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ECOLOGICAL AND ECONOMICAL BALANCE

LEADING THE WAY
IN ENVIRONMENTAL
MANAGEMENT

HIGH ENVIRONMENTAL VALUES REPORT

HILLIER PARADE, SOUTH WEST ROCKS

NOVEMBER 2023

Contents

List of Tables

List of Figures

List of Photos

Document Control Page

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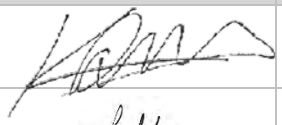
Karl Robertson	BAAS21022		7/12/2023
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Executive Summary

This report has assessed the ecological values of land within the entirety of Lot 17, majority of Lot 11 and a small portion of Lot 16 DP1277594 (the Subject Land) South West Rocks which is an area of 14.01 ha. This assessment is to inform the rezoning planning proposal for land currently zoned RU2 and has been requested by the *NSW Biodiversity Conservation Department.*

This assessment considers all relevant documentation that has been published for the Subject Land. Existing information has concluded that three Plant Community Types (PCTs) exist within the Subject Land in varying condition states. None of these PCTs conform to TECs listed under the *NSW BC Act 2016* or *EPBC Act* 1999.

Part of the land currently zone RU2 is mapped as Secondary 'A' Koala Habitat under KSC CKPoM. Targeted survey has revealed that the area does not conform to Core Koala Habitat in accordance with the Kempsey CKPoM. The current extent of Potential Koala Habitat mapped with in RU2 zone equates to 4.5 ha. The CKPoM requires impacts to mapped koala habitat to be offset at a ratio of 2:1, requiring an area of 9 ha in total to be offset. The land proposed for offsetting of impacts to mapped Secondary A Potential Koala Habitat is mapped "like for like" within the CKPoM (both Secondary A). Similarly, the proposed offsetting area for revegetation is currently mapped as 'other' under the CKPoM, however the proposed species for replanting (*E. robusta*) is described as occurring within the PCT and has been observed growing naturally in identical ASL within 1km of the Subject Land. Specific detail around koala offsetting locations and species can be found in Section 4.3

An assessment of ecological values of the broader Rezoning Footprint has been made in accordance with the criteria listed in Attachment 2 of the *Biodiversity Conservation Department (BCD) NE Branch Steps for Assessing Biodiversity in Planning Proposals*. The results of the assessment is summarised below:

- **Biodiversity Values Mapping:** Whilst limited Swift Parrot Foraging habitat exists within the Rezoning Footprint (23 Swamp Mahogany's) an overwhelming majority of the BV mapping does not reflect habitat that would be utilised by the species. As such a BV mapping review has been submitted to amend the mapped extent. Further information can be found in section 1.1 of Table 14 and Appendix 3.
- **Over cleared Vegetation Types:** none of the vegetation types within the Rezoning Footprint are over cleared. Further detail found in section 2.1 of Table 14
- **Vegetation in Over-cleared landscapes:** The Macleay Alluvial Plains on which the Rezoning Footprint exists is not considered an over cleared landscape. Further detail in Section 2.2 of Table 14.
- **Threatened Ecological Communities:** PCTs present on the Subject Land did not conform to the Final Determination (*BC Act*) or the Conservation Advice – Key Diagnostics (*EPBC Act*) for Coastal Swamp Sclerophyll TEC due primarily to edaphic features and infrequency of inundation respectively. Further detail found in section 2.3 in Table 14 and Section 3.3 and Section 4.6.
- **Key habitat for threatened species under the BC Act:** A number of threatened

species have been recorded on the subject land out side of the Rezoning Area. Habitat within the Rezoning Area is degraded with improved habitat to the east of the Subject Land. It is unlikely the vegetation in the Rezoning Area constitutes key habitat for any threatened species. The Wallum Froglet has also been recorded on the Subject Land and specific habitat study undertaken. Buffers have been included in the previous C2 zone planning and as such accommodate Key Habitat for the Wallum Froglet Further detail in section 3.1 of Table 14 and Appendix 1.

- **National Important Wetlands:** No National Important Wetlands were mapped within the Rezoning Footprint**.**
- **Vulnerable estuaries and ICOLLS:** There are no vulnerable estuaries or ICOLLS present in the Rezoning Area.
- **Karst Landscapes:** No Karsts are recorded in the Locality.
- **Sits of Geological Significance:** No sites of geological significance are present in the locality.

It is understood that Lot 16 and Lot 17 DP1277594 are in the same ownership and the proposed revegetated Koala habitat offset areas would be secured on title through a VPA and ultimate dedication of the land to council of the National Parks Estate, or, under an 88B restriction on use requiring landowner management of the area in accordance with a Vegetation Management Plan

In conclusion, the rezoning footprint assessed within this HEV Report contains a variety of lower order biodiversity values. None of these values meet the key consideration criteria for High Environmental Value Land (as described within Attachment 2 of the BCD NE Branch Steps for Assessing Biodiversity in Planning Proposals). Those matters which may marginally occur within the Rezoning Footprint (such as foraging habitat for the Swift Parrot) will see a significant increase in available resource through the statutory offsetting provisions of the Kempsey CKPoM, ultimately resulting in a Net beneficial outcome for the species. As such, it is deemed appropriate that the land is rezoned from RU2 to R1 from a perspective of biodiversity.

Abbreviations

Table 1: List of abbreviations within report

BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
Bio Aus.	Biodiversity Australia
BOS	Biodiversity Offset Scheme
DAWE	Department of Agriculture, Water and the Environment
DEC	Department of Environment and Conservation
DPE	Department of Planning and Environment
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities
EEC	Endangered Ecological Community
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GIS	Geographic Information System
HBT	Hollow-bearing Tree
KFT	Koala Food Tree
KPoM	Koala Plan of Management
KTP	Key Threatening Process
LGA	Local Government Area
MNES	Matter of National Environmental Significance
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PIR	Passive Infrared Camera
SAII	Serious and Irreversibly Impacts
SAT	Spot Assessment Technique
SEPP	*State Environmental Protection Policy*
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VMP	Vegetation Management Plan

STAGE 1 - BIODIVERSITY ASSESSMENT

1. Introduction

Biodiversity Australia (Bio Aus) was requested to undertake an assessment of the High Environmental Value (HEV) land for a planning proposal.

1.1 Land Zoning

The property exists under multiple land use zones with land in the east zoned as R1 General residential, Land in the West zoned RU2 – Rural Landscape and in the south C2 – Environmental Conservation.

For the purposes of this HEV Report the Rezoning Footprint is limited to the area of RU2 zoning, this is defined in depth within the descriptions below and shown within Figure 2. The area contains areas mapped as Biodiversity Values in the West, North and south of Subject Land. These mapped areas relate to Important Habitat for the Swift Parrot An application has been submitted to review the extent of BV mapping within the Subject Land to better reflect appropriate habitat for the species.

1.2 Definitions Used in the Report

This report uses the following key definitions:

- **Assessment Area:** includes the subject land and the area of land within the 1500 m buffer zone surrounding the subject land (or 500 m buffer zone for linear proposals) that is determined as per Subsection 3.1.2 of the BAM. Figure 3: Biodiversity Values map
- **Subject Land:** Lot 11, 16 & 17 DP1277594, South West Rocks which is an area of 69.5ha. Figure 2: Subject Land, Land Zones and photo locations
- **Rezoning Footprint:** the entirety of Lot 17, majority of Lot 11 and a small portion of Lot 16 DP1277594 South West Rocks which is an area of 14.01 ha. Figure 2: Subject Land, Development Footprint and photo locations

These definitions are in line with the BAM Methodology, which provides further explanation of definitions and legal terms that may be used in this report.

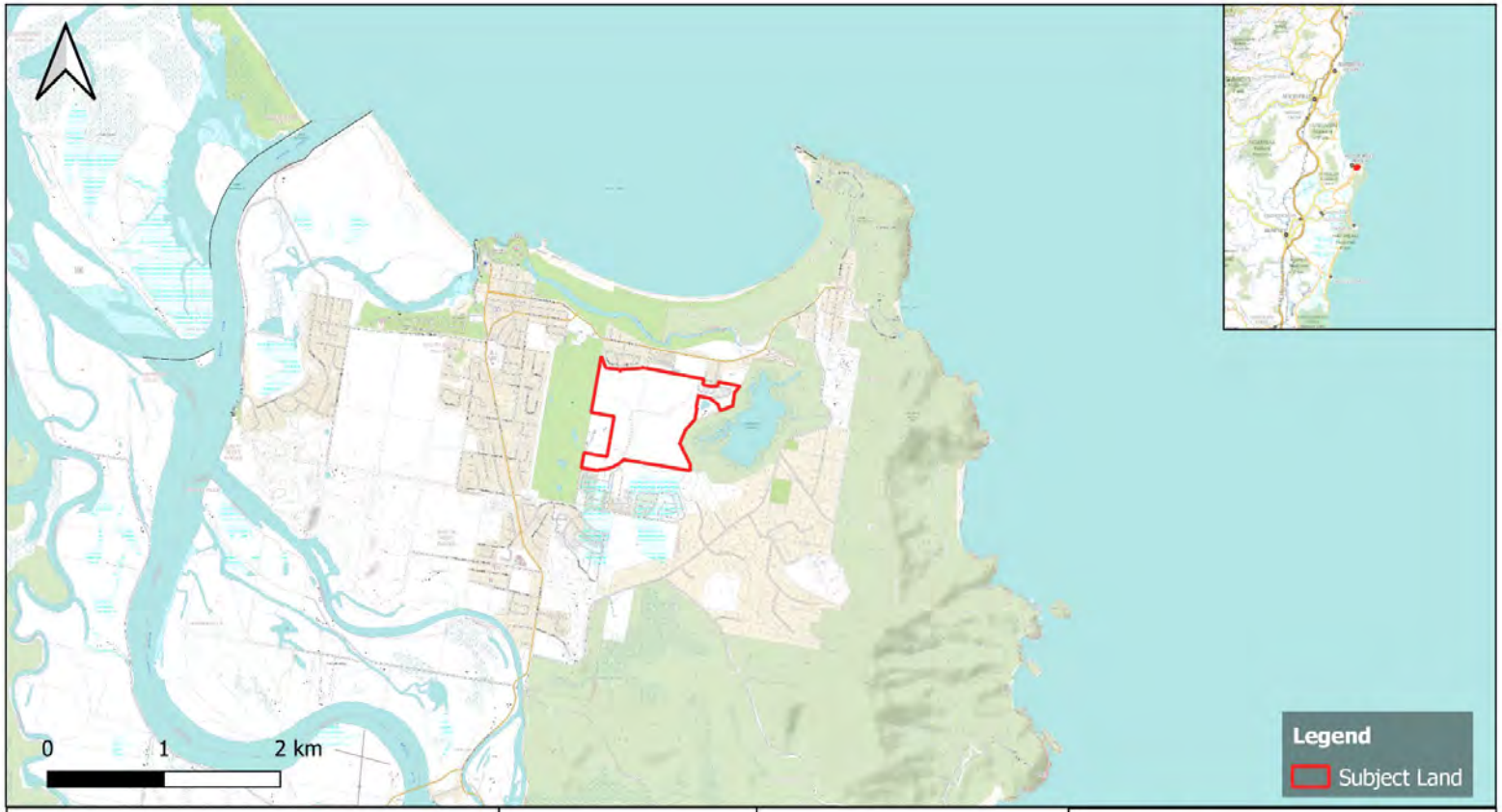
1.3 Description of the Subject Land

The Subject Land comprises a 69.5ha property located off Hillier, South West Rocks. It is formally described as Lots 11, 16 & 17 DP1277594. The entirety of Subject Land is zoned RU2, R1 and C2. The context of the Subject Land is provided within Figure 1: Location of the Subject Land

The Subject Land consists of three vegetation communities with one existing in multiple integrity conditions due to historical land use and ongoing maintenance. Uses of the Subject Land are limited currently with areas subject to frequent slashing. The Subject Land was previously cleared to be utilised as native forestry with planted vegetation still present. Vegetation in the North East and South have remained largely unimpacted and are of a moderate to good condition The Subject Land is bordered by South West Rocks Golf Course to the west, Nature reserve to the east and residential land to the north and south.

Figure 2 and the subsequent Photo Plate 1: Images of the Subject Land depict the condition of uses of the Subject Land.

Figure 1: Location of the Subject Land



This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: KR	Figure Name: Subject Land Location	Biodiversity AUSTRALIA
	Drawn by: LW	Location: Hillier Parade, South West Rocks	
	Date: November 2022	Client: King & Campbell	Job Number: ENS6093 / Spatial Reference: MGA Zone 55/GDA 2020 / Scale: 1:51000

Figure 2: Subject Land, Land Zones and photo locations

This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: KR	Figure Name: Subject Land Location & Zoning	Biodiversity AUSTRALIA
	Drawn by: LW	Location: Hillier Parade, South West Rocks	
	Date: November 2022	Client: King & Campbell	Job Number: ENS6093 / Spatial Reference: MGA Zone 55/GDA 2020 / Scale: 1:51000

Photo Plate 1: Images of the Subject Land


Photo 13


Photo 16


Photo 19


Photo 21


Photo 22


Photo 25


Photo 26


Photo 27


Photo 29


Photo 30

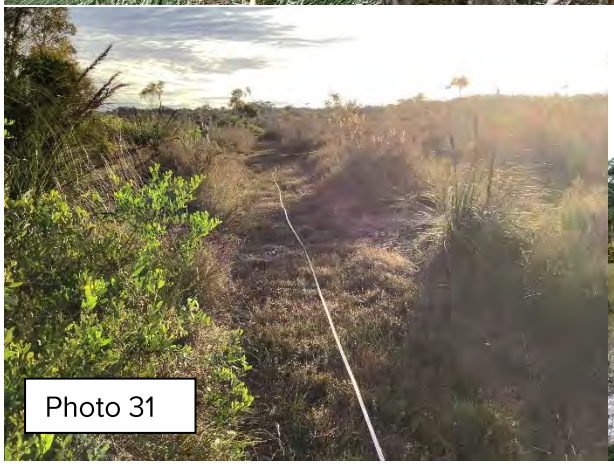


Photo 31

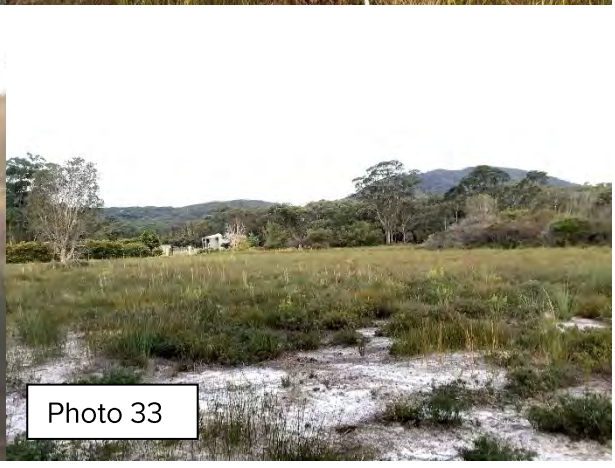


Photo 33

1.4 Information Sources

The following databases and Geographic Information System (GIS) layers were searched/obtained:

- Department of Climate Change, Energy, the Environment and Water - Protected Matters Search Tool (DCCEEW 2023a).
- Department of Climate Change, Energy, the Environment and Water - MNES SPRAT Profiles (DCCEEW 2023b).
- Office of Environment and Heritage Threatened Biodiversity Data Collection (OEH 2023).
- NSW Department of Planning and Environment - BioNet/Atlas of Wildlife (DPE 2023a).
- NSW Department of Planning and Environment - Regional Corridors and Key Habitat Mapping (DPE 2023b).
- NSW Department of Planning, Industry and Environment - Biodiversity Values Map and Threshold Tool and digital data layer (DPE 2022c).
- NSW Department of Planning, Industry and Environment – BioNet Vegetation Classification (DPE 2023)
- NSW Department of Planning and Environment – NSW Mitchell Landscapes (DPE 2023d).
- NSW Department of Planning and Environment – State Vegetation Type Mapping (DPE 2023e).
- South West Rocks LES Investigations Detailed Wallum Froglet Study (Connell Wagner PTY LTD 2007)
- Literature Review, Preliminary Ecological Assessment – RU2 Rezoning Planning Proposal – Wainbar Avenue, South West Rocks (Biodiversity Australia, 2021). Provided in Appendix 5.
- Coastal Quaternary Geology – North and South Coast of NSW digital data layer (Troedson & Hashimoto 2008)

2. Site Context

2.1.1 IBRA Bioregions and Subregions

The Subject Land is located in the NSW North Coast IBRA region and the Macleay Hastings subregion. The Subject Land is located on the Macleay Coastal Alluvial Plains Mitchell Landscape.

2.1.2 Native Vegetation Extent in 1500m Buffer

A 1500 m buffer was established around the Subject Land (Figure 4: Subject Land context). Analysis with GIS has determined that there is approximately 44 % native vegetation cover within 1500 m buffer.

2.1.3 Cleared Areas

Cleared areas occur both on and adjacent to the Subject Land. Part of the Subject Land has been cleared, is regularly slashed since being cleared for native forestry.

2.1.4 Landscape Features

The following table shows the presence of landscape features on the Subject Land and provides details of these features if present.

Table 2: Landscape features present

Feature	Present on site?	Present on adjoining land?	Description
Rivers and Streams	Yes	Yes	An unnamed creek is present in the south of the Subject Land running West to East and terminating in Saltwater Lagoon to the East.
Important Local Wetlands	No	Yes	Coastal Wetland SEPP is mapped adjacent to the site along the eastern boundary of the Subject Land. the Development Footprint boundary adjoins the proximity buffer to mapped coastal wetland, Saltwater Lagoon. The DAWE Protected Matters Search Tool – interactive map was consulted and shows that the Clybucca Creek Estuary occurs approximately 0.7km west of the Subject Land which is a listed Nationally Important Wetland. Some parts of Lot 16 are also mapped, however this is considered to be incorrect.
Connectivity Features	Yes	Yes	The Subject Land falls within mapped regional wildlife corridors as per Figure 5: Regional connectivity. On a more local scale, forested areas occur on land to the east which provide connectivity for flora and fauna along Saltwater Creek and moving north to south along the coast. The Development Footprint itself is partially cleared and therefore its connectivity value is reduced.

Feature	Present on site?	Present on adjoining land?	Description
Areas of Geological Significance (e.g. karst, caves, crevices, cliffs)	No	No	There were no Karsts or Caves mapped on the Subject Land or on land adjacent to the property
Soil Hazard Features	No	No	The Subject Land is mapped as L4 stating a low probability to risk of Acid Sulphate Soils.

2.1.5 Biodiversity Values

The Subject Land contains areas mapped as Biodiversity Values (Figure 3: Biodiversity Values map). This area corresponds to a defined “important area” for the Swift Parrot. Much of the mapped land has been impacted by historically clearing as such a formal review of the mapping has been undertaken. The full Biodiversity Map Review Report is provided in Appendix 3.

Figure 3: Biodiversity Values map

This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: KR	Figure Name: Biodiverstiy Values Mapping	Biodiversity AUSTRALIA	
	Drawn by: LW	Location: Hillier Parade, South West Rocks		
	Date: November 2023	Client: King & Campbell	Job Number: ENS6093	Spatial Reference: MGA Zone 55/GDA 2020 Scale: 1:8000

Figure 4: Subject Land context

This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: KR	Figure Name: Subject Land Context	Biodiversity AUSTRALIA
	Drawn by: LW	Location: Hillier Parade, South West Rocks	
	Date: November 2023	Client: King & Campbell	Job Number: ENS6093 / Spatial Reference: MGA Zone 55/GDA 2020 / Scale: 1:35000

Figure 5: Regional connectivity

This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: KR	Figure Name: Reigonal Connectivity	Biodiversity AUSTRALIA
	Drawn by: LW	Location: Hillier Parade, South West Rocks	
	Date: November 2023	Client: King & Campbell	Job Number: ENS6093 / Spatial Reference: MGA Zone 55/GDA 2020 / Scale: 1:35000

3. Native Vegetation

3.1 Survey Methods

Vegetation surveys were undertaken by BAM accredited assessors and Botanists in June of 2022. The NSW State Vegetation Type Mapping layer was initially consulted to guide plot locations and potential vegetation. The results of this search are shown in Figure 6. The following PCTs were mapped on the Subject Land;

- PCT 3549 – Lower North Sandplain Heathy Forest
- PCT 3906 – Northern Lowland Clay Wet Heath
- PCT 4004 – Northern Melaleuca quinquenervia Swamp Forest
- PCT 4020 – Coastal Creek flat Layered Grass-sedge Swamp Forest

3.1.1 Vegetation Integrity Survey

Vegetation integrity survey plots were undertaken within the development footprint as per the BAM methodology. Each consists of a 20x20 metre plot in which floristic composition and structural attributes are collected, and a 20x50 metre plot which collects ecosystem function attributes.

The vegetation within the Subject Land has been disturbed over many years and as such the structure of the Vegetation Zones varies substantially. The establishment of multiple Vegetation Zones is one method which has been adopted to categorise these differences in structure and integrity. In this circumstance, the method for locating plots was used as an additional measure to ensure that plot data was representative of the numerous Vegetation Zones throughout the Subject Land. Randomly allocated locations and bearings were not considered appropriate as it allowed a high probability of misrepresenting the Vegetation Zone. For this reason, plots were located to ensure they capture the attributes relevant to that Vegetation Zone as per Section 4.3.4 (3)(c) of the BAM 2020. Section 4.3.4 (5) was also fully considered and adopted in this process. In some circumstances, this meant that plot locations fell within 50m of ecotones.

The following information was collected within each vegetation plot:

- Observer, location and date;
- Plot dimensions and orientation;
- Photographic record of vegetation;
- Vegetation Class and Plant Community Type (PCT);
- Physical features and disturbance history;
- Full flora list;
- Growth-form cover and abundance of each species;
- Exotic and High Threat Exotic (HTE) plant cover;
- Number of large trees;
- Recruitment;
- Presence of hollow-bearing trees;
- Length of logs; and
- Litter cover

The field data collected was tallied and input into the BAM calculator to determine a vegetation integrity score for each vegetation zone.

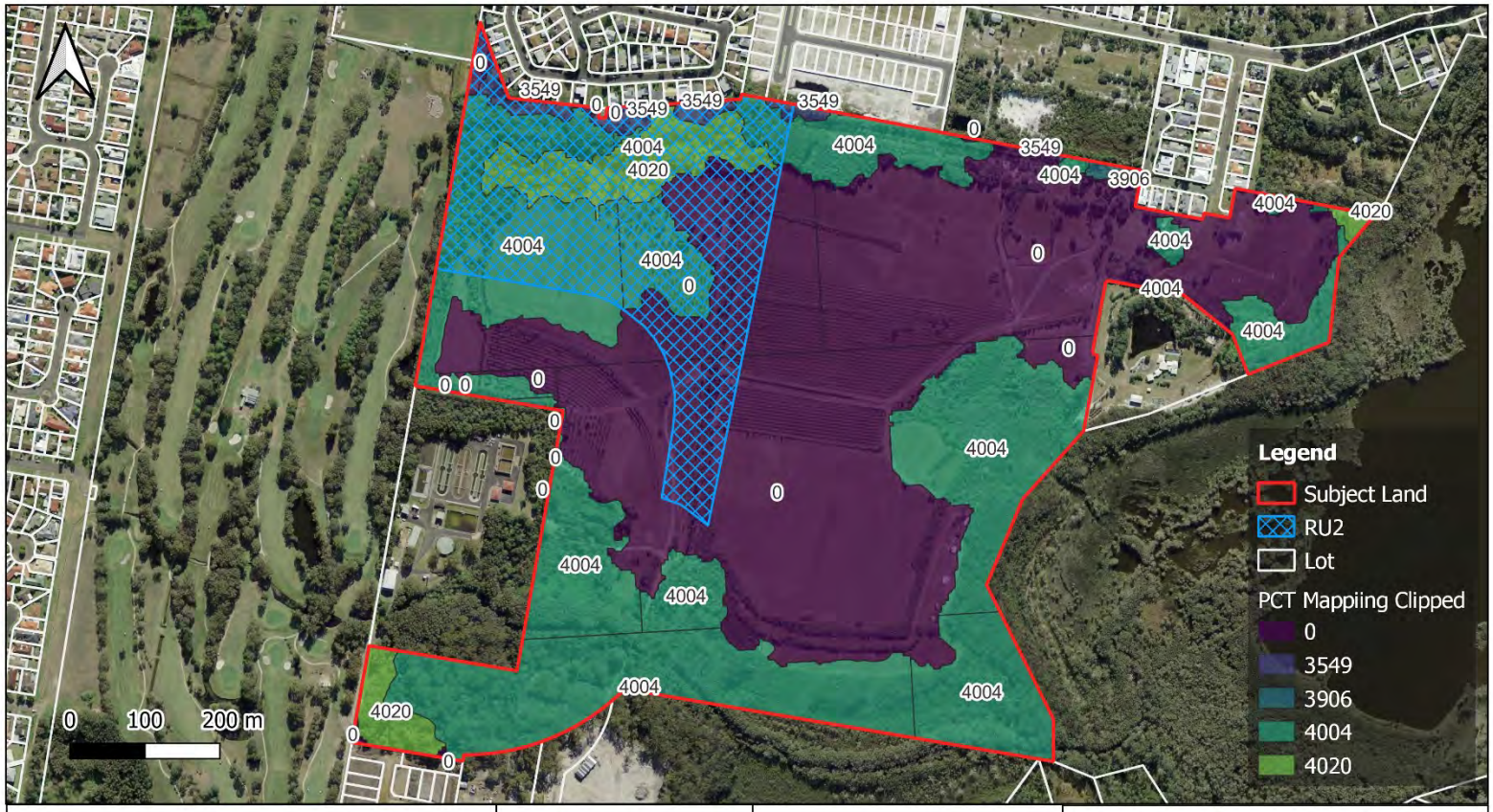
3.1.2 Vegetation Classification and Mapping

Vegetation communities were sampled by the vegetation plots described above and through walking random meander transects. The random meander transects also allowed for a more comprehensive flora inventory on the Subject Land.

The vegetation communities were described from data collected during the vegetation plots and random meander transect studies. The vegetation classification is based on the NSW Plant Community Type (PCT) Classification.

Plant species were identified to species or subspecies level and nomenclature conforms to that currently recognised by the Royal Botanic Gardens and follows Harden and PlantNET for changes since Harden.

Figure 6: NSW State Vegetation Type Mapping (SEED Portal)



This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: KR	Figure Name: NSW SVTM	Biodiversity AUSTRALIA	
	Drawn by: LW	Location: Hillier Parade, South West Rocks		
	Date: November 2023	Client: King & Campbell	Job Number: ENS6093	Spatial Reference: MGA Zone 55/GDA 2020 Scale: 1:8000

3.2 Plant Community Type Descriptions

Native vegetation is dominant across the Subject Land with cleared areas still exhibiting high cover and abundance of native species. Vegetation survey determined the following PCTs were present within the Subject Land;

- PCT 3573 Northern Scribbly Gum – Bloodwood Forest,
- PCT 3915 Northern Sands Prickly Tea-tree Wet Shrubland, &
- PCT 4004 Northern *Melaleuca quinquenervia* Swamp Forest.

The following provides a description of the native vegetation within the Subject Land that will be affected by the proposal. As described below, three Plant Community. No PCTs conform to the associated Threatened Ecological Communities (TECs) or Endangered Ecological Communities (EECs) under the *EPBC Act* or *BC Act*.

These communities were largely consistent with the broad Vegetation Types which had the Subject Land mapped. Vegetation zones have been more accurately mapped following the field verifications. These are presented within Figure 8: Vegetation zones and survey locations.

A description of the vegetation communities sampled is provided below, with photos following. A map of the vegetation communities is provided in Figure 8: Vegetation zones and survey locations.

3.2.1 Community 1

Table 3: Vegetation community 1 description

Vegetation Community (NSW PCT)	PCT 3573 Northern Scribbly Gum – Bloodwood Forest
Vegetation Formation	KF_CH5B Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation Class	North Coast Dry Sclerophyll Forests
Land Zones & Area	Moderate – 8.1
EEC Status	N/A
Clearing Extent	12.95%
Vegetation Zones	1
Number of Plots	4
Location	Occurs along the south west and south east section.
Description	**Canopy:** Structure and Species: A tall open forest with *Eucalyptus racemosa* and *Corymbia gummifera* the most common canopy forming species in areas mapped in the west. Areas mapped in the east had the stringy bark *E. planchoniana* as the dominant canopy forming species. Other species recorded in the understory included *Endiandra sieberi, Banksia aemula, Melaleuca quinquenervia, Pittosporum undulatum and Banksia integrifolia* **Shrub layer:** Structure and Species: The shrub layer was typically sparse though relatively speciose. Species included *Monotoca scoparia, Leptospermum polygalifolium, Melaleuca nodosa, Hibbertia scandens, Leptospermum liversidgei* and *Tetratheca thymifolia* **Ground layer:** Structure and Species: The ground stratum was typically sparse with sedges, grasses and ferns being the most common families present. Species most commonly recorded included; *Anisopogon avenaceus, Baumea teretifolia, Caustis recurvata Baloskion tetraphyllus, Pteridium esculentum Lindsea incisa and Gahnia sieberiana*

	a) Lianas, scramblers, etc.: *Cassytha glabella* may sometimes occur.
Condition	This community was largely undisturbed with low weed cover and minimal historical clearing. Canopy strata was largely intact across the mapped extent. Shrub and ground layer was diverse in areas however cover was typically low.

Photo Plate 2: Community 1 at survey plot 15

3.2.2 Community 2

Table 4: Vegetation community 2 description

Vegetation Community (NSW PCT)	PCT 3915 Northern Sand Prickly Tea-tree Wet Shrubland
Vegetation Formation	KF_CH8 Freshwater Wetland
Vegetation Class	Coastal Swamp Heath
Land Zones & Area	High – 5.7 ha Moderate – 17.3 Low – 20.0
EEC Status	The PCT is associated with the TEC *Sydney Freshwater Wetlands in the Sydney Basin Bioregion.* The PCT does not conform the final determination of this TEC as the Subject Landa exists outside of the appropriate IBRA region.
Clearing Extent	47.30 % however the accuracy of the estimate has not been assessed.
Vegetation Zones	3
Number of Plots	12
Location and Area	Over the majority of the central section of the Subject Land
Description	**Canopy:** Structure and Species: The PCT exists in a number of integrity states one of which lacks canopy structure entirely though regrowth of canopy species is present. Within high and moderate integrity zones the PCT had *Melaleuca quinquenervia* as a scattered emergent with *Banksia ericifolia, Acacia maidenii, Acacia sophorae, Leptospermum polygalifolium, Callistemon pachyphyllus* and *Leptospermum liversidgei* forming a low canopy. **Shrub layer:** Structure and Species: The shrub layer was diverse with *Leptospermum juniperinum, Epacris pulchella, Pimelea linearifolia, Dillwynia retorta, Melaleuca nodosa, Boronia pinnatum tetra theca thymifolia, Monotoca scoparia, Brachyloma daphnoides* and *Conospermum ericifolium* present **Ground layer:** Structure and Species: The ground layer was dense in disturbed areas with many shrub species being present in the ground layer. Species with greatest cover in disturbed areas included *Baloskion tetraphyllum, Bauera capitata, Caustis recurvata, Baumea juncea and Boronia ledifolia.* Other species recorded in the ground layer included *Gonocarpus micranthus, Selaginella uliginosa, Eurychordata complanata, juncus planifolius, Banksia ericifolia, Epacris purpurascens, Melaleuca quinquenervia* and *Xyris operculata* **Lianas, scramblers, etc.:** *absent*
Condition	This community occurred in three clear condition states. Low, being regularly maintained via slashing had a relatively high species diversity though lacked structural complexity, Moderate, was defined as being in a state of regrowth and exhibited many of the associated species however lacked structural components though some canopy was present and High where the zone was relatively unimpacted by historical clearing.

Photo Plate 3: Community 2 at survey plot 6

Photo Plate 4: Community 2 at survey plot 18

Photo Plate 5: Community 2 at survey plot 19

Community 3

Table 5: Vegetation community 3 description

Vegetation Community (NSW PCT)	PCT 4004 Northern Melaleuca quinquenervia Swamp Forest.
Vegetation Formation	KF_CH9 Forested Wetlands;
Vegetation Class	Coastal Swamp Forests;
Land Zones & Area	Moderate – 10.0 ha
EEC Status	PCT is associated with the *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregion* as listed under the NSW *BC Act 2016*. The PCT does not conform to the final determination for the TEC as the community does not exist on soils of alluvial origin. Further detail is provided in the sections below.
Clearing Extent	32.84% however the accuracy of the estimate has not been assessed.
Vegetation Zones	1
Number of Plots	6
Location and Area	Occurs in the north western corner and a smaller patch in the south west.
Description	**Canopy:** Structure and Species: An Open Swamp Forest dominated by Paperbark (*Melaleuca quinquenervia*) with isolated Swamp Mahogany (*Eucalyptus robusta*) present. Height ranges from 18-25 m. **Understorey** Structure and Species: The mid-stratum included *Acacia maidenii, Glochidion ferdinandi* and *Melicope elleryana* **Shrub layer:** Structure and Species: The shrub layer was typically low in cover and diversity due to dominance of canopy. Species present in the shrub layer included *Callistemon pachyphyllus, Leptospermum liversidgei, Acacia sophorae, Melaleuca thymifolia and Persoonia media.* **Ground layer:** Structure and Species: The ground stratum is typically dense and is characteristically a mix of grasses; sedges and ferns. Areas were dominated by ferns such as *Histiopteris incisa* and Gleichenia dicarpa. Other ferns present included *Hypolepis muelleri, Blechnum indicum and Nephrolepis cordifolia.* Othe species recorded across the mapped extent included *Baumea teretifolia, Gahnia sieberiana, Carex appressa, Baumea articulata phragmites australis Cassytha glabella and Baumea juncea* **Lianas, scramblers, etc.:** *Pandorea pandorana* and *Parsonsia straminea* were recorded.
Condition	This community exists in a single vegetation integrity with understory areas showing signs of previous impact.
EEC Assessment	This PCT floristically conforms to the nominated EEC "Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions". However, as per the NSW Scientific Committees – Final Determination for the EEC, this EEC requires *humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains.* The quaternary geology of the Subject Land is from Marine provenance (Figure 7: Quaternary geology) and as such the Vegetation Zone does not meet t the geomorphological criteria of the EEC. In conclusion, the Vegetation Zone associated with PCT4004 conforms to the floristic composition of the EEC however the geology is incorrect. As such, the community is not consistent with the "Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions". This is discussed in more depth within section 3.3.

Photo Plate 6: Community 3 at plot 1

3.2.3 Justification of PCT and Vegetation Zones

Justification of the PCTs selected is given in the Tables below.

Table 6. Justification of PCT 3573 selection

PCT 3573 Northern Scribbly Gum – Bloodwood Forest		
Justification of PCT selection	**Search Term**	**Selection**
	IBRA Bioregion	NSW North Coast
	IBRA Sub-region	Macleay Hastings
	Vegetation Formation	Dry Sclerophyll Forests (Shrubby sub formation)
	Upper Stratum Species	*Eucalyptus signata, Corymbia gummifera*
	Long List	Returned PCTs 3544, 3548, 3549, 3551, 3552, 3553, 3561, 3573, 3574 & 3576.
		PCTs 3544, 3551, & 3552 were removed as *E. pilularis* was absent from the canopy. PCT 3576 was excluded as the community occurs on granite substrate which was not analogous with the geology of the Subject Land.
	Canopy species	*Eucalyptus planchoniana*

	Short List	Returned a short list of two PCTs 3561 & 3753
	Selection	PCT 3561 was excluded as the community present did not include *Angophora woodsiana.* It was concluded the PCT 3573 to be the most reasonable match describing the community on the Subject Land.

Table 7. Justification of PCT 3915 selection

PCT 3915 Northern Sands Prickly Tea-tree Wet Shrubland		
Justification of PCT selection	**Search Term**	**Selection**
	IBRA Bioregion	NSW North Coast
	IBRA Sub-region	Macleay Manning
	Vegetation Formation	Freshwater Wetland
	Upper Stratum Species	*Melaleuca quinquenervia*
	Long List	Returned PCTs 3900, 3906, 3907, 3908, 3912, 3913, 3915, 3968
		PCT 3900, 3906, 3907, 3908,3912, and 3913 were excluded as the community on the subject land did not exhibit the diversity of canopy species in areas of intact vegetation.
	Short List	PCTs 3915 & 3968
	Selection	The floristic description of PCT 3915 describes the community on the Subject Land more adequately than PCT 3968. Hence PCT 3915 was selected.

Table 8. Justification of PCT 4004 selection

PCT 4004 Northern Melaleuca quinquenervia Swamp Forest		
Justification of PCT selection	**Search Term**	**Selection**
	IBRA Bioregion	NSW North Coast
	IBRA Sub-region	Manning Macleay
	Vegetation Formation	Forested Wetland
	Upper Stratum Species	*Melaleuca quinquenervia & Eucalyptus robusta*
	Long List	Returned PCTs 3986, 3998, 4000, 4004, 4006, 4007, 4008, 4020, 4028, 4034, 4042, 4044, 4047, 4048
		PCTs 4028, 4034 and 4048 were excluded as the community did not contain *Casuarina glauca.*
	Ground Stratum Species	*Histiopteris incisa*
	Short List	PCTs 3986, 3998, 4004, 4006, 4008 and 4020
	Selection	PCTs 3986, 3998, 4008 were excluded as these PCTs list *Eucalyptus robusta* as a dominant species. The

		community had isolated occurrences of the species however was dominated by *Melaleuca quinquenervia.* PCT 4020 was excluded as the community did not occur on a creekflat. PCT 4006 was excluded was Saw-sedge was not a notable part of the groundlayer. PCT 4004 was selected as the most suitable selection for the community on the Subject Land

3.3 Endangered Ecological Community Assessment – BC Act

Biodiversity Australia accredited assessor Karl Robertson (BAAS21022) assessed the areas of Tall Open Swamp Sclerophyll Forest as not conforming to the to the Swamp Sclerophyll EEC on the basis that the edaphic descriptors listed by the NSW Scientific Committee 2011 – Final Determination. This final determination provides a detailed description of the three requirements needed to define an ecological community (Preston & Adam 2004a). Namely;

- The constituents of a community must be species – The species which are indicative of the community are clearly listed within Part 1 of the Final Determination.
- The species need to be brought together into an assemblage – The assemblage of the community is described within, but not limited to Part 2 of the Final Determination,
- The assemblage of species must occupy a particular area – The particular area by which the assemblage must occupy is described within Part 1 of the Final Determination. It states, "*Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions is the name given to the ecological community associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Floodplains are level landform patterns on which there may be active erosion and aggradation by channelled and overbank stream flow with an average recurrence interval of 100 years or less (adapted from Speight 1990). Swamp Sclerophyll Forest on Coastal Floodplains generally occurs below 20 m (though sometimes up to 50 m) elevation, often on small floodplains or where the larger floodplains adjoin lithic substrates or coastal sand plains in the NSW North Coast, Sydney Basin and South East Corner bioregions. .....The composition of Swamp Sclerophyll Forest on Coastal Floodplains is primarily determined by the frequency and duration of waterlogging and the texture, salinity nutrient and moisture content of the soil.*"

Dimitri Young – Senior Team Leader Planning, North East Branch provided commentary around the classification of Swamp Mahogany/Broad-leaved Paperbark forest vegetation as an EEC. This was subsequently followed by additional commentary within attachment 1 which relies on the *NSW Threatened Species Scientific Committee guidelines for interpreting listing criteria for species, populations and ecological communities under the NSW Biodiversity Conservation Act 2016 (TSSC 2020):* Dimitri has relied on a guideline which contradicts the descriptions provided within the Final Determinations which is legally incorrect in accordance with the **Newcastle & Hunter Valley Speleological Society Inc v Upper Hunter Shire Council and Stoneco Pty Limited [2010] NSWLEC 48.** The case found the following

'42' Resolution of these competing positions requires interpretation of the Final Determination and the application of this interpretation to the Project Site. This flows from the definition of "endangered ecological community". An "endangered ecological community" is defined in s 4 of the TSC Act as meaning an ecological community specified in Part 3 of Schedule 1 of the TSC Act. Part 3 of Schedule 1 specifies the listed endangered ecological communities to date,

including the White Box EEC, adding after each of the words "(as described in the Final Determination of the Scientific Committee to list the ecological community)". Hence, the inquiry as to whether the vegetation on the Project Site comprises the White Box EEC must be directed to the description in the Final Determination of the Scientific Committee to list the White Box EEC as an EEC.

'43' Documents not referred to in the Final Determination of the Scientific Committee to list White Box EEC, such as the White Box Yellow Box Blakely's Red Gum Woodland (Box-Gum Woodland) Identification Guidelines or the White Box – Yellow Box – Blakely's Red Gum (Box-Gum) Woodland fact-sheet, both produced by the NSW National Parks and Wildlife Service, are useful sources of information. ***However, where the documents describe the White Box EEC in different terms to the description in the Final Determination, or use of the documents results in different outcomes than the outcome that would arise from application of the description in the Final Determination, the description in the Final Determination must prevail."***

This case law is also backed by guidance released from the DPE titled – Updating BioNet Plant Community Types: Eastern NSW PCT Classifications Version 1.1 (2022) which prevails the TSSC 2020 document stated by Dimitri. The DPE guidance states the following within Appendix E.

Appendix E: Guiding principles applied to the process of identifying relationships between PCTs of eastern NSW and TECs

A Preamble

1. A Final Determination (FD) made by the NSW Threatened Species Scientific Committee constitutes the legal definition of a threatened ecological community (TEC), and is not superseded by any advice, publication or opinion (other than a revised Determination or a judgement of the courts). Applied interpretations of a TEC do not influence its definition unless confirmed through legal processes.
2. A TEC is an assemblage of species in an area. A site cannot be diagnosed as representing an example of a TEC unless it occurs within the geographic boundaries stated in the Final Determination, and some component of the species assemblage listed in the Determination is found to be present.
3. The principles outlined in this document are relevant to the interpretation of Final Determinations for the purposes of the Department of Planning and Environment (DPE) operational needs to relate Approved plant community types (PCTs) included in the PCT master list. Other interpretations may exist elsewhere that may result in independent and alternative outcomes. Additional information in the form of published TEC interpretations and mapping may be considered but does not supersede the FD or constrain the interpretations of DPE.

The above shows both case law and recent DPE guidance that demonstrates that in no situation does advice supersede the Final Determinations.

In addition to the above, the following case law also supports the position that an EEC must meet both the floristic and edaphic criteria of the Final Determinations to be defined as the EEC.

Gales Holdings Pty Limited v Tweed Shire Council [2008] NSWLEC 209 – which describes edaphic, topographical and location criteria of the EEC according to the FD and how these are essential for categorising the EEC. This case is acutely similar to the current Subject Land in that;

- The soils do not satisfy the edaphic criteria as soils are clearly from marine origins. Based on GIS data layers, ESpade data.
- The Subject Land does not satisfy the topographical criteria of being on alluvial flats and drainage lines as no drainage lines occur within the lower areas of the Subject Land,

This case law concluded that "*For these reasons, I am not satisfied that vegetation community 6 can be properly characterised as comprising Swamp Sclerophyll Forest endangered ecological community.*"

Kyluk Pty Ltd v Chief Executive, Office of Environment and Heritage [2013] NSWCCA 114 – this case further enforces the characteristics of flora, transitional soil and location are interlinked and must be present. And concludes "*I conclude that there are no "dominant" or "subordinate" characteristics in the final determination.* ***The characteristics of flora, transitional soil and location are interlinked and must be present.*** *A similar analysis was adopted in Gale Holdings Pty Limited v Tweed Shire Council [2008] NSWLEC 209, a civil case, where Preston CJ considered the final determination of the Scientific Committee to list Freshwater Wetlands. "*

From the information presented above, it is outstandingly clear that both floristic and edaphic criteria are both critical components when determining the Swamp Sclerophyll EEC. This position, in full has been presented to the BCD on many occasions, yet the BCD elect to continue to maintain an entirely subjective position that ignores legal precent and guidance from their own department. The ecologists asks, once again, that the BCD align their position with the Final Determinations.

3.4 Vegetation Integrity Assessment

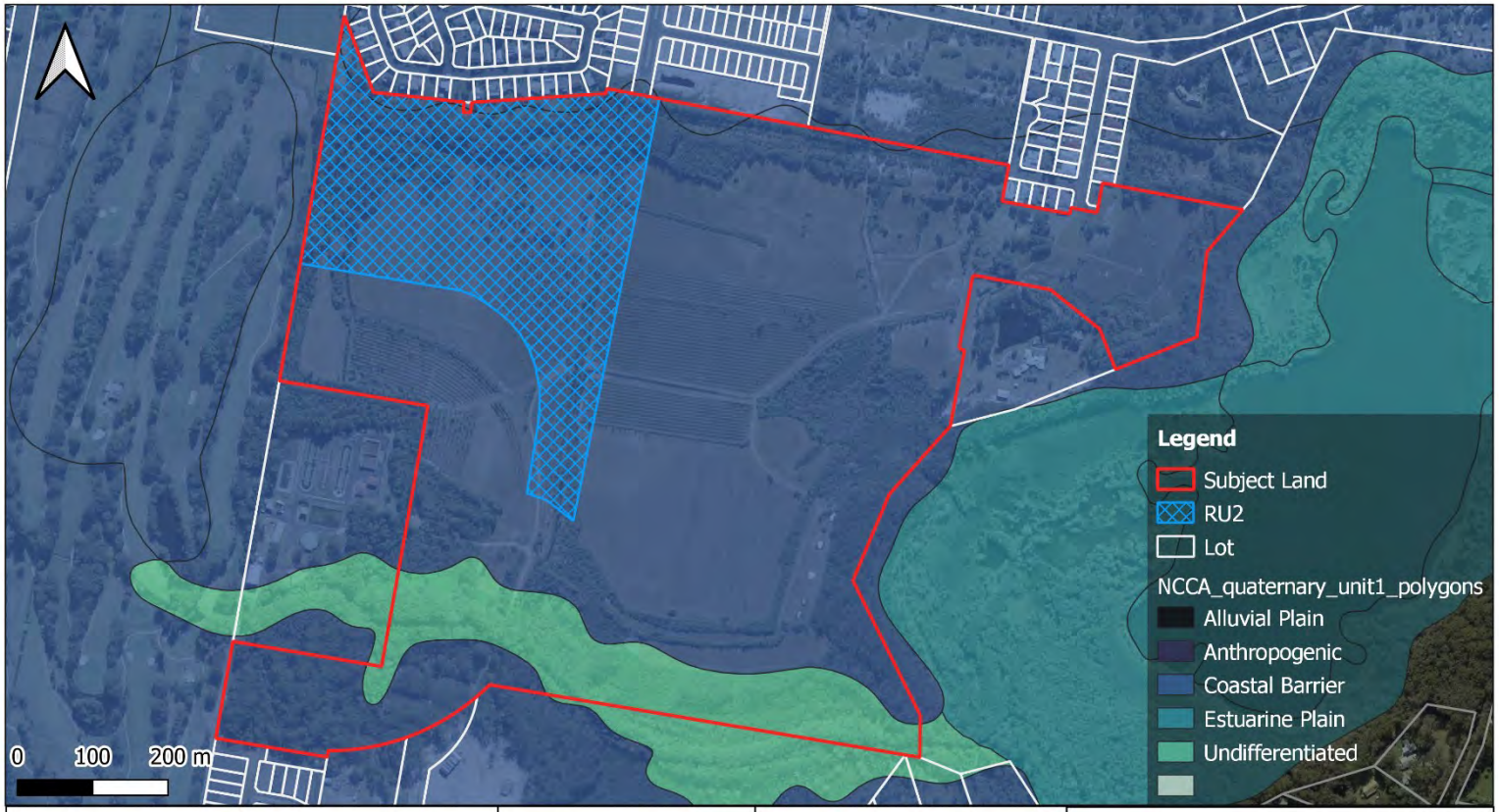
3.4.1 Vegetation Zones and Integrity Scores

Table 9 presented the vegetation integrity scores for the PCT condition zones recorded on the Subject Land. Figure 8 shows the location of these zones.

Table 9: Vegetation zone and current integrity score

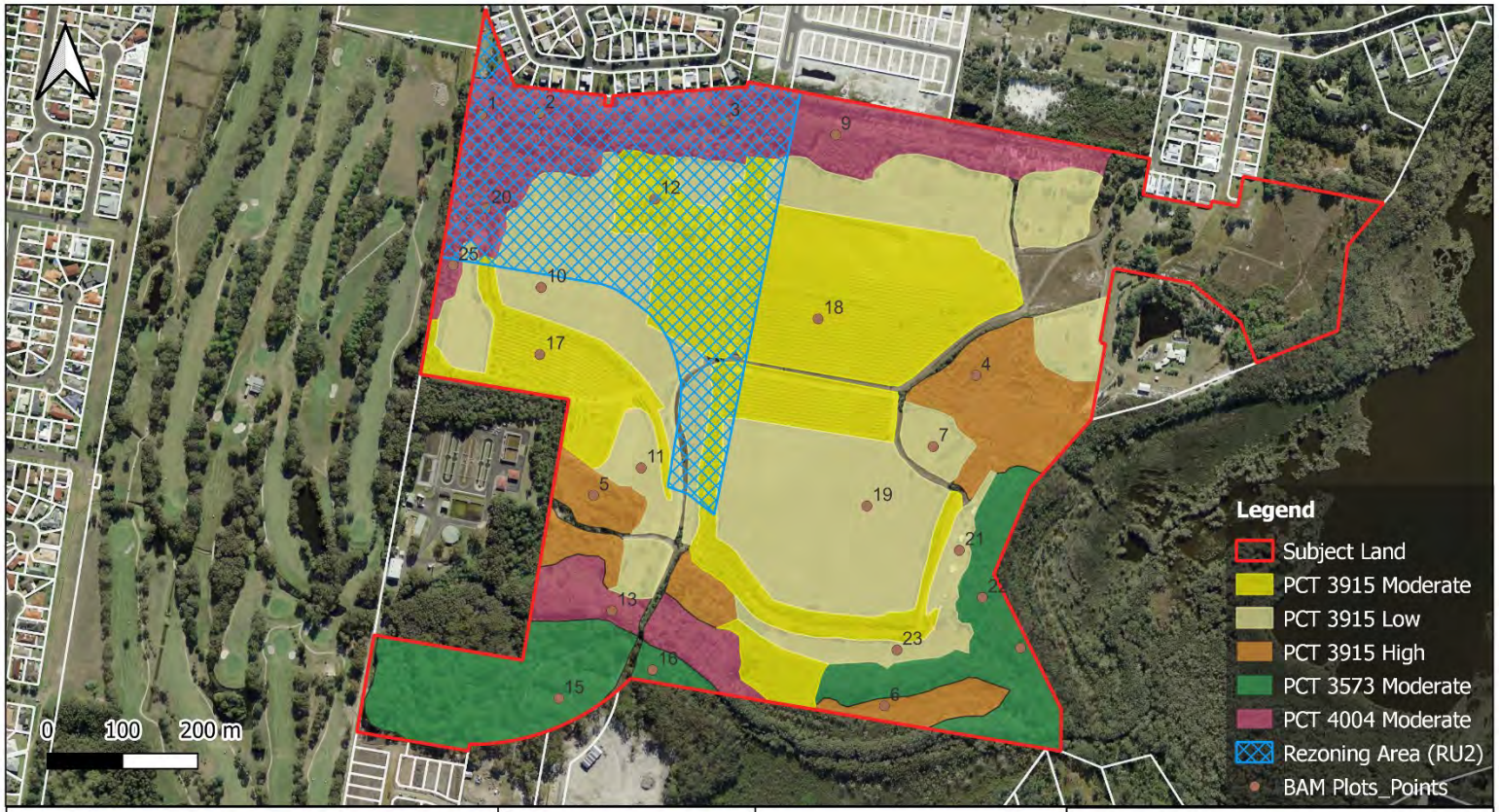
Vegetation Community	Vegetation Zone	Condition Class	Patch Size Category	Area Impacted	Vegetation Integrity (VI) Score			
					Composition	Structure	Function	Total
3915 – Northern Sands Prickly Tea-tree Wet Shrubland	3	High	>100 ha	5.79 ha	77.9	33.5	-	51.1
3915 – Northern Sands Prickly Tea-tree Wet Shrubland	4	Moderate	>100 ha	17.3 ha	85.9	29.5	-	50.3
3915 – Northern Sands Prickly Tea-tree Wet Shrubland	1	Low	>100 ha	20.02 ha	58.5	66.6	-	62.4
4004 Northern *Melaleuca quinquenervia* Swamp Forest	2	Degraded	>100 ha	10.9 ha	22	66.8	38.7	38.5

Figure 7: Quaternary geology



This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: KR	Figure Name: NSW Quaternary Geology	Biodiversity AUSTRALIA	
	Drawn by: LW	Location: Hillier Parade, South West Rocks		
	Date: November 2023	Client: King & Campbell	Job Number: ENS6093	Spatial Reference: MGA Zone 55/GDA 2020 Scale: 1:8000

Figure 8: Vegetation zones and survey locations



This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: KR	Figure Name: PCT Mapping	Biodiversity AUSTRALIA
	Drawn by: LW	Location: Hillier Parade, South West Rocks	
	Date: November 2022	Client: King & Campbell	Job Number: ENS6093 / Spatial Reference: MGA Zone 55/GDA 2020 / Scale: 1:8000

4. Threatened Species

4.1 Targeted Survey Methods

Targeted surveys were undertaken for the threatened species with the potential to occur on the Subject Land. These were undertaken by a BAM Accredited Assessor and Senior Botanist during June 2022. Additional survey effort was undertaken in October of 2023 for threatened amphibians to confirm extent and currency of previous surveys conducted on the Subject Land. The surveys were conducted under Biodiversity Australia's scientific licence and animal research authority.

A description of the survey methods used is provided in the following sections.

4.1.1 Threatened Flora Survey

Threatened flora searches were undertaken by BAM accredited assessor and Senior Botanist during June 2022. Observations were made during systematic searches whilst conducting plots and opportunity whilst traversing the Subject Land.

4.1.2 Fauna Survey

In consideration of the survey requirements of the candidate threatened fauna species as listed within the Bionet Atlas, and other potentially occurring fauna species (DEC 2004, DECC 2007), the following survey methods were utilised:

- Habitat evaluation;
- Reptile searches;
- Diurnal bird surveys;
- Spotlighting and torch searches;
- Call playback and detection;

The fauna surveys were undertaken between 28th – 30th of June 2022 Surveys were undertaken by BAM accredited assessor and Senior Botanist under Biodiversity Australia's scientific license and animal research authority. The methods per survey measure are detailed below.

4.1.2.1 Habitat Evaluation

This was the main survey method employed to assess the suitability of site habitats for threatened species recorded in the locality, or in broadly similar habitats in the region.

Habitats on and adjacent to the Subject Land were defined and assessed according to parameters such as:

- Structural and floristic characteristics of the vegetation e.g. understorey type and development, crown depth, groundcover density, etc.
- Degree and extent of disturbance e.g. fire, logging, weed invasion, modification to structure and diversity, etc.
- Presence of water in any form e.g. rivers, dams, creeks, drainage lines, soaks.

- Size and abundance of hollows and fallen timber.
- Availability of shelter e.g. rocks, logs, hollows, undergrowth.
- Wildlife corridors, refuges and proximate habitat types.
- Presence of mistletoe, nectar, gum, seed, sap, etc. sources.

This information is considered for evaluation of the potential occurrence of threatened species on or adjacent to the site based on cited ecology and personal experience/knowledge of the species.

4.1.2.2 Secondary Evidence and Active Herpetological Searches

Physical habitat searches involved lifting of any timber, rocks and debris, and inspection of dense vegetation and leaf litter for frogs and reptiles; inspection of trees for Koalas and claw markings; binocular inspection of trees; looking for tree hollows; observation of likely basking sites; searches for nests; and searches for scats, owl regurgitation pellets, tracks and scratches.

Formal SAT were not undertaken during the surveys in June 2022. Secondary evidence and herpetological searches were conducted opportunistically whilst undertaking tasks across the subject land and where suitable habitat was noted. Targeted surveys for Koala's using SAT technique was undertaken in 2017 which returned a nil result.

4.1.2.3 Amphibian Survey

Active amphibian survey was undertaken across the Subject Land each evening from the 28th – 30th of June 2022. This involved two ecologists conducting aural visual surveys in suitable habitat whilst conducting spotlight transects. Additional survey effort was undertaken during October 2023 to confirm previous mapping extent described by Connell Wagner (2007).

4.1.2.4 Diurnal Bird Survey

This involved passive surveys (e.g. listening for bird calls) and active observation/binocular searches while walking around the entire Subject Land; and opportunistically during other activities. Bird surveys were undertaken primarily within two hours of dawn or dusk to coincide with periods of peak activity.

4.1.2.5 Spotlighting and Torch Searches

Spotlighting was conducted by two ecologists for one hour per night over three nights. This was undertaken via walking transects through forested areas of the site. A hand held 1100 lumen LED spotlight was used and the ecologist targeted the trunks and branches of canopy trees and understorey, whilst also periodically scanning the ground.

4.1.3 Survey Timing and Limitations

4.1.3.1 Flora

Threatened flora searches were undertaken in winter when detection of some species is reduced detectability as surveys occurred outside flowering/fruiting period.

4.1.3.2 Fauna

Fauna detectability is limited by seasonal, behavioural or lifecycle characteristics of each species, and even by habitat variations (e.g. flowering periods), which can occur within a year, between years, decades, etc. (DEC 2004). The fauna survey period fell in summer which is a period of high activity for arboreal mammals, Microchiropteran bats, frogs and birds (DEC 2004).

4.2 Targeted Survey Results

4.2.1 Flora

Threatened flora surveys failed to detect the presence of any threatened flora species within the Subject Land. Targeted survey for all species has not yet been undertaken however this process will occur as per the requirements of the BAM when necessary.

4.2.2 Fauna

4.2.2.1 Habitat Features

The Subject Land was found to be in a modified state and included disturbances such as frequent slashing and cleared areas.

A range of habitat features were recorded which are described in Table 10.

Table 10: Summary of site habitat values

Habitat/ Attribute Type	Vegetation Zone 1	Vegetation Zone 2	Vegetation Zone 3	Vegetation Zone 4	Vegetation Zone 5
	3968 High	3968 moderate	3968 low	4004 moderate	3573 moderate
Groundcover	Open to dense groundcover layer, depending on canopy cover.	Dense groundcover comprising of native sedges and shrubs. Partially impacted by slashing.	Dense ground layer of shrubs and regrowth trees and grasses and sedges due to frequent slashing of these zones.	Typically dense ground layer cover of ferns or sedges depending on waterlogging.	Typically sparse cover in ground layer with localised patches of dense grasses such as *Lomandra.*
Leaf litter	Moderate leaf litter for most patches.	Minimal leaf litter over the majority of zone due to limited canopy cover	Low due to limited canopy cover	Leaf litter is was dense across most of the zone	Dense across much of the zone.
Logs and debris	A small number of small logs were present throughout the vegetation zone.	Absent	Absent.	Limited logs across the zone.	Moderate amount of logs present within the zone.
Hollows	Absent	Absent	Absent	Absent	6 hollow Bearing Trees were recorded in the zone. Hollows ranged from small to large.
Nectar Sources	Abundant with Banksia and Melaleuca spp common	Limited to regrowth Melaleuca spp.	Flowering species abundant however provide limited resource due to frequent slashing	Melaleuca spp abundant with Eucalypts present in fewer numbers	Eucalypt and Corymbia spp abundant in the canopy.
Sap and gum sources	Absent	Absent	Absent	Limited number of Eucalypts present.	Eucalypt and Corymbia spp abundant in the canopy.
Primary preferred Koala browse trees	Absent.	Absent	Absent	*Eucalyptus robusta* and *E. microcorys* present	No listed Primary or Secondary Koala Food Trees as listed in the KSC CKPoM
Allocasuarinas	A*llocasuarina littoralis* scattered through western mapped zones.	Absent	Absent	Absent.	Absent
Aquatic/ wetland habitats	Absent	During wet periods community would hold water in depressions.	During wet periods community would hold water in depressions	During wet periods community would hold water in localised depressions	Absent
Fruiting species	Absent	Absent	Absent.	*Glochidion* present	*Dianella spp.* present
Forest bird habitat	Dense shrub layer provides cover for avian species.	Limited to regrowth canopy trees.	Absent	Mature canopy vegetation and dense ground layer provide adequate habitat diversity.	Mature canopy species and diverse ground layer habitat provides good resources for avian species.

Habitat/ Attribute Type	Vegetation Zone 1	Vegetation Zone 2	Vegetation Zone 3	Vegetation Zone 4	Vegetation Zone 5
	3968 High	3968 moderate	3968 low	4004 moderate	3573 moderate
Caves, cliffs, overhangs, culverts, bridges	Absent. Absence of roosts for obligate Microchiropteran bats.	Absent. Absence of roosts for obligate Microchiropteran bats.	Absent. Absence of roosts for obligate Microchiropteran bats.	Absent. Absence of roosts for obligate Microchiropteran bats.	Absent. Absence of roosts for obligate Microchiropteran bats.
Small terrestrial prey	Dense ground cover from sedges and cover from CWD provide adequate cover for reptiles and mammals	Likely to be low due lack of habitat in ground layer.	Likely to be low due to lack of habitat diversity in the ground layer.	Dense ground cover from sedges and ferns provide adequate cover for reptiles and mammals	Dense litter layer and scattered CWD provide adequate habitat for small reptiles and mammals.
Habitat Linkages	Vegetation zone is well connected to adjoining vegetation in the east of the subject land and with intact vegetation on the boundary of the subject land in the west.	Zone provides limited habitat connectivity.	Zone provides limited habitat connectivity.	Vegetation provides connectivity on the western boundary to intact vegetation in the south which links to nature reserve in the east..	Vegetation zone is well connected to adjoining vegetation in the east of the subject land and with intact vegetation on the boundary of the subject land in the west.

4.2.2.2 Hollow Bearing Trees

Hollow Bearing Trees recorded in on the Subject Land are described in Table 11 and their location shown in Figure 9.

Table 11: Details of hollow-bearing trees within the Subject Land

Tree #	Species	Height (m)	DBH (cm)	No. Small Hollows	No. Medium Hollows	No. Large Hollows
HBT 1	*Eucalyptus planchoniana*	20	37	-	1	-
HBT 2	*Eucalyptus planchoniana*	20	40	-	1	-
HBT 3	*Eucalyptus planchoniana*	25	53	-	1	-
HBT 4	*Eucalyptus planchoniana*	18	45	-	-	1
HBT 5	*Eucalyptus racemosa*	20	53	3	-	-
HBT 6	*Eucalyptus planchoniana*	21	45	1	-	-

Figure 9: Location of hollow-bearing trees

This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: KR	Figure Name: HBT Locations	Biodiversity AUSTRALIA
	Drawn by: LW	Location: Hillier Parade, South West Rocks	
	Date: November 2023	Client: King & Campbell	Job Number: ENS6093
			Spatial Reference: MGA Zone 55/GDA 2020
			Scale: 1:8000

4.2.2.3 Observed/Detected Fauna

During the survey period of June 2022 a range of fauna species were detected over the Subject Land. Birds were the most common species detected (25) while 1 reptile and 1 amphibian were also detected. No threatened species were detected during this survey period. Subsequent survey during October 2023 confirmed the previously recorded *Crinia tinnula* frequently over the Subject Land.

Due to limited targeted survey being carried out at the time of reporting a potential occurrence assessment has been conducted for the Subject Land using threatened species returned from *NSW BioNet Atlas* search and *EPBC Protected Matters Search*. The results of this are presented in Appendix 4

4.3 Kempsey KPoM

The Subject Land and Rezoning Footprint fall within the jurisdiction of the KSC CKPoM (KSC 2011), and hence a compliance assessment is required.

4.3.1 Site Classification and Required Assessments

As shown in Figure 10, the majority of the Subject Land and the entirety of the Rezoning Footprint is mapped as Preferred Koala Habitat (PKH) under the Kempsey Shire Council Comprehensive Koala Plan of Management (KSC CKPoM). The mapped area largely comprises 'other' with an area of Secondary (Class A) in the northwest. An area in the south of the property is also mapped as Secondary A.

The following assessments are required and undertaken for the site:

- Unknown: Section 4.5 requires vegetation community mapping to determine if the Unknown habitat is Potential Koala Habitat, or Other vegetation.
- Preferred Koala Habitat: Section 4.6 requires that a Koala Habitat assessment must be undertaken using a regularised SAT grid, and all preferred Koala Food Trees (KFTs) potentially affected by the proposal located and mapped.

4.3.2 Field Survey

A site inspection and field survey was undertaken over the site by two Biodiversity Australia ecologists on 23rd March 2017. This involved vegetation assessment, two dedicated scat searches for the Koala as per the Spot Assessment Technique (SAT) and marking of Koala food trees listed under the KSC CKPoM. The trees were flagged with yellow flagging tape, marked with an inscribed metal tag and recorded via GPS.

The location of the site is provided in Figure 11.

4.3.3 Unknown Vegetation Assessment

Verification of vegetation in the portion of the Rezoning Footprint mapped as Unknown was undertaken during the survey. This identified the area mapped as Unknown as containing primarily PCT3549 which has no value for the Koala due to its heavily disturbed and maintained condition. Areas mapped as Secondary (A) habitat are loosely aligned with the PCT community PCT4004 which is dominated by *M. quinquenervia* and occasional *E. robusta.* Whilst the boundary of the Secondary (A) habitat is not correct, the underlining community which incorporates most of the area is consistent with the definition of Secondary (A) habitat.

Given the above classification, no further survey in this area is required.

4.3.4 Koala Habitat Assessment

As only a limited area of forest vegetation occurs within the Rezoning Area, a regularised grid-based SAT assessment was not undertaken due to lack of trees to satisfy the statistical assumptions of the method.

Two SAT surveys were undertaken on the property as shown in Figure 2. The first was located within a cluster of Swamp Mahogany in the northwest of the property. The second was located in the south of the property. Even though this area is outside the proposed Rezoning Footprint,

a survey was conducted here to check for Koala activity due to the high density of Swamp Mahogany which was considered to hold the highest likelihood of Koala activity within the Subject Land. Despite this, no evidence of Koala activity was found during the searches, thus the SATs recorded zero activity. Hence the mapped PKH on site does not qualify as Core Koala Habitat (CKH), and the proposal must be assessed under the CKPoM provisions for PKH.

South West Rocks is known to harbour a small Koala population and records of Koalas do occur nearby. While the survey did not record any Koalas, there is still a possibility that Koalas would use habitat on the Subject Land primarily in the south due to its connectivity value and more prevalent *E. robusta*.

However, the focus area for this planning proposal is along the northern boundary. This area provides very little value as a connectivity corridor and is affected by residential development and associated Key Threatening Processes to the north. In addition, despite numerous targeted surveys, the Koala has never been recorded in the area. Due consideration should be given to the appropriateness of the area as a resource for the Koala and the KTPs which a Koala would be subjected to if they frequented the area. This ecologist would recommend that if the area were to be removed, it would have no material impact on the local Koala population (given that there are no records of Koalas using the area) and the statutory offsetting as per the CKPoM would provide a net benefit to the species both in resource and strategic connectivity.

The proposed KFT to be removed cover an area of 4.5 ha and as per the CKPoM would require an offset area no less than two times this area. This would result in 9 ha of Koala habitat being secured within the south of the Subject Land, in an area that contains many more KFTs and would provide far greater connectivity value. This area must comprise no more than half existing preferred koala habitat with the remaining comprising cleared or partially cleared land for revegetation. The proposed offsetting areas are shown in Figure 12.

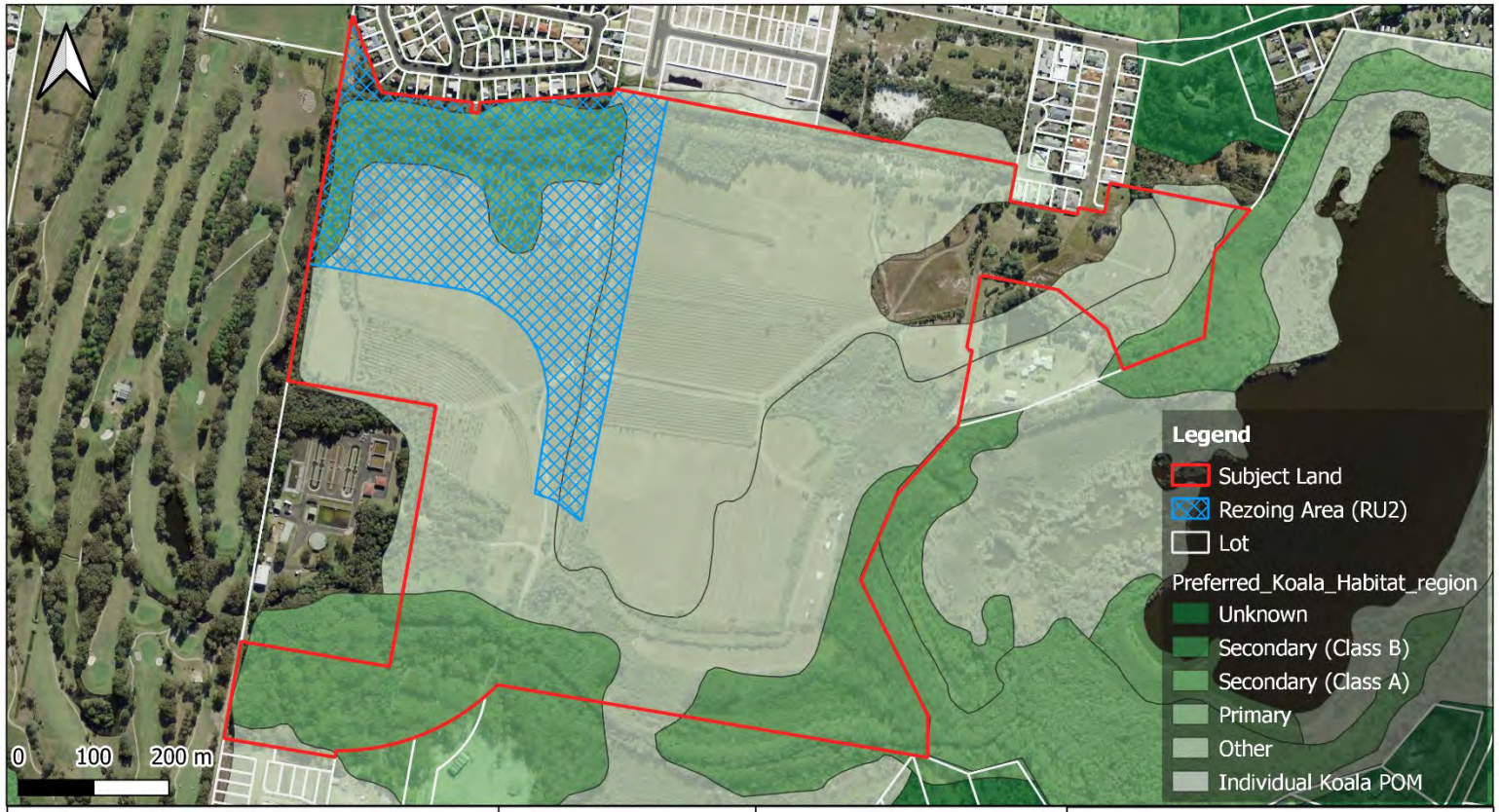
As *Eucalyptus robusta* is the primary KFT being removed it is advised that replacement plantings be of this species. The use of the *E. robusta* as a replacement tree species aligns with the CKPoM as the species is listed as a primary food tree species. It is also a listed canopy tree species of PCT 3915 and occurred in low numbers across the mapped high integrity areas of the PCT. *E. robusta* has also been observed growing naturally in similar PCTs at exactly the same ASL within 1km of the Subject Land.

It is considered very likely that the removal of the Secondary (A) habitat within the Rezoning Area and statutory offsetting in the south of the Subject Land would have a net positive benefit to a potentially occurring Koala population.

All Koala food trees potentially impacted by later stages of the development were surveyed and mapped. A total of 23 Primary Koala food trees were recorded and consisted of Swamp Mahogany and Tallowwood. Their approximate location on the site (subject to GPS limitations) is shown in Figure 11.

As per the CKPoM, these trees will need to be accurately surveyed by a registered surveyor.

Figure 10: KSC KPoM Preferred Koala Habitat Mapping



This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: KR	Figure Name: KPoM Habitat Mapping	Biodiversity AUSTRALIA	
	Drawn by: LW	Location: Hillier Parade, South West Rocks		
	Date: November 2023	Client: King & Campbell	Job Number: ENS6093	Spatial Reference: MGA Zone 55/GDA 2020 Scale: 1:8000

Figure 11: Location of KFTs

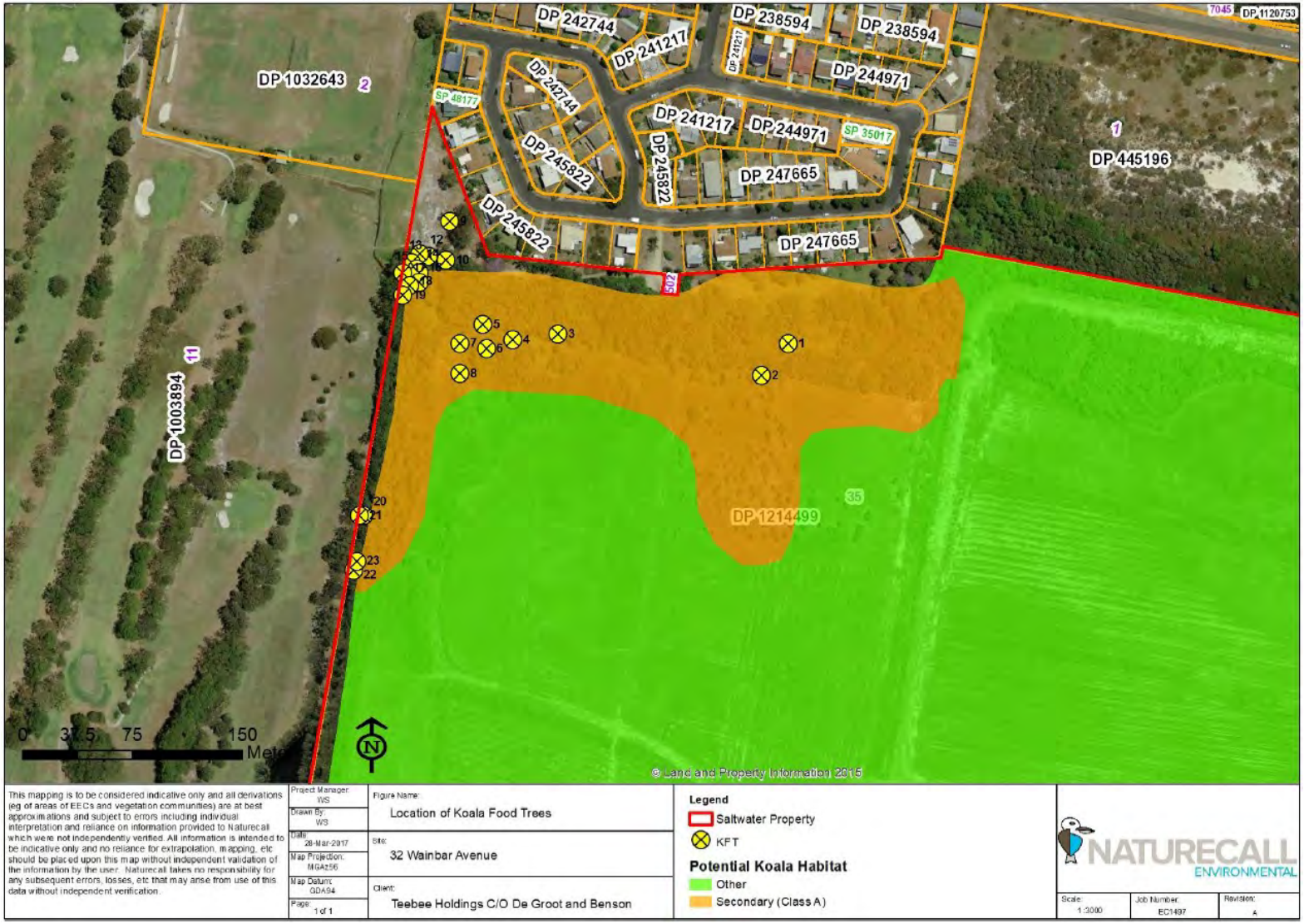
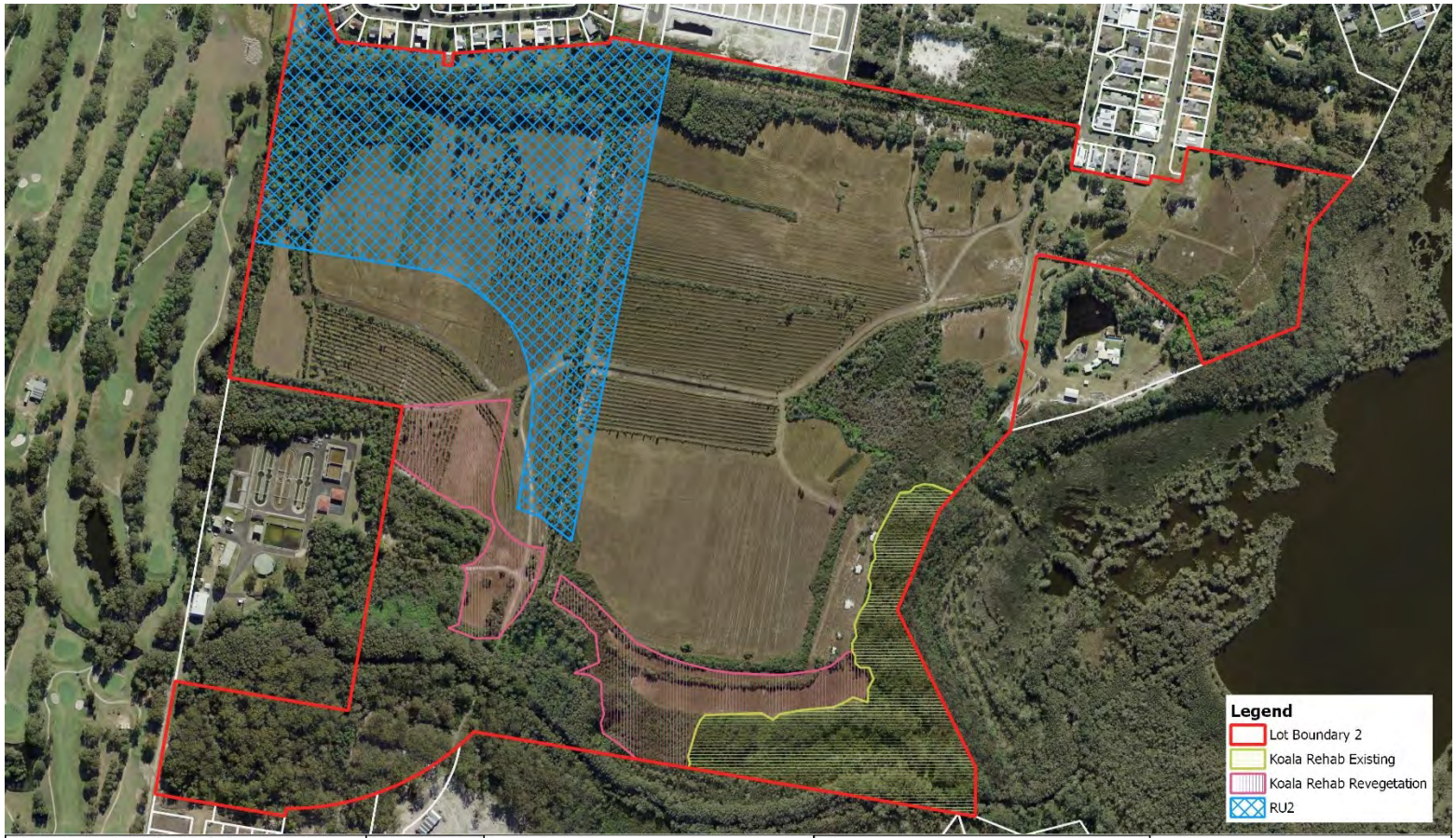


Figure 12: Proposed KPoM Offsetting Areas



This mapping is to be considered indicative only and all derivations (eg of areas of EECs and vegetation communities) are at best approximations and subject to errors including individual interpretation and reliance on information provided to Biodiversity Australia where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping, ect. should be placed upon this map without independent validation of the information by the user.Biodiversity Australia takes no responsibility for any sudsequent error losses etc. that may arise from use of this data without independent verification.

Project Manager: KR	
Drawn By: KR	
Date: 7/12/2023	
Map Projection: MGA Zone 56	
Datum: GDA2020	

Figure Name: Kempsey KPoM Offset Locations

Site: Saltwater, South West Rocks

Client: Lex Tall

0 0.1 0.2 km

Biodiversity AUSTRALIA

QGIS

Job Number: ENS6093	Scale:
Page: 1 of 1	Veriation A

4.4 Environmental Protection and Biodiversity Conservation Act 1999

A potential occurrence assessment has been undertaken to assess the potential impact of rezoning he land in question on threatened species listed under the *EPBC Act 1991* that have the potential to occur on the Subject Land. The potential occurrence assessment included those species returned from a BioNet Atlas Search.

An initial desk top assessment was undertaken, and from this a list of threatened entities recorded in the locality was produced. A summary of the search are shown below in Table 12.

Table 12: Locally recorded MNES (DAWE 2020)

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	1	One Commonwealth Marine Area occurs within the locality.
Listed Threatened Ecological Communities	6	Four listed threatened ecological communities are listed as likely to occur within the locality.
Listed Threatened Species	81	Species or species habitat is known/likely/may occur within the locality. Suitable habitats for threatened flora species *Acronychia littoralis* (Scented Acronychia) and *Phaius australis* (Southern Swamp Orchid) occur on the subject site. Three threatened fauna species listed under the EPBC Act are considered to potentially occur none of which are considered to have Key habitat within the Rezoning Footprint.
Listed Migratory Species	61	Migratory wetland, terrestrial and marine species or species habitat is known/likely/may occur within the locality. The Potential Occurrence Assessment has determined three terrestrial Migratory Species listed under the EPBC Act have potential to occur at the subject land.
Other matters protected by the EPBC Act		
Commonwealth Land	2	Commonwealth Land - Australian Telecommunications Commission. Refer to full report in Appendix
Commonwealth Heritage Places	1	Smokey Cape Lighthouse. Refer to full report in Appendix
Listed Marine Species	82	Species or species habitat is known/likely/may occur within the locality.
Whales and other Cetaceans	13	Species or species habitat is known/likely/may occur within the locality.
Critical Habitats	None	-
Commonwealth Reserves - Terrestrial	None	-
Commonwealth Reserves - Marine	None	-

4.5 Potential Occurrence Assessment

This section assesses the threatened entities listed under the BC Act and/or the EPBC Act that have been recorded or predicted to occur within the locality have been assessed for their potential to occur on the subject site given the habitats present. Threatened species listed under the EPBC Act have not been considered in the assessment as they do not form part of

the criteria of HEV land under Attachment 2 of the *BCD NE Branch Steps for Assessing Biodiversity in Planning Proposals)*. Potential occurrence assessment of threatened flora and fauna species listed under the NSW BC Act 2016 is provided in Appendix 2.

This desktop assessment and literature review has determined the following threatened species to potentially occur at the Subject Land.

Table 13: Potential occurrence assessment – flora

Species Name	Common Name	BC Act Listing	EPBC Act Listing	Likelihood of Occurrence	Significance Assessment Required?
Acronychia littoralis	Scented Acronychia	Endangered	Endangered	Thirteen record within the locality none within 4.5km of the subject site. The subject site does not contain the preferred littoral rainforest mosaic habitat of the species. Unlikely to occur	No
Allocasuarina defungens	Dwarf Heath Casuarina	Endangered	Endangered	Subject Land support appropriate habitat for the species. Much of the habitat in areas of potential impact is highly degraded.	No
Caesalpinia bonduc	Knicker Nut	Endangered	-	Grows on sandy coral derived soil close to shore lin. Suitable habitat absent form Subject Land	No
Chamaesyce psammogeton	Sand Spurge	Endangered	-	Suitable dune, strandlines and headland habitat absent form the subject land.	No
Cynanchum elegans	White-flowered Wax Plant	Endangered	Endangered	The potential habitat of the species within the Subject Land is present in a degraded state. There are six records of the species within the locality however all occur approximately 4.5km to the south east around Smokey Cape Lighthouse. Unlikely to occur.	No
Peristeranthus hilli	Brown Fairy-chain Orchid	Vulnerable	-	Species restricted to littoral and lowland rainforest. Suitable habitat absent from subject land	No
Phaius australis	LesserSwamp orchid	Endangered	-	Suitable habitat on the Subject land though in a degraded state.	**Yes**
Rhodamnia rubescens	Scrub Turpentine, Brown Malletwood	Critically Endangered	Critically Endangered	No records within the locality. The subject site does not contain the preferred rainforest habitats of the species. Unlikely to occur	No

Rhodomyrtus psidioides	Native Guava	Critically Endangered	Critically Endangered	No records within the locality. The subject site does not contain the preferred rainforest habitats of the species. Unlikely to occur	No
Syzygium paniculatum	Magenta Lilly Pilly	Endangered	Vulnerable	Restricted to margins of littoral rainforest. Suitable habitat absent form Subject Land.	No

Table 14: Potential occurrence assessment – fauna

Species Name	Common Name	BC Act Listing	EPBC Act Listing	Likelihood of Occurrence	Significance Assessment Required?
Amphibia					
Mixophyes balbus	Stuttering Frog, Southern Barred Frog (in Victoria)	Endangered	Endangered	Preferred habitat for the species is Rainforest which does not occur within the Development Footprint. Unlikely.	No
Crinia tinnula	Wallum Froglet	Vulnerable	-	Suitable habitat for the species occurs on the subject land. The species has been confirmed on the Subject Land	**Yes**
Reptilia					
Caretta caretta	Loggerhead turtle	Endangered	Endangered	Marine Species. No Suitable habitat present on the subject land	No
Chelonia mydas	Green Turtle	Vulnerable	Vulnerable	Marine Species. No Suitable habitat present on the subject land	No
Dermochelys coriacea	Leatherback Turtle	Endangered	Endangered	Marine Species. No Suitable habitat present on the subject land	No
Aves					
Anthochaera phrygia	Regent Honeyeater		Critically Endangered	The Development Footprint does not contain land mapped as important habitat for the species. Unlikely to occur.	No
Anseranas semipalmata	Magpie Goose	Vulnerable	-	Suitable foraging habitat absent from the subject land.	No
Ardenna carneipes	Flesh-footed shearwater	Vulnerable	-	Marine species	No
Botaurus poiciloptilus	Australasian Bittern		Endangered	The Subject Land does not contain preferred habitat for the species. Unlikely to occur.	No
Calyptorhynchus lathami lathami	Glossy-black Cockatoo	Vulnerable	-	Limited foraging habitat for the species. Limited breeding habitat for the species.	Yea
Daphoenositta chrysoptera	Varied Sitella	Vulnerable	-	Suitable habitat available on the subject land	**Yes**

Esacus magnirostris	Beach-stone curlew	Critically Endangered	-	Habitat degraded on the subject land.	No
Ephippiorhynchus asiaticus	Black-necked stork	Endangered	-	Suitable wetland habitat absent from the Subject Land	No
Epthianura albifrons	White-fronted Chat	Vulnerable		Suitable habita occurs on the Subject Land. No Records of species on Subject Land or adjacent properties.	No
Glossopsitta pusilla	Little Lorikeet	Vulnerable	-	Suitable habitat for species in conservation zoned land and within land currently zoned RU2.	**Yes**
Grus rubicunda	Brolga	Vulnerable	-	The subject land provides limited foraging habitat to the species during periods of high rainfall.	No
Haliaeetus leucogaster	White-bellied Sea-eagle	Vulnerable	-	Limited breeding habitat inside rezoning area. Suitable breeding habitat in Conservation zoned area.	**Yes**
Ixobrychus flavicollis	Black Bittern	Vulnerable	-	Suitable habitat absent from subject land.	No
Lathamus discolor	Swift Parrot		Critically Endangered	The Subject Land contains habitat mapped as important areas for the species. The actual area of habitat is much smaller than that depicted by mapping as such a review has been submitted. Low likelihood of occurring,	No
Limosa limosa	Black tailed Godwit	Vulnerable	-	Suitable habitat for the species absent from the Subject land	
Lophoictinia isura	Square-tailed Kite	Vulnerable	-	The Subject Land contains suitable foraging habitat in Conservation zoned areas which will remain.	No
Macronectes giganteus	Southern Giant-Petrel, Southern Giant Petrel	Endangered	Endangered / Marine / Migratory	The Subject Land does not contain preferred habitat for the species. Unlikely to occur.	No
Pandion Cristatus	Eastern Osprey	Vulnerable	-	Foraging habitat absent. Breeding habitat present in conservation zoned area.	No
Procelsterna cerulea	Grey Ternlet	Vulnerable	-	The Subject Land does not contain preferred habitat for the species. Unlikely to occur	No
Ptilinopus magnificus	Wompoo Fruit-Dove	Vulnerable	-	Suitable foraging habitat extremely limited on subject land	No
Ptilinopus regina	Rose-crowned Fruit-Dove	Vulnerable	-	Suitable foraging habitat extremely limited on subject land	No
Sternula albifrons	Little Tern	Endangered	-	The Subject Land does not contain preferred habitat for the species. Unlikely to occur.	No

Sula Dactylatra	Masked Booby	Vulnerable		The Subject Land does not contain preferred habitat for the species. Unlikely to occur.	
Thalassarche cauta	Shy Albatross		Endangered / Marine / Migratory	The Subject Land does not contain preferred habitat for the species. Unlikely to occur.	No
^^*Tyto longimembris*	Eastern Grass Owl	Vulnerable	-	Foraging habitat limited to vegetated areas of the subject land. Limited breeding habitat present	No
^^*Tyto novaehollandiae*	Masked Owl	Vulnerable	-	Foraging habitat limited to vegetated areas of the subject land. Limited breeding habitat present	No
^^*Tyto tenebricosa*	Sooty Owl	Vulnerable	-	Foraging habitat limited to vegetated areas of the subject land. Roost habitat absent.	No
Mammals					
Cercartetus nanus	Eastern Pygmy-possum	Vulnerable	Vulnerable	Suitable foraging habitat for the species in PCT 3915. Potential to occur on the Subject Land	**Yes**
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Vulnerable	Endangered	There are two records of the species within the locality. The Subject Land contains a small number of potentially suitably hollow bearing trees however burrows, small caves or rock outcrops are absent. Much better habitat occurs external to the Subject Land. Unlikely to occur.	No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Vulnerable	Suitable foraging habitat present on the subject land. Potential to occur	**Yes**
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable	Vulnerable	Suitable foraging habitat present on the subject land. Potential to occur	**Yes**
Miniopterus australis	Little Bent-winged Bat	Vulnerable	Vulnerable	Suitable roost habitat absent from subject land. No bionet records. Unlikely to occur.	No
Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	Vulnerable	Suitable roost habitat absent from subject land. No bionet records. Unlikely to occur.	No
Petaurus norfolcensis	Squirrel Glider	Vulnerable	Vulnerable	Suitable foraging habitat present on the subject land. Potential to occur.	**Yes**
Phascogale tapoatafa	Brush-tailed Phascogale	Vulnerable	Vulnerable	Potential habitat present on the subject land. Potential to occur.	**Yes**
Phascolarctos cinereus	Koala	Vulnerable	Endangered	The Subject Land falls within the Kempsey Shire Council CKPoM. This CKPoM has mapped the area as Secondary A habitat	Yes, as a matter of applying the

				meaning that a preferred koala food tree is part of the canopy of the area but not dominant. This assessment has undertaken extensive survey for the Koala in the form of spotlighting and secondary evidence searches (SAT) but has failed to record the species on the site. There are 76 records of the species within the locality however none within or adjacent to the Subject Land.	precautionary principal.
Planigale maculata	Common Planigale	Vulnerable	Vulnerable	Potential habitat present across the Subject land. Potential to occur	**Yes**
Potorous tridactylus tridactylus	Long-nosed Potoroo (SE Mainland)	Vulnerable	Vulnerable	The Subject Land contains degraded representations of the preferred habitat for the species. Much larger areas of better quality habitat occur throughout the locality and hence it is considered unlikely that the species would occur within the Subject Land to any significant capacity. Unlikely to occur.	No
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Vulnerable	No records of Grey-headed Flying-fox were recorded during the field survey. No evidence of roosting was recorded. The Subject Land contains eucalyptus and melaleuca species which may form a minute part of a much larger foraging range for the species. If the species were to occur within the Subject Land it would be for very finite foraging and hence the significance is negligible. Unlikely to occur	No
Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	Vulnerable	Suitable foraging habitat present across the Subject Land. Potential to occur.	**Yes**
Syconycteris australis	Common Blossom bat	Vulnerable	Vulnerable	Suitable foraging habitat present across the Subject Land. Potential to occur.	**Yes**
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Vulnerable	No records of the species on the subject land. Potential foraging habitat present. Low likelihood of occurring	No
Vespadelus troughtoni	Eastern Cave Bat	Vulnerable	Vulnerable	Suitable roost habitat absent from subject land. No bionet records. Unlikely to occur.	No

4.6 Threatened Ecological Community Assessment

As described in the table above there is the potential for PCT 4004 to be associated with the *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* as listed under the *EPBC Act 1999* due to the floristic composition and landscape position being appropriate for the community. As such the Conservation Advice for the community has been consulted to determine where it is appropriate for the community to be considered part of the TEC.

Section 1 describes the community as having a layered canopy whereby melaleucas and/or *Eucalyptus robusta* are dominant. This is consistent with the community on the Subject Land.

Section 2.1 of the Conservation Advice states the following "*Areas of vegetation* ***that do not meet the key diagnostics do not support the nationally listed ecological community***".

A summary of these diagnostic features include:

- Occurs in the appropriate geographic location i.e. near coastal eastern australia from South-east Queensland to South-east NSW. *The subject land occurs in coastal NSW Mid North Coast.*
- Occurs in coastal catchments below 20m but up occasionally up to 220m ASL. *The Subject Land occurs on lands between 5-7m ASL.*
- Occurs on hydric soils with inundation patterns ranging from intermittent to episodic. *Modelling has been conducted for the Subject Land and surrounds and demonstrates that a 1 in 100 year flood even with the addition of 30% increase in rainfall would not inundate the vegetation mapped as PCT 4004 in the north west of the property suggesting that it is not periodically or episodically inundated. The extent of such an event is shown Appendix 4 courtesy of de Groot & Benson 2023. It is for this reason that the patch of mapped PCT 4004 is not considered part of the Coastal Swamp Sclerophyll TEC.*

Further assessment of Key Diagnostics attributes of the community were not considered as the vegetation on the subject land did not meet the requirement of being periodically or intermittently inundated and there cannot be considered as the TEC.

HIGH ENVIRONMENTAL VALUE LAND ASSESSMENT

5. Assessment of High Environmental Value Land

5.1 What is High Environmental Value Land

An assessment of the suitability of the Subject Land to be considered has been undertaken using the criteria for HEV land in Attachment 2 of the *BCD NE Branch Steps for Assessing Biodiversity in Planning Proposals*. The results of this assessment are presented below in Table 15.

Table 15: Application of the High Environmental Value Criteria

High Environmental Value (HEV) Criteria and Components	PCT Scale HEV Result (4004)	PCT Scale HEV Result (3915)
1.1 Biodiversity Values Map	Vegetation that has been ground truthed as PCT 4004 is present within land zoned RU2 and is also mapped as Biodiversity Values. This mapping is in relation to '*threatened species or communities with potential for serious and irreversible impacts*'. Specifically this relates to important habitat mapping for the Swift Parrot. This BV mapping is considered to be partially correct, particularly where *Eucalyptus robusta* occur due to the winter flowering qualities aligning with the potential occurrence season of the Swift Parrot. The location of these winter flowering eucalypts is depicted within Figure 11 and are 23 trees in total. When applying the Sall framework, it is considered extremely unlikely that the impacts of removing these 23 trees would have a significant impact on the Swift Parrot. Firstly due the site only having a negligible and minute foraging value for the species, and secondly, Due to the substantial offsetting that would occur under the CKPoM which would result in a 2:1 ratio of offset by area and substantially more *E. robusta* being planted then the 23 being removed. This would equate to a net increase in the available foraging habitat for the Swift Parrot. Appendix 3 presents the ecological assessment supporting a review of the Swift Parrot Important Habitat Mapping on the site to include only habitat in which supports habitat that has the potential to provide habitat for the species. In conclusion, the proposed rezoning and subsequent potential development of the land would result in a net increase in the available resource for the Swift Parrot.	Vegetation that has been ground truthed as PCT 3549 is also partially mapped under Biodiversity Values mapping in relation to '*threatened species or communities with potential for serious and irreversible impacts*'. Again, this mapping relates to important habitats as mapped for the Swift Parrot. Part of these areas mapped under the BV Map however occur on vegetation devoid of canopy trees and may not constitute important habitat for the species. I find it likely that BV mapping for PCT3915 could be removed and is currently under an amendment request.
2.1 Over-cleared vegetation types	The land zoned RU2 does not support any PCT that is considered 'over cleared (>70%)'. The percent cleared status of PCT 4004 – 32.84%	The land zoned RU2 does not support any PCT that is considered 'over cleared (>70%)'. The percent cleared status of PCT 3915 – 30.18%
2.2 Vegetation in over-cleared landscapes	Reviewing over-cleared Mitchell Landscapes map data through the SEED portal showed that the Mitchell Landscapes, Macleay Alluvial Plains, is not mapped as over cleared. Vegetation on this Mitchell landscape does not need to mapped as HEV.	Reviewing over-cleared Mitchell Landscapes map data through the SEED portal showed that the Mitchell Landscapes, Macleay Alluvial Plains, is not mapped as over cleared. Vegetation on this Mitchell landscape does not need to mapped as HEV.
2.3 Threatened Ecological Communities – Any vulnerable, endangered, or critically endangered ecological community listed under the *Biodiversity Conservation Act* 2016, *Fisheries Management*	PCT 4004 is associated with BC Act listed *Swamp Sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney basin and South East Corner Bioregion*. This TEC is described in the NSW final determination as occurring on alluvial flats ==. The quaternary geology mapping for the locality is described as coastal barrier sands and not deposited through alluvial processes. On this point alone it is not considered that PCT	The PCT is not associated with a TEC and therefore vegetation ground trothed as PCT 3915 does not conform to a TEC.

High Environmental Value (HEV) Criteria and Components		PCT Scale HEV Result (4004)	PCT Scale HEV Result (3915)
Act 1994, EPBC Act 1999 and not mapped as Biodiversity Values.		4004 meets the definition of the Swamp Sclerophyll EEC in this location. Please refer to Section 4.6 for further explanation. With regards to assessing this vegetation against the Key Diagnostics (Section 2.1 of the DAWE Conservation Advice 8/12/2021) of the EPBC Act Listed – COASTAL SWAMP SCLEROPHYLL FOREST OF NEW SOUTH WALES AND SOUTH EAST QUEENSLAND. The area of PCT 4004 which falls within the Rezoning Footprint is not subject to periodic inundation as it falls well outside of the 100 year ARI Flood with 30% increase in rainfall intensity (Appendix 2), the community therefore does not meet the third key diagnostic criteria and is therefore not a TEC. This is described in depth within Section 4.6. In conclusion, the Rezoning area does not contain any areas of EEC or TEC.	
2.4 100m Buffer on Coastal Wetlands and Littoral Rainforest as per State Environmental Planning Policy (SEPP) (Resilience and Hazards) 2021		Of the lands mapped as PCT 4004 none falls within lands mapped as Proximity to Coastal Wetland and as such has not been included in any HEV lands mapped.	Of the lands mapped as PCT 3915 none falls within lands mapped as Proximity to Coastal Wetland and as such has not been included in any HEV lands mapped.
3.1 Key habitat for threatened species (vulnerable, endangered, or critically endangered species listed under BC Act)	Key breeding habitat with known breeding occurrence	There are numerous threatened species records within 5 km of the land in question. Of these records however, none occur within land that conforms to PCT 4004. Records in close proximity to vegetation mapped as PCT 4004 include the Koala, Brush-tailed phascogale, and little bent-wing bat. Grey-headed Flying foxes have also been recorded in close proximity however no roost colony was observed during field survey. The Naturecall report demonstrates that Koalas are unlikely to have Core Koala habitat within the RU2 zone. No Flying-fox roosts occur within the RU2 zone, Little Bent-winged Bat required caves or dwellings which are absence, Brush-tailed phascogale would have a low to moderate likelihood of occurrence and has not been subjected to targeted survey. The species however has vast areas of better habitat to the east of the Subject Land and would thus be unlikely to frequent the site to fulfil any life cycle requirements.	There are numerous threatened species records within 5 km of the land in question. Of these records however, none occur within land that conforms to PCT 3915. Records in close proximity in similar habitat include little bent-winged bat, long nosed potoroo, and squirrel glider however these were recorded in higher quality habitat to the south of the land in question. Part of this area has been mapped as containing Wallum Froglets as per the Connell Wagner Report however the key refuges for this species have already been considered within previous planning proposals and appropriate conservation zonings applied.
	Core Koala Habitat	The Kempsey KPoM suggest that vegetation mapped in the north west of the property conforms to that of Secondary A koala habitat. However a Koala Habitat Assessment undertaken by Naturecall did not record koalas within the land zoned RU2 nor were there any signs of the species. Therefore it was determined that potential koala habitat was not considered core koala habitat. Secondary A koala habitat has not been included in HEV mapped land.	The Kempsey KPoM has mapped land mapped as PCT 3915 as 'Other vegetation (not koala habitat)'.

High Environmental Value (HEV) Criteria and Components		PCT Scale HEV Result (4004)	PCT Scale HEV Result (3915)
	Habitat for known populations of species credit species and SAII entities	A BDAR is in progress on the land in question and targeted survey has removed a number of species credit species from occurring within the land zoned RU2. Of the species that have outstanding targeted survey requirements the quality of habitat present within lands zoned RU2 does not support habitat attributes required for these species i.e. hollows, freshwater wetland, mature eucalypts or dense understory for example. The precautionary principle would suggest that species that have not been excluded though targeted survey may occur within the land in question. Potential foraging habitat for SAII species, Swift Parrot exists in the north west of the land zoned RU2. The species was not recorded during diurnal bird surveys however the site is currently mapped as important habitat. Under an SaII assessment, it is considered very unlikely that the Swift Parrot would have any likelihood of a significant impact, this is primarily because the species breeds within Tasmania and travels north in winter to forage. The Rezoning Area contains only 23 winter flowering eucalypt species (as per the 2017 Naturecall report) and thus only a negligible amount of foraging resource would be removed. Due to the offsetting provisions of the CKPoM, the Swift Parrot would have a net increase in the available winter flowering resource as a result of this rezoning and subsequent development of R1 land.	A BDAR is in progress on the land in question and targeted survey has removed a number of species credit species from occurring within the land zoned RU2. Of the species that have outstanding targeted survey requirements the quality of habitat present within lands zoned RU2 does not support habitat attributes required for these species i.e. hollows, freshwater wetland, mature eucalypts or dense understory for example. The precautionary principle would suggest that species that have not been excluded though targeted survey may occur within the land in question. However given the ongoing maintenance that occurs targeted surveys are expected to exclude the vast majority of these species from being present in RU2 zoned land. The exception to this is the threatened amphibian, *Crinia tinnula*. An expert report has been undertaken for the Subject Land however the data is now 17 years old. It should be noted however that no substantial hydrological change has occurred since that time as per survey conducted in October 2023. This survey confirmed that the Connell Wagner Report is still current. This report (Appendix 1) details a small area within the far south of the RU2 zone which recorded Wallum Froglets calling. It was also suggested that a vast majority of the Subject Land could provide habitat during periods of heavily rainfall. However, the 2007 detailed investigation by Connell Wagner was part of an LES investigation for the Subject Land in its entirety. Accordingly, the LES and associated LEP made appropriate provisions of C2 zoning to accommodate for wetland buffers and biodiversity considerations, including but not limited to, refuge habitat for the Wallum Froglet. As such, the C2 allowance for Wallum Froglet Habitat has already been duly considered.
	Key habitats for migratory species	A search of Bionet records of migratory species recorded within 5 km of the subject land revealed numerous records. None of which fell within the subject land. The vast majority of the species records generated are of marine/coastal associated species of which suitable habitat is not supported on land mapped as PCT 4004.	A search of Bionet records of migratory species recorded within 5 km of the subject land revealed numerous records. None of which fell within the subject land. The vast majority of the species records generated are of marine/coastal associated species of which suitable habitat is not supported land mapped as PCT 3915. The fork-tailed swift is the exception to this, however due to the low vegetation integrity of the subject land and better quality habitat that is present on adjacent land it is not considered that the land in question is considered key habitat for the fork-tailed swift and hence has not been included in HEV mapping for the land in question
4.1 Nationally important wetlands		A review of DIWA shows that there are no recognised wetlands mapped on land within RU2 zone that is mapped as PCT 4004. Therefore such wetland values have not been considered for HEV.	A review of DIWA shows that there are no recognised wetlands mapped on land within RU2 zone that is mapped as PCT 3915. Therefore such wetland values have not been considered for HEV.
4.2 Vulnerable estuaries and Intermittently Opening and Closing Lakes and Lagoons (ICOLLs)		A review of mapping revealed that no vulnerable estuaries or ICOLLs are mapped on the RU2 zoned land.	A review of mapping revealed that no vulnerable estuaries or ICOLLs are mapped on the RU2 zoned land.

High Environmental Value (HEV) Criteria and Components	PCT Scale HEV Result (4004)	PCT Scale HEV Result (3915)
5.1 Karst landscapes	A review of relevant mapping and Guide to New South Wales Karst and caves suggest no such habitat is present in the locality of the Subject Land.	A review of relevant mapping and Guide to New South Wales Karst and caves suggest no such habitat is present in the locality of the Subject Land.
5.2 Sites of geological significance included in the State Heritage register or Heritage Register	A review of sites of geological significance listed in Annexure A are not within the vicinity of the land in question and will not contribute to HEV of the site.	A review of sites of geological significance listed in Annexure A are not within the vicinity of the land in question and will not contribute to HEV of the site.

6. Conclusion

This report has assessed the ecological values of land within Lot 11, 16 & 17, DP 1277594, Hillier Parade, South West Rocks. This assessment is to support the rezoning planning proposal for land currently zoned RU2 and has been requested by the *NSW Biodiversity Conservation Department.*

This assessment considers all relevant documentation that has been published for the Subject Land. Existing information has concluded that three Plant Community Types (PCTs) exist within the Subject Land in varying condition states. None of these PCTs conform to TECS listed under the *NSW BC Act 2016* or *EPBC Act* 1999.

Part of the land currently zone RU2 is mapped as Secondary 'A' Koala Habitat under KSC CKPoM. The current extent of Koala Habitat mapped with in RU2 zone equates to 4.5 ha. The CKPoM requires impacts to mapped koala habitat to be offset at a ratio of 2:1, requiring an area of 9 ha in total to be offset.

The land proposed for offsetting of impacts to mapped Koala Habitat were deemed suitable as part is currently mapped as Secondary 'A' Koala Habitat under the CKPoM and contains the proposed species for replanting within the description of he community. Similarly, the proposed offsetting area for revegetation is currently mapped as 'other' under the CKPoM, however the proposed species for replanting is described as occurring within the PCT. Specific detail around koala offsetting locations and species can be found in Section 4.3

An assessment of ecological values of the broader subject land in relation to criteria listed in Attachment 2 of the *BCD NE Branch Steps for Assessing Biodiversity in Planning Proposals* has been undertaken. The results of the assessment is summarised below:

- **Biodiversity Values Mapping:** Whilst limited Swift Parrot Foraging habitat exists on the subject land much of the BV mapping does not reflect habitat that would be utilised b the species. As such a BV mapping review has been submitted to review the mapped extent. Further information can be found in section 1.1 of Table 14 and Appendix 3
- **Over cleared Vegetation Types:** Vegetation types, PCT 4004 and confirmed within land zoned RU2 is not considered over cleared. Further detail found in section 2.1 of Table 14
- **Vegetation in Over-cleared landscapes:** The Macleay Alluvial Plains on which the subject land exists is not considered an over cleared landscape. Further detail in Section 2.2 of Table 14.
- **Threatened Ecological Communities:** PCTs present on the Subject Land did not conform to the Final Determination (*BC Act*) or the Conservation Advice – Key Diagnostics (*EPBC Act*) for Coastal Swamp Sclerophyll TEC due to the geological setting or inundation period. Further detail found in section 2.3 in Table 14 and Section 3.3 and Section 4.6.
- **Key habitat for threatened species under the BC Act:** A number of threatened species have been recorded on the subject land out side of the Rezoning Area. Habitat within the Rezoning Area is degraded with improved habitat to the eat of the Subject

Land. It is unlikely the vegetation in the Rezoning Area constitutes key habitat for a threatened species, some of which however is mapped as koala habitat and will be offset according the CKPoM. The Wallum Froglet has also been recorded on the Subject land and specific habitat study undertaken. Buffers have been included in the initial C2 zone planning and as such accommodate Wallum Froglet Foraging habitat Further detail in section 3.1 of Table 14 and Appendix 1.

- **National Important Wetlands:** No National Important Wetlands were mapped within the Rezoning Area**.**
- **Vulnerable estuaries and ICOLLS:** There are no vulnerable estuaries or ICOLLS present in the Rezoning Area.
- **Karst Landscapes:** No Karsts are recorded in the Locality.
- **Sits of Geological Significance:** No sites of geological significance are present in the locality.

It is understood that Lot 16 and Lot 17 DP1277594 are in the same ownership and the proposed revegetated Koala habitat offset areas would be secured on title through a VPA and ultimate dedication of the land to council of the National Parks Estate, or, under an 88B restriction on use requiring landowner managmemetn of the area in accordance with a Vegetation Management Plan.

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Appendices

A-1 Wallum Froglet Study (Connell Wagner 2007)

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South West Rocks LES Investigations
Detailed Wallum Froglet Study

Lot 19 DP 882848, Lot 52 DP 831284, Lot 509 DP 850963, and Lot 84 DP 792945, South West Rocks

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Table of Contents

1. Introduction

Kempsey Shire Council engaged Connell Wagner to present detailed information on the distribution and abundance of the Wallum Froglet (*Crinia tinnula*) in South West Rocks. In particular, the distribution of the species on the land identified as Lot 29 DP 1100740, Lot 51 DP 831284, Lot 52 DP 831284, Lot 84 DP 792945, Lot 509 DP 850963 in South West Rocks was to be identified. This information is to assist in decision making for an application to rezone the land between Phillip Drive and Belle O'Connor Street to permit residential development.

1.1 Location of Study Site

South West Rocks is a coastal village located on the North Coast of NSW, approximately 35 kilometres northeast of Kempsey. The study site constitutes an area of approximately 110 hectares and is situated between Phillip Drive and Belle O'Connor Street in South West Rocks (Figure 1.1).

The area is bounded to the west by the South West Rocks Golf Course and the Council Sewage Treatment Plant. Saltwater Lagoon forms the eastern boundary of the site. The southern boundary of the study site is the unformed extension of Belle O'Connor Street, whilst to the north the site adjoins the southern boundary of the former Caltex and Shell Fuel Depots and the residential properties along Phillip Drive.

Current access to the site is from the southern end of Waianbar Close. An unformed access road also exists from Belle O'Connor Street to service the existing dwelling in the south west corner of the site.

1.2 Objectives of the Study

The objectives of the Wallum Froglet study were to:

- Investigate the distribution and abundance of the Wallum Froglet in South West Rocks and, in particular, on the study site;
- Present information on the habitat requirements of the Wallum Froglet;
- Identify and map Wallum Froglet habitat on the study site;
- Identify land use constraints on the study site with regard to the Wallum Froglet; and
- Identify management actions that will facilitate the maintenance of the Wallum Froglet population and habitat in perpetuity.

2. Methods

2.1 Scope of Works

The scope of works undertaken for this study included:

- Literature review;
- Database searches;
- Limited field survey; and
- Preparation of report and mapping.

2.2 Sourcing of Wallum Froglet Records in the South West Rocks Area

Records of the Wallum Froglet in the South West Rocks area were derived from:

- A review of existing studies relating to the study site as well as Saltwater Lagoon;
- A search of DEC's Atlas of NSW Wildlife for a 10 km radius around the study site; and
- Field observations of the species in the South West Rocks area.

The study site, and the Saltwater Lagoon area in general, have been the focus of several investigations on the environmental and ecological issues related to the area. Information from these studies has been extracted to compile a description of the study site (presented in Section 4 of this report). An outline of the information that was extracted from these sources is provided below.

- A description of topography and soils within the study site was sourced from Connell Wagner (2005).
- Vegetation descriptions were sourced from Peter Parker (2002), Kendall and Kendall (2003) and Connell Wagner (2005).
- Wallum Froglet survey information was sourced from Peter Parker (2002), Kendall and Kendall (2003) and Connell Wagner (2005).
- Wallum Froglet records across the study site were sourced from Connell Wagner (2005).

2.3 Mapping of Wallum Froglet Habitat Across the Study Site

Mapping of Wallum Froglet habitat, and predicted distribution of the species across the study site, was based on:

- The species' preference for wallum vegetation, that is vegetation occurring on high acidity, low fertility soils overlying a high water table;
- The distribution of soils suitable for supporting wallum vegetation across the study site, namely the Swamp Soil Landscapes of Clybucca, Hat Head and Seven Oaks; and
- The distribution of wallum vegetation, namely Mixed Sedge/Heath, Swamp Forest, Sedgeland, Shrubland and Scribbly Gum woodland.

The Wallum Froglet records from Connell Wagner (2005), together with the wetland/estuary buffer recommended by WBM (2006), were then overlain on a map to illustrate the predictive distribution of the species over the site.

3. Wallum Froglet Species Profile

3.1 Distribution

In New South Wales, the Wallum Froglet has been recorded in coastal rain shadow areas in the Sydney Metropolitan, Hunter/Central Rivers and Northern Rivers regions (DEC 2006). The Wallum Froglet is restricted in its distribution to coastal heath and wetlands from Littabella National Park, near Bundaberg in Queensland, to the Sydney Metro Catchment Management Region on the NSW central coast (Ehmann 1996a; DEC, 2005). Large areas of coastal heath within the species range have been cleared or modified for housing development, agriculture and plantation forestry.

3.2 Habitat Requirements

3.2.1 'Wallum' Habitat

Wallum is an aboriginal word for the Wallum Banksia (*Banksia aemula*), found growing on the coastal lowlands between northern New South Wales and southern Queensland. The term 'Wallum' is commonly used to describe coastal vegetation types growing on sand dunes or flat to undulating country with acid soils and a high water table. The Wallum Froglet belongs to a group of frogs known as acid frogs (Ingram and Corben, 1975), so named for their ability to breed in waters of low pH (high acidity) which are characteristic of coastal wetlands.

The term 'Wallum habitat' encompasses a broad spectrum of vegetation types, including open (dry) heathland and shrubland, closed (wet) heathland and sedgelands, and woodlands dominated by Scribbly Gum and banksias. Because minor changes in slope and soil moisture can lead to dramatic changes in habitat type, it is common to see several distinct habitats in a short distance with seemingly little change in the terrain.

Wallum habitats are highly susceptible to environmental disturbance. Any small change in the environment, such as variations in hydrology (water tables and drainage) or the addition of soil nutrients (via storm water and general runoff), has the potential to affect the ecology of the wallum habitat and this has flow-on effects to animals living in the wallum. Altered wallum habitats cannot support the same diversity of species.

3.2.2 Other Habitats Utilised by Wallum Froglet

Whilst much of the literature states the Wallum Froglet has specific habitat requirements, such as acidic paperbark (*Melaleuca*) swamps, *Melaleuca*-Swamp Mahogany forest, sedgeland, *Blechnum* (fern) swamps and ephemeral bogs, low closed scrub, warm temperate grasslands and wet heath (Ehmann 1997; Darkheart 2004a; Darkheart 2005; Darkheart 2006), occurrences of the species in semi-natural, temporarily flooded areas are not infrequent. For example, the Wallum Froglet has been recorded in pasture adjacent to swamps/wetlands and heaths (Robinson 1995; Cogger 1992; Tyler 1992; EEC 1998), flooded (and in some cases cattle-trodden) pasture next to a remnant wetland (Berrigan 2002; Darkheart 2005) and in cleared modified drains and shallow ponds adjacent to remnant paperbark acid swamp (Darkheart 2004; Darkheart 2006).

Whilst records of the Wallum Froglet are generally confined to vegetation on poorly drained soils, vegetation types range from wetland associations on waterlogged alluvial soils to drier forest on clay loams (DEC 2006). Despite records in such a range of vegetation associations, localised rainfall, micro-topography, ground water levels and/or proximate preferred wetland habitat are likely to have influenced the occurrence of this species in the drier associations.

3.3 Behaviour Patterns

Breeding appears to mainly occur within habitat subject to shallow ephemeral inundation, often after heavy local winter rainfall and/or flooding. The period of egg incubation extends for 28 to 30 days, thus the species is often successful in breeding in ephemeral and disturbed situations (Mike Mahoney pers. comm. 21/3/06[1]). The known breeding period is in autumn and may also occur in late winter, spring and late summer (FAN, 2006). Males can call all year round from secluded positions beside the water or while afloat among vegetation (FAN, 2006). During drier periods, the frog retreats to denser moist vegetation, eg closed heath, and emerges when suitable moist conditions occur. It does not usually occupy permanent water bodies, and avoids deep water (EEC 1998).

Foraging, shelter, roosting and refuge habitat is typically moist microhabitats in swamps, or wet or dry heaths, or sedge grasslands and swamps (DEC, 2006).

3.4 Threats

The overall abundance of Wallum Froglet is generally considered to be declining. This decline has been attributed to a number of threats, including *Key Threatening Processes* listed on the TSC Act. These threats include:

[1] Mike Mahoney – Associate Professor and Herpetologist of Newcastle University

- **Vegetation clearance and modification of coastal wetlands**

  Pressure from coastal urban development and historic agricultural landuse has led to clearing of native vegetation within, and adjacent to, coastal wetlands, as well as draining and infilling of wetlands. Both clearing of native vegetation and wetland modification are listed as *Key Threatening Processes* on the TSC Act. Both threatening processes have placed enormous pressure on the Wallum Froglet (DEC, 2006).

- **Inappropriate Catchment Management**

  Pressures from coastal landuses (such as urban development and agriculture) have led to poor catchment management and planning decisions. Consequently, coastal wetlands have been the focal point for impacts from altered stormwater regimes and subsequent coastal wetland water quality issues have occurred. The Wallum Froglet is considered sensitive to poor water quality (DEC, 2006).

- **Vehicular collision**

  In a study on the North Coast of NSW, Goldingay and Taylor (un-published) found that the Wallum Froglet was particularly sensitive to vehicular collision road fatalities. This threat is typically increased when high volume roads bisect areas of suitable habitat, essentially creating two habitat isolates and sub-populations.

- **Frequent Fire**

  A high fire frequency in Wallum Froglet habitat is considered a threat to this species (DEC, 2006).

- **Grazing**

  Stock grazing on, and adjacent to, Wallum Froglet habitat is likely to alter vegetation structure and water quality resulting in a threat to the species (DEC, 2006).

- **Introduced species**

  The introduced Plague Minnow (*Gambusia holbrooki*) is an invasive and aggressive aquatic fish known to predate on tadpoles, and this is considered to represent a threat to the Wallum Froglet (DEC, 2006).

4. Site Description

4.1 Topography and Soils

According to Connell Wagner (2005), the study site contains three types of soil landscape groups: aeolian/barrier landscapes, swamp landscapes and disturbed landscapes. These landscapes are described below.

4.1.1 Aeolian/barrier Landscapes

The aeolian/barrier landscapes include the Korogoro soil landscape located at the far south of the study site. This landscape consists of low transgressive Pleistocene dunes located in areas of less than ten metres above sea level and slopes of less than five percent. The relief is extremely low, being typically less than three metres, but may range from one to nine metres.

The Korogoro soil landscape is characterised by sandy soils with high erodibility, high permeability, very low available water holding capacity and low fertility. This landscape has been associated with a number of limitations, including rapid drainage, groundwater pollution hazard, severe wind erosion hazard, non-cohesive soils and very low moisture availability.

4.1.2 Swamp Landscapes

The study site contains three swamp soil landscapes, the Clybucca, Hat Head and Seven Oaks soils. Swamp soil landscapes, by virtue of their strong acidity, low fertility and high water tables, provide conditions suitable for wallum vegetation. Areas supporting wallum vegetation, in turn, are known to be favoured by the Wallum Froglet. Hence, it is reasonable to base the predicted occurrence of the Wallum Froglet within the study site not only on the vegetation, but on the underlying soil landscape, particularly as the physico-chemical nature of water bodies is strongly influenced by the underlying substrate.

Clybucca Soil Landscape

The Clybucca soil landscape consists of backbarrier muddy swale swamps and closed-depressions overlying Pleistocene sands. Relief is less than one metre; elevation is less than five metres; and slopes are less than three percent. This landscape is characterised by organic soils with low wet bearing strength, sodicity, low subsoil permeability, localised acid sulfate soil potential, strong acidity, high aluminium toxicity potential and low fertility.

The Clybucca soil landscape has been associated with a number of limitations, including poor drainage, high run-on, flood hazard, permanently high watertables, groundwater pollution hazard, non-cohesive soils, high foundation hazard and soil fire hazard.

Hat Head Soil Landscape

The Hat Head soil landscape is the dominant landscape of the northern half of the study site. The Hat Head soil landscape consists of level closed and open-depressions perched within Pleistocene dunes. Relief is less than one metre and elevation less than 20 metres. Open-depressions may have slopes of about one per cent, while closed-depressions are slightly concave or flat. A variant of this landscape is present in the study site as level, backbarrier beach ridge swale swamps.

Soils associated with the Hat Head soil landscape are organic soils with low wet bearing strength, high erodibility, low permeability, strong acidity, low available waterholding capacity and low fertility. The Hat Head soil landscape has been associated with a number of limitations, including poor drainage, flood hazard, permanently high watertables, groundwater pollution hazard, non-cohesive soils and high foundation hazard.

Seven Oaks Soil Landscape

A small area of the Seven Oaks soil landscape is present on the central eastern boundary of the study site. The Seven Oaks soil landscape is characterised by alluvial deltaic backswamps and flood basins. Relief is less than one metre, elevation is less than five metres and slopes are less than one per cent.

Soils associated with the Seven Oaks soil landscape are organic soils with low wet bearing strength, high erodibility, sodicity, low permeability, potential acid sulfate soils, strong acidity, high aluminium toxicity potential and salinity. In addition to limitations posed by these qualities, the Seven Oaks soil landscape has been associated with a number of limitations, including poor drainage; high flood hazard; seasonal waterlogging; permanently high watertables; groundwater pollution hazard; foundation hazard and soil fire hazard.

4.1.3 Disturbed Landscapes

The study site also contains a disturbed area along or in close proximity to the northern and western boundaries of the study site. Disturbances to this landscape unit are such that its properties no longer represent a naturally occurring soil landscape, occurring where the original soil has been removed, greatly disturbed or buried. The disturbed terrain in the study site is noted to consist of unconsolidated sandy or gravelly materials.

4.2 Vegetation Communities on the Study Site

Seven vegetation communities have been identified by Peter Parker (2002), Kendall and Kendall (2003) and Connell Wagner (2005) as occurring on the study site. These include Mixed Sedge/Heath, Open Forest, Swamp Forest, Sedgeland, Shrubland, Scribbly Gum Woodland, and Red Gum/Swamp Mahogany Woodland. The distribution of vegetation communities across the study site is illustrated in Figure 4.1. A brief description of each community is provided below.

4.2.1 Mixed Sedge Heath

A wet heath / sedge land community occurs in an area recently slashed or cleared in the northern sections of the site. Kendall and Kendall (2003) considered regeneration by native species to be in the early stages and expected such areas to return to a wet heath - sedgeland complex. This area becomes inundated after rainfall and is subject to poor soil drainage.

4.2.2 Open Forest

Open forest dominated by Needlebark Stringybark (*Eucalyptus planchoniana*), Red Bloodwood (*Corymbia gummifera*) and Saw Banksia (*Banksia serrata*) occurs near the central western boundary of the site, adjacent to Swamp Forest. The community contains some mature to senescent trees with occasional hollows.

4.2.3 Swamp Forest

Swamp Forest, dominated by Broad-leaved Paperbark (*Melaleuca quinquenervia*), Prickly Tea Tree (*M. nodosa*) and Heath-Leaf Banksia (*Banksia ericifolia*), occurs along the site's central drainage line. This area is subject to poor drainage and inundation.

4.2.4 Sedgeland

The sedgeland is dominated by *Baumea juncea* and occurs along the eastern boundary, adjacent to Saltwater Lagoon; patchily along road edges; within the shrubland community; within the Scribbly Gum woodland community; and along water body margins. This community is subject to regular inundation.

4.2.5 Shrubland

Shrubland dominated *Banksia ericifolia var. macrantha* is scattered through the central and northern parts of the study site and dominates the poorly drained areas in the south and southeast of the site. The presence of occasional emergent Swamp Mahogany (*E. robusta)*, paperbarks and other typical swamp associates suggests the area is subject to poor drainage and likely to be inundated during prolonged rainfall.

4.2.6 Scribbly Gum Woodland

Woodland dominated by Scribbly Gum (*Eucalyptus racemosa*) and Pink Bloodwood (*Corymbia intermedia*) is scattered in the northwest corner, forms much of the eastern boundary and occurs in the southwest and south of the study site. It contains occasional hollow-bearing trees. The mid-storey contains Prickly Tea Tree (*Melaleuca nodosa*) and occasional Broad-Leaved Paperbark (*M. quinquenervia*) in association with Heath-Leaf Banksia (*B. ericifolia*), suggesting a poorly drained substrate.

4.2.7 Red Gum/Swamp Mahogany Woodland

Woodland dominated by Forest Red Gum (*Eucalytpus teretecornis*), Swamp Mahogany (*E. robusta*) and Coastal Wattle (*Acacia sophorae*) occurs in the northwest corner of the site, adjacent to the golf course. The urban interface contains areas disturbed by the dumping of garden waste. The presence of Swamp Mahogany suggests the association occurs over a relatively high water table.

4.3 Habitat Connectivity

4.3.1 Key Habitats and Corridors

Scotts (2003) presents information on key habitats and regional corridor interconnectivity on the north coast of New South Wales, and identifies the study site as *Key Habitat*. Scotts (2003) also identifies the study site as forming part of a *Regional Corridor*, intended to link large areas of Key Habitat to the west to those along the coast to the east and south (Figure 4.2). The Regional Corridor extends to the north of the study site towards Arakoon State Conservation Area and to the south of the study site to Hat Head National Park.

The integrity and viability of the Regional Corridor, however, is threatened by habitat fragmentation to the west, northwest and southwest. This fragmentation has been created by urban development, urban infrastructure, and other landuses involving vegetation clearing. Such fragmentation exacerbates the natural barrier created by the Macleay River and is likely to restrict the suitability of the Regional Corridor to more mobile species capable of crossing areas of cleared land. Such species include highly mobile species (eg birds and bats) and slightly less mobile species (eg Koala, Brush-Tailed Phascogale), though the latter group would incur some substantial risk (eg traffic collision and predation) and are incapable of crossing the Macleay River.

4.3.2 Local Corridor Connectivity

In terms of connectivity in the immediate locality of the study site, for species with low mobility (ie the Wallum Froglet), the study site currently has good connectivity to the east and northeast and to the south and southeast. Hence, the populations of less mobile species are restricted to these areas and isolated from other populations to the west.

Linkage to the east and northeast extends through Saltwater Lagoon and towards Arakoon State Conservation Area and the northeast extent of Hat Head National Park. Linkage to the south and southeast extends into Hat Head National Park. Vegetation communities in these contiguous areas of habitat include, but are not restricted to, swamp forest, wet heath, dry and wet sclerophyll forest, littoral rainforest, rushland and beach and tussock grassland (Kendall and Kendall 2003; DEC 2006).

5. Previous Investigations and Evidence of Wallum Froglet

5.1 Peter Parker Environmental Consultants 2002

Peter Parker Environmental Consultants (2002) conducted a detailed flora and fauna survey of the majority of the study site. A small area of land to the southeast of the current study site was not included as it was acquired after the completion of the 2002 study.

The fauna survey took place from 23rd to 26th September 2002, and included a variety of survey techniques targeting amphibians, reptiles, birds and mammals. An earlier survey was conducted on 26th May 2002 for the Wallum Froglet, when weather conditions were considered appropriate (ie scattered showers, previous heavy downpours) for detecting the species. However, the Wallum Froglet was not detected during this study. The apparent absence of calling frogs should not be taken as an indication that the species was absent from the study area, as only one night was dedicated to surveying for the Wallum Froglet. This level of survey is considered inadequate, as DEC (2004) recommends a minimum survey effort of 30 minutes per stratification unit on each of two separate nights.

5.2 Kendall and Kendall 2003

Kendall & Kendall undertook the Saltwater Creek Flora and Fauna Study in 2003 as a supplement to the Saltwater Creek Estuary Management Processes Study. The report provided an outline of the flora and fauna communities and species within the catchment. The study area covered approximately 900 ha and comprised the Saltwater Creek catchment and the north-facing foredunes of Front Beach.

Kendall and Kendall (2003) used information from previous studies and a brief field survey to map vegetation communities. The study identified the extent of watertable dependent communities, which includes known Wallum Froglet habitat (see Connell Wagner 2005), and identifies appropriate buffers to retain the integrity of these habitats. Kendall and Kendall (2003) recommend a buffer of 1 to 1.5 m above the upper reaches of wetland (dependent on periodic flooding and high water tables), with the buffer considered in vertical, rather than horizontal, terms (Map 3 in Kendall and Kendall 2003).

This survey did not specifically target the Wallum Froglet and thus this species was not detected on the study site.

5.3 Umwelt 2004

The area covered by this study comprised Lot 21 DP 560726, a land parcel approximately 30 ha in size located to the south of the current study site on the southern side of Belle O'Connor Street. Umwelt (2004) describe the vegetation as being dominated by pastoral grassland and cleared areas with scattered overstorey species including Blackbutt (*Eucalyptus pilularis*), Red Bloodwood (*Corymbia gummifera*), Scribbly Gum (*E. racemosa*) and Needlebark Stringybark (*E. planchoniana*). Lower lying areas were found to contain Broad-leaved Paperbark (*Melaleuca quinquenervia*) and one Swamp Mahogany (*E. robusta*), remnants of a previously occurring swamp forest ecosystem.

Umwelt (2004) did not record the Wallum Froglet despite a DEC Atlas of Wildlife record suggesting the presence of the species on the subject land. The survey comprised of two person hours over consecutive evenings. Failure to detect the species may have been due to inappropriate survey effort, season and weather conditions. Despite the Atlas for Wildlife record, Umwelt (2004) suggested that the cleared wet soak areas on this site was not preferred habitat for this species, however it was considered to be potentially occurring on site.

5.4 Connell Wagner 2005

Connell Wagner (2005) presents information on the flora and fauna of the current study site as part of a comprehensive LES for a proposed rezoning of the area. The report largely utilised information gathered from previous investigations, however, it identified flora and fauna limitations from these previous investigations.

This study included a field survey, part of which was carried out after heavy rainfall suitable to elicit calling from the Wallum Froglet. The methodology employed during the field survey involved traversing the site and listening for the distinctive calls of the Wallum Froglet. Two captures were recorded to positively identify the species on the site. Once positive identification was made, mapping of the extent of the site utilisation by the froglet was undertaken using GPS to record the extent of the area from which calls could be heard.

The field survey resulted in the detection of the Wallum Froglet over a large proportion of the site, including within much of the Mixed Sedge Heath, Open Forest and Shrubland (Figure 5.1). The calling activity indicated relatively even distribution across this area.

Given the large area of known habitat, Connell Wagner (2005) concluded that the study site is considered likely to contain significant habitat for the Wallum Froglet.

5.5 DEC Atlas of NSW Wildlife

A request (dated 5/4/06) for current data from DEC's Wildlife Data Unit identified the presence of several Wallum Froglet records within 10 km of the study site. This included one record associated with Saltwater Lagoon, 150 metres to the northeast, and a record within 300 metres to the south (Figure 5.2). These records are likely to demonstrate the presence of extant Wallum Froglet populations, rather than an individual observed frog. However, the size and extent of these populations cannot be determined from these records.

6. Distribution of the Local Wallum Froglet Population

6.1 Local Wallum Froglet Records and Sub-populations

The study site and broader locality of South West Rocks are positioned on the coast in the lower Macleay River Floodplain. This broad area of floodplain is typically characterised by periodically inundated alluvial soils, dune swales, back barrier lagoons and wetlands with waterlogged soils and grade up to more elevated floodplain levees, coastal hills and headlands (Keith 2004). The permanently or periodically inundated low lying soils in the area are generally sub-saline or acidic, due to historic sea level changes, and support either saline wetlands (eg mangroves and saltmarsh) or freshwater wetland complexes and swamp forests.

Records extracted from DEC's Atlas of NSW Wildlife, together with unpublished local studies, suggest there are 16 Wallum Froglet records within 10 km of the study site (Figures 5.1 & 5.2) (DEC 2006; Connell Wagner 2005; Darkheart 2004). These records have generally been interpreted as representing sub-populations of Wallum Froglet rather than observations of individual frogs, as this species typically forms localised sub-populations consisting of multiple individuals. While these sub-populations appear to be disjunct, it is possible that breeding, and hence the transfer of genetic information, may occur between proximate sub-populations.

Wallum Froglet records within the South West Rocks area are generally confined to, or in proximity to, wetland associations in low-lying areas and are typical of this species habitat requirements. In this context, the vegetation associations on poorly drained swampy soils are considered to offer suitable habitat for the Wallum Froglet both within the study site and adjoining lands.

Habitat fragmentation from urban development and infrastructure is likely to have caused some isolation and division of Wallum Froglet sub-populations to the west of the South West Rocks township from those to the east and southeast of the town. These two groups of sub-populations are referred to in this study as the 'western population' and 'eastern population', respectively. This isolation of eastern and western populations enhances the significance of the sub-populations, as breeding and the transfer of genetic information, which improves population viability, has also been disrupted. This is particularly relevant for the western sub-population, which is restricted to suitable wetland habitat between the Macleay River to the west and the South West Rocks township to the east.

Records of the Wallum Froglet on the study site are considered to form part of the eastern population, which appears to be directly linked to a record in the north of Saltwater Lagoon and a record to the south on adjacent land. The records may also be linked to sub-populations in Hat Head National Park to the south and southeast (Figure 5.2). The viability of these discrete Wallum Froglet sub-populations in the South West Rocks area relies on the maintenance of corridor connectivity between areas of wetland habitat.

6.2 Wallum Froglet Records Across the Study Site

During a two day site inspection undertaken for Connell Wagner (2005), the Wallum Froglet was detected across a large proportion of the study site following a single rainfall event on 21st April 2004 (Figure 5.1). Calling activity indicated a relatively even distribution of frogs across much of this area, (Connell Wagner 2005).

6.3 Predicted Occurrence of Wallum Froglet Across the Study Site

The study site contains a mosaic of vegetation communities associated with different soil types, as described in Section 4.1 and 4.2 of this report. The areas of swamp soil landscapes (ie Clybucca, Hat Head and Seven Oaks soil landscapes) are typically associated with the Mixed Sedge Heath, Swamp Forest, Sedgeland and parts of the Shrubland and Scribbly Gum Woodland communities occurring on-site. Based on current literature and site records, these vegetation associations are all considered structurally suitable for supporting foraging and breeding by the Wallum Froglet.

Parts of the study site have been periodically slashed over a number of years, which has led to the vegetation being lower and more open than what might have occurred previously. It is not known what impact this has had on the abundance of the Wallum Froglet in the study site (Connell Wagner 2005). However, this species has been recorded in similarly disturbed situations and thus displays some tolerance to recoverable disturbances such as slashing (Darkheart 2004; Darkheart 2005; Darkheart 2006). Despite past disturbance, the habitats on-site are considered capable of sufficiently recovering and maintaining an extant Wallum Froglet population, providing other threats (eg vegetation clearing, reduced water quality) are mitigated.

To effectively manage the Wallum Froglet population within the study site, it is important to identify the key habitat components of the study site required to fulfil the lifecycle requirements of the species, including breeding, dispersal, foraging and movement. There has been limited research on the influence of season and climate on the lifecycle movements of the Wallum Froglet. However, anecdotal evidence suggests that during drier periods the frog retreats to a core area of denser moist vegetation (eg closed wet heath) and emerges when suitable rainfall and moist conditions occur. If such movement patterns are being undertaken by Wallum Froglet on-site, extensive observations of the frog across the site immediately after rainfall may be attributed to an emergence of the frog population from a refuge habitat area in response to the rainfall event on 21st April 2004.

The current evidence suggests that the area of potential Wallum Froglet habitat identified on-site (Figure 6.1) would fulfil most aspects of the species' lifecycle requirements, including foraging, breeding and shelter. Furthermore, the dynamic variables that determine suitable Wallum Froglet habitat are likely to cause expansion and contraction of the site's Wallum Froglet sub-population distribution beyond and within the current boundary of habitat. In this context, establishing suitable habitat boundaries and buffers is considered important for the local sub-population and these should be managed appropriately.

7. Site Constraints and Recommendations

The study site is currently subject to a rezoning application. As part of the considerations for the rezoning assessment, Kempsey Shire Council needs to be able to identify the constraints to, and opportunities for, development of the site. The maintenance of the Wallum Froglet population and its habitat in perpetuity has the potential to conflict with the proposed re-zoning of the site for residential development, with areas of the site constrained by the known and predicted occurrence of the species across the site.

The objectives of the site constraints mapping and assessment were to identify the extent of Wallum Froglet habitat and to highlight the management actions required to maintain the integrity of this sub-population on the study site in perpetuity. Recommended management actions include habitat buffers, corridor retention, appropriate landuse zoning and development design principles. These are described in detail in the following sections.

7.1 Buffers for Wetland Habitat

Several studies have been conducted in the study area and across the Saltwater Lagoon catchment, including flood and water quality studies. Some of these studies have included water quality buffers and flood event boundaries which may influence the ecology of the Wallum Froglet.

Kendall and Kendall (2003) conducted a flora and fauna study of the Saltwater Creek Catchment and mapped the extent of the catchment's wetland boundaries. While often not permanently inundated, the flora and fauna assemblages within these areas require periodic and intermittent inundation to remain viable (Kendall and Kendall 2003). The Wallum Froglet is typically known to occupy ephemeral habitats such as these. The wetland boundaries were derived by Kendall and Kendall from the expected vertical variation in water levels as well as a lateral offset between the maximum inundation extents and the possible future development areas (Kendall and Kendall 2003).

In addition, WBM (2006) recommended that development be excluded from areas within the wetland boundary and that these areas be rezoned 7(a) environmental protection. The final extent of the buffer recommended by WBM constituted a 50 metre horizontal distance outside of the 3.0 m AHD contour. This area was considered a necessary buffer to ensure long term sustainability and maintenance of environmental values of Saltwater Creek and Lagoon (WBM 2005). This wetland boundary and its buffer area are illustrated in Figure 7.1.

These boundaries generally correspond with the predicted distribution of Wallum Froglet across the study site, based on the species' habitat requirements, the distribution of soil landscapes supporting wallum vegetation and the distribution of wallum vegetation (Figure 7.1).

While not specifically related to Wallum Froglet habitat, ideal wetland vegetation buffers should match the intensity of the adjacent land use or land use impacts. Identification of the key land use impacts will help in formulating objectives designed for attaining a site specific buffer (DPI&F 2004). Buffers for the maintenance of wetland vegetation should be between 10 to 50 metres in horizontal distance from the wetland boundary (Nambucca Shire Council 2005; Prosser *et al*. 2006), but will depend on the intensity of the adjoining landuse. Considering the rezoning application is to allow for residential landuse (ie an intensive landuse), the preferred buffer should be at the upper limit of this range (ie 50 metre horizontal distance) and extend from the outer edge of the predicted distribution of Wallum Froglet habitat, as identified in Figure 7.1.

7.2 Corridor Retention

During the process of planning for future landuse, the allocation of habitat corridor networks is vital for the conservation and maintenance of viable flora and fauna assemblages, particularly threatened biodiversity. The main functions of corridors are to:

- provide for the movement of fauna through contiguous habitat;
- allow for population replenishment post-disturbance (eg from fire); and
- to facilitate genetic exchange between populations (Bennett 1990, Saunders 1990, Winter 1991, Goldingay and Kavanagh 1991).

The isolation of the Wallum Froglet sub-populations from other areas of potential habitat, and therefore other potential sub-populations (ie populations in Saltwater Lagoon, habitat on adjacent land to the south and within Hat Head National Park) would diminish the long-term viability of the study site sub-population. It is therefore essential that the provision of corridors be considered when allocating future landuse not only to the study site, but also on adjacent land.

Ideally, corridors for the Wallum Froglet should include areas of suitable habitat and preferably link to other large areas of suitable habitat that support a sub-population of the species. The most obvious corridor link to retain is to Saltwater Lagoon to the immediate east of the study site (Figure 6-1).

Saltwater Lagoon contains the nearest known record of Wallum Froglet outside the study site and represents the most feasible and sustainable habitat linkage to the site.

The Wallum Froglet has also been recorded within Hat Head National Park, which occurs to the south and southwest of the study site and offers a variety of habitats, including those suitable for Wallum Froglet habitation. Currently, there is an intact link to Hat Head National Park and the study site via a 300 metre strip of known Wallum Froglet habitat to the south of the study site (Figure 6.1). However, this area of Wallum Froglet habitat occurs on land currently subject to a Development Application by its land owner, separate to this rezoning. Hence it is likely that not only may an existing corridor be severed, but a link between the study site and a conservation reserve which could potentially ensure the long-term viability of Wallum Froglet habitat may also be lost. The management of the viability of the Wallum Froglet sub-populations on the study site, within Saltwater Lagoon and the overall Wallum Froglet population occupying suitable habitat in the South West Rocks locality is dependent upon appropriate planning and management of development of linkages between known sub-populations, including those on the study site and those within Hat Head NP. Therefore the cumulative impacts of development within the South West Rocks area will need to be considered by Kempsey Council in determining future applications for development in the area.

7.3 Future Land Use on the Study Site

In order to manage and maintain the integrity of the Wallum Froglet sub-population on the study site, it is important to identify areas suitable for certain land use practices at the rezoning stage. There are three land use zones that currently apply to the site: 1(c) Rural (Small Holdings), 1(d) Rural (Investigation) and 7 (a) Wetlands Protection Zone (Kempsey LEP). The current zoning does not permit residential development on any part of the site, thus a rezoning application to allow such development on the site has been lodged by the landowner.

Extensive residential development within the study site could potentially result in substantial impacts on the sub-population of Wallum Froglet detected in the area if not appropriately managed. Such development could involve loss of breeding, shelter and forage habitat, habitat fragmentation, the creation of sub-population isolates and the introduction of threats that have the potential to rapidly reduce the size of the Wallum Froglet sub-population, eg road fatalities (Goldingay and Taylor unpublished literature). An Assessment of Significance under Section 5A of the *Environment Planning and Assessment Act 1979* (EP&A Act), as amended by the *Threatened Species Conservation Act 1995* (TSC Act) has not been undertaken for this study but will need to be undertaken for any future applications for development of the site should the rezoning proceed. It is considered likely that such an assessment could conclude that the impacts of residential development across the entire site may be significant enough to warrant a Species Impact Statement (SIS) and concurrence from DEC. Therefore, areas of the site significantly constrained by the Wallum Froglet populations are recommended to be excluded from those areas proposed to be rezoned for residential purposes.

In this context, it is important to identify a boundary and buffer that excludes development from within the area identified as important to the Wallum Froglet. Hence, all development, including roads, houses and infrastructure should be constructed outside of this buffer area.

Figure 7.1 identifies Wallum Froglet habitat across the site. This includes all known habitat for the species on site, and areas of potential habitat identified from vegetation mapping and soil landscape information.

The area of land within this boundary should ideally be rezoned from 1(d) Rural Investigation and 1(c) Rural Small Holdings to 7(a) Wetland Protection to maintain Wallum Froglet habitat on-site in perpetuity. This is in keeping with WBM (2006) which concluded that much of this area is unsuitable for development due to the environmental sensitivity of the Saltwater Creek Catchment, which is currently considered at a threshold of contaminated stormwater inputs from current urban development. This factor is relevant to the sub-population of Wallum Froglet, a species considered sensitive to poor water quality.

7.4 Development Design Principles

Should Council decide to rezone portions of the site that are less critical to the local Wallum Froglet sub-population, such as the northern and southern areas of the site beyond the limits of the known occurrence including an appropriate buffer zone, it is recommended that several design principles be implemented to maintain the viability and security of the Wallum Froglet sub-population on-site. These principles are described in the following sections.

7.4.1 Avoid Habitat Isolation

Wallum Froglet habitat must not be isolated or fragmented by development, particularly roads. Development should be restricted to the outer fringes of the study site (ie north and southwest portions of the site) and roads should not bisect areas of Wallum Froglet habitat. The Wallum Froglet has been recorded crossing roads in large numbers where adjoining suitable habitat occurs, resulting in extensive traffic collision fatalities (Goldingay and Taylor unpublished literature).

7.4.2 Minimise Traffic Speed

Traffic speed within the development area should preferably be restricted to less than 50 km/hour by suitable signage and road design. This should limit the loss of excessive numbers of frogs from traffic collision and also advantage other fauna groups, such as Koala.

7.4.3 Stormwater Treatment

Stormwater should be treated on-site via appropriately constructed wetlands, or other appropriate water sensitive urban design solutions, to limit the extent of contaminated inputs flowing into Saltwater Lagoon and Wallum Froglet habitat. However, consideration should be given to the location of constructed wetlands so that individual frogs are not guided to an area of high risk (eg developed area or road).

7.4.4 Minimise Habitat Loss

Clearing for the purpose of development is to be excluded from within Wallum Froglet habitat and adjoining buffer as identified in Figure 7.1. This measure also applies to the allocation of any required Bushfire Asset Protection Zones, which should be located outside of the identified Wallum Froglet buffer zone. If vegetation removal is unavoidable, then suitable Wallum Froglet habitat must not be fragmented (ie only the outer edges are to be removed as a last resort).

8. Conclusion

In general, the flood liable and ephemeral nature of the study site and adjoining Saltwater Lagoon present ideal environmental conditions for supporting foraging and breeding habitat for the Wallum Froglet. This species is listed as 'vulnerable' under the *Threatened Species Conservation Act (1995)*.

Several key site constraints and recommendations for the future management and zoning of the study site have been identified based on the current information on the distribution of Wallum Froglet in the South West Rocks area. Much of the site has been mapped as potential Wallum Froglet habitat with an area of known habitat in the central section of the site.

Key management actions recommended for the future development of the area include:

- Excluding development from potential Wallum Froglet habitat;
- Allocating appropriate buffers to maintain potential Wallum Froglet habitat;
- Retaining corridors and linkages between proximate sub-populations;
- Applying zonings appropriate for maintaining the population in perpetuity; and
- Applying development design principles to minimise the impacts to retained Wallum Froglet habitat including:

– avoid habitat isolation;
– Minimise traffic speed;
– Appropriate stormwater treatment; and
– Minimise habitat loss.

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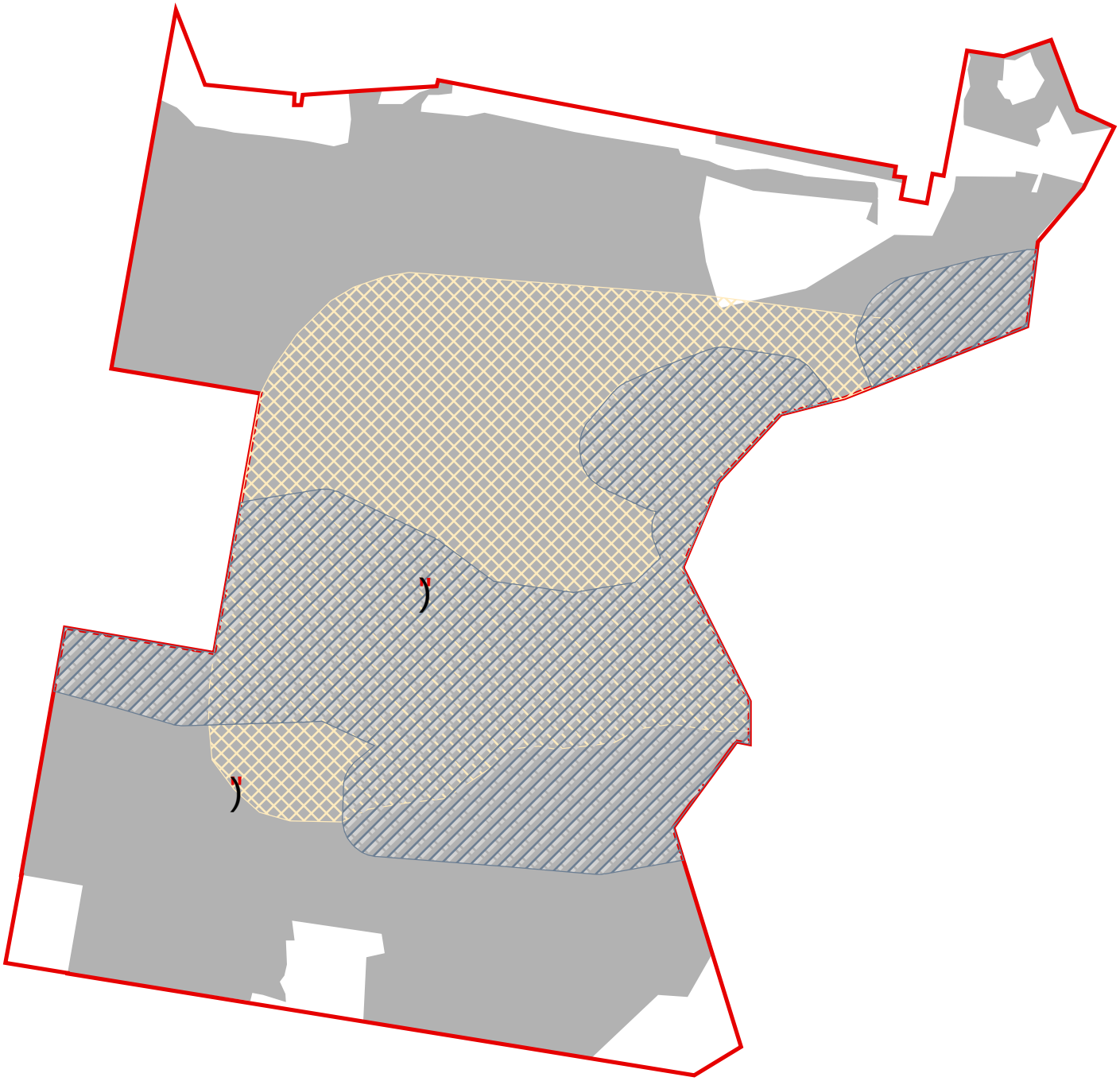


LEGEND

- Study Area
- Predicted Wallum Froglet Habitat
- Extent of Wallum Froglet Calling *Connell Wagner 2004*
- Wallum Froglet Observation *Connell Wagner 2004*
- Recommended Wetlands/Estuary Buffer *WBM 2006*

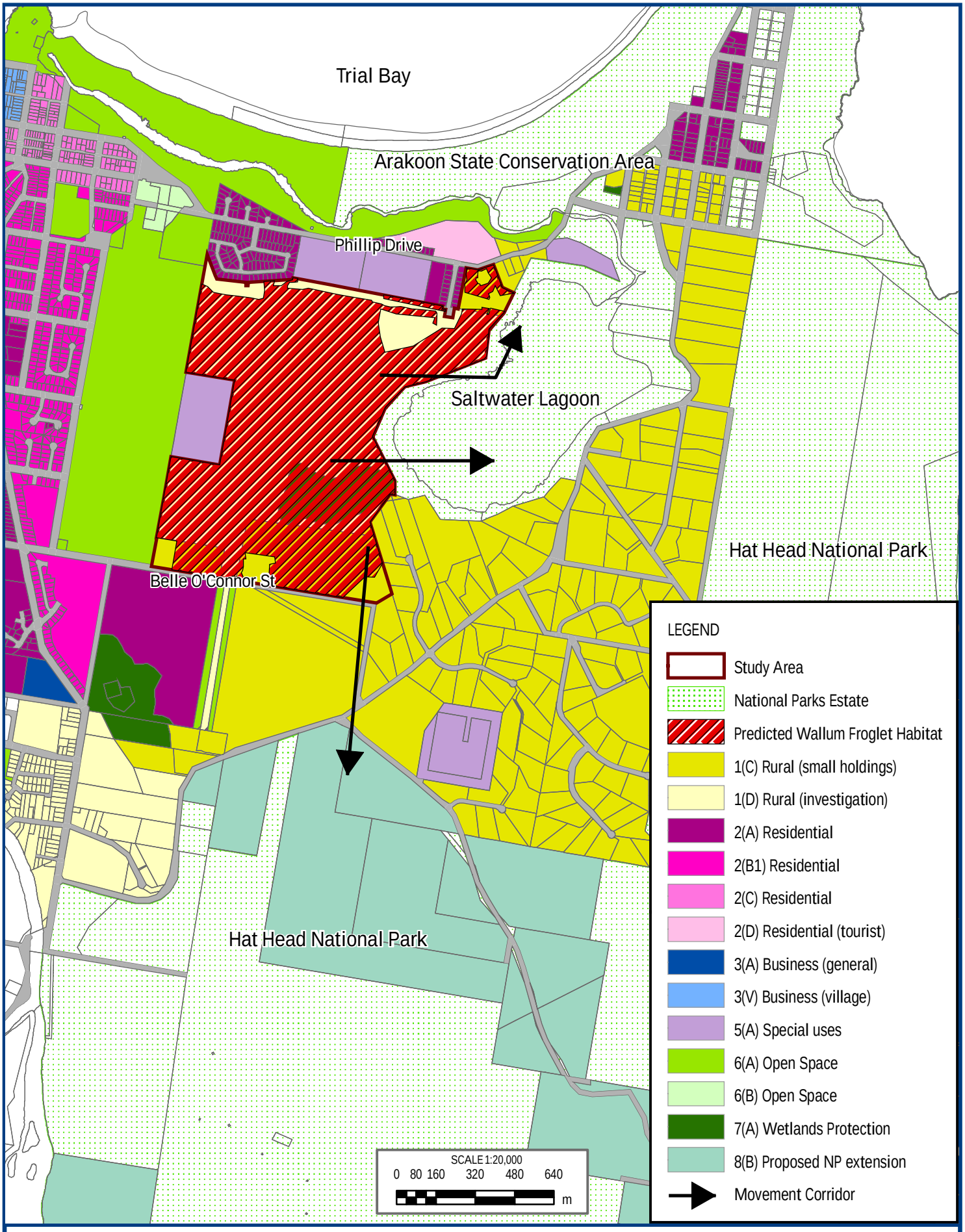
SCALE 1:8,000

0 37.5 75 150 225 300 m

South West Rocks
Local Environment Study
Detailed Wallum Froglet Study

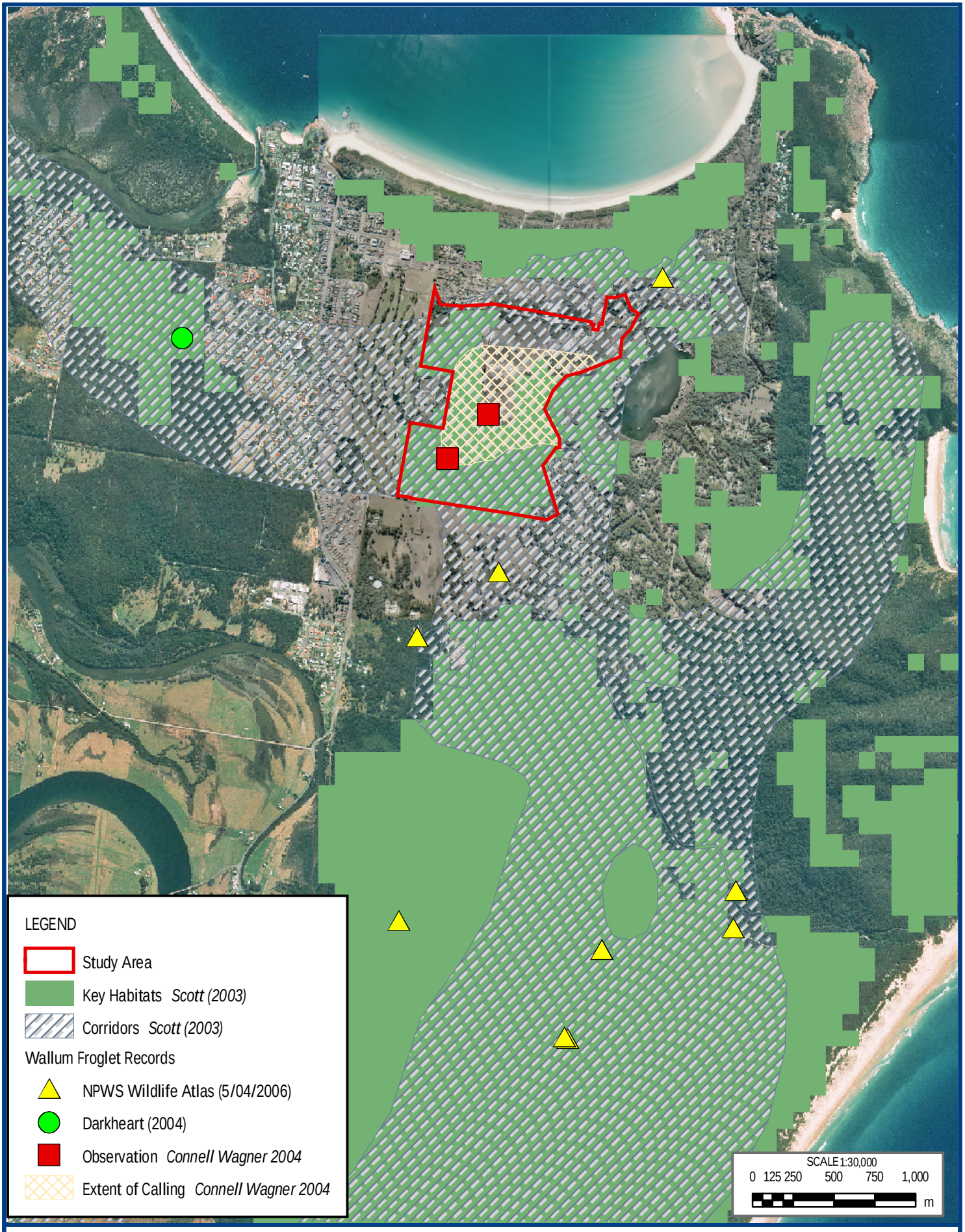
EMP - Estuary Management Plan

FIGURE 7.1
EMP BUFFER (WBM 2006) AND
PREDICTED WALLUM FROGLET HABITAT



South West Rocks
Local Environment Study
Detailed Wallum Froglet Study

FIGURE 6.1
PREDICTED WALLUM FROGLET HABITAT, CORRIDORS AND ZONING



South West Rocks
Local Environment Study
Detailed Wallum Froglet Study

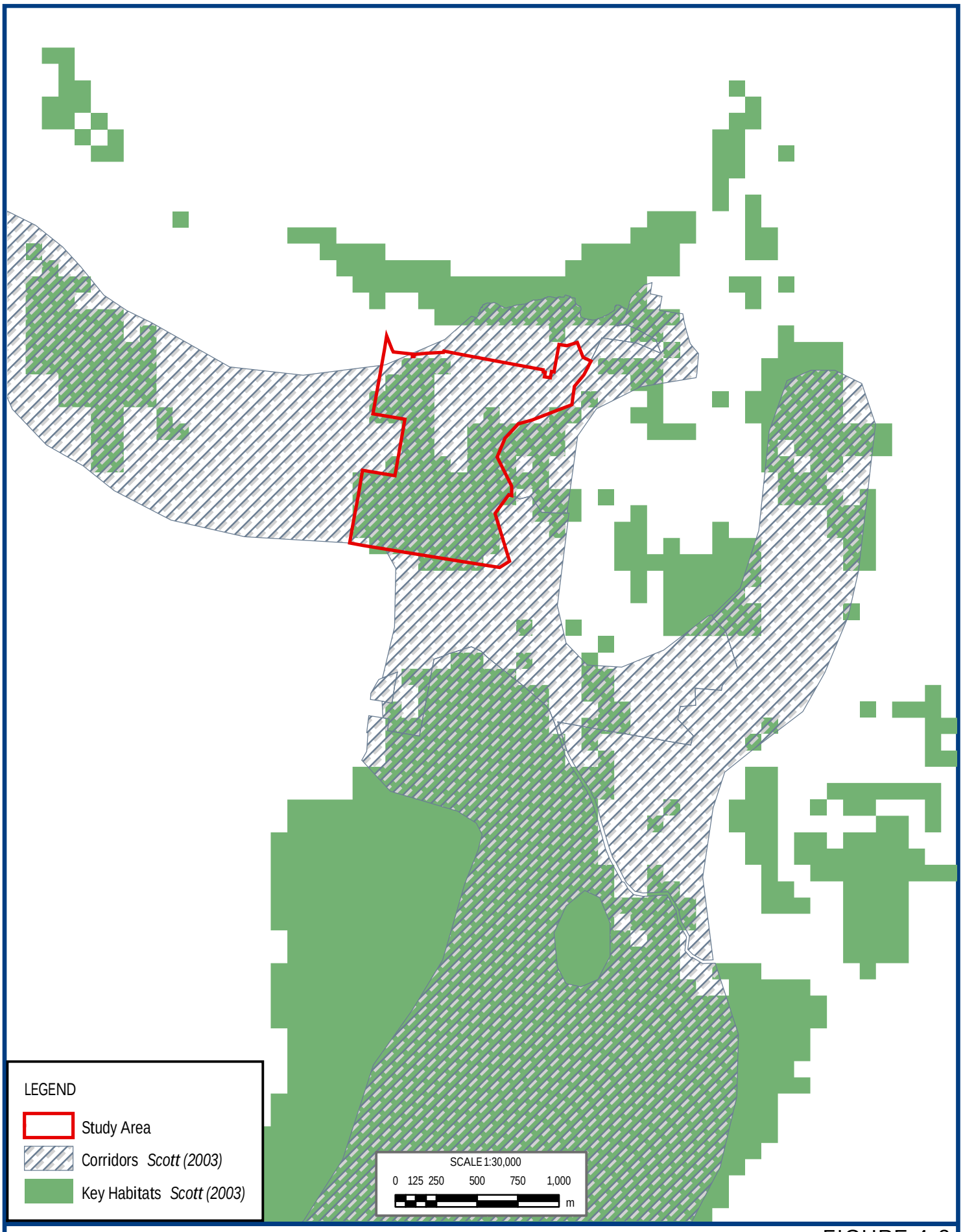
Aerial Photography:
Region 1997
Study Area July 2004

FIGURE 5.2
WALLUM FROGLET RECORDS

South West Rocks
Local Environment Study
Detailed Wallum Froglet Study

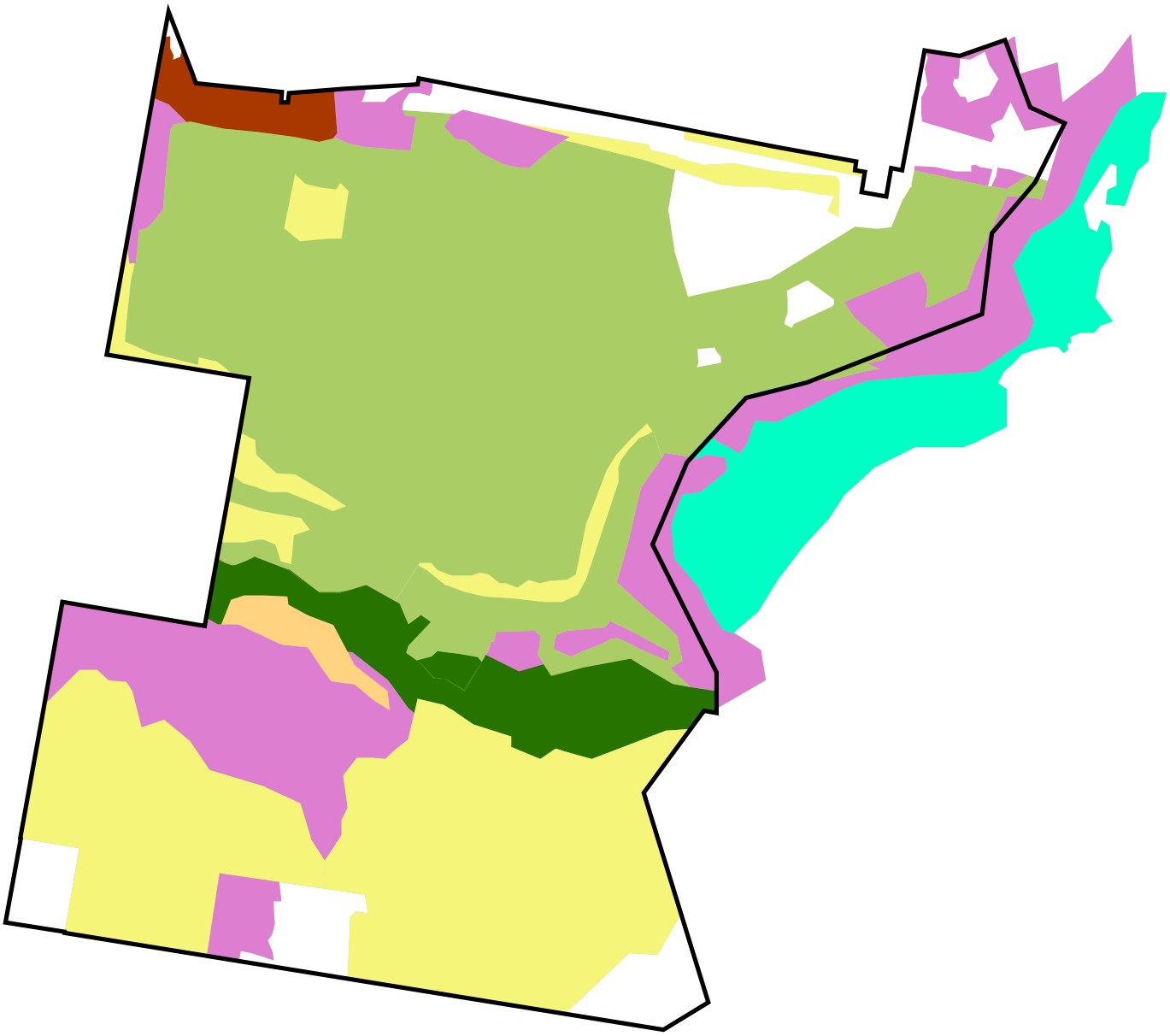
Aerial Photography:
Study Area July 2004

FIGURE 5.1
CONNELL WAGNER
WALLUM FROGLET RECORDS



South West Rocks
Local Environment Study
Detailed Wallum Froglet Study

FIGURE 4.2
KEY HABITATS
AND CORRIDORS



LEGEND

- Study Area
- Mixed Sedge Heath *
- Open Forest
- Swamp Forest *
- Sedgeland *
- Shrubland *
- Scribbly Gum Woodland *
- Red Gum/ Swamp Mahogany Woodland
- Cleared

* Wallum vegetation

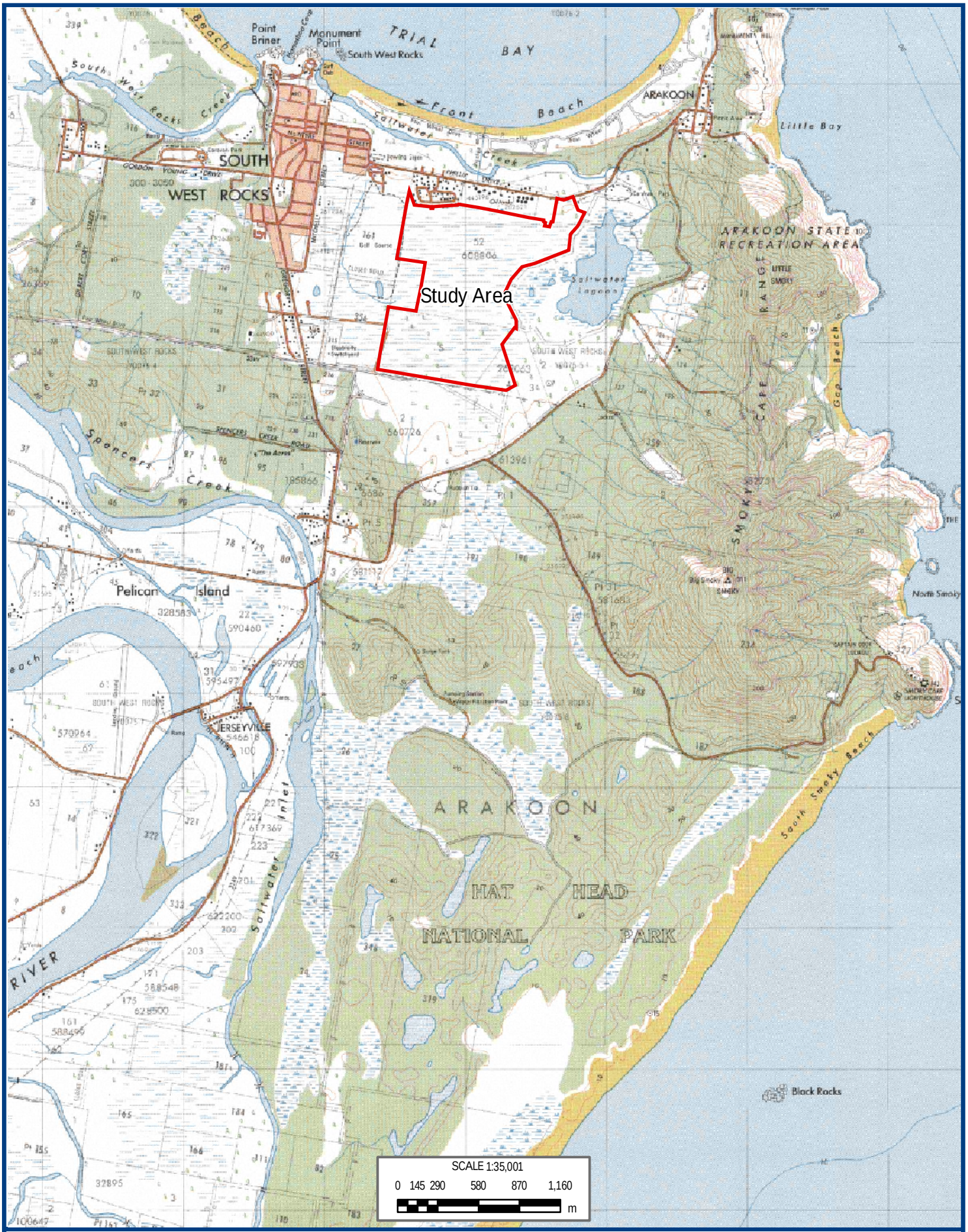
SCALE 1:9,000
0 40 80 160 240 320
m

South West Rocks
Local Environment Study
Detailed Wallum Froglet Study

SOURCE: Peter Parker; Kendall & Kendall

N

FIGURE 4.1
VEGETATION COMMUNITIES

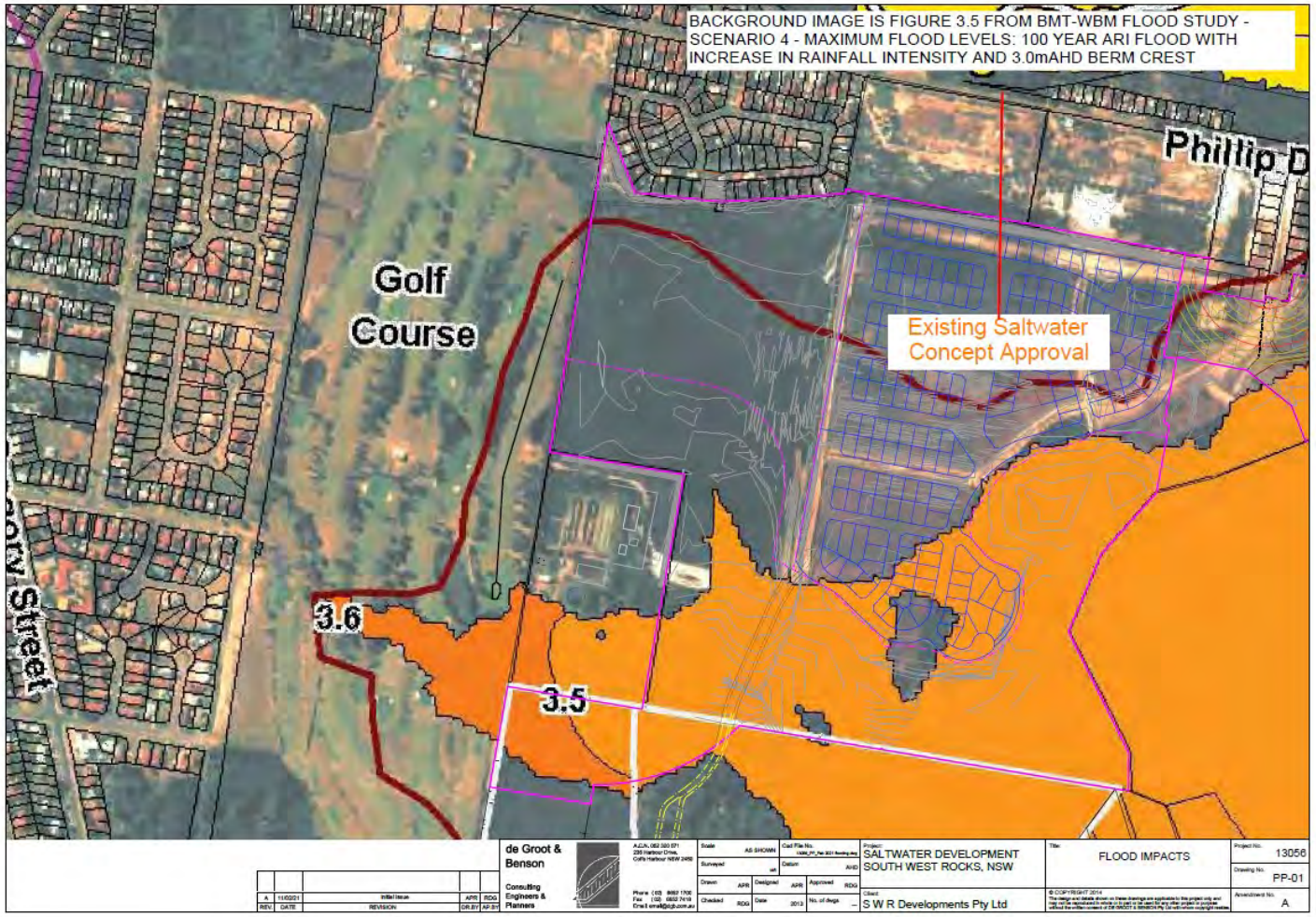


South West Rocks
Local Environment Study
Detailed Wallum Froglet Study

FIGURE 1.1
LOCATION OF STUDY SITE

A-2 100 year flood level with 30% increase rainfall

Figure 13: 100 year flood level flood model



A-3 Biodiversity Values Mapping Review Report

Biodiversity AUSTRALIA

SUSTAINABLE PARTNERSHIPS
DEDICATED TO ACHIEVING
ECOLOGICAL AND ECONOMICAL BALANCE

LEADING THE WAY
IN ENVIRONMENTAL
MANAGEMENT

ECOLOGICAL ASSESSMENT

KING & CAMPBELL, SOUTH WEST ROCKS

November 2023

Contents

List of Tables

List of Figures

List of Photos

Document Control Page

Version Control

Version	Purpose	Author	Reviewed / approved by	Date
Rev 0.1	Draft Report	Lachlan Webster	Karl Robertson	20/11/2023
Rev1.0	Final Report	Lachlan Webster	Jessica Hobart	24/11/2023

Distribution Control

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1	File Copy	Electronic/Email	Biodiversity Australia	Chantal Sargeant	20/11/2023
2	Client Review	Electronic/Email	King & Campbell	Craig Campbell	20/11/2023

Project Number: ENS6093

Our Document Reference: ENS6093-BEC-REP-HillierPdeBVReview-rev.1.0

1. Executive Summary

Biodiversity Australia was engaged to assess the extent of mapped Biodiversity Values within Lots 11 11, 16, 17 DP1277594, Hillier Parade, SouthWest Rocks. This report has assessed the floristic characteristics and vegetation structure in association with the mapped Swift Parrot Important Areas. This report presents relevant information to support the review of the Biodiversity Values Mapping present within the above listed property.

The Subject Land had isolated occurrences of listed preferred food tree species for the Swift Parrot as per the NSW OEH species profile. There were no obvious lerp infected trees within the Subject Land during the time of survey. A number of winter flowering Eucalyptus were also recorded within areas mapped as PCT 4004 and PCT 3573. As these may form potential foraging resource for the species, areas where the species was recorded were included in the revised Biodiversity Mapping.

This statutory assessment has concluded that large areas of the Biodiversity Valus mapping on the Subject Land does not meet the criteria to be considered significant habitat for the Swift Parrot. Consequently, it is suggested that a review of the current mapping of Swift Parrot habitat is conducted with proposed revision provided.

Abbreviations

Table 1: List of abbreviations used within the report

BAM	Biodiversity
BC Act	*Biodiversity Conservation Act*
BDAR	Biodiversity Development Assessment Report
CBD	Central Business District
DA	Development Application
DBH	Diameter at Breast Height
DCP	Development Control Plan
DEC	Department of Environment and Conservation
DEE	Department of Environment and Energy
EEC	Endangered Ecological Community
EPBC Act	*Environment Protection and Biodiversity Conservation Act*
HBT	Hollow-bearing Tree
KFT	Koala Food Tree
KPoM	Koala Plan of Management
KTP	Key Threatening Process
LEP	Local Environment Plan
LGA	Local Government Area
MNES	Matter of National Environmental Significance
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PIR	Passive Infrared Camera
SAT	Spot Assessment Technique
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community
VMP	Vegetation Management Plan

2. Background Information

2.1 Location of the Subject Land and Key Definitions

The Subject Land is located off Hillier Parade, South West Rocks and is under multiple land use zones including R1 – General Residential, RU2 – Rural Residential and C2 – Environmental Conservation. The land is vacant and open areas are subject to frequent slashing. The Subject Land is located north of the Coffs Harbour CBD and is less than 1 kilometre west from the coastline. Areas subject to slashing are devoid of canopy and shrub strata though diversity of ground layer is still high. Areas of largely intact vegetation are present in the northeast and south of the Subject Land.

The Subject Land is defined as land included within the Lots 11, 16, and 17 DP1277594. The Subject Land is shown in Figure 1.

2.2 Soils, Topography and Geology

The Subject Land occurs on Manning – Macleay Coastal Alluvial Plains as mapped under the Mitchell Landscapes. The NSW Great Soil Group Soil Type describes soils mapped on the majority of the subject land as Acid Peats with a small area mapped as humus Podzols in the southeastern portion of the Subject Land. Additional detail provided by the NSW eSPADE tool describes the Acid Peats as the Hat Head soil landscape. This soil landscape is described as being poorly drained and semiaquatic and Aquic Podosols. Organic Soils with low wet bearing strength, high erodibility, low permeability and water holding capacity, strong acidity, and low fertility. This landscape is prone to flood with a permanently high water table and groundwater pollution hazard.

2.3 Vegetation Mapping

The current PCT mapping for the Subject Land shows four Plant Community Types are suggested to be present.. These include:

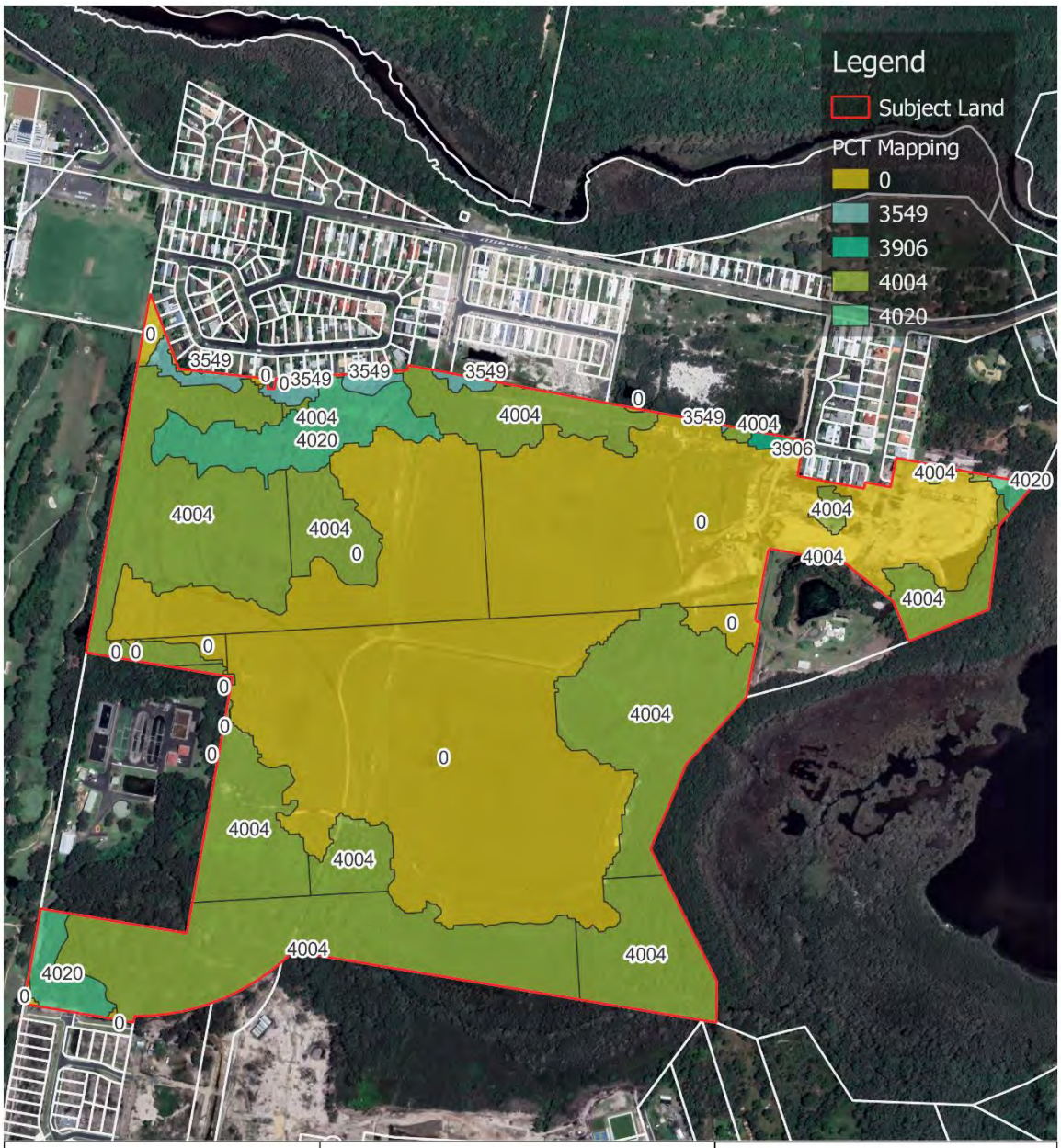
- 3549 – Lower North Sandplain Heathy Forest
- 3906 – Northern Lowland Clay Wet Heath
- 4004 – Northern Melaleuca quinquenervia Swamp Forest
- 4020 - Coastal Creek flat Layered Grass Sedge Swamp Forest

The extent within the Subject Land of each PCT is shown in Figure 2.

Figure 1: Location of the Subject Land

This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Figure Name: Site Location	Biodiversity Australia
	0 1 2 km	Job Number: ENS6093
	Project Manager: KR / Drawn By: LW / Nov 2023	Spatial Reference GDA2020 MGA Zone 56
	Client: King & Campbell	Scale: 1:8500

Figure 2: NSW State Vegetation Type Mapping



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	0 1 2 km	Job Number: ENS6093
	Project Manager: KR / Drawn By: LW / Nov 2023	Spatial Reference GDA2020 MGA Zone 56
	Client: King & Campbell	Scale: 1:8500

Photo Plate 1: Site Photos

3. Methods

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:

- Resilience and Hazard SEPP – Littoral Rainforest & Coastal Wetland Mapping;
- Coastal Quaternary Geology – North and South Coast of NSW digital data layer (Troedson & Hashimoto 2008);
- NSW Department of Planning & Environment – NSW BioNet/Atlas of Wildlife (DPE 2022a);
- NSW Department of Planning & Environment – Threatened Biodiversity Data Collection (DPE 2022b);
- NSW Department of Planning & Environment – Biodiversity Value Mapping Tool (DPE 2023)
- NSW Department of Planning & Environment – NSW State Vegetation Type Mapping (DPE 2023)
- NSW Department of Planning & Environment – eSPADE tool v2.2 (DPE 2022)

3.2 Flora Survey

Vegetation integrity survey plots were undertaken within the development footprint as per the BAM methodology (2020). Each consists of a 20x20 metre plot in which floristic composition and structural attributes are collected, and a 20x50 metre plot which collects ecosystem function attributes.

3.2.1 Vegetation Classification and Mapping

Vegetation was surveyed via a full floristic composition survey of the site.

Vegetation classifications were based on the NSW Plant Community Type (PCT) Classification. Determination of Threatened Ecological Communities (TECs) was based on the data collected in the survey and review of the relevant final determination (DPE, 2022) and Department of Environment and Energy conservation advice (DCCEEW 2022).

The following information was collected on site;

- Observer, location and date;
- Plot dimensions and orientation;
- Photographic record of vegetation;
- Vegetation Class and Plant Community Type (PCT);
- Physical features and disturbance history;
- Full flora list;
- Growth-form cover and abundance of each species;
- Exotic plant cover;
- Number of large trees;
- Recruitment;
- Presence of hollow-bearing trees;

3.2.2 Threatened Species

3.3 Flora Searches

A general flora survey was undertaken on 28th-30th June 2022 within the Subject Land. General flora searches were across the Subject Land in addition to formal vegetation plots. This gave an understanding of areas that had the potential to provide Swift Parrot Habitat.

3.4 Fauna Survey

Formal threatened species searches were undertaken for 30 mins at the beginning of each day during the survey period. Incidental observations were all undertaken during other survey activities across the Subject Land.

The habitat evaluation was the principal survey method employed to assess the suitability of habitats for the Swift Parrot recorded in the locality, or in broadly similar habitats in the region.

Habitats on and adjacent to the site were defined and assessed according to parameters such as:

- Structural and floristic characteristics of the vegetation;
- Presence of associated vegetation;
- Degree and extent of disturbance;
- Presence of primary food trees and food items such as lerp infestations and
- Presence of associated vegetation.

This information is considered for evaluation of the potential occurrence of threatened species on or adjacent to the site based on cited ecology and personal experience/knowledge of the species.

4. Results

4.1 Desktop Search Results

The NSW Biodiversity Values Mapping and Threshold Tool was used to determine the extent of current biodiversity values mapping of Swift Parrot Important Habitat on the Subject Land. Figure 3 shows the current extent of vegetation considered Swift Parrot Important Habitat as per the Biodiversity Values Mapping.

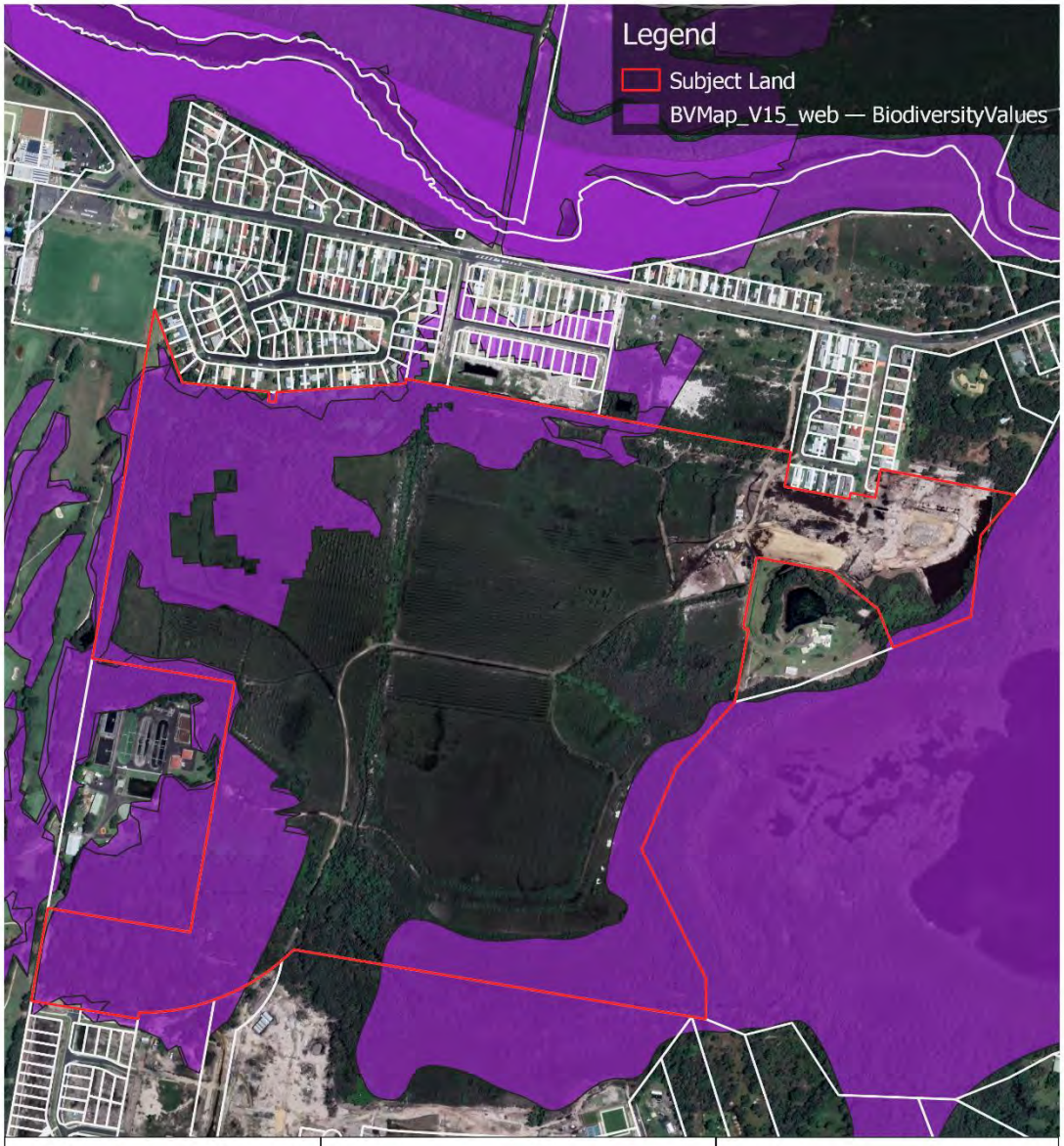
4.1.1 swift parrot (*Lathamus discolor)*

The NSW threatened species profile and *Listing eligibility and Conservation Actions Lathamus discolor* (DPE 2016) for the Swift Parrot describes preferred mainland habitat as Box-Ironbark and Grassy Woodlands and Coastal Swamp Mahogany (*Eucalyptus robusta)* and Spotted Gum (*Corymbia maculata)*. Other species known to be utilised include Red Bloodwood (*C. gummifera)*, Forest Red Gum (*E. tereticornis*), Mugga Ironbark (*E. sideroxylon*), and White Box (*E. albens*. The species is also commonly known to use Eucalyptus with abundant lerp infestations.

The Important Areas mapping for the Swift Parrot available through the Biodiversity Offsets Scheme has also been reviewed and is shown in Figure 4.

The results from the BioNet Atlas species search show 1 record from within 10 km of the Subject Land, however, no records from within the Subject Land.

Figure 3: Biodiversity Values Mapping – Swift Parrot



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	0 100 200 m	Job Number: ENS6093
	Project Manager: KR / Drawn By: LW / Nov 2023	Spatial Reference GDA2020 MGA Zone 56
	Client: King & Campbell	Scale: 1:8500

4.2 Flora Survey Results

4.2.1 Vegetation Communities

Historical land use of the property has seen it partially cleared for use in native forestry. This has meant that large patches in the east and southeast are devoid of canopy and shrub structure. This is also the case in patches of land in the Northwest.

Vegetation plots were carried out across the entirety of the Subject Land as part of a broader biodiversity assessment. Eleven plots were completed in vegetation mapped as Biodiversity Values. These include plots 1, 2, 3, 5, 9, 10, 12, 13, 15, 20, and 25. The location of these plots are shown in Figure 4. Vegetation Plots determined that three Plant Community Types are likely present one of which exists in multiple integrity conditions. The PCTs present on the Subject Land as determined by vegetation plots include the following PCTs. A summary of each PCT as it exists on the Subject Land is Presented in Table 2, Table 3 and Table 4.

3573 – Northern Lowland Scribbly Gum – Bloodwood Forest

Table 2: Site vegetation description

Vegetation Community	North Coast Dry Sclerophyll Forest
Condition	Moderate
NSW Plant Community Type (PCT)	3573 – Norther Lowland Scribbly Gum Bloodwood Forest
TEC Status	Not associated with a PCT
Location and Area	Southwest and South Eat of the Subject Land
Description	**Canopy:** Canopy composition varied depending on plot however *Eucalyptus signata* and *Eucalyptus planchoniana* were present. *Corymbia gummifera* was also recorded in the community. **Understory& shrub:** Understory strata was relatively diverse across the community and included species *Persoonia stradbrokensis, Pittosporum undulatum, Banksia integrifolia, Dillwynia retorta, Hibbertia scandens* and *Lomatia silaifolia* **a) Ground layer:** *Structure and Species:* Ground cover was sparse with grasses and sedges to most common growth form. Comon species *Baloskion tetraphylla, Lomandra gracilis, Baumea teretifolia* and *Lomandra longifolia.*

3915 – Northern Sands Prickly Tea-tree Wet shrubland

Table 3: Site vegetation description

Vegetation Community	Coastal Heath Swamp
Condition	The PCT was present in three varying condition states. A relatively intact condition (Good), areas in a state of regrowth (Moderate) and areas that are regularly maintained through slashing (Low). Species composition was relatively similar within disturbed areas however structural complexity was lacking.

NSW Plant Community Type (PCT)	3915 – Northern Sands Prickly Tea-tree Wet Shrubland
TEC Status	The PCT is associated with the Sydney Freshwater Wetlands in the Sydney Basin Bioregion. The PCT is not considered part of this TEC as it does not occur in the Sydney Basin Bioregion.
Location and Area	Central and Eastern portions of the Subject Land.
Description	**Canopy:** Canopy structure was low, typical of heath communities with shrub species forming the a low canopy of 4-6m. *Banksia ericifolia, Acacia sophorae* and *Leptospermum spp*. were the predominant canopy forming species. Canopy composition was heavily dependant on level of disturbance. *Melaleuca quinquenervia* was recorded in all plots considered good condition, although at a low cover. This species was considered an emergent with canopy formed by taller shrub species. *Allocasuarina littoralis* was also recorded at low abundance. **Understory& shrub:** Other species occurring in the shrub layer included *Callistemon pachyphyllus*, *Leptospermum juniperinum, Epacris pulchella and Leptospermum polygalifolium* were also recorded. **b) Ground layer:** *Structure and Species:* Ground cover was sparse with grasses and sedges to most common growth form. Common species *Baloskion tetraphylla, Baumea juncea, Baumea teretifolia* and *Sphagnum falcatum, Gahnia sieberiana,* and *Empodisma minus.*

4004 – Northern Melaleuca quinquenervia Swamp forest

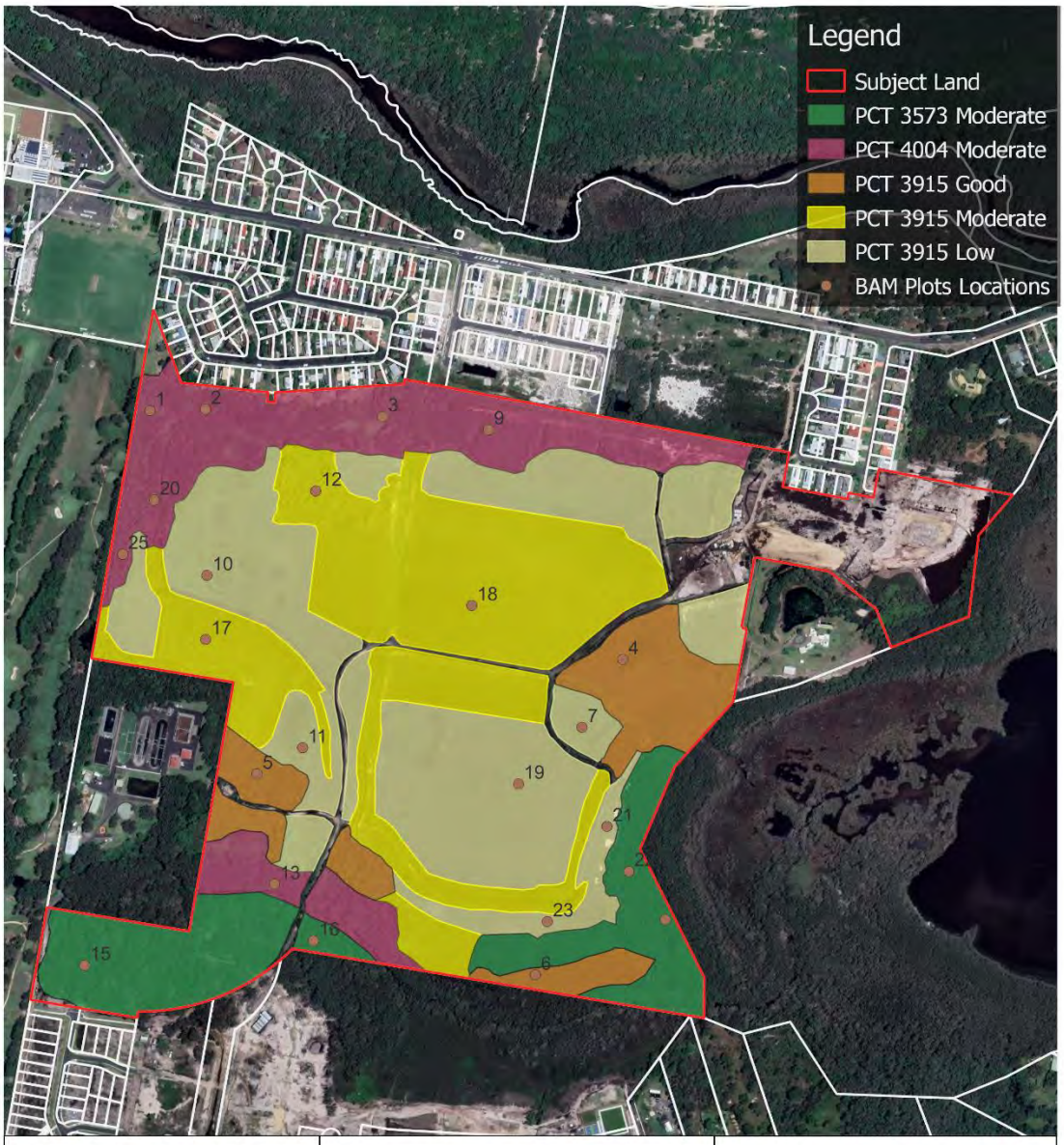
Table 4: Site vegetation description

Vegetation Community	Coastal Swamp Forest
Condition	Moderate
NSW Plant Community Type (PCT)	4004 – Northern *Melaleuca quinquenervia* Swamp Forest
TEC Status	PCT associated with Swamp Sclerophyll Forest on Coastal Floodplain of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion. The community does not occur on soils derived from alluvial processes and is therefore not considered a TEC under the *NSW BC Act 2016.*
Location and Area	Northwest corner of the Subject Land.
Description	**Canopy:** Canopy composition varied depending on plot however *Melaleuca quinquenervia* was the dominant species. Other species present include *Eucalyptus robusta* and *E. grandis. Glochidion ferdinandi, Acacia maidenii, Notelaea longifolia* and *Banksia integrifolia* were also recorded. **Understory& shrub:** Understory and shrub cover varied depending on plot. *Callistemon pachyphyllus* was common. *Melaleuca thymifolia, Persoonia media Acacia sophorae, Leptospermum liversidgei* were also recorded in the **c) Ground layer:** *Structure and Species:* Ground cover was dominated by fern species with *Histiopteris incisa, Hypolepis muelleri, Gleichenia dicarpa, Blechnum indicum* and *Nephrolepis cordifolia* all recorded. Sedges were also locally common with *Baumea juncea* and *Baumea articulata* present across the extent of the PCT. *Phragmites tricarinatus, Gahnia sieberiana, Carex appressa and paspalum distichum, Cryptostylis erecta and Potamogeton ovalis* also recorded.

4.2.2 Threatened Ecological Communities

The Plant Community Types recorded on the Subject Land do not conform to the associated TECS of the PCTs due to existing on the incorrect soil type or existing outside of the necessary IBRA region.

Figure 4: Confirmed PCT Mapping



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	0 100 200 m	Job Number: ENS6093
	Project Manager: KR / Drawn By: LW / Nov 2023	Spatial Reference GDA2020 MGA Zone 56
	Client: King & Campbell	Scale: 1:8500

4.3 Fauna Survey Results

4.3.1 Swift Parrot Habitat Assessment

The Subject Land does contain limited associated flora species as outlined in Section 4.1.1. No noticeable lerp infestations were noted during the time of survey.

The following table summarises the habitat evaluation that has the potential to provide habitat for threatened species within the survey area.

Table 5: Summary of site habitat values

Habitat/Attribute Type	Site/Study Area	Potential Values to Threatened Species Occurrence
Nectar Sources	A limited number of known food tree species, Swamp Mahogany (*Eucalyptus robusta*) were recorded in within vegetation mapped as PCT 4004. The winter flowering, *Eucalyptus grandis,* was also recorded within the PCT which may provide a potential food source when the species migrates to mainland Australia. PCT 3573 also contained *Corymbia gummifera* another species known to be utilised by the species.	Suitable food trees would provide a limited resource to the species.
Fruiting species	Fruiting species are absent on site.	N/A
Habitat Linkages	Suitable habitat is isolated within the Subject Land. Vegetation to the East and North of the Subject Land likely provide a more appropriate avenue for dispersal for species that are within the locality.	Suitable food trees would provide limited connectivity to surrounding vegetation.
Priority Management Area	The site is not part of a Priority Management Area under the Saving Our Species Program.	N/A

5. Habitat Assessment

The Swift Parrot is a migratory species moving from Tasmania to south-eastern areas on mainland Australia between February to October. The species utilises areas of profusely flowering eucalypts within box-ironbark woodlands and coastal habitats. Preferred food tree species in coastal areas include Swamp Mahogany (*Eucalyptus robusta)*, Spotted Gum (*Corymbia maculata),* Red Bloodwood (*C. gummifera*) and Forest Red Gum (*E. tereticornis*). Swamp Mahogany and Red Bloodwood were both recorded on the Subject Land and are considered a limited foraging resource for the threatened species.

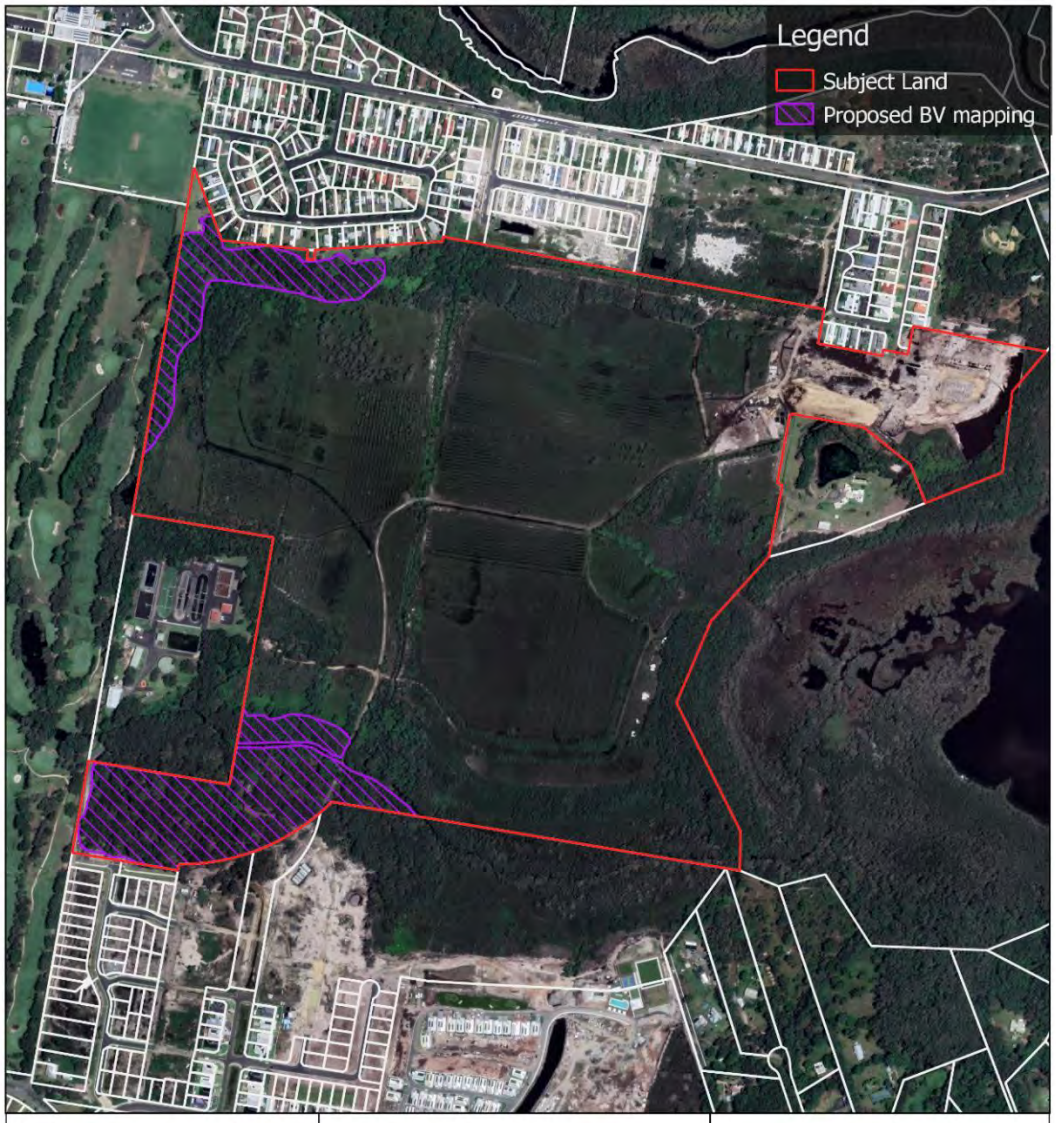
Much of the Land mapped as Biodiversity Values, associated with foraging habitat for the species would not constitute suitable habit for the species due to large areas being devoid of canopy species or suitable food trees being absent from mapped areas.

This ecological assessment proposes a review of the Biodiversity Values mapping within the Subject Land to include areas known to harbour potential food tree species. Figure 5 provides a conservative revision of the actual Biodiversity Values present on the Subject Land associated with the Swift Parrot.

The proposed mapping includes known occurrences of Swamp Mahogany and Red Bloodwood, known food trees for the Swift Parrot. Flooded Gum (*Eucalyptus grandis*) were also included within mapping

though not listed as a preferred food tree, as Flooded Gums are known to flower during the known migration times for the Swift Parrot and could form a potential foraging resource.

Figure 5: Proposed Biodiversity Values Mapping



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	0 100 200 m	Job Number: ENS6093
	Project Manager: KR / Drawn By: LW / Nov 2023	Spatial Reference GDA2020 MGA Zone 56
	Client: King & Campbell	Scale: 1:8500

6. Conclusion

Biodiversity Australia was engaged to assess the extent of mapped Biodiversity Values within Lot 11, 16, 17 DP1277594, Hillier Parade, South West Rocks. This report has assessed the floristic characteristics and vegetation structure in association with the mapped Swift Parrot Important Areas. This report presents relevant information to support the review of the Biodiversity Values Mapping present within the above listed property.

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This statutory assessment has concluded that large areas of the Biodiversity Valus mapping on the Subject Land does not meet the criteria to be considered significant habitat for the Swift Parrot. Consequently, it is suggested that a review of the current mapping of Swift Parrot habitat occurs, with proposed revision provided.

7. References

Department of Environment and Conservation (DEC 2004). Threatened Biodiversity Survey and Assessment: Guidelines for Development and Activities. Working Draft. NSW DEC, Hurstville.

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DPE (2023b) Threatened Biodiversity Data Collection. Website < https://atlaseditor.bionet.nsw.gov.au/>

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DPE (2022c) Threatened Species Profile. Website www.threatenedspecies.environment.nsw.gov.au

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OEH (2022d) Espade. Website < https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Land-and-soil/espade-user-manual-160451.pdf

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A-4 EPBC MNES Search Results

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. Please see the caveat for interpretation of information provided here.

Report created: 24-Nov-2023

Summary

Matters of National Environment 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 (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	86
Listed Migratory Species:	61

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 https://www.dcceew.gov.au/parks-heritage/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 Lands:	2
Commonwealth Heritage Places:	1
Listed Marine Species:	82
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	6
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	7
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In buffer area only

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.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community likely to occur within area	In buffer area only
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area	In buffer area only
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area	In feature area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In feature area
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
null			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Mordacia praecox](#) Non-parasitic Lamprey, Precocious Lamprey [81530]	Endangered	Species or species habitat likely to occur within area	In feature area
BIRD			
[Anthochaera phrygia](#) Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Botaurus poiciloptilus](#) Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Calyptorhynchus lathami lathami](#) South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Climacteris picumnus victoriae](#) Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
[Cyclopsitta diophthalma coxeni](#) Coxen's Fig-Parrot [59714]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature 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	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area
FISH			
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
FROG			
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat known to occur within area	In feature area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
INSECT			
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area	In feature 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	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Eubalaena australis](#)			
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Notamacropus parma](#)			
Parma Wallaby [89289]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Petauroides volans](#)			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
[Petaurus australis australis](#)			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In feature 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]	Endangered	Species or species habitat known to occur within area	In feature area
[Potorous tridactylus tridactylus](#)			
Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Pseudomys novaehollandiae](#)			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area	In feature area
[Pteropus poliocephalus](#)			
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
PLANT			
[Acronychia littoralis](#)			
Scented Acronychia [8582]	Endangered	Species or species habitat known to occur within area	In feature area
[Arthraxon hispidus](#)			
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Asperula asthenes](#)			
Trailing Woodruff [14004]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat known to occur within area	In feature area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
Leichhardtia longiloba listed as Marsdenia longiloba Clear Milkvine [91911]	Vulnerable	Species or species habitat likely to occur within area	In feature 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	In feature area
Parsonsia dorrigoensis Milky Silkpod [64684]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat known to occur within area	In feature area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Vincetoxicum woollsii listed as Tylophora woollsii			
[40080]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area	In buffer area only
SHARK			
Carcharias taurus (east coast population)			
Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Congregation or aggregation known to occur within area	In buffer area only
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In buffer area only
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat known to occur within area	In buffer area only

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus			
Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]		Species or species habitat likely to occur within area	In buffer area only
Ardenna pacifica			
Wedge-tailed Shearwater [84292]		Breeding known to occur within area	In buffer area only
Calonectris leucomelas			
Streaked Shearwater [1077]		Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sternula albifrons Little Tern [82849]		Breeding may occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Marine Species			
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Balaenoptera edeni](#) Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Carcharhinus longimanus](#) Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Migratory Terrestrial Species

Scientific Name	Threatened Category	Presence Text	Buffer Status
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [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.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [11661]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11361]	NSW	In feature area

Commonwealth Land Name	State	Buffer Status

Commonwealth Heritage Places [Resource Information]

Name	State	Status	Buffer Status
Historic			
Smoky Cape Lighthouse	NSW	Listed place	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat likely to occur within area	In buffer area only
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		Breeding known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Stercorarius antarcticus as Catharacta skua			
Brown Skua [85039]		Species or species habitat may occur within area	In buffer area only
Sterna striata			
White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons			
Little Tern [82849]		Breeding may occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus			
Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area
Thalassarche bulleri			
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri platei as Thalassarche sp. nov.			
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area
Fish			
[Acentronura tentaculata](#) Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In buffer area only
[Festucalex cinctus](#) Girdled Pipefish [66214]		Species or species habitat may occur within area	In buffer area only
[Filicampus tigris](#) Tiger Pipefish [66217]		Species or species habitat may occur within area	In buffer area only
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In buffer area only
[Hippichthys heptagonus](#) Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area	In buffer area only
[Hippichthys penicillus](#) Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In buffer area only
[Hippocampus whitei](#) White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Histiogamphelus briggsii](#) Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Lissocampus runa](#) Javelin Pipefish [66251]		Species or species habitat may occur within area	In buffer area only
[Maroubra perserrata](#) Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In buffer area only
[Solegnathus dunckeri](#) Duncker's Pipehorse [66271]		Species or species habitat may occur within area	In buffer area only
[Solegnathus spinosissimus](#) Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In buffer area only
[Solenostomus cyanopterus](#) Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In buffer area only
[Solenostomus paradoxus](#) Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area	In buffer area only
[Stigmatopora nigra](#) Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In buffer area only
[Syngnathoides biaculeatus](#) Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only
[Trachyrhamphus bicoarctatus](#) Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In buffer area only
[Urocampus carinirostris](#) Hairy Pipefish [66282]		Species or species habitat may occur within area	In buffer area only
[Vanacampus margaritifer](#) Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In buffer area only
Mammal			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Arctocephalus forsteri			
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In buffer area only
Arctocephalus pusillus			
Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In buffer area only
Reptile			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Hydrophis elegans			
Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area	In buffer area only
Hydrophis platurus as Pelamis platurus			
Yellow-bellied Sea Snake [93517]		Species or species habitat may occur within area	In buffer area only
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata			
Minke Whale [33]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Arakoon	National Park	NSW	In feature area
Clybucca	Aboriginal Area	NSW	In buffer area only
Clybucca	Historic Site	NSW	In buffer area only
Fishermans Bend	Nature Reserve	NSW	In buffer area only
Hat Head	National Park	NSW	In feature area
Yarrahapinni Wetlands	National Park	NSW	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
North East NSW RFA	New South Wales	In feature area

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Clybucca Creek Estuary	NSW	In feature area

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Referral decision				
Breeding program for Grey Nurse Sharks	2007/3245	Referral Decision	Completed	In buffer area only

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Dolphins			
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur	In buffer area only
Seabirds			
Ardenna carneipes Flesh-footed Shearwater [82404]	Foraging	Known to occur	In buffer area only
Procellaria parkinsoni Black Petrel [1048]	Foraging	Likely to occur	In buffer area only
Sharks			
Carcharias taurus Grey Nurse Shark [64469]	Foraging	Known to occur	In buffer area only
Carcharias taurus Grey Nurse Shark [64469]	Migration	Known to occur	In buffer area only
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In buffer area only
Whales			
Megaptera novaeangliae Humpback Whale [38]	Foraging	Known to occur	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

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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A-5 Biodiversity Australia 2021 Report

Biodiversity AUSTRALIA

SUSTAINABLE PARTNERSHIPS
DEDICATED TO ACHIEVING
ECOLOGICAL AND ECONOMICAL BALANCE

LEADING THE WAY
IN ENVIRONMENTAL
MANAGEMENT

PRELIMINARY ECOLOGICAL ASSESSMENT

FOR RU2 REZONING PLANNING PROPOSAL – WAINBAR AVENUE, SOUTH WEST ROCKS

January 2021

Contents

List of Tables

List of Figures

List of Photos

Document Control Page

Version Control

Version	Purpose	Author	Reviewed / approved by	Date
Rev 0.1	Draft Report	Natasha Reid	Karl Robertson	22/01/2020

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Copy	Purpose	Method	Issued to:	Name	Date
1	File Copy	Electronic/Email	Biodiversity Australia	Chantal Sargeant	22/01/2020
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Project Number: EC4505

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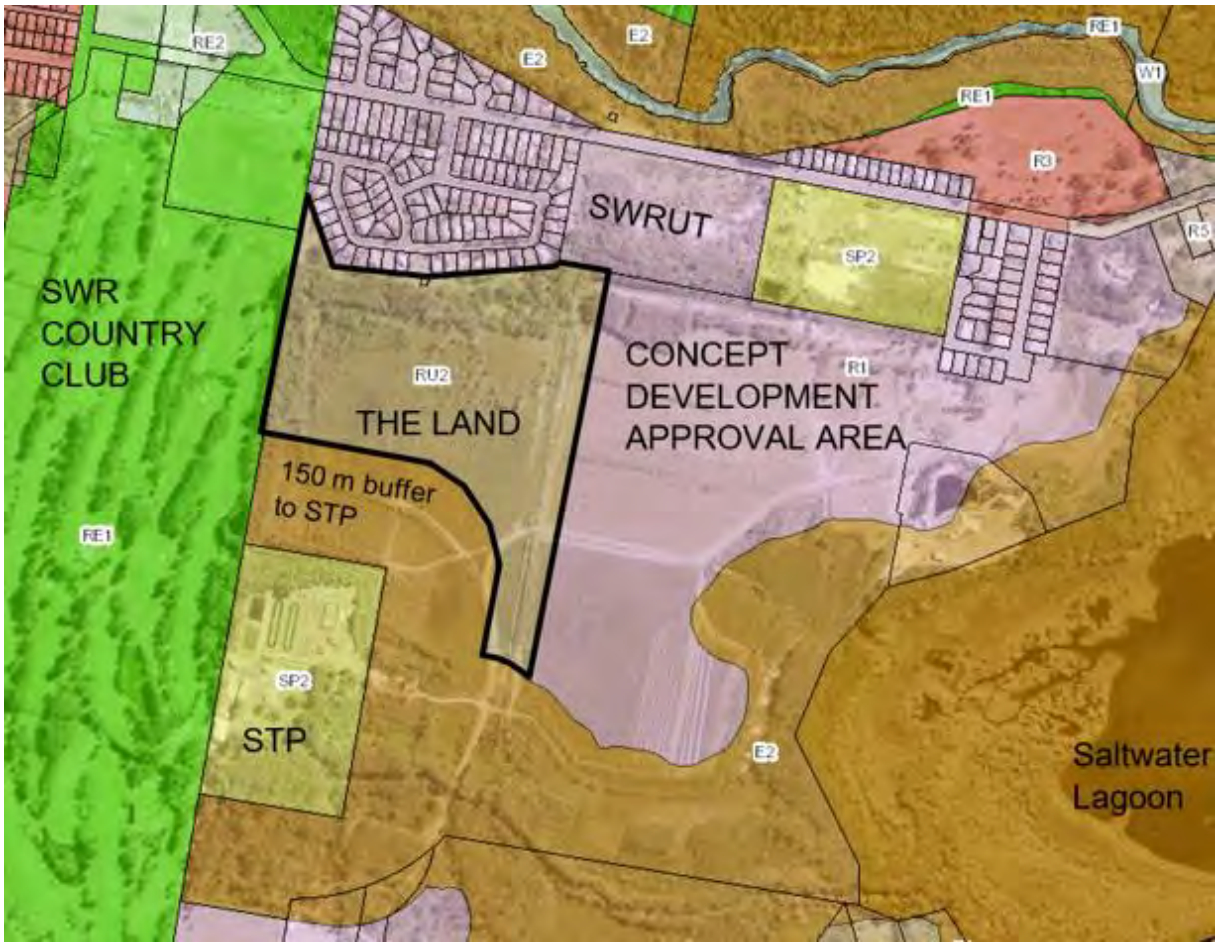
1. Executive Summary

Biodiversity Australia has been engaged to prepare this Preliminary Ecological Assessment and Literature Review to support the Planning Proposal for the proposed amendment to the Kempsey Local Environmental Plan 2013 (LEP 2013) to enable the residential development of part of Lot 35 DP 12114499 that is currently zoned RU2 Rural Landscape. The subject site is 12.3 hectares in area.

The subject site is 12.3 ha in area and is shown in the aerial image below as 'The Land'. The subject site was assessed via desktop, in accordance with the requirements of the NSW *Biodiversity Conservation Act 2016*, *Biodiversity Conservation Regulation 2017* and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* - Matters of National Environmental Significance (MNES).



Environmental conservation values and constrains within the subject sites includes extensive known and predicted Wallum Froglet habitat, Preferred Koala Habitat, Primary Koala Food Trees and Key habitats and fauna Corridors. The site also exhibits habitats for the potential occurrence of Federal and State listed threatened species including two threatened flora species, 16 threatened fauna species including birds, mammals and microchiropteran bats and three terrestrial migratory birds.

The proposal is likely to impact on these ecological values to some extent. This assessment has identified areas on the site where further development is recommended to be precluded due to the ecological values present on the site.

2. Abbreviations

Table 1: List of abbreviations used within the report

APZ	Asset Protection Zone
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
CBD	Central Business District
DA	Development Application
DAWE	Department of Agriculture, Water and the Environment
DCP	Development Control Plan
DEC	Department of Environment and Conservation
DPIE	Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GIS	Geographic Information System
HBT	Hollow-bearing Tree
KFT	Koala Food Tree
PKH	Preferred Koala Habitat
CKPoM	Comprehensive Koala Plan of Management
KTP	Key Threatening Process
LEP	Local Environment Plan
LGA	Local Government Area
MNES	Matter of National Environmental Significance
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PP	Planning Proposal
KSC	Kempsey Shire Council
SAT	Spot Assessment Technique
SEPP 44	*State Environmental Protection Policy No. 44*
STP	Sewerage Treatment Plant
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VMP	Vegetation Management Plan

3. Background Information

3.1 Location and History of the Study Site

The subject property (Lot 35 DP 1214499) is a 12.3 ha portion of the Lot that is zoned RU2 Rural Landscape. The site is accessible from an unnamed track from the western end of Wainbar Avenue. The land is vacant and adjoins the approved residential subdivision (DA T6-17-446) for 221 lots, the South West Rocks Country Club, an established residential area on Currawong Crescent, the approved and commenced SWRUT 63 lot residential subdivision and the environmental buffer to the Sewerage Treatment Plant. The land is subject to and existing 1996 development consent for a Tea Tree plantation (DA/96/2). The Tea Tree plantation commenced and is therefore preserved in perpetuity.

The land is identified in the Kempsey Local Growth Management Strategy Residential Component 2010 as a new release area. The land was previously zoned Rural Investigation D under the Kempsey LEP 1987. The land was deferred from LEP Amendment 55 in 2009 pending the upgrade of the South West Rocks Sewage Treatment Plant (SWR STP) and odour modelling of the STP operating under 'worst case' scenario. Subsequently, a review of the SWR STP Buffer Zone Odour Impact Assessment has determined that a 150 m buffer from the SWR STP is considered reasonable.

In 2013 Council invited the proponents to submit a new Planning Proposal for the deferred land and recommended a waiver for the need to prepare a Local Environmental Study or to re-exhibit the Planning Proposal. Since 2013, preliminary discussions between the proponent and Council indicates that the land is suitable for private recreation and residential purposes.

3.2 Development Proposal

The purpose of the Planning Proposal (PP) is to amend LEP 2013, as it applies to part of Lot 35 DP 1214499. The intention of this PP is to:

- Rezone 12.3 hectares of land from RU2 Rural Landscape to R1 General Residential.
- Amend the Minimum Lot Size Map for the land from 40 hectares to 500 square metres (m^2)
- Identify the land on the Height of Building Map as 8.5 m.

Native vegetation disturbance and habitat loss associated with the proposal covers approximately 12.3 ha which includes a large area of native grassland and wetland.

3.3 The purpose of this report

Up to 12.3 ha of native vegetation will require removal under this proposal. The future loss of vegetation has potential to have at least a minor impact on recorded and potentially occurring threatened species via loss of habitat and thus thorough and objective assessment is required.

The potential direct and indirect impacts associated with the loss of vegetation intended for the PP include; habitat removal, habitat fragmentation, increased human presence, edge effects and weed invasion. These impacts have been previously assessed within several environmental impact investigations.

The aim of this report is to:

- Review background information and previous studies and summarise results.
- Provide an up to date desktop assessment to Identify the current ecological values of the site.
- Provide advice for the rezoning of the site.

Photo 1: View of the site looking north from the southern boundary

Photo 2: View of the vegetation along the northern boundary

Figure 1: Location of the subject site

add

Figure 2: Development layout plan (Draft Masterplan)

4. Desktop Assessment

A desktop assessment was carried out on the 14th Dec 2020 to gather updated, relevant environmental information and data related to the subject site. The following databases and Geographic Information System (GIS) layers were searched/obtained:

- Department of Agriculture, Water and the Environment Protected Matters Search Tool (DAWE 2020);
- Office of Environment and Heritage NSW BioNet Atlas of Wildlife (DPIE 2020).
- Office of Environment and Heritage Threatened Biodiversity Data Collection (DPIE 2020a).
- Kempsey Shire LGA Comprehensive Koala Plan of Management – Eastern Portion (KSC 2011).
- NSW Government - Biodiversity Values Map and Threshold Tool and digital data layer (DPIE 2021).
- SEPP (Coastal Management) 2018

4.1 Database Search Results

4.1.1 Locally Recorded Threatened Species and Communities

The following table lists the threatened flora and fauna species and communities recorded within the locality of the subject site.

Table 2: Locally recorded threatened species and communities (DPIE 2020)

Common Name	Scientific Name	BC Status	EPBC Status	Number of Records within 10km locality*
Communities				
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	*Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E	V	**Known to occur**
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	*Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E	-	**Known to occur**
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	*Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E	CE	**Known to occur**
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	*Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions*	E	CE	**Known to occur**
Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	*Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion*	E	CE	**Known to occur**
Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	*Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion*	E	-	**Known to occur**
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E	E	**Known to occur**

Common Name	Scientific Name	BC Status	EPBC Status	Number of Records within 10km locality*
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	*Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E	-	**Known to occur**
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	*Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions*	E	-	**Known to occur**
Flora				
White-flowered Wax Plant	*Cynanchum elegans*	E	E	**6**
Knicker Nut	*Caesalpinia bonduc*	E	-	**4**
Scrub Turpentine	*Rhodamnia rubescens*	E	-	**2**
Native Guava	*Rhodomyrtus psidioides*	E	-	**2**
Magenta Lilly Pilly	*Syzygium paniculatum*	E	V	**1**
Southern Swamp Orchid	*Phaius australis*	E	E	**1**
Scented Acronychia	*Acronychia littoralis*	E	E	**10**
Aves				
Wompoo Fruit-Dove	*Ptilinopus magnificus*	V	-	**1**
Rose-crowned Fruit-Dove	*Ptilinopus regina*	V	-	**1**
White-throated Needletail	*Hirundapus caudacutus*	-	M	**6**
Black-necked Stork	*Ephippiorhynchus asiaticus*	E	-	**42**
Black Bittern	*Ixobrychus flavicollis*	V	-	**2**
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V	M	**71**
Square-tailed Kite	*Lophoictinia isura*	V	-	**11**
Eastern Osprey	*Pandion cristatus*	V	-	**64**
Brolga	*Grus rubicunda*	V	-	**13**
Beach Stone-curlew	*Esacus magnirostris*	E	-	**2**
Sooty Oystercatcher	*Haematopus fuliginosus*	V	-	**13**
Pied Oystercatcher	*Haematopus longirostris*	E	-	**14**
Lesser Sand-plover	*Charadrius mongolus*	V	E, M	**1**
Comb-crested Jacana	*Irediparra gallinacea*	V		**1**
Curlew Sandpiper	*Calidris ferruginea*	E	CE, M	**9**
Broad-billed Sandpiper	*Limicola falcinellus*	V	M	**1**
Black-tailed Godwit	*Limosa limosa*	V	M	**2**
Eastern Curlew	*Numenius madagascariensis*		CE, M	**17**
Little Tern	*Sternula albifrons*	E	M	**14**
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V	-	**23**
Little Lorikeet	*Glossopsitta pusilla*	V	-	**7**
Swift Parrot	*Lathamus discolor*	E	CE	**24**

Common Name	Scientific Name	BC Status	EPBC Status	Number of Records within 10km locality*
Powerful Owl	*Ninox strenua*	V	-	**4**
Eastern Grass Owl	*Tyto longimembris*	V	-	**2**
Masked Owl	*Tyto novaehollandiae*	V	-	**5**
Sooty Owl	*Tyto tenebricosa*	V	-	**1**
Varied Sittella	*Daphoenositta chrysoptera*	V	-	**2**
Mammals-				
Spotted-tailed Quoll	*Dasyurus maculatus*	V	E	**1**
Brush-tailed Phascogale	*Phascogale tapoatafa*	V	-	**33**
Common Planigale	*Planigale maculata*	V	-	**1**
Koala	*Phascolarctos cinereus*	V	V	**61**
Squirrel Glider	*Petaurus norfolcensis*	V	-	**44**
Long-nosed Potoroo	*Potorous tridactylus*	V	V	**1**
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	**43**
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V	-	**2**
Eastern Coastal Free-tailed Bat	*Micronomus norfolkensis*	V	-	**8**
Hoary Wattled Bat	*Chalinolobus nigrogriseus*	V	-	**3**
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V	-	**1**
Southern Myotis	*Myotis macropus*	V	-	**1**
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V	-	**4**
Eastern Cave Bat	*Vespadelus troughtoni*	V	-	**3**
Little Bent-winged Bat	*Miniopterus australis*	V	-	**16**
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	V	-	**6**
Amphibians				
Wallum Froglet	*Crinia tinnula*	V	-	**9**
Stuttering Frog	*Mixophyes balbus*	E	V	**1**

Key: Critically Endangered (CE), Endangered (E), Vulnerable (V), Migratory (M), Not Listed (-).

Marine species restricted to marine environments have been excluded from the results as the subject site does not contain these environments.

*Search radius of 10 km from the subject site.

4.1.2 Matters of National Environmental Significance

The full report and results of the MNES search are provided in A-2. The search was undertaken using a 10 kilometre search radius from the subject site.

Table 3: Locally recorded MNES (DAWE 2020)

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	1	One Commonwealth Marine Area occurs within the locality.
Listed Threatened Ecological Communities	4	Four listed threatened ecological communities are listed as likely to occur within the locality.
Listed Threatened Species	71	Species or species habitat is known/likely/may occur within the locality. Suitable habitats for threatened flora species *Acronychia littoralis* (Scented Acronychia) and *Phaius australis* (Southern Swamp Orchid) occur on the subject site. Three threatened fauna species listed under the EPBC Act are considered to potentially occur. See Table 4 and Appendix A-1
Listed Migratory Species	61	Migratory wetland, terrestrial and marine species or species habitat is known/likely/may occur within the locality. The Potential Occurrence Assessment has determined three terrestrial Migratory Species listed under the EPBC Act have potential to occur at the subject site. These species include Black-faced Monarch, Spectacled Monarch and the Satin Flycatcher. See Table 4 and Appendix A-1
Other matters protected by the EPBC Act		
Commonwealth Land	1	Commonwealth Land - Australian Telecommunications Commission. Refer to full report in Appendix A-2
Commonwealth Heritage Places	1	Smokey Cape Lighthouse. Refer to full report in Appendix A-2
Listed Marine Species	78	Species or species habitat is known/likely/may occur within the locality.
Whales and other Cetaceans	14	Species or species habitat is known/likely/may occur within the locality.
Critical Habitats	None	-
Commonwealth Reserves - Terrestrial	None	-
Commonwealth Reserves - Marine	None	-

4.2 Potential Occurrence Assessment

This section assesses the threatened species listed under the BC Act and/or the EPBC Act that have been recorded or predicted to occur within the locality have been assessed for their potential to occur on the subject site given the habitats present. Potential occurrence assessment of threatened flora and fauna species is provided in A-1.

This desktop assessment and literature review has determined the following threatened species to potentially occur at the subject site:

Table 4: Potentially Occurring Threatened Species

Common Name	Scientific Name	BC Act	EPBC Act	Habitat Significance
Flora				
Scented Acronychia	*Acronychia littoralis*	E	E	Soil requirements and vegetation habitats present
Southern Swamp Orchid	*Phaius australis*	E	E	Soil requirements and vegetation habitats present
Fauna				
Wallum Froglet	*Crinia tinnula*	V	-	Breeding and foraging habitat present
Glossy-black Cockatoo	*Calyptorhynchus lathami*	V	-	Foraging habitat present
Little Lorikeet	*Glossopsitta pusilla*	V	-	Foraging habitat present
Masked Owl	*Tyto novaehollandiae*	V	-	Foraging habitat present
Powerful Owl	*Ninox strenua*	V	-	Foraging habitat present
Square-tailed Kite	*Lophoictinia isura*	V	-	Foraging habitat present
Swift Parrot	*Lathamus discolor*	E	CE	Foraging habitat present
Brushtailed Phascogale	*Phascogale tapoatafa*	V	-	Foraging habitat present
Koala	*Phascolarctos cinereus*	V	V	Foraging habitat present
Little Bent-winged Bat	*Miniopterus australis*	V	-	Roosting and foraging habitat present
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	V	-	Roosting and foraging habitat present
Eastern Coastal Free-tail Bat	*Micronomus norfolkensis*	V	-	Roosting and foraging habitat present
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	Roosting and foraging habitat present
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V	-	Roosting and foraging habitat present
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V	-	Roosting and foraging habitat present
Squirrel Glider	*Petaurus norfolcensis*	V	-	Foraging habitat present
Migratory				
Black-faced Monarch	*Monarcha melanopsis*	-	M	Foraging habitat present
Spectacled Monarch	*Symposiachrus trivirgatus*	-	M	Foraging habitat present
Satin Flycatcher	*Myiagra cyanoleuca*	-	M	Foraging habitat present

Key: Critically Endangered (CE), Endangered (E), Vulnerable (V), Migratory (M), Not Listed (-).

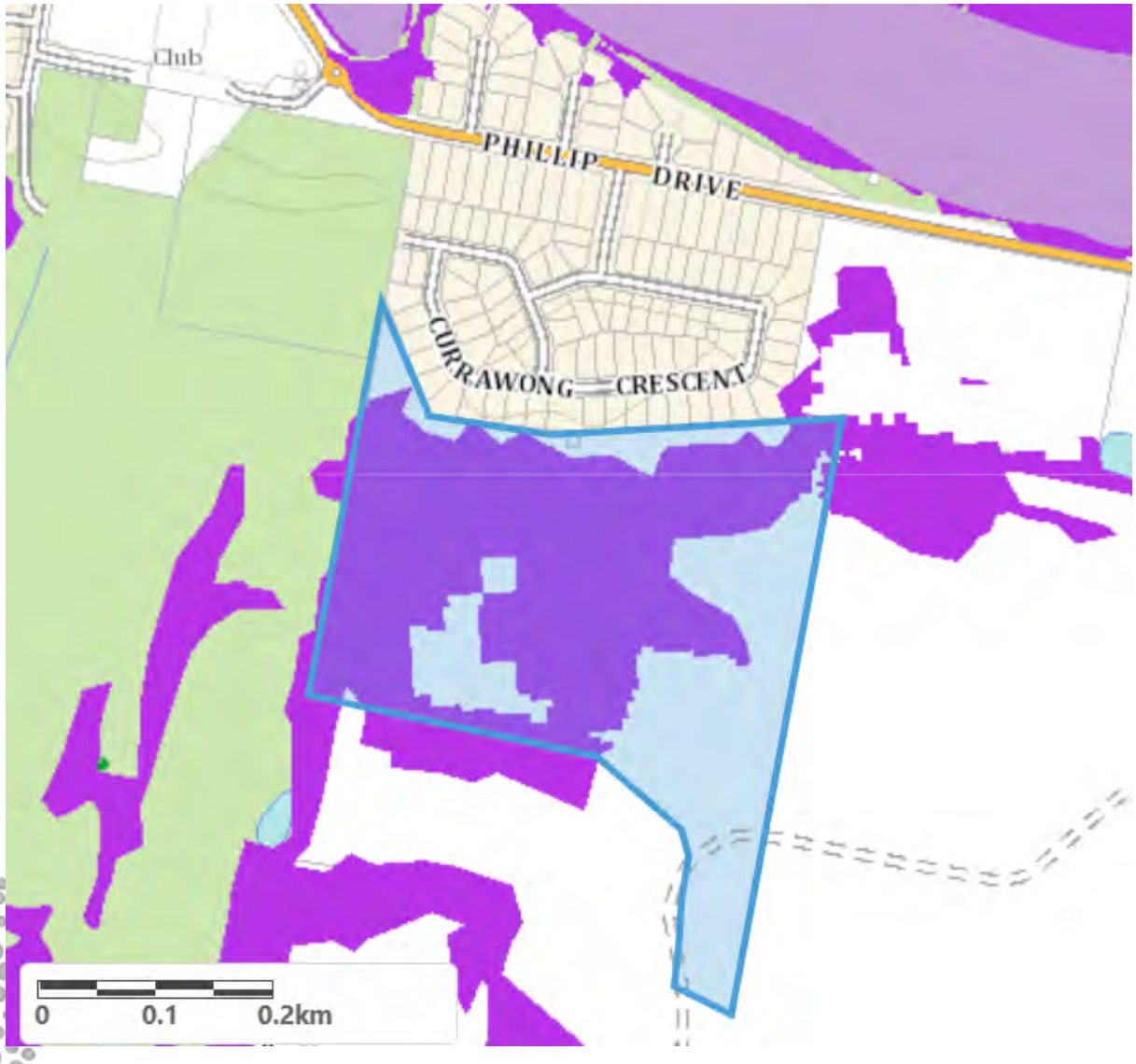
4.3 Biodiversity Values Mapping

The Biodiversity Values map is administered by DPIE and maps areas of land with high biodiversity value such as Coastal Wetlands, Littoral Rainforest, Endangered Ecological Communities, Core Koala Habitat and riparian corridors. Any development that impacts on a mapped area automatically triggers entry into the Biodiversity Offset Scheme (BOS). See Section 0.

Review of the Biodiversity Values Map has identified that a large portion of the site is mapped as shown in Figure 3. This layer is mapped as Biodiversity Values (added in the last 90 days). For areas added in the last 90 days, the report generated by the BMAT Tool states the date that this 90-day period expires, after which, a Biodiversity Development Assessment Report (BDAR) would be required for clearing in these areas. The details applicable to the Biodiversity Values layer for the subject site includes:

- **Date added to BV Map:** 11/27/2020
- **BV Map Criteria:** Threatened species or communities with potential for serious and irreversible impacts.

Figure 3: Biodiversity Values Mapping (DPIE 2021).



4.4 Kempsey Shire LGA Comprehensive Koala Plan of Management

The Kempsey Shire Comprehensive Koala Plan of Management (Working Provisions) (CKPoM) mapping (KSC 2011) shows approximately half of the site is mapped as "Other" vegetation, however an area of subject site is mapped as Preferred Koala Habitat (Secondary Class A) in the north and west. This area is classified as vegetation communities and/or associations where in Primary food tree species are subdominant components of the overstory tree species and usually (but not always) growing in association with one or more secondary food tree species.

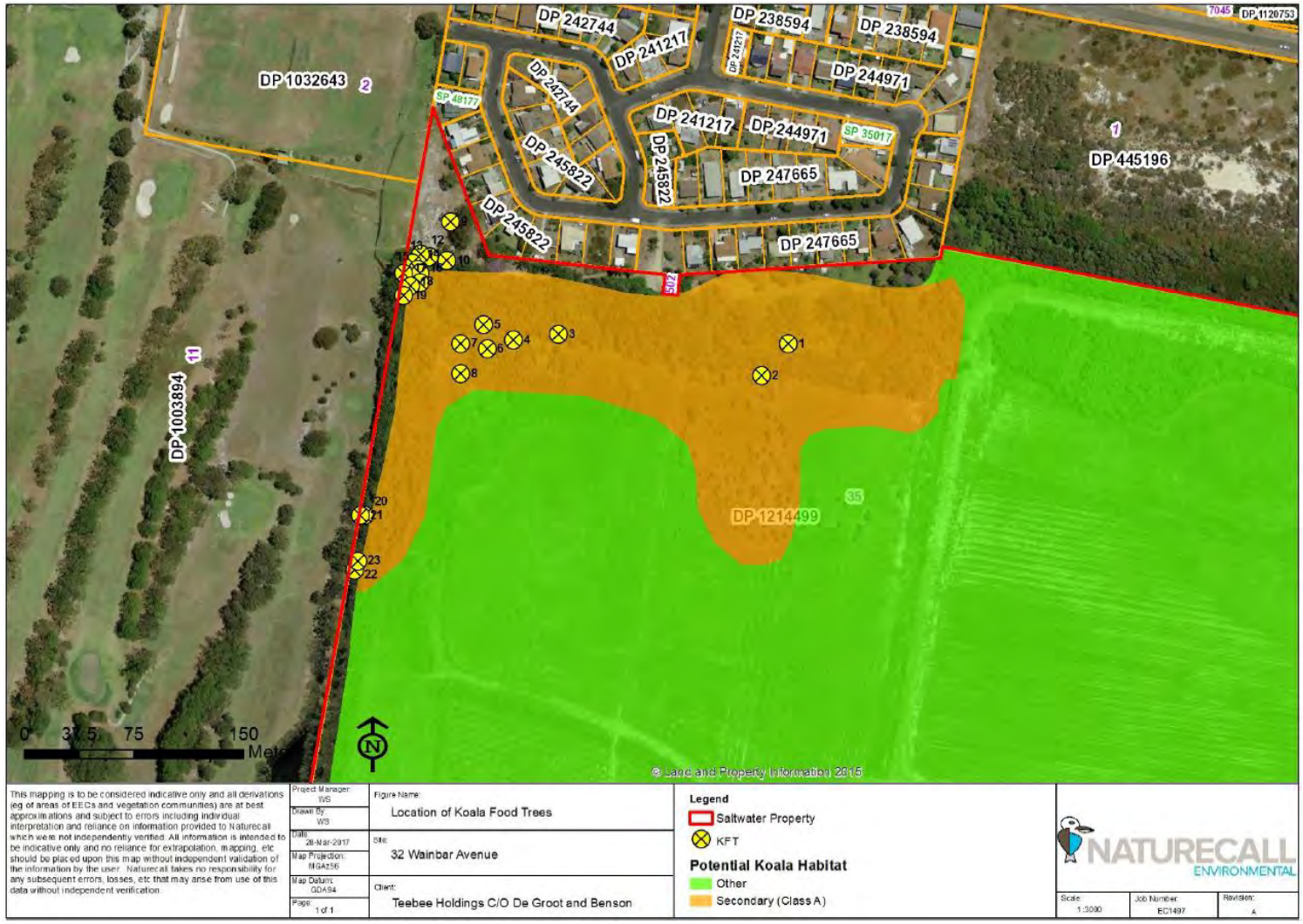
The subject site falls within the jurisdiction of the KSC CKPoM (KSC 2011). Hence a compliance assessment is required. A Kempsey Shire Council Comprehensive Koala Plan of Management Assessment was undertaken across the entire Lot by Naturecall (Naturecall 2017) to comply with the CKPoM for the staged subdivision.

The following assessments have been undertaken across the subject site to determine areas which qualify as Core Koala Habitat and identify Koala activity:

- **Other:** Section 4.2 states that If the land is mapped as Other vegetation or Non–Vegetation no further assessment of the DA or Rezoning Application is required under the plan.
- **Unknown:** Section 4.5 requires vegetation community mapping to determine if the Unknown habitat is Potential Koala Habitat, or Other vegetation.
- **Preferred Koala Habitat:** Section 4.6 requires that a Koala Habitat assessment must be undertaken using a regularised SAT grid, and all preferred Koala Food Trees (KFTs) potentially affected by the proposal located and mapped.

The results of the CKPoM Assessment (Naturecall 2017) are shown in Figure 4 and discussed in Section 5. As a result of this assessment, recommendations on the final development layout that comply with the KSC CKPoM have been discussed in Section 6.

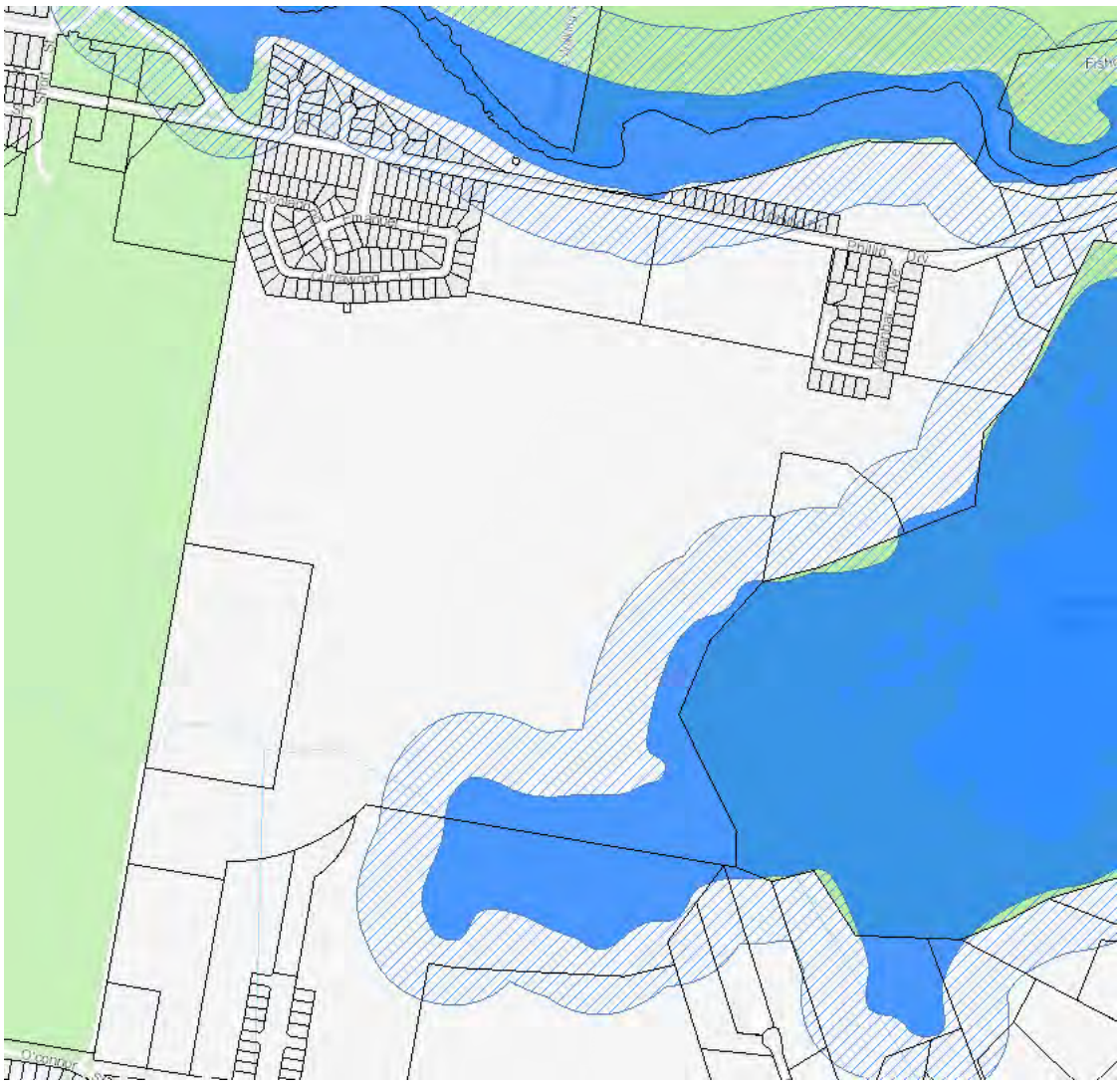
Figure 4: Primary Koala Habitat and Koala Feed Trees (Naturecall 2017).



4.5 Coastal Management SEPP 2018

No Coastal Wetlands or Littoral Rainforest are mapped on the site. A mapped Coastal Wetland is located in close proximity approximately 200m to the north of the site and approximately 200m to the southeast of the site. This mapping is shown in Figure 5.

Figure 5: Coastal Management SEPP wetland in the west of the subject site (solid blue polygon)



5. Literature Review

Several environmental investigations have previously been conducted at the subject site. The table below summarises the methods and results of each investigation and the environmental characteristic that was targeted relevant to the site that is the subject of this report.

Table 5: Review of literature available

Title	Methods	Results and Recommendations
Detailed Wallum Froglet Study **(Connell Wagner 2007)** (Lot 29 DP 1100740, Lot 51 DP 831284, Lot 52 DP 831284, Lot 84 DP 792945, Lot 509 DP 850963)	• Conduct a literature review of existing studies relating to the study site as well as Saltwater Lagoon. Studies included but not limited to: Peter Parker (2002), Kendall and Kendall (2003), Umwelt (2004) and Connell Wagner (2005) • Complete database searches. • Conduct a limited field survey of the species in the South West Rocks area.. • Field Mapping of Wallum Froglet Habitat, corridors and observations across the site.	• Seven vegetation communities have been identified include Mixed Sedge/Heath, Open Forest, Swamp Forest, Sedgeland, Shrubland, Scribbly Gum Woodland, and Red Gum/Swamp Mahogany Woodland. • Predicted Wallum Froglet habitat was mapped across the majority of Lot 35 DP 1214499. The flood liable and ephemeral nature of the study site and adjoining Saltwater Lagoon present ideal environmental conditions for supporting foraging and breeding habitat for the Wallum Froglet. See Figure 7). • Two observations of Wallum Froglet were recorded in the study area and the extent of Wallum Froglet heard calling was mapped Connell Wagner (2004). (See Figure 7). • Wallum Froglet Corridors were also mapped across the entire study area except for a very small area in the northwest corner of the site Scotts (2003). (See Figure 8). • Evidence suggests that the area of potential Wallum Froglet habitat identified on-site would fulfil most aspects of the species' lifecycle requirements, including foraging, breeding and shelter. Recommended management actions include: • Excluding development from potential Wallum Froglet habitat; • Allocating appropriate buffers to maintain potential Wallum Froglet habitat; • Retaining corridors and linkages between proximate sub-populations; • Applying zonings appropriate for maintaining the population in perpetuity; and • Applying development design principles to minimise the impacts to retained Wallum Froglet habitat including: avoid habitat isolation, minimise traffic speed, use appropriate stormwater treatment and minimise habitat loss.
Flora and Fauna Assessment **(Flametree Ecological Consulting**	• Conducted a literature review of the findings of previous studies undertaken at / or within part of, the Development area. These studies include: Peter Parker (2002), Umwelt (2004), Connell Wagner (2005 and 2006), WBM (2006), Cumberland Ecology (2008) and Whelans Insites (2008).	• Two vegetation communities (Mixed Sedge Heath and Woodland) occurs at the site, some Shrubland borders the site in the south west (See Figure 6 below). All vegetation considered heavily disturbed and to exhibit low weed infestations. • No Threatened flora (species, populations or communities) was recorded at the site.

Title	Methods	Results and Recommendations
2017) (Lot 35 DP 1214499 Stage 1 Area)	• Undertook threatened species database searches to obtain a list of recorded and predicted state and federally threatened species within a 10km radius. • Flora surveys include quadrat surveys in Nov 4th 2013.and random meander technique was undertaken during the flowering period of the threatened orchid *Cryptostylis hunteriana* in Jan 10th 2014. Tree counts were also undertaken. • Fauna habitat assessment conducted on 5th Nov 2013. • Fauna surveys included spotlighting and call playback 3-6th Nov 2013, Elliott trapping and diurnal bird surveys 4-7th Nov 2013 were also undertaken for this study. • Opportunistic fauna sightings were recorded in addition.	• One Threatened fauna species (Grey-headed Flying-fox) was recorded at the site during surveys for this report. • Most of the Subject site provides poor habitat for fauna. An exception is the area of Broad-leaved Paperbark Shrubland in the west of the site which provides an important source of nectar for nectarivorous fauna during autumn and winter. • Two additional threatened fauna species (Brushtailed Phascogale and Squirrel Glider) were observed in woodland a short distance east of the site, and a possible nest of the Threatened Osprey located in the same area of woodland. Assessments of Significance concluded that the proposal is unlikely to have a significant impact on these four species or on the 24 additional Threatened fauna species that could potentially be affected by the proposal. • An EPBC (Commonwealth) assessment concluded that the proposal is unlikely to have a significant impact on any matters of National Environmental Significance. • This study recommended that the proposal should comply with the requirements of the Saltwater Development Control Plan (DCP) (2010) to minimise impacts on flow regimes, water quality and soil. Additionally signs advising residents of the presence of threatened fauna should be erected to encourage responsible pet ownership.
KSC CKPoM Assessment **(Naturecall 2017)** (Lot 35 DP 1214499)	• A Koala Habitat assessment of Preferred Koala Habitat areas across the entire Lot was undertaken on 23rd March 2017 using a regularised SAT grid, and all preferred Koala Food Trees (KFTs) and vegetation potentially affected by the proposal located and mapped. Trees were flagged and marked with an inscribed metal tag and recorded via GPS. • Two SAT surveys were undertaken however, regularised grid based assessment was not undertaken due to lack of trees to satisfy the statistical assumptions of the method. One of these SAT surveys was located within the PKH area of the subject site of the Planning Proposal. • Conduct a Performance Criteria Compliance Assessment for criteria listed under Section 4.10 of the CKPoM.	• No evidence of Koala activity was found during the searches, thus the SATs recorded zero activity. Hence the mapped PKH on site does not qualify as Core Koala Habitat (CKH), and the proposal must be assessed under the CKPoM provisions for PKH. • All Koala food trees potentially impacted by later stages of the development were surveyed and mapped. A total of 23 Primary Koala food trees were recorded and consisted of 22 Swamp Mahogany and one Tallowwood. • Recommends that if the subdivision cannot retain all KFTs mapped within the PKH (Secondary Class A) areas, compensation measures apply as per Section 4.12 of the CKPoM will apply to the proposal.
Preliminary Vegetation Management Plan **(Flametree Ecological Consulting 2017a)**	• Map the existing vegetation within Stage 1 of the development site. • Provide vegetation community descriptions for communities within Stage 1 of the development site. • Compile list of weed species present at the site. • Identify management zones, their land use and vegetation management for each zone.	• Three vegetation communities at the site include; slashed and unslashed areas of Mixed Sedge Heath, slashed and unslashed Shrubland and Woodland. These communities are described by structure and species composition. • Weed species include Groundsel Bush, Bitou Bush, Winter Senna, Fireweed, Coastal Morning Glory , Whisky Grass, Setaria and Lantana (Table 2). Weeds are common in the Shrubland and parts of the slashed Mixed Sedge Heath communities, but are scarce or absent in the Woodland and unslashed Mixed Sedge Heath communities.

Title	Methods	Results and Recommendations

(Lot 35 DP 1214499 Stage 1)	• Identify management actions to be undertaken for each zone.
	• Document the flora species previously recorded at the site by Flametree (2014) and Whelans InSites (2008).
		• Four management zones within Stage 1 of the development include:
		  • Residential Development Zone
		  • Conservation Zone
		  • Access Zone and,
		  • Bio-retention basin Zone.
		• Management actions include: Fencing, signage, slashing zones, plantings, photographic monitoring, initial and follow up weed control, fire management and monitoring, reporting and costing.

Flora and Fauna Assessment Report **(Dominic Fanning - Gunninah 2018)** (Lot 35 DP 1214499)	• This study includes a compilation of information gathered from field investigations on Lots 35 and 36, and other lands in the immediate vicinity (including the Malbec development site on Belle O'Connor Street), on several occasions between 2007 and 2016. • Additional information regarding the Wallum Froglet was gathered from the published literature and websites. • Section 5A of the EP&A Act Assessments of Significance for the Wallum Froglet and the Koala.	• The KLEP 2013 process identified and protected the areas of greatest ecological value on Lot 35 – 29.97 hectares (43% of Lot 35) in the E2-zoned land. • Key Habitats mapped across the study site and wildlife corridors mapped adjacent to the west of the study area (Connell Wagner 2005). • That land contains the most relevant habitat for the Wallum Froglet on the site, and together with the similarly zoned land on the Malbec site to the immediate south, provides a sufficient and satisfactory reserve for this species. • The only potential habitat for the Koala within the Concept Plan area is located within the 'Deferred Area' in the northwestern corner of the subject land, with extremely small areas of potential habitat in the northern parts of Stages 2 and 3 of the Concept Plan. • No other threatened species would be adversely affected to any significant extent by the proposed development activities as depicted in the Stage 1 DA and the Concept Plan. • The development proposals for the Stage 1 DA and the Concept Plan have incorporated measures specifically designed to protect the surrounding E2-zoned land and to maintain water quality in the environment. • The proposed development activities – as depicted in the Stage 1 DA and in the Concept Plan – are not likely to impose significant adverse effects or impacts on any threatened biota listed in either the TSC Act or the EPBC Act. • The proponent is committed to implementing a Vegetation Management Plan (VMP) for the E2-zoned land.
Wallum Froglet Investigation **(Lewis Ecological 2020)** (Lot 35 DP 1214499)	• Field surveys of approximately 10 ha of E2 zoned land to the south of Road 2, east of Road 14 and 15 were performed in May 2020. • 2nd May 2020 investigations of types of habitats present at the site was undertaken. • Sampling was conducted on 2nd18-19th May with each of these dates occurring within 5 days of a notable rainfall event involved some call broadcast surveys as well as direct observation and aural (i.e.	• Wallum Froglets were recorded at just one location to the south of Road 2. Habitat in this vicinity (± 100m) is a mosaic of wet and dry heath communities with a network of old drains. Froglets are likely to move throughout this area depending on the prevailing weather conditions. • The invasive Mosquito Fish (*Gambusia holbrooki*) were recorded at some but not all of these drains. • Areas to the south of Road 15, Lots 277-279 and 288-291 and Road 2 tended to support the Common Eastern Froglet (*Crinia signifera*) which is indicative of some past habitat disturbance,

Title	Methods	Results and Recommendations
	listening) surveys. Some dip-netting of water bodies was also performed. • Make recommendation to relocate the park onto E2 zoned	particularly changed water quality with an increase in water pH. • Field data suggested three possible areas to relocate the park onto E2 zoned land of Lot 35:

Figure 6: Vegetation mapping of Saltwater Development Area (extract from Connell and Wagner 2005, as cited in Flametree 2017).

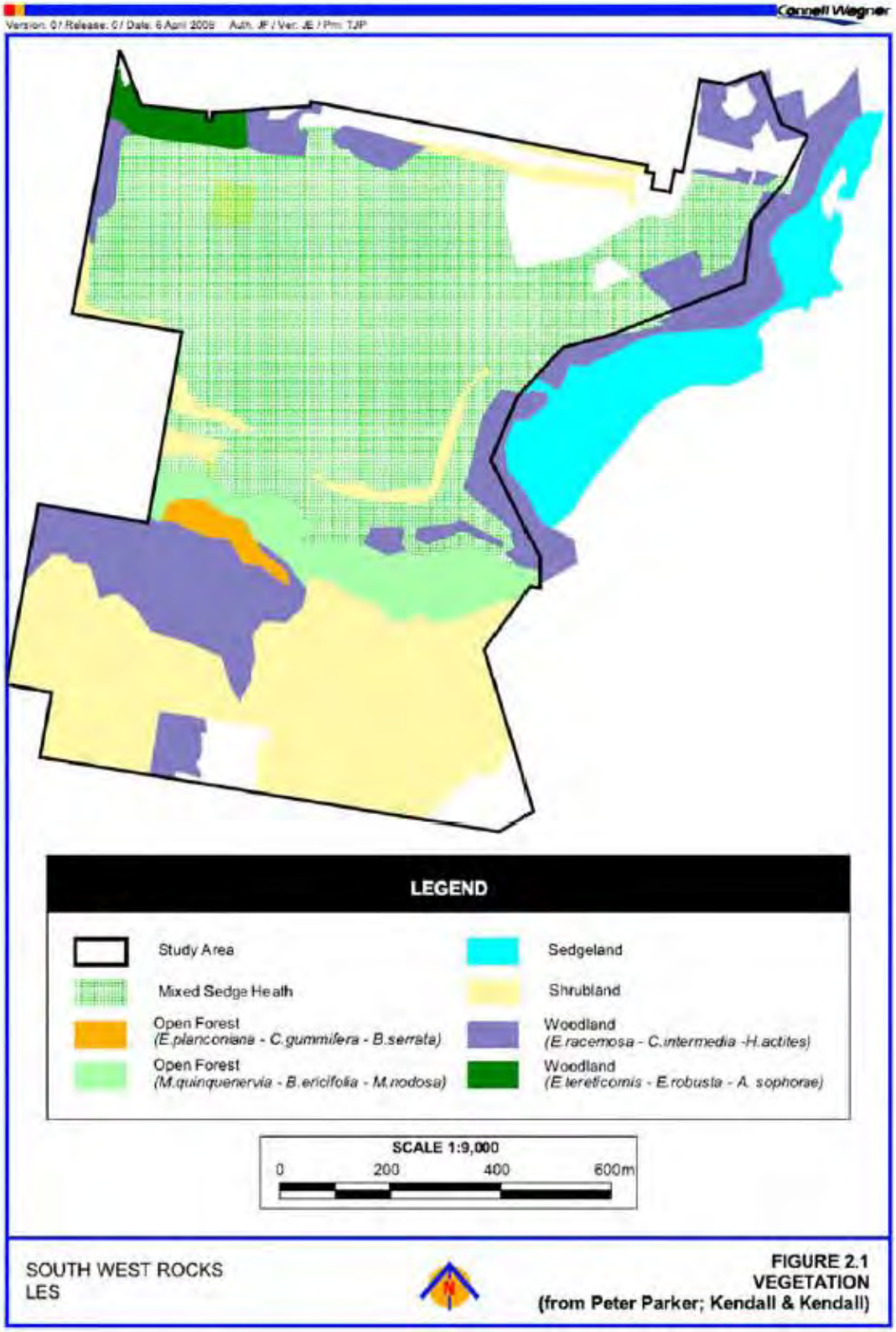

Version: 01 Release: 01 Date: 6 April 2009 Auth: JF / Ver: JE / Pm: TJP
Connell Wagner
LEGEND
Study Area
Mixed Sedge Heath
Open Forest
(E.planconiana - C.gummifera - B.serrata)
Open Forest
(M.quinquenervia - B.ericifolia - M.nodosa)
Sedgeland
Shrubland
Woodland
(E.racemosa - C.intermedia -H.actites)
Woodland
(E.tereticornis - E.robusta - A. sophorae)
SCALE 1:9,000
0
200
400
600m
SOUTH WEST ROCKS
LES
FIGURE 2.1
VEGETATION
(from Peter Parker; Kendall & Kendall)

Figure 7:Predicted Wallum Froglet Habitat (Connell Wagner 2007).

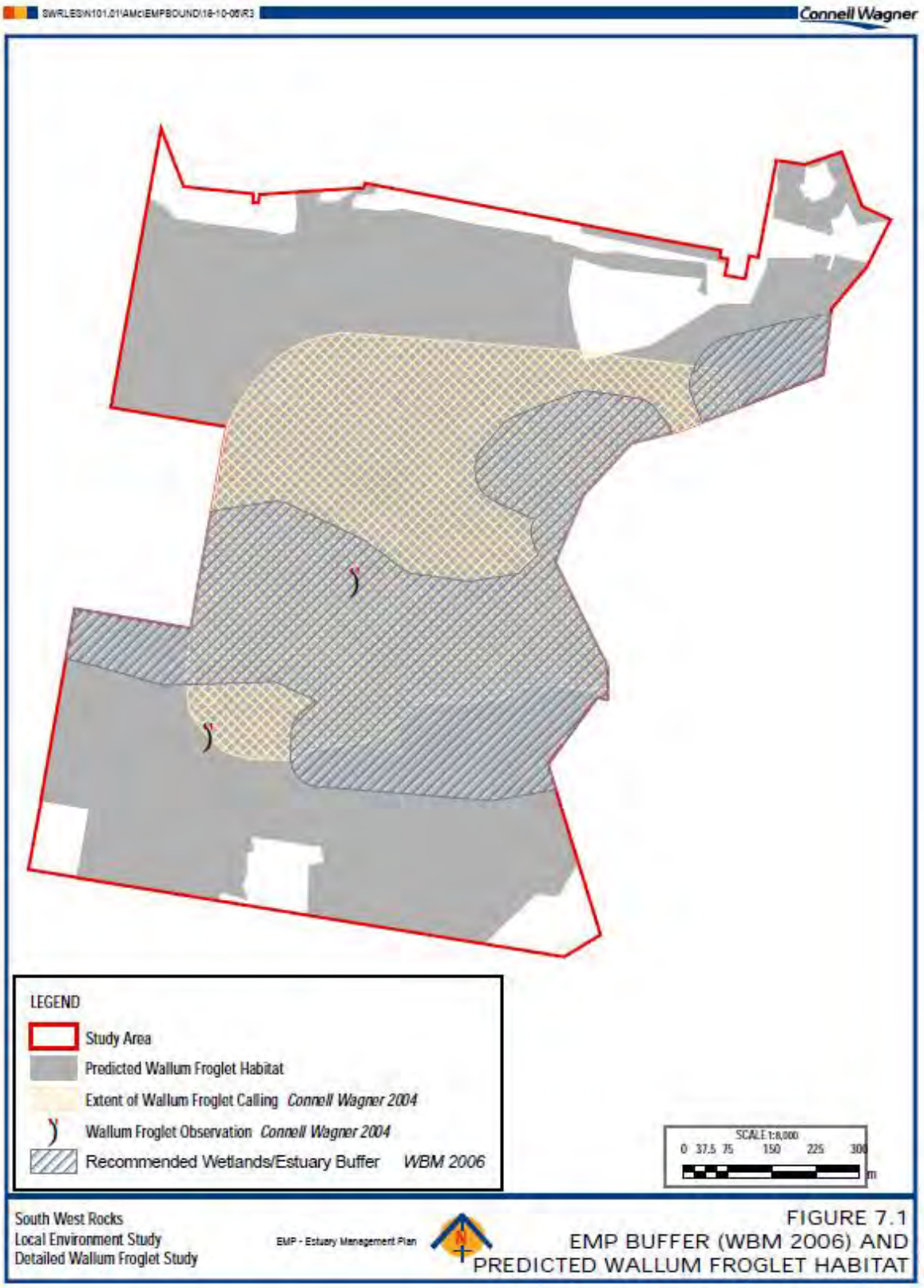
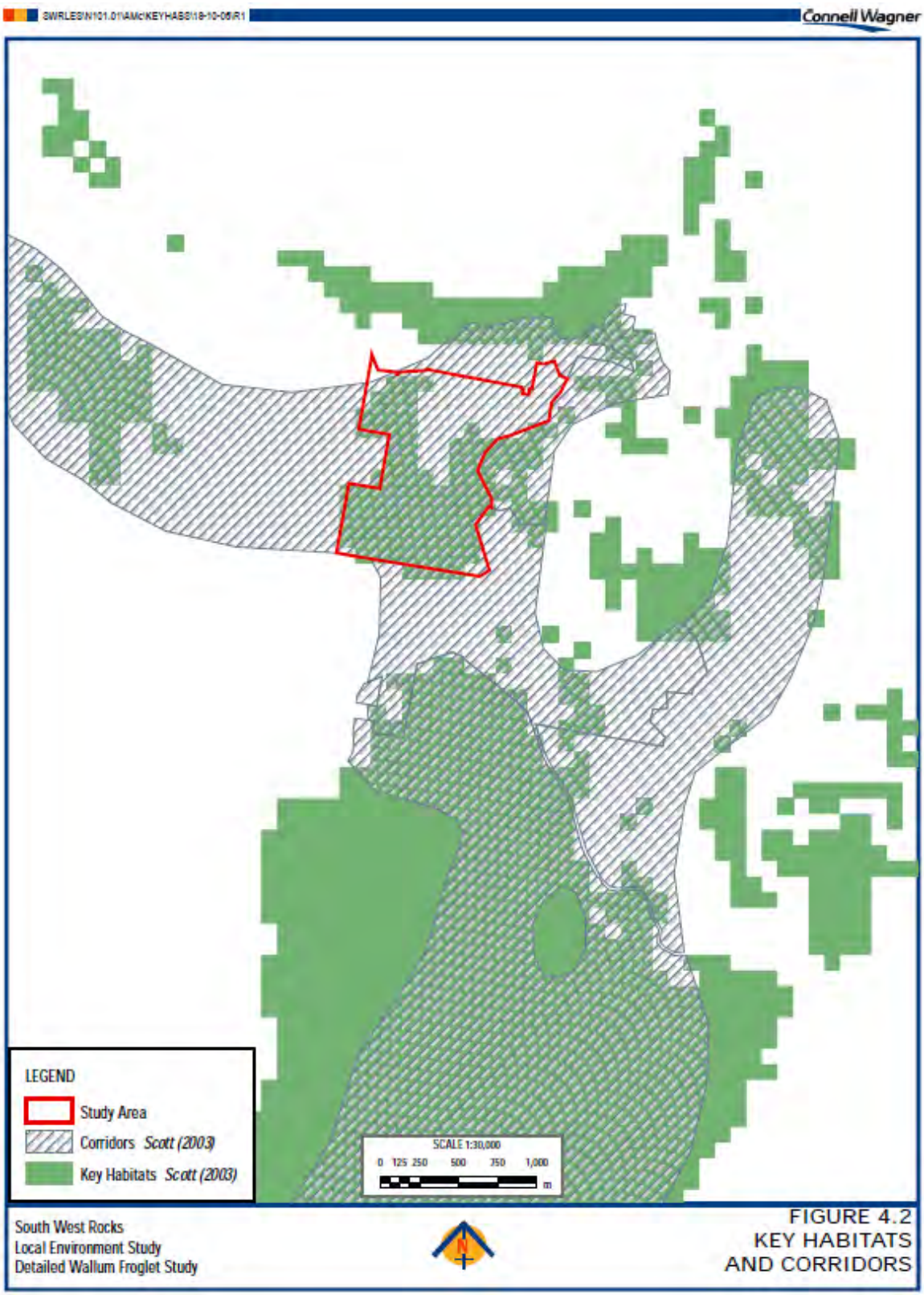


FIGURE 7.1
EMP BUFFER (WBM 2006) AND PREDICTED WALLUM FROGLET HABITAT

Figure 8:Key Habitats and Corridors (Connell Wagner 2007).


SWRLES\N101.01\AMc\KEYHABS\18-10-05\R1
Connell Wagner
LEGEND
Study Area
Corridors Scott (2003)
Key Habitats Scott (2003)
SCALE 1:30,000
0 125 250 500 750 1,000
m
South West Rocks
Local Environment Study
Detailed Wallum Froglet Study
N
FIGURE 4.2
KEY HABITATS
AND CORRIDORS

6. Recommendations

The development design and layout should consider the ecological constraints and high value areas on the site, including Preferred Koala Habitat, KTS, hollow-bearing trees and habitats for threatened species that may potentially occur at the site. This considered, it is also acknowledged that the previous LES and subsequent LEP's considered the subject site when determining appropriate zoning in the areas surround the subject site.

6.1 KSC CKPoM Requirements

A total of 23 Primary Koala food trees were recorded and consisted of 22 Swamp Mahogany and one Tallowwood. Their approximate location on the site (subject to GPS limitations) is mapped and trees are flagged on site.

Previous studies, most notably Naturecall 2017 have undertaken detailed field survey yet failed to record Koala activity in this area. This suggests that the subject site is not currently being utilised by the local Koala population for foraging or connectivity resource.

It is considered likely that KFTs labelled 1,2,3,4,5,6, & 8 may not be practical to retain and as such will need to offset as per the CKPoM. A 20m vegetation retention area in the north of the subject site would provide opportunity for these subject plantings. Given the lack of Koala activity on the subject site this is not considered to have a significant impact on the local Koala population

As per the CKPoM, these trees will need to be accurately surveyed by a registered surveyor. If the subdivision cannot retain all Koala food trees in the mapped Secondary Preferred Koala Habitat areas, the area based habitat compensation measures apply. This requires the retention and securement of Koala habitat no less than twice the area of land affected by vegetation removal. All compensatory land should also be located on the same site of vegetation clearance where possible and be secured by a legally binding mechanism.

If Koala food trees can be retained, section 4.7(a) applies. Section 4.7(a) requires assessment of the Performance Criteria in section 4.10 of the CKPoM.

All other KFTs noted in the Naturecall 2017 report excluding those mentioned above are recommended to be retained.

6.2 Wallum Froglet

Extensive targeted study of the subject site, study area and locality for Wallum Froglet has been undertaken (Lewis Ecological 2020, Connell Wagner 2007 etc). From these surveys, namely Connell Wagner 2007 predictive mapping of Wallum Froglet habitat was developed, see Figure 7. Drawing precedent on previous determination of appropriate environmental conservation land (Connell Wagner 2007 and Kempsey LEP 2013) it is clear that land which was mapped as Recommended Wetland and Estuary Buffer (Figure 7) has formed the basis of the 2013 LEP E2 zoning. With this considered, and that the original 2007 report also incorporated the current subject site, it is considered appropriate that the areas of environmental conservation for Wallum Froglet have already been afforded with the Kempsey LEP 2013.

6.3 Assessment Pathway

Under the NSW *Biodiversity Conservation Act 2016* and *Biodiversity Conservation Regulation 2017*, Part 4 developments under the *Environmental Planning & Assessment Act 1979* (other than State Significant Development) are assessed through the following process:

- For developments in which the impact exceeds the clearing threshold, will impact any area mapped on the Biodiversity Value Map or impact on an area of Outstanding Biodiversity Value, a Biodiversity Development Assessment Report (BDAR) will be required. This assesses the impact using the Biodiversity Assessment Method (BAM) and determines the offset obligations required. Offsets can be met through several options including:
    - Purchase and retirement of biodiversity credits from the open market.
    - Establish a biodiversity stewardship site and create credits via managing the land for conservation in perpetuity.
    - Pay an amount of money into the newly established Biodiversity Conservation Trust who will source credits on behalf of the proponent.
- Developments which fall below the clearing threshold and do not impact on sensitive biodiversity values must be assessed under the new five part test of significance (replacing the former seven part test). If the test determines that a significant impact is likely, a BDAR will be required. There is no offset obligation for Part 4 developments which fall below the threshold and/or are unlikely to have a significant impact on threatened species and/or ecological communities.

The table below provides an assessment to determine if a BDAR is required.

Table 6: Assessment of BDAR requirement

Criteria	Response
Will the development require clearing of native vegetation? *If no a BDAR is not required.*	Yes
Has the development been granted Biodiversity Certification?	No
Is the development considered State Significant Infrastructure?	No
Does the development affect an area mapped in the NSW Biodiversity Values Map? *If yes, a BDAR is required.*	Yes – refer to Figure 3
Minimum lot size on which the development is located.	0.05 ha
Will the development require the removal of >0.25 ha of vegetation? *If yes a BDAR is required.*	Yes.
Result	BDAR is required

The above assessment has determined that a BDAR will be required for the development proposal. The BDAR process will provide a more detailed assessment of the specific impacts of any proposed development and almost determinations of appropriate mitigations and offsetting of residual impacts.

7. Conclusion

This desktop study and literature review has been prepared to provide ecological information to support the Planning Proposal for the rezoning of the site from RU2 Rural Landscape to R1 General Residential as part of a larger staged residential development proposal. This report has provided up to date database searches, ecological mapping and a review of previous ecological assessments relevant to the site..

The subject site and/or the surrounding lands contains extensive known and predicted Wallum Froglet habitat, Preferred Koala Habitat (Secondary Class A), 23 Primary Koala Food Trees and is mapped as Key habitats and fauna Corridors however minimum evidence was recorded that suggested the site was being utilised as a fauna corridor. The subject site also exhibits habitats for several Federal and State listed threatened species including two threatened flora species, 16 threatened fauna species including birds, mammals and microchiropteran bats and three terrestrial migratory birds.

The proposal will impact on some if not all these ecological values to some extent. Recommendations of Koala Food Tree retention have been made to provide *in-situ* protection as well as guidance on the appropriate offsetting provisions for Koala Food Trees which cannot be practically maintained. Whilst previous studies have mapped the subject site as potential Wallum Froglet Habitat, previous LES studies and LEP zonings are considered to have adequately addressed these concerns.

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9. Appendices

A-1 Potential Occurrence Assessment

The following tables are used as a summary to address threatened species in terms of potential occurrence and requirement for formal assessment. A threatened species should be assessed if it is:

a) Recorded on-site; or

b) Not recorded on site, but recorded within a 10 km radius (the locality), and is considered to have a *Fair* to *High* probability of occurring on-site due to potential habitat, key habitat component, etc.

Likelihood of occurrence is based on the probability of occurrence in terms of:

- Habitat extent (e.g. sufficient to support an individual or the local population; comprises all of home range; forms part of larger territory, etc.); quality (i.e. condition, including an assessment of threats, historical land uses on and off-site, and future pressures); interconnectivity to other habitat; and ability to provide all the species life-cycle requirements (either the site alone, or other habitat within its range);
- Occurrence frequency (i.e. on-site resident; portion of larger territory or seasonal migrant); and
- Usage i.e. breeding or non-breeding; opportunistic foraging (e.g. seasonal, migratory or opportunistic); marginal fringe of core range; refuge; roosts; etc.

An indicative 1-5 scale used by the author to indicate the likelihood of the species to potentially occur in the habitat on the study site (if they have not been recorded in the locality) is as follows:

- 0: *Unlikely* (<1% probability) - no potentially suitable habitat; too disturbed; or habitat is very poor. No or few records in region or records/site very isolated e.g. by pastoral land, urbanisation, etc.
- 1: *Low* (1-25%) - few minor areas of potential habitat; highly modified site/habitat; or few habitat parameters present, but others absent or relatively insignificant (sub-optimum habitat). Usually very few records in locality.
- 2: *Fair* (25-50%) - some significant areas of potential habitat, but some habitat parameters limited. Potential for occasional foraging e.g. from nearby more optimal areas or known habitat. Records at least within 10-15 km radius of site.
- 3: *Moderate* (50-75%) - quite good potentially suitable habitat on and adjacent to the site, and/or good quality and abundance of some vital habitat parameters. Records within <10km, or adjacent to site, or adjacent to high quality habitat where species likely to occur.
- 4: *High* (>75%) - very good to optimum habitat occurring on or adjacent to the site (support breeding pair or population). Recorded within 5-10 km of site in same or similar habitat.

A-1-1 Listed Flora Species and Eligibility for Test of Significance and MNES Assessment

Table 7: Potential occurrence assessment - flora

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
Scented Acronychia *Acronychia littoralis*	E	E	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10030	Scented Acronychia occurs in transition zones between littoral rainforest and swamp sclerophyll forest; between littoral and coastal cypress pine communities; and margins of littoral forest. The species mainly occurs within 2km from the coast on sandy soil. The site contains sandy soil types and is within 2km of the shoreline. However, the species is not within the vicinity of littoral rainforest margins. Given this, and that there are 10 records of this species within the locality and is therefore considered to have a fair likelihood of occurrence.	**Fair**
Leafless Tongue-orchid *Cryptostylis hunteriana*	V	V	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10187	The larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black Sheoak (*Allocasuarina littoralis*); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*). Site habitat unlikely to be suitable due to disturbance history, limited associated vegetation and no local occurrence records. Low likelihood of occurrence.	Low
Southern Swamp Orchid *Phaius australis*	E	E	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10610	This species inhibits swampy grassland or swampy forests in coastal areas. Habitats at the site have potential to support this species however, due to the sites disturbance history and that there is only one record within the locality, this species is moderately likely to occur.	**Moderate**
White-flowered Wax Plant *Cynanchum elegans*	E	E	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10196	This species predominately occurs in dry rainforest and littoral rainforest communities. Habitat of this type does not occur on the subject site. Unlikely to occur.	Unlikely
Knicker Nut *Caesalpinia bonduc*	E	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10876	This species grows on sandy, coral-derived soil close to the shoreline, in coastal scrub vegetation, in full sun or light shade. Habitats at the site have potential to support this species however, due to the sites disturbance history, the proximity to the shoreline and	Unlikely

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
				limited records in the locality this species is unlikely to occur.	
Hairy-joint Grass *Arthraxon hispidus*	V	V	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10066	Moisture and shade-loving grass, found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps. Limited suitable habitat occurs on site, subject site is located outside of the known distribution and not recorded within the locality. Unlikely to occur.	Unlikely
Stinking Cryptocarya *Cryptocarya foetida*	V	V	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10186	Found in littoral, warm temperate and subtropical rainforest, wet sclerophyll forest and Camphor laural forest usually on sandy soils, but mature trees are also known on basalt soils. The subject site does not contain suitable habitat, therefore this species is unlikely to occur.	Unlikely
Slender Marsdenia *Marsdenia longiloba*	E	V	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10507	This species habitats include subtropical and warm temperate rainforest, lowland moist or open eucalypt forest adjoining rainforest and, sometimes, in areas with rocky outcrops. No suitable habitat on site and not recorded within the locality. Unlikely to occur.	Unlikely
Tall Knotweed *Persicaria elatior*	V	V	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10590	This species prefers damp habitats beside waterbodies or streams. No suitable habitat on site and no records within the locality. Unlikely to occur.	Unlikely
- *Euphrasia arguta*	CE	CE	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20165	The subject site is located outside of this species known distribution No suitable habitat on site and no local records. Unlikely to occur.	Unlikely
Macadamia Nut *Macadamia integrifolia*	-	V	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=7326	This species is generally found in Queensland with the subject site occurring In the southern extent of this species predicted habitat distribution. The Macadamia Nut grows in remnant rainforest. No records within the locality. Unlikely to occur.	Unlikely
Lesser Swamp-orchid *Phaius australis*	E	E	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10610	This species is limited to areas of swampy grassland and swampy forest. Limited suitable habitat occurs on the subject site and no local records. Unlikely to occur.	Unlikely
Native Guava *Rhodomyrtus psidioides*	CE	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20342	Native Guava is associated with littoral, warm temperate, wet sclerophyll and subtropical rainforest habitats often near creeks and drainage lines. Marginal suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
Scrub Turpentine *Rhodamnia rubescens*	CE	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20341	This species is associated with rainforest habitats and volcanic and sedimentary soils. No suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely
Magenta Lilly Pilly *Syzygium paniculatum*	E	V	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10794	This species is restricted to specific soils of riverside rainforests and remnant littoral rainforests. No suitable habitat for this species occurs within the subject site. Unlikely to occur.	Unlikely
Austral Toadflax *Thesium austral*	V	V	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10802	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*). Site contains areas of native groundcover, however the habitat in general is unlikely to be suitable for this species which is more often associated with grassland on coastal sea cliffs. Unlikely to occur.	Unlikely
Cryptic Forest Twiner *Tylophora woollsii*	E	E	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10816	This species grows in moist eucalypt forest, moist sites in dry eucalypt forest and rainforest margins. Habitats present within the subject site provide low suitability habitat for this species. Species is unlikely to occur.	Unlikely

A-1-2 Listed Fauna Species and Eligibility for Test of Significance and MNES Assessment

Table 8: Potential occurrence assessment - fauna

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
Giant Barred Frog *Mixophyes iterates*	-	E	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10538	This species is found in moist forests and rainforests. The vegetation communities on site are not suitable for this species. Unlikely to occur.	Unlikely
Green & Golden Bell Frog *Litoria aurea*	E	V	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10483	This species inhabits permanent waterbodies with a preference for those which are still. No waterbodies are present on site. Unlikely to occur.	Unlikely
Stuttering Frog *Mixophyes balbus*	E	V	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10536	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. No suitable habitats present on site and only one local record not in proximity to the subject site. Unlikely to occur.	Unlikely
Wallum Froglet *Crinia Tinnula*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10183	This species is usually associated with acidic swaps on coastal sand plains. They typically occur in sedgelands and wet heathlands. Suitable habitat occurs on the subject site for this species. Nine records within the locality and previously recorded within the subject site. Highly likely to occur.	**High**
Australasian Bittern *Botaurus poiciloptilus*	E	E	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10105	An estuarine or freshwater species found in areas of dense sedges, reeds and rushes. Suitable habitat for this species does not occur on site. Unlikely to occur.	Unlikely
Red Goshawk *Erythrotriorchis radiatus*	CE	V	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10279	In NSW, preferred habitats include mixed subtropical rainforest, *Melaleuca* swamp forest and riparian *Eucalyptus* forest of coastal rivers. Limited suitable habitat for this species occurs on site. May on occasion be seen flying over. Unlikely to occur.	Unlikely
Grey Falcon *Falco hypoleucos*	E	V	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10330	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. The site is outside of its known distribution and no local records. Unlikely to occur.	Unlikely
White-throated Needletail *Hirundapus caudacutus*	-	V, M	https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=682	**White-throated Needletail is almost exclusively aerial, the species forages aerially and roosts in trees in forests and woodlands in dense foliage or hollows.** Six records within the locality. Unlikely to occur nesting or foarging within	Unlikely

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
				vegetation at the site, however may be seen flying over the site from time to time.	
Black Necked Stork *Ephippiorhynchus asiaticus*	E	-	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10275	This species is found in close proximity to a water source. Generally inhabits lakes, swamps, mudflats and mangroves. Habitat of this type does not occur on the development site. 2 records are within 1 km from the subject site however these records are located at the nearby Saltwater Lagoon. Unlikely to occur.	Unlikely
Comb-crested Jacana *Irediparra gallinacea*	V	-	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10435	This species is found in areas with a permanent water source and a good cover of surface vegetation. It is most commonly recorded in freshwater swamps, billabongs and ponds. Habitat for this species does not occur on site. Unlikely to occur.	Unlikely
Eastern Osprey *Pandion cristatus*	V	M	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10585	A water-dependent species which favours river mouths and coastal lakes and lagoons. This species forages over large waterbodies and breeds in nests constructed in the dead branches high in the canopy. Neither foraging, nor breeding habitat occur within the subject site. Unlikely to occur.	Unlikely
Glossy Black Cockatoo *Calyptorhynchus lathami*	V	-	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10140	This species requires *Allocasuarina* and/or casuarina species to forage and large tree hollows to breed. The site provides limited foraging resources of *Allocasuarinas and Casuarinas* recorded within the site. 23 records within the locality. Moderate likelihood of occurrence.	**Moderate**
Little Lorikeet *Glossopsitta pusilla*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20111	This species is mostly found in areas of profuse-flowering eucalypts where it feeds on nectar and pollen from the tree canopy. Has been recorded occurring in isolated roadside and paddock trees. Potential foraging resources for this species occurs on site and in adjoining properties. Moderate chance of occurrence.	**Moderate**
Masked Owl *Tyto novaehollandiae*	V	-	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10820	This species occurs in forests and woodlands with a sparse understory. It requires tree hollows for nesting and an abundance and diversity of prey species. Several prey species are likely to occupy the site. Masked owls may forage over the site as part of a larger range. Five records within the locality. Moderate chance of occurrence.	**Moderate**
Regent Honeyeater *Anthochaera phrygia*	CE	CE	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10841	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak with an abundance of bird life and mistletoes.	Low

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
				This habitat does not occur on site and this species has not been recorded in the locality. Low chance of occurring.	
Painted Honeyeater *Grantiella picta*	V	V	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=470	This species inhabits mistletoe-infested forest and woodland communities. This habitat does not occur on site and this species has not been recorded in the locality. Unlikely to occur.	Unlikely
Powerful Owl *Ninox strenua*	V	-	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10562	This species occurs in sclerophyll forests and requires an abundance and diversity of prey species. Large tree hollows are also required for nesting. Several prey species are likely to occupy the site. Powerful Owls may forage over the site as part of a larger range. Four records within the locality. Moderate chance of occurrence.	**Moderate**
Sooty Owl *Tyto tenebricosa*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10821	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Nests in very large tree-hollows. This habitat does not occur on site. One species record within the locality. Unlikely to occur.	Unlikely
Square-tailed Kite *Lophoictinia isura*	V	-	http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10495	This species is commonly found in open forests and woodlands. 11 records in the locality, due to the size of the subject site there is a high chance of occurrence for this species to use the site as part of a larger foraging range. Fair likelihood of occurrence.	**Fair**
Swift Parrot *Lathamus discolor*	E	CE	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=744	This species favours winter flowering eucalypts, several records in the locality for this species. Some suitable habitat occurs for foraging within the development site. This species does not breed on the mainland. Potential foraging habitat only exists within the site for the Swift Parrot. Low to moderate likelihood of occurrence.	**Moderate**
White-bellied Sea Eagle *Haliaeetus leucogaster*	V	M	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20322	This species is found in areas containing large open water for foraging. Nests are often built in tall emergent eucalypts and often have dead branches or trees nearby to be used as 'guard roosts'. Potential areas for foraging resources occurs nearby to the subject site including Trial Bay and Saltwater Lagoon, the vegetation on site is unlikely to provide a suitable nesting site for this species. Unlikely to occur.	Unlikely
Wompoo Fruit-dove *Ptilinopus magnificus*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10707	Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests. No habitat of this type occurs within close proximity to the subject site. Unlikely to occur.	Unlikely

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
Rose-crowned Fruit-dove *Ptilinopus regina*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10708	Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. The subject site contained limited fruiting species and no suitable habitat for this species. Unlikely to occur.	Unlikely
Sooty Oystercatcher	V	-	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10385	This species favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. No suitable habitat within the subject site. Unlikely to occur.	Unlikely
Pied Oystercatcher *Haematopus longirostris*	E	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10386	This species favours intertidal flats of inlets and bays, open beaches and sandbanks. No suitable habitat within the subject site. Unlikely to occur.	Unlikely
Lesser Sand-plover *Charadrius mongolus*	V	E	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10162	Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms. No suitable habitat within the subject site. Unlikely to occur.	Unlikely
Varied Sittella *Daphoenositta chrysoptera*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20135	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. Two records in locality, however not in close proximity to the subject site. Limited habitat for this species occurs on site. This species has a low chance of occurrence as part of a larger home range.	Low
Bar tailed Godwit *Limosa lapponica baueri*	-	V, M	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20313	This species is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Less frequently it occurs in salt lakes and brackish wetlands, sandy ocean beaches and rock platforms. No suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely
Black-tailed Godwit *Limosa limosa*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10479	Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. No suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely
Beach-stone Curlew *Esacus magnirostris*	CE	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10280	Beach Stone-curlews are found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries.	Unlikely

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
				No suitable habitat occurs on the subject site. Unlikely to occur.	
Curlew Sandpiper *Calidris ferruginea*	E	CE	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20166	Curlew Sandpiper generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. No suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely
Broad-billed Sandpiper *Limicola falcinellus*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10478	Broad-billed Sandpipers favour sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat. No suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely
Black Bittern *Ixobrychus flavicollis*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10441	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. No suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely
Brolga *Grus rubicunda*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10382	Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands, especially shallow swamps. Limited suitable habitat occurs on the subject site following significant rainfall. Several records within the locality. Nearest record approximately 5km from subject site. Low likelihood of occurrence.	Low
Eastern Curlew *Numenius madagascariensis*	-	CE	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20284	This species generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. No suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely
Eastern Grass Owl *Tyto longimembris*	V	-	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10819	Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains. Limited habitat for this species occurs due to ongoing slashing disturbances. Two records within the locality. Low likelihood of occurrence.	**Low**
Hooded Plover *Thinornis rubricollis*	CE	V	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10803	Hooded Plovers prefer sandy ocean beaches and occasionally on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. No suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
Little Tern *Sternula albifrons*	E	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10769	Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers. No suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely
Australian Fritillary *Argynnis hyperbius inconstans*	E	CE	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10064	The Australian Fritillary is found in open swampy coastal habitat. Some suitable habitat on the subject site. Not previously recorded within the locality. Low likelihood of occurrence.	Low
Brush-tailed Phascogale *Phascogale tapoatafa*	V	-	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10613	This species is generally found in areas of dry sclerophyll open forest containing sparse groundcover. The subject site contains some potential foraging habitat for this species. Several records of this species within the locality. Moderate chance of occurrence.	**Moderate**
Koala *Phascolarctos cinereus*	V	V	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10616	Koalas Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Areas of the subject site are classified as Preferred Koala Habitat (Secondary Class A) and 23 Primary Koala Food trees were identified within this area. There are 61 local records for the Koala, two records in very close proximity to the site. The site also has potential to be used as a corridor for higher quality habitats in the locality. Moderate likelihood of occurrence	**Moderate**
Common Planigale *Planigale maculata*	V	-	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10635	This species is found in areas where there is dense groundcover and in close proximity to water. Hollow logs, rocks and crevices are required for shelter diurnally. The disturbance history and habitats of the site is unlikely to support this species. Unlikely to occur.	Unlikely
Eastern Cave Bat *Vespadelus troughtoni*	V	-	https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10829	A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs. The development site locality lacks cliffs or overhangings. Unlikely to occur.	Unlikely
Large Bent-wing Bat *Miniopterus schreibersii oceanensis*	V	-	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534	This species is known to occur in well-forested areas and often found roosting in caves, old mines and old buildings. Although ideal roosting habitat for this species does not occur on development site, there is potential for this species to roost in hollow-bearing trees in the study area. Six local records. Given the size of the site, the site may also form a	**Moderate**

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
				part of larger foraging range. Moderate chance of occurring on site.	
Little Bent-wing Bat *Miniopterus australis*	V	-	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533	As for Large Bent-wing Bat.16 local records.	**Moderate**
Eastern Coastal Free-tail Bat *Mormopterus norfolkensis*	V	-	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10544	As for Large Bent-wing Bat. 8 local records.	**Moderate**
Grey-headed Flying Fox *Pteropus poliocephalus*	V	V	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10697	A nomadic species which is dependent on winter flowering eucalypts. Suitable foraging resources occur on site for this species however no breeding or roosting camps were located within the subject site. 43 local records. Highly likely to occur foraging as part of larger range.	**High**
Large-eared Pied Bat *Chalinolobus dwyeri*	V	V	http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10157	The development site lacks preferred roosts such as caves, mines. Considered unlikely to occur on site due to the lack of breeding habitat and no records in the locality.	Unlikely
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10331	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. There is potential for this species to roost within the subject site under Melaleuca bark. The site may also form a part of larger foraging range. One record in the locality. Fair to moderate likelihood of occurring on site.	**Moderate**
Greater Broad-nosed Bat *Scoteanax rueppellii*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10748	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. The site may also form a part of larger foraging range. Four records in the locality. Fair to moderate likelihood of occurring on site.	**Moderate**
Hoary Wattled Bat *Chalinolobus nigrogriseus*	V	-	https://www.environment.nsw.gov.au/ThreatenedSpeciesApp/profile.aspx?id=10158	Hoary Wattled Bat occurs in dry open eucalypt forests, favouring forests dominated by Spotted Gum, boxes and ironbarks, and heathy coastal forests where Red Bloodwood and Scribbly Gum are common. Roosts in hollows and rock crevices. Three records in the locality. Species may use the site as part of a larger foraging territory however site lacks many favoured tree species. Low likelihood of occurrence.	Low
Southern Myotis *Myotis macropus*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10549	This species roosts close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forages over streams and pools. No suitable roosting or foraging habitat on the subject	Unlikely

Species	BC Act	EPBC Act	Link to Profile	Habitat Association	Likelihood of Occurrence
				site. Higher quality suitable habitat within the nearby Saltwater lagoon. Unlikely to occur.	
Yellow-bellied Sheathtailed Bat *Saccolaimus flaviventris*	V	-	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10741	Species roosts in tree hollows and buildings, forages aerially for insects across a wide range. Two records within the locality. Species has potential to use the site for foraging habitat as part of a larger home range. Low likelihood of occurrence.	Low
Greater Glider *Petauroides volans*	E	V	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20306	This species requires a high density of tree hollows for shelter. The subject site is unlikely to contain enough hollow-bearing trees to support this species. No local records. Unlikely to occur.	Unlikely
Long-nosed Potoroo (SE mainland) *Potorous tridactylus*	V	V	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10662	This species requires a dense understory and groundcover for refuge whilst feeding. Very limited habitat for this species occurs on site. One local record. Unlikely to occur.	Unlikely
New Holland Mouse *Pseudomys novaehollandiae*	-	V	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=96	This species requires heathlands with a dense understory. Very limited habitat for this species occurs on site within the intact vegetation. No local records. Unlikely to occur	Unlikely
Spotted-Tailed Quoll (SE mainland population) *Dasyurus maculatus*	V	E	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=75184	This species prefers forest habitats with dense vegetation. For nesting, caves, large hollow logs or tree hollows are required. Site habitat likely to be too open and disturbed for this species. Very limited habitat for this species occurs on site within the intact vegetation. One local record. Unlikely to occur.	Unlikely
Squirrel Glider *Petaurus norfolcensis*	V	-	http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10604	This species is commonly found in dry, open forests with an abundance of winter-flowering trees. The site has low quality potential foraging habitat but the majority of the site lacks an understorey. 44 records within the locality, several of which are in close proximity to the subject site. Moderately likely to occur.	**Moderate**

A-1-3 Listed Migratory Terrestrial and Wetland Species Eligibility for Test of Significance and MNES Assessment

Table 9: Potential occurrence assessment - Migratory Terrestrial and Wetland Species

Species	BC Act	EPBC Act	Link to Profile	Likelihood of Occurrence	Significance Assessment Required?
Oriental Cuckoo *Cuculus optatus*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=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 suitable habitat within the subject site, no local records. Unlikely to occur.	Unlikely
Black-faced Monarch *Monarcha melanopsis*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=609	Wet forest specialist, found mainly in rainforest and wet sclerophyll forest, especially in sheltered gullies and slopes with a dense understorey of ferns and/or shrubs. Limited suitable foraging habitat within the subject site, no local records. Moderately likely to occur.	**Moderate**
Spectacled Monarch *Symposiachrus trivirgatus*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=83946	Prefers dense vegetation, mainly in rainforest but also in moist forest or wet sclerophyll and occasionally in other dense vegetation such as mangroves, drier forest and woodlands. Limited suitable foraging habitat within the subject site, no local records. Moderately likely to occur.	**Moderate**
Satin Flycatcher *Myiagra cyanoleuca*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=612	Eucalypt forest and woodlands, at high elevations when breeding. They are particularly common in tall wet sclerophyll forest, often in gullies or along water courses. Limited suitable foraging habitat within the subject site, no local records. Moderately likely to occur.	**Moderate**
Rufous Fantail *Rhipidura rufifrons*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=592	Moist, dense habitats, including mangroves, rainforest, riparian forests and thickets, and wet eucalypt forests with a dense understorey. Limited suitable habitat within the subject site, no local records. Unlikely to occur.	Unlikely
Latham's Snipe *Gallinago hardwickii*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=863	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands. No suitable habitat occurs on the subject site. Unlikely to occur.	Unlikely

Species	BC Act	EPBC Act	Link to Profile	Likelihood of Occurrence	Significance Assessment Required?
Common Sandpiper *Actitis hypoleucos*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59309	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. No suitable habitat within the subject site, no local records. Unlikely to occur.	Unlikely
Sharp-tailed Sandpiper *Calidris acuminata*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=874	Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. No suitable habitat within the subject site, no local records. Unlikely to occur.	Unlikely
Red Knot *Calidris canutus*	-	E, M	https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20310	Red Knot mainly occurs in small numbers on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours and sandflats and sandy beaches of sheltered coasts. No suitable habitat within the subject site, no local records. Unlikely to occur.	Unlikely
Pectoral Sandpiper *Calidris melanotos*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=858	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. Limited suitable habitat within the subject site, no local records. Unlikely to occur.	Unlikely
Swinhoe's Snipe *Gallinago megala*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=864	Swinhoe's Snipe occurs at the edges of wetlands, such as wet paddy fields, swamps and freshwater streams. The species is also known to occur in grasslands, drier cultivated areas. Limited suitable habitat within the subject site, no local records. Unlikely to occur.	Unlikely
Pin-tailed Snipe *Gallinago stenura*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=841	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. No suitable habitat within the subject site, no local records. Unlikely to occur.	Unlikely
Little Curlew *Numenius minutus*	-	M	http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=848	Little Curlew congregates around pools, river beds and water-filled tidal channels, and shallow water at edges of billabongs. No suitable habitat within the subject site, no local records. Unlikely to occur.	Unlikely

A-2 EPBC MNES Search Results

Australian Government

Department of Agriculture, Water and the Environment

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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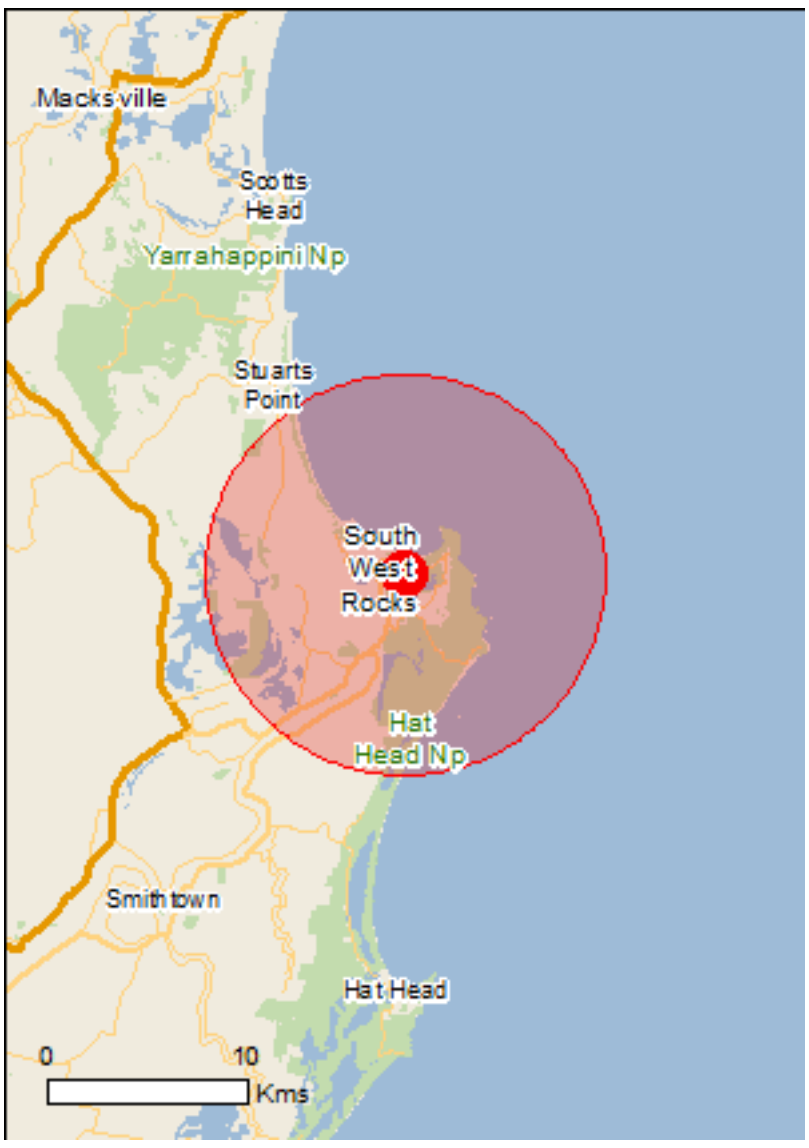

Coordinates

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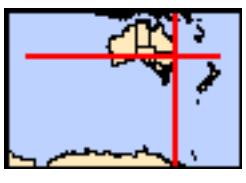

Summary

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:	1
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	71
Listed Migratory Species:	61

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	1
Listed Marine Species:	78
Whales and Other Cetaceans:	14
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:	31
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Name
EEZ and Territorial Sea

Marine Regions [Resource Information]

If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.

Name
Temperate East

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
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically 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	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
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 may 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
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 known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), 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 known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area

Name	Status	Type of Presence
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 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	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur 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 likely to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat known to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat likely to occur within area
Insects		
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
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
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 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 likely to 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
Plants		
Acronychia littoralis Scented Acronychia [8582]	Endangered	Species or species habitat known to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	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 likely to occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat known to 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

Name	Status	Type of Presence
Marsdenia longiloba Clear Milkvine [2794]	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 known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Tylophora woollsii [20503]	Endangered	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour 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	Foraging, feeding or related behaviour 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	Breeding likely to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat known to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to 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 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

Name	Threatened	Type of Presence
		habitat likely to occur within area
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour 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
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Breeding 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	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
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 borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to 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 habitat may occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to 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	Foraging, feeding or related behaviour 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	Foraging, feeding or related behaviour 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
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Rhincodon typus Whale Shark [66680]	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 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 known 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
Limosa lapponica Bar-tailed Godwit [844]		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

Name	Threatened	Type of Presence
Numenius minutus		
Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Pandion haliaetus		
Osprey [952]		Breeding known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land - Australian Telecommunications Commission

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Smoky Cape Lighthouse	NSW	Listed place

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
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
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

Name	Threatened	Type of Presence within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour 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 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
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 known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		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

Name	Threatened	Type of Presence
		habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
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 likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may 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 likely to occur within area
Puffinus pacificus Wedge-tailed Shearwater [1027]		Breeding 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]		Breeding 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

Name	Threatened	Type of Presence
		area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour 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	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 nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		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
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		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 habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat likely to occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may 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
Solegnathus dunckeri Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		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 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
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour 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	Foraging, feeding or related behaviour 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
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely 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 borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area

Name	Status	Type of Presence
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dophin, 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
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely 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
Arakoon	NSW
Clybucca	NSW
Clybucca	NSW
Fishermans Bend	NSW
Hat Head	NSW
Yarrahapinni Wetlands	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 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
Pycnonotus jocosus Red-whiskered Bulbul [631]		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
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

Name	Status	Type of Presence
		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		
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
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
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
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
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

Nationally Important Wetlands	[Resource Information]
Name	State
Clybucca Creek Estuary	NSW

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

-30.8939 153.05165

Acknowledgements

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-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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