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Environmental Assessment

Proposed Sports Ground (Lot 3156 DP 1267803), located at 15 Suncroft Street, Chisholm NSW.

Prepared for: Maitland City Council

C/- de Witt Consulting

May 2024

AEP Ref: 3525

Revision: 01

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Document Control

Document Name	Environmental Assessment Proposed Sports Ground (Lot 3156 DP 1267803), located at 15 Suncroft Street, Chisholm NSW
Project Number	3327
Client Name	Maitland City Council C/- de Witt Consulting
AEP Project Team	Ian Benson Sarah Currie Kelly Drysdale Kara Dunn Sam Rayfield

Revision

Revision	Date	Authors	Reviewed	Approved
00	12/04/2024	Sarah Currie	Kelly Drysdale	Ian Benson
01	02/05/2024	Sarah Currie	Kelly Drysdale	Ian Benson

Distribution

Revision	Date	Name	Organisation
00	12/04/2024	Liberty Pannowitz	de Witt Consulting
01	02/05/2024	Liberty Pannowitz	de Witt Consulting

EXECUTIVE SUMMARY

Anderson Environment & Planning (AEP) was commissioned by de Witt Consulting on behalf of Maitland City Council to undertake an Environment Assessment (EA) for the proposed Sports Ground development which includes a sporting field, car park, playground and associated infrastructure, located at 15 Suncroft Street, Chisholm NSW (Lot 3156 DP 1267803).

AEP previously completed a *BioBanking Assessment Report for Residential Development of Lots 1 to 3 DP 1224086, Thornton North* on behalf of Thornton Waters Pty Ltd dated April 2017. This BioBanking Assessment Report (BAR) was approved as BioBanking Statement (BS) 36. The Subject Site for this EA is located within Stage 2A of the approved development and was subject to vegetation clearing and earthworks as part of the approved subdivision.

de Witt Consulting have been engaged by Maitland City Council to prepare the Review of Environmental Factors (REF) for the proposed sports field development within the site. As part of the REF, an Environmental Assessment is required.

This assessment evaluates the likelihood of the proposed activities having a significant impact on potentially occurring threatened species or ecological communities. In this regard, the assessment aims to recognise the relevant requirements Part 5 of the *Environmental Planning & Assessment Act 1979 (EP&A Act)*, the *Biodiversity Conservation Act 2016* (NSW) (BC Act), and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Fieldwork was conducted to ground-truth State Vegetation Type Mapping and although STVM mapping indicated 'Non-Native Vegetation', it was confirmed the Subject Site, albeit in a severely degraded condition, was likely commensurate with PCT 3446 - *Lower North Foothills Ironbark-Box-Gum Grassy Forest*. Vegetation on site comprised of no upper stratum, two colonising mid stratum species and a few native ground stratum species, predominantly *Cynodon dactylon* indicating the previously cleared pasture improved lands.

Flora and fauna habitat surveys were undertaken and no threatened flora or fauna species were identified within the Subject Site.

Part 5, Section 5.5 of the EP&A Act requires that assessment of the proposed works considers environmental impacts. To ensure best practice the desktop and field assessment were assessed under BC Act *Section 7.3* (5-part test of significance) and undertaken to determine if the proposed works will have a significant impact upon listed threatened entities. No significant impact to threatened species under the 5-part test are anticipated and Latham's Snipe has been considered for indirect impacts, specifically light pollution. Additionally, consideration of the EPBC Act revealed that impacts on Matters of National Environmental Significance are unlikely to occur, nor require referral to the Commonwealth.

General recommendations and mitigation measures have been included to minimise environmental impacts of the proposal during the construction phase. These measures should provide adequate protection during the construction phase for native flora and fauna in the locality.

Study Certification and Licensing

The fieldwork for this study was carried out and the report was written by Sarah Currie B Env Sc & Mgmt and Kelly Drysdale Ass Dip Sc, Grad Dip BA, TAE. The assessment was approved by Ian Benson BEng (Civil), Grad Dip Sc (Ecology) BAAS: 18147 of Anderson Environment & Planning.

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101313;
- Animal Research Authority (Trim File No: 14/600(2)) issued by NSW Agriculture; and
- Animal Research Establishment Accreditation Number 53724.

Certification:

As the principal certifier, I, Ian Benson, make the following certification:

The results presented in the assessment are, in the opinion of the principal author and certifier, a true and accurate account of the species recorded, or considered likely to occur within the Survey Area.

Commonwealth, state and local government policies and guidelines formed the basis of project surveying methodology, unless specified departures from industry standard guidelines are justified for scientific and/or animal ethics reasons; and

All research workers have complied with relevant laws and codes relating to the conduct of flora and fauna research, including the Animal Research Act 1995, Biodiversity Conservation Act 2016 and the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes.

Principal Certifier:

Ian Benson

Principal Ecologist

Anderson Environment & Planning

2 May 2024

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1.0 Introduction

Anderson Environment & Planning (AEP) was commissioned by de Witt Consulting on behalf of Maitland City Council to undertake an Environment Assessment (EA) for the proposed Sports Ground development which includes a sporting field, car park, playground and associated infrastructure, located at 15 Suncroft Street, Chisholm NSW (Lot 3156 DP 1267803). The proposal will impact approx. 5.14ha of native vegetation in a severely degraded, highly modified and managed condition. Refer to **Figure 2** for the proposed development plans and **Figure 6** for proposed impact area.

The Subject Site is zoned as R1 – General Residential' and 'RU2 – Rural Landscape' (pub. 16-12-2011)

AEP have undertaken necessary investigations for the production of this EA to adequately address *Section 5.5* of the EP&A Act. As there are no guidelines for environmental assessment under *Section 5.5* of the EP&A Act, AEP has undertaken the assessment in accordance with *Section 7.3* of the BC Act (known as the "5-part test") as this assessment is considered best practice to assess the environmental impacts of the proposal.

This assessment has been undertaken with reference to the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), the *NSW Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This assessment is specifically intended to indicate the likelihood of the proposal having a significant impact on threatened species or ecological communities. In this regard, the assessment aims to recognise the relevant requirements of the EP&A Act, the BC Act and the EPBC Act. The purpose of this assessment is to:

- Describe the ecological values of the Subject Site;
- Explore the potential for threatened species to utilise the area; and
- Assess ecological impacts associated with the proposal against relevant legislation.

Potential ecological impacts on native species in general are also considered, as are recommendations for minimising any impacts within the scope of the development.

For the purposes of referencing, this document should be referred to as:

> *Anderson Environment & Planning, Environmental Assessment for proposed Sports Ground development located at 15 Suncroft Street, Chisholm NSW. April 2024*

2.0 Site Particulars

Table 1 – Subject Site Particulars

Detail	Comments
Client	Maitland City Council C/- de Witt Consulting
Address	15 Suncroft Street, Chisholm *NSW* 2322
Title(s)	Lot 3156 DP 1267803
Subject Site	The Subject Site is the entirety of Lot 3156 DP 1267803 and contains managed native and exotic vegetation totalling approx. 5.14ha. (**Figure 2**; **Figure 6**).
LGA	Maitland City
Zoning	Under the Maitland Local Environmental Plan 2011 (pub. 16-12-2011) the Study Area is zoned as 'R1 – General Residential' and 'RU2 – Rural Landscape'.
Current Land Use	The current land use is an unoccupied semi managed grassland, with no existing dwellings. The site contains severely degraded exotic and native vegetation across the whole area with some dirt tracks throughout. It is noted that the site was completely cleared and regraded as part of the approved subdivision.
Surrounding Land Use	The Subject Site is bounded by Raymond Terrace Road to the south and to the south west where a mapped hydro line is located and has undergone recent improvements separate from this proposal including new culverts. Approved residential developments are occurring on all sides of the Subject Site.

Figure 1 depicts the extent of the site overlaid on an aerial photograph of the locality.

3.0 Proposed Development

The proposed development is for a Sports Ground which includes a sporting field, car park, playground and associated infrastructure, located at 15 Suncroft Street, Chisholm NSW (Lot 3156 DP 1267803).

Approximately 5.14ha of severely degraded native and exotic vegetation is proposed to be impacted by the works.

Figure 2 depicts the proposed development plan within the Subject Site.

AEP

Figure 1 - Site Location
Location:15 Suncroft Street, Chisholm 2322

Date: March 2024

Client: Maitland City Council C/- de Witt Consulting

AEP ref: 3525

SUNCROFT ST

MATCH EXISTING LEVEL

APPROXIMATE LOCATION OF BURIED ASBESTOS

TRAMPORE ESPLANADE

MAYO CRES

MEATH ST

MAYO CRES

RAYMOND TERRACE RD

RL13.94

RL13.90

RL13.85

RL13.85

RL13.78

-5 %

-5 %

-5 %

RL10.56

RL10.47

RL10.73

RL10.66

RL10.65

-0.5 %

RL11.20

-1 %

RL11.15

CRICKET NETS

PLAY AREA (BY OTHERS)

APPROX. COASTAL WETLANDS

FF12.60

RL11.49

RL12.30

RL11.49

-1.0 %

-0.5 %

-1.0 %

-0.5 %

RL10.84

RL11.65

RL10.84

50 PIPE UNDER KERB
TO 2.0m BEYOND
STRUCTION.
E CONNECTION.

P:\Task Folders 2324\TN18 - Thornton North Sportsground (Sophia Waters) - 4139\02 DESIGN\4139-1A.dwg

SHEET REVISION	BY	DATE

Plotted: 29/02/2024 8:41:48 AM By: AN

CONCEPT PLAN - NOT FOR CONSTRUCTION

RATIO @A3
Horizontal Ratio:1:1000
Vertical Ratio:1:1000

SURVEYOR	DATUM
M Osborn	A.H.D.
DESIGNER	DATE OF PLAN
A MOHAN	DD/MM/YYYY

MAITLAND CITY COUNCIL
INFRASTRUCTURE & WORKS
285-287 HIGH STREET
P.O. BOX 220
MAITLAND 2320
PHONE: (02) 49349700
FAX (02) 49333209
DX 21613 MAITLAND

TN18 - THORNTON NORTH SPORTS GROUND
MCFARLANES ROAD & RAYMOND TERACE ROAD
THORNTON
PROPOSED GRADING PLAN

PLAN No.
4139-1A
Sheet 4 of 5

4.0 Scope and Purpose

Investigations were carried out within the Subject Site and via literature / database searches to gather information required to adequately address *Section 5.5* of the EP&A Act using *Section 7.3* of the BC Act (known as the "5-part test"), to assess the environmental impacts of the proposal.

Also afforded consideration were the Commonwealth *Environmental Protection Biodiversity Conservation Act, 1999* (EPBC Act), relevant *State Environmental Planning Policies* (SEPPs) and local provision such as Local Environmental Plan and Development Control Plan.

The assessment approach was tailored to undertake sufficient works to ensure that legislative requirements were met relating to threatened species and native species in general for the proposed specific development. This was achieved by background research and literature review, database searches, consultation, targeted ecological fieldwork and mapping, detailed habitat assessment, and impact assessment consideration against the type and form of development proposed.

Impact assessment was undertaken with due reference to the "*Threatened Species Test of Significance Guidelines"* (OEH, 2018).

Specifically, the scope of this study is to:

- Identify vascular plant species occurring within the site, including any threatened species listed under the BC Act or EPBC Act;
- Identify and map the extent of vegetation communities within the site, including any EECs listed under the BC Act or EPBC Act;
- Identify any fauna species, including threatened and migratory species, and populations or their habitats, which occur within the site and are known to occur in the wider locality;
- Assess the potential of the proposed development to have a significant impact on any threatened species, populations or ecological communities (or their habitats) identified from the site; and
- Describe measures to be implemented to avoid, minimise, manage or monitor potential impacts of the proposal.

In addition to the survey work conducted within the site boundary and its immediate surrounds, consideration has been afforded to the wider locality, via database searches within 10km of the site and via consideration of habitat areas that may be linked ecologically to the site.

5.0 Methodology

The field surveys for the site have been prepared and performed with due recognition of the State Survey Guidelines (DEC 2004; DECC 2009; DPIE 2020, OEH 2018).

The size of the site, the type of native vegetation and habitats remaining, the status of existing and proposed surrounding land use, and the level and type of habitat linkages to proximate bushland areas were considered in formulating the methodology employed and described below.

The assessment approach was tailored to undertake sufficient works to ensure that legislative requirements were met relating to threatened species and native species in general for the proposed specific development.

5.1 Information Sources

Information and spatial data provided within this EA Report has been compiled from various sources including:

- Aerial Photograph Interpretation (API) of the site and surrounding locality;
- *NSW Biodiversity Values Map* (accessed April 2024);
- State Vegetation Type Map (SVTM Version 2.0, 2023)
- State survey guidelines (DEC 2004; DECC 2009; OEH 2018; DPIE 2020a; DPIE 2020b; DPE 2022a);
- DPE Threatened Species, Populations and Ecological Communities website (*https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/Default.aspx?a=1*) (accessed April 2024); and
- Collective knowledge gained from previous ecological survey and assessment in the Maitland region over the past 25 years.

Additionally, database searches were carried out, namely:

- Review of flora and fauna records held by the BioNet Atlas of NSW Wildlife within a 10km radius of the site (April 2024) and;
- Review of flora and fauna records held by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search within a 5km radius of the Subject Site (April 2024).

5.2 Survey Methods

All fieldwork was conducted within the Subject Site as shown in **Figure 5.**

5.2.1 Vegetation Communities

Vegetation was surveyed utilising a variety of methods, as outlined:

- Consideration of State Vegetation Type Mapping (2023) (refer **Figure 3**);
- Aerial Photo interpretation (API) to identify any notable variations within the site;
- Consultation of 1:25,000 topographic map series for the area;
- Inspection of the site to ground-truth the unit(s); and

- Identification of the vegetation map unit occurred via identification of required dominant species in community structural layers.

The final derived vegetation map was based on dominant species present in the canopy, shrub and ground layers. The dominant species composition, structural and physical attributes were all considered when assigning the best fit ecological communities.

Consideration was given to the potential for the derived vegetation communities to constitute EECs as listed under the BC Act and/or EPBC Act. The floristic composition, geomorphological characteristics and geographical extent were important considerations in this process. The type and location of the relevant vegetation communities can be seen in **Figure 4**.

5.2.2 Flora

A flora survey was undertaken to produce a flora species list for the Subject Site, to search specifically for threatened flora species known from the wider locality, and to gather data necessary to both derive vegetation community type(s) and to meet relevant survey guidelines. Such works included:

- Identification of all vascular plant species encountered during fieldwork;
- Survey involved systematic coverage of the Subject Site. The Random Meander Technique (Cropper, 1993) was utilised to maximise species encountered; and
- Biodiversity Assessment Method (BAM) plots were undertaken.

5.2.3 Habitat

An assessment of the relative habitat values present within the Subject Site was carried out. This assessment focused primarily on the identification of specific habitat types and resources within the site favoured by known threatened species from the region. The assessment also considered the potential value of the Subject Site (and surrounding areas) for all major guilds of native flora and fauna.

The assessment was based on the specific habitat requirements of each threatened fauna species regarding home range, feeding, roosting, breeding, movement patterns and corridor requirements. Consideration was given to contributing factors including topography, soil, light and hydrology for threatened flora and assemblages.

5.2.4 Fauna

Fauna survey was carried out utilising techniques as outlined below**.** Fauna survey work was undertaken with reference to relevant guidelines and to add additional information to the generated Expected Fauna Species List (**Appendix B**).

Avifauna Surveys

The presence of avifauna within the site was assessed via incidental observations during all other phases of fieldwork.

For incidental observations, birds were identified by direct observation or by recognition of calls or distinctive features such as nests, feathers etc.

Mammals

The occurrence of mammals within the site was assessed by utilising habitat assessment as an analogue for presence. Habitat assessment included survey for foraging resources (blossom, herbaceous, prey etc), hollows and roosting opportunity, connectivity and water.

Incidental Observations & Secondary Indications

Incidental records of any fauna species observed during fieldwork were noted. This included opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of any resident or migratory species. Searches were also conducted for whitewash, regurgitation pellets and prey remain from Owls, chewed (Allo) *Casuarina* cones from Black-Cockatoos, chewed fruit remains from frugivorous birds etc.

5.2.5 Details of Field Surveys

A summary of the survey effort is below in **Table 2** and **Figure 5**.

Table 2 – Field Survey Periods

Date	Time	Field Activity	No. of Persons on Site
21/04/2024	10:00am - 1:45pm	Site walkover Vegetation mapping General habitat survey Incidental observations 3 X BAM plots	2

The above survey methodology is considered to provide sufficient understanding of the biodiversity of the Subject Site.

Additionally, by applying rigorous habitat assessment to more mobile species identified in BioNet Atlas records within the locality, it was ensured that all possible use of the Subject Site by notable species was considered and accommodated within subsequent ecological assessment and management recommendations.

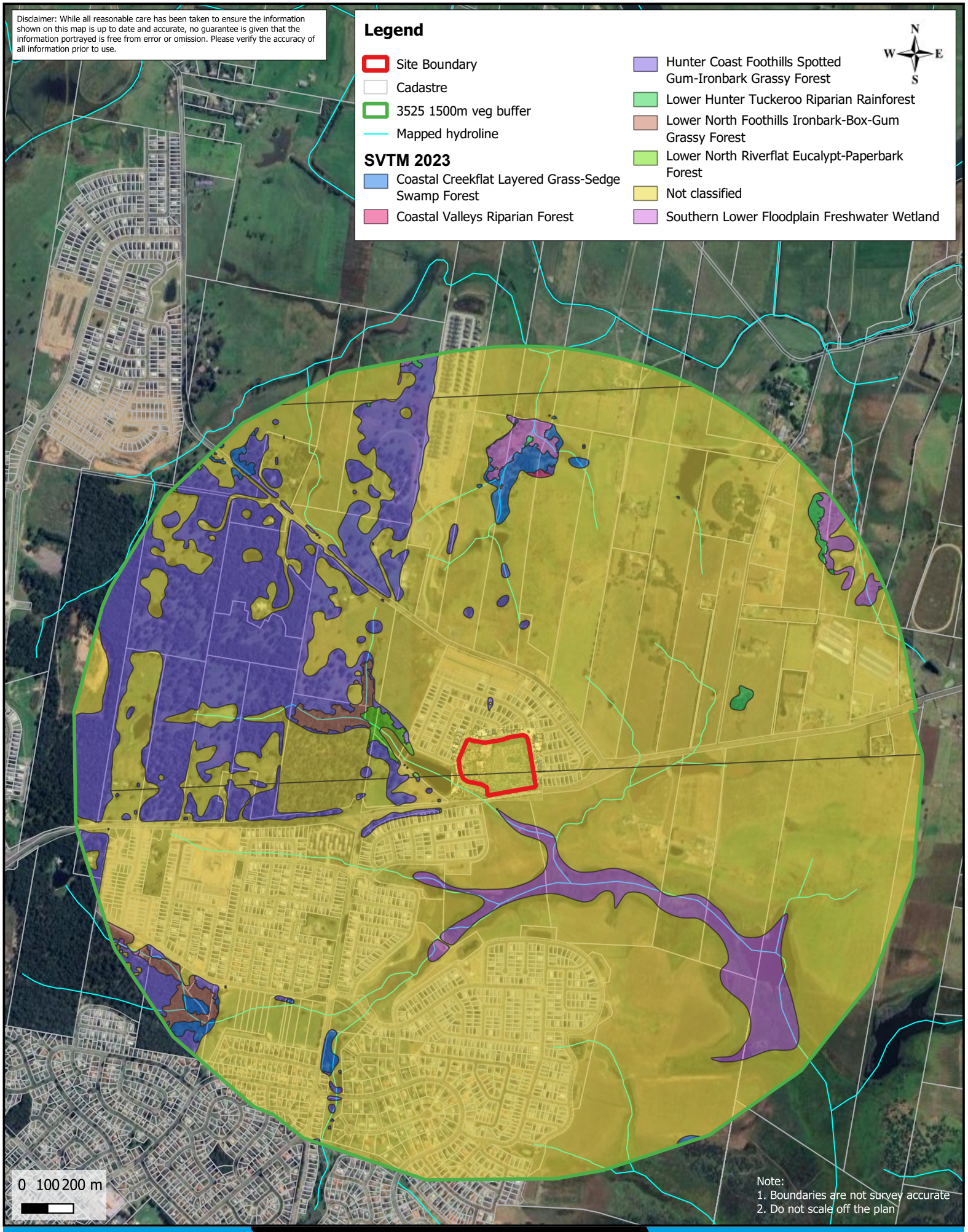

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Figure 3 - State Vegetation Mapping (2023)

Date: March 2024

Location:15 Suncroft Street, Chisholm 2322

Client: Maitland City Council C/- de Witt Consulting

AEP ref: 3525

6.0 Results

6.1 Vegetation Communities

State Vegetation Type Mapping (Version 2.0**,** 2023) indicates that the Subject Site contains Non-native Vegetation. **Figure 3** shows the extent of SVTM vegetation within, and surrounding the Subject Site.

Fieldwork was conducted to ground-truth vegetation type and condition within the Subject Site and three (3) BAM plots were completed. Sparse regrowth mid stratum vegetation was found only within Plot 1 along a small area not managed by recent mowing. Plot 2 was in a similar degraded condition to Plot 1, while Plot 3 was slightly wetter underfoot, located in an area of historical infill of a hydroarea (Figure 4).

BAM plot surveys recorded some native species present therefore further assessment of locally mapped Plant Community Types (PCT) to the west of the Subject Site were considered including:

- PCT 4042 - *Lower North Riverflat Eucalypt-Paperbark Forest;* and
- PCT 3446 - *Lower North Foothills Ironbark-Box-Gum Grassy Forest.*

Both PCT 4042 and PCT 3446 includes mid stratum species; *Acacia falcata* and *Daviesia ulicifolia,* and dominant ground stratum species *Cynodon dactylon,* along with *Eragrostis leptostachya* and *Fimbristylis dichotoma* within the diagnostic species lists. However, PCT 3446 also listed *Chrysocephalum apiculatum* and *Lobelia purpurascens* and therefore as such, it could be reasonably assigned to a PCT and it was selected as the best fit PCT.

Utilising the BAM plot data both PCTs were entered into the BAM calculator to assess the vegetation conditions. PCT 4042 and 3446 resulting in Vegetation Integrity Scores of 12.5 and 7.5 respectively.

PCT 3446 - *Lower North Foothills Ironbark-Box-Gum Grassy Forest* has an associated Listed BC threatened ecological community (TEC) *Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions* and a Listed EPBC TEC *Central Hunter Valley eucalypt forest and woodland.* Although given the severely degraded condition of the Subject Site, absence of upper stratum species, the scarcity of the mid stratum and dominance of *Cynodon dactylon* in previously cleared pasture lands, it is considered that the TEC's are not associated to this PCT within the Subject Site.

Exotic species present included: *Conyza spp., Gamochaeta spp., Hypochaeris radicata, Medicago spp., Plantago lanceolata, Rumex conglomeratus, Verbena bonariensis, Setaria parviflora* and *Sida rhombifolia.*

A number of High Threat Exotics were noted within the site including: *Axonopus fissifolius* (Narrow leafed Carpet grass), *Bidens pilosa* (Cobblers Pegs), *Cenchrus clandestinus* (Kikuyu Grass), *Chloris gayana (*Rhodes Grass), *Paspalum dilatatum* (Paspalum) and *Senecio madagascariensis* (Fireweed).

Figure 4 shows the extent of ground-truthed vegetation identified and survey effort within the Subject Site.

6.2 Habitat Assessment

The Subject Site is comprised of disturbed previously cleared pasture lands dominated by *Cynodon dactylon* with a cover of 45% within the ground stratum, sparse single shrubs and no upper stratum. There are no existing dwellings or infrastructure. Although the Subject Site is considered to be native vegetation as diagnostic species were present so that it could be reasonably assigned to a PCT, habitat values are considered to be highly marginal for mobile species only. There are no hollow-bearing trees, thick leaf litter and or fallen logs that could provide any habitat or foraging opportunities. With little habitat for local flora and fauna species and there were no threatened species detected within the area,

it is unlikely the works will impact the habitat values of local fauna populations, when considering the small area proposed for impact and the connectivity of the site to broader patches of high-quality remnant forest within the wider Chisholm area. Off-site vegetation is likely to offer optimal foraging and nesting habitat for bats, birds, and arboreal mammals.

6.3 Flora

Flora surveys have resulted in the identification of twenty-two species within the Subject Site, including seven (7) native species and 15 exotic species. It should be noted that *Cynodon dactylon* is considered to be a native non-endemic species that has been planted for pasture historically within the area.

No threatened flora species were recorded within the Subject Site as such no threatened species will be impacted by the proposed works.

A full list of flora species identified within the site is included in **Appendix C**.

6.4 Fauna

Fauna surveys identified:

- Six (6) species of birds

No listed threatened fauna species were detected within the Subject Site.

It is evident that the site does not act as a key area within the broader context that fauna would rely upon. As such, it is not expected that the Subject Site would be utilised by threatened fauna species to any significant degree. Native vegetation in the wider Chisholm area would likely contain suitable foraging habitat and nesting habitat for bats, birds, and arboreal mammals.

A list of fauna species present onsite has been generated for the site and is included within the Observed Fauna List in **Appendix D**.

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Figure 4 - Survey Effort and Ground-truthed Vegetation Date: March 2024

Location:15 Suncroft Street, Chisholm 2322

Client: Maitland City Council C/- de Witt Consulting AEP ref: 3525

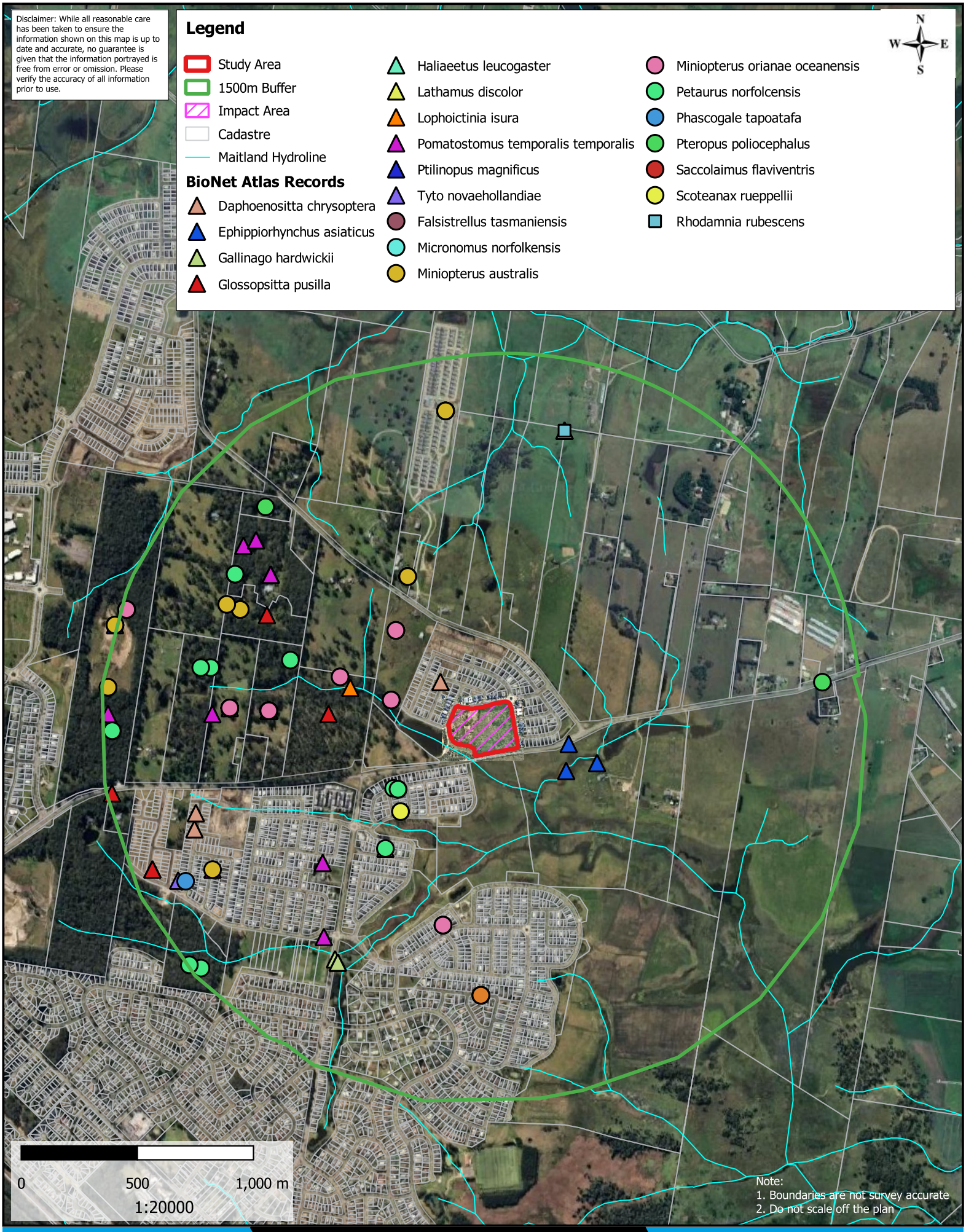

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Figure 5 - Bionet Records

Date: April 2024

Location: 15 Suncroft Street, Chisholm 2322

Client: Maitland City Council C/- de Witt Consulting

AEP ref: 3525

AEP

Figure 6 - Impact Area
Location:15 Suncroft Street, Chisholm 2322

Date: March 2024

Client: Maitland City Council C/- de Witt Consulting

AEP ref: 3525

6.5 Database Searches

Searches were undertaken of databases within a 5km radius of the Subject Site for BC Act listings and EPBC Act listings. Note that any records considered erroneous, historic only, or obviously of no relevance to the site in regard to habitat (e.g., seabirds, marine species etc.) were omitted.

The potential for listed threatened species to occur within the site are considered in **Appendix B**. Detailed ecological profiles of threatened species can be found at: https://www.environment.nsw.gov.au/threatenedspeciesapp/ From **Appendix B**, no threatened flora or fauna species were observed within the Subject Site or would utilise the Subject Site for any part of their life cycle including foraging, breeding or movement through the locality.

7.0 Key Species Considerations

The species identified for further consideration in **Table 3** have been analysed in **Table 4**. By considering these species and their lifecycle needs, many other species are also inadvertently considered. The analysis below considers key lifecycle features for each guild of species in more detail and assists in informing the subsequent 5-part test assessment.

Table 3 – Key Species

Guild / Species	Reason for Inclusion	Comment
Gallinago hardwickii (Lathams Snipe)	BioNet records within proximity of the study area. The constructed drainage area creates suitable habitat for this species.	There is low suitable habitat within the Subject Site. However, suitable foraging habitat occurs within the constructed drainage line outside of the Subject Site to the west and within the adjacent wetlands to the south. Consideration of indirect impacts specifically light pollution.

8.0 Five-part Test Assessment

Part 5, Section 5.5 of the EP&A Act requires the assessment for proposed works considers the environmental impacts, AEP has used the *Section 7.3* 5-part test of significance to determine if the proposed works will have a significant impact upon threatened entities listed under the BC Act that was identified to potentially occur within the site during the survey period as detailed in **Table 4. Figure 5** indicates all BioNet species within a 1500m buffer from the Subject Site.

Table 4 – Five-part Test

No.	Clause	Assessment
a)	In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.	5.14ha of PCT 3446 - *Lower North Foothills Ironbark-Box-Gum Grassy Forest* in severely degraded condition will be impacted by this proposal. Considering the small amount of highly modified urbanised habitat to be removed, it is not anticipated that the proposal will have significant impacts to any species and that will adversely affect the life cycle of a species. There are sixty-six (66) BioNet records of *Gallinago hardwickii* (Latham's Snipe) within proximity to the Subject Site. Latham's Snipe is a non-breeding visitor to south-eastern Australia. The distribution is fragmented because the preferred habitat (i.e. freshwater wetlands) occurs in patches throughout the non-breeding grounds. They usually inhabit open, freshwater wetlands with low, dense vegetation. However, they can also occur in habitats with saline or brackish water, in modified or artificial

No.	Clause	Assessment
		habitats, and in habitats located close to humans or human activity. The proposed development will remove approx. 5.14ha of degraded condition vegetation within the Subject Site. Considering the habitat within the surrounding area, the proposed development is not expected to have an adverse effect on the life cycle of the species such that the local population is likely to be placed at risk of extinction. Indirect impacts of the proposed development include artificial light pollution from use of the sporting grounds at night. Implementation of Best Practice Lighting Design and incorporating landscape and urban design, including sympathetic lighting strategies including timers, lighting directional away from potential habitat, dark zone between light source and habitat, using recommended lighting types for use near migratory shorebird habitat, and utilisation of natural barriers such as vegetation screening. While the proposed development is not expected to adversely impact the survival of any threatened species, any potential indirect impacts to these species should be carefully considered. Where possible, avoid and minimise principles noted above should be adopted and potential impacts to threatened species should be minimised.
b)	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	PCT 3446 - *Lower North Foothills Ironbark-Box-Gum Grassy Forest* has an associated Listed BC threatened ecological community (TEC) *Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions* and a Listed EPBC TEC *Central Hunter Valley eucalypt forest and woodland.* Although given the severely degraded condition of the Subject Site, absence of upper stratum species, the scarcity of the mid stratum and dominance of *Cynodon dactylon* in previously cleared pasture lands, it is considered that the EEC's are not associated to this PCT within the Subject Site. Therefore, vegetation present within the Subject Site does not constitute an EEC. No EEC vegetation will be directly affected by the proposal.

No.	Clause	Assessment
c)	In relation to the habitat of a threatened species or ecological community: • the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and • whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and • the importance of the habitat to be removed, modified, fragmented, or isolated to the long-term survival of the species or ecological community in the locality.	The removal of 5.14ha of highly modified and managed vegetation is unlikely to have a significant impact on the survival of the aforementioned threatened species that are highly mobile. The vegetation present on site has been disturbed by weed invasion, historical clearing and frequent mowing. No significant impacts to threatened species or ecological communities are expected. As such, no habitat areas are likely to become fragmented or isolated from other areas of habitat as a result of the proposed development. The Subject Site is surrounded by cleared and developed areas to the north, south, east and west. Native vegetation exists further to the west but is not currently connected to the Subject Site. Habitat on site consists of isolated and highly managed native and exotic vegetation amongst residential properties. Land is currently being developed to the north, south, east and west of the site. There is limited connectivity to neighbouring vegetation and the removal of a small amount of highly modified vegetation is unlikely to impact the long-term survival of a species or ecological community.
d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)	The site does not contain, nor is adjacent to, any areas of outstanding biodiversity value. Consequently, no adverse impacts are anticipated as part of this development.
e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process (KTP).	The development has potential to contribute to the following KTP: *Anthropogenic Climate Change* While the proposed development will have minimal direct contribution towards anthropogenic climate change, cumulative impacts should be considered. It is recommended that all construction processes and designs adopt relevant guidelines for the reduction and minimisation of actions contributing to climate change. *Clearing of native vegetation* Minimal native vegetation is to be impacted, consequently habitat loss is considered marginal.

9.0 SEPP (Resilience and Hazards) 2021 – Chapter 2 Coastal Management - Assessment

Consultation of *SEPP (Resilience and Hazards) 2021 - Chapter 2 Coastal Management* maps as available on the *NSW Planning Portal Spatial Viewer* indicates that the Subject Site is located within the Proximity Area for Coastal Wetlands mapping. As such, an assessment has been undertaken to determine if the proposed development is likely to impact the Coastal Wetland Area Map (refer **Figure 6**).

Therefore, in accordance with *Chapter 2 Coastal Management of the R&H SEPP*, the following assessment has been undertaken (refer **Table 5**).

Table 5 – Proximity to Coastal Wetland Area Assessment

Clause Number	Clause	Assessment
Division 1 Coastal Wetlands and Littoral Rainforests Area		
2.8	(1) Development consent must not be granted to development on land identified as "proximity area for coastal wetlands" or "proximity area for littoral rainforest" on the Coastal Wetlands and Littoral Rainforests Area Map unless the consent authority is satisfied that the proposed development will not significantly impact on— (a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or	The Subject Site is bounded by Raymond Terrace Road to the south and to the south west where the mapped hydroline is located has undergone improvements separate from this proposal including new culverts. The proposed Erosion and Sedimentation Control Plan (ESCP), will ensure the adjoining coastal wetland will not be impacted. The larger TNURA Stormwater Management Plan would ensure appropriate discharge and run-off is incorporated within the plan to minimise downstream hydrology changes. As a result, it has been determined that the proposal is unlikely to impact the integrity and resilience of the surrounding biophysical, hydrological and ecological environment, of the adjacent Coastal Wetlands.
	(b) the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.	The proposed development will impact highly managed and modified vegetation with low habitat value. Areas within the local surrounds of higher ecological value are not expected to be impacted by this proposed development. Best practice erosion and sedimentation (ERSED) and dust suppression control methods are to be adopted, monitored and maintained throughout any vegetation clearing works, particularly for downstream areas. Such are to be in accordance with "Soils and Construction – Managing Urban Stormwater" published by Landcom. Incorporation of Water Sensitive Urban Design (WSUD) principles within stormwater

Clause Number	Clause	Assessment
		infrastructure is to occur to minimise downstream hydrology changes. It has been strongly recommended that the Stormwater Management Plan for the site be completed to the highest standard whereby the stormwater quality, erosion and sediment control and water sensitive urban design exceed council's baseline requirements and effectively reduces nutrients and gross pollutant output into the adjacent wetland. As mentioned above, these plans will mitigate any additional run-off which may occur during the construction phase of this proposal and ensure the proposed will not significantly impact the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland.

As demonstrated in the above assessment, the proposed development is expected to have a minimal impact on the catchment area following the implementation of appropriate Erosion and Sedimentation Control Plan, Stormwater Management Plan and Water Sensitive Urban Design.

10.0 Preliminary EPBC Act Assessment

A search was conducted in November 2023 of Matters of National Environmental Significance (MNES) as relevant to the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act). The following MNES are considered in this assessment.

World Heritage Properties:

The site is not a World Heritage area and is not in close proximity to any such area.

National Heritage Places:

The site is not a National Heritage Place and does not contain any matters of national heritage.

Wetlands of International Significance (declared Ramsar wetlands):

The site does occur within 10 km proximity of Hunter estuary wetlands.

Great Barrier Reef Marine Park:

The site is not part of, or within close proximity to, the Great Barrier Reef Marine Park.

Commonwealth Marine Areas:

The site is not part of, or within close proximity to, any Commonwealth Marine Area.

Threatened Ecological Communities:

Seven (7) Threatened Ecological Communities are listed as potentially present within 5km of the site.

- CEEC – *Central Hunter Valley eucalypt forest and woodland;*
- EEC – *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community;*
- EEC – *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland;*
- EEC – *Kurri sand swamp woodland of the Sydney Basin bioregion;*
- CEEC – *Lowland Rainforest of Subtropical Australia;*
- CEEC – *River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria;* and;
- VEC – *Subtropical and Temperate Coastal Saltmarsh.*

Although the listed EPBC TEC *Central Hunter Valley eucalypt forest and woodland* is associated with the PCT on site, given the severely degraded condition of the Subject Site, absence of upper stratum species, the scarcity of the mid stratum and dominance of *Cynodon dactylon* in previously cleared pasture lands, it is considered that the TEC's are not associated to this PCT within the Subject Site.

Threatened Species:

No threatened flora or fauna species within the EPBC Act have been identified on or in close proximity to the site.

Migratory Species:

There is potential for some of the migratory terrestrial species listed in the EPBC Act to visit the site on an irregular basis. It is considered that the proposal is unlikely to significantly affect the availability of

potential habitat for such mobile species, or disrupt migratory patterns. However, due to the number of BioNet records of the recently listed Latham's Snipe in close vicinity to the Subject Site, this species was considered for indirect impacts, specifically light pollution.

EPBC Act Assessment Conclusion:

Consideration of the EPBC Act revealed that it is unlikely that significant impacts on Matters of National Environmental Significance will occur as a result of the proposal. As such a referral is not considered likely to be necessary.

11.0 Recommendations

Impacts from the proposed development have been considered though the 5-Part test and other relevant legislative instruments. As the development only requires the removal of highly managed and modified vegetation that was assigned to PCT 3446 - *Lower North Foothills Ironbark-Box-Gum Grassy Forest* (5.14ha) the development is unlikely to have any significant impact to any threatened entities. The following general recommendations are made for consideration to minimise localised impacts on biodiversity in general as a result of the proposed site works;

- An Erosion and Sedimentation Control Plan (ESCP) should be prepared for the proposal following guidelines from Landcom (2004), as well as a Stormwater Management Plan (SMP);
- Best practice erosion and sedimentation controls should be put in place to limit offsite movement of materials into the adjacent vegetation;
- Erosion and sedimentation controls should be checked daily and maintained in working order especially after rain events;
- Establish and maintain appropriate erosion and sediment controls during construction and thereafter;
- Effective weed control should be used on site, ensuring that appropriate methods are used to eliminate and dispose of high threat exotic weeds and highly competitive weeds.
- Undertake ongoing weed management within close proximity to the works;
- Equipment should be cleaned thoroughly and disinfected before entering and exiting site to prevent weed and disease introduction such as *Phytophthora cinnamomi* (Root-rot fungus), *Puccinia psidii* (Myrtle Rust) and others;
- If any fauna is injured during vegetation clearing, they are to be taken promptly to a nearby veterinarian or suitable wildlife carer contact;
- Landscaping should incorporate species that are endemic to the area; and
- Artificial Lighting should be implemented utilising Best Practice Lighting Design and incorporating landscape and urban design, including sympathetic lighting strategies including timers, lighting directional away from potential habitat, dark zone between light source and habitat, using recommended lighting types for use near potential migratory shorebird habitat, and utilisation of natural barriers such as vegetation screening.

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Appendix A – Development Plans

Appendix B – Likelihood of Occurrence

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
Flora							
Callistemon linearifolius	Netted Bottle Brush	V,3	-	-	1	The only BioNet Atlas record occurs approximately 5.3km to the south west of the Subject Site. This species grows in dry sclerophyll forest on the coast and adjacent ranges, which is not present within the site. This species was not detected during surveys and is considered unlikely to occur.	N
Eucalyptus camaldulensis	*Eucalyptus camaldulensis* population in the Hunter catchment	E2	-	-	1	The only BioNet Atlas record occurs approx. 2.7km south west of the Subject Site. The Hunter population occurs from the west at Bylong, south of Merriwa, to the east at Hinton, on the bank of the Hunter River, in the Port Stephens local government area. May occur with *Eucalyptus tereticornis, Eucalyptus melliodora, Casuarina cunninghamiana subsp. cunninghamiana* and *Angophora floribunda*. Prior to European settlement, it is likely that the species formed extensive stands of woodland and open woodland on the major floodplains of the Hunter and Goulburn rivers, especially in areas where water impoundment occurs after flood. Since settlement, most of the floodplains have been cleared of woody vegetation. Suitable habitat is not present within the site. This species was not detected during surveys and is considered unlikely to occur.	N
Maundia triglochinoides		V	-	-	1	One (1) BioNet Atlas record occurs approx. 3.9km south west of the Subject Site. This species has a restricted distribution to coastal NSW and extending into southern Queensland. The current southern limit is Wyong; former sites around Sydney are now extinct. Grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay,	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						low nutrients. Suitable habitat is not present within the site. This species was not detected during surveys and is considered unlikely to occur.	
Rhodamnia rubescens	Scrub Turpentine	E4A	CE	CE	2	The closest BioNet Atlas record occurs approx. 1.2km to the north east of the Subject Site from 2010. The second BioNet record occurs approx. 6.1km south west of the Subject Site from 1998. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. Suitable habitat is not present within the site. This species was not detected during surveys and is considered unlikely to occur.	N
Rhodomyrtus psidioides	Native Guava	E4A	CE	CE	2	The closest BioNet Atlas record occurs approx. 6.2km to the south west of the Subject Site. This species occurs in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. Suitable habitat is not present within the site. This species was not detected during surveys and is considered unlikely to occur.	N
Fauna							
Anseranas semipalmata	Magpie Goose	V, P	-	-	1	The only BioNet Atlas record occurs approx. 5.1km south of the Subject Site. This species is mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation. The site contains minimal suitable foraging habitat for this	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						species which may be utilised occasionally as part of a larger home range. This species was not detected during surveys and is considered unlikely to occur.	
Anthochaera phrygia	Regent Honeyeater	E4A	CE	CE	3	All three (3) BioNet Atlas records are located >8km north west of the Subject Site in 2018. Species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak. The site contains minimal suitable foraging habitat which may be occasionally utilised as part of a larger home range. The site is not mapped as an Important Area for this species. This species was not detected during surveys and is considered unlikely to occur.	N
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	-	1	The only BioNet Atlas record occurs approx. 6.2km south west of the Subject Site. This species predominantly inhabits dry, open eucalypt forests and woodlands, including mallee associations, with an open or spare understorey of eucalypt saplings acacias and other shrubs and with a ground cover of grasses or sedges and fallen woody debris. The site contains minimal suitable foraging habitat for this species which may be utilised occasionally as part of a larger home range. This species was not detected during surveys and is considered unlikely to occur.	N
Callocephalon fimbriatum	Gang-gang Cockatoo	V, P,3	E	E	2	The closest BioNet Atlas record occurs approx. 6km south west of the Subject Site. In spring and summer, this species is generally found in tall	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 7 cm in diameter or larger in eucalypts and 3 metres or more above the ground. The site does not contain any hollow bearing trees, thus breeding habitat is absent. The site contains minimal suitable foraging habitat for this species which may be utilised occasionally as part of a larger home range. This species was not detected during surveys and is considered unlikely to occur.	
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V, 2	V	V	2	The two (2) BioNet Atlas records are located approx. 6.9km south west of the Subject Site from 2016 and 2020. This species inhabits open forests and woodlands of the coast and the Great Dividing Range where stands of she-oak occur. Species is dependent on large hollow-bearing eucalypts for nest sites, which are not present within the Subject Site. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*Allocasuarina torulosa*) are important foods, both of which were not present onsite. There is low potential for species to occur or be significantly affected by this proposal, the species was not detected during surveys. Considered unlikely to occur. The site does not contain any hollow bearing trees, thus breeding habitat is absent. The site is absent of suitable foraging habitat for this species.	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						This species was not detected during surveys and is considered unlikely to occur.	
Chalinolobus dwyeri	Large-eared Pied Bat	V	E	E	2	The closest BioNet Atlas record occurs approx. 3.7km north west of the Subject Site. This species roosts in caves, crevices in cliffs, and old mine workings. Usually found in well-timbered areas containing gullies, and forages for small, flying insects below the forest canopy. The Subject Site is absent of breeding habitat with no caves or cliffs occurring within the Subject Site or its immediate surrounds. Minimal foraging habitat is present on site and is considered unlikely to occur.	N
Circus assimilis	Spotted Harrier	V	-	-	2	The two (2) BioNet Atlas records are located approx. 3.5km north east of the Subject Site from 2016. The Spotted Harrier is a terrestrial bird residing in open grasslands, open woodland including acacia and mallee, inland riparian woodland, grassland and shrubland. It can be most commonly found in native grassland however it is also seen in agricultural land and inland wetlands for the purpose of foraging. No stick nests were observed during site survey and this species unlikely to be impacted by this proposal. The site does not contain any stick nests, thus breeding habitat is absent. The site contains minimal suitable foraging habitat for this species which may be utilised occasionally as part of a larger home range. This species was not detected during surveys and is considered unlikely to occur.	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
Daphoenositta chrysoptera	Varied Sittella	V	-	-	6	The closest BioNet Atlas record is located >1km west of the Subject Site from 2023. Species inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. The site is absent of suitable foraging habitat for this species with absent strong mid and nil upper story vegetation. This species was not detected during surveys and is considered unlikely to occur.	N
Dasyurus maculatus	Spotted-tailed Quoll	V	E	E	2	The closest BioNet Atlas record is located approx. 2.6km south west of the Subject Site from 2015. This species occupies a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. No suitable habitat is present on site and low connectivity to intact vegetation. This species was not detected during surveys and is considered unlikely to occur.	N
Ephippiorhynchus asiaticus	Black-necked Stork	E1, P	-	-	26	The closest BioNet Atlas record is located <1km south east of the Subject Site from 2003. Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Suitable habitat is present within the local surrounds however, absent within the Subject Site and disconnected by urban development.	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						This species was not detected during surveys and is considered unlikely to occur.	
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	-	29	Four (4) BioNet Atlas records occur within a <1km radius of the Subject Site, from 2008 to 2022. The majority of records are located >4.5km south west of the Subject Site near Beresfield open cut mine. This species prefers moist habitats, with trees taller than 20m and generally roosts within eucalypt hollows. The Subject Site is absent of breeding habitat with no caves or rocky outcrops occurring within the Subject Site or its immediate surrounds. Minimal foraging habitat is present on site, the species is considered unlikely to occur.	N
Gallinago hardwickii	Latham's Snipe	P	V	V	66	There are sixty-six (66) BioNet Atlas records occurring within <1km radius of the Subject Site with majority of records located to the west. Latham's Snipe is a non-breeding visitor to south-eastern Australia. The distribution is fragmented because the preferred habitat (i.e. freshwater wetlands) occurs in patches throughout the non-breeding grounds. They usually inhabit open, freshwater wetlands with low, dense vegetation. However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. The Subject Site contains minimal foraging and roosting habitat however due to the proximity of the modified drainage line to the west of the Subject Site and wetlands south of Raymond Terrace Road the species has been included.	Y

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
Glossopsitta pusilla	Little Lorikeet	V	-	-	23	The closest BioNet Atlas record is located <1km west of the Subject Site from 2017. The Majority of the additional records occur west and south west of the Subject Site in areas of historically intact vegetation. This species generally forages primarily in the canopy of open Eucalyptus Forest and woodland and primarily uses riparian habitats due to higher soil fertility. Suitable habitat is present within the local surrounds however, absent within the Subject Site and disconnected by urban development. This species was not detected during surveys and is considered unlikely to occur.	N
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	-	12	The closest BioNet Atlas record is located <1km west of the Subject Site from 2017. Preferred habitat consists of Coastal areas and inland rivers and wetlands. Nests in large emergent eucalypts. No stick nests were observed during site survey and this species unlikely to be impacted by this proposal. Suitable habitat, both breeding and foraging, are absent from the Subject Site. Sightings of this species in this area is most likely due to the bird travelling to more suitable habitats, within this species greater home range. This species was not detected during surveys and is considered unlikely to occur.	N
Hirundapus caudacutus	White-throated Needletail	P	V	V	3	All three (3) BioNet Atlas records are located >6km south west of the Subject Site from 1998, 2016 and 2018. Most often seen in eastern Australia before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. These conditions are often used by insects to swarm	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						(e.g. termites and ants) or tend to lift insects away from the surface which favours sighting of White-throated Needletails as they feed. More common in coastal areas, less so inland. The site contains minimal suitable foraging habitat for this species, disconnected from larger tracts of vegetation by urban development, main roads and waterways. This species was not detected during surveys and is considered unlikely to occur.	
Lathamus discolor	Swift Parrot	E1	CE	CE	1	The only BioNet Atlas record occurs <1km west of the Subject Site from 2017. Preferred habitats are NSW eucalypt forests and woodlands with winter flowering eucalypts where they migrate between March and October. The site is not mapped as an Important Area for this species. The site contains minimal suitable foraging habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N
Litoria aurea	Green and Golden Bell Frog	E1, P	V	V	1	One (1) BioNet Atlas record occurs approx. 3.7km west of the Subject Site recorded in 1976. Formerly distributed from the NSW north coast near Brunswick Heads, southwards along the NSW coast to Victoria where it extends into east Gippsland. Since 1990 there have been approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. These locations occur over the species former range; however, they are widely separated and isolated. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						north coast (one an island population). Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha spp.)* or spikerushes (*Eleocharis spp*.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish, have a grassy area nearby and diurnal sheltering sites available. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	
Lophoictinia isura	Square-tailed Kite	V,3	-	-	1	The only BioNet Atlas record occurs <1km west of the Subject Site from 2017. Preferred habitat consists of coastal and sub-coastal open forest, woodland or lightly timbered habitats and inland habitats along watercourses and Mallee that are rich in passerine birds. The site does not contain any upper stratum vegetation and is absent of stick nests. The site contains minimal suitable foraging habitat for this species which may be utilised occasionally as part of a larger home range. This species was not detected during surveys and is considered unlikely to occur.	N
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V, P	-	-	3	All three (3) BioNet Atlas records are located >5km south west of the Subject Site one (1) from 1998 and two (2) from 2004. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	-	43	Nineteen (19) BioNet Atlas records occur within a <2km radius of the Subject Site, from 2003 to 2022. This species' preferred habitat consists of Eucalypt Forest and woodland on the coastal side of the Great Dividing Range. Roosts in tree hollows, under bark and in various man-made structures. The Subject Site is absent of breeding habitat with no tree hollows occurring within the Subject Site. Minimal foraging habitat is present on site and is considered unlikely to occur.	N
Miniopterus australis	Little Bent-winged Bat	V	-	-	73	Eighteen (18) BioNet Atlas records occur within a <2km radius of the Subject Site, from 2008 to 2022. This species preferred habitat consists of Coastal forests, vine thickets and adjoining cleared areas. Roosts in caves, abandoned mines and man-made structures. The Subject Site is absent of breeding habitat with no caves or man-made structures occurring within the Subject Site. Minimal foraging habitat is present on site and is considered unlikely to occur.	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	-	32	Ten (10) BioNet Atlas records occur within a <2km radius of the Subject Site, from 2008 to 2022. Preferred habitat consists rainforest, wet and dry sclerophyll forest, open woodland, Melaleuca forests and open grassland. Roosts in caves and man-made structures. The Subject Site is absent of breeding habitat with no caves or man-made structures occurring within the Subject Site. Minimal foraging habitat is present on site and is considered unlikely to occur.	N
Myotis macropus	Southern Myotis	V	-	-	25	Seven (7) BioNet Atlas records occur within a <2km radius of the Subject Site, from 2003 to 2022. Preferred habitat is roosts in in caves, mines, tunnels, buildings, tree hollows and under bridges. Foraging is associated with streams and open waterways, catching insects and small fish by raking their feet across the water surface. The site does not contain suitable foraging habitat for this species and considered unlikely to occur.	N
Neophema pulchella	Turquoise Parrot	V, P,3	-	-	2	The closest BioNet Atlas record is located approx. 4.5km south west of the Subject Site from 2004. The species lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. The site contains minimal suitable foraging habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure.	

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						This species was not detected during surveys and is considered unlikely to occur.	
Ninox connivens	Barking Owl	V, 3	-	-	2	The closest BioNet Atlas record is located approx. 4.4km north west of the Subject Site from 2004. This species inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils. Barking owl's roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. The Subject Site is absent of breeding habitat and contains minimal foraging habitat, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N
Ninox strenua	Powerful Owl	V, 3	-	-	15	The closest BioNet Atlas record is located approx. 2.5km south west of the Subject Site from 2021. The other fourteen (14) records occur further south west of the site, located >2.8km in disconnected vegetation. This species preferred habitat consists of mature forests containing large hollows for breeding & densely vegetated gullies for roosting.	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						The Subject Site is absent of breeding habitat and contains minimal foraging habitat, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	
Oxyura australis	Blue-billed Duck	V, P	-	-	1	The only BioNet Atlas record occurs approx. 4.3km north west of the Subject Site from 1987. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N
Pandion cristatus	Eastern Osprey	V, 3	-	-	3	The closest BioNet Atlas record is located 3.8km south west of the Subject Site from 2009. Eastern Osprey's preferred habitat is associated with waterbodies; inclusive of coastal waters, inlets, lakes, estuaries and offshore islands with dead trees for perching and feeding. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
Petauroides volans	Southern Greater Glider	E1	E	E	2	The only BioNet Atlas record occurs approx. 6km south west of the Subject Site from 1998. This species typically inhabits eucalypt forests and shelters in large hollow sections of eucalypt trees, foraging exclusively on eucalypt leaves, buds, flowers and mistletoe. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N
Petaurus norfolcensis	Squirrel Glider	V, P	-	-	19	Nineteen (19) BioNet Atlas records from 2003 – 2017 and one more recently in 2020 occur between 800m – 6km radius from the Subject Site. Inhabits mature or old growth Blackbutt-Bloodwood Forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstory. Require abundant tree hollows for refuge and nest sites. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N
Petroica boodang	Scarlet Robin	V	-	-	1	The only BioNet Atlas record occurs approx. 5.2km south west of the Subject Site from 1995. The scarlet robin is most commonly found in eucalyptus woodland and forest, from sea level to 1000 m, particularly the more open habitats with grassy and shrubby understories. The site contains minimal suitable habitat for this species, disconnected from larger tracts of vegetation by urban	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	
Phascogale tapoatafa	Brush-tailed Phascogale	V, P	-	-	5	The closest BioNet Atlas record is located approx. 1.6km south west of the Subject Site from 2018. The other four (4) records occur >4km north west of the site. This species prefers dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N
Phascolarctos cinereus	Koala	E1	E	E	7	The closest BioNet Atlas record is located approx. 2.8km south west of the Subject Site from 2021. The other records occur >3.8km to the north and south west of the site. Koalas typically prefer wet & dry eucalypt forest on high nutrient soils containing preferred feed trees. No Koala use trees or any trees are present within the Subject Site. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	-	31	The closest BioNet Atlas record is located <1km west of the Subject Site from 2017. Grey-crowned Babblers occupy open woodlands dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs. The species builds conspicuous dome-shaped nests and breeds co-operatively in sedentary family groups of 2-13 birds (Davidson and Robinson 1992). Grey-crowned Babblers are insectivorous and forage in leaf litter and on bark of trees. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas. The site contains minimal suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	V	59	There are numerous BioNet Atlas records located within 5kms of the Subject Site with four (4) records within 1km of the site (2008, 2017, 2020 and 2022). Species inhabits rainforest, mangroves, paperbark swamp, wet and dry open forest and cultivated areas. They roost in trees in gullies, riparian habitats and urban areas. No roost or camp sites were observed onsite. The site contains minimal suitable foraging habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. The site does not comprise any meaningful habitat for the species and as such is considered unlikely to occur within the Subject Site.	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
Ptilinopus magnificus	Wompoo Fruit-Dove	V	-	-	2	The closest BioNet Atlas record is located approx. 1.3km north west of the Subject Site from 2019. The other record is located approx. 4.4km north west, recorded in 2022. In NSW, the Wompoo Fruit-dove occurs in patches of subtropical rainforest and adjoining wet sclerophyll habitats. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N
Ptilinopus regina	Rose-crowned Fruit-Dove	V, P	-	-	1	The only BioNet Atlas record occurs approx. 4.7km north east of the Subject Site from 2007. 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. They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	-	11	Four (4) BioNet Atlas records occur within a <1km radius of the Subject Site, from 2003, 2017, 2019 and 2022. The remain records are located >2.5km south of the Subject Site. This species preferred habitat consists of wet and dry sclerophyll forest, open woodland, shrubland, mallee, grassland and desert, they roost in tree hollows. The site contains minimal suitable habitat for this species,	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
						disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species is considered unlikely to occur.	
Scoteanax rueppellii	Greater Broad-nosed Bat	V, P	-	-	30	Eight (8) BioNet Atlas records occur within a <1km radius of the Subject Site, from 2008 to 2022. The remain records are located >2.5km south of the Subject Site. This species prefers moist gullies in mature coastal forest, rainforest, open woodland, sclerophyll forest and cleared areas with remnant trees. They roost in tree hollows, under bark and in man-made structures. The site contains minimal suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species is considered unlikely to occur.	N
Stictonetta naevosa	Freckled Duck	V	-	-	5	The closest BioNet Atlas record is located approx. 4.3km north west of the Subject Site from 1985. This species prefers permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. The site does not contain suitable habitat for this species, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N

Scientific Name	Common Name	NSW status	Comm Status	EPBC Act	BioNet Records	Likelihood of Occurrence	Subject Species
Tyto novaehollandiae	Masked Owl	V, P,3	-	-	9	The closest BioNet Atlas record is located approx. 1.5km south west of the Subject Site from 2018. The remaining records occur further to the south west, recorded from 1998 to 2021. This species occupies open forests & woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting. The Subject Site is absent of breeding habitat and contains minimal foraging habitat, disconnected from larger tracts of vegetation by urban development and associated infrastructure. This species was not detected during surveys and is considered unlikely to occur.	N
Vespadelus troughtoni	Eastern Cave Bat	V	-	-	10	The closest BioNet Atlas record is located approx. 1km west of the Subject Site from 2022. This species inhabits woodland and wet & dry sclerophyll forest in areas with rock outcrops and caves for roosting. The Subject Site is absent of breeding habitat with no caves or rocky outcrops occurring within the Subject Site or its immediate surrounds. Minimal foraging habitat is present on site and is considered unlikely to occur. This species is considered unlikely to occur.	N

Appendix C – Flora Species List

FLORA SPECIES LIST

The following list includes all species of vascular plants observed on site during fieldwork. It should be noted that such a list cannot be considered comprehensive, but rather indicative of the flora present on the site. It can take many years of flora surveys to record all of the plant species occurring within any area, especially plant species that are only apparent in some seasons such as Orchids.

A number of species cannot always be accurately identified during a brief survey, generally due to a lack of suitable flowering and/or fruiting material. Any such species are identified as accurately as possible, and are indicated in the list as thus:

- specimens that could only be identified to genus level are indicated by the generic name followed by the abbreviation “sp.,” indicating an unidentified species of that genus.

Authorities for the scientific names are not provided in the list. These follow the references outlined below.

Harden, G. (ed) (2000). *Flora of New South Wales, Volume 1*. Revised edition. UNSW, Kensington, NSW.

Harden, G. (ed) (2002). *Flora of New South Wales, Volume 2*. Revised edition. UNSW, Kensington, NSW.

Harden, G. (ed) (1992). *Flora of New South Wales, Volume 3*. UNSW, Kensington, NSW.

Harden, G. (ed) (1993). *Flora of New South Wales, Volume 4*. UNSW, Kensington, NSW.

Names of families and higher taxa follow a modified Cronquist System (1981).

Introduced species are indicated by an asterisk “*”.

Threatened species listed under the *Biodiversity Conservation Act 2016* (BC Act) or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are indicated in **bold font.**

Scientific Name	Common Name
Acacia falcata	-
Axonopus fissifolius	Narrow-leafed Carpet Grass
Bidens Pilosa	Cobbler's Pegs
Cenchrus clandestinus	Kikuyu Grass
Chloris Gayana	Rhodes Grass
Chrysocephalum apiculatum	Common Everlasting
Conyza spp.	-
Cynodon dactylon	Common Couch
Daviesia ulicifolia	Gorse Bitter Pea
Eragrostis leptostachya	Paddock Lovegrass
Fimbristylis dichotoma	Common Fringe-sedge
Gamochaeta spp.	-
Hypochaeris radicata	Catsear
Lobelia purpurascens	Whiteroot
Medicago spp.	-
Paspalum dilatatum	Paspalum
Plantago lanceolata	Lamb's Tongues
Rumex conglomeratus	Clustered Dock
Senecio madagascariensis	Fireweed
Setaria parviflora	-
Sida rhombifolia	Paddy's Lucerne
Verbena bonariensis.	Purpletop

Appendix D – Observed Fauna Species List

Key

Observations: Observed (O), Heard (W), Scat (P), Misc. (M), Track/scratching (F), Nest (E), Burrow (FB)

Bat Records: Observed (O), Definitely (D), Possible or within Species Group (P), Likely (L)

Survey equipment: Anabat (A), Songmeter (SM), Camera Trap (CT)

Bolded Species: Are listed threatened species in bold

Scientific Name	Common Name	Surveyed Observations	Survey Equipment
Aves			
Gymnorhina tibicen	Australian Magpie	O W	
Grallina cyanoleuca	Magpie-lark	W	
Cacatua sanguinea	Little Corella	O W	
Nycticorax caledonicus	Nankeen Night Heron	O	
Acridotheres tristis	Common Myna	O W	
Hirundo neoxena	Welcome Swallow	O W	

Appendix E – Site Photographs

Above: Vegetation along BAM Plot 3.

Above: Highly managed vegetation within BAM Plot 2.

Above: Regeneration mid canopy species present on site due to past clearing.

Below: Residential Development to the west.

Appendix F – Authors CVs