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ECOLOGICAL ASSESSMENT REPORT

Proposed Development

Lot 13 DP 1239, Lot 142 DP 537053, Lot 15 DP 1239,
Lot 16 DP 1239

85-91 Thomas Street
Parramatta

16 May 2024

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ECOLOGICAL ASSESSMENT REPORT

Proposed Multi-Residential Development

Lot 13 DP 1239, Lot 142 DP 537053, Lot 15 DP 1239, Lot 16 DP 1239, 85-91
Thomas Street, Parramatta

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features is to be confirmed by a registered surveyor.

LIST OF ABBREVIATIONS

APZ	asset protection zone
BAM	Biodiversity Assessment Method (2020)
BAR	Biodiversity Assessment Report
<i>BC Act</i>	<i>Biodiversity Conservation Act (2016)</i>
<i>BC Reg</i>	<i>Biodiversity Conservation Regulation (2017)</i>
BCAR	Biodiversity Certification Assessment Report
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
BPA	bushfire protection assessment
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically endangered ecological community
<i>CM Act</i>	<i>Coastal Management Act 2016</i>
DAWE	Commonwealth Department of Agriculture, Water and the Environment (superseded by DCCEEW)
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DCP	development control plan
DEC	NSW Department of Environment and Conservation (superseded by DECC from April 2007)
DECC	NSW Department of Environment and Climate Change (superseded by DECCW from October 2009)
DECCW	NSW Department of Environment, Climate Change and Water (superseded by OEHL from April 2011)
DEWHA	Commonwealth Department of Environment, Water, Heritage & the Arts (superseded by SEWPAC)
DOEE	Commonwealth Department of Environment & Energy (superseded by DAWE)
DPE	NSW Department of Planning and Environment
DPIE	NSW Department of Planning, Industry and Environment (superseded by DPE)
EEC	endangered ecological community
EPA	Environment Protection Authority
<i>EP&A Act</i>	<i>Environmental Planning and Assessment Act (1979)</i>
<i>EPBC Act</i>	<i>Environment Protection and Biodiversity Conservation Act (1999)</i>
<i>FM Act</i>	<i>Fisheries Management Act</i>
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	local environmental plan
LGA	local government area
<i>LLS Act</i>	<i>Local Land Services Act (2013)</i>
NES	national environmental significance
<i>NPW Act</i>	<i>National Parks and Wildlife Act (1974)</i>
NRAR	Natural Resources Access Regulator (NSW)
NSW DPI	NSW Department of Industry and Investment
OEHL	Office of Environment and Heritage (superseded by DPIE from August 2019)
PCT	plant community type
PFC	projected foliage cover
RFS	NSW Rural Fire Service
SAII	Serious And Irreversible Impacts
SEPP	State Environmental Planning Policy
SEWPAC	Commonwealth Dept. of Sustainability, Environment, Water, Population & Communities (superseded by DOEE)
SIS	species impact statement
TEC	threatened ecological community
TPZ	tree preservation zone
<i>TSC Act</i>	<i>Threatened Species Conservation Act (1995) – Superseded by the Biodiversity Conservation Act (2016)</i>
VMP	vegetation management plan

EXECUTIVE SUMMARY

Travers bushfire & ecology (TBE) has been engaged to undertake a constraints assessment within Lot 13 DP 1239, Lot 142 DP 537053, Lot 15 DP 1239, Lot 16 DP 1239, at 85-91 Thomas Street, Parramatta within City of Parramatta Local Government Area (LGA). The extent of this entire lot is shown in Figure 1 of the main document. This lot is subject to a proposed development application and will hereafter be referred to as the 'study area.'

The area containing the proposed development and all associated impact on habitat features is hereafter referred to as the 'development footprint' (refer to Figure 4).

Proposed development

The proposal involves the demolition of existing residential dwellings for the construction of 2 residential apartment buildings and over basement carparking at 85-91 Thomas Street Parramatta. Access to the site will be provided via Thomas Street.

Recorded biodiversity

In respect of matters required to be considered under the *Environmental Planning and Assessment Act 1979* and relating to the species and provisions of the *Biodiversity Conservation Act 2016*, including:

- One (1) TEC – Coastal Saltmarsh of the NSW North Coast, Sydney Basin and South East Corner Bioregion,
- No threatened fauna species,
- No threatened flora species, and,
- No endangered flora populations.

In respect of matters to be considered under the *EPBC Act*, no threatened fauna species and no threatened flora species were observed within the development footprint.

The TEC, Subtropical and Temperate Coastal Saltmarsh listed under the *EPBC Act* could be equivalent to the *BC Act* listed entity, however the condition thresholds are not met.

In respect of matters relative to the *FM Act*, no suitable habitat for threatened marine or aquatic species was observed within the development footprint.

Impact summary

The assessment of impacts identified:

- The proposed works are not located on land mapped as biodiversity values,
- The area of native vegetation to be cleared is less than the clearing threshold is 0.25 ha,
- No threatened flora species, fauna species were identified in the impact area. However, potential habitat was observed within the site boundaries,
- The test of significance has been applied so the determining authority may assess whether the proposal is likely to have a significant impact on the aforementioned threatened species as a result of potential habitat loss, and
- The proposal impacts within 40m of an endangered wetland community and occurs within an area of proximity to a coastal wetland.

The proposal is not required to be assessed under the Biodiversity Offset Scheme for the purposes of Biodiversity offsetting due to the lack of native vegetation impacts.

The state assessment of significance (Appendix 3) has concluded that the proposed development will not likely have a significant impact on any threatened species, populations

or TECs. Therefore, (a) a Species Impact Statement is not required for the proposal and (b) biodiversity offsetting is not required.

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1. BACKGROUND

Travers bushfire & ecology has been engaged to undertake a biodiversity development assessment within Lot 13 DP 1239, Lot 142 DP 537053, Lot 15 DP 1239, Lot 16 DP 1239, at 85-91 Thomas Street, Parramatta within City of Parramatta local government area (LGA). The extent of this entire lot is shown in Figure 1 below. This lot is subject to a proposed development application and will hereafter be referred to as the 'study area'.

The area containing the proposed development, APZs and all associated impact on habitat features is hereafter referred to as the 'development footprint' (refer to Figure 4).

The proposal shall be assessed under the *Biodiversity Conservation Act (BC Act)*, 2016.



Figure 1 – Study area (red)

1.1 Proposed development

The proposal involves the demolition of existing residential dwellings for the construction of 2 residential apartment buildings and over basement carparking at 85-91 Thomas Street

Parramatta. Access to the site will be provided via Thomas Street. The site plan is shown in

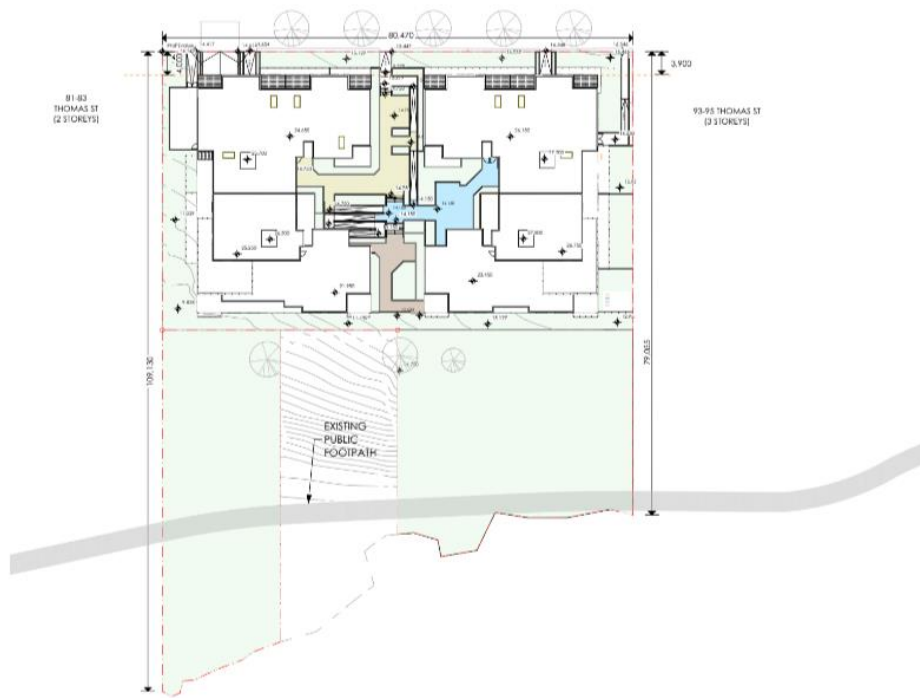


Figure 2 – Proposed development

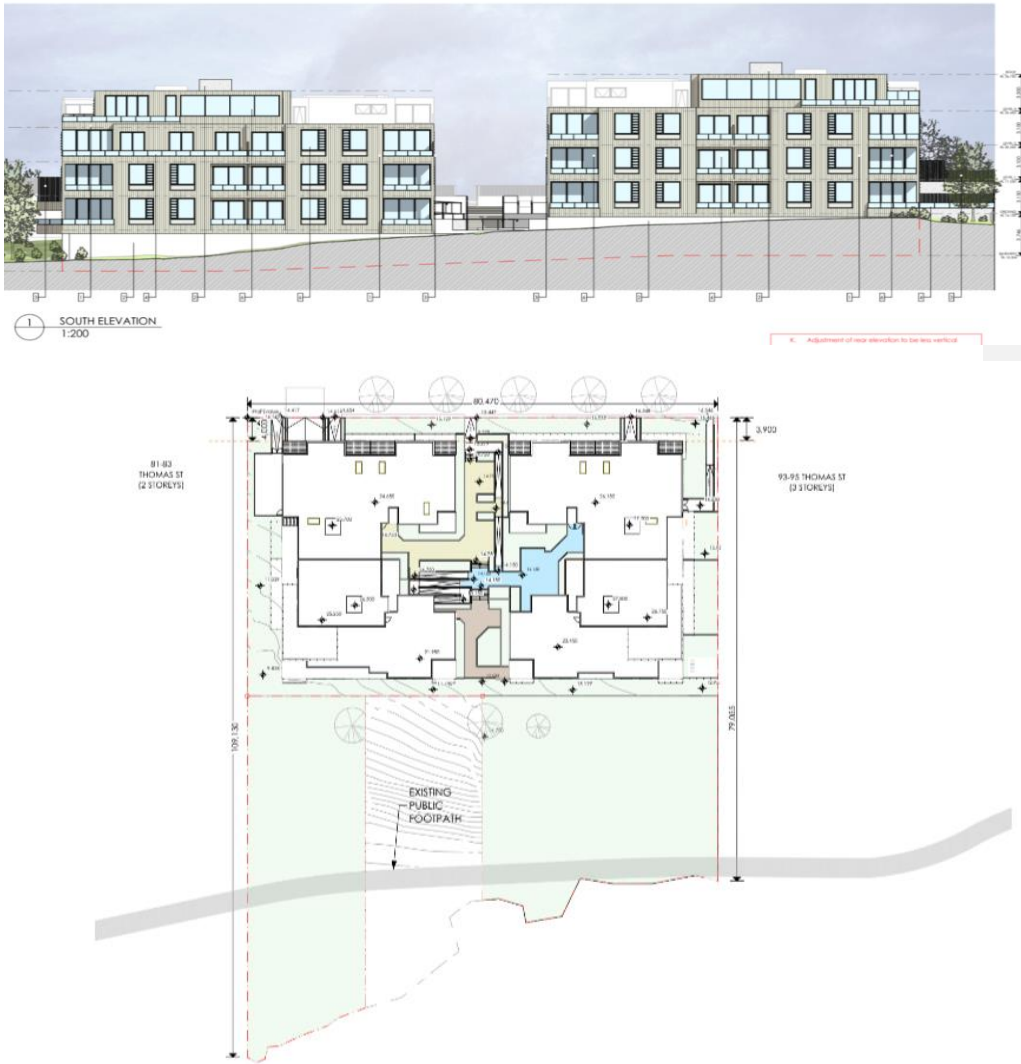


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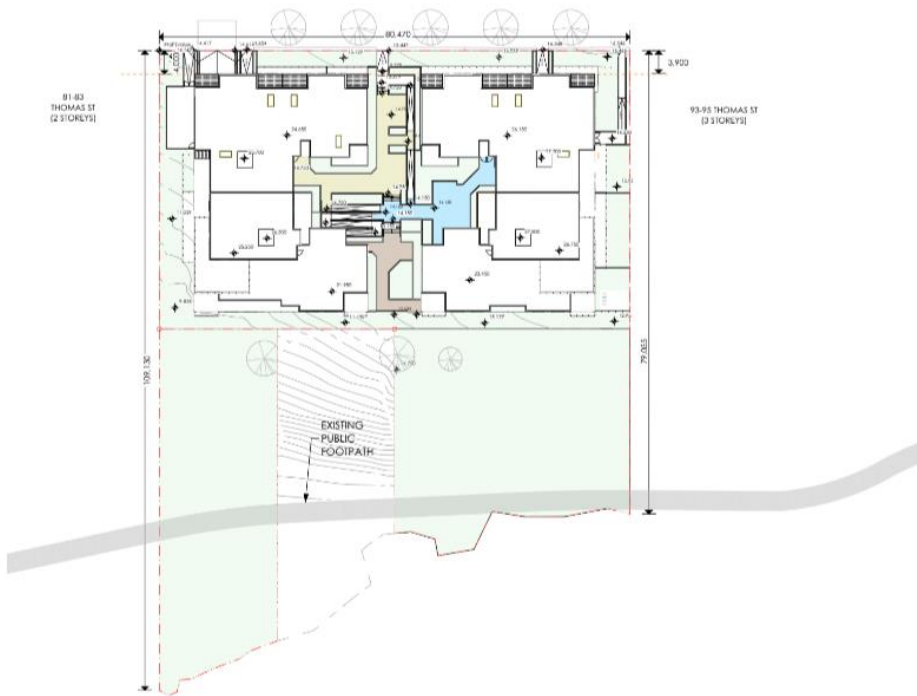


Figure 2 – Proposed development

(Source: PTI Architecture 2024 Project 541 – DA08 Revision D)

1.2 Site description

Table 1 provides a summary of the planning, cadastral, topographical, and disturbance details of the study area.

Table 1 – Site features

Location	85-91 Thomas Street Parramatta, Lot 13 DP 1239, Lot 142 DP 537053, Lot 15 DP 1239, Lot 16 DP 1239
Study area	0.7 ha approximately
Local government area	City of Parramatta
Zoning	R4 High Density Residential, RE1 Public Recreation
Grid reference	328184E 5702086N MGA-56
Elevation	Approximately 2–16 m AHD
Topography	Situated on a very south aspect with a gradient of 5 degrees
Geology and soils	<p>Blacktown (9130bt) Geology: Wianamatta Group– Ashfield Shale consisting of laminite and dark grey siltstone and Bringelly Shale which consists of shale, with occasional calcareous claystone, laminite and coal. 24 This unit is occasionally underlain by claystone and laminite lenses within the Hawkesbury Sandstone such as at Duffys Forest Soils: Shallow to moderately deep (<100 cm) Red Brown Podzolic Soils (Dr3.21, Dr3.11, Db2.11) on crests, upper slopes and well-drained areas; deep (150-300 cm) Yellow Podzolic Soils and Soloths (Dy2.11, Dy3.11) on lower slopes and in areas of poor drainage.</p> <p>Lucas Heights (9130lh) Geology: Mittagong Formation–interbedded shale, laminite and fine to medium grained quartz sandstone. The Mittagong Formation is located stratigraphically between the Ashfield Shale and Hawkesbury Sandstone. It is often relatively shallow. Minor areas of Hawkesbury Sandstone and minor areas of Ashfield Shale may occur. Soils: Moderately deep (50-150 cm), hardsetting Yellow Podzolic Soils and Yellow Soloths (Dy2.41); Yellow Earths (Gn2.24) on outer edges)</p>
Catchment, drainage and stream order	There are no creek lines within the site. The site drains downhill and into the Baludarri Wetlands and adjoins the Parramatta River to the south.
Existing land use	Currently existing use includes container storage facility and residential
Connectivity features	The vegetation within the development footprint is already fragmented from other areas of contiguous bushland however, the fringing vegetation along the Parramatta River provides some limited opportunity for passage by transiting fauna. The nearest natural vegetation occurs to the north east within Vinyard Creek Reserve, with another patch of remnant vegetation to the north west around Parramatta Lake. This vegetation is also already fragmented in the local landscape with significant barriers from existing development and infrastructure specifically James Rues Drive and Victoria Road. Therefore, the study area provides no local or regionally important connective values within the proposed development footprint. However, the development proposal intends retain the fringing vegetation within the southern boundary of the study site that contributes to remanent connective vegetation along the Parramatta River. Figure 5 shows an overview of the extent of native vegetation in the locality.

2. BIODIVERSITY IMPACT ASSESSMENT

2.1 Biodiversity Offsets Scheme (BOS)

The BC Act repeals the *Threatened Species Conservation Act 1995*, the *Nature Conservation Trust Act 2001* and the animal and plant provisions of the *National Parks and Wildlife Act 1974*. Together with the [Biodiversity Conservation Regulation 2017](#), the BC Act establishes a new regulatory framework for assessing and offsetting biodiversity impacts on proposed developments and clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme (BOS). Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the Biodiversity Assessment Method (BAM).

Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the BAM.

The Biodiversity Offsets Scheme applies to:

- local development (assessed under Part 4 of the *Environmental Planning and Assessment Act 1979*) that triggers the Biodiversity Offsets Scheme Threshold or is likely to significantly affect threatened species based on the test of significance in section 7.3 of the *Biodiversity Conservation Act 2016*
- state significant development and state significant infrastructure projects, unless the Secretary of the Department of Planning, Industry and Environment and the environment agency head determine that the project is not likely to have a significant impact
- [biodiversity certification](#) proposals
- clearing of native vegetation in urban areas and areas zoned for environmental conservation that exceeds the Biodiversity Offsets Scheme threshold and does not require development consent
- clearing of native vegetation that requires approval by the Native Vegetation Panel under the [Local Land Services Act 2013](#)
- activities assessed and determined under Part 5 of the *Environmental Planning and Assessment Act 1979* (generally, proposals by government entities) if proponents choose to 'opt in' to the Scheme.

The application of the Biodiversity Offsets Scheme Threshold and the test of significance is provided in section 2.2 and advise the Biodiversity offset scheme is not triggered.

2.2 Threshold assessment

The Biodiversity Offsets Scheme applies to local development (assessed under Part 4 of the *Environmental Planning and Assessment Act 1979*) that **is likely to significantly affect threatened species**. Local development is likely to significantly affect threatened species and require a biodiversity development assessment report (section 7.7 of the *Biodiversity Conservation Act 2016*) if impacts either:

- exceed the Biodiversity Offsets Scheme threshold (BC Act, section 7.4); the threshold includes clearing on land within the Biodiversity Values Map or clearing of an area that exceeds the threshold.
- are carried out on an Area of Outstanding Biodiversity Value (AOBV)
- are likely to significantly affect threatened species, ecological community.

The BOS includes three (3) elements to the threshold test – an area trigger, a Biodiversity Values Land Map trigger and the Test of Significance. If impacts exceed at least one of these triggers, the Biodiversity Offset Scheme applies to the proposed clearing.

The Biodiversity offset thresholds are examined below.

2.2.1 Biodiversity Values Land Map

Biodiversity Values Land has been mapped within the study area in the south of the site. However, as biodiversity lands has not been mapped within the impacted area – an offset is not required under this trigger. The proposed dwelling locations are generally within the pale yellow portion of the study area (northern half).



Figure 3 below shows the site (blue) in relation to those areas (coloured mauve) as having biodiversity values.

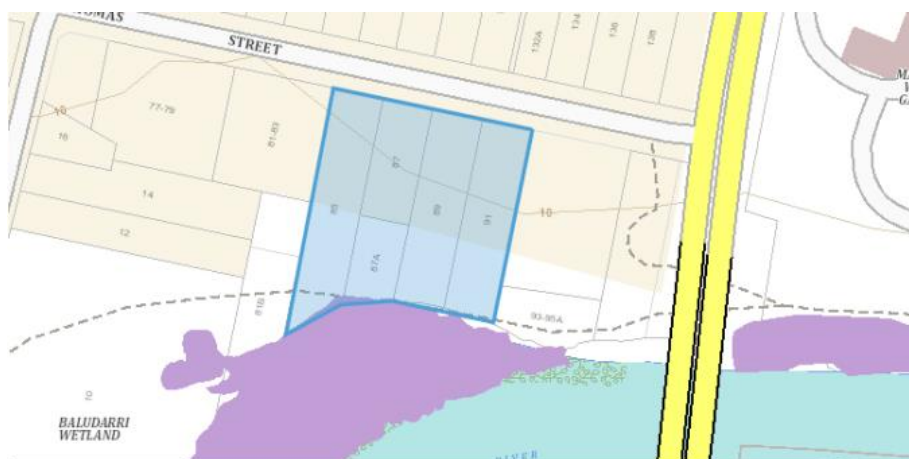


Figure 3 – Biodiversity values land (purple) relative to the development footprint (blue)

(Source: DPIE – Biodiversity Values Map – March 2019)

2.2.2 Area clearing threshold

The area threshold varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP)), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

Table 2 – BOS entry threshold report

Biodiversity Values Map and Threshold Report		
Date of Report Generation		07/02/2024 12:29 PM
1. Biodiversity Values (BV) Map - Results Summary (Biodiversity Conservation Regulation Section 7.3)		
1.1	Does the development Footprint intersect with BV mapping?	yes
1.2	Was ALL BV Mapping within the development footprinted added in the last 90 days? (dark purple mapping only, no light purple mapping present)	no
1.3	Date of expiry of dark purple 90 day mapping	N/A
1.4	Is the Biodiversity Values Map threshold exceeded?	yes
2. Area Clearing Threshold - Results Summary (Biodiversity Conservation Regulation Section 7.2)		
2.1	Size of the development or clearing footprint	6,549.0 sqm
2.2	Native Vegetation Area Clearing Estimate (NVACE) (within development/clearing footprint)	3,126.5 sqm
2.3	Method for determining Minimum Lot Size	LEP
2.4	Minimum Lot Size (10,000sqm = 1ha)	550 sqm
2.5	Area Clearing Threshold (10,000sqm = 1ha)	2,500 sqm
2.6	Does the estimate exceed the Area Clearing Threshold? (NVACE results are an estimate and can be reviewed using the Guidance)	yes
REPORT RESULT: Is the Biodiversity Offset Scheme (BOS) Threshold exceeded for the proposed development footprint area? (Your local council will determine if a BDAR is required)		yes

Table 2 identifies that the BOS entry threshold report has determined the area threshold based on the minimum lot size of 0.25 ha, and the area clearing threshold for which the BOS applies is 1 ha. Clearing of 'native vegetation' that exceeds 1 ha will require a biodiversity offset to be obtained. Note that 'native vegetation' includes planted native species. The development proposal will require the clearing of 0.003 ha of native vegetation, therefore offsetting will not be required under this trigger.

2.2.3 Test of Significance

A detailed test of significance has been applied to *Wilsonia backhousei* and *Coastal Saltmarsh of NSW*, Large Bent-winged Bat, Eastern Coastal Free-tailed Bat, Southern Myotis, Greater Broad-nosed Bat, White-fronted Chat and White-bellied Sea Eagle within Appendix 3 in accordance with Section 7.2 of the *BC Act*. The test of significance for threatened entities has concluded a non-significant impact.

2.2.4 Areas of Outstanding Biodiversity Value (AOBV)

Areas of Outstanding Biodiversity Value are special areas with irreplaceable biodiversity values that are important to the whole of New South Wales, Australia or globally.

The relevant legislative provisions for AOBV are Part 3, *BC Act* 2016 and Part 3, *BC reg.* 2017.

AOBV declarations in New South Wales include the following:

- *Gould's Petrel – critical habitat declaration*
- *Little penguin population in Sydney's North Harbour – critical habitat declaration*
- *Mitchell's Rainforest Snail in Stotts Island Nature Reserve – critical habitat declaration*
- *Wollemi Pine – critical habitat declaration*

None of the above occur within the development footprint or will be indirectly impacted.

3. FLORA

3.1 Survey

Botanical survey was undertaken on 19 April 2024 over a time frame of approximately 2 hrs.

Botanical survey included a random meander in accordance with Cropper (1993) to gain a full species list of the plants within the site, and then one (1) quadrat of 0.1 ha was undertaken in accordance with the Biodiversity Assessment method 2020 (BAM). A review of the Atlas of NSW Wildlife (DPE 2024) was undertaken prior to the site visit to determine threatened species previously recorded within 10 km of the development footprint, and relevant target searches were undertaken as suited, generally as near-linear transects underneath or adjacent to remnant canopy vegetation.

All naturally occurring species were identified to species level where possible, and are listed in Appendix 1.

3.2 Vegetation communities

The *Native Vegetation of the Sydney Metropolitan Area* (OEH 2016) maps the following vegetation communities:

- Weeds and Exotics
- Estuarine Mangrove Forest
- Estuarine Saltmarsh

State Vegetation Type Map, Eastern NSW (DPE 2022) maps the following vegetation communities:

- PCT 4097 Samphire Saltmarsh
- PCT 3595 Sydney Coastal Sandstone Gully Forest
- PCT 4091 Grey Mangrove – River Mangrove Forest

Field verification of the study area found the following vegetation communities:

- Exotic Vegetation
- Regenerated Native Vegetation
- PCT 4097 Samphire Saltmarsh
- Planted Native Vegetation

Vegetation associated with PCT 4097 Samphire Saltmarsh has a higher local occurrence of *Casuarina glauca* than typically expected from this community (BioNet Vegetation Classification 2023) due to natural regeneration of the species in the area and regeneration works of community groups at Baludarri Wetlands.

Similarly, the Regenerated Native Vegetation has been planted as a part restoration works for Baludarri Wetlands and the pedestrian bridge running through the site.

Details of these vegetation communities are provided below in Table 3.

Table 3 – Observed vegetation communities

Community	Location within site and condition	Canopy	Midstory	Ground layer	Area (ha)	Conservation status	
						BC Act	EPBC
Exotic Vegetation	Majority of the site, around the house dwellings.	<i>Jacaranda mimosifolia</i> , <i>Cinnamomum camphora</i> , <i>Cupressus lusitanica</i> , <i>Plumeria obtusa</i> , <i>Magnolia x soulangiana</i>	<i>Camellia japonica</i> , <i>Bambusa vulgaris</i> , <i>Schefflera arboricola</i> , <i>Celtis sinensis</i> , <i>Lantana camara</i> , <i>Gardenia jasminoides</i>	<i>Cardiospermum grandiflora</i> , <i>Stenotaphrum secundatum</i> , <i>Cenchrus clandestinus</i> , <i>Ehrharta erecta</i> , <i>Trachelospermum jasminoides</i> , <i>Paspalum dilatatum</i> , <i>Tradescantia pallida</i> , <i>Sida rhombifolia</i> , <i>Eragrostis curvula</i>	0.27 ha, 0.22 ha impacted	No associated TEC	No associated TEC
Regenerated Native Vegetation	Occurs behind each of the dwellings on an embankment regenerated as part of the Baludarri Wetlands Regeneration Project in a moderately weedy condition	<i>Eucalyptus botryooides</i> Exotics: <i>Camphora</i> , <i>Cinnamomum</i> , <i>Jacaranda mimosifolia</i> , <i>Olea europaea subsp. cuspidata</i>	<i>Lomandra longifolia</i> , <i>Acacia linearifolia</i> , <i>Plectranthus parviflorus</i> , <i>Hakea dactyloides</i> , <i>Trema tomentosa</i> , <i>Acacia decurrens</i> . Exotics: <i>Ochna serrulata</i> , <i>Cestrum parqui</i>	<i>Oplismenus aemulus</i> , <i>Imperata cylindrica</i> , <i>Entolasia stricta</i> , <i>Microlaena stipoides</i> , <i>Commelina cyanea</i> Exotics: <i>Solanum nigrum</i> , <i>Cardiospermum grandiflorum</i> , <i>Ehrharta erecta</i>	0.18 ha	No associated TEC	No associated TEC
PCT 4097 Samphire Saltmarsh	Good condition, located within 85 Thomas Street in the southwestern corner of the lot.	<i>Casuarina glauca</i> , <i>Avicennia marina subsp. australasica</i>	Generally absent	<i>Sueda australis</i> , <i>Sporobolus virginicus</i> , <i>Juncus kraussii</i>	0.1 ha	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner	Does not meet diagnostic criteria under the EPBC Act

Community	Location within site and condition	Canopy	Midstory	Ground layer	Area (ha)	Conservation status	
						BC Act	EPBC
						Bioregion - Endangered	
Planted native vegetation	Planted native vegetation occurs around some of the dwellings	<i>Callistemon salignus</i> , <i>Stenocarpus sinuatus</i>	<i>Cyathea australis</i>	As per exotic-dominated grassland	0.003 ha	No associated TEC	No associated TEC



Photo 1 – Exotic dominated vegetation at the rear of 87 Thomas Street



Photo 2 – Regenerated Native Vegetation



Photo 3 – PCT 4097 Sampire Saltmarsh near pedestrian bridge in southwest corner



Photo 4 – Exotic vegetation at 87 Thomas Street

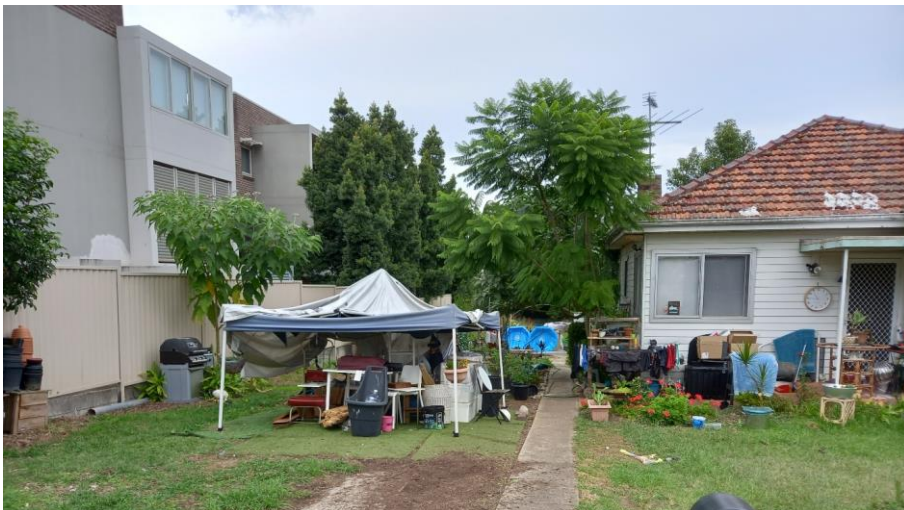


Photo 5 – Exotic planted vegetation at 91 Thomas Street

3.3 Threatened flora species

BC Act – A search of the Atlas of NSW Wildlife (DPE 2024) indicated a list of species that have been recorded within a 10 km radius of the development footprint. These species are listed in Appendix 2 and are considered for potential habitat within the development footprint.

EPBC Act – A review of the schedules of the *EPBC Act* indicated the potential for a list of threatened flora species to occur within a 10 km radius of the development footprint.

Based on the habitat assessment within Appendix 2 it is considered that the development footprint provides potential habitat for the following threatened flora species. These species will be considered in the test of significance within Appendix 3:

Table 4 – Threatened flora species with suitable habitat present

Scientific name	BC Act	EPBC Act	Potential to occur
<i>Wilsonia backhousei</i>	V	-	Low

All threatened species in both the BioNet (NSW) and *EPBC Act* coordinate search (National) were considered to have low potential suitable habitat within the study area because of previous clearing and landscaping works, past and ongoing land management practices, unsuitable soils / geology, unsuitable previous vegetation type or large distance to known specimens.

The state test of significance assessment (Appendix 3) and a review of *EPBC Act* impact criteria (Appendix 4) has concluded that the proposed development will not have a significant impact on threatened flora species or TECs. Therefore, (a) a Species Impact Statement is not required in respect to flora for the proposal and (b) biodiversity offsetting is not required.

3.4 Endangered flora populations

Two endangered flora populations occur within The City of Parramatta LGA. Another endangered population is known to occur within 10 km of the study area. These populations are:

- Tadgell’s Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield
- *P. prunifolia* in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas

No specimens of Tadgells Bluebell (*Wahlenbergia multicaulis*) were identified onsite and suitable habitat onsite was not identified. The nearest population is approximately 5.95 km southeast of the site. Therefore, it can be concluded that this population does not occur within the study area.

No specimens of *Pommaderris prunifolia* were identified onsite and suitable habitat was not identified. The nearest population is approximately 2.7 km east of the site. Therefore, it can be concluded that this population does not occur within the study area.

3.5 Threatened ecological communities

Exotic Vegetation, Planted Native vegetation, and Regenerated vegetation onsite are not considered to be commensurate with any *BC Act* Listed or *EPBC Act* listed Threatened Ecological Communities.

PCT 4097 Samphire Saltmarsh is commensurate with *BC Act* Listed Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions which is listed as Endangered. This community occupies a small portion of the southwest corner of the site and extends into larger patches within Baludarii Wetlands.

With respect to the *EPBC Act*, PCT 4097 Samphire Saltmarsh forms part of *Subtropical and Temperate Coastal Saltmarsh*. For recognition under the *EPBC Act* the community must meet a key diagnostic criterion:

- occurs south of 23° 37' S latitude - from the central Mackay coast on the east coast of Australia, southerly around to Shark Bay on the west coast of Australia (26° latitude), and including the Tasmanian coast and islands within the above range
- occurs on the coastal margin, along estuaries and coastal embayments and on low wave energy coasts
- occurs on places with at least some tidal connection, including rarely-inundated supratidal areas, intermittently opened or closed lagoons, and groundwater tidal influences, but not areas receiving only aerosol spray
- occurs on sandy or muddy substrate and may include coastal clay pans (and the like)
- consists of dense to patchy areas of characteristic coastal saltmarsh plant species (i.e. salt-tolerant herbs, succulent shrubs or grasses, that may also include bare sediment as part of the mosaic) and
- proportional cover by tree canopy such as mangroves, *Melaleucas* or *Casuarinas* is not greater than 50%, nor is proportional ground cover by seagrass greater than 50%.

The proportional cover of the tree canopy within the site boundary is greater than 50% tree cover comprising of a high proportion of *Casuarina glauca* with *Melaleuca styphelioides*, indicating that it does not meet the *EPBC Act* diagnostic criteria.

4. FAUNA

4.1 Survey / Habitat assessment

Fauna survey including diurnal survey and threatened species habitat assessment was undertaken within the subject site and nearby surrounds on 6th & 7th April 2020.

Diurnal fauna survey included:

- Frog and reptile habitat searches,
- Dural Land Snail shelter habitat opportunity.
- 3x bird census points (out to a radius of 30–50 m for 15 minutes),
- Opportunistic bird call and activity survey between census points,
- Presence of any raptor nests.
- Terrestrial shelters, burrows and/or hollows.
- Connectivity potential to and from the site.
- Presence of drainages for frog species habitat.
- Observations for presence of potential *Allocasuarina* trees for foraging by Glossy Black-cockatoo.
- Mammal activity searches (scats, scratches, diggings, burrows, etc.)
- Habitat tree survey.
- Significant habitat tree survey.

Significant habitat trees are defined as trees containing large hollows suitable for owls/cockatoos and/or two or more good quality medium hollows and/or several small hollows and/or a tree showing notable use by a threatened species (eg. sap feed tree, raptor nest tree, microbat roost, etc.).

Specific survey effort locations and results are shown on Figure 4. All fauna species recorded during survey within the development footprint and nearby surrounds are listed in Appendix 2.

A review of the Atlas of NSW Wildlife (DPE 2024) was undertaken prior to the site visit to determine threatened species previously recorded within 10 km of the development footprint.

4.2 Habitat features

The following notable habitat features were observed present:

- Year-round nectar producing tree species, principally planted vegetation
- Seed producing *Allocasuarina* trees
- Fruit producing fig trees
- Ephemeral artificial drainage line with sandstone cladding
- Dense mid and upper-storey foliage areas within the southern boundary
- Surface soils suitable for foraging by bandicoots
- Adjoining mangrove wetland and Aquatic habitat within the Parramatta River

Hollow-bearing trees were surveyed during the fauna survey with no (0) trees containing hollows observed within or close to the development footprint area.

Therefore, the site does not contain suitable breeding habitat for threatened large forest owls or cockatoos or roosting habitat for threatened microbat species.

4.3 Threatened fauna species

BC Act – A search of the Atlas of NSW Wildlife (DPE, 2024) provided a list of threatened fauna species previously recorded within a 10 km radius of the development footprint. These species are listed in Appendix 2 and are considered for potential habitat within the study area.

EPBC Act – A review of the schedules of the *EPBC Act* identified a list of threatened fauna species or species habitat likely to occur within a 10 km radius of the development footprint.

In accordance with Appendix 2 the following state and nationally listed threatened fauna species are considered to have suitable habitat with varying potential to occur within the study area. The state listed species will be considered in the test of significance (Appendix 3):

Table 5 – Threatened fauna species with suitable habitat present

Common name	BC Act	EPBC Act	Potential to occur
White-bellied Sea Eagle	V	-	high
Grey-headed Flying-fox	V	V	high
Large Bent-winged Bat	V	-	high
Southern Myotis	V	-	high
Black Bittern	V	-	moderate
Eastern Coastal Free-tailed Bat	V	-	Moderate
White-fronted Chat	V	-	moderate
Greater Broad-nosed Bat	V	-	moderate
Red-crowned Toadlet	V	-	Low
Green and Golden Bell Frog	E	V	Low
Australasian Bittern	E	E	low
Little Eagle	V	-	low
Eastern Osprey	V	-	low
Red Goshawk	E	V	low
Grey Falcon	V	-	low
Greater Sand-plover	V	-	low
Curlew Sandpiper	E	CE	low
Eastern Curlew	-	CE	low
Gang-gang Cockatoo	V	-	low
Glossy Black-Cockatoo	V	-	low
Little Lorikeet	V	-	low
Swift Parrot	E	E	low
Turquoise Parrot	V	-	low
Barking Owl	V	-	low
Powerful Owl	V	-	Low
Masked Owl	V	-	low
Sooty Owl	V	-	low
White-throated Needletail	-	V	low
Brown Treecreeper	V	-	low
Eastern Bristlebird	E	E	low
Pilotbird	-	V	low
Regent Honeyeater	E4A	CE	low
Painted Honeyeater	V	V	low

Common name	BC Act	EPBC Act	Potential to occur
Varied Sittella	V	-	low
Dusky Woodswallow	V	-	low
Scarlet Robin	V	-	low
Flame Robin	V	-	low
Diamond Firetail	V	-	low
Spotted-tailed Quoll	V	E	low
Southern Brown Bandicoot	E	E	low
Koala	E	E	low
Yellow-bellied Glider	V	-	low
Southern Greater Glider	-	V	low
Parma Wallaby	V	-	low
Brush-tailed Rock-wallaby	E	V	low
Yellow-bellied Sheath-tail Bat	V	-	low
Large-eared Pied Bat	V	V	low
Eastern False Pipistrelle	V	-	low
Little Bent-winged Bat	V	-	low
Corbans Long-eared Bat	V	V	low
New Holland Mouse	-	V	low
Cumberland Plain Land Snail	E	-	low
Dural Land Snail	E	E	low

The state test of significance assessment (Appendix 3) and a review of *EPBC* impact criteria (Appendix 4) has concluded that the proposed development will not have a significant impact on threatened fauna species. Therefore, (a) a Species Impact Statement is not required in respect to fauna for the proposal and (b) biodiversity offsetting is not required.

Fisheries Management Act (FM Act) – No habitats suitable for threatened aquatic species were observed within the development footprint and as such the provisions of this act do not require any further consideration.

4.4 Protected migratory species (National)

The *EPBC Act* Protected Matters Report provides additionally listed terrestrial, wetland and marine migratory species of national significance likely to occur, or with habitat for these species likely to occur, within a 10 km radius of the development footprint. The habitat potential of migratory species is considered in Table 9 and 10 (Appendix 2).

No (0) nationally protected migratory bird species was recorded present within the study area during survey. It is considered that migratory species protected under the *EPBC* do not likely contain any breeding habitat or habitat otherwise of importance within the study area. Therefore, these species will not likely offer constraint to the proposal.

4.5 Endangered fauna populations

There is one (1) known endangered fauna population within the City of Parramatta, the White-fronted Chat population in the Sydney Metropolitan Catchment Management Area.

From the Scientific Committee's final determination, point 4 - Two (2) isolated sub-populations of White-fronted Chats are currently known from the Sydney Metropolitan Catchment Management Authority area; one at Newington Nature Reserve on the Parramatta River and

one at Towra Point Nature Reserve in Botany Bay. These sub-populations are separated from each other by 25 km of urbanised land, across which White-fronted Chats are unlikely to fly. They are isolated by even greater distances from the nearest extant populations outside the Sydney Metropolitan Catchment Management Authority area, at Ash Island north of Newcastle and Lake Illawarra, south of Wollongong. The last records of White-fronted Chats at Penrith Lakes (2001), Hawkesbury Swamps (2002), Tuggerah Lake (1997) and Lake Macquarie (1998) have not been repeated in recent years (Alan Morris, pers comm. 2009).

The study area is located approximately 6 km from the known sub-population of Newington and approximately 43 km from the Towra Point sub-population. Newington Nature Reserve spans approximately 50ha encompassing 14ha of saltmarsh bordered by mangroves (Saintilan and Rogers, 2008). The White-fronted Chat relies on salt marsh and other damp areas with low vegetation.

Samphire Saltmarsh occupies a small portion of the southwest corner of the site and extends into larger patches within Baludarii Wetlands however none of this vegetation community will be impacted by the proposal.

Whilst the study is in close proximity to the Newington sub-population, given suitable habitat including Samphire Saltmarsh will be conserved, it is not expected that the future development of the site will not likely have any significant impact upon the endangered population.

4.6 State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Koala Habitat Protection

Chapter 4 of State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Koala Habitat Protection) applies to land within LGAs listed under Schedule 2 of the Policy. As the study area falls under the City of Parramatta LGA, which is not listed under Schedule 2, it is considered that SEPP 2021 does not apply to this development proposal. Therefore, the overarching legislative document relating to Koalas will be the *BC Act*.

As of May 2024 there have only been 4 Koala observations within a 10 km radius of the study site, three of which are rehabilitation records. The nearest observational record was from 2021 within the suburb of Epping Heights approximately 9.5 km to the north east. Within a 10 km radius. According to the Australian Koala Foundation, the Koala population within the Parramatta electorate has been declared extinct with an estimated 3.2% of Koala habitat left remaining intact. The highest concentration of records is located near the township of Liverpool to the south.



Figure 4 – Flora & fauna survey effort & results

4.7 Connectivity

The vegetation within the development footprint is already fragmented from other areas of contiguous bushland however, the fringing vegetation along the Parramatta River provides some limited opportunity for passage by transiting fauna. The nearest natural vegetation occurs to the north east within Vinyard Creek Reserve, with another patch of remnant vegetation to the north west around Parramatta Lake. This vegetation is also already fragmented in the local landscape with significant barriers from existing development and infrastructure specifically James Rues Drive and Victoria Road. Therefore, the study area provides no local or regionally important connective values within the proposed development footprint. However, the development proposal intends retain the fringing vegetation within the southern boundary of the study site that contributes to remanent connective vegetation along the Parramatta River.

The study areas contribution to local connectivity is shown in Figure 5 below.



Figure 5 – Local connectivity (study site in red)

5. WATERCOURSES & WETLANDS

5.1 Endangered wetland communities

A number of wetland communities have been listed as an 'endangered ecological community' under the NSW *BC Act*. We note that 'wetlands' are included in the definition of 'waterfront lands' in accordance with the *Water Management Act (WM Act) 2000*, due to their inclusion in the definition of a 'lake' under the same act.

Impacts on wetland communities must be assessed under the *BC Act* and if present the management of wetland communities must be given due consideration in accordance with the objectives and principles of management as contained within the NSW Wetlands Policy (2010), and appropriate management as determined by NSW DPE - Office of Water in their general terms of approval. This may include but not limited to the provision of buffers, management of stormwater runoff and maintenance of natural inflows or runoff into those wetland communities.

- Artesian springs ecological community
- Castlereagh Swamp Woodland Community
- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions
- Coastal Upland Swamp in the Sydney Basin bioregion
- Coolibah–Black Box woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands bioregions
- Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions
- Kurri sand swamp woodland in the Sydney Basin Bioregion
- Lagunaria swamp forest on Lord Howe Island
- Maroota Sands swamp forest
- Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions
- Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions
- The shorebird community occurring on the relict tidal delta sands at Taren Point
- Upland wetlands of the drainage divide of the New England Tableland Bioregion
- Wingecarribee Swamp

In accordance with the *WM Act*, endangered wetland communities are through the definition of 'lakes' potentially classed as waterfront land. Referral to NSW Natural Resources Access Regulator (NRAR) may be required for determination under the *WM Act* as a controlled activity. As well as protection, a buffer may be applied to these communities as specified by the NRAR.

One endangered wetland community was present – Coastal Saltmarsh - in the study area and therefore a referral to NRAR may be required for impacts on waterfront lands. At the closest point there is a minimum 20m to the mapped saltmarsh community.

5.2 Groundwater dependent ecosystems (GDEs)

Groundwater dependent ecosystems are communities of plants, animals and other organisms whose extent and life processes are dependent on groundwater. Some examples of ecosystems which depend on groundwater are:

- wetlands;
- red gum forests, vegetation on coastal sand dunes and other terrestrial vegetation;
- ecosystems in streams fed by groundwater;
- limestone cave systems;
- springs; and
- hanging valleys and swamps.

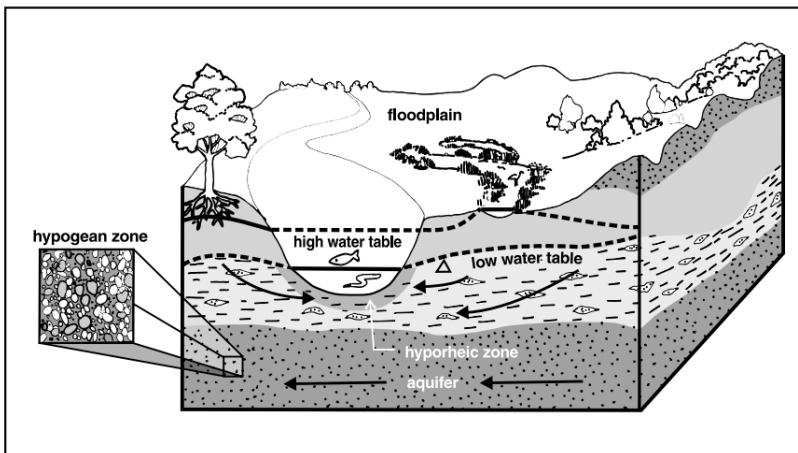


Figure 6 – Alluvial groundwater system discharging into a river

Groundwater dependent ecosystems are therefore ecosystems which have their species composition and their natural ecological processes determined by groundwater (NSW State Groundwater Dependent Ecosystems Policy April 2002).

Groundwater Dependent Ecosystems (GDEs) are mapped with low potential to occur are present within the site boundaries (Figure 7). Ground-truthing onsite confirmed the presence of Baludarri Wetlands occurring within the southern portion of the site and therefore the policy requires further consideration. The proposal will not directly impact this vegetation therefore a referral to NRAR is not required.

It's our understanding the project is being fully drained to the kerb side and does not require any stormwater exports or works leading to Parramatta River or the adjoining wetland communities. Therefore indirect impacts such as shading are the most likely cause of changes to vegetation to the south.

As the proposal will be indirectly impacting on the GDE, appropriate erosion and sediment controls should be implemented during construction, and stormwater infrastructure installed as to ensure there are no indirect impacts to any occurring GDEs or local drainage lines and watercourses.

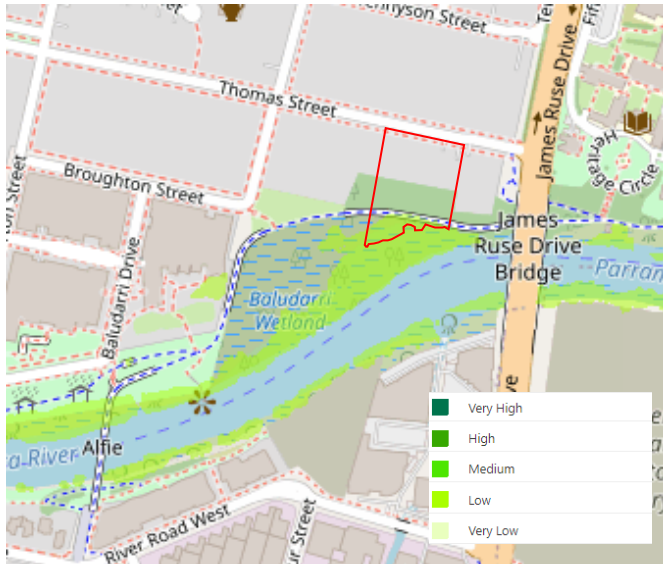


Figure 7 – Groundwater dependant ecosystems mapped onsite

5.3 Watercourse assessment

No hydrolines are mapped onsite, however each lot adjoins >4th order Parramatta River and Baludarrri Wetlands. The proposal is not within 40m of the mapped extent of Parramatta River.

A riparian buffer is the required setback of 40m from top of bank is recommended in accordance with the NSW Controlled Activity Guidelines for Riparian corridors 2022. The standard setbacks are (Source: DPE Controlled activities – Guidelines for riparian corridors on waterfront land 2022) as follows:

Watercourse type	VRZ width (each side of watercourse)	Total RC width
1 st order	10 metres	20 m + channel width
2 nd order	20 metres	40 m + channel width
3 rd order	30 metres	60 m + channel width
4 th order and greater (includes estuaries, wetlands and any parts of rivers influenced by tidal waters)	40 metres	80 m + channel width

Note: where a watercourse does not exhibit the features of a defined channel with bed and banks, the department may determine that the watercourse is not waterfront land for the purposes of the WM Act.

Figure 8 - Guidelines for riparian corridors on waterfront land (DPE 2022)

A referral is required if impacts are within 40m of a watercourse termed as “waterfront land”. The proposed development does not impact on waterfront land and a referral to NRAR is not required for impacts on waterfront land.



Figure 9 – Watercourses mapped onsite
(Source: Water Management (general) Regulation 2018 hydroline spatial data 1.0)

5.4 Coastal wetlands

The Coastal Wetlands SEPP 2018 identifies that the site is mapped as “coastal wetlands” or proximity area for coastal wetlands” (Figure 10).

As stated in Division 1 of the *State Environmental Planning Policy (Resilience and Hazards) 2021*, development consent is required for any development within these areas and must not be given unless the consent authority is satisfied that sufficient measures have been, or will be, taken to protect, and where possible enhance, the biophysical, hydrological and ecological integrity of the coastal wetland. Additionally, within the “proximity area for coastal wetlands” area, development consent must not be given unless the consent authority is satisfied that the proposed development will not significantly impact on the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland.

The impacts of the current proposal are limited to the north of the site and any associated clearing is occurring within the ‘proximity area for coastal wetlands’. Vegetation being removed for the proposal is predominantly exotic vegetation. *Travers bushfire & ecology* consider that this will not significantly impact on the quantity and quality of surface and ground water flows to and from the adjacent wetland. Whilst there is no direct impact proposed, indirect and

incremental impacts will remain. Council may still request a referral to NRAR given proximity reasons.

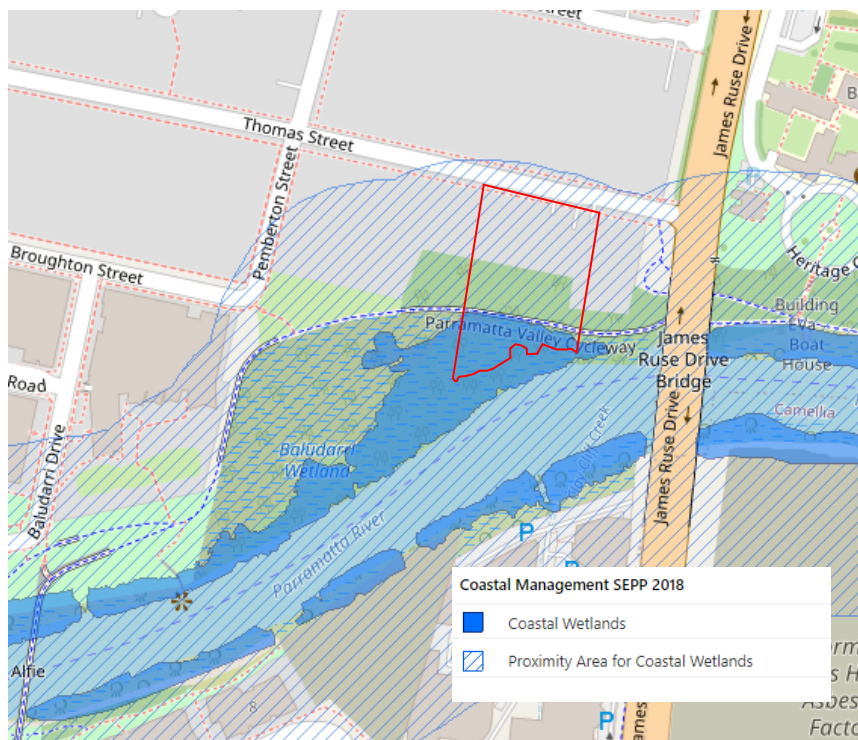


Figure 10 – Coastal wetlands area map

5.5 Mitigation measures

The following mitigation measures are recommended to avoid, minimise or ameliorate the above potential ecological impacts, address threatening processes and to guide a more positive ecological outcome for threatened species and their associated habitats.

Action / Technique	Outcome	Timing / Frequency	Responsibility
(a) Sediment and erosion control measures in accordance with Managing Urban Stormwater: Soils and Construction (Landcom 2004) to minimise impact of possible sedimentation to local drainage lines.	Maintain integrity of nearby wetland habitat and natural topsoil soil by preventing deposition and the water quality to Baludarii Wetlands and Parramatta River	Prior to any clearing works. Ongoing during all exposed soil stages until landscaping is completed	Project Manager
(b) Temporary fencing - Where they adjoin the development areas, the boundaries of the conserved vegetation areas shall be clearly marked out on-site to ensure their protection. All areas of natural vegetation retention shall be protected by fencing, prior to construction, to ensure that these areas are not damaged during the construction phase.	Maintain integrity of remaining natural habitat	Prior to construction / habitat clearance	Project Manager with assistance of project ecologist if required
(c) Prior to any habitat removal, a comprehensive search for fauna and habitat is to be undertaken to relocate any terrestrial individuals and identify any important nesting to be protected until fledging.	Reduce potential for impact on native species	Immediately prior to land clearance	Project Manager with assistance of project ecologist if required

Action / Technique	Outcome	Timing / Frequency	Responsibility
<p>(d) Management of hollows and hollow-dependent fauna:</p> <ul style="list-style-type: none"> The felling of hollow-bearing trees is to be conducted under the supervision of a fauna ecologist to ensure appropriate animal welfare procedures are taken, particularly for threatened species. Hollows of high quality or with fauna recorded residing within should be dismantled for relocation and all hollows should be inspected for occupation, signs of previous activity and potential for reuse. <p>Note: No hollow-bearing trees were located during site survey. However, in the case of a hollow-bearing tree being identified later, provisions for hollow bearing trees have been provided.</p>	Protection of hollow-dependent wildlife	At time of removal. Note, that no hollow-bearing trees were observed in the development footprint at the time of survey, however they may appear after storm activity breaks through a trunk or branch	Project Ecologist
(e) Management of any other displaced fauna	Prevent direct impacts on nesting and terrestrial native fauna species	Prior to and during habitat removal / Adaptive management required	Project Ecologist
(f) If any fauna species, a nest or roost is located during development works, then works should cease until safe relocation can be advised by a contact fauna ecologist	Prevent direct impacts on nesting and terrestrial native fauna species	At time of removal / Adaptive management required	Project Ecologist / Contractors
(g) Appropriate stormwater management design to avoid hydrological changes in surface water inputs in the southern TEC vegetation and associated habitat	Prevent changes in hydrological processes affecting TEC vegetation and threatened species habitat, reducing scour and erosion	DA Application Stage	Applicant

Action / Technique	Outcome	Timing / Frequency	Responsibility
(h) Installation of constructed nest boxes should as priority target hollow-dependent threatened species with a high – moderate potential to occur including Southern Myotis, Eastern Coastal Free-tailed Bat and Greater Broad-nosed Bat. Boxes should be constructed all of weatherproof timber (marine ply), fasteners and external paint and appropriately affixed to a recipient tree under the guidance of a fauna ecologist.	Protection of hollow-dependent wildlife	At the discretion of the proponent	Project Ecologist

5.6 Ecological impacts

The direct, indirect and cumulative ecological impacts have been considered in respect to recorded biodiversity, threatening processes and extent of impact as a result of the proposed works.

5.6.1 Direct impacts

Table 6 – Direct impacts

Direct impact	BC Act status	SAIL entity	Project phase/timing of impact	Extent (ha, number of individuals)
Removal of potential foraging resources for threatened species including Grey-headed Flying-fox and vegetation contributing to foraging resources for prey species for Large Bent-winged Bat, Southern Myotis, Eastern Coastal Free-tailed Bat, Black Bittern, White-bellied Sea-Eagle, White-fronted Chat and Greater Broad-nosed Bat	Various	No	Demolition / clearing	0.003 ha of planted native vegetation

5.6.2 Indirect impacts

Table 7 – Indirect impacts

Indirect impact description	Impacted entities (PCT, species, TEC)	Frequency	Duration	Project phase/timing of impact	Likelihood and consequences
Edge effects	All retained vegetation within c. 10 m of development	Constant	Lifetime of development	Clearing, construction and ongoing	<ul style="list-style-type: none"> Increased soil nutrients from changes to runoff that may provide further opportunities for weeds. Spill-over from noise, activity, scent and lighting effects Inappropriate use of remaining native vegetation areas such as additional clearing, dumping of materials and waste

Indirect impact description	Impacted entities (PCT, species, TEC)	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Concentrated stormwater runoff from solid surfaces and subsequent increased flows	All retained vegetation, watercourses and habitat downslope of the development	During rainfall events	Lifetime of development	Clearing, construction and ongoing	<ul style="list-style-type: none"> • Potential increased flow, nutrient and sediment loads that may provide further opportunities for weeds within retained vegetation. • Potential increased flow, nutrient and sediment loads within watercourses on site. • Potential discharge into Baludarri Wetlands and Parramatta River
Reduced inter-site connectivity	Small bird species, arboreal mammals	Once	Lifetime of development	Clearing, construction	<ul style="list-style-type: none"> • Reduced cross-site movements by local and transient fauna

5.6.3 Cumulative impacts

Table 8 – Cumulative impacts

Indirect impact description	Impacted entities (PCT, species, TEC)	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Cumulative loss of native vegetation within the local area	All retained vegetation within c. 10 m of development	Constant	Lifetime of development	Clearing, construction and ongoing	<ul style="list-style-type: none"> • Increased soil nutrients from changes to runoff that may provide further opportunities for weeds. • Spill-over from noise, activity, scent and lighting effects • Inappropriate use of remaining native vegetation areas such as additional clearing, dumping of materials and waste
Increased risk of weed invasion and fungal mobilisation or infections	All retained vegetation	Constant	Lifetime of development	Clearing, construction and ongoing	<ul style="list-style-type: none"> • Increased vehicle traffic with potential weed seed or pathogens • Increased human presence (construction workers, contractors) and machinery carrying weed seed or pathogens • Potential of residents to bring in weed seed, non-native vegetation or pathogens in the future

Indirect impact description	Impacted entities (PCT, species, TEC)	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Cumulative loss of foraging habitat for native fauna	All retained vegetation within c. 10 m of development	Constant	Lifetime of development	Clearing, construction and ongoing	<ul style="list-style-type: none"> • Loss of resident native fauna overtime • Increase in invasive fauna and/or aggressive exclusionary native species e.g. noisy miners
Increased varied human presence and activity	All retained vegetation and all resident fauna	Constant	Lifetime of the development	Clearing, construction and ongoing	<ul style="list-style-type: none"> • Increased noise activity, scent and lighting effects • Impacts to remaining native vegetation areas such as additional clearing, dumping of materials and waste

6. CONCLUSION

Ecological survey and assessment have been undertaken in accordance with relevant legislation including the *Environmental Planning and Assessment Act 1979*, the *Biodiversity Conservation Act 2016*, the commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the *Fisheries Management Act 1994*.

6.1 Recorded biodiversity

In respect of matters required to be considered under the *Environmental Planning and Assessment Act 1979* and relating to the species and provisions of the *Biodiversity Conservation Act 2016*, no (0) threatened fauna species, no (0) threatened flora species, no endangered populations and one (1) TEC – Coastal Saltmarsh of the NSW North Coast, Sydney Basin and Southeast corner bioregion were recorded within the study area.

6.2 Impact summary

The state assessment of significance (Appendix 3) has concluded that the proposed development will not have a significant impact on any threatened species, populations or TECs. Therefore, (a) a Species Impact Statement is not required for the proposal and (b) biodiversity offsetting is not required.

The assessment of impacts identified:

- The proposed works are not located on land mapped as biodiversity values.
- The area of native vegetation to be cleared is less than the clearing threshold is 0.25 ha.
- No threatened flora species, fauna species were identified in the impact area. However, potential habitat was observed within the site boundaries.
- The test of significance has been applied so the determining authority may assess whether the proposal is likely to have a significant impact on the aforementioned threatened species as a result of potential habitat loss.
- The proposal impacts within 40m of an endangered wetland community and within an the mapped proximity area to a coastal wetland.

6.3 Biodiversity Offsets Scheme (BOS) – Threshold assessment

Offsetting under the Biodiversity Offsets Scheme (BOS) is not required for the proposal as:

- The development footprint area is not located on lands mapped as Biodiversity Values Land.
- The proposed clearing of 0.003 ha of native vegetation is less than the area clearing threshold of 0.25 ha.

The consent authority will assess the third trigger, the test of significance, and determine whether or not a significant impact is likely based on the findings in Appendix 3.

In respect of matters required to be considered under the *Environment Protection and Biodiversity Conservation Act 1999*, no threatened fauna species, no (0) protected migratory species, no threatened flora species, and one (1) TECs – Coastal Saltmarsh were recorded within the study area.

The proposal was not considered to have a significant impact on OR be constrained by matters of national environmental significance. As such a referral to Department of Agriculture, Water and the Environment should not be required.

In respect of matters relative to the *Fisheries Management Act 1994*, no suitable habitat for threatened marine or aquatic species was observed within the development footprint and there are no matters requiring further consideration under this Act.

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Appendix 1. Flora & Fauna Species Lists

Table 9 – Flora species recorded

Family	Scientific name	Common name
TREES		
Mimosaceae	<i>Acacia decurrens</i>	Sydney Green Wattle
Acanthaceae	<i>Avicenna marina subsp. australasica</i>	Grey Mangrove
Myrtaceae	<i>Callistemon salignus</i>	Willow Bottlebrush
Theaceae	<i>Camellia japonica</i> *	Japanese Camellia
Lauraceae	<i>Cinnamomum camphora</i> *	Camphor Laurel
Casuarinaceae	<i>Casuarina glauca</i>	Swamp Oak
Cannabaceae	<i>Celtis sinensis</i> *	Japanese Hackberry
Rutaceae	<i>Citrus limon</i> *	Lemon Tree
Rutaceae	<i>Citrus reticulatus</i> *	Mandarin Tree
Rutaceae	<i>Citrus sinensis</i> *	Orange Tree
Cupressaceae	<i>Cupressus lusitanica</i> *	Mexican Cypress
Myrtaceae	<i>Eucalyptus botryoides</i>	Southern Mahogany
Proteaceae	<i>Grevillea robusta</i>	Silky Oak
Bignoniaceae	<i>Jacaranda mimosifolia</i> *	Jacaranda
Oleaceae	<i>Ligustrum lucidum</i> *	Large-leaf Privet
Magnoliaceae	<i>Magnolia x soulangiana</i> *	Saucer Magnolia
Myrtaceae	<i>Melaleuca styphelioides</i>	
Moraceae	<i>Morus alba</i> *	Mulberry
Oleaceae	<i>Olea europaea subsp. cuspidata</i> *	African Olive
Rosaceae	<i>Photinia robusta</i> *	Photinia
Apocynaceae	<i>Plumeria obtusa</i> *	Frangipani
Proteaceae	<i>Stenocarpus sinuatus</i>	Firewheel Tree
Ulmaceae	<i>Ulmus parviflora</i> *	American Elm
SHRUBS		
Casuarinaceae	<i>Allocasuarina littoralis</i>	Forest Oak
Poaceae	<i>Bambusa vulgaris</i> *	Bamboo
Pittosporaceae	<i>Bursaria spinosa var. spinosa</i>	Native Blackthorn
Phyllanthaceae	<i>Breynia oblongifolia</i>	Coffee Bush
Solanaceae	<i>Cestrum parqui</i> *	Green Cestrum
Cyatheaceae	<i>Cyathea australis</i>	Rough Tree-fern
Cycadaceae	<i>Cycas revoluta</i> *	Sago Palm
Iridaceae	<i>Dietes grandiflora</i> *	Wild Iris
Verbenaceae	<i>Lantana camara</i> *	Lantana
Asparagaceae	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
Rubiaceae	<i>Gardenia jasminoides</i> *	Gardenia
Proteaceae	<i>Hakea teretifolia</i>	Needlebush
Zingiberaceae	<i>Hedychium gardnerianum</i> *	Kahili Ginger
Melastomataceae	<i>Pleroma granulatum</i> *	Tibouchina
Ochnaceae	<i>Ochna serrulata</i> *	Mickey Mouse Plant
Araliaceae	<i>Schefflera arboricola</i> *	Dwarf Umbrella Tree

Family	Scientific name	Common name
Fabaceae	<i>Senna pendula</i> *	Easter Cassia
Solanaceae	<i>Solanum linnaeanum</i> *	Apple of Sodom
Solanaceae	<i>Solanum mauritianum</i> *	Tobacco Bush
Cannabaceae	<i>Trema tomentosa</i>	Poison Peach
GROUNDCOVERS		
Amaryllidaceae	<i>Agapanthus praecox</i> *	African Lily
Asteraceae	<i>Bidens pilosa</i> *	Cobbler's Pegs
Poaceae	<i>Cenchrus clandestinus</i> *	Kikuyu
Apocynaceae	<i>Coleus canina</i> *	Dogsbane
Asteraceae	<i>Conyza sumatrensis</i> *	Fleabane
Commelinaceae	<i>Commelina cyanea</i>	Scurvy Weed
Poaceae	<i>Cynodon dactylon</i>	Couch
Cyperaceae	<i>Cyperus gracilis</i>	Slender Flat-sedge
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed
Asphodelaceae	<i>Dianella caerulea</i>	Blue Flax Lily
Poaceae	<i>Ehrharta erecta</i> *	Panic Veldtgrass
Chenopodiaceae	<i>Einadia nutans</i> *	Climbing Saltbush
Poaceae	<i>Entolasia stricta</i>	Wiry Panic
Euphorbiaceae	<i>Euphorbia peplus</i> *	Petty Spurge
Poaceae	<i>Eragrostis curvula</i> *	African Lovegrass
Asteraceae	<i>Hypochaeris radicata</i> *	Flat-weed
Poaceae	<i>Imperata cylindrica</i>	Blady Grass
Juncaceae	<i>Juncus kraussii</i>	Sea Rush
Poaceae	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
Malvaceae	<i>Modiola caroliniana</i> *	Red-flowered Mallow
Lamiaceae	<i>Ocimum basilicum</i> *	Perennial Basil
Poaceae	<i>Oplismenus aemulus</i>	Wavy Beard Grass
Poaceae	<i>Paspalum dilatatum</i> *	Dallis Grass
Geraniaceae	<i>Pelargonium</i> sp.*	Geranium
Polygonaceae	<i>Persicaria capitata</i> *	
Plantaginaceae	<i>Plantago lanceolata</i> *	Ribwort
Lamiaceae	<i>Plectranthus parviflorus</i>	Cockspur Flower
Ericaceae	<i>Rhododendron</i> sp.*	Azalea
Polygonaceae	<i>Rumex crispus</i> *	Curled Dock
Primulaceae	<i>Samolus repens</i>	Creeping Brookweed
Malvaceae	<i>Sida rhombifolia</i> *	Paddy's Lucerne
Solanaceae	<i>Solanum nigrum</i> *	Blackberry Nightshade
Poaceae	<i>Sporobolus virginicus</i>	Sand Couch
Poaceae	<i>Stenotaphrum secundatum</i> *	Buffalo Grass
Aizoaceae	<i>Tetragonia tetragonoides</i>	Warrigal Greens
VINES		
Apocynaceae	<i>Araujia sericifera</i> *	Moth Vine
Nyctaginaceae	<i>Bougainvillea glabra</i> *	Bougainvillea
Sapindaceae	<i>Cardiospermum grandiflorum</i> *	Balloon Vine
Fabaceae	<i>Glycine clandestina</i>	Twining Glycine
Passifloraceae	<i>Passiflora caerulea</i> *	Blue Passionflower

Family	Scientific name	Common name
Apocynaceae	<i>Trachelospermum jasminoides</i> *	Chinese Star Jasmine
Commelinaceae	<i>Tradescantia pallida</i> *	Purple Heart
Fabaceae	<i>Wisteria sinensis</i> *	Wisteria

* denotes exotic species
 TS denotes threatened species

It should be noted that not all garden, cultivar or landscape species have been identified as part of this assessment.

Table 10 – Fauna species recorded

Common name	Scientific name	Method observed
Birds		
Australian brush-turkey	<i>Alectura lathamii</i>	OW
Australian King Parrot	<i>Alisterus scapularis</i>	W
Australian Magpie	<i>Cracticus tibicen</i>	OW
Australian Raven	<i>Corvus coronoides</i>	O W
Australian White Ibis	<i>Threskiornis molucca</i>	O W
Bar-shouldered Dove	<i>Geopelia humeralis</i>	O
Common Myna *	<i>Sturnus tristis</i>	O W
Common Starling *	<i>Sturnus vulgaris</i>	O
Crested Pigeon	<i>Ocyphaps lophotes</i>	O W
Eastern Yellow Robin	<i>Eopsaltria australis</i>	W
Eurasian Blackbird	<i>Turdus merula</i>	O
Grey Butcherbird	<i>Cracticus torquatus</i>	O W
Grey Fantail	<i>Rhipidura albiscapa</i>	O W
House Sparrow *	<i>Passer domesticus</i>	O
Little Wattlebird	<i>Anthochaera chrysoptera</i>	W
Magpie-lark	<i>Grallina cyanoleuca</i>	O W
Noisy Miner	<i>Manorina melanocephala</i>	O W
Pied Currawong	<i>Strepera graculina</i>	O W
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	W
Red-browed Finch	<i>Neochmia temporalis</i>	O W
Rock Dove *	<i>Columba livia</i>	O W
Silver Gull	<i>Larus novaehollandiae</i>	O
Sulphur Crested Cockatoo	<i>Cacatua galerita</i>	W
Superb Fairy-wren	<i>Malurus cyaneus</i>	O W
Welcome Swallow	<i>Hirundo neoxena</i>	O
Willie Wagtail	<i>Rhipidura leucophrys</i>	O W
Mammals		

Common name	Scientific name	Method observed
Cat (feral)*	<i>Felis catus</i>	O
Domesticated Dog *	<i>Canis lupus familiaris</i>	O
Reptiles		
Delicate Skink	<i>Lampropholis delicata</i>	O
Amphibians		
Striped Marsh Frog	<i>Limnodynastes peronii</i>	W
E - Nest/roost F-Tracks/scratchings FB - Burrow G - Crushed cones	H - Hair/feathers/skin K- Dead O - Observed OW- Obs & heard call	P - Scat Q- Camera T - Trapped/netted U- Anabat/ultrasound

Appendix 2. Threatened Flora & Fauna Habitat Assessment

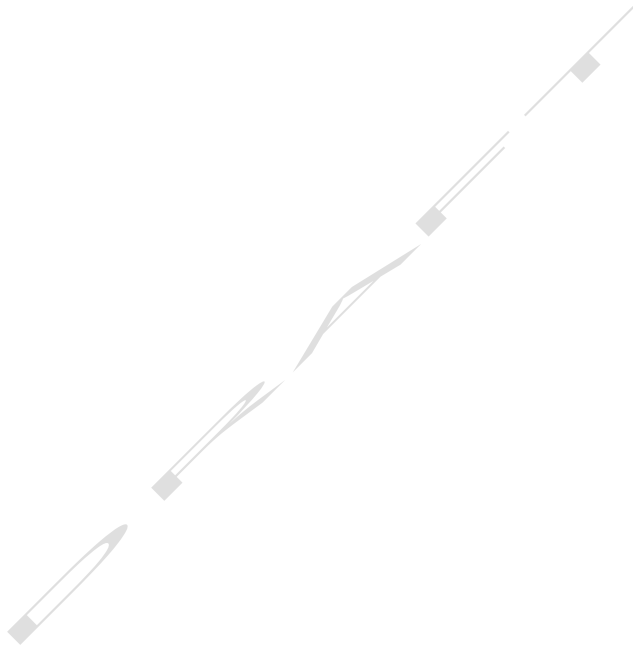


Table 11 – Threatened flora species habitat assessment (Appendix 2)

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site			Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	
<i>Acacia pubescens</i> DPE EPBC	V	V	Spreading shrub 1-4 m high open sclerophyll growing in open forest and woodlands on clay soils. <i>Distribution limits N-Bilpin S-Georges River.</i>	no	no	n/a	n/a	no
<i>Dillwynia tenuifolia</i> DPE	V	-	Erect shrub 0.6-1 m high. Grows in woodlands and open forest on sandstone shale or laterite. <i>Distribution limits N-Howes Valley S-Cumberland Plain.</i>	no	no	n/a	n/a	no
<i>Epacris purpurascens</i> var. <i>purpurascens</i> DPE	V	-	Erect shrub to 1.5 m high growing in sclerophyll forest and scrub and near creeks and swamps on sandstone. <i>Distribution limits N-Gosford S-Blue Mountains.</i>	no	no	n/a	n/a	no
<i>Hibbertia spanantha</i> DPE EPBC	CE	CE	Grows in forest with canopy species including <i>E. pilularis</i> , <i>E. resinifera</i> , <i>C. gummitera</i> and <i>A. costata</i> . The understorey is open with species of Poaceae, Orchidaceae, Fabaceae and Liliaceae. Flowers Oct-Nov with odd flowers throughout the year. Substrate is identified as a light clay occurring on a shale sandstone soil transition.	no	no	n/a	n/a	no
<i>Hibbertia superans</i> DPE	E1	-	Small spreading shrub to 0.3 m high. Grows on sandstone, usually in or near SSTF. <i>Distribution limits N-Glenorie S-Kellyville disjunct Mt Boss.</i>	no	no	n/a	n/a	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site			Considered in test of significance test (✓) Refer to Appendix 3	
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s)) from recent years (y/n) Notes 1,2 & 3		Potential to occur
<i>Macadamia integrifolia</i> EPBC	-	V	The species was known to occur in north-east New South Wales and was collected from Camden Haven, and there are specimens also from Lismore. This species grows in remnant rainforest, including complex mixed notophyll forest, and prefers partially open areas such as rainforest edges.	no	no	n/a	n/a	Only as a planted specimen	no
<i>Pterostylis saxicola</i> DPE EPBC	E1	E	Terrestrial orchid. Grows in shallow sandy soil above rock shelves, usually near Wianamatta / Hawkesbury transition. <i>Distribution limits N-Hawkesbury River S-Campbelltown.</i>	no	no	n/a	n/a	no	no
<i>Pimelea curviflora</i> <i>var. curviflora</i> DPE EPBC	V	V	Woody herb or sub-shrub to 0.2-1.2 m high. Grows on Hawkesbury Sandstone near shale outcrops. <i>Distribution Sydney.</i>	no	no	n/a	n/a	no	no
<i>Rhodamnia rubescens</i> DPE EPBC	E4A	CE	Shrub or small tree to 25 m high found in rainforest and riparian vegetation along the coast and up to 600 m ASL. Flowers in late winter through to spring, with a peak in October, and fruits typically begin to appear in December in the Sydney region. <i>Distribution limits N-Tweed Heads S-Batemans Bay.</i>	no	no	n/a	n/a	no	no
<i>Syzygium paniculatum</i> DPE EPBC	V	V	Small tree. Subtropical and littoral rainforest on sandy soil. <i>Distribution limits N-Forster S-Jervis Bay.</i>	no	no	n/a	n/a	Only as a planted specimen	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site			Considered in test of significance test (✓) Refer to Appendix 3	
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s)) from recent years (y/n) Notes 1,2 & 3		Potential to occur
<i>Wilsonia backhousei</i> DPE	V	-	Perennial subshrub with procumbent branches. Grows in coastal saltmarshes. <i>Wilsonia backhousei</i> is salt tolerant and is found in intertidal saltmarshes and, more rarely, on seacliffs. In New South Wales <i>Wilsonia backhousei</i> is scattered along the coast, reaching a northern limit at Wamberal Lagoon. In the Sydney region there has been a considerable decline in the abundance of the species over the last 100yrs, largely as a result of loss of habitat. <i>Distribution limits N-Sydney S-South of Eden.</i>	no	yes	yes	yes	low	yes
DPE	- Denotes species listed within 10 km of the development footprint on the Atlas of NSW Wildlife								
EPBC	- Denotes species listed within 10 km of the development footprint in the EPBC Act habitat search								
TBE	- Denotes additional species considered by Travers bushfire & ecology to have potential habitat based on regional knowledge and other records								
V	- Denotes vulnerable listed species under the relevant Act								
E or E1	- Denotes endangered listed species under the relevant Act								
E4a or CE	- Denotes critically endangered listed species under the relevant Act								
NOTE:	This field is not considered if no suitable habitat is present within the development footprint 'records' refer to those provided by the Atlas of NSW Wildlife 'nearby' or 'recent' records are species specific accounting for home range, dispersal ability and life cycle								

Table 12 – Threatened fauna species habitat assessment (Appendix 2)

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 10km	# records within ~500m in previous 20 years	Potential to occur	
Red-crowned Toadlet <i>Pseudophryne australis</i> DPE	V	-	Prefers sandstone areas, breeds in grass and debris beside non-perennial creeks or gutters. Individuals can also be found under logs and rocks in non-breeding periods. <i>Distribution limit: N-Pokolbin. S-near Wollongong.</i>	No	Sub-Optimal	3	0	Low	No
Green and Golden Bell Frog <i>Litoria aurea</i> DPE EPBC	E	V	Prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds. Often found under debris. <i>Distribution limit: N-Byron Bay S-South of Eden.</i>	No	Sub-Optimal	5588	0	Low	Yes
Australasian Bittern <i>Botaurus poiciloptilus</i> EPBC	E	E	Found in or over water of shallow freshwater or brackish wetlands with tall reedbeds, sedges, rushes, cumbungi, lignum and also in ricefields, drains in tussocky paddocks, occasionally saltmarsh, brackish wetlands. <i>Distribution limit: N-North of Lismore. S- Eden.</i>	No	Yes (Within Wetland)	3	0	Low	No
Black Bittern <i>Ixobrychus flavicollis</i> DPE	V	-	Found in shadowy, leafy waterside trees such as callistemons, casuarinas, paperbarks, eucalypts, mangroves and willows along tidal creeks, freshwater and brackish streams and ponds, sheltered mudflats and oyster slats. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Yes (Within Wetland And Adjoining Veg)	3	0	Moderate	Yes
White-bellied Sea Eagle (<i>Haliaeetus leucogaster</i>) DPE	V	-	Occupies coasts, islands, estuaries, inlets, large rivers, inland lakes and reservoirs. <i>Sedentary; dispersive. N-Tweed Heads. S-South of Eden.</i>	No	Marginal	193	0	High	Yes
Little Eagle <i>Hieraaetus morphnoides</i>	V	-	Utilises plains, foothills, open forests, woodlands and scrublands; river red gums on watercourses and lakes. <i>Distribution limit - N-Tweed Heads. S-South of Eden.</i>	No	Sub-Optimal	3	0	Low	No

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site			Considered in test of significance (y/n) Refer to Appendix 3	
					Suitable habitat present	# records within 10km	# records within ~500m in previous 20 years		Potential to occur
DPE									
Eastern Osprey <i>Pandion cristatus</i> DPE	V	-	Utilises waterbodies including coastal waters, inlets, lakes, estuaries and offshore islands with a dead tree for perching and feeding. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Sub-Optimal	3	0	Low	No
Red Goshawk <i>Erythrotriorchis radiatus</i> DPE EPBC	E	V	Inhabits tall open forests and woodlands. Breeds in tall trees adjacent to watercourses of wetlands. <i>Distribution limit: N-Border Ranges National Park. S-Foster.</i>	No	Sub-Optimal	0	0	Low	No
Grey Falcon <i>Falco hypoleucos</i> DPE	V	-	Occurs over mainly inland drainage systems of open plains and lightly timbered country including the acacia scrub, spinifex and tussock grasslands. <i>Distribution limit: N-Mullumbimby. S-Bega.</i>	No	Sub-Optimal	0	0	Low	No
Greater Sandplover <i>Charadrius leschenaultia</i> DPE	V	-	An almost exclusively coastal species favouring extensive mudflats and marshes. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Marginal	0	0	Low	No
Curlew Sandpiper <i>Callidris ferruginea</i> DPE	E	CE	Mainly coastal, but many inland feeding along tidal mudflats, salt marsh, salt fields, fresh, brackish or saline wetlands and sewerage ponds. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Sub-Optimal	1	0	Low	No
Eastern Curlew <i>Numenius madagascariensis</i> TBE	-	CE	Primarily coastal especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. Often recorded among saltmarsh and on mudflats fringed by mangroves and also in coastal saltworks and	No	No	4	0	Low	No

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site			Considered in test of significance (y/n) Refer to Appendix 3	
					Suitable habitat present	# records within 10km	# records within ~500m in previous 20 years		Potential to occur
			sewage farms. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>						
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i> DPE	V	-	Prefers wetter forests and woodlands from sea level to > 2,000 m on the Great Dividing Range, timbered foothills and valleys, timbered watercourses, coastal scrubs, farmlands and suburban gardens. <i>Distribution limit: mid north coast of NSW to western Victoria.</i>	No	Marginal	1	0	Low	No
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i> DPE	V	-	Open forests with <i>Allocasuarina</i> species and hollows for nesting. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Sub-Optimal	1	0	Low	No
Little Lorikeet <i>Glossopsitta pusilla</i> DPE	V	-	Inhabits forests, woodlands; large trees in open country; timbered watercourses, shelterbeds, and street trees. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Marginal	5	0	Low	No
Swift Parrot <i>Lathamus discolor</i> DPE EPBC	E	E	Inhabits eucalypt forests and woodlands with winter flowering eucalypts. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	No	Sub-Optimal	3	0	Low	No
Turquoise Parrot <i>Neophema pulchella</i> DPE	V	-	Inhabits coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands. <i>Distribution limit: N-Near Tenterfield. S-South of Eden.</i>	No	Sub-Optimal	1 (Rehabilitation Record)	0	Low	No
Barking Owl <i>Ninox connivens</i> DPE	V	-	Inhabits principally woodlands but also open forests and partially cleared land and utilises hollows for nesting. <i>Distribution limit: N-Border Ranges National Park. S-Eden.</i>	No	Sub-Optimal	2	0	Low	No
Powerful Owl <i>Ninox strenua</i> DPE	V	-	Forests containing mature trees for shelter or breeding and densely vegetated gullies for	No	Sub-Optimal	160	0	Low	Yes

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site			Considered in test of significance (y/n) Refer to Appendix 3	
					Suitable habitat present	# records within 10km	# records within ~500m in previous 20 years		Potential to occur
			roosting. <i>Distribution limits: N-Border Ranges National Park. S-Eden.</i>						
Masked Owl <i>Tyto novaehollandiae</i> DPE	V	-	Open forest and woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting. <i>Distribution limit: N-Border Ranges National Park. S-Eden.</i>	No	Sub-Optimal	3	0	Low	No
Sooty Owl <i>Tyto tenebricosa</i> DPE	V	-	Tall, dense, wet forests containing trees with very large hollows. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	No	No	1	0	Low	No
White-throated Needletail ^{MS} <i>Hirundapus caudacutus</i> DPE EPBC	-	V	Airspace over forests, woodlands, farmlands, plains, lakes, coasts, towns; companies often forage along favoured hilltops and timbered ranges. Breeds Siberia, Himalayas, east to Japan. Summer migrant to eastern Australia. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Marginal	17	0	Low	No
Brown Treecreeper <i>Climacteris picumnus victoriae</i> DPE	V	-	Occupies eucalypt woodlands, open woodland lacking a dense understorey with fallen dead timber. <i>Distribution limit: (Sub species victoriae) Central NSW west of Great Div. Cumberland Plains, Hunter Valley, Richmond, Clarence, and Snowy River Valleys.</i>	No	Sub-Optimal	0	0	Low	No
Eastern Bristlebird <i>Dasyornis brachypterus</i> DPE EPBC	E	E	Coastal woodlands, dense scrubs and heathlands, especially where low heathland borders taller woodland or dense tall tea-tree. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Sub-Optimal	0	0	Low	No
Pilotbird <i>Pycnoptilus floccosus</i> DPE EPBC	-	V	Strictly terrestrial, living on the ground in dense forests with heavy undergrowth. <i>Distribution limits: N-Newcastle, S-Melbourne.</i>	No	Sub-Optimal	0	0	Low	No
Regent Honeyeater	E4A	CE	Found in temperate eucalypt woodland and open forest including forest edges, wooded	No	Sub-Optimal	0	0	Low	No

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site			Considered in test of significance (y/n) Refer to Appendix 3	
					Suitable habitat present	# records within 10km	# records within ~500m in previous 20 years		Potential to occur
<i>Xanthomyza Phrygia</i> DPE EPBC			farmland and urban areas with mature eucalypts. <i>Distribution limit: N-Urbanville. S-Eden.</i>						
White-fronted Chat <i>Epithianura albifrons</i> DPE	V	-	Found in open damp ground, grass clumps, fencelines, heath, samphire saltmarshes, mangroves, dunes, saltbush plains. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Yes (Within Adjoining Wetlands)	176	0	Moderate	Yes
Painted Honeyeater <i>Grantiella picta</i> DPE EPBC	V	V	A nomadic bird occurring in low densities within open forest, woodland and scrubland feeding on mistletoe fruits. Inhabits primarily Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. <i>Distribution limit: N-Boggabilla. S-Albury with greatest occurrences on the inland slopes of the Great Dividing Range.</i>	No	Sub-Optimal	0	0	Low	No
Varied Sittella <i>Daphoenositta chrysoptera</i> DPE	V	-	Open eucalypt woodlands / forests (except heavier rainforests); mallee, inland acacia, coastal tea-tree scrubs; golf courses, shelterbelts, orchards, parks, scrubby gardens. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	No	Marginal	2	0	Low	No
Dusky Woodswallow <i>Artamus cyanopterus cyanopterus</i> DPE	V	-	Found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests. Prefers habitat with an open understorey. Often observed in farmland tree patches or roadside remnants. <i>Widespread in eastern, southern and south-western Australia.</i>	No	Sub-Optimal	4	0	Low	No

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site			Considered in test of significance (y/n) Refer to Appendix 3	
					Suitable habitat present	# records within 10km	# records within ~500m in previous 20 years		Potential to occur
Scarlet Robin <i>Petroica boodang</i> DPE	V	-	Found in foothill forests, woodlands, watercourses; in autumn-winter, more open habitats: river red gum woodlands, golf courses, parks, orchards, gardens. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Marginal	1	0	Low	No
Flame Robin <i>Petroica phoenicea</i> DPE	V	-	Summer: forests, woodlands, scrubs, from sea-level to c. 1800 m. Autumn-winter: open woodlands, plains, paddocks, golf courses, parks, orchards. <i>Distribution limit: N northern NSW tablelands. S-South of Eden.</i>	No	Sub-Optimal	1	0	Low	No
Diamond Firetail <i>Stagonopleura guttata</i> DPE	V	-	Found in eucalypt woodlands, forests and mallee where there is grassy understorey west of the Great Div. also drier coastal woodlands of the Cumberland Plain and Hunter Richmond and Clarence River Valleys. <i>Distribution limit: N-Rockhampton Q. S-Eyre Pen Kangaroo Is. SA.</i>	No	Sub-Optimal	0	0	Low	No
Spotted-tailed Quoll <i>Dasyurus maculatus</i> DPE EPBC	V	E	Dry and moist open forests containing rock caves, hollow logs or trees. <i>Distribution limit: N-Mt Warning National Park. S-South of Eden.</i>	No	Sub-Optimal	2	0	Low	No
Southern Brown Bandicoot <i>Isodon obesulus</i> DPE EPBC	E	E	Utilises a range of habitats containing thick ground cover - open forest, woodland, heath, cleared land, urbanised areas and regenerating bushland. <i>Distribution limit: N-Kempsey. S-South of Eden.</i>	No	Sub-Optimal	0	0	Low	No
Koala <i>Phascolarctos cinereus</i> DPE EPBC	V	V	Inhabits both wet and dry eucalypt forest on high nutrient soils containing preferred feed trees. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Sub-Optimal	4	0	Low	No
Yellow-bellied Glider <i>Petaurus australis</i>	V	-	Tall mature eucalypt forests with high nectar producing species and hollow bearing trees. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	No	Sub-Optimal	0	0	Low	No

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site			Considered in test of significance (y/n) Refer to Appendix 3	
					Suitable habitat present	# records within 10km	# records within ~500m in previous 20 years		Potential to occur
DPE									
Southern Greater Glider <i>Petauroides volans</i> EPBC	-	V	Favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. Population density is optimal at elevation levels at 845 m above sea level. Prefer overstorey basal areas in old-growth tree stands. Highest abundance typically in taller, montane, moist eucalypt forests, with relatively old trees and abundant hollows <i>Distribution limit: N-Border Ranges National Park. S- South of Eden.</i>	No	Sub-Optimal	1	0	Low	No
Parma Wallaby <i>Macropus parma</i> DPE	V	-	Inhabits rainforests and wet and dry sclerophyll forests with a dense understorey and associated grassy patches. <i>Distribution limit: N-Border Ranges National Park. S-Morton National Park.</i>	No	Sub-Optimal	0	0	Low	No
Brush-tailed Rock-wallaby <i>Petrogale penicillata</i> DPE EPBC	E	V	Found in rocky gorges with a vegetation of rainforest or open forests to isolated rocky outcrops in semi-arid woodland country. <i>Distribution limit: N-North of Tenterfield. S-Bombala.</i>	No	Sub-Optimal	0	0	Low	No
Grey-headed Flying-fox <i>Pteropus poliocephalus</i> DPE EPBC	V	V	Found in a variety of habitats including rainforest, mangroves, paperbark swamp, wet and dry open forest and cultivated areas. Forms camps commonly found in gullies and in vegetation with a dense canopy. <i>Distribution limit: N-Tweed Heads. S-Eden.</i>	No	Optimal (Foraging Only)	862	3	High	Yes
Yellow-bellied Sheath-tail-bat <i>Saccolaimus flaviventris</i> DPE	V	-	Rainforests, sclerophyll forests and woodlands. <i>Distribution limit: N-North of Walgett. S-Sydney.</i>	No	Sub-Optimal	12	0	Low	No

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 10km	# records within ~500m in previous 20 years	Potential to occur	
Eastern Coastal Free-tailed Bat <i>Micronomus norfolkensis</i> DPE	V	-	Inhabits open forests and woodlands foraging above the canopy and along the edge of forests. Roosts in tree hollows, under bark and buildings. <i>Distribution limit: N-Woodenbong. S-Pambula.</i>	No	Optimal	11	0	Moderate	Yes
Large-eared Pied Bat <i>Chalinolobus dwyeri</i> DPE EPBC	V	V	Warm-temperate to subtropical dry sclerophyll forest and woodland. Roosts in caves, tunnels and tree hollows in colonies of up to 30 animals. <i>Distribution limit: N-Border Ranges National Park. S-Wollongong.</i>	No	Sub-Optimal	2	0	Low	No
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i> DPE	V	-	Recorded roosting in caves, old buildings and tree hollows. <i>Distribution limit: N-Border Ranges National Park. S-Pambula.</i>	No	Sub-Optimal	11	0	Low	No
Little Bent-winged Bat <i>Miniopterus australis</i> DPE EPBC	V	-	Roosts in caves, old buildings and structures in the higher rainfall forests along the south coast of Australia. <i>Distribution limit: N-Border Ranges National Park. S-Sydney.</i>	No	Sub-Optimal	8	0	Low	No
Large Bent-winged Bat <i>Miniopterus orianae oceanensis</i> DPE EPBC	V	-	Prefers areas where there are caves, old mines, old buildings, stormwater drains and well-timbered areas. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	No	Sub-Optimal	75	1	High	Yes
Southern Myotis <i>Myotis macropus</i> DPE	V	-	Roosts in caves, mines, tunnels, buildings, tree hollows and under bridges. Forages over open water. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	No	Optimal (Foraging Only)	45	0	High	Yes

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 10km	# records within ~500m in previous 20 years	Potential to occur	
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i> DPE	V	-	Inhabits areas containing moist river and creek systems, especially tree lined creeks. <i>Distribution limit: N-Border Ranges National Park. S-Pambula.</i>	No	Optimal (Foraging Only)	6	0	Moderate	Yes
New Holland Mouse <i>Pseudomys novaehollandiae</i> EPBC	-	V	Occurs in heathlands, woodlands, open forest and paperbark swamps and on sandy, loamy or rocky soils. Coastal populations have a marked preference for sandy substrates, a heathy understorey of leguminous shrubs less than 1 m high and sparse ground litter. Recolonise of regenerating burnt areas. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	No	Sub-Optimal	0	0	Low	No
Cumberland Plain Land Snail <i>Meridolum corneovirens</i> DPE EPBC	E	-	Inhabits remnant eucalypt woodland of the Cumberland Plan. Shelters under logs, debris, clumps of grass, around base of trees and burrowing into loose soil. <i>Distribution limit: Cumberland Plain of Sydney Basin Bioregion.</i>	No	Sub-Optimal	1	0	Low	No
Dural Land Snail <i>Pommerhelix duralensis</i> DPE EPBC	E	E	Occurs on shale-sandstone transitional forest landscapes within the Blue Mountains, Penrith, The Hills, Wollondilly, Hornsby and Parramatta LGA's. Occurs in low abundance and shelters under rocks or inside curled-up bark, beneath leaves and light woody debris. <i>Distribution limit: St Albans to Mulgoa with most records from The Hills LGA.</i>	No	Sub-Optimal	38	0	Low	Yes
DPE	- Denotes BC Act listed species within 10 km of the development footprint on the <i>Bionet Atlas of NSW Wildlife</i>								
EPBC	- Denotes EPBC Act listed species within 5 km of the development footprint in the <i>Protected Matters Search Tool (PMST)</i>								
TBE	- Denotes additional species considered by <i>Travers bushfire & ecology</i> to have potential habitat based on regional knowledge and other records								
V	- Denotes vulnerable listed species under the relevant Act								
E or E1	- Denotes endangered listed species under the relevant Act								

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 10km	# records within ~500m in previous 20 years	Potential to occur	
E4a or CE	- Denotes critically endangered listed species under the relevant Act								
No or Low potential to occur	These categories represent an “unlikely” chance of occurrence and are therefore not included in the test of significance.								
Moderate or High potential to occur	These categories represent an at least somewhat “likely” chance of occurrence and are therefore included in the test of significance.								

A detailed assessment in accordance with Section 1.7 of the *EPA Act* will be completed for these species in Appendix 3 of this report.

Table 13 provides an assessment of potential habitat within the study area for nationally *protected* migratory fauna species recorded within 10 km on the *EPBC Act* Protected Matters Tool.

Table 13 – Protected migratory bird habitat assessment (Appendix 2)

Common name <i>Scientific name</i>	Preferred habitat Migratory breeding	Suitable habitat present (✓)	Recorded on site (✓)	Comments
White-bellied Sea Eagle (<i>Haliaeetus leucogaster</i>)	Found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands. Presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats. Mostly recorded in coastal lowlands, but can occupy habitats up to 1400 m above sea level on the Northern Tablelands of NSW. Has been recorded at or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, saltmarsh and sewage ponds. Also occur at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Breeding has been recorded on the coast, at inland sites, and on offshore islands. Breeding territories are located close to water, and mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest (including rainforest), closed scrub or in remnant trees on cleared land.	✓	✓	See Appendix 3 for assessment.

Common name Scientific name	Preferred habitat Migratory breeding	Suitable habitat present (✓)	Recorded on site (✓)	Comments
Osprey (<i>Pandion haliaetus</i>)	Occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes. They exhibit a preference for coastal cliffs and elevated islands in some parts of their range, but may also occur on low sandy, muddy or rocky shores and over coral cays. They may occur over atypical habitats such as heath, woodland or forest when travelling to and from foraging sites. Eastern Ospreys occur sympatrically and sometimes interact with White-bellied Sea-Eagles.	x	x	-
White-throated Needletail (<i>Hirundapus caudacutus</i>)	Airspace over forests, woodlands, farmlands, plains, lakes, coasts, towns; companies often forage along favoured hilltops and timbered ranges. Breeds Siberia, Himalayas, east to Japan. Summer migrant to eastern Australia.	x	x	-
Painted Snipe (<i>Rostratula australis</i>)	Generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum or canegrass or sometimes tea-tree. The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber. Breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover. Has also been recorded nesting in and near swamps, canegrass swamps, flooded areas including samphire, grazing land, among cumbungi, sedges, grasses, salt water couch (<i>Paspalum</i>), saltbush (<i>Halosarcia</i>) and grass, also in ground cover of water-buttons and grasses, at the base of tussocks and under low saltbush.	x	x	-

Common name Scientific name	Preferred habitat Migratory breeding	Suitable habitat present (✓)	Recorded on site (✓)	Comments
Latham's Snipe (<i>Gallinago hardwickii</i>)	Soft wet ground or shallow water with tussocks and other green or dead growth; wet parts of paddocks; seepage below dams; irrigated areas; scrub or open woodland from sea-level to alpine bogs over 2,000m; samphire on saltmarshes; mangrove fringes. <i>Breeds Japan. Regular summer migrant to Australia. Some overwinter.</i>	x	x	-
Bar-tailed Godwit (<i>Limosa lapponica</i>)	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh.	x	x	-
Black-tailed Godwit (<i>Limosa limosa</i>)	Primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets. The use of habitat often depends on the stage of the tide. It is also found in shallow and sparsely vegetated, near-coastal, wetlands; such as saltmarsh, saltflats, river pools, swamps, lagoons and floodplains. There are a few inland records, around shallow, freshwater and saline lakes, swamps, dams and bore-overflows. They also use lagoons in sewage farms and saltworks	x	x	-
Red Knot (<i>Calidris canutus</i>)	Intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps.	x	x	-
Great Knot (<i>Calidris tenuirostris</i>)	Prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, saltlakes and non-tidal lagoons. The Great Knot rarely occurs on inland lakes and swamps.	x	x	-

Common name Scientific name	Preferred habitat Migratory breeding	Suitable habitat present (✓)	Recorded on site (✓)	Comments
Common Greenshank (<i>Tringa nebularia</i>)	Found in a wide variety of inland wetlands and sheltered coastal habitats (with large mudflats and saltmarsh, mangroves or seagrass) of varying salinity. Habitats include embayments, harbours, river estuaries, deltas and lagoons. It uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. Also artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. In NSW the Hunter River estuary has been identified as a site of international importance. <i>Breeds in Eurasia, the northern British Isles, Scandinavia, east Estonia and north-east Belarus, through Russia and east.</i>	x	x	-
Curlew Sandpiper (<i>Calidris ferruginea</i>)	Mainly coastal, but many inland feeding along tidal mudflats, salt marsh, salt fields, fresh, brackish or saline wetlands and sewerage ponds. <i>Distribution Limit: N-Tweed Heads. S-South of Eden.</i>	x	x	-
Sharp-tailed Sandpiper (<i>Calidris acuminata</i>)	Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgeland and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves.	✓	x	-
Ruddy Turnstone (<i>Arenaria interpres</i>)	Found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral. It has occasionally been sighted in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats.	x	x	-
Lesser Sand Plover (<i>Charadrius mongolus</i>)	Occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves. Also inhabits saltworks and near-coastal saltpans, brackish swamps and sandy or silt islands in river beds. Seldom recorded away from the coast, at margins of lakes, soaks and swamps associated with artesian bores.	x	x	-

Common name Scientific name	Preferred habitat Migratory breeding	Suitable habitat present (✓)	Recorded on site (✓)	Comments
Eastern Curlew <i>(Numenius madagascariensis)</i>	Primarily coastal especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. Often recorded among saltmarsh and on mudflats fringed by mangroves and also in coastal saltworks and sewage farms. <i>Distribution Limit: N-Tweed Heads. S-South of Eden.</i>	x	x	-

Appendix 3. Test of Significance

Flora and fauna survey and habitat assessments of the study area have resulted in the identification of suitable habitat for the following threatened biodiversity that was recorded present or considered otherwise with varying potential to occur. The potential for any direct or indirect impacts on species has been considered and noted.

Table 14 – Threatened flora impact summary (Appendix 3)

Scientific name	BC Act	Potential to occur	Potential habitat impact
<i>Wilsonia backhousei</i>	V	Low	Indirect impact of <0.1 ha of potential habitat

Table 15 – Threatened fauna impact summary (Appendix 3)

Common name	BC Act	Potential to occur	Potential habitat impact
White-bellied Sea Eagle	V	high	None anticipated
Grey-headed Flying-fox	V	high	Direct – on potential foraging
Large Bent-winged Bat	V	high	Direct – on potential foraging
Southern Myotis	V	high	Direct – on potential foraging
Black Bittern	V	moderate	Direct – on potential foraging
Eastern Coastal Free-tailed Bat	V	Moderate	Direct – on potential foraging
White-fronted Chat	V	moderate	Direct – on low potential foraging
Greater Broad-nosed Bat	V	moderate	Direct – on potential foraging

Endangered populations

There is one (1) known endangered fauna population within the City of Parramatta, the White-fronted Chat population in the Sydney Metropolitan Catchment Management Area.

From the Scientific Committee's final determination, point 4 - Two (2) isolated sub-populations of White-fronted Chats are currently known from the Sydney Metropolitan Catchment Management Authority area; one at Newington Nature Reserve on the Parramatta River and one at Towra Point Nature Reserve in Botany Bay. These sub-populations are separated from each other by 25 km of urbanised land, across which White-fronted Chats are unlikely to fly. They are isolated by even greater distances from the nearest extant populations outside the Sydney Metropolitan Catchment Management Authority area, at Ash Island north of Newcastle and Lake Illawarra, south of Wollongong. The last records of White-fronted Chats at Penrith Lakes (2001), Hawkesbury Swamps (2002), Tuggerah Lake (1997) and Lake Macquarie (1998) have not been repeated in recent years (Alan Morris, pers comm. 2009).

The study area is located approximately 6 km from the known sub-population of Newington and approximately 43 km from the Towra Point sub-population. Newington Nature Reserve spans approximately 50 ha encompassing 14 ha of saltmarsh bordered by mangroves

(Saintilan and Rogers, 2008). The White-fronted Chat relies on salt marsh and other damp areas with low vegetation.

Samphire Saltmarsh occupies a small portion of the southwest corner of the site and extends into larger patches within Baludarii Wetlands however none of this vegetation community will be impacted by the proposal.

Whilst the study is in close proximity to the Newington sub-population, given suitable habitat including Samphire Saltmarsh will be conserved, it is not expected that the future development of the site will not likely have any significant impact upon the endangered population.

Threatened ecological communities

- Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

BC ACT 2016 - SECTION 7.3

TEST OF SIGNIFICANCE

As outlined in Section 7.2 of the *BC Act* development or an activity is *likely to significantly affect threatened species* if:

- (a) It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in Section 7.3, or
- (b) The development exceeds the threshold if the BOS applies to the impacts of the development on biodiversity values, or
- (c) It is carried out in a declared area of outstanding biodiversity value.

With respect to (a) above, and outlined in Section 7.3 of the *BC Act*, the following *test of significance* is a set of five main considerations, with sub-considerations for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats.

- (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,**

The direct and indirect impacts of the proposal are considered within Section 5.6.

With consideration to the relative direct and indirect impacts on all threatened species with varying potential to occur, it is considered that the proposal is unlikely to disrupt the life cycle for any of these listed species such that a viable local population would be placed at risk of extinction. Species recorded present during survey, previously recorded nearby or with high potential to occur and requiring further discussion given potential impacts are further discussed in detail below.

Summary of threatened species recorded or potential to occur

Wilsonia backhousei

Narrow-leafed *Wilsonia* is a perennial, sprawling, matted shrub less than 15cm tall. The narrow pointed, dark green, stalkless leaves are succulent and less than 20 mm long. This species occurs as a species of the margins of salt marshes and lakes. In NSW the Narrow-leafed *Wilsonia* is found on the coast between Mimosa Rocks National Park and Wamberal north of

Sydney (Nelson's Lake, Potato Point, Sussex Inlet, Wowly Gully, Parramatta River at Ermington, Clovelly, Voyager Point, Wollongong and Royal National Park). It grows in all Southern States.

The nearest recorded specimen is approximately 2.77 km to the west. Due to the proximity of nearest recorded specimen and lifecycle of this species, it is considered to have low potential of occurring within the study area.

White-bellied Sea Eagle

The White-bellied Sea-Eagle is mostly recorded in coastal lowlands, but can occupy habitats up to 1400 m above sea level on the Northern Tablelands of NSW. It also extends inland along some of the larger waterways, especially in eastern Australia. Habitats occupied are characterised by the presence of large areas of open water (larger rivers, freshwater swamps, lakes, billabongs, reservoirs, but also saltmarsh and sewage ponds). They also occur at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves. Birds have been recorded in (or flying over) a variety of terrestrial habitats including coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas.

Breeding territories are located close to water, and mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest (including rainforest), closed scrub or in remnant trees on cleared land. The breeding season extends from June to January and the nest is a large structure composed of sticks and lined with leaves, grass or seaweed. Pairs usually return to the same breeding territory each year, and often the same nest, although territories tend to contain one or two additional, less developed nests. Breeding pairs tend to be widely dispersed, and are generally separated by distances of several kilometres or more.

Breeding adult birds are generally sedentary, although they forage over large areas and are capable of undertaking long-distance movements. Each pair defends a breeding territory (primarily against other sea-eagles, particularly immature birds, and Wedge-tailed Eagles), which consists of a small area around the nest. Home ranges occupied by the White-bellied Sea-Eagle can be up to 100 km². Within these home ranges, breeding territories are typically located close to bodies of water.

The White-bellied Sea-Eagle feeds opportunistically on a variety of fish, birds, reptiles, mammals and crustaceans, and on carrion and offal. It hunts its prey from a perch, or whilst in flight (by circling slowly, or by sailing along 10–20 m above the shore). When a prey item is located, the sea-eagle usually launches into a dive or shallow glide to snatch its prey, usually in one foot, from the ground or water surface. Prey is usually carried to a feeding platform or (if small) consumed in flight, but some items are eaten on the ground.

The main threats to the White-bellied Sea-Eagle are the loss of habitat due to land development, and the disturbance of nesting pairs by human activity. The White-bellied Sea-Eagle is sensitive to disturbance when nesting, especially during the early stages of the breeding season, and may desert nests and young if confronted by humans or exposed to human activity. The disturbance of nesting pairs by human activity can thus lower breeding success, and has been associated with some local population declines.

The White-bellied Sea Eagle was not recorded 2024 survey. Given White-bellied Sea Eagle preference to nest on high vantage points, It is not expected that the low-lying exotic vegetation to be removed will contribute to any potential breeding habitat given the vast presence of highly suitable breeding habitat including mature emergent trees lining the Parramatta River and in surrounding vegetated landscapes.

Grey-headed Flying-fox

Grey-Headed Flying-foxes are canopy feeding frugivores and nectarivores, inhabiting a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas. This species roosts in camps, which may contain tens of thousands of individuals.

Camps are commonly formed in gullies, typically not far from water and usually in vegetation with a dense canopy (Tidemann 1998). Camps can be found in riparian rainforest patches, Melaleuca stands, mangroves, riparian woodland or modified vegetation in urban areas. Loyalty to a site is high and some camps in NSW have been used for over a century (NSW NPWS 2001). Some camps are used at the same time every year by hundreds of thousands of flying-foxes while others are used sporadically by a few hundred individuals (Strahan 1995). Generally foraging is within 20km of camps but individuals are known to commute up to 50km to a productive food source.

It is considered that the study area provides suitable foraging habitat for the Grey-headed Flying-fox. Areas of foraging habitat will be removed wherever mature flowering trees are removed including exotic flowering vegetation.

No Grey-headed Flying-fox was recorded in subject site during survey however within a 10km radius there have been 862 recorded observations. There is no likelihood of this species utilising the site for roosting and subsequent breeding habitat.

As foraging habitat will remain consistent within the locality specifically planted vegetation, and the proposal will not impact on the breeding biology of the local occurring population it is concluded that there will be no likely significant impact on the Grey-head Flying-fox as a result of the proposal.

Large Bent-winged Bat

The life cycle of the Large Bent-winged Bat can be divided into three main components; maternity roosts, over-winter roosts, and foraging habitat (Churchill 2008, Mills 2021, OEH 2023).

Maternity Roosts:

The Large Bent-winged Bat forms discrete populations centred on a maternity roost that is used annually from approximately October to March (Churchill 2008, OEH 2023). These maternity roosts are occupied by up to 100,000 females for the birth and rearing of their young (Churchill 2008, OEH 2023). There are only 12 maternity roosts known throughout the species' complete range (Hoy & Hall 2008) and only 3 known maternity roosts within NSW (Mills 2021). Caves are an important resource for this species, particularly for breeding where maternity caves must have suitable temperature, humidity and physical dimensions to permit breeding (Dwyer 1995). The subject land in Parramatta, NSW does not contain any habitat features that are suitable for use as a maternity roost such as caves or mines. Therefore, the proposed development would not directly impact a maternity roost site.

Over-winter Roosts:

During the colder months (approximately April to September), populations of Large Bent-winged Bats disperse from maternity roosts to over-winter roosts within a range of up to ~300 km (OEH 2023). A key function of over-winter roosts is to provide suitable conditions for mating. Female bats store the male's sperm until summer at the maternity roost. The species has been recorded using urban areas, including parts of the greater Sydney region, for over-

winter roosting (White 2011). Known roosting habitat includes derelict mines, storm-water tunnels, road culverts, buildings and other man-made structures (Churchill 2008, OEH 2023). Roost sites in tree hollows have not been reported within the literature reviewed. The subject land in Parramatta, NSW does not contain abandoned, derelict buildings that provide potential over-winter roosting habitat. However, these buildings are situated on busy, well-lit streets with occupied buildings on either side of them and limited foraging habitat within the locality. The buildings also seem to be made from materials that would not provide an ideal microclimate for mating. It is considered that the combination of these factors makes it unlikely that the buildings are used as an over-winter roost. Therefore, the proposed development would not likely disrupt over-winter roosting sites.

Foraging habitat:

The Large Bent-winged Bat utilizes a variety of habitats for foraging, including rainforests, dry and wet sclerophyll forests, woodlands, *Melaleuca* forests and open grasslands (Churchill 2008). They typically hunt above the canopy in forested areas, catching flying insects like moths (Churchill 2008, OEH 2023). Although, Large Bent-winged Bat has been recorded foraging low in open grasslands habitat (Churchill 2008). They can fly 10 kilometres or more when foraging (Hoye and Hall 2008). The small amount of vegetation in Parramatta, NSW primarily consists of primarily exotic vegetation and scattered native trees with no understorey. It is, therefore, considered unlikely that the development would significantly impact the foraging opportunities for the species, especially considering the large foraging range of the species.

Considering the absence of suitable maternity roost habitat, limited foraging opportunities on the subject land, and the unlikelihood of the abandoned buildings in the locality being used as over-winter roosts, the Parramatta proposed development is considered unlikely to have an adverse effect on the life cycle of Large Bent-winged Bat such that a viable local population of the species will be placed at risk of extinction.

Greater Broad-nosed Bat, Eastern Coastal Free-tailed Bat & Southern Myotis

These three microbats are considered here together given their similar dependence on hollows, albeit different in microhabitat requirements, and therefore their similar assessment outcome.

The Greater Broad-nosed Bat inhabits a variety of habitats including moist gullies in mature coastal forest, rainforest, open woodland, *Melaleuca* swamp woodland, wet and dry sclerophyll forests, cleared paddocks with remnant trees and tree lined creeks in open areas (Churchill 2008). The Greater Broad-nosed Bat predominantly forages within open forest, woodlands, along vegetated creek lines and small river systems (Hoye and Richards 1995). This species roost in tree hollows, cracks and fissures in trunks and dead branches, under exfoliating bark as well as the roof of old buildings (Churchill 2008, Hoye & Richards 1995). The Greater Broad-nosed Bat feeds on large slow flying beetles and moths (Dwyer 1965; Vestjens and Hall 1977). This species is a slow flier and generally hunts for insects over understorey vegetation as well as foraging along the interface of clearings and paddocks with forested areas and along tree-lined creeks (Richards 1988).

The Eastern Coastal Free-tailed Bat forages above the canopy of open forests and woodlands and in clearings at forest edges, feeding on small insects (Allison, Hoye & Law 2008). This species is thought to roost predominantly in tree hollows but also under loose bark and occasionally in houses and outbuildings (Allison, Hoye & Law 2008). Until recent findings of a roost within mangroves, all known natural roosts had occurred within hollow spouts of large mature eucalypts. The species is often found close to dams and waterholes. The Eastern

Coastal Free-tailed Bat species will utilise paddock trees and isolated remnant vegetation when in proximity to larger forest remnants (Allison, Hoyer & Law 2008).

The Southern Myotis inhabits rainforests and open forests containing creeks and lakes over which it feeds and roosts in tree hollows, caves, mines, under bridges, in tunnels and occasionally buildings (Richards 1995). The Southern Myotis predominantly forages along creek lines and over waterbodies where it takes insects and small fish from on and just below the water surface (Richards 1995).

This species has a strong association with streams and permanent waterways, most frequently at low elevations and in flat or undulating country and usually in areas that are vegetated rather than cleared. They will live in most habitat types as long as it is near water (Churchill 2008).

No ultrasonic recording was undertaken during 2024 survey.

It is considered that the development footprint provides potentially suitable roosting and foraging habitat for the Eastern Coastal Free-tailed Bat, Southern Myotis and Greater Broad-nosed Bat. This is based on the presence of artificial structures including the existing walkway beyond the southern boundary of the property and an exposed concrete slab to the east of the property however, no hollows were documented during survey.

The TBDC also notes that Southern Myotis it is dependent on waterways with pools of 3m wide or greater for foraging. These habitat features are present within the subject area and immediate surrounds.

These three species are known to utilise artificial roost boxes, and as such the installation of nest boxes in the surrounding environment particularly within the retained vegetation along the southern boundary of the property. may encourage additional roosting opportunities for any hollow-dependant microbat species, including the threatened Eastern Coastal Free-tailed Bat, Southern Myotis and Greater Broad-nosed Bat. Furthermore, nest box installation will enhance the existing roosting habitat, contributing to their conservation and population stability.

Given that no suitable roosting habitat is being impacted by the proposal and the implementation of recommended mitigation measures if administered the proposed development will not likely have an adverse effect on the life cycle of Eastern Coastal Free-tailed Bat, Southern Myotis and Greater Broad-nosed Bat. such that a viable local population of the species will be placed at risk of extinction.

White-fronted Chat

The White-fronted Chat is a small passerine bird found in the southern regions of Australia, extending from southernmost Queensland to southern Tasmania and westward to Western Australia as far north as Carnarvon. This species predominantly inhabits temperate to arid climates, with rare occurrences in sub-tropical areas, typically occupying foothills and lowlands up to 1000 m above sea level.

In New South Wales (NSW), its presence is primarily concentrated in the southern half of the state, favoring damp open habitats along the coast and areas adjacent to waterways in the western region. Along the coastline, it predominantly occupies saltmarsh vegetation but can also be found in open grasslands and occasionally in low shrubs bordering wetland areas.

Within the Sydney Metropolitan Catchment Management Authority (CMA) area, two isolated sub-populations of White-fronted Chats have been identified, one located at Newington Nature

Reserve on the Parramatta River and the other at Towra Point Nature Reserve in Botany Bay. These sub-populations are separated by approximately 25 km of urbanized land, a distance considered unlikely for the Chats to traverse.

The nearest extant populations outside the Sydney Metropolitan CMA are situated at Ash Island north of Newcastle and Lake Illawarra, south of Wollongong. Historical records indicate previous sightings of White-fronted Chats at Penrith Lakes (2001), Hawkesbury Swamps (2002), Tuggerah Lake (1997), and Lake Macquarie (1998). across the southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. (Department of the Environment (2024) in Species Profile and Threats Database, Department of the Environment, Canberra).

The study area is located approximately 6 km from the known sub-population of Newington and approximately 43 km from the Towra Point sub-population. Newington Nature Reserve spans approximately 50 ha encompassing 14 ha of saltmarsh bordered by mangroves (Saintilan and Rogers, 2008). The White-fronted Chat relies on salt marsh and other damp areas with low vegetation.

Samphire Saltmarsh occupies a small portion of the southwest corner of the site and extends into larger patches within Baludarii Wetlands however none of this vegetation community will be impacted by the proposal.

Whilst the study is in close proximity to the Newington sub-population, given suitable habitat including Samphire Saltmarsh will be conserved, it is not expected that the future development of the site will not likely have any significant impact upon the endangered population.

Black Bittern

The Black Bittern inhabits freshwater and brackish wetlands, ponds and streams with tall dense reed beds (Lindsey 1992). They usually forage at the edge of running or still water, usually in permanent wetlands fringed by dense vegetation (Marchant & Higgins (Eds) 1998). In NSW the Black Bittern occurs coastally south to Sydney and then rarely to near the Victorian border and occasionally inland (Marchant & Higgins (Eds) 1998). A number of sightings have also been recorded inland of Lake Macquarie, Tuggerah Lakes and Gosford.

Whilst considered with a moderate potential to occur within the study area, given that no suitable habitat specifically wetland habitat along the southern boundary of the subject site the proposed development will not likely have an adverse effect on the life cycle of the Black Bittern such that a viable local population of the species will be placed at risk of extinction.

(b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

i. 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

One (1) TEC – Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregion – were observed within the site. While the proposal is unlikely to require the direct removal of the community the proposal will likely indirectly impact on the community through runoff associated with stormwater. Appropriate design from a suitably qualified stormwater engineer and mitigation measures will ensure that there is no adverse effects to the community in the locality. There is already existing development that will be replaced with new development in almost the same location, but at a higher density. There is a buffer of almost 40m between the development and the existing Coastal Saltmarsh, with a buffer of planted native vegetation between.

It is therefore considered that the proposed development is unlikely 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.

ii. 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,

The *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregion* is not directly impacted by the proposal. As such, it is unlikely that the proposed development will adversely modify the composition of the community such that its local occurrence is likely to be placed at risk of extinction.

It is recommended that species utilised for landscape plantings of the proposal are commensurate with the TEC to ensure no garden escapees establish within the community to prevent modification and composition to the community. It is also recommended that sediment fencing is to be installed for the duration construction in compliance with Soils & construction Managing Urban Stormwater (Landcom 2004) to prevent downhill effects to the community.

(c) In relation to the habitat of threatened species or ecological community:

It is considered that the habitat attributes of the development footprint provide known or potential habitat for *Wilsonia backhousei*, *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions*, White-bellied Sea Eagle, Grey-headed Flying-fox, Large Bent-winged Bat, Southern Myotis, Black Bittern, Eastern Coastal Free-tailed Bat, White-fronted Chat and Greater Broad-nosed Bat.

i. The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

The development footprint has an impact area of 0.22 ha, which comprises approximately 0.27 ha of exotic vegetation. The proposed development is likely to indirectly impact 0.18 ha of Regenerated Native Vegetation, 0.003ha of planted native vegetation and 0.1 ha of native vegetation as a result of the proposed development, which provides habitat for the aforementioned species.

ii. 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 development footprint is predominantly exotic vegetation with adjoining planted native vegetation and PCT 4097 Sapphire Saltmarsh. The site is fragmented by James Ruse Drive to the east, Thomas Street to the north and the Parramatta River to the south. The site is connected to a patch of vegetation covering approximately 3.45 ha.

The proposal has been designed to be located predominantly within the existing cleared areas of the site as well as within the vegetation that is considered exotic. The proposal will not fragment or isolate currently connected areas of habitat.

Therefore, it is considered that known habitat for a threatened species, population or ecological community within the local area and region is unlikely to become isolated or fragmented as a result of the proposal.

iii. 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

In respect to threatened fauna species recorded or with potential to occur the proposed area of impact is not likely of high quality, of any breeding importance or central to the home range requirements of any species such that behaviour or ecology of these species will be significantly altered in any way.

In respect to threatened flora species with potential to occur within the site, the proposed area of impact is considered unlikely to support potential habitat for those species considered as this area is considered to be exotic vegetation and would likely not support these species due to current land management practices, such that it will impact the long-term survival of the species.

The proposal will not impact directly on the Coastal Saltmarsh and given the retention of this community and the extent of occurrence of similar vegetation adjoining the development footprint, the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species and ecological community in the locality is considered to be minimal.

(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 development footprint is not within any declared area of outstanding biodiversity value. Therefore, the proposal will not have any adverse effects on any declared area of outstanding biodiversity value (either directly or indirectly).

(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.

A key threatening process is defined as a process that threatens, or could threaten, the survival or evolutionary development of species, populations or ecological communities.

The current list of key threatening processes, and whether the proposed activity is recognised as a threatening process, is shown below.

Table 16 – Key threatening processes (Appendix 3)

Listed key threatening process	Development a threatening process?		
	Likely	Possible	Unlikely
Aggressive exclusion of birds by Noisy Miners (<i>Manorina melanocephala</i>)	✓		
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands		✓	
Anthropogenic Climate Change			✓
Bushrock removal			✓
Clearing of native vegetation			✓
Competition and habitat degradation by feral goats			✓

Listed key threatening process	Development a threatening process?		
Competition and grazing by the feral European Rabbit (<i>Oryctolagus cuniculus</i>)			✓
Competition from feral honeybees			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in, or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners			✓
High frequency fire resulting in the disruption of life-cycle processes in plants and animals and loss of vegetation structure and composition			✓
Herbivory and environmental degradation caused by feral deer			✓
Importation of red imported fire ants into NSW			✓
Infection by <i>Psittacine circoviral</i> (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae		✓	
Infection of native plants by <i>Phytophthora cinnamomi</i>		✓	
Introduction of the large earth bumblebee (<i>Bombus terrestris</i>)			✓
Invasion and establishment of exotic vines and scramblers	✓		
Invasion and establishment of Scotch Broom (<i>Cytisus scoparius</i>)			✓
Invasion and establishment of the Cane Toad (<i>Bufo marinus</i>)			✓
Invasion, establishment and spread of <i>Lantana camara</i>		✓	
Invasion of native plant communities by bitou bush & boneseed <i>Chrysanthemoides monilifera</i>			✓
Invasion of native plant communities by exotic perennial grasses	✓		
Invasion of native plant communities by African Olive (<i>Olea europaea</i> subsp. <i>cuspidata</i>)	✓		
Invasion of the Yellow Crazy Ant (<i>Anoplolepis gracilipes</i>)			✓
Loss of Hollow-bearing trees			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	✓		
Loss and/or degradation of sites used for hill-topping by butterflies			✓
Predation and hybridisation by feral dogs (<i>Canis lupus familiaris</i>)			✓
Predation by the European Red Fox (<i>Vulpes vulpes</i>)			✓

Listed key threatening process	Development a threatening process?		
Predation by the Feral Cat (<i>Felis catus</i>)			✓
Predation by <i>Gambusia holbrooki</i> Girard, 1859 (plague minnow or mosquito fish)			✓
Predation by the Ship Rat (<i>Rattus rattus</i>) on Lord Howe Island			✓
Predation, habitat degradation, competition & disease transmission from Feral pigs (<i>Sus scrofa</i>)			✓
Removal of dead wood and dead trees			✓

The above key threatening processes have been considered in reference to the proposal. It was considered that the proposal may contribute to a small degree to a number these processes as described below. It was not considered that the proposal will have significant impact on any of the following key threatening processes. Some mitigation measures have been listed under each process to minimise or reduce such impacts upon those processes.

Summary of “likely” or “possible” Key Threatening Processes

This section identifies what mitigation measures can be implemented to address threatening processes.

Aggressive exclusion of birds by Noisy Miners (Manorina melanocephala)

Noisy Miners have been recorded present within the study area. It is likely that Noisy Miners from within the study area may be slightly displaced as a result of habitat removal for the development, resulting in increased impacts from this species on other native birds in the nearby surrounds. Given the high degree of disturbance in the local surrounds it is expected that the Noisy Miner is already at impacting numbers in these areas.

Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands

In accordance with the Water Management Act, consideration is to be given to the impact of the proposed action on local watercourses and native vegetation riparian buffers and stormwater measures will need to be implemented in accordance with a required Controlled Activity Approval issued by the NRAR. The proposal is likely to modify and re-divert stormwater runoff from development areas (impermeable road and property surfaces) and concentrate this increased flow into Baludarii Wetlands and The Parramatta River.

Anthropogenic Climate Change

The proposal will require the removal of a small amount of vegetation which will result in a negative or positive contribution to climate change. Vegetation is considered to act as a sink for a range of greenhouse gases but in particular Carbon Dioxide. The maintenance of native vegetation cover is a key strategy to combat the contributing impacts of the proposed action on Climate Change. Increased risk of bushfire, flooding and storms are to be considered as part of the proposed action. Vegetation also acts as a heat sink, and provides important shade, particularly in urban areas. This issue requires total systems management including consideration of energy use throughout the lifecycle of the proposed action including all aspects of the actions processes, materials supply and production. Whilst almost insignificant in size, the proposal is part of the accumulative effect and thus should be considered as contributing to this threatening process.

Clearing of native vegetation

The proposal is of a class of development recognised as a threatening process. It is generally recommended that all sites should aim to achieve a maintain or improve outcome on the quality and quantity of native vegetation cover through protection and restoration measures. The vegetation management process is to be undertaken in accordance with the conditions of consent for the proposed development. The removal of native vegetation on the development footprint is not likely to significantly affect the biodiversity of the local area due to the extent of better quality natural vegetation within the local area and the small area of vegetation to be removed.

Invasion and establishment of exotic vines and scramblers

The development footprint currently contains exotic vine and scrambler species such as *Cardiospermum grandiflorum* (Morning Glory), *Araujia sericifera* (Mothvine), *Trachelospermum jasminoides* (Chinese Star Jasmine) and *Tradscantia pallida* (Purple Heart) proposed development will provide an opportunity to remove, control and possibly eradicate these species within the development footprint. This will result in a beneficial outcome by reducing the likelihood of this Key Threatening Process (KTP) from impacting on the site.

High frequency fire resulting in the disruption of life-cycle processes in plants and animals and loss of vegetation structure and composition

The proposal will result in increased human presence surrounding the local bushland interface which is a vegetation structure susceptible to fire. Increased human presence results in increased potential for ignition points for fires into the surrounding landscape.

*Infection of native plants by *Phytophthora cinnamomi**

The proposal may temporarily increase the risk of fungal infection on site as it may be spread via vehicular movement and relocation of soil and vegetation. Consequently standard *Phytophthora cinnamomi* protocol applies to the cleaning of all plant, equipment, hand tools and work boots prior to delivery onsite to ensure that there is no loose soil or vegetation material caught under or on the equipment and within the tread of vehicle tyres or tracks. Any equipment found to contain soil or vegetation material from offsite is to be cleaned in a quarantined work area or wash station and treated with fungicides prior to commencing work.

Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae

'Myrtle Rust' may be spread via machinery, animals and humans as well as by environmental factors such as wind. The presence of machinery and construction works is likely to slightly increase the potential for spread of this key threatening process. Similar protocols as to *Phytophthora cinnamomi* should be applied.

*Invasion, establishment and spread of *Lantana camara**

The site currently contains this species, however it is expected that the proposed development will provide an opportunity to remove, control and manage this species throughout the whole of the site by the application of a bushland management plan or weed control program.

*Invasion of native plant communities by African Olive (*Olea europaea* subsp. *cuspidata*)*

This species is present on the development footprint. The proposed development may provide an opportunity to ameliorate the effect of this key threatening process by the application of suitable weed control measures.

Invasion of native plant communities by exotic perennial grasses

The proposal is of a class of development recognised as a threatening process due to possible incursions of grasses such as *Cenchrus clandestinum* (Kikuyu). However the vegetation within the development footprint is of a degraded nature and the proposed development is not expected to significantly increase the prevalence of exotic perennial grasses. It is expected that the proposed development will decrease the number of exotic grass species and will provide an opportunity to manage the area with regard to weed invasion and impacts to adjoining native vegetation.

Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants

The proposal could potentially be a class of development recognised as a threatening process if invasive garden plants are utilised as part of the landscaping and allowed to spread into retained vegetation adjoining the Parramatta River. It is therefore recommended that native plant species commensurate with PCT 4097 Samphire Saltmarsh be utilised as part of the future landscaping works and weed control is applied to reduce the potential for spread and establishment of invasive garden plants.

Appendix 4. EPBC significance assessment criteria

Under the *EPBC Act* an action will require approval from the Australian Government Environment Minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance. The following significant impact criteria were sourced from the *EPBC Act* Policy Statement 1.1 (May 2006):

CRITICALLY ENDANGERED AND ENDANGERED SPECIES

Significant impact criteria

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- Lead to a long-term decrease in the size of a population;
- Reduce the area of occupancy of the species;
- Fragment an existing population into two or more populations;
- Adversely affect habitat critical to the survival of a species;
- Disrupt the breeding cycle of a population;
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- Introduce disease that may cause the species to decline; or
- Interfere with the recovery of the species.

What is a population of a species?

A 'population of a species' is defined under the *EPBC Act* as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations; or
- a population, or collection of local populations, that occurs within a particular bioregion.

What is habitat critical to the survival of a species or ecological community?

- What is habitat critical to the survival of a species or ecological community?
- 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:
 - For activities such as foraging, breeding, roosting, or dispersal;
 - For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
 - To maintain genetic diversity and long-term evolutionary development; or
 - For the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the *EPBC Act*.

VULNERABLE SPECIES

Significant impact criteria

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

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

What is an important population of a species?

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

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

CRITICALLY ENDANGERED AND ENDANGERED ECOLOGICAL COMMUNITIES

Significant impact criteria

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- Reduce the extent of an ecological community;
- Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;
- Adversely affect habitat critical to the survival of an ecological community;
- Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;
- Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;
- Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
 - assisting invasive species, that are harmful to the listed ecological community, to become established; or
 - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community; or
- Interfere with the recovery of an ecological community.

MIGRATORY SPECIES

Significant impact criteria

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

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or

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

What is important habitat for a migratory species?

An area of 'important habitat' for a migratory species is:

- a) Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- b) Habitat that is of critical importance to the species at particular life-cycle stages; and/or
- c) Habitat utilised by a migratory species which is at the limit of the species range; and/or
- d) Habitat within an area where the species is declining.

What is an ecologically significant proportion?

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness and species-specific behavioural patterns (for example, site fidelity and dispersal rates).

What is the population of a migratory species?

'Population', in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.

