



planning consultants

Review of Environmental Factors

Installation of Ecologically Sensitive Lighting

Baludarri Wetlands, Parramatta



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May 2025

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Abbreviations

AS	Australian Standard
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCA	Building Code of Australia
Council	City of Parramatta
DFP	DFP Planning Pty Limited
DPHI	NSW Department of Planning, Housing and Infrastructure
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2021</i>

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Abbreviations

EPI	Environmental Planning Instrument
LEP	Local Environmental Plan
LGA	Local Government Area
REF	Review of Environmental Factors
SEPP	State Environmental Planning Policy
SEPP TI	State Environmental Planning Policy (Transport and Infrastructure) 2021
TfNSW	Transport for NSW
WM Act	<i>Water Management Act 2000</i>

1 Introduction

1.1 Commission

DFP has been commissioned by the City of Parramatta (Council) to prepare a Review of Environmental Factors (REF) for the proposed works to Baludarri Wetlands, Parramatta, located on the northern side of the Parramatta foreshore.

This REF report assesses the potential environmental impacts which could arise from the 'Proposal' which include:

- Installation of four (4) light poles;
- New ecologically sensitive lighting to the existing shared concrete pathway and fibre-reinforced polymer (FRP) boardwalk with consideration to adjacent Baludarri Wetlands habitat;
- Entry wall lighting; and
- Minor landscaping works.

This REF also details any relevant environmental management measures that should be implemented during the carrying out of the works.

This REF has been prepared in accordance with the relevant provisions of the *Environmental Planning and Assessment Act 1979* (EP&A Act), the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) and *State Environmental Planning Policy (Transport and Infrastructure) 2021* (SEPP TI) and concludes that, by adopting the mitigation measures identified in this assessment, it is unlikely that there would be significant environmental impacts associated with the Proposal.

1.2 Background

The scope of works at Baludarri Wetlands form part of the Eastern Parramatta River and CBD Precinct Cycleway upgrades, which include George Kendall Riverside Park, Royal Shores, Reid Park and Rangihou Reserve.

This project has been given State government funding as part of the Western Sydney Infrastructure Grants Program, in association with Council.

In total, the project will deliver 2.8km worth of separated walking and cycling paths to increase the capacity, safety and accessibility of the cycling and pedestrian network along the Parramatta River foreshore. The project is planned for completion in 2027.

This REF relates only to the works within Baludarri Wetlands, with separate REF's being prepared in relation to the four (4) other locations along the foreshore.

1.3 Certification

This REF provides a true and fair review of the Proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal. The information contained in this REF is neither false nor misleading. This REF has been prepared in accordance with the relevant requirements of the EP&A Act, EP&A Regulation, and the NSW Code of Practice for Part 5 Activities.

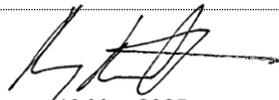
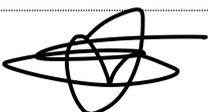
Name of the person(s) who prepared the REF:	Thomas West
Position and Qualifications of the person(s) who prepared the REF:	Senior Project Planner M.Planning Macquarie University

Signature:


Date: 19 May 2025

Name of the person(s) who reviewed the REF:	Henry Burnett
---	----------------------

1 Introduction

Position and Qualifications of the person(s) who prepared the REF:	Director B Planning Grad. Dip. Building Surveying
Signature	 Date: 19 May 2025
I have examined this REF and the Certification and accept the REF on behalf of the City of Parramatta	
Name of the Authorised Person:	Troy Holbrook
Position of the Authorised Person:	Senior Open Space & Natural Area Planner
Signature:	 Date: 21 May 2025
I accept this REF on behalf of the City of Parramatta, as the determining authority and determine that the Proposal can proceed subject to the mitigation measures being implemented	
Name of Delegated Officer:	Pino Todarello
Designation:	Natural Resources Manager
Signature:	 Date: 22 May 2025

1.4 Material Relied Upon

This REF has been prepared by DFP based on the information listed below.

Appendix 1: *Survey Plan, prepared by City of Parramatta, dated April 2025;*

Appendix 2: *Landscape Plans prepared by Capital Projects, dated 2 April 2024;*

Appendix 3: *Arborist Report prepared by Hugh The Arborist, dated 23 December 2024;*

Appendix 4: *Ecological Impact Assessment prepared by East Coast Ecology, dated 26 March 2025;*

Appendix 5: *Flood Advice prepared by City of Parramatta, dated 25 February 2025;*

Appendix 6: *Lighting Plans prepared by Webb Australia;*

Appendix 7: *Geotechnical Report prepared by Douglas Partners, dated 23 January 2025;*

Appendix 8: *Preliminary Construction Management Plan prepared by City of Parramatta;*

Appendix 9: *Heritage Impact Statement prepared by DFP Planning, dated 28 January 2025;*

Appendix 10: *AHIMS Search, dated 4 October 2024;*

Appendix 11: *Community Engagement Report, dated February 2025; and*

Appendix 12: *Mitigation Measures*

1.5 Site Context and Surrounds

1.5.1 The Site

The site is located approximately 1km to the east of the Parramatta CBD and is within the City of Parramatta Local Government Area (LGA).

The site subject to the proposed activity is known as Baludarra Wetlands and is located within the following property addresses:

1 Introduction

- Lot 5 in DP 20765;
- Lot 1 in DP 566807;
- Part Lot 13, 15, 16 & 19 in DP 1239;
- Lot 141 in DP 537053; and
- Lot 101 in DP 1189711.

A Survey of the site is included at **Appendix 1** of this REF.

The site of the proposed works is irregularly shaped. The site adjoins residential developments to the north, including a mixture of low and medium-density residential properties. To the south of the site is Parramatta River, including the Alfred Street Pedestrian and Cyclist Bridge to the south west and James Ruse Drive to the east.

Figure 1 below is a locality plan showing the site outlined in blue.

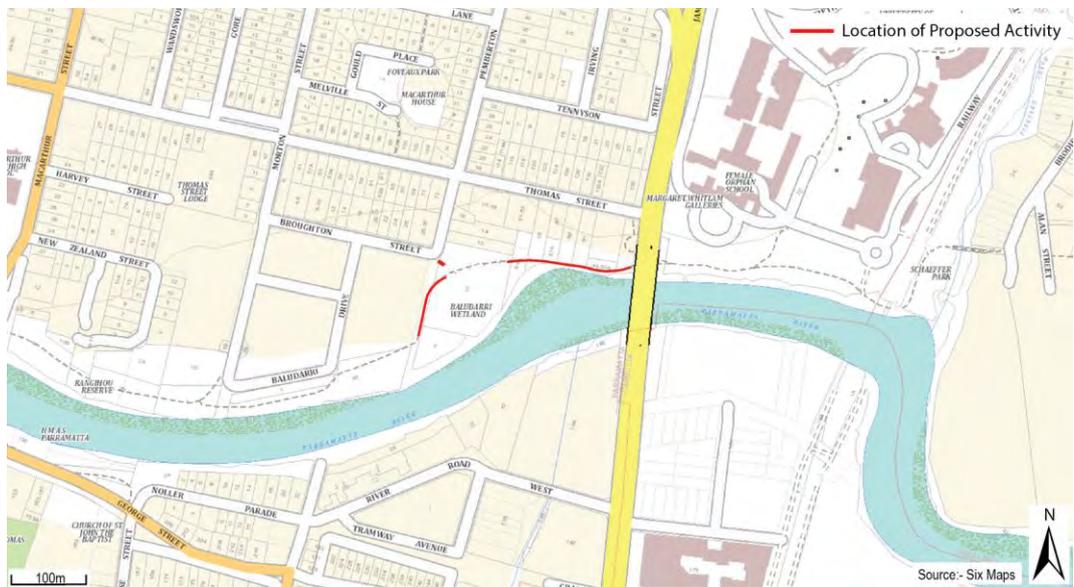


Figure 1 Site Location

Figure 2 is an aerial photograph of the site and its surrounds.



Figure 2 Aerial photograph.

1 Introduction

1.5.2 Relevant Development History

Baludarri Boardwalk

The existing Baludarri Boardwalk was constructed in 2014, having been previously approved under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and subject to a Review of Environmental Factors (REF).

These works were development permitted without consent under Division 12 of *State Environmental Planning Policy (Infrastructure) 2007* (now repealed).

The pruning of mangroves was involved as part of these works, which required a Part 7 Permit to be issued by NSW Fisheries, under the *Fisheries Management Act 1994*.

DA/344/2023

To the north of the existing boardwalk, at Nos. 85-91 Thomas Street, a development application for residential flat buildings has been submitted to Council (DA/344/2023) on 28 May 2024. That DA is for:

Demolition, tree removal and construction of 2 residential flat buildings over basement car parking with associated site and landscaping works. The application is Integrated Development pursuant to the Fisheries Management Act 1994 and Nominated Integrated Development pursuant to the Water Management Act 2000. The determining authority is the Sydney Central City Planning Panel.

The application is being re-notified due to the submission of amended plans, which includes a rooftop communal open space, and following a formal request by the applicant to defer the determination of the application by the Sydney City Central Planning Panel (SCCPP) until the amended plans have been considered.

Having regard to the latest Architectural Plans for this proposed DA, the development does not extend to within the location of the boardwalk and preserves the majority of the established vegetation to the north of the boardwalk, providing a buffer between the proposed development and the subject site.

1.5.3 Easement Agreements

Separate easement agreements were entered into in 2012 between Council and the owners of Lot 13, Lot 15 and Lot 16 DP 1239 (being 85, 89 and 91 Thomas Street, Parramatta) for a 6m wide access for the purpose of a public access and cycleway. That cycleway has since been constructed and is now operational, as shown in **Section 1.5.4** below.

1.5.4 Physical Description

The site that is the subject of the proposed works is known as Baludarri Wetlands. Having regard to the Flora and Fauna Assessment prepared by East Coast Ecology, most of the area is made up of Grey Mangrove-River Mangrove Forest, with pockets of Sydney Coastal Sandstone Gully Forest and Samphire Saltmarsh also present within the site.

The area has been subject to recent development for the purpose of constructing a boardwalk that provides a link from Parramatta to the west, through to the remainder of the eastern Parramatta River foreshore.

At present, the boardwalk does not contain lighting, which makes utilising the boardwalk for walking or pedestrian purposes difficult at night.

Figures 3 to Figure 8 are photographs of the site.

1 Introduction



Figure 3 Photograph of the existing shared path towards the east



Figure 4 Photograph of the existing boardwalk looking west



Figure 5 Photograph of the existing boardwalk looking west

1 Introduction



Figure 6 Photograph of existing shared path looking west

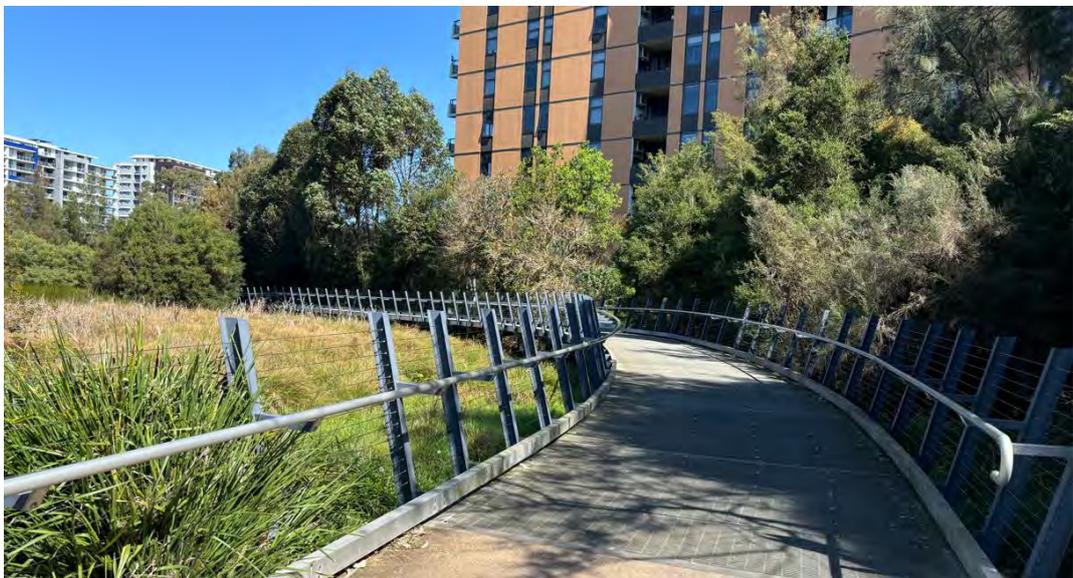


Figure 7 Photograph of existing boardwalk looking west

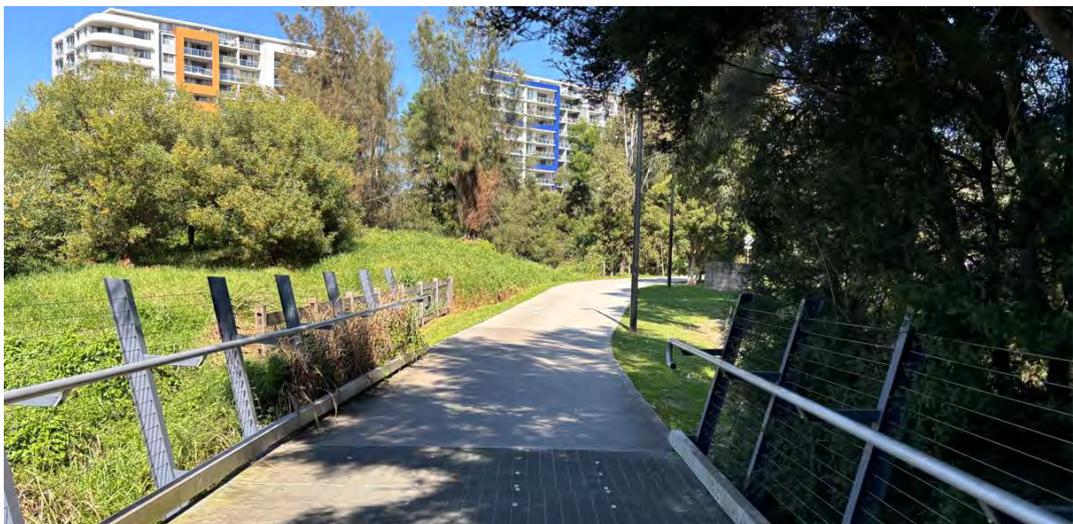


Figure 8 Photograph of existing boardwalk looking west

1 Introduction

1.5.5 Vegetation

The location of the proposed works are on an existing boardwalk that is partly located over wetlands.

There are also a variety of trees, shrubs and ground covers across the Baludarri Wetlands site. Trees located within the vicinity of the proposed works have been assessed in the Arboricultural Impact Assessment (AIA) report prepared by Hugh The Arborist (see **Appendix 3**).

The site is located within a proximity area to coastal wetlands that are along the foreshore of Parramatta River (to the south of the park).

Land south of the proposed works is mapped as comprising biodiversity values. As discussed in Section 5 of this REF, three (3) vegetation communities are located south of the proposed activity, including Sydney Coastal Sandstone Gully Forest (PCT 3595), Grey Mangrove-River Mangrove Forest (PCT 4091) and Samphire Saltmarsh (PCT 4097).

1.5.6 Surrounding Development

To the north of the site are low and medium density residential properties.

To the east of the site is James Ruse Drive. Also located to the east of the site is Western Sydney University (Parramatta campus).

To the south of the site is Parramatta River.

To the west of the site are high density residential properties. Also located to the west of the site is the Alfred Street Bridge.

2 Description of Proposed Works

2.1 Summary of Works

In summary the proposed development comprises:

- New ecologically sensitive lighting to the existing shared concrete pathway and fibre-reinforced polymer (FRP) boardwalk with consideration to adjacent Baludarri Wetlands habitat;
- Installation of four (4) light poles;
- Entry wall lighting; and
- Minor landscaping works.

The following subsections provide a more detailed description of the proposed works and should be read in conjunction with the accompanying consultant plans and reports.

2.2 Ecologically Sensitive Lighting - Handrails

Environmentally sensitive hardwired LED handrail lighting is proposed along the northern side of the existing shared boardwalk over the Baludarri Wetlands.

Currently there is no lighting along the Baludarri Wetland section of the Parramatta River Foreshore shared path. The intention is to improve the useability of this boardwalk for pedestrians and cyclists who utilise it in the evenings.

As part of the works, a new power connection point will be created from an existing Council owned and operated light pole along the south eastern corner of the site.

The location of the environmentally sensitive lighting is shown highlighted in yellow in the plan below (**Figure 9**).



Figure 9 Proposed Site Plan. Source: City of Parramatta

2.3 Proposed Light Poles – Footpath

The proposal also includes the installation of four (4) light poles between two (2) existing boardwalks. These light poles will be concrete encased and fitted within environmentally sensitive hard wired LED lights.

The poles will be placed 500mm from the edge of the shared path and separated by approximately 20m.

2 Description of Proposed Works

Details of the proposed poles are provided as part of the Lighting Plans prepared by Webb Australia (**Appendix 7**) and shown at **Figure 10** below.

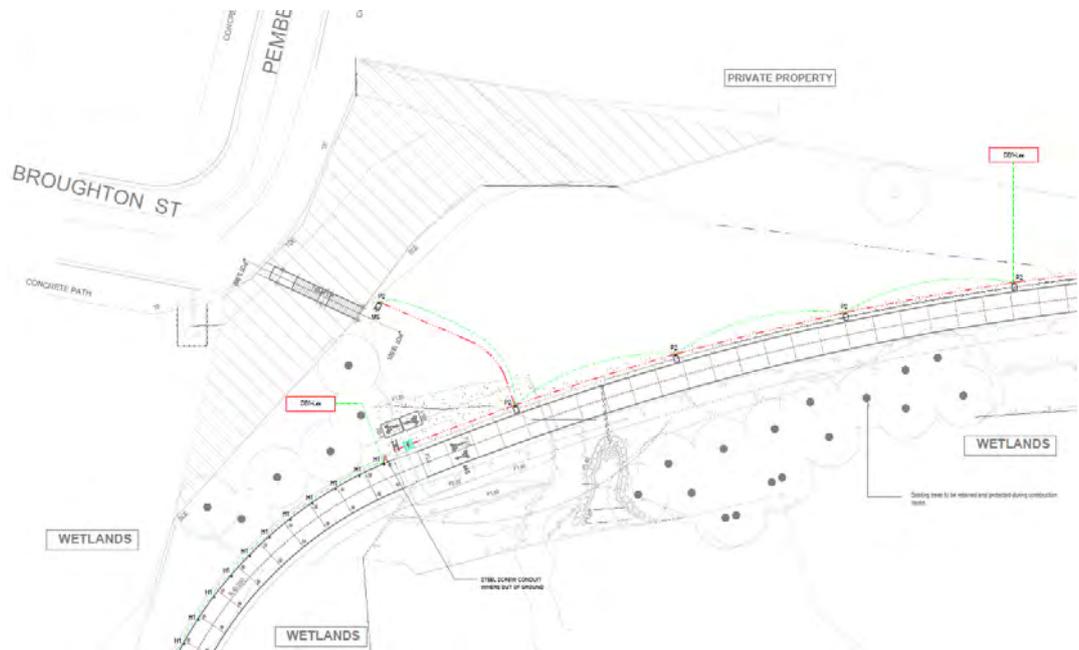
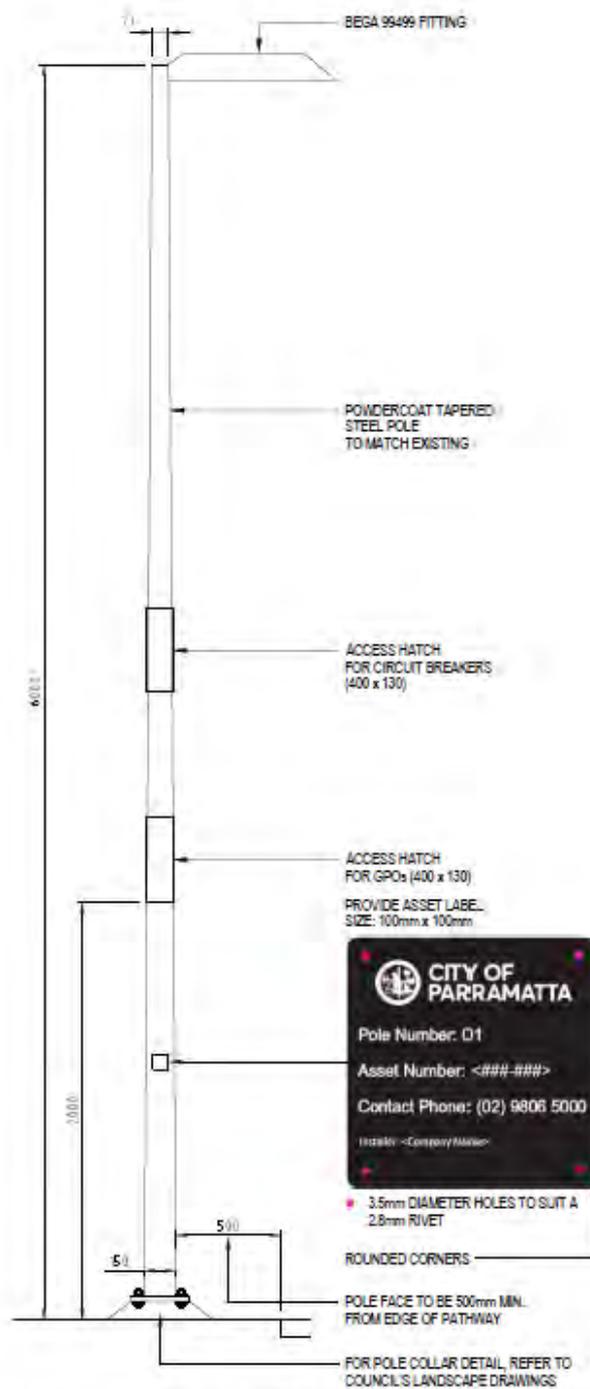


Figure 10 Lighting Layout Plan. Source: Webb Australia

An extract of the pole details is provided at **Figure 11** below.

2 Description of Proposed Works



TYPICAL TYPE P2 POLE DETAIL

1:20 @ A1

Figure 11 Type P2 Pole Details. Source: Webb Australia

2.4 Lighting – Entry Wall

Uplighting is proposed at the front of an existing entry wall to Baludarri Wetlands, including associated reticulation of cabling to the new inground lights.

2 Description of Proposed Works

The front elevation view of the lighting is shown at **Figure 12** below.

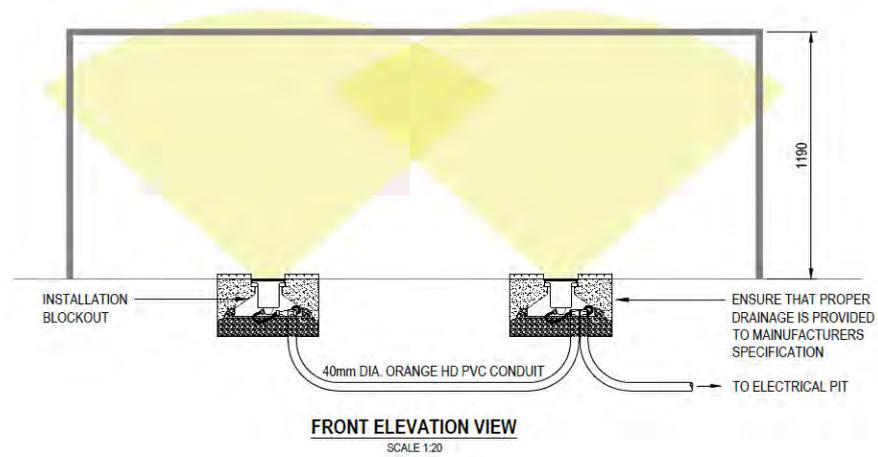


Figure 12 Front Elevation View of Entry Wall. Source: Webb Australia

2.5 Landscaping

Minor associated landscaping works are proposed, including the removal and replacement of low native groundcovers around an existing sandstone block wall towards the eastern side of the site.

3 Statutory Framework

This section describes the statutory framework under which the Proposal has been assessed.

3.1 Relevant Legislation

3.1.1 Environmental Planning and Assessment Act, 1979

The provisions of SEPP TI allow the proposed works to be carried out as development without consent under Part 5 of the *Environmental Planning & Assessment Act 1979* (EP&A Act).

This REF also considers the requirements of Section 6.28 of the EP&A Act and Section 170, Section 171 and Section 171A of the EP&A Regulation.

3.1.2 Other Relevant Acts

Table 1 below provides an assessment against the relevant provisions of other applicable Acts under NSW legislation:

Table 1 Assessment against other relevant Acts		
Legislation	Assessment	Compliance
National Parks & Wildlife Act 1974	<p>The NP Act, amongst other things, aims to conserve nature, objects, places or features of cultural value within the landscape.</p> <p>An AHIMS Search was conducted on 3 October 2024 (refer to Appendix 10). One (1) Aboriginal site has been declared in or near the location of the works at Baludarri Wetlands. Notwithstanding, the location of the proposed lighting is clear of the Aboriginal site and due to the minor nature of the proposed works, is unlikely to impact on the Aboriginal site. Therefore, there is a low likelihood of Aboriginal objects being present within the area of the proposed works and as a result, no Aboriginal Heritage Impact Permit (AHIP) is required.</p> <p>Notwithstanding, a Mitigation Measure has been included that relates to unexpected finds. If encountered during construction, all works should cease and consultation with a heritage professional or State government agency be conducted to determine the subsequent course of action.</p>	Yes
Local Government Act 1993	<p>The site is partly classified as 'Community Land' under the LG Act and is categorised as a 'Park', 'Bushland' and 'Wetland'.</p> <p>Chapter 6 of the LG Act regulates community land, which is required to be managed in accordance with a Plan of Management and consistent with the core objectives for the category applying to the land. The Plan of Management must categorise the land and prescribe performance targets.</p> <p>The Community and Crown Land Plan of Management was adopted on 4 December 2023 and includes Baludarri Wetlands. It is noted that this Plan of Management replaced the former Baludarri Wetland Plan of Management 2010.</p> <p>The proposed works relate to an existing boardwalk and are adjacent to an existing shared path. Therefore, the activity is sited in a portion of the site that has already been subject to disturbance.</p> <p>The POM specifies that development of Community Land is to be consistent with the objectives of the plan and the provisions of any relevant environmental planning instrument (EPI's), including the EP&A Act.</p> <p>The proposed activity relating to lighting and minor landscaping is consistent with the core objectives for Bushland, Wetlands and Parks, as set out in Section 4.5 of the POM. Specifically, the proposed activity will encourage the recreational use of the boardwalk and shared path, particularly during the evening and early morning, which is currently challenging due to the lack of lighting along the path. Furthermore, the proposed activity will ensure the ongoing</p>	Yes

3 Statutory Framework

Table 1 Assessment against other relevant Acts

	<p>viability of the land by protecting the ecological biodiversity and habitat values of the land.</p> <p>This REF has considered the relevant EPI's and the EP&A Act, noting that the works are proposed to be undertaken in accordance with Part 5 of the EP&A Act</p>	
Fisheries Management Act 1994	<p>The objects of the FM Act are to develop and share the fishery resources of the State for the benefit of present and future generations.</p> <p>Baludarri Wetlands adjoins Parramatta River to the south. However, the location of the proposed works do not extend to within Parramatta River, including marine vegetation (such as mangroves and saltmarsh) that is protected under the FM Act. In this regard, no permit issued under Part 7 of the FM Act is required.</p> <p>Notwithstanding, erosion and sediment control measures during the construction works will be important to prevent sediment-laden water from entering into the nearby natural waterways.</p> <p>The Preliminary Construction Management Plan (PCMP) (Appendix 8) sets out requirements for management of erosion and sediment control, which includes the preparation of a plan that is to be established by the Principal Contractor and approved by Council prior to the commencement of works.</p> <p>Subject to the implementation of appropriate erosion and sediment control measures, it is considered that the proposed works are consistent with the objects of the FM Act.</p>	Yes
Water Management Act 2000	<p>The objectives of the WM Act are to provide for sustainable and integrated management of the water sources of the State for the benefit of both present and future generations.</p> <p>Section 91 of the WM Act relates to a controlled activity approval on waterfront land. Waterfront land is defined in the WM Act as being text for emphasis:</p> <p><i>(a) the bed of any river, together with any land lying between the bed of the river and a line drawn parallel to, and the prescribed distance inland of, the highest bank of the river, or (a1) the bed of any lake, together with any land lying between the bed of the lake and a line drawn parallel to, and the prescribed distance inland of, the shore of the lake, or (a2) the bed of any estuary, together with any land lying between the bed of the estuary and a line drawn parallel to, and the prescribed distance inland of, the mean high-water mark of the estuary, or</i></p> <p><i>(b) if the regulations so provide, the bed of the coastal waters of the State, and any land lying between the shoreline of the coastal waters and a line drawn parallel to, and the prescribed distance inland of, the mean high-water mark of the coastal waters,</i></p> <p><i>where the prescribed distance is 40 metres or (if the regulations prescribe a lesser distance, either generally or in relation to a particular location or class of locations) that lesser distance. Land that falls into 2 or more of the categories referred to in paragraphs (a), (a1) and (a2) may be waterfront land by virtue of any of the paragraphs relevant to that land.</i></p> <p>Whilst a portion of the proposed works is close to being within 40m of Parramatta River, Clause 41 of the <i>Water Management (General) Regulation 2011</i> in any event provides that public authorities are exempt from Section 91E(1) of the WM Act.</p> <p>Consequently, Council does not require a controlled activity approval in this instance.</p>	Yes

3 Statutory Framework

Table 1 Assessment against other relevant Acts

Biodiversity Conservation Act 2016	<p>The requirements for biodiversity assessment under the EP&A Act are provided in Part 7 of the BC Act.</p> <p>The test under Part 7 that needs to be established is whether an activity is “likely to significantly affect threatened species” for works undertaken pursuant to Part 5 of the EP&A Act.</p> <p>In this regard, a Flora and Fauna Assessment Report (FFAR) has been prepared by East Coast Ecology (Appendix 4) which has considered whether the proposed works are likely to affect threatened species.</p> <p>Having regard to Section 1.3.3 of the FFAR, the proposed works will not result in a significant impact on any threatened entities and as a result, the Biodiversity Offset Scheme (BOS) is not triggered. Therefore, no Biodiversity Development Assessment Report (BDAR) or Species Impact Statement (SIS) are required to be prepared.</p>	Yes
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3.1.3 Environmental Protection and Biodiversity Act 1999 (Commonwealth)

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), a referral is required to the Australian Government for proposed actions that have the potential to significantly impact on matters of National Environmental Significance (NES) or the environment of Commonwealth land.

An assessment of the proposals impact on matters of National Environmental Significance is included in **Table 2** below.

Table 2 EPBC Act 1999 Checklist

Factor	Impact
Any significant impact on a declared World Heritage Property?	No
Any significant impact on a National Heritage place?	No
Any significant impact on a declared RAMSAR wetland?	No
Any significant impact on Commonwealth listed threatened species or endangered community?	No
Any significant impact on Commonwealth listed migratory species?	No
Does any part of the proposal involve nuclear actions?	No
Any significant impact on Commonwealth marine areas?	No
Any significant impact on the Great Barrier Reef Marine Park?	No
Any significant impact on Commonwealth land?	No
Any significant impact on a declared World Heritage Property?	No

3.1.4 Environmental Planning and Assessment Regulation 2021

This REF has been prepared in accordance with the Guidelines for Division 5.1 Assessments prepared by the Department of Planning and Environment dated June 2022, in accordance with Section 170 of the Regulation.

Table 3 includes an assessment against factors for consideration under Section 171 of the Regulation.

Table 3 Environmental Factors to be considered under s171 of the EP&A Regulation

Factor	Assessment
(1) When considering the likely impact of an activity on the environment, the determining authority must take into account the environmental factors specified	This REF has been prepared in accordance with the Guidelines for Division 5.1 Assessments. There are no activity specific guidelines.

3 Statutory Framework

Table 3 Environmental Factors to be considered under s171 of the EP&A Regulation

Factor	Assessment
in the environmental factors guidelines that apply to the activity.	
(2) If there are no environmental factors guidelines in force, the determining authority must take into account the following environmental factors— (a) the environmental impact on the community,	The environmental impact on the community has been considered in the assessment at Section 5 of this REF.
(b) the transformation of the locality,	The proposal relates to the installation of environmentally sensitive lighting and associated minor works All of these works will improve the functionality of the boardwalks and paths with which they relate to, however, will not significantly transform the locality.
(c) the environmental impact on the ecosystems of the locality,	The impact of the proposed works on existing vegetation is assessed in this REF as being minimal. The proposal also involves the planting of additional trees.
(d) reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality,	The proposal will improve the recreational facilities associated with the Baludarri Wetlands and the operation of the existing share path and boardwalk facilities The associated environmental impacts of the development have been assessed in this REF as being minimal.
(e) the effects on any locality, place or building that has— (i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance, or (ii) other special value for present or future generations,	An AHIMS Search (Appendix 10) was undertaken on 3 October 2024 which identified one (1) known Aboriginal site or place within a 200m radius of the site. Notwithstanding, the location of the proposed lighting is clear of the Aboriginal site and due to the minor nature of the proposed works, is unlikely to impact on the Aboriginal site. If during the construction works, Aboriginal objects or relics are uncovered, works must cease immediately and the relevant authority must be contacted.
(f) the impact on the habitat of protected animals, within the meaning of the <i>Biodiversity Conservation Act 2016</i> ,	The proposal does not result in the removal of any significant or established trees, only shrubs within proximity of the entry walls. These can be easily replaced. Furthermore, and in accordance with the Flora and Fauna Assessment Report (FFAR) prepared by East Coast Ecology, dated 9 December 2024, the proposed activity will not result in a significant impact on the habitat of protected animals, within the meaning of the <i>Biodiversity Conservation Act 2016</i> .
(g) the endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air,	The proposal will does not involve any tree removal and is unlikely to result in any adverse impacts on any species of animal plant or other wildlife.
(h) long-term effects on the environment,	This REF has assessed that the minimal short-term construction impacts of the proposal can be mitigated and that there will be no significant adverse long-term effects on the environment.
(i) degradation of the quality of the environment,	
(j) risk to the safety of the environment,	
(k) reduction in the range of beneficial uses of the environment,	The proposed upgrades are anticipated to improve the use of the environment.

3 Statutory Framework

Table 3 Environmental Factors to be considered under s171 of the EP&A Regulation

Factor	Assessment
(l) pollution of the environment,	<p>It is anticipated that some light pollution will be generated by the proposed activity. However, in accordance with the Light Assessment undertaken by Webb Australia Group (Appendix 6), the lighting proposed on the handrails of the boardwalk and the free-standing light poles will comply with the relevant Australian Standards.</p> <p>Lighting is discussed in further detail at Section 5.1.2 of this report.</p>
(m) environmental problems associated with the disposal of waste,	As detailed within this REF, short term construction waste can be appropriately managed and there will be no long-term waste associated with the proposal.
(n) increased demands on natural or other resources that are, or are likely to become, in short supply,	The proposed development is minor in nature and is not likely to result in a substantial increase in demands on natural or other resources that are likely to become in short supply.
(o) the cumulative environmental effect with other existing or likely future activities,	The proposed works involve upgrades to existing infrastructure. Given the minor nature of the proposed works, there are not foreseen to be any significant adverse cumulative impacts arising from the development that will affect future activities.
(p) the impact on coastal processes and coastal hazards, including those under projected climate change conditions,	<p>The site is located within a Coastal Use Area, Coastal Environment Area and proximity area to Coastal Wetlands. Part of the southern side of the existing boardwalk is mapped as Coastal Wetlands; however, the lighting has been located only on the northern side of the boardwalk and therefore outside of the mapped area.</p> <p>Having regard to the FFAR, further degradation of the coastal environmental values and natural coastal processes within the location of the proposed works is unlikely, given the existing state of the land and as a result, no further impacts to the coastal environmental area are anticipated, subject to compliance with the Mitigation Measures.</p> <p>With regard to coastal wetlands, the proposed works have been sited to avoid impacts to coastal wetlands. As a result, the biophysical, hydrological and ecological integrity of the coastal wetlands will not be adversely affected by the proposed works.</p>
(q) applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1,	The proposal is considered to be consistent with relevant strategic documents as it will improve a high- quality recreational resource to service the existing and future population of the City of Parramatta.
(r) other relevant environmental factors.	All relevant factors have been considered within this REF.

3.1.5 State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP TI)

Chapter 2 of SEPP TI provides planning provisions for the establishment of infrastructure. Relevant to the proposed works are Section 2.10-2.17 and Section 2.73.

Section 2.10 – Section 2.17 – Consultation

Section 2.10 – Section 2.15 relate to consultation requirements for development with impacts to Council related infrastructure or services, local heritage, flood liable land and within a coastal zone.

3 Statutory Framework

Notwithstanding, Section 2.17 provides for exceptions to consultation. Subclause (c) provides that consultation in accordance with Section 2.10 – 2.15 is not required to be given to Council or a public authority that is carrying out the development. In this instance, Council is carrying out the proposed development.

Section 2.16 of SEPP TI relates to consideration of planning for bush fire protection. It is noted that the site is not mapped as bush fire prone land. Notwithstanding, this section only applies to development for the purpose of health services facilities, correctional centres, and residential accommodation.

Section 2.73 – Parks and other Public Reserves

Section 2.73(3) of SEPP TI sets out the following development that may be carried out by or on behalf of a public authority (including Council) as development without consent on a public reserve as follows (**bold emphasis added**):

- (3) *Any of the following development may be carried out by or on behalf of a public authority without consent on land owned or controlled by the public authority—*
 - (a) *development for any of the following purposes—*
 - (i) *roads, pedestrian pathways, cycleways, single storey car parks, ticketing facilities, viewing platforms and pedestrian bridges,*
 - (ii) *recreation areas and recreation facilities (outdoor), but not including grandstands,*
 - (iii) *visitor information centres, information boards and other information facilities,*
 - (iv) **lighting, if light spill and artificial sky glow is minimised in accordance with the Lighting for Roads and Public Spaces Standard,**
 - (v) **landscaping, including landscape structures or features (such as art work) and irrigation systems,**
 - (vi) *amenities for people using the reserve, including toilets and change rooms,*
 - (vii) *food preparation and related facilities for people using the reserve,*
 - (viii) *maintenance depots,*
 - (ix) *portable lifeguard towers,*
 - (b) *environmental management works,*
 - (c) *demolition of buildings (other than any building that is, or is part of, a State or local heritage item or is within a heritage conservation area).*

The proposed works involve the installation of environmentally sensitive lighting on existing handrails and freestanding light poles, as well as landscaping within the Baludarri Wetlands, being land that is controlled by Council, by way of ownership or easements.

Accordingly, the proposal can be undertaken as development without consent pursuant to Section 2.73(3) of SEPP TI.

3.1.6 State Environmental Planning Policy (Resilience and Hazards) 2021

Chapter 4 of *State Environmental Planning Policy (Resilience and Hazards) 2021* (SEPP RH) relates to remediation of land. The object of this chapter is to *promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment*.

Section 4.6 requires a consent authority to consider whether the land is contaminated and if it is contaminated, that it would be suitable in its contaminated state or whether remediation is required.

In this regard, the site has a history of being used for the purpose of a park and associated public recreational purposes. As the proposal seeks to widen an existing path and other minor associated works that relate to the existing use, it is considered unlikely that contamination will be identified during the construction works.

3 Statutory Framework

Notwithstanding, if contamination material is encountered during the construction works, then works must cease immediately and appropriate action be undertaken in accordance with the best-practice guidelines and the requirements of SEPP TI.

In this regard, Mitigation Measures have been included that relate to contamination and unexpected finds.

3.1.7 State Environmental Planning Policy (Biodiversity and Conservation) 2021

Section 171A of the EP&A Regulation requires the determining authority to 'take into account' certain sections of *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (SEPP BC) as the site is within the Sydney Harbour Catchment, a regulated catchment under SEPP BC.

Water Quality and Quantity

Section 6.6 of SEPP BC sets out water quality and quantity provisions. Having regard to the Landscape Plans prepared by Council, the proposed activity within the Baludarri Wetlands relates to lighting and as a result, will only generate minor additional hardstand areas to facilitate the installation of four (4) light poles adjacent to an existing path.

Consequently, it is deemed that the activity will result in negligible impacts to the water quality and quantity.

Aquatic Ecology

Section 6.7 of SEPP BC sets out aquatic ecology provisions. The provisions relate to impacts on terrestrial, aquatic or migratory animals or vegetation and, if required, whether the development will require permits for the clearing of riparian vegetation.

The Flora and Fauna Assessment Report (FFAR) that accompanies this REF does not identify any impacts to protected fauna and impacts to threatened species and communities. The FFAR also acknowledges that the proposed impacts to vegetation within the project area will be negligible and can be mitigated through best practices outlined in a Construction Environmental Management Plan that will be prepared by the contractor, prior to works commencing.

The proposed activity will be undertaken in a nature that minimises impacts on the natural water body including sediment and erosion control during construction.

Flooding

Section 6.8 of SEPP BC sets out provisions to consider the impacts on periodic flooding that benefits wetlands and other riverine ecosystems.

Council have advised that the area is impacted by flooding from Parramatta River in the 1% AEP event. However, due to the nature of the activity, it is considered to have negligible impact on flood behaviour and therefore negligible impact on the recession of waters into natural waterbodies. Erosion and sediment control during construction and hardstand surfaces will minimise the likelihood of pollutants entering the natural waterbody.

As a safety measure for occupiers of the boardwalk, Council have recommended that Flood Warning Signs be installed in the area to direct users of the boardwalk to higher ground. This has been included as a Mitigation Measure.

Recreation and public access

Section 6.9 of SEPP BC sets out recreation and public access provisions. The proposed activity is for the purpose of enhancing recreation and public access and is accordingly consistent with these provisions.

Development in Foreshores and Waterways Area

Section 6.28(1) of SEPP BC sets out general provisions for development in the Foreshores and Waterways Area. The proposed activity promotes recreation within the foreshore while not resulting in any adverse impacts on its natural setting.

3 Statutory Framework

3.1.8 Parramatta Local Environmental Plan 2023

Permissibility

The site is zoned RE1 Public Recreation (the RE1 Zone) and W1 Natural Waterways (the W1 zone), W2 Recreational Waterways (the W2 zone), SP2 Infrastructure (the SP2 zone) and R4 High Density Residential (the R4 zone) under the LEP.

The location of the proposed works is only on land in the W1 zone, RE1 zone and R4 zone.

The proposal involves the construction of a new pathway, to the north of an existing shared path. The existing shared path is located along the southern side of GKR and will be converted to a cycleway once the pedestrian path has been constructed.

Pursuant to the LEP, the works are defined as being an 'Environmental Facility' which is permissible with development consent in all of the relevant zones, with the exception of the R4 zone. Notwithstanding, the proposed activity relates to upgrades to an existing environmental facility and the works are being undertaken under the provisions of Chapter 2 of SEPP TI, as discussed above.

An extract of the zoning map for the site is provided at **Figure 13** below.



Figure 13 Land zoning map. Source: ePlanning Spatial Viewer

Zone Objectives

The objectives of the RE1 zone are provided below.

- To enable land to be used for public open space or recreational purposes.
- To provide a range of recreational settings and activities and compatible land uses.
- To protect and enhance the natural environment for recreational purposes.
- To conserve, enhance and promote the natural and cultural heritage value of parks and open space in the zone.
- To create opportunities to use riverfront land for public recreation.

Having regard to the objectives of the RE1 zone, the proposed works relate to an existing area of boardwalk that is utilised for recreational purposes, including walking and cycling.

The proposed lighting will improve the useability of the boardwalk at night. The boardwalk is an essential link between the Parramatta CBD to the west and the remainder of the eastern Parramatta River foreshore.

3 Statutory Framework

The proposed works do not involve the removal of any trees and will incorporate eco sensitive lighting to protect the natural environment.

Having regard to the Heritage Impact Statement (HIS) that accompanies this development, the proposal will not adversely impact on the natural and cultural heritage value of the park.

The separated pedestrian path will create more of an opportunity for people to use the boardwalk at night.

The objectives of the W1 zone are as follows:

- *To protect the ecological and scenic values of natural waterways.*
- *To prevent development that would have an adverse effect on the natural values of waterways in this zone.*
- *To provide for sustainable fishing industries and recreational fishing.*
- *To provide for cultural and scientific study of natural waterways.*
- *To enable works associated with the rehabilitation of land towards its natural state.*

As set out above, the proposed lighting consists of eco sensitive lighting to protect the ecological values of the surrounding environment, including the natural waterways.

The proposed works do not impact on the potential for sustainable fishing industries, recreational fishing and the cultural and scientific study of natural waterways. The works do not involve the rehabilitation of land.

The objectives of the R4 zone are as follows:

- *To provide for the housing needs of the community within a high-density residential environment.*
- *To provide a variety of housing types within a high-density residential environment.*
- *To enable other land uses that provide facilities or services to meet the day-to-day needs of residents.*
- *To provide for high density residential development close to open space, major transport nodes, services and employment opportunities.*
- *To provide opportunities for people to carry out a reasonable range of activities from their homes if the activities will not adversely affect the amenity of the neighbourhood.*

The proposed works do not impact on the potential to provide housing and for other land uses to provide facilities or services to meet the day-to-day needs of residents.

Relevant Planning Considerations

Table 4 below provides an assessment of the proposed works against the relevant provisions of the LEP.

Table 4 Assessment of proposal against relevant provisions of the LEP		
Provision	Assessment	Consistent
Clause 5.10: Heritage Conservation	<p>An item of heritage significance is located on the site, known as 'Wetlands Significance' (I011).</p> <p>A Heritage Impact Statement (HIS) has been prepared by DFP Planning, dated 28 January 2025, which assesses the impact of the proposed activity on the heritage significance of the site.</p> <p>The HIS has determined that the proposed activity will not result in any adverse heritage impacts on the site.</p>	Yes

3 Statutory Framework

Table 4 Assessment of proposal against relevant provisions of the LEP

	<p>The HIS states:</p> <p><i>The proposed lighting works for the existing pathway in Baludarrri Wetlands are minor in scale, will provide for safety of the public and will cause no adverse physical impact and negligible visual impact. The proposed works are consistent with the objectives of the Clause 5.10 LEP</i></p> <p><i>The works do not comprise any removal or alteration of any significant built fabric or vegetation</i></p>	
Clause 5.21: Flood Planning	<p>Flood Advice has been provided by Council, which documents that the area is impacted by flooding from the Parramatta River in the 1% AEP.</p> <p>As a mitigation measure, Council has recommended that Flood Warning signs be installed in this area to direct users of the cycleway to higher ground, in the event of flooding.</p>	Yes
Clause 6.1: Acid Sulfate Soils	<p>The location of the proposed activity is on Class 2 and Class 5 acid sulfate soils.</p> <p>An Acid Sulfate Soil (ASS) Assessment has been undertaken as part of the Geotechnical Report prepared by Douglas Partners (Appendix 7).</p> <p>Screen testing was undertaken through soil samples that were taken on site. Whilst the results indicated 12 samples showed positive indicators for potential acid sulfate soils (PASS), no strong indicators were observed.</p> <p>To assess the presence of PASS, additional Chromium Sulfur testing was carried out in three of the soil samples. Based on these results, the Geotechnical Report has concluded that the testing indicates no presence of acid sulfate soils within either the fill or alluvial soil material. Therefore, no Acid Sulfate Soils Management Plan is required.</p>	Yes
Clause 6.6: Foreshore Area	<p>The site is partly located within a foreshore area. The objective of Clause 6.6 of the LEP is to protect the Parramatta River by ensuring development in the area will not impact nature foreshore processes, the significance and amenity of the area and that the development will be compatible with the riverine environment.</p> <p>Based on the minor nature of the proposed works and subject to compliance with the Mitigation Measures, it is considered that the proposed works will be consistent with the objectives of this clause.</p>	Yes

4 Environmental Risk Assessment

This section examines the environmental risks in relation to the proposed works.

4.1 Assessment Method

The methodology applied to the environmental risk assessment for the proposed works is as follows:

- Initial risk assessment for environmental constraints based upon:
 - Review of relevant planning controls and legislation;
 - Review of consultant reports; and
 - Examination of aerial photographs and site photos.
- Identifying potential environmental risks/impacts associated with the proposed works;
- Evaluating identified risks/impacts to determine the potential for occurrence and degree of severity; and
- Identifying and determining suitable environmental management/mitigation procedures and control measures appropriate for planned works.

4.2 Site Constraints

Table 5 identifies site constraints applicable to the site. Where an environmental issue is identified, impact assessment is provided in **Section 5** and mitigation measures and conditions are included in **Appendix 12**.

Table 5 Site Constraints

Constraint	Factor	Yes	No	Action
Contamination	Is the site affected by contamination as identified in Section 10.7 Certificate or 'List of NSW contaminated sites notified to the EPA' and/or potentially affected by contamination?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Having regard to the Section 10.7 Planning Certificates for the site, the land is not affected by contamination, pursuant to Clause 59(2) of the <i>Contaminated Land Management Act 1997</i> . The site is also not listed on the NSW contaminated sites that are notified to the EPA. It is noted that Lot 3 DP 1215559 (to the south-west of the site) is the subject of a site audit statement. Notwithstanding, the location of the proposed works is entirely outside of the area of this allotment.
	Does the project involve demolition of buildings or part of a building that may contain Asbestos?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The proposed works does not involve the demolition of buildings or part of buildings that may contain asbestos. The only demolition works that are proposed relate to the removal of ancillary park features.
	Does the project require the disturbance of any other hazardous material (e.g. lead paint, lead dust, PCBs, ozone depleting substances)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The proposed works relate to the installation of lighting and are not expected to result in any disturbances to other hazardous materials, such as lead paint, lead dust, PCB's, or ozone depleting substances.
Flooding	Is the site affected by flooding? (i.e. is the land below the 1 in 100-year flood planning level)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Having regard to Flood Advice provided by Council, the location of the proposed activity is on land that is impacted by flooding from the Parramatta River in the 1% AEP event. As a consequence, the Flood Advice recommends that Flood Warning signs be installed within the location of the activity to direct users of the cycleway to higher ground in the event of flooding.
Coastal Hazards	Is the site identified within the coastal zone in the <i>Coastal Management Act 2016</i> OR has the site been identified by Council as affected, or potentially affected, by existing and future coastal hazards? This includes coastal storm erosion and recession of land due to sea level rise.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The site is mapped within a coastal environment area, a coastal use area and partly coastal wetlands. It is noted that the location of the proposed works is within a proximity area to coastal wetlands. To mitigate impacts towards the coastal zones with which the site is located within a within proximity to, the implementation of appropriate erosion and sediment control measures is required.
Bushfire Hazard	Is the land nominated as Bushfire Prone Land on the Section 10.7 Certificate or is the site within 100m of unmanaged bushland?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
Threatened Species	Does the Project involve the clearing of vegetation that would affect any threatened species? If YES, answer the following two questions:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The proposed works does not involve any tree removal.
	Has the Section 10.7 Certificate and/or consultation with Council and/or review of the OEH critical habitat register identified a known critical habitat or threatened species, populations or endangered ecological communities and their habitat on or in close proximity to the site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A

Table 5 Site Constraints

Constraint	Factor	Yes	No	Action
	Is the Project Site adjacent to an area of bushland (including a National Park, State Forest, Council Reserve or area of unmanaged bushland) OR a natural watercourse (including a creek, river, estuary, lake or wetland)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The site is located to the north of Parramatta River. Notwithstanding, the proposed works are confined to an existing boardwalk and park that has been modified over recent years.
Native Vegetation	Does the project involve the clearing of native vegetation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
Aboriginal Cultural Significance	Has the Section 10.7 certificate and/or consultation undertaken with Council identified that the site has, or is likely to have, significance to Aboriginal people, AND / OR will the proposed project impact on an Aboriginal place or known Aboriginal Objects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The Section 10.7 Planning Certificate for the site has identified the site as being low sensitivity and having limited potential to contain items of Aboriginal heritage. Notwithstanding, an Aboriginal Heritage Information Management System (AHIMS) Search was undertaken on 3 October 2024 (Appendix 10) which identified one (1) Aboriginal site located within a 200m radius of the subject site. The location of the proposed lighting is clear of the Aboriginal site and due to the minor nature of the proposed works, is unlikely to impact on the Aboriginal site.
	Is the site in an area very highly disturbed /modified (i.e. does it contain large areas of sealed surface, fill or previously excavated areas?)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The works involve the provision of lighting on an existing boardwalk and the installation of free-standing light poles within an existing park that has been disturbed / modified in recent years. Minor works are also proposed to existing entry walls to the wetlands.
	If NO, does the project involve more than 1ha of ground disturbance?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
	Is the project site within 200m of a high-water mark of coastal waters of NSW?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
	Is the project site within 200m of a wetland, coastal lake or waterway?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The proposed activity is located <200m of coastal wetlands. The location of the proposed works is therefore within a proximity area to coastal wetlands. Notwithstanding, the proposed works are minor in nature and subject to the implementation of appropriate erosion and sediment control measures, are unlikely to result in any impacts to the nearby Coastal Wetlands.
	Is the project site located on a sand sheet or within a dune area located on a ridge top?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
	Is the project site within 20m of a cave, rock shelter, or a cave mouth?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
	Acid Sulphate Soils	Is the site less than 6m AHD?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Does the site contain acid sulphate soils of Class 1-4?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The site is mapped as Class 2 Acid Sulfate Soils. A Geotechnical Report has been prepared which has included an assessment in relation to acid sulfate soils. The outcomes of this assessment has been discussed in Section 5 of this REF.

Table 5 Site Constraints

Constraint	Factor	Yes	No	Action
	If YES, does the Project involve the excavation of more than 1 tonne of soil?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
Mine Subsidence	Is the land located in a Mine Subsidence District?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
Land Slip	Does the Section 10.7 Certificate and/or consultation with the relevant council identify the site as being affected by land slip?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
Heritage	Does the site contain an item of local or state heritage significance or is the site located in the vicinity of a local or state heritage item?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>A heritage item known as 'Parramatta River Wetlands' (I011) is located within the subject site.</p> <p>A Heritage Impact Statement (HIS) has been prepared by DFP Planning, which has considered the impact of the proposed works on this heritage item.</p> <p>Based on the conclusions of the HIS, the works will have a negligible visual impact and no physical impact on the natural significance of the remnant mangroves and saltmarsh.</p> <p>No further action is required.</p>

5 Environmental Impact Assessment

This section provides an environmental impact assessment for the proposed works at Baludarri Wetland. The assessment includes an overview of the proposal and provides additional information for any specific environmental issues relating to the site which require more detailed consideration.

5.1 Detailed Environmental Assessment

The following environmental aspects are considered to be applicable to the site and the proposed works:

- Flora and Fauna;
- Lighting Impacts;
- Geotechnical Impacts;
- Aboriginal Heritage;
- European Heritage;
- Waste Management;
- Community Amenity;
- Cumulative Impacts; and
- Construction Management.

5.1.1 Flora & Fauna

The proposed works within Baludarri Wetlands do not involve any tree removal. The proposed light poles have been carefully located to preserve existing trees and established vegetation.

As a consequence of providing electrical cabling from the environmentally sensitive hardwired LED handrail lights to existing sandstone block walls towards the east and west of the site, some planting is required to be removed.

As set out in the Arborist Report, the planting subject to removal on the eastern side includes one (1) small *Callistemon viminalis* which is approximately 1m high, multi-stemmed and easily replaceable. Any excavation works required for electrical conduits must involve tree sensitive construction methods to prevent impacts on existing trees that are to be retained.

Planting on the western side of the site that is subject to removal include two (2) *Lomandra* grasses and one (1) young *Eucalpt* Spp. Both are considered to be easily replaceable.

Photographs of the vegetation subject to removal is set out in **Figure 14** below.

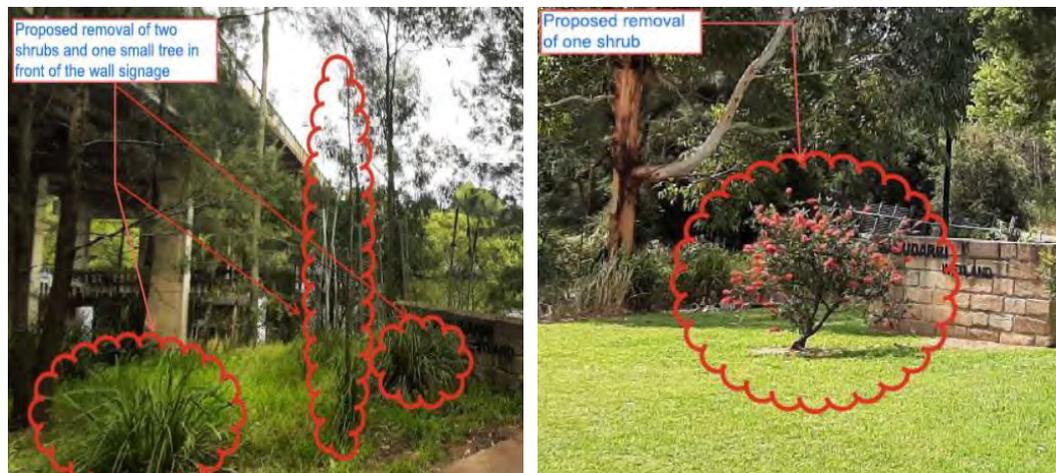


Figure 14 Vegetation subject to removal

5 Environmental Impact Assessment

A Flora and Fauna Assessment Report has been prepared by East Coast Ecology, dated 26 March 2025, given the biodiversity values that are present within broader site and vicinity of the proposed activity.

As documented within the FFAR, the Baludarri Wetlands are mapped as comprising Sydney Coastal Sandstone Gully Forest (PCT 3595), Grey Mangrove-River Mangrove Forest (PCT 4091) and Samphire Saltmarsh (PCT 4097). The location of the proposed activity is clear of these mapped areas.

An extract of the mapping which shows the vegetation communities within and surrounding the subject land is provided at **Figure 15** below.

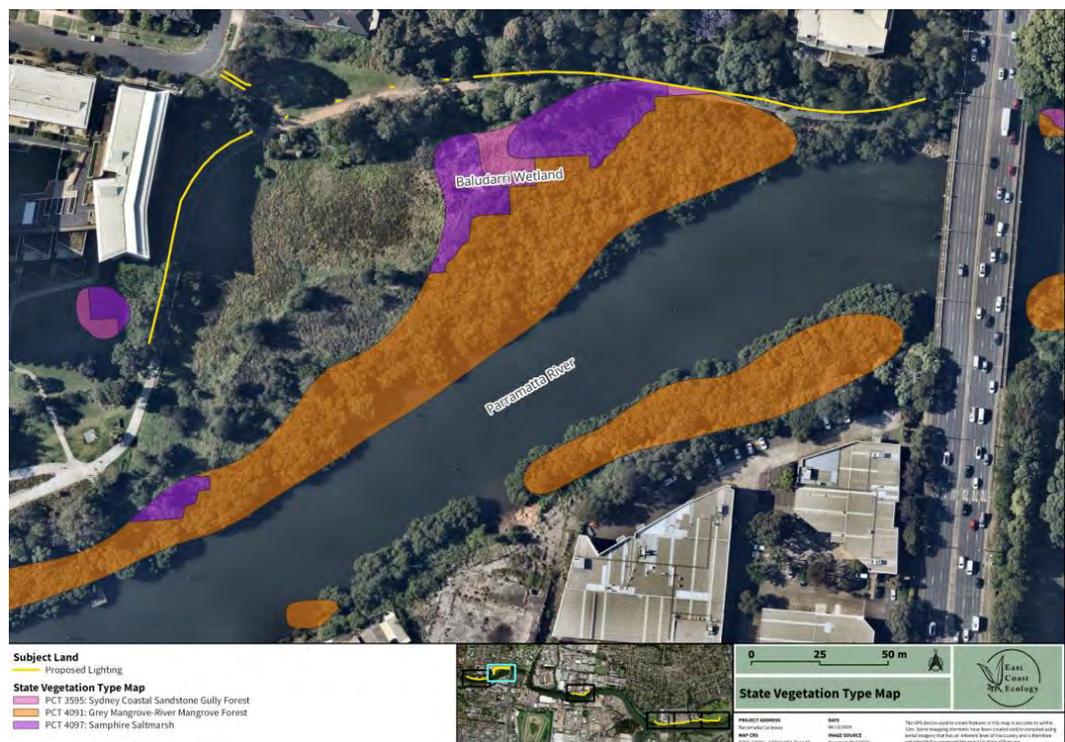


Figure 15 Vegetation Communities within and surrounding the subject land. Source: East Coast Ecology

A review of threatened species within the subject land was also undertaken as part of the FFAR. Based on threatened species records, there has been one (1) record of species within the vicinity of the proposed works, being a *Pteropus poliocephalus* (grey-headed flying fox).

An assessment of the likely occurrence of threatened species within the subject land has been conducted as part of the FFAR. In relation to the *Pteropus poliocephalus*, the species is highly mobile and may be an occasional visitor, however, habitat similar to that within the subject area is widely distributed in the locality, meaning that the species is not dependent on the subject land habitat.

On this basis and due to the minor nature of works proposed within the Baludarri Wetlands, it is considered that no further assessment is required when considering the impact of the works on threatened species.

5.1.2 Lighting Impacts

Having regard to the FFAR, there is expected to be some negligible increase to indirect impacts on adjacent habitat from the proposed activity. As a result, it is a requirement for lighting to be designed in accordance with the relevant Australian Standards and Guidelines (AS 4282-2023 Control of the Obtrusive Effects of Outdoor Lighting).

5 Environmental Impact Assessment

Furthermore, and in order to minimise glare from lighting to adjacent habitat, lighting is to be installed in a direction that is oriented away from the vegetation within the Baludarri Wetlands. This is to be managed in accordance with the final Construction Environmental Management Plan that will need to be endorsed by Council.

A Lighting Calculation Plan has been prepared which provides an assessment of the illuminance (Lux level) and whether the proposed lighting will likely comply with AS 4282-2023. Based on the test results undertaken by Webb Australia Group, the proposed lighting complies with the maximum allowable illuminance level, the luminous intensity at vertical planes and the upward waste light ratio. In this regard, the design of the lighting is unlikely to generate any adverse impacts on the adjoining wetlands and other ecological values in the area.

A Certificate of Design has also been issued by Webb Australia Group for the lighting along Baludarri Wetlands. This provides certification that the design of the lighting is compliant with the relevant Australian Standards and National Construction Code (NCC).

5.1.3 Geotechnical Impacts

Acid Sulfate Soils

The site is mapped as Class 2 and Class 5 Acid Sulfate Soils. To consider if the location of the proposed works are impacted by acid sulfate soils, a Geotechnical Report has been prepared by Douglas Partners (**Appendix 8**).

The Geotechnical Report has also considered the geology of the land and the salinity potential of the site. As part of these investigations, five (5) boreholes were drilled into the soils within the location of the proposed works (**Figure 16**).



Figure 16 Borehole Locations. Source: Douglas Partners

Based on the results of the soil testing, 12 samples showed a positive indicator for potential acid sulfate soils (PASS). Further testing using Chromium Reducible Sulfur was carried out on three (3) of the samples to assess the presence of PASS. The results of this testing indicated that acid sulfate soils is not present within either the fill or alluvial soil material and therefore, no acid sulfate management plan is required for the disturbance of these soils.

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Footings

Based on the field work results from the Geotechnical Report, fill was encountered in all four (4) of the boreholes, consisting of variable soil types including clay, sandy clay, sand, gravelly sand, clayey sand and silty sand. The fill extended to depths ranging between 0.3m to 1.0m.

The testing of this soil indicated that the fill was generally moderately well compacted, however, was assessed as being uncontrolled in nature due to the absence of information that would indicate otherwise.

Consequently, the free-standing light poles are proposed to be constructed as small diameter cased-bored piles that are constructed to a depth of at least 1.5m and founded within loose alluvial sand (or better).

The Geotechnical Report has recommended that during the detailed design phase of the project, a design check be conducted on the ultimate lateral capacity of the piles, using the Broms method with an assigned undrained shear strength of 40 kPa for the fill materials.

5.1.4 European Heritage

The site is mapped as comprising one (1) heritage item, being:

- 'Wetlands' (I011).

As shown in **Figure 17** below, the location of the proposed activity is partly located over the mapped heritage item.



Figure 17 Heritage Map. Source: ePlanning Spatial Viewer

A Heritage Impact Statement (HIS) has been prepared by DFP (**Appendix 9**) to assess the potential impact of the proposed activity on the heritage significance of the site.

Having regard to the NSW Heritage Inventory, the following statement of heritage significance applies for the Wetlands.

The wetlands along Parramatta River are of significance for Parramatta area as remnant representative areas of mangroves and salt marshes which once extensively lined the foreshores and tidal water flats of the region.

The HIS has acknowledged that the works located within the mapped area are confined to an existing boardwalk over part of the Baludarrri Wetlands and that there will be no physical impact on the natural significance of the remnant mangroves and saltmarsh. The HIS concludes that there will be a negligible visual impact caused by the proposed activity.

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5.1.5 Aboriginal Heritage

The AHIMS search has identified one (1) Aboriginal site within the vicinity of the proposed works, however it is not within the location of the proposed lighting. Furthermore, the lighting relates to existing boardwalks, with the exception of the four (4) free standing light poles that are located approximately 120m to the north of the identified Aboriginal site. The location of the light poles is also within a highly disturbed area of the site and therefore, further archaeological investigation is not required.

However, in the event that any items of Aboriginal Cultural Heritage significance are uncovered during construction works, it is noted that all Aboriginal objects are protected under the *National Parks & Wildlife Act 1974* (NPW Act) regardless of if they are identified on the AHIMS or not. If suspected Aboriginal objects are uncovered during the works, works must cease in the affected area and a suitably qualified archaeologist assess the finds.

5.1.6 Waste Management

The Construction Management Plan (CMP) prepared by Council (**Appendix 7**) provides that it is the responsibility of the principal contractor to prepare a detailed Construction Waste Management Plan (CWMP) which specifies the likely waste generation and how waste will be disposed of.

The CMP provides that waste material taken off site must be classified and managed in accordance with the Waste Classification Guidelines and approved by Council prior to works commencing.

Whilst specific details in relation to the management of waste will be set out in the CWMP, Council requires that litter and waste must be contained on site prior to being disposed of in an appropriate manner. Skip bins located on site must have hinged lids and kept closed each night and on wind affected days.

A mitigation measure has been included which requires the preparation of a CWMP prior to works commencing.

5.1.7 Community Amenity

As set out in **Section 2** of this REF, Baludarri Wetlands comprises boardwalks, bushland and a park that are available for community use.

The proposed works will provide for lighting along an existing shared path and boardwalk, which will improve the useability of the facilities, particularly during the evening hours whereby visibility is currently minimal after sunset.

Subject to compliance with the mitigation measures, it is considered that the community and amenity impacts in relation to the proposed works are acceptable.

Formal public consultation for the proposed works occurred between 21 October 2024 and 21 November 2024, including engagement with local residents, targeted letter box distributions, City of Parramatta website, social media and newsletters. It is noted that the formal public consultation related to the full extent of upgrades along the northern side of Parramatta River. This includes upgrades to Royal Shores, Reid Park, Baludarri Wetlands and Rangihou Reserve.

In total, 156,370 people were reached during the community engagement associated with this activity. During this engagement period, a total of 67 surveys were completed by members of the community, of which 53 were supportive of the proposed works, 12 were supportive to an extent, one (1) was unsure and one (1) did not support the proposal. 80 pins were also placed on the interactive map that was available for residents to participate on.

The majority of the submissions that were received are summarised by the following themes:

5 Environmental Impact Assessment

1. **Cycle and Pedestrian Paths:** The separation of cycle and pedestrian paths was supported by local residents. Further to this, the removal of narrow sections of the existing path was also supported.
Some comments were also received relating to signage and potential for campaigns to improve the operation between users of the cycle path and pedestrian path.
2. **LED Lighting:** Residents enthusiastically endorsed LED lighting to promote use of the path in the evenings.
3. **Planting:** Residents enthusiastically supported the planting of more trees, native shrubs and grasses in sections of the park. Some comments were also provided in relation to the original path (to the south of the proposed activity). These comments were predominantly associated with general upkeep of this area, to prevent it from becoming overgrown and therefore underutilised.

Other general comments received during the public notification period related to the provision of additional bins (including dog poo bins/bags), additional water/drinking fountains, additional bike repair stations and upgrades to existing cycle paths to fix bumps in the surface.

In regard to the first theme, the boardwalk and connecting shared paths in and around the Baludarri Wetlands are being retained and will not be widened as part of these works.

In regard to the second theme, LED lighting is proposed along the northern side of the existing handrails. Four (4) free standing light poles are also proposed along the northern side of an existing shared path that connects two (2) sections of the Baludarri Wetlands boardwalk.

In regard to the third theme, the proposed activity will provide for the planting of replacement planting around the existing entry wall along the eastern side of the site. No tree removal is proposed.

5.1.8 Cumulative Impacts

It is unlikely that any significant adverse cumulative impacts would be generated as a result of the proposed works.

Any cumulative impacts associated with the works are considered to be minor, temporary and acceptable, subject to the implementation of the mitigation measures, as provided in **Appendix 12** of this REF.

Some short-term impacts are likely to be generated by the construction works, including the potential for impacts relating to noise and vibration. Notwithstanding, the longer-term benefits of the proposed works is likely to significantly outweigh any short-term impacts.

5.1.9 Construction Management

A Preliminary Construction Management Plan (PCMP) has been prepared by the City of Parramatta (**Appendix 7**) which sets out the approach for managing construction works, as well as establishing management measures to mitigate or minimise environmental impacts and protocols for communicating with relevant authorities and other stakeholders.

6 Conclusion

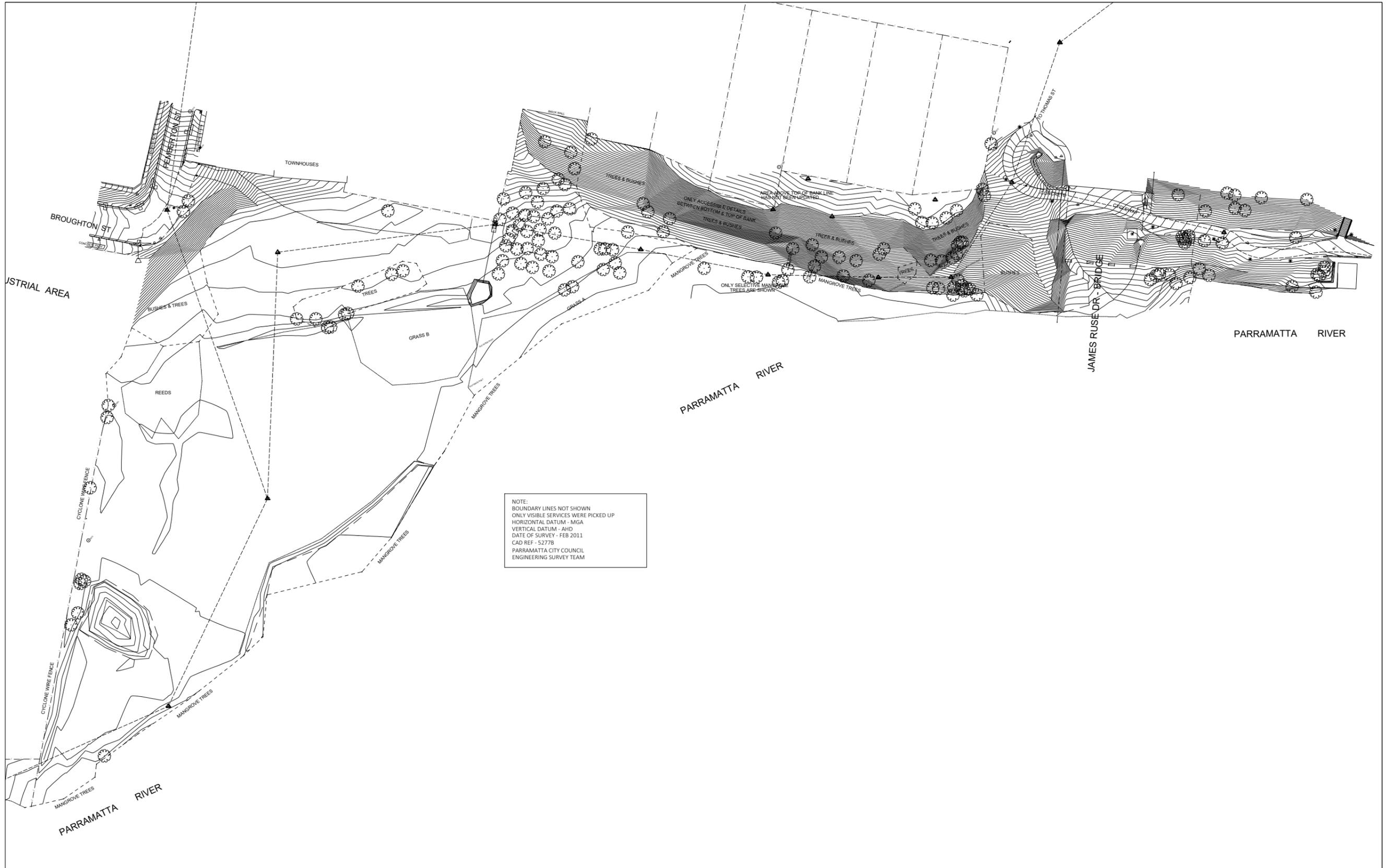
This Review of Environmental Factors has been prepared by DFP for the City of Parramatta Council, the proponent and determining authority for the proposed upgrade works within the Baludarri Wetlands.

This REF describes the existing site context and provides details of the proposed works which should be read in conjunction with the relevant design documentation which accompanies the REF.

An assessment of the potential for the proposed works to impact the environment has been undertaken, drawing upon other specialist reports and investigations and together with those reports and investigations, this REF identifies relevant environmental management measures that should be implemented during the carrying out of the works to mitigate or minimise potential impacts to an acceptable level.

This REF concludes that the proposed works can be undertaken as development without consent pursuant to Part 5 of the EP&A Act and pursuant to the provisions of SEPP TI.

Furthermore, it is assessed that, by adopting the mitigation measures identified in this assessment, it is unlikely that there would be significant environmental impacts associated with the proposed development and no impact on threatened species.



Date: April 2025
 Drawing Scale: 1:500 @ A1

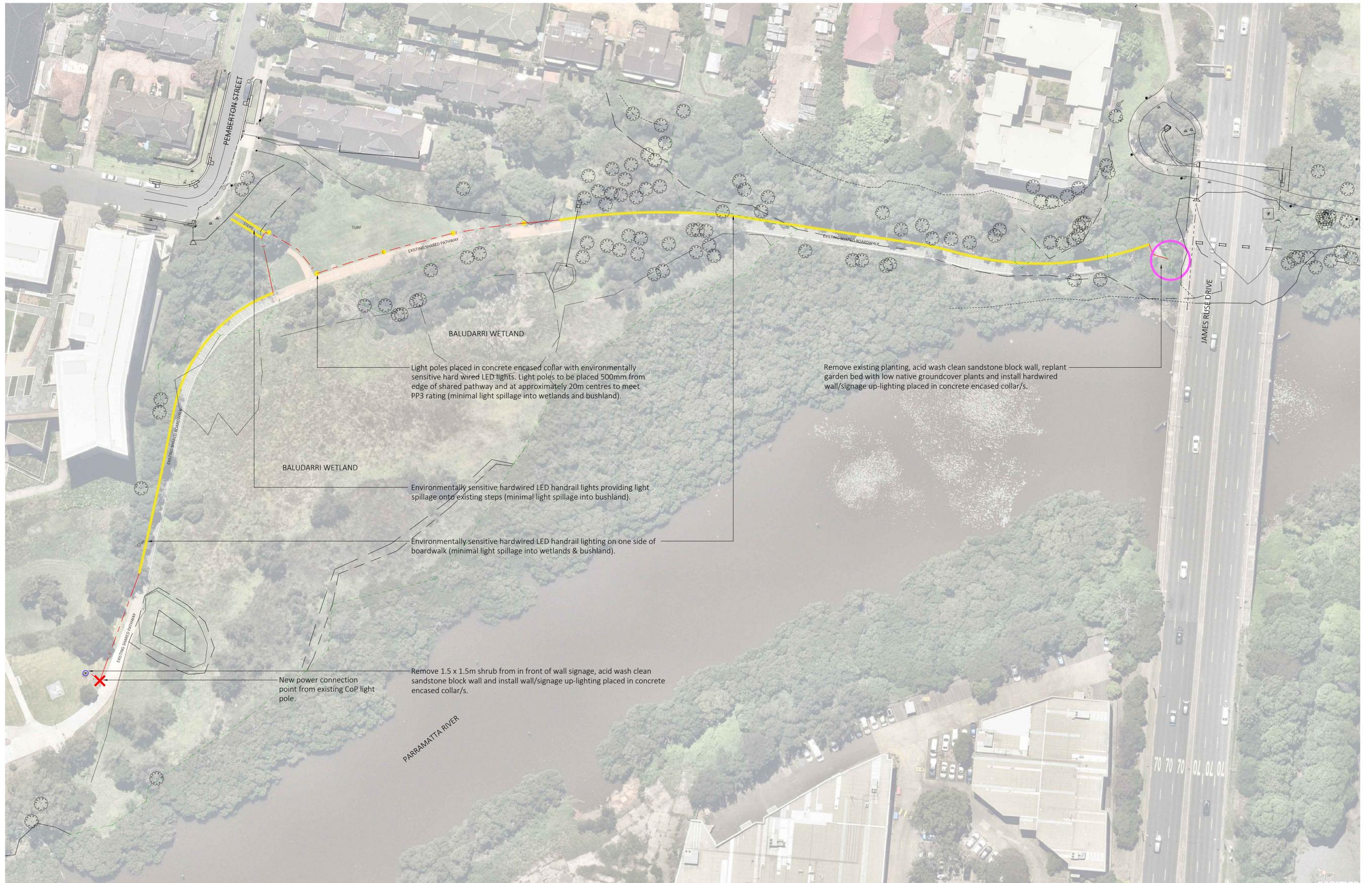


BALUDARRI WETLANDS PARRAMATTA

SITE SURVEY (PRIOR TO CONSTRUCTION OF SHARED BOARDWALK STRUCTURE)

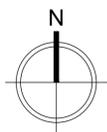


CITY OF PARRAMATTA



Date: September 2024

Drawing Status:
REVISION B - CONCEPT
** Subject to consultation & further investigative works*



BALUDARRI WETLAND PARRAMATTA

SHARED PATHWAY ENVIRONMENTALLY SENSITIVE LIGHTING



CITY OF PARRAMATTA



HUGH
THE ARBORIST

Arboricultural Impact Assessment Report

Parramatta Cycleway Upgrades



Date Prepared: 23rd December 2024
Client Name: City of Parramatta Council
Site Address: Parramatta Cycleway NSW
Authors Details: Hugh Millington
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Report on trees at: Parramatta Cycleway NSW
Prepared for: City of Parramatta Council
Prepared by: Hugh Millington, hugh@hughtheArborist.com.au
Date prepared: 23rd December 2024

SUMMARY

A total of 302 trees have been assessed as part of this report. Trees have been included within approximately five metres of any proposed works across the five sites. The proposed works generally consist of upgrading, extending or relocating hard surfaces for the shared paths and cycleways. Therefore there is opportunity to minimize the associated impacts for the trees by constructing the hard surfaces via tree sensitive methods such as structures on or above the existing grade, pier and beam or bridging over sensitive areas. Of the 302 trees assessed across the sites, 34 trees have been identified as requiring removal, 178 trees will be retained under no encroachment, 48 trees will be retained subject to minor encroachment and 42 trees can be retained subject to tree sensitive construction methods. The following report contains a series of tables which summarizes the associated impacts across the sites to provide a more concise presentation of data and provides detailed recommendations on how to minimise development impacts. Table 7 of this report includes additional advice where modifications to the design could potentially enable the retention of additional trees in the event the modifications are achievable.

1. INTRODUCTION

- 1.1 Hugh The Arborist Pty Ltd have been instructed by Shane Lauger of City of Parramatta Council to provide an Arboricultural Impact Assessment Report to assess trees located at five sites along the Parramatta Cycleway that may be impacted by the proposed upgrades.

Table 1: Proposed Plans And Documents Used For The Assessment

Title	Author	Date	Reference on Document
Site Survey Plan	Unknown, DWG files provided only	Not stated	Not stated
Proposed Site Plans	City of Parramatta Council	September 2024	Rangihou Reserve Rev C Baludarri Wetland Rev B Reid Park Rev C Royal Shores Rev C sheets 1,2,3 George Kendall Riverside Park Rev C

- 1.2 The site assessment and tree data collection was carried out on 25th October 2024. Access was available to the subject public areas only. All tree data contained in this report was collected during this time.
- 1.3 The weather during of the site inspections was clear with average visibility.

Report on trees at: Parramatta Cycleway NSW
Prepared for: City of Parramatta Council
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2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

- 2.1.1 Conduct a visual assessment from ground level of trees identified on the plans provided that may be affected by the proposed upgrade of the cycleway in five locations.
 - George Kendall Riverside Park Ermington
 - Rangihou Reserve Parramatta
 - Reid Park Rydalmere
 - Royal Shores Ermington
 - Baludarri Wetland Parramatta
- 2.1.2 Determine the trees estimated contributing years, remaining useful life expectancy and award the trees a retention value.
- 2.1.3 Provide an assessment of the potential impact the proposed development is likely to have on the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).
- 2.1.4 Recommend methods to mitigate development impacts where appropriate.
- 2.1.5 Recommend tree protection measures for any tree to be retained in accordance with AS4970 Protection of Trees on Development Sites - 2009.

3. LIMITATIONS

- 3.1 The findings of this report are based on the observations and site conditions at the time inspection.
- 3.2 All observations were carried out from ground level. No detailed additional testing was carried out on trees or soil on site and none of the surrounding surfaces were lifted for investigation.
- 3.3 The tree identification icons shown on the survey plans and the proposed plans vary considerably and a significant volume of trees that have been assessed in this report are not shown on the survey plan provided. The trees included in this report have been surveyed using GPS and overlaid onto the survey plan then transferred to the proposed plans as accurately as possible. However, their locations and therefore the associated development impacts may vary.
- 3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

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- 3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.
- 3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with a spp.
- 3.7 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.
- 3.8 Hugh The Arborist neither guarantees, nor is responsible for, the accuracy of information provided by others that is contained within this report.
- 3.9 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.
- 3.10 The retention of trees subject to development impact is only feasible if all recommendations and specifications are followed accurately.
- 3.11 Sensitive methods of construction such as sub-surface boring, manual (or non-destructive excavation) and the use of structural soil for fill may have limitations where the engineering requirements of the design cannot be met using these methods or materials. These limitations include pipe diameters, compaction, allowable garage changes and drainage requirements. Recommendations made in this report relating to amended methodology or materials should be reviewed by a professional qualified in the relevant field.
- 3.12 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.
- 3.13 Alteration of this report invalidates the entire report.

4. METHODOLOGY

- 4.1 The following information was collected during the assessment of the subject tree(s).
 - 4.1.1 Tree common name
 - 4.1.2 Tree botanical name
 - 4.1.3 Tree age class
 - 4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m above ground level) - millimetres.
 - 4.1.5 Estimated height - metres
 - 4.1.6 Estimated crown spread (Radius of crown) - metres
 - 4.1.7 Health
 - 4.1.8 Structural condition
 - 4.1.9 Amenity value
 - 4.1.10 Estimated remaining contribution years (SULE)¹
 - 4.1.11 Retention value (Tree AZ)²
 - 4.1.12 Notes/comments
 - 4.1.13 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).³
 - 4.1.14 Tree diameter was measured using a set of 400 millimetre metal callipers or a calculated DBH tape measure. All other measurements were estimations unless otherwise stated.
 - 4.1.15 Tree locations have been plotted using Pocket GIS and the site plans prepared using PT Mapper Pro.
 - 4.1.16 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009)⁴ and in some cases estimated. See appendices for information.
 - 4.1.17 Details of how the observations in this report have been assessed are listed in the appendices.

¹ Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, <http://www.treeaz.com/>.

² Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, <http://www.treeaz.com/>.

³ Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

⁴ Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

5. SITE LOCATIONS AND BRIEF DESCRIPTION OF PROPOSAL

- 5.1 The sites are located within the City of Parramatta Local Government Area (LGA)
- 5.2 This assessment has been carried out in accordance with the following policy and legislation.
 - 5.2.1 Parramatta Local Environmental Plan (LEP) 2011
 - 5.2.2 Parramatta Development Control Plan (DCP) 2011
 - 5.2.3 State Environmental Planning Policy (Biodiversity and Conservation) 2021

- 5.1 Any heritage or ecological significance of the five sites should be referred to by the relevant professional in that field. This assessment will address the impacts on trees from the proposed works only.
- 5.2 The subject sites form part of a shared path and cycleway along the Parramatta river. The sites are generally well vegetated with multiple trees of varying maturity and value located either side of an existing bitumen pathways.
- 5.3 The proposal seeks to provide upgrades to the existing shared pathways, pedestrian pathways, cyclist pathways and the inclusion of environmentally sensitive lighting.

6. OBSERVATIONS AND GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

- 6.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in appendix 2, where the indicative tree protection zone (TPZ) for the subject trees has been calculated. The TPZ and SRZ should be measured in radius from the centre of the trunk. Trees have been awarded a retention value based on site observations. The system used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. A field sheet of Tree AZ categories sheet (Barrell Tree Consultancy) has been included at the end of the report to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline.
- 6.2 **Site plans:** Refer to the Appendices section of this report for a full list of site plans. Each plan provided contains the tree identification numbers, canopy spread, Tree Protection Zone and Structural Root Zone overlaid onto proposed plans. No site plan has been prepared for Baludarri Wetlands, refer to section 10.
- 6.3 **Tree Inspection Schedules:** Data for each tree assessed can be located in the Appendices section where a tree schedule has been prepared for each site. No Tree Inspection Schedule has been prepared for Baludarri Wetlands, refer to section 10.
- 6.4 **Tree protection zone (TPZ):** The TPZ is principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be the extent where root loss or disturbance will generally impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). The TPZ of palms, other monocots, cycads and tree ferns has been calculated at one metre outside the crown projection.

- 6.5 **Structural Root Zone (SRZ):** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always needs to be maintained to preserve a viable tree. There are several factors that can vary the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ.
- 6.6 **Minor encroachment into TPZ:** Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
- 6.7 **Major encroachment into TPZ:** Where encroachment of more than 10% of the overall TPZ area is proposed an Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.

7. ASSESSEMENT OF CONSTRUCTION IMPACTS OF INDEIVIDUAL SITES

7.1 The tables below contain a summary of the proposed development impact to trees affected by the proposed works at each site. Refer to Appendix 2 for full tree data.

Table 2: George Kendall Riverside Park, Ermington		
Encroachment/ Impact description	Category A Tree Identification Numbers	
	Category Z Tree Identification Numbers	
Retained trees subject to major encroachment from proposed structures or new surfacing that may affect the viability of the tree where <u>impacts can be minimised by tree sensitive construction methods.</u>	3, 4 (Two trees)	0 (No trees)
Retained trees subject to minor encroachment from proposed structures or new surfacing that will not significantly affect the viability of the trees and <u>does not require tree sensitive construction methods.</u>	11 (One tree)	0 (No trees)
Retained trees subject to no encroachment – no new encroachment is proposed from structures or surfaces and trees <u>will not be impacted by the proposed works.</u>	1, 2, 5, 6, 7, 8, 9, 10 (Eight trees)	0 (No trees)
Trees to be removed – trees within the footprint of the proposed structures or surfacing or impacts from major encroachment which <u>cannot be satisfactorily reduced or mitigated to enable the trees retention</u>	0 (No trees)	0 (No trees)

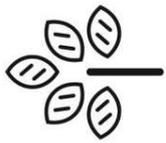


Table 3: Rangihou Reserve, Parramatta		
Encroachment/ Impact description	Category A Tree Identification Numbers	Category Z Tree Identification Numbers
Retained trees subject to major encroachment from proposed structures or new surfacing that may affect the viability of the tree where impacts can be minimised by tree sensitive construction methods.	233, 234, 235, 237, 250, 254, 255, 258, 267, 268, 270, 271, 272, 274, 275, 287 (sixteen trees)	238 (One tree)
Retained trees subject to minor encroachment from proposed structures or new surfacing that will not significantly affect the viability of the trees and does not require tree sensitive construction methods.	233a, 247, 269, 283, 284, 285 (Six trees)	0 (No trees)
Retained trees subject to no encroachment – no new encroachment is proposed from structures or surfaces and trees will not be impacted by the proposed works.	230, 240, 241, 242, 243, 244, 245, 246, 249, 251, 259, 260, 263, 264, 286, 288 (Sixteen)	228, 229, 261, 262, 265 (Five trees)
Trees to be removed – trees within the footprint of the proposed structures or surfacing or impacts from major encroachment which cannot be satisfactorily reduced or mitigated to enable the trees retention	232, 239, 248, 252, 253, 256, 257, 266, 276, 277, 278, 279, 280, 281, 282 (Fifteen trees)	231, 236, 273 (Three trees)

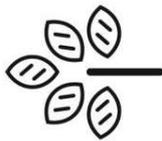


Table 4: Reid Park Rydalmere		
Encroachment/ Impact description	Category A Tree Identification Numbers	Category Z Tree Identification Numbers
Retained trees subject to major encroachment from proposed structures or new surfacing that may affect the viability of the tree where <u>impacts can be minimised by tree sensitive construction methods.</u>	178, 182, 185, 189, 190, 192, 195, 224a, 225a, 226a, 227a, 228a (Twelve trees)	183, 184 (Two trees)
Retained trees subject to minor encroachment from proposed structures or new surfacing that will not significantly affect the viability of the trees and does not require <u>tree sensitive construction methods.</u>	174, 218 (Two trees)	0 (No trees)
Retained trees subject to no encroachment – no new encroachment is proposed from structures or surfaces and <u>trees will not be impacted by the proposed works.</u>	175, 176, 177, 187, 191, 193, 194, 196, 197, 198, 199, 200, 201, 202, 206, 207, 208, 209, 211, 212, 216, 217, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233 (Thirty-two trees)	186, 188, 203, 204, 205, 210, 213, 214, 215, 219, 220, 221, 222, 223 (Fourteen trees)
Trees to be removed – trees within the footprint of the proposed structures or surfacing or impacts from major encroachment which <u>cannot be satisfactorily reduced or mitigated to enable the trees retention.</u>	N/A	179, 180, 181 (Three trees)

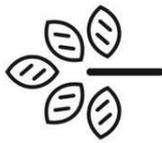


Table 5: Royal Shores, Ermington		
Encroachment/ Impact description	Category A Tree Identification Numbers	Category Z Tree Identification Numbers
Retained trees subject to major encroachment from proposed structures or new surfacing that may affect the viability of the tree where impacts can be <u>minimised by tree sensitive construction methods.</u>	15, 16, 23, 41, 159, 165, 167, 171 (Eight Trees)	139 (One Tree)
Retained trees subject to minor encroachment from proposed structures or new surfacing that will not significantly affect the viability of the trees and <u>does not require tree sensitive construction methods.</u>	21, 25, 26, 27, 31, 42, 52, 67, 71, 72, 73, 74, 75, 76, 79, 90, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 107, 109, 111, 112, 113, 136, 145, 146, 154, 172, 173 (Thirty-nine trees)	0 (No trees)
Retained trees subject to no encroachment – no new encroachment is proposed from structures or surfaces and <u>trees will not be impacted by the proposed works.</u>	14, 18, 19, 20, 22, 28, 29, 30, 36, 43, 42a, 43a, 44, 45, 46, 47, 48, 49, 51, 53, 54, 55, 56, 57, 58, 59, 61, 62, 63, 65, 66, 68, 69, 70, 77, 78, 80, 81, 82, 83, 84, 85, 87, 88, 89, 106, 108, 114, 115, 116, 117, 118, 119, 120, 121, 123, 124, 125, 127, 128, 129, 130, 131, 132, 133, 134, 135, 137, 138, 141, 144, 147, 148, 152, 153, 156, 157, 158, 160, 161, 163, 168, 169 (Eighty-three trees)	32, 33, 34, 35, 37, 50, 60, 64, 86, 91, 92, 93, 122, 126, 140, 142, 143, 149, 162, 170 (Twenty trees)
Trees to be removed – trees within the footprint of the proposed structures or surfacing or impacts from major encroachment which <u>cannot be satisfactorily reduced or mitigated to enable the trees retention</u>	13, 17, 24, 40, 110, 150, 151, 155, 164, 166 (Ten trees)	12, 38, 39 (Three trees)

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 **Table 6:** The table below provides additional information on the recommendations arising from major and minor encroachments and their associated potential impacts.

Encroachment/ Impacts	Conclusions and Recommendations	Total number of trees across the sites
Major	Trees proposed to be retained subject to major encroachment greater than 10% within the Tree Protection Zones or any encroachment within the Structural Root Zones will require tree sensitive methods of construction to minimise development impacts. The dominant source of encroachment from the proposed works is hard surfacing which can potentially be carried out while retaining significant tree roots. Refer to section 9 for full specifications on how to retain tree roots and minimise the impacts below new hard surfacing.	42
Minor	Trees subject to minor encroachment of less than 10% within the Tree Protection Zone with no encroachment in the Structural Root Zone will not be subject to significant impacts and are therefore tree sensitive construction methods are not required and the trees are identified for retention.	48
None	Trees that will not be subject to encroachment and can be retained without development impact.	178
Remove	Trees subject to impacts from major encroachment that cannot be sufficiently mitigated by tree sensitive construction or are within the footprint of proposed hard surfacing and cannot be retained.	34

8.2 **Table 7:** The following table contains recommendations for specific trees that require modifications to the proposal to minimise the associated impact. The trees included in table 7 are generally of higher value and the modifications to design are considered a worthy consideration to reduce development impacts.

Location	Tree ID numbers and additional notes/recommendations
George Kendall Reserve	<ul style="list-style-type: none"> - Tree 3. Consider increasing the setback of the new section of cycleway to 2.6 metres from the centre of the trunk to avoid the SRZ area. - Tree 4. Consider increasing the setback of the new section of cycleway to 1.6 metres from the centre of the trunk to avoid the SRZ area.
Rangihou Reserve	<ul style="list-style-type: none"> - Tree 268. The proposed raised boardwalk is required to be constructed above the existing soil grade with piers located outside of the 2.8 metre SRZ. - Tree 271. The proposed raised boardwalk is required to be constructed above the existing soil grade with piers located outside of the 2 metre SRZ. - Tree 272. The proposed raised boardwalk is required to be constructed above the existing soil grade with piers located outside of the 2 metre SRZ. - Tree 274 and 275. Major encroachment into the SRZ area. Consider extending the pathway on the opposite side to the trees to minimise impacts.
Reid park	<ul style="list-style-type: none"> - Tree 192. The setback of the existing path is recommended to be maintained within 6.5 metres of the centre of the tree trunk. Alternatively the section of pathway should be bridged over the TPZ ad SRZ, refer to section 9. - Tree 195. The setback of the existing path is recommended to be maintained within 6.4 metres of the centre of the tree trunk. Alternatively the section of pathway should be bridged over the TPZ ad SRZ, refer to section 9.

Location	Tree ID numbers and additional notes/recommendations
<p>Royal Shores</p>	<ul style="list-style-type: none"> - Livistona species. Numerous individual Palm trees will be subject to major encroachment from the proposed new cycleway and shared paths. The roots systems of dicotyledonous and coniferous trees are characterised by large, multi-branched woody roots. In contrast, Palms have an adventitious root system composed of numerous, simple fibrous primary roots that arise independently and periodically from the Root Initiation Zone (RIZ) at the base of the trunk. Studies conducted by <i>Broschat and Donselman</i> (1984,1990) in regard to the severing of palm roots for the purpose of transplanting state, “most of a mature palms roots are found within 30cm of the trunk”, and in conclusion found that most mature palms need only a root ball of 30cm radius from the trunk and 30cm soil depth to survive. Literature also shows that most palms are able to generate new root systems, with the production of new roots from the RIZ and / or branching and regrowth of roots severed during transplanting (<i>Pittenger et al 2005</i>). Although there are major encroachments to multiple Palm trees, with reference to the literature and the setbacks on the remaining sides of the TPZ the development should have a minimal impact on the long-term viability of the Palms. - Tree 13. The tree is located on an embankment proposed to be excavated for the new pathway and retaining wall which will encroach by up to 30% of the TPZ and the SRZ. Due to the proposed excavation, tree sensitive construction may not be achievable and a greater setback outside of the 2.7 metre SRZ area should be provided if the tree is to be retained. The tree is currently identified for removal. - Tree 16. Mangroves have been grouped into T16. They will not be affected by the proposed works as they are situated on a lower level than the proposed works supported by a retaining wall. - Tree 110. The plans provided identify T110 for removal. The proposed hard surfaces encroach by up to 30% in the TPZ and the SRZ indicating tree sensitive construction methods to retain significant tree roots could enable the retention of the tree. The tree is currently identified for removal as per the proposed plans. - Trees 145 and 146. Livistona Palm species. The proposed pathway is located within close proximity to the RIZ (refer to the notes above on RIZ) indicating the Palm may be impacted by the major encroachment. Allowing a greater setback from the trunk of up to 500mm will reduce the impact. The trees are currently identified for retention. - Tree 165. The proposed pathway location transects through the landscapes area containing significant trees. The existing levels are higher than the existing (and assumed proposed pathway) indicating grading will be required which will significantly impact the tree. A raised boardwalk section over the TPZ and SRZ will allow the retention of major tree roots and minimise the impact on the tree. The tree is currently identified for retention under tree sensitive construction methods.

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 Date prepared: 23rd December 2024

9. TREE SENSITIVE CONSTRUCTION SPECIFICATIONS

9.1 Tree Sensitive Construction Specification: The dominant source of impact from the proposed upgrades is the installation of hard surfacing. To ensure that trees identified for retention are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be completed in accordance with these specifications, the trees may not be viable for retention.

9.1.1 Tree Sensitive Hard Surfacing Construction: Hard surfacing within the TPZ of the trees should be constructed in a tree sensitive method. The hard surfacing should be constructed above existing grades in the TPZ of the trees. The diagram below (Image C) gives an example of a no-excavation method for constructing hard surfacing close to trees. The location of retaining pegs should be flexible, avoiding damage to structural roots.

If excavations are essential, they must not exceed 100mm below the existing grades. The excavations should be supervised by a project Arborist with a minimum AQF level 5 qualification. All excavations for the hard surfacing should be carried out manually to avoid impacting retained tree roots. All tree roots greater than 40mm in diameter should be retained unless the project arborist has assessed and advised that the pruning/severing of the root will not impact the condition or stability of the tree. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device.

Where tree roots greater than 40mm are encountered that must be retained, the hard surfacing should be elevated over the individual tree root to allow for its retention. Examples of methods that can be used to bridge individual tree roots have been included below (Image D and E). Using pier and beam bridges as per image E is the recommended/preferred method, as it will allow for future growth of the tree roots, reducing future damage to the surfacing from the roots.

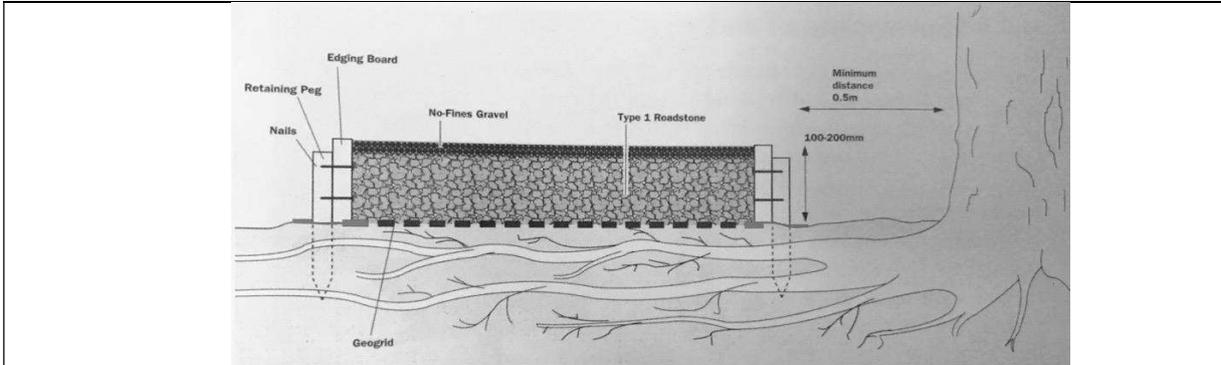


Image C: An image from 'Tree Roots in the Built Environment'⁵, showing how to construct hard surfacing above a trees root system without excavation. Type 1 Roadstones are an example of blue metal or crushed sandstone.

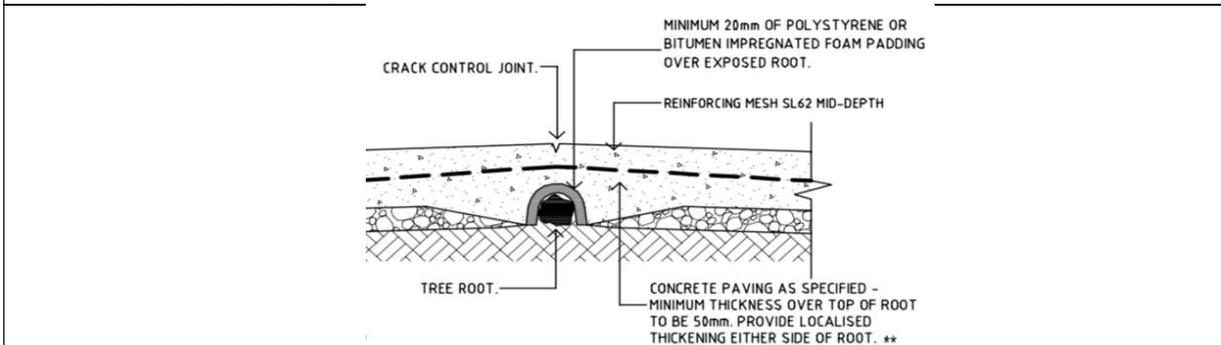


Image D: Example method for bridging concrete surfacing over tree roots provided in the Canterbury Bankstown Council standard drawings.⁶

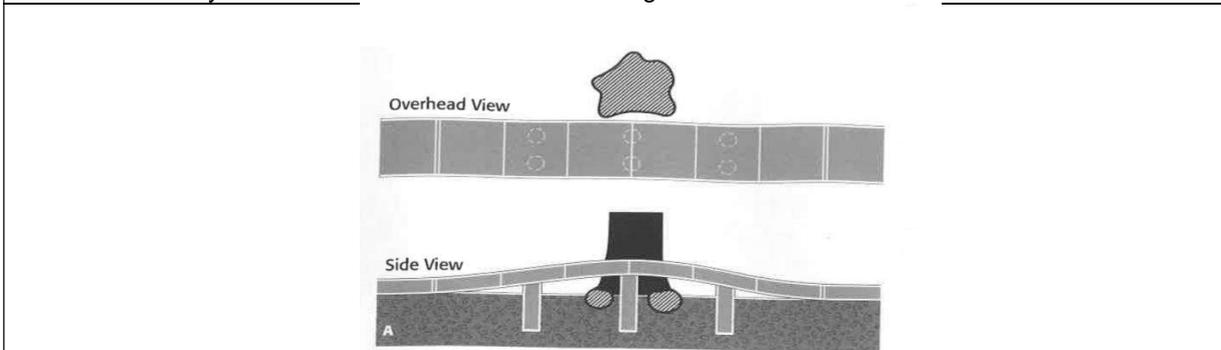


Image E: Example method from Reducing infrastructure damage by tree roots: A compendium of strategies.⁷

⁵ Roberts, J., Jackson, N., & Smith, M., *Tree Roots in the Built Environment*, The Stationary Office, London, England (2006). Page 305 & 306.

⁶ Canterbury Bankstown Council standard drawing S-209 Existing street tree treatments, <https://www.cbcity.nsw.gov.au/development/planning-control-policies/council-standard-drawings>, accessed 3 October 2019.

⁷ Costello, L. R., & Jones, K. S., *Reducing infrastructure damage by tree roots: A compendium of strategies*, Western Chapter of the International Society of Arboriculture, 31883 Success Valley Drive, Porterville, CA (2003), page 27.

9.1.2 Underground services: AS4970 Protection of trees on development sites (2009) recommends that all underground services located inside the TPZ of any tree to be retained should be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention.

If directional drilling is proposed, section 4.5.5 of AS4970-2009 says that 'The directional drilling bore should be at least 600 mm deep. The project Arborist should assess the likely impacts of boring and bore pits on retained trees'.⁸ If manual excavations are proposed, all excavations for the services should be carried out manually under the supervision of the project Arborist (minimum qualification AQF 5). Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. All roots greater than 40mm in diameter should be retained in the service trench. The service pipe should then be threaded below the retained roots where practical. Roots greater than 40mm within the alignment of the service pipe should only be severed/pruned under the approval of the project Arborist. All root pruning should be in accordance with AS4373 Pruning of amenity trees (2007). Open trenching in the SRZ of trees can be impractical without impacting significant roots, as often dense root growth is present in the SRZ. Open trenching should therefore be avoided in the SRZ. It is recommended that any section of pipe that is located in the SRZ of trees to be retained is installed via sub-surface boring/directional drilling methods only. The feasibility of sub-surface boring/directional drilling will need to be investigated by a sub-surface boring/directional drilling specialist. The project Arborist should provide advice and supervise excavations for bore pits, which must be carried out manually if located within the TPZ. The top of the pipe must be at least 600mm below the existing soil grade. The location of bore pits should be flexible in the TPZ to avoid significant roots, the project Arborist should assess and advise in writing the impact of any significant root severance to the condition of the tree.

9.1.3 Tree Sensitive Pier Footings (decking and boardwalks): To minimise root loss in the TPZ of the trees, the footings of the structures must be located to avoid significant tree roots in the TPZ and SRZ. To ensure that significant tree roots are retained, it must be demonstrated that the following construction methods can be implemented;

- All decking boards/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

⁸ Council Of Standards Australia, *AS 4970 Protection of trees on development sites* (2009) page 18.

- Excavations in the TPZ should be for pier footings only. All excavations for piers must be carried out manually under the supervision of the project Arborist (see section 11 for details of manual excavation and project Arborist).
- The location of piers must be flexible to avoid significant roots (roots greater than 40mm in diameter). If practical, it is recommended that piers are located to avoid the SRZ of the trees.
- All roots greater than 40mm in diameter must be retained unless the project arborist has assessed and approved in writing that the root(s) are not critical to the health or stability of the tree.

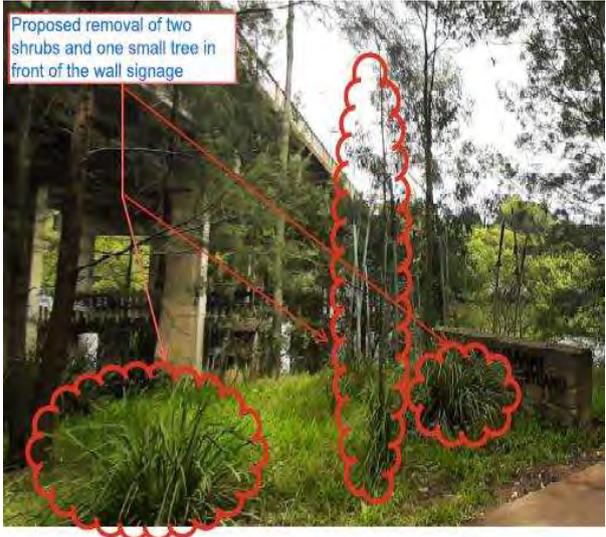
9.1.4 Root investigations: Where major TPZ encroachments require demonstrating the viability of trees the following method for root investigations is to be used. Non-destructive excavations are to be carried out along the outer edge of proposed or existing structures within the TPZ (excavation methods include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device). Excavations generally consist of a trench to a depth dictated by the location of significant roots, bedrock, unfavourable conditions for root growth, or the required depth for footings up to 1 metre. The investigation is to be carried out by AQF5 consulting Arborist who is to record all roots greater than 40 millimetres in diameter and produce a report discussing the significance of the findings. No roots 40 millimetres in diameter are to be frayed or damaged during excavation and the trench is to be backfilled as soon as possible to reduce the risk of roots drying out. In the event roots must be left exposed they are to be wrapped in hessian sack and regularly irrigated for the duration of exposure.

9.2 All construction activity is recommended to comply with Australian Standard AS4970 Protection of Trees on Development Sites (2009), sections 7, 10 and 11 of this report.

9.3 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

10. BALUDARRI WETLANDS

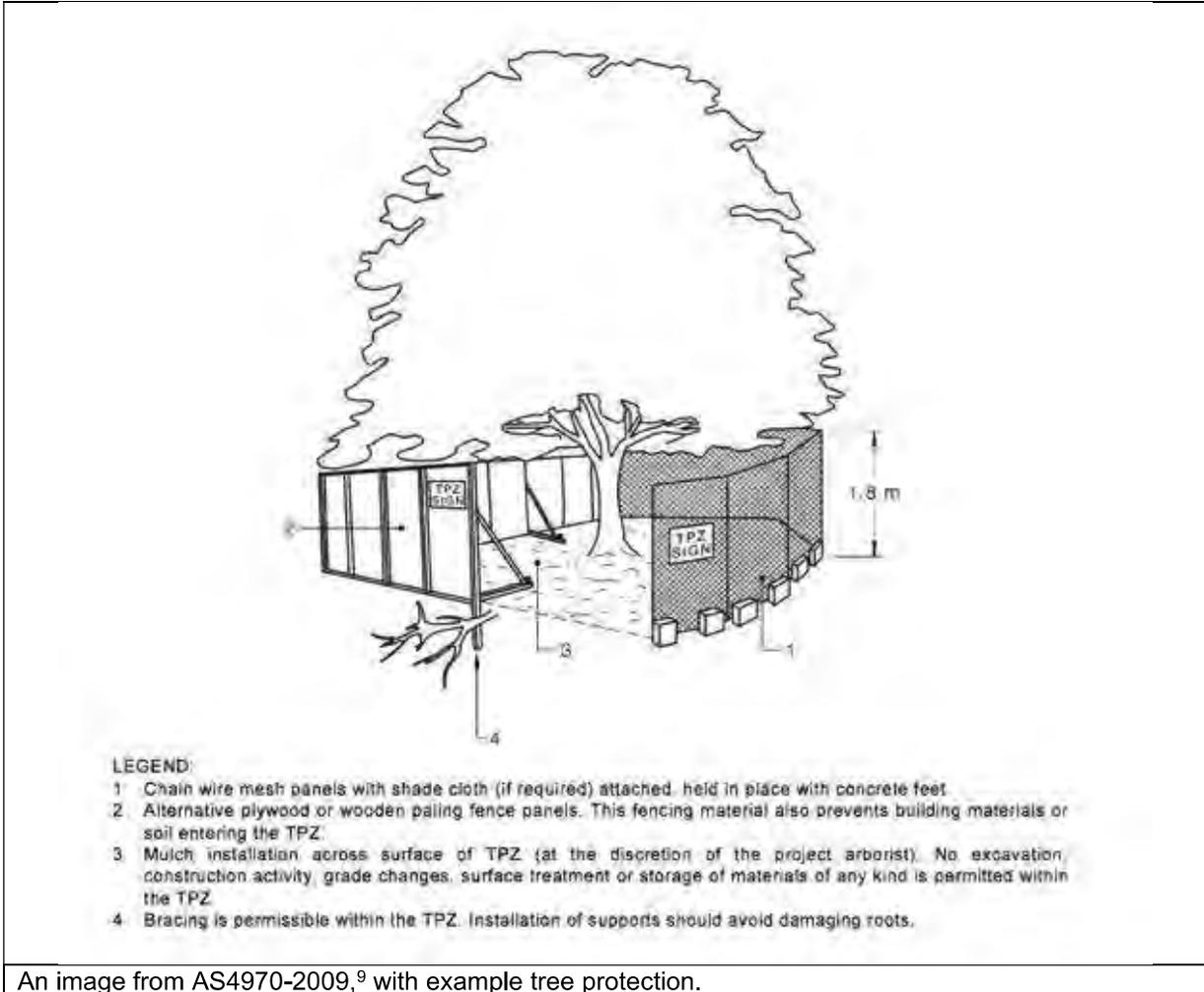
- 10.1 The works proposed in this location that affects trees is the cleaning and upgrade of the sandstone block walls at each end of the reserve which show the name of the reserve. The other proposed works consist of installing environmentally sensitive lighting that will not impact trees.
- 10.2 At the eastern side of the site, one small *Callistemon viminalis* is proposed to be removed: the tree is approximately 1 metre tall and is multi stemmed. The tree is considered to be easily replaceable.
- 10.3 To the western end of the site, two *Lomandra* grasses are proposed to be removed and one young Eucalypt Spp. The eucalypt is estimated to be less than five years old and has a height of approximately 3 metres and a stem diameter of 50 millimetres. Both the *Eucalypt* and the *Lomandra* are considered to be easily offset with replacement planting. Refer to the images below.

	
<p>Image A: Eastern site of Baludarri Wetland and proposed vegetation removal.</p>	<p>Image A: Western site of Baludarri Wetland and proposed vegetation removal.</p>

11. ARBORICULTURAL WORK METHOD STATEMENT (AMS) AND TREE PROTECTION REQUIREMENTS

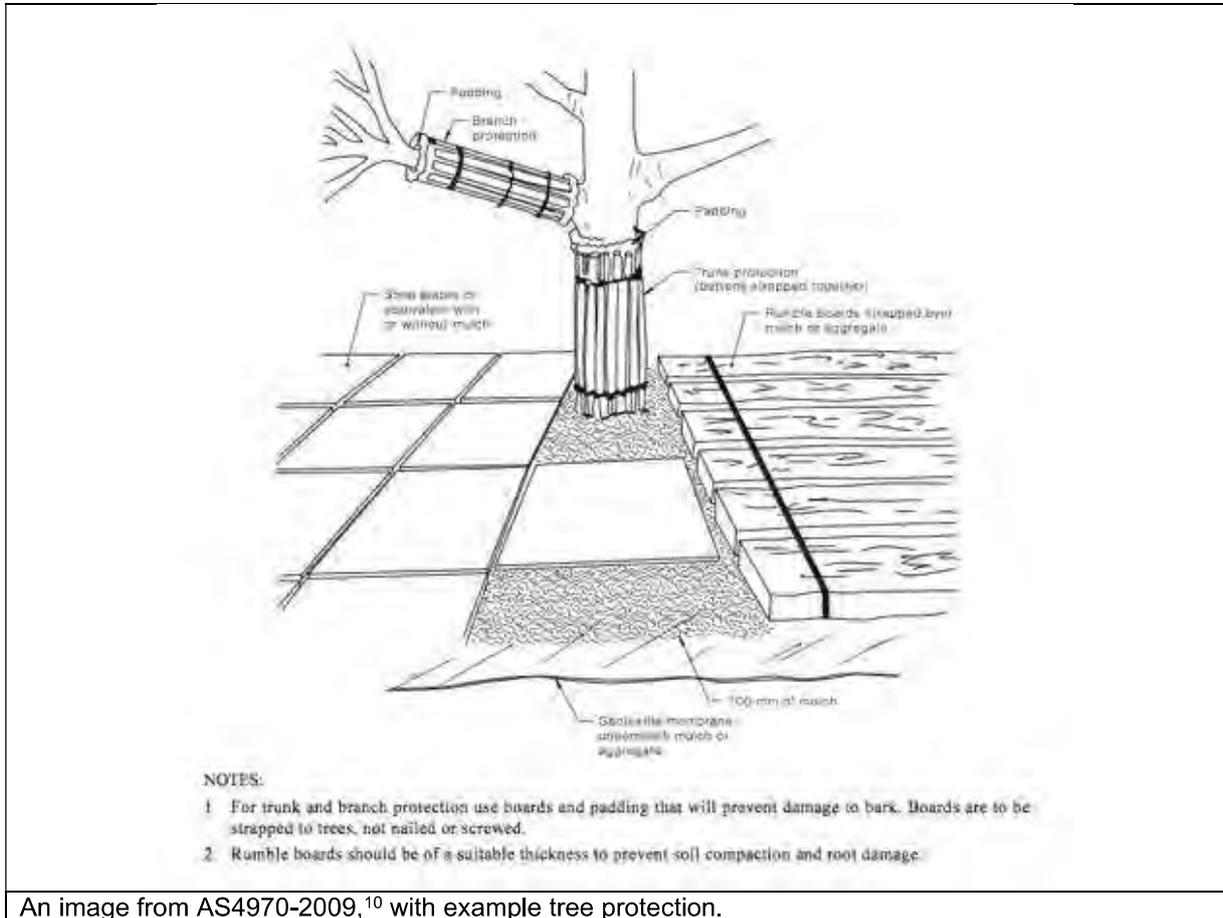
- 11.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site and be provided a copy of this report.
- 11.2 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.
- 11.3 **Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 3 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).
- 11.4 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principle contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. I recommend regular site inspections on a frequency based on the longevity of the project, this is to be agreed in the initial meeting.
- 11.5 **Tree protection Specifications:** It is the responsibility of the principle contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.
- 11.6 **Protective fencing:** Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing in unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

- 11.7 **TPZ signage:** Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:
- Tree protection zone/No access.
 - This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
 - The name, address, and telephone number of the developer/builder and project Arborist
- 11.8 **Trunk and Branch Protection:** The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.
- 11.9 **Mulch:** Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.
- 11.10 **Ground Protection:** Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.



An image from AS4970-2009,⁹ with example tree protection.

⁹ Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.



An image from AS4970-2009,¹⁰ with example tree protection.

11.11 Restricted activities inside TPZ: The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

- A) Machine excavation.
- B) Ripping or cultivation of soil.
- C) Storage of spoil, soil or any such materials
- D) Preparation of chemicals, including preparation of cement products.
- E) Refueling.
- F) Dumping of waste.
- G) Wash down and cleaning of equipment.
- H) Placement of fill.
- I) Lighting of fires.

¹⁰ Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

- J) Soil level changes.
- K) Any physical damage to the crown, trunk, or root system.
- L) Parking of vehicles.

11.12 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

11.13 **Excavations and root pruning:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For excavations within the TPZ, manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 10mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).¹¹ The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

11.14 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpath should be located outside the SRZ.

¹¹ Council Of Standards Australia, AS 4373 *Pruning of amenity trees* (2007) page 18

The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

Sediment and Contamination: All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

- 11.15 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.
- 11.16 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

12. HOLD POINTS

12.1 **Hold Points:** Below is a sequence of hold points requiring project Arborist certification throughout the development process. It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development.

Hold Point	Stage	Responsibility	Certification	Complete Y/N and date
Project Arborist to hold pre construction site meeting with principle contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise.	Prior to work commencing.	Principle contractor	Project Arborist	
Project Arborist To supervise all pruning works to retained trees.	Prior to works commencing	Principal Contractor	Project Arborist	
Project Arborist to assess and certify that tree protection has been installed in accordance with section 11 and AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	Principle contractor	Project Arborist	
In accordance with AS4970-2009 the project arborist should carry out regular site inspections to ensure works are carried out in accordance with the recommendations. I recommend site inspections on a monthly frequency.	Ongoing throughout the development	Principle contractor	Project Arborist	
Project Arborist to supervise all manual excavations and demolition inside the TPZ of any tree to be retained.	Construction	Principle contractor	Project Arborist	



HUGH
THE ARBORIST

Hold Point	Stage	Responsibility	Certification	Complete Y/N and date
Project Arborist to certify that all pruning of roots greater than 40mm in diameter has been carried out in accordance with AS4373-2007. All root pruning must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	Principle contractor	Project Arborist	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	Principle contractor	Project Arborist	
All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimize the impact to trees.	Landscape	Principle contractor	Project Arborist	
After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigor and authorize the removal of protective fencing. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of construction	Principle contractor	Project Arborist	
Any wounding or injury that occurs to a tree during the demolition/construction process will require the project arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. All remediation work is to be carried out by the project arborist, at the contractor's expense.	Ongoing throughout the development	Principle contractor	Project Arborist	

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 Date prepared: 23rd December 2024

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14. LIST OF APPENDICES

The following are included in the appendices that have been provided as separate documents to this report:

- Appendix 1 - Proposed Site Plans
- Appendix 2 – Tree Inspection Schedules
- Appendix 3 – Health
- Appendix 4 – Amenity/Landscape Value
- Appendix 5 – Age Class
- Appendix 6 – Structural Condition
- Appendix 7 – SULE Categories
- Appendix 8 – Tree AZ Values
- Appendix 9 – TPZ Encroachment

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Prepared for: City of Parramatta Council
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Date prepared: 23rd December 2024

Flora and Fauna Assessment

Eastern Parramatta River & CBD Precinct Cycleway

Prepared for: City of Parramatta Council

Report Date: March 2025





Document Control

Project Title: Flora and Fauna Assessment – Eastern Parramatta River & CBD Precinct Cycleway

Project Manager: Alex Graham *BSc (Biology), Grad Dip. (Bushfire Protection)*

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GLOSSARY

Abbreviation	Definition
amsl	Above mean sea level
BAM	Biodiversity Assessment Method 2020
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BDAR	Biodiversity Development Assessment Report
BOM	Bureau of Meteorology
DBH	Diameter at Breast Height
DCCEEW	Department of Climate Change, the Environment and Water
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
ECE	East Coast Ecology
EP&A Act	<i>Environmental Planning & Assessment Act 1979 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FFA	Flora and Fauna Assessment
FM Act	<i>Fisheries Management Act 1994</i>
ha	Hectares
km	Kilometres
LGA	Local Government Area
Locality	The same meaning when describing a local population of a species or local occurrence of an ecological community.
m	metres
mm	millimetres
MNES	Matters of National Environmental Significance
NSW	New South Wales
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
SIS	Species Impact Statement
Subject Land	The land depicted in Figure 1 - Figure 6.
TEC	Threatened Ecological Community
TfNSW	Transport for NSW

1. INTRODUCTION

1.1 The Proposed Activity

The City of Parramatta Council proposes to upgrade the existing Eastern Parramatta River and CBD Precinct Cycleway. The current cycleway stretches over 15km alongside the Parramatta River and is an important asset and public facility of the Parramatta CBD. The proposal is concentrated within the following five separate site locations along the existing cycleway:

- Rangihou Reserve, Parramatta
- Baludarri Wetlands, Parramatta
- Ried Park, Rydalmere
- Royal Shores, Ermington, and
- George Kendall Riverside Park, Ermington.

These areas been identified as high priority for upgrade due to an increase in cyclist and pedestrian usage.

Key features of the proposed activity would include the following scope of works:

- Resurfacing and widening of the existing pathway
- Installation of new public seating
- Replacement of existing fencing with sandstone retaining walls, and
- Installation of new light poles and LED handrail lights.

To facilitate the proposed activity, removal of native vegetation will be required. East Coast Ecology Pty Ltd (ECE) was commissioned by City of Parramatta Council to prepare a Flora and Fauna Assessment (FFA) to assess the works associated with the proposed activity.

1.2 The Subject Land

The area assessed within this report is referred to as the 'Subject Land' and has been defined by the extent of construction including proposed path extensions and lighting upgrades as depicted in the Concept Design Plans (City of Parramatta Council, 2024) (**Appendix A**).

The location of the proposed activity is depicted in **Figure 1- Figure 6**.

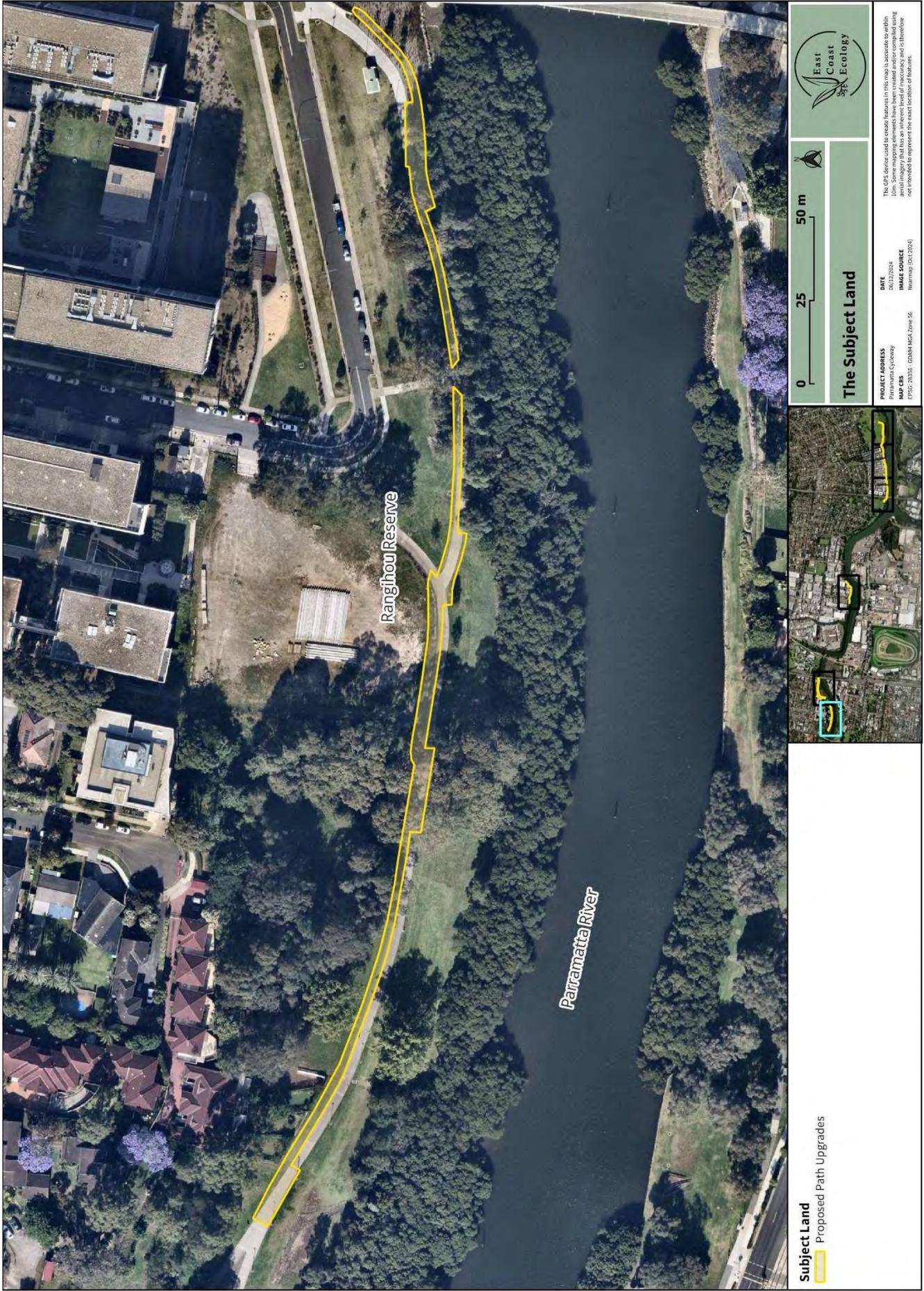


Figure 1. The Subject Land (Rangihou Reserve).

East Coast Ecology – Flora and Fauna Assessment
 Eastern Parramatta River & CBD Precinct Cycleway

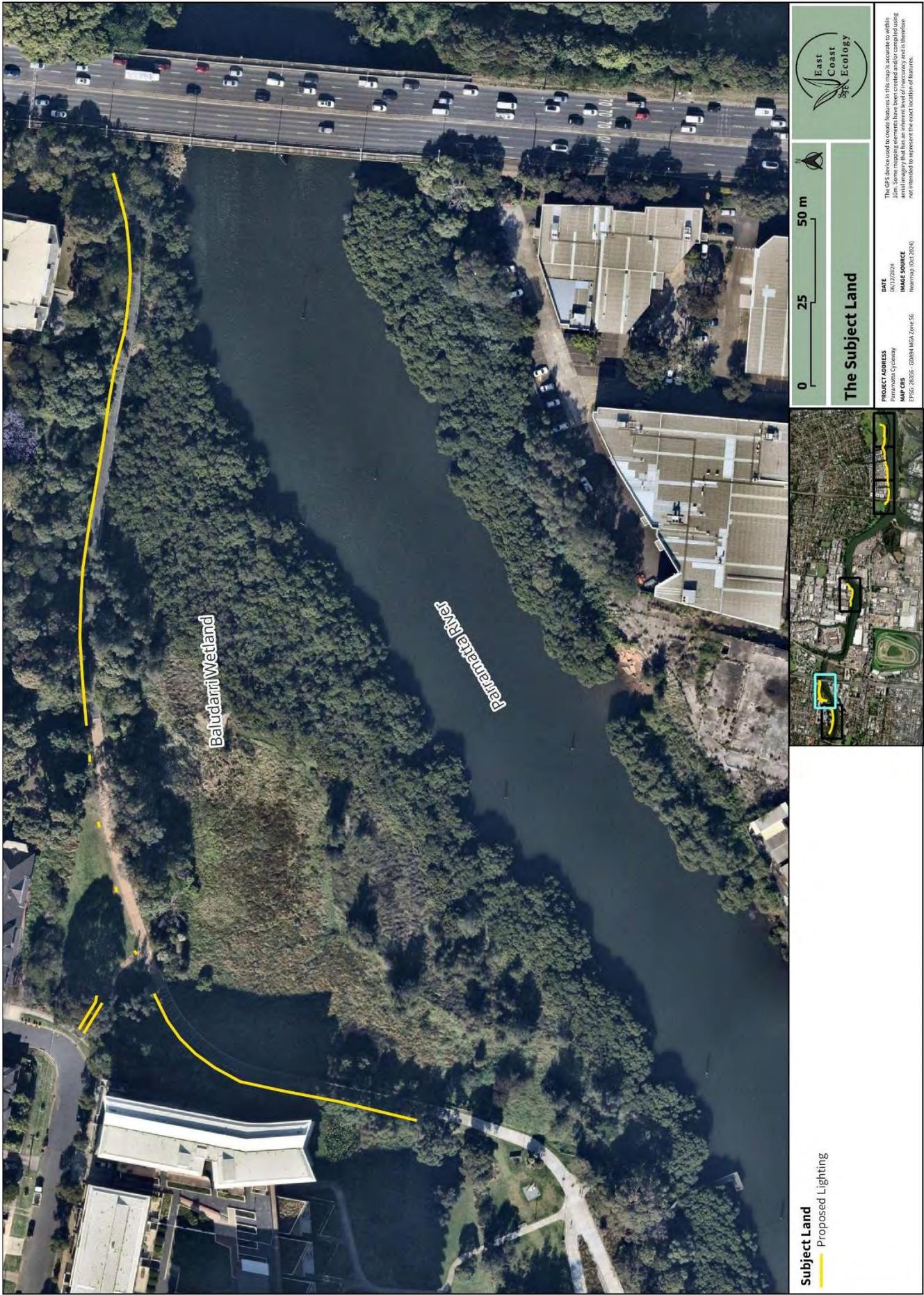
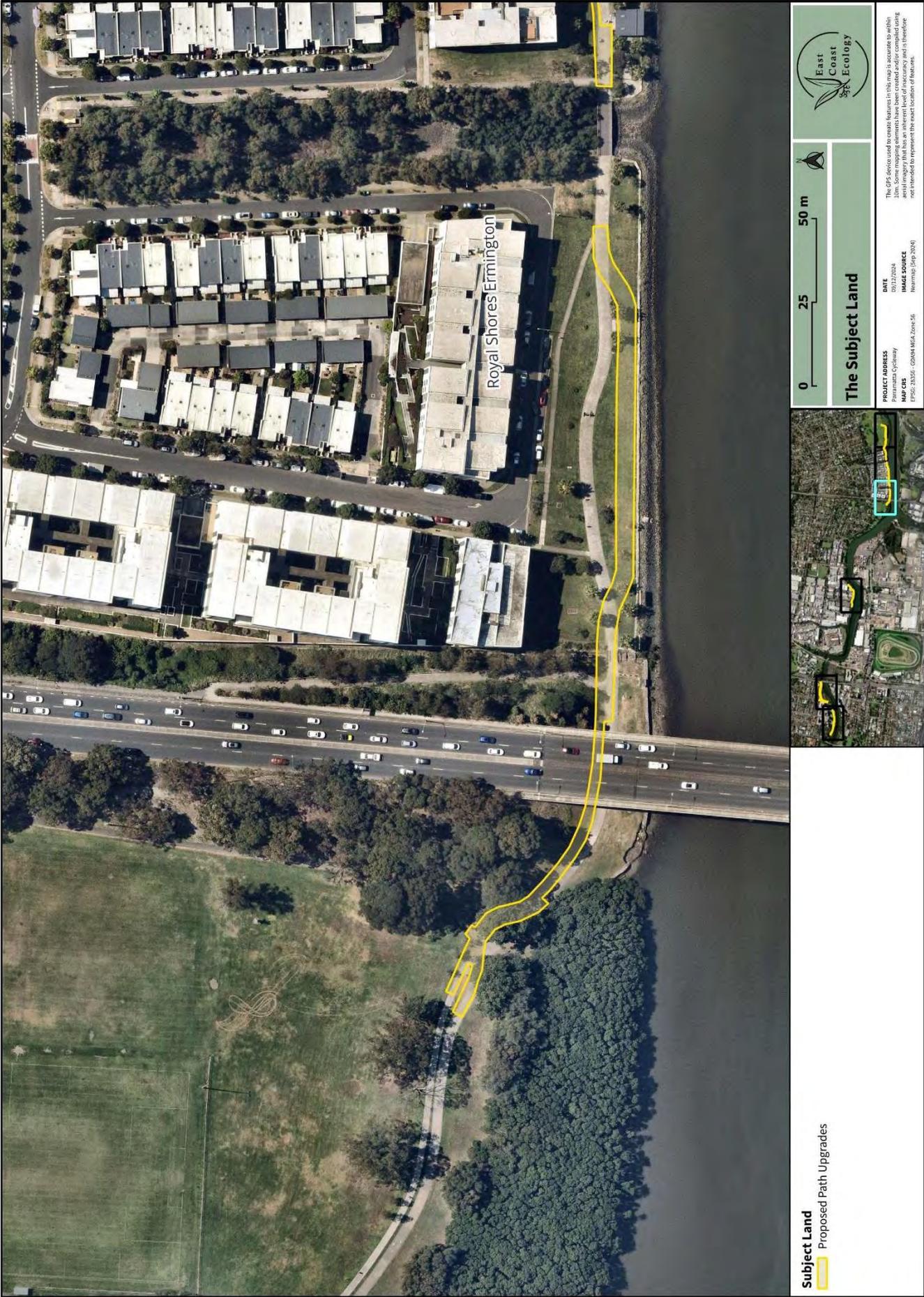


Figure 2. The Subject Land (Baludarrri Wetland).



Figure 3. The Subject Land (Reid Park).



Subject Land
 Proposed Path Upgrades

The Subject Land

PROJECT ADDRESS
 Parramatta Cycleway
 M47 CBD
 EPSR 2035F - CDNR MRA Zone 56

DATE
 02/12/2024

IMAGE SOURCE
 Nearmap (Sep 2018)

0 25 50 m

East Coast Ecology

The GPS service used to create features in this map is accurate to within 10 metres. The aerial imagery has an inherent level of inaccuracy and is therefore not intended to represent the exact location of features.

Figure 4. The Subject Land (Royal Shores Ermington).

East Coast Ecology - Flora and Fauna Assessment
 Eastern Parramatta River & CBD Precinct Cycleway

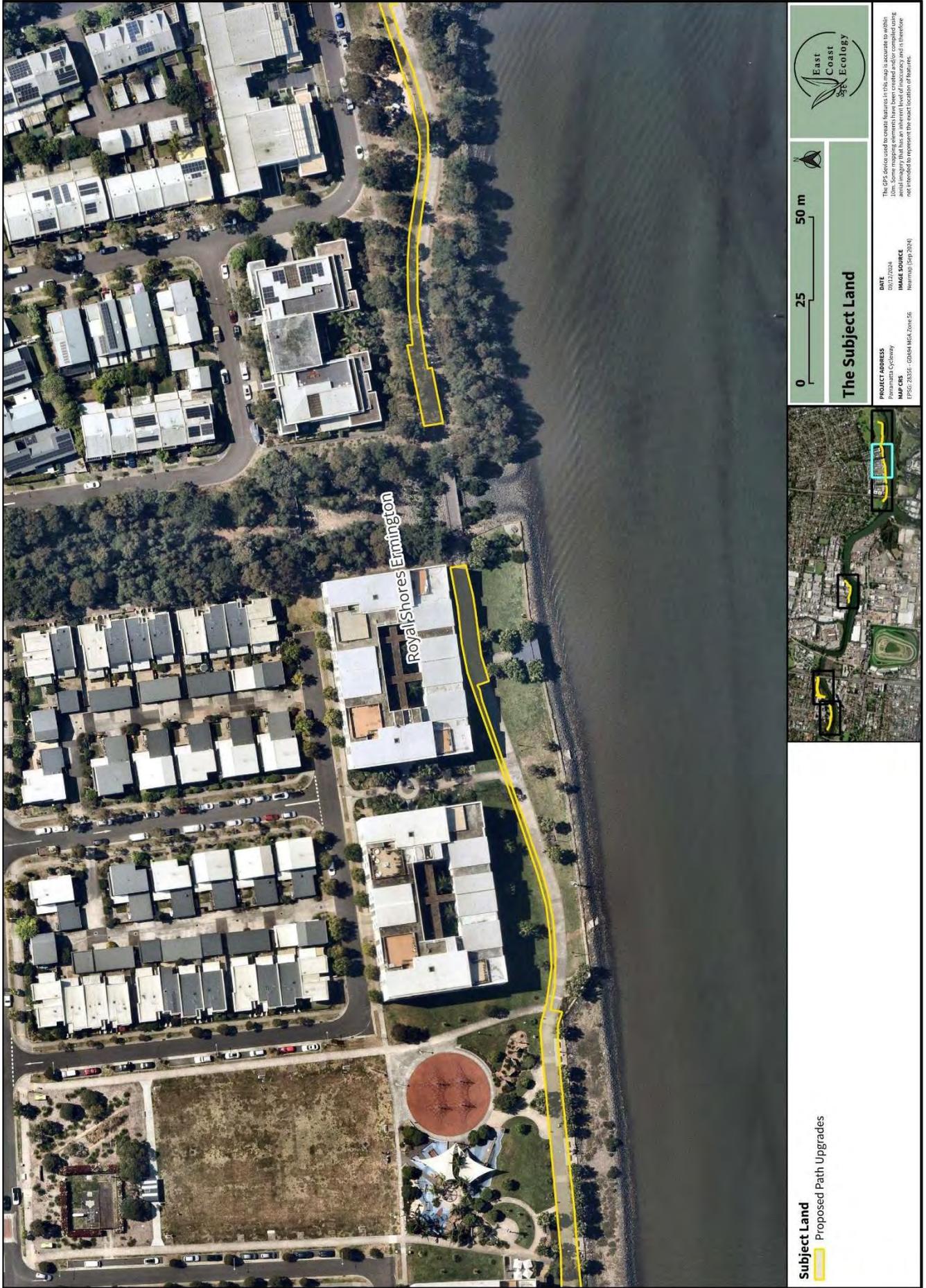


Figure 5. The Subject Land (Royal Shores Ermington).

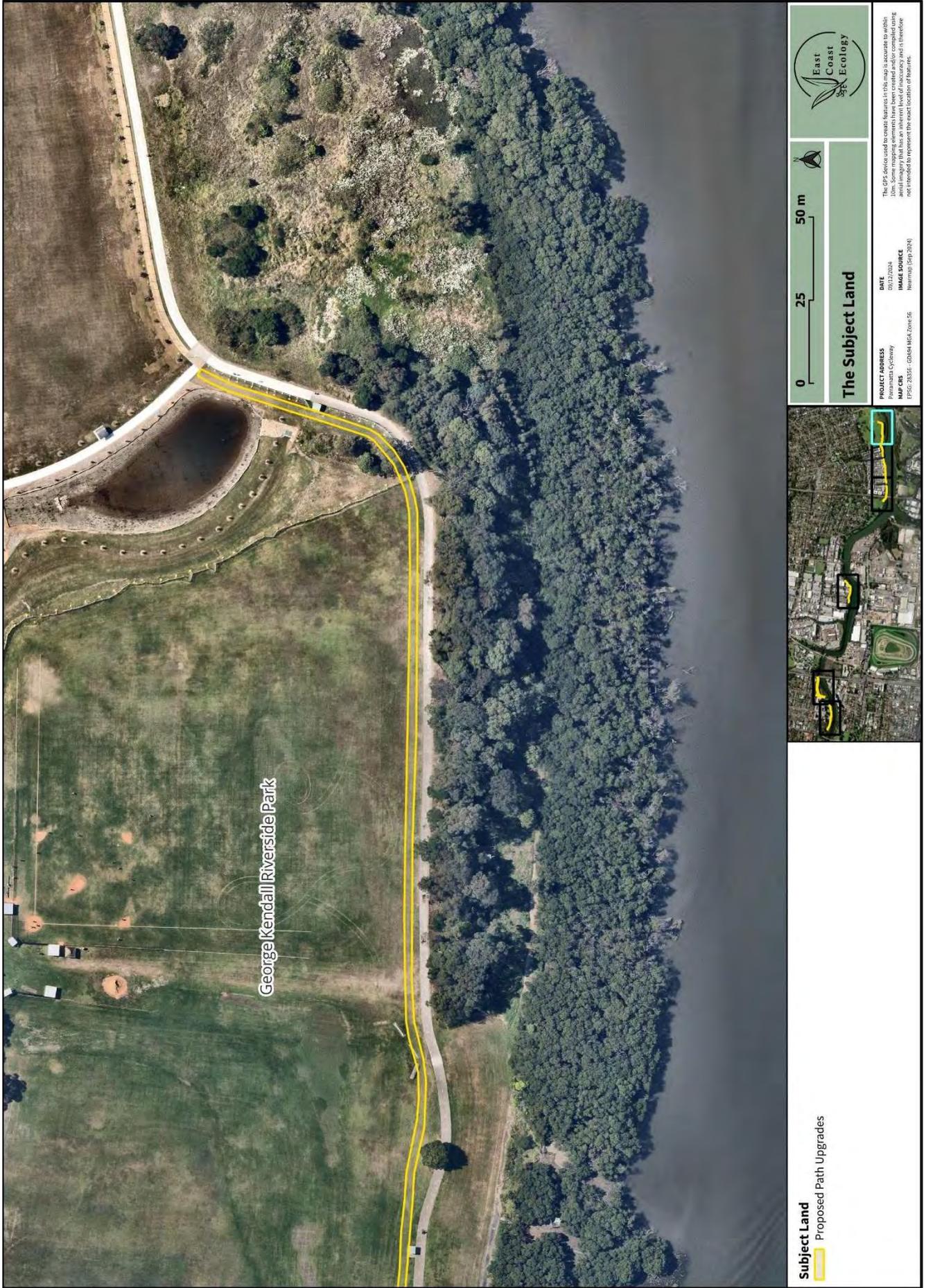


Figure 6. The Subject Land (George Kendall Riverside Park).

1.3 Legislative Context

1.3.1 *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)*

The Commonwealth EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places which are considered Matters of National Environmental Significance (MNES). Under the EPBC Act, approval is required for actions that have, will have, or are likely to have a significant impact on MNES.

Several EPBC listed threatened species have potential to utilise the Subject Land. The proposed activity will not result in a 'significant impact' on any MNES and a referral to the Australian Government Minister for the Environment is not required.

1.3.2 *Environmental Planning and Assessment Act 1979*

The *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) establishes the system of environmental planning and assessment in NSW. The proposed activity is being assessed under Division 5.1 of the EP&A Act via a Review of Environment Factors (REF). This report provides input into the REF and environmental impact assessment process by providing assessment specific to matters of biodiversity.

1.3.3 *Biodiversity Conservation Act 2016*

The BC Act (NSW) seeks to conserve biological diversity and promote ecologically sustainable development, to prevent extinction and promote recovery of threatened species, populations and ecological communities and to protect areas of outstanding biodiversity value.

Several BC Act listed threatened species have the potential to occur within, or utilise, the Subject Land. The BC Act requires that the significance of the impact on threatened species, populations and threatened ecological communities is assessed using the test listed in Section 7.3 of the BC Act. Where a significant impact is likely to occur, a Species Impact Statement (SIS) must be prepared in accordance with the Environment Agency Head's requirements, or a Biodiversity Development Assessment Report (BDAR) must be prepared by an accredited assessor in accordance with the Biodiversity Assessment Method (BAM) (DPE, 2020a). The proposed activity will not result in a 'significant impact' on any threatened entities and therefore the Biodiversity Offset Scheme is not triggered (**Appendix C**). As such, an SIS or a BDAR is not required. The Subject Land is not located within any Areas of Outstanding Biodiversity Value.

1.3.4 *Biosecurity Act 2015*

The *Biosecurity Act 2015* (NSW) provides a framework for the prevention, elimination and minimisation of biosecurity risks posed by an activity as a matter of biosecurity. As defined in Part 3, section 23 of this Act, any non-conformance by an individual is defined as guilty of an offence.

No priority weeds for the Greater Sydney Region were identified within the Subject Land.

Suitable mitigation measures (**Section 7.2**) have been provided to manage weeds within the impact areas in accordance with the *Biosecurity Act 2015*, should they be identified in future.

1.3.5 Water Management Act 2000

The main objective of the *Water Management Act 2000* (NSW) (WM Act) is to manage NSW water in a sustainable and integrated manner that will benefit today's generations without compromising future generations' ability to meet their needs. Section 91E of the Act establishes an approval regime for controlled activities within waterfront land. However, clause 41 of the Water Management (General) Regulation 2018 provides an exemption for public authorities in relation to all controlled activities on waterfront land. Therefore, approval under the WM Act is not required.

1.3.6 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (NSW) (FM Act) aims to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations including conserving fish stocks and key fish habitats and promoting ecologically sustainable development. No Key Fish Habitat (KFH) was identified within the Subject Land. The closest KFH is mapped within the Parramatta River, immediately adjoining the Subject Land, however, no impact to KFH is expected.

1.3.7 State Environmental Planning Policy (Biodiversity and Conservation) 2021

On 1 March 2022, the State Environmental Planning Policy (Biodiversity Conservation) 2021 (Biodiversity Conservation SEPP) came into effect, consolidating and repealing several former State Environmental Planning Policies (SEPPs) and Regional Environmental Plans (REPs) relating to biodiversity in NSW. Specifically, Chapters 3 and 4 of the Biodiversity Conservation SEPP incorporate the Koala SEPP 2020 and Koala SEPP 2021, respectively. Neither Chapter 3, nor Chapter 4 of the Biodiversity Conservation SEPP apply to the Hills Shire LGA.

Chapter 2 aims to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation. Chapter 2 does apply to City of Parramatta, however, as the proposal does not require development consent in accordance with the State Environmental Planning Policy (Transport and Infrastructure) 2021, the Biodiversity Conservation SEPP does not apply to the proposal. Regardless, this document has been considered when assessing potential impacts on trees and vegetation.

1.3.8 State Environmental Planning Policy (Resilience and Hazards) 2021

The State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) commenced on the 1st of March 2022 and replaces the following former SEPPs:

- State Environmental Planning Policy (Coastal Management) 2018
- State Environmental Planning Policy 33 – Hazardous and Offensive Development, and
- State Environmental Planning Policy 55 – Remediation of Land.

The Subject Land is situated within land mapped under the following areas:

- 'Coastal Use Area'
- 'Coastal Environment Area' and,
- 'Proximity to coastal wetlands or littoral rainforest'.

Compliance with the controls listed under Division 4 – Coastal Use Area are discussed in the REF. The following subsections details the criteria (biodiversity specific) of this SEPP that applies.

1.3.8.1 Development on land within the coastal environment area

- (1) Development consent must not be granted to development on land that is within the coastal environment area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following:
 - (a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment
 - (b) coastal environmental values and natural coastal processes
 - (c) the water quality of the marine estate (within the meaning of the Marine Estate Management Act 2014), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1,
 - (d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,
 - (e) existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,
 - (f) Aboriginal cultural heritage, practices and places,
 - (g) the use of the surf zone
- (2) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:
 - (a) the development is designed, sited and will be managed to avoid an adverse impact referred to in subclause (1), or
 - (b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or
 - (c) if that impact cannot be minimised—the development will be managed to mitigate that impact

The proposed activity is an extension of an existing pathway within a highly modified landscape. Any further degradation of the coastal environmental values and natural coastal processes is unlikely given the existing state of the Subject Land. Subject to mitigation measures, no further impacts to the coastal environment area are anticipated as a result of the proposal.

1.3.8.2 Development on land in proximity to coastal wetlands or littoral rainforest

Development consent must not be granted to development on land identified as “proximity area for coastal wetlands” or “proximity area for littoral rainforest” on the Coastal Wetlands and Littoral Rainforests Area Map unless the consent authority is satisfied that the proposed development will not significantly impact on

- (a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or
- (b) the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.

The proposed activity has been specifically designed to avoid impacts to Coastal Wetlands. Given the proposed activity is an extension of an existing pathway within a highly modified landscape, no changes to the quantity and quality of surface and groundwater flows that feed adjoining coastal wetlands are expected. The biophysical, hydrological and ecological integrity of the Coastal Wetlands will not be adversely affected by the proposed activity.

2. METHODOLOGY

2.1 Background Research

A thorough literature review of local information relevant to the Subject Land was undertaken. Searches using NSW Wildlife Atlas (BioNet) (NSW DCCEEW, 2024a) and the Commonwealth Protected Matters Search Tool (PMST) (DCCEEW, 2024) were conducted to identify all current threatened flora and fauna, as well as migratory fauna records, within a 5km radius of the Subject Land. These data were used to assist in establishing the presence or likelihood of any ecological values as occurring on or adjacent to the Subject Land and helped inform our ecologists on what to look for during the site assessment.

Soil landscape and geological mapping, as well as existing vegetation mapping, were examined to assist in determining whether any threatened flora or ecological communities could be present. The following technical resources were comprised in the preparation of this report:

- State and Commonwealth datasets:
 - EPBC Protected Matters Search Tool (DCCEEW, 2024)
 - NSW BioNet. The website of the Atlas of NSW Wildlife (NSW DCCEEW, 2024a)
 - NSW BioNet. Threatened Biodiversity Data Collection (NSW DCCEEW, 2024b)
 - NSW BioNet. Vegetation Classification System (NSW DCCEEW, 2024c)
 - NSW Government Spatial Services: Search and Discovery - Historical, Aerial and Satellite Imagery (Spatial Services, 2024a)
 - NSW Government Spatial Services: Six Maps Clip & Ship (Spatial Services, 2024b)
 - Key Fish Habitat Maps – Sydney Metro (DPI, 2024b)
- Vegetation and soil mapping:
 - The NSW State Vegetation Type Map (NSW DCCEEW, 2024d)
 - eSPADE v2.2.0 (NSW DCCEEW, 2024f)
- NSW State guidelines:
 - Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method (DPE, 2020a)
 - Threatened Species Survey and Assessment: Guidelines for developments and activities. Working Draft (DEC, 2004)

Species from both the BioNet and PMST online searches were combined to produce a list of threatened species, populations and communities that are likely to occur within the Subject Land (**Appendix B**).

2.2 Scope of Assessment

The overarching objective of this assessment was to evaluate the ecological values that occur within the Subject Land and identify how the proposed activity satisfies the relevant planning framework. This report discerns the likelihood of occurrence of any threatened entities (i.e. ecological communities and species) listed under the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The full scope of the assessment included:

- Background research to determine the likelihood for NSW and/ or Commonwealth threatened biota to occur within the Subject Land during any point of their lifecycle
- Assess any potential impacts to species and/ or communities listed under the BC Act and EPBC Act, including the Long-nosed bandicoot, North Head - endangered population,
- Establishing the likelihood of occurrence of migratory species and threatened ecological communities (TEC) as listed under the BC Act and/ or the EPBC Act
- Identifying and mapping the distribution of vegetation communities within the Subject Land
- Recording presence and the extent of any known or potential fauna habitat features such as nests, dreys, caves, crevices, culverts, pools, soaks, flowering trees, fruiting trees or hollow-bearing trees and provide recommendations for on-going management of these habitat features and any fauna present
- Determining potential ecological impacts or risks that may result due to the proposed works, and
- Recommendation of any controls or additional actions to be taken to protect or improve environmental outcomes of the activity.

2.3 Limitations

Not all flora and fauna species could be directly surveyed for during the site assessment. These species include nocturnal fauna and cryptic flora with flowering times outside of the survey period. The presence of nocturnal and cryptic species was assessed based on habitat constraints and historical records

2.4 Native Vegetation, Threatened Ecological Communities and Vegetation Integrity Methods

2.4.1 Existing Information

A review of the State Vegetation Type Map (NSW DCCEEW, 2024d) was used to assist in the identification of Plant Community Types (PCTs) within and surrounding the Subject Land. The PCT of 'best-fit' was determined based on the floristic descriptions within the Vegetation Classification System database (NSW DCCEEW, 2024c).

2.4.2 Mapping Native Vegetation Extent

The extent of native vegetation within the Subject Land was determined through a field assessment with the aid of a GPS-enabled tablet.

2.5 Threatened Flora Survey Methods

2.5.1 Review of Existing Information

Threatened flora with potential to occur within the Subject Land and immediate surrounds were identified following review of BioNet and the PMST. Soil mapping (NSW DCCEEW, 2024e) and topography (Google Earth) were also used to provide further context on habitat constraints for threatened flora.

2.5.2 Field Surveys

To determine whether any threatened flora or their habitats were present, a survey was undertaken using parallel field traverses in accordance with the ‘Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method’ (DPE, 2020a).

2.6 Threatened Fauna Survey Methods

2.6.1 Review of Existing Information

Threatened fauna with potential to occur within the Subject Land and immediate surrounds were identified following review of BioNet and the PMST. Soil mapping (NSW DCCEEW, 2024e) and topography (Google Earth) were also used to provide further context on habitat constraints for threatened fauna.

2.6.2 Habitat Constraints

A field survey was undertaken to identify any habitat constraints (e.g. waterbodies, rocky areas, tree hollows), including microhabitat, present within the Subject Land and immediate surrounds. Potential habitat constraints within the broader area (500m buffer) were assessed using Google Earth, historical aerial imagery (Spatial Services, 2024a), soil landscape mapping (NSW DCCEEW, 2024e) and recent vegetation mapping (NSW DCCEEW, 2024b).

2.6.3 Field Surveys

No targeted surveys for fauna were undertaken. To determine whether any threatened fauna species were present, targeted habitat surveys were undertaken using parallel field traverses.

2.7 Weather Conditions

Surveys were undertaken on 3rd December 2024 within and immediately surrounding the Subject Land. Weather conditions taken from the nearest weather station (Parramatta (station 066124) in the lead up and during the field survey are outlined in **Table 1**.

Table 1. Weather conditions taken from the nearest weather stations (Station number 066124) in the lead up and during the field survey (BOM, 2024).

Timing/activities	Date	Day	Temperature (°C)		Rainfall (mm)
			Min	Max	
Lead up to the survey	26/12/2024	Tuesday	19	37.5	0
	27/12/2024	Wednesday	19.8	37	0
	28/12/2024	Thursday	21.8	29.2	2
	29/12/2024	Friday	21	22.8	3.8
	30/12/2024	Saturday	20.5	26	14.6
	01/12/2024	Sunday	20.2	31.5	1.4
	02/12/2024	Monday	18.8	36	5.2
Site Assessment	03/12/2024	Tuesday	20.5	32.5	0

2.8 Permits and Licences

The biodiversity assessment was conducted under the terms of ECE's Scientific Licence issued by the NSW Department of Planning and Environment (SL102667). Fauna survey was conducted under approval RVF22/2367 from the NSW Animal Care and Ethics Committee.

3. SITE CONTEXT

3.1 Landscape Features

3.1.1 IBRA Bioregion and subregion

The Subject Land is situated within the Parramatta Local Government Area (LGA) and lies partly within the Cumberland and the Pittwater Interim Biogeographic Regionalisation for Australia (IBRA) Subregions, within the Sydney Basin IBRA Bioregion.

3.1.2 Rivers, streams, estuaries and wetlands

The Subject Land does not intersect with any mapped or unmapped watercourses.

Parramatta River, a fourth-order stream, adjoins to the south of the Subject Land. The Subject Land is therefore located within its associated 40m riparian buffer zone.

3.1.3 Topography, Geology and Soils

The Subject Land occurs on a consistent gradient across all areas of 7m above sea level (asl). The Subject Land is mapped as occurring on the 'Lucas Heights' soil landscape, characterised by gently undulating crests and ridges of interbedded shale on plateau surfaces of the Mittagong formation.

3.1.4 Karst, Caves, Crevices, Cliffs, Rocks or Other of Geological Features of Significance

The Subject Land did not contain areas of geological significance (karsts, caves, cliffs and crevices). The Subject Land, and surrounding area (500m buffer), is mapped as occurring on acid sulfate soils and/or having a risk/probability of exhibiting occurrence of acid sulfate soils.

3.1.5 Areas of Outstanding Biodiversity Value

No Areas of Outstanding Biodiversity Value (AOBV) occur within the Subject Land.

3.1.6 NSW (Mitchell) Landscapes

Mitchell Landscapes (Mitchell, 2002) groups ecosystems into meso-ecosystems representing larger natural entities based on topography and geology. The naming of ecosystems and meso-ecosystems was standardised so that each name provided location information and a meaningful descriptive landscape term. The Subject Land occurs within the 'Port Jackson Basin' and 'Ashfield Plains' Mitchell Landscape Ecosystem.

3.1.6.1 Port Jackson Basin

Deep elongated harbour with steep cliffed margins on horizontal Triassic quartz sandstone. Small pocket beaches and more extensive Quaternary estuary fill of muddy sand at the head of most tributary streams. General elevation 0 to 80m, local relief 10 to 50m. Sandstone slopes and cliffs have patches of uniform or gradational sandy soil on narrow benches and within joint crevices that support forest and woodland of Sydney Peppermint (*Eucalyptus piperita*), Smooth-barked Apple (*Angophora costata*), Red Bloodwood (*Corymbia gummifera*) and Blackbutt (*Eucalyptus pilularis*). Sheltered gullies contain some Turpentine

(*Syncarpia glomulifera*), Coachwood (*Ceratopetalum apetalum*) and Water Gum (*Tristaniopsis laurina*). Estuarine sands were originally dominated by saltmarsh but have been taken over by Grey Mangrove (*Avicennia marina*) in the past century.

3.1.6.2 Ashfield Plains

Undulating hills and valleys on horizontal Triassic shale and siltstone, occasional quartz sandstones especially near the margin of the Port Jackson landscape. Coastal extension of the Cumberland Plain landscape. Red and brown texture-contrast soils on crests grading to yellow harsh texture-contrast soils in valleys. Open forest of Broad-leaved Ironbark (*Eucalyptus fibrosa ssp. fibrosa*), Grey Box (*Eucalyptus moluccana*), with Tea-tree (*Leptospermum sp.*) along creeks and forests of Turpentine (*Syncarpia glomulifera*), Red Mahogany (*Eucalyptus resinifera*), Grey gum (*Eucalyptus punctata*), Sydney Blue Gum (*Eucalyptus saligna*) and Blackbutt (*Eucalyptus pilularis*) with a grassy understorey of Kangaroo Grass (*Themeda triandra*) on moister sites.

4. RESULTS: NATIVE VEGETATION

4.1 Plant Community Types

4.1.1 Historically Mapped Vegetation

The State Vegetation Type Map (NSW DCCEE, 2024d) indicated the presence of four Plant Community Types (PCT) in proximity to the Subject Land:

- PCT 3595: Sydney Coastal Sandstone Gully Forest
- PCT 4028: Estuarine Swamp Oak Twig-rush Forest
- PCT 4091: Grey mangrove-River Mangrove Forest, and
- PCT 4097: Samphire Saltmarsh

The following PCTs are associated with the below threatened ecological communities (TEC):

- PCT 4028:
 - Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and Southeast Corner Bioregions (BC Act Listed; Endangered)
 - Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and Southeast Queensland ecological community (EPBC Act Listed; Endangered)
- PCT 4097:
 - Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and Southeast Corner Bioregions (BC Act Listed; Endangered), and
 - Subtropical and Temperate Coastal Saltmarsh (EPBC Act Listed; Vulnerable)

The State Vegetation Type Map is presented in **Figure 7 - Figure 12**.

4.1.2 Field-validated Vegetation

Site assessment determined the presence of one PCT within the Subject Land:

- PCT 4006: Northern Paperbark-Swamp Mahogany Saw-sedge Forest

Native vegetation within the Subject Land has been assessed as aligning with the BioNet Vegetation Classification PCT identified within **Table 2**. A detailed description of the PCT is provided in the following subsections. One novel vegetation type was allocated to exotic and/or planted vegetation that could not be assigned to a PCT:

- Exotic/Ornamental Grasses

The vegetation within the Subject Land is detailed in **Table 3** and presented in **Figure 13- Figure 18**.

Table 2. PCT identified within the Subject Land.

PCT ID	PCT Scientific Name	Area within the Subject Land
4006	Northern Paperbark Swamp Mahogany Saw-sedge Forest	31 trees (0.09ha)

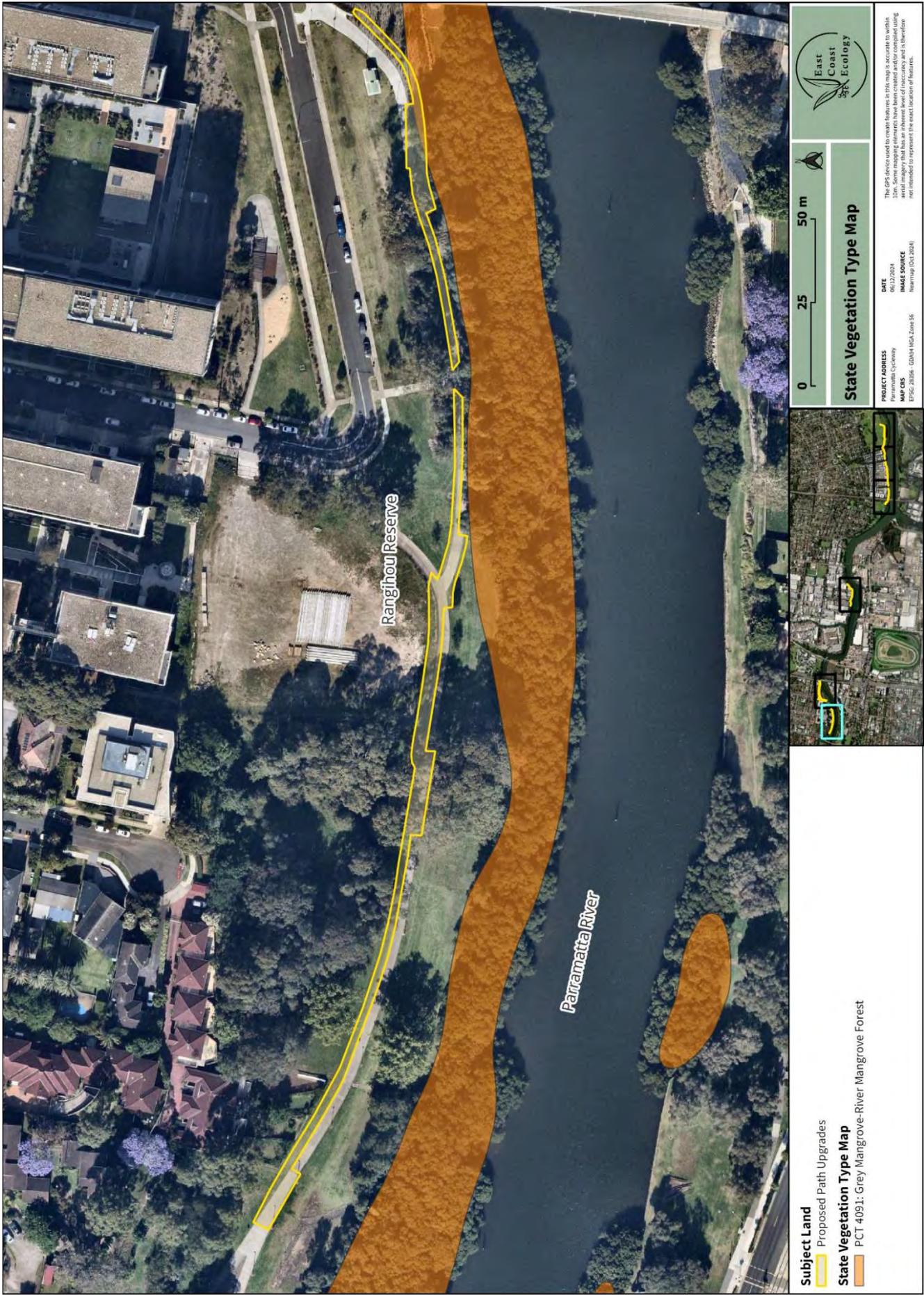


Figure 7. Vegetation Communities within and surrounding the Subject Land (Rangihou Reserve).

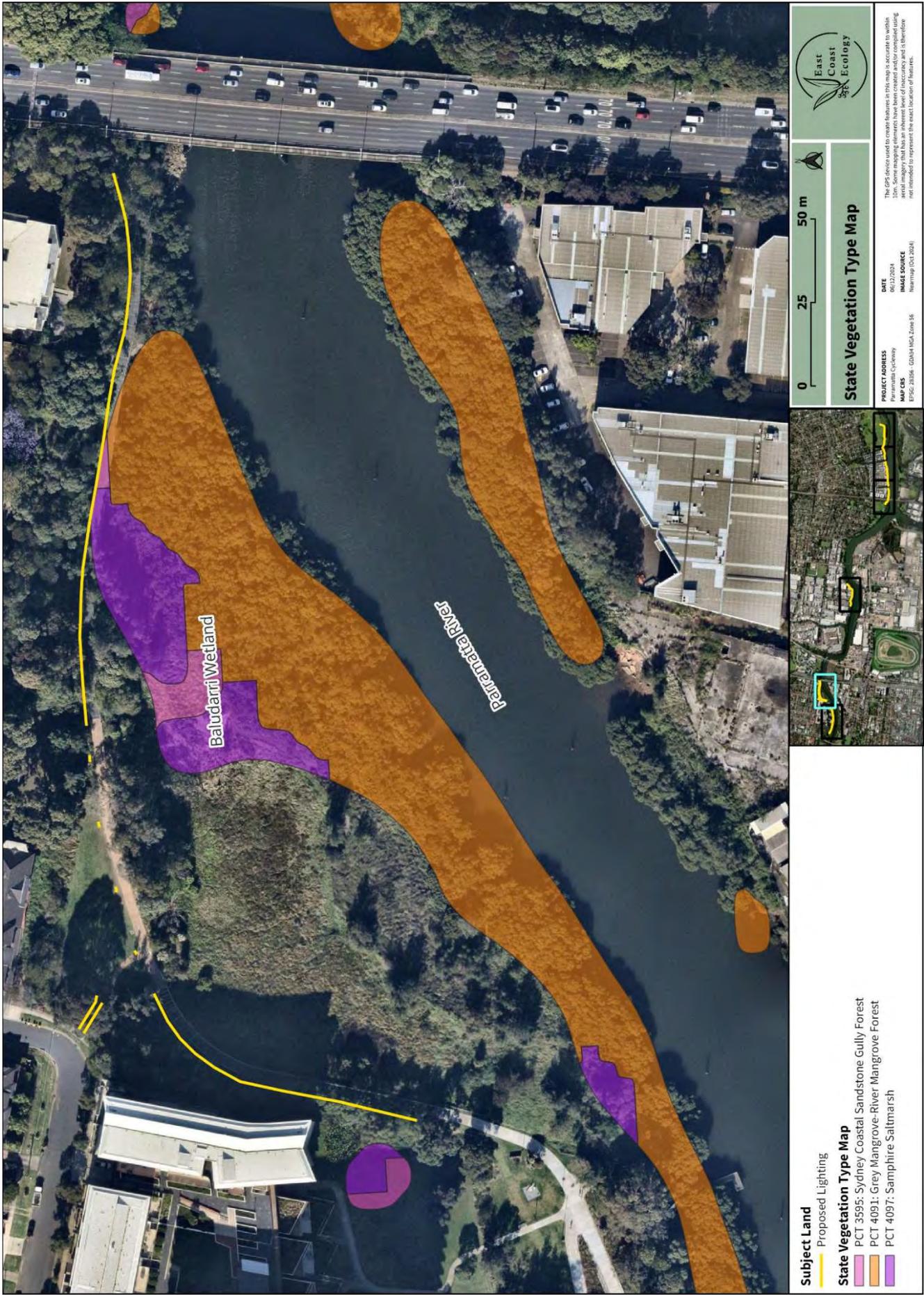


Figure 8. Vegetation Communities within and surrounding the Subject Land (Baludarrri Wetland).

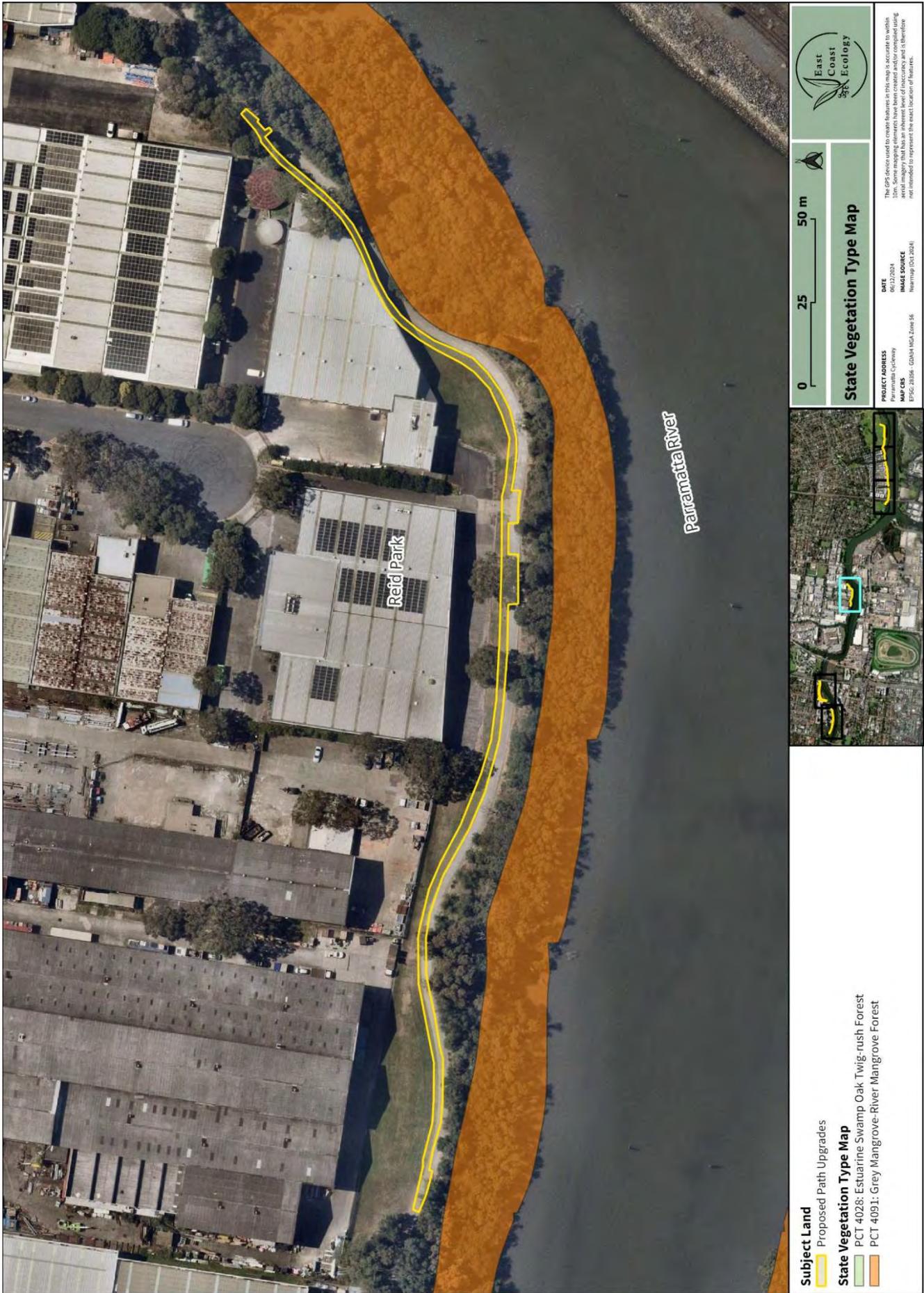


Figure 9. Vegetation Communities within and surrounding the Subject Land (Reid Park).

East Coast Ecology – Flora and Fauna Assessment
 Eastern Parramatta River & CBD Precinct Cycleway

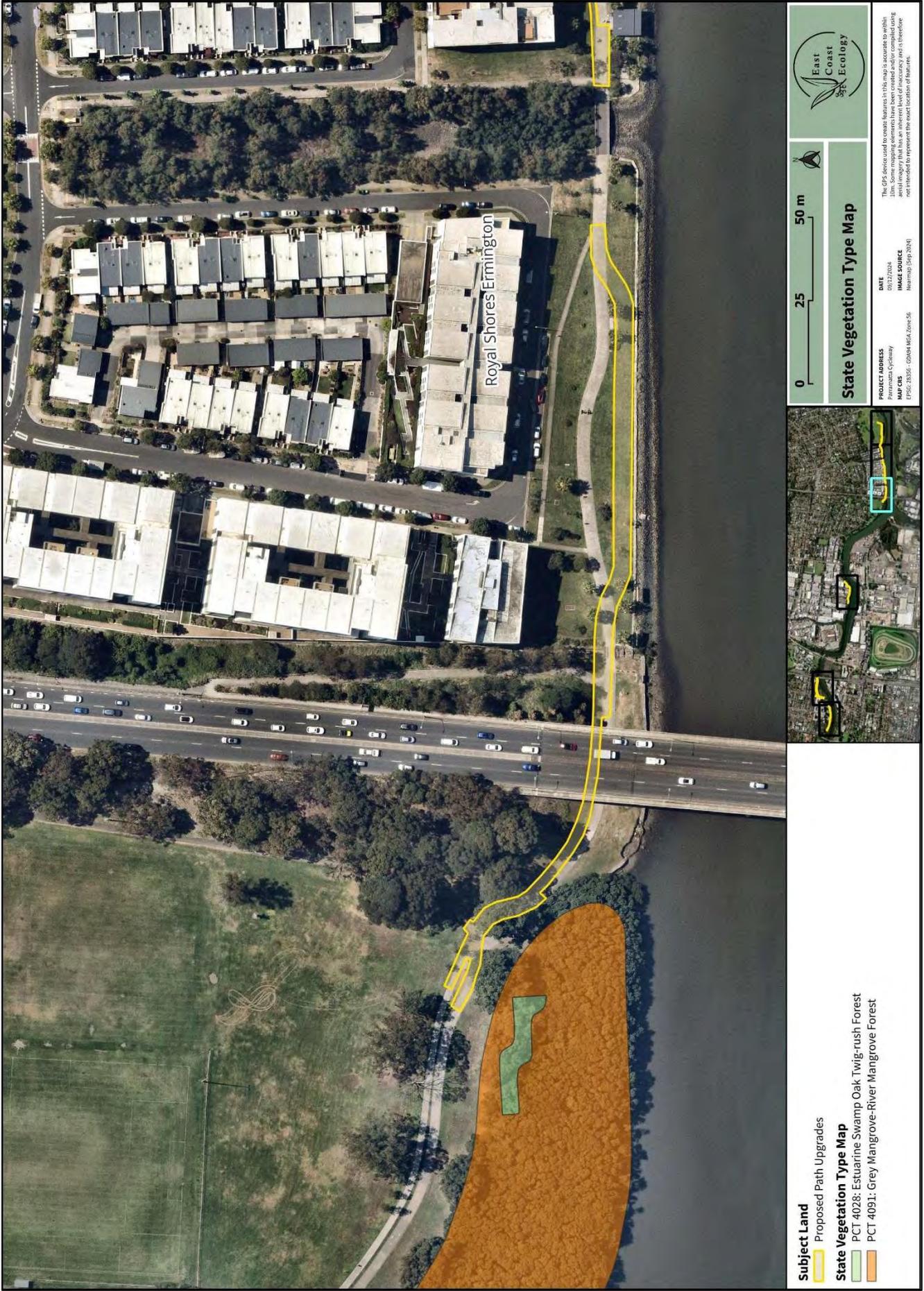


Figure 10. Vegetation Communities within and surrounding the Subject Land (Royal Shores Ermington).

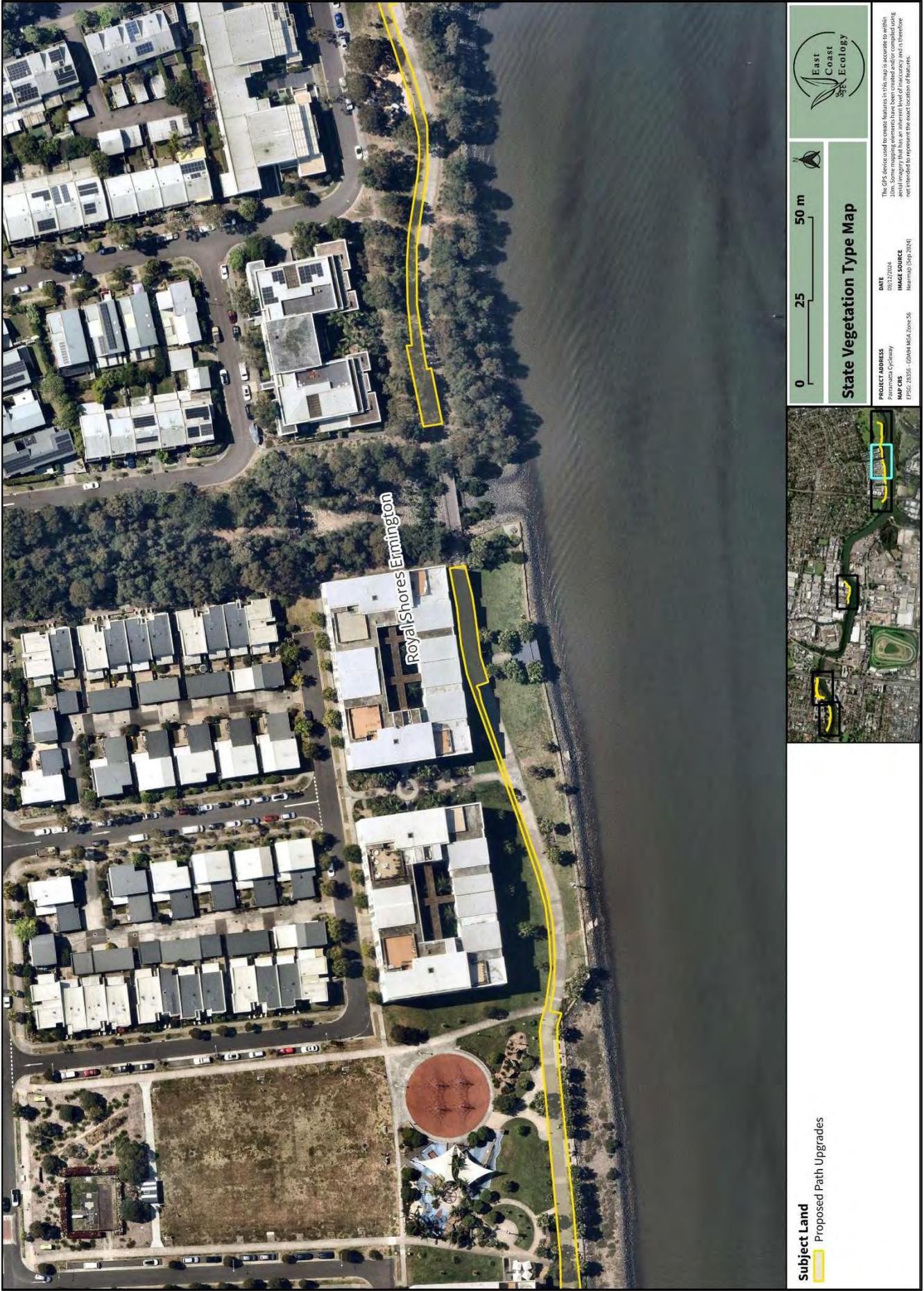


Figure 11. Vegetation Communities within and surrounding the Subject Land (Royal Shores Ermington).

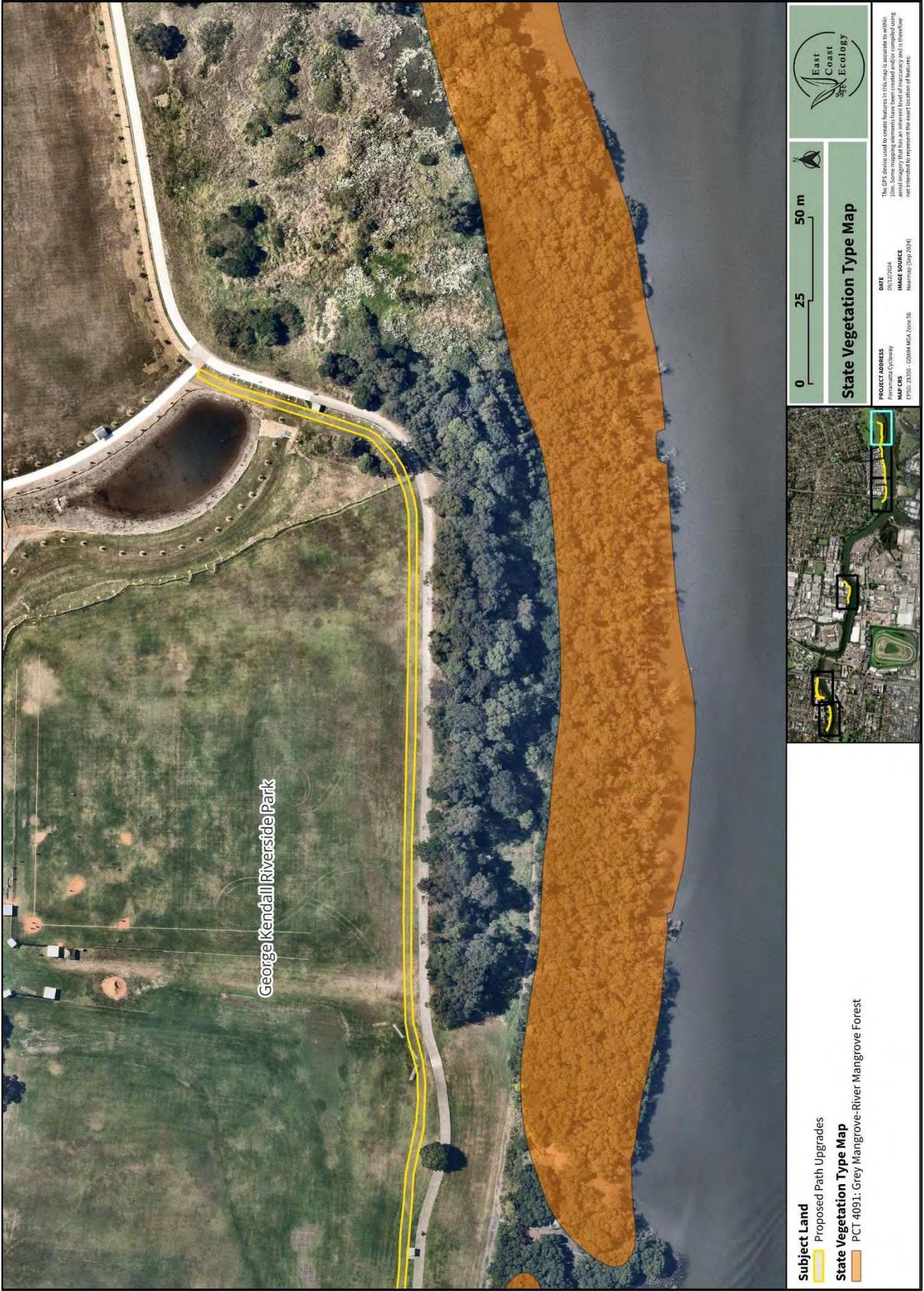


Figure 12. Vegetation Communities within and surrounding the Subject Land (George Kendall Riverside Park).

Table 3. Description of vegetation within the Subject Land, that will be impacted by the activity.

PCT 4006: Northern Paperbark-Swamp Mahogany Saw-sedge Forest	
	
Vegetation Formation	Forested Wetlands
Extent within Subject Land (approximate)	31 trees (0.09ha)
Description of the Vegetation within the Subject Land	
<p>Within the Subject Land, this PCT was highly modified, characterised by trees, on a mostly absent native ground and midstorey. The following trees, characteristic of PCT 4006, are proposed for removal:</p> <ul style="list-style-type: none"> ▪ 2 x <i>Corymbia citriodora</i> (T12, T253) ▪ 1 x <i>Allocasuarina torulosa</i> (T13) ▪ 3 x <i>Corymbia maculata</i> (T17, T24, T231) ▪ 4 x <i>Angophora costata</i> (T39, T110, T150 – T151) ▪ 9 x <i>Casuarina glauca</i> (T40, T232, T276 – T282) ▪ 1 x <i>Livistona australis</i> (T155) ▪ 5 x <i>Casuarina cunninghamiana</i> (T164, T166, T252, T256 – T257) ▪ 1 x <i>Glochidion ferdinandi</i> (T236) ▪ 2 x <i>Melaleuca quinquenervia</i> (T239, T248) ▪ 2 x <i>Melaleuca styphelioides</i> (T179, T273) ▪ 1 x <i>Eucalyptus spp.</i> (T180), and ▪ Occasional native shrubs and groundcovers. 	

PCT 4006: Northern Paperbark-Swamp Mahogany Saw-sedge Forest

The locations of these trees are depicted in **Figure 13 - Figure 18**.

Nearby to the Subject Land, good condition patches of this PCT were represented with the same upper canopy species, with a sparse mid stratum layer dominated by *Leptospermum laevigatum*, *Kunzea ambigua*, *Acacia parramattensis* and *Homalanthus populifolius*. The ground layer was dominated by common coastal grass and grasslike species including, *Juncus usitatus*, *Lomandra longifolia*, *Dianella caerulea*, *Themeda triandra*, *Imperata cylindrica* and *Bromus spp.*.

Description of PCT 4006 in BioNet

A mid-high to very tall mixed eucalypt and Melaleuca open to closed forest with a sparse mid-stratum of mesophyll small trees and palms and a dense ground layer of sedges and ferns. This PCT occurs on low-lying coastal alluvial swamps and depressions and back barrier sand flats between Sydney and Yamba, Central Coast and north coast. The tree canopy very frequently includes both *Melaleuca quinquenervia* and *Eucalyptus robusta*, rarely with other eucalypts. The vine *Parsonsia straminea* is very frequently recorded in the canopy or mid-stratum. The mid-stratum is otherwise sparse, however often layered with small trees that very frequently includes *Glochidion ferdinandi*, occasionally *Livistona australis* and *Casuarina glauca*, and rarely *Melaleuca linariifolia*. A patchy cover of smaller sclerophyll shrubs occasionally includes *Acacia longifolia* and *Breynia oblongifolia*. The ground layer is very often dense and almost always includes a high cover of the tall sedge *Gahnia clarkei* together with the ferns *Telmatoblechnum indicum*, *Pteridium esculentum*, *Hypolepis muelleri* and *Calochlaena dubia*. Other species include grasses such as *Entolasia marginata*, which is common and occasionally sedges *Machaerina rubiginosa*, *Machaerina articulata* or *Carex appressa*. This PCT occurs on very low-lying alluvium, estuarine deposits, back barrier flats, back swamps and rarely sand swales, at elevations almost always below 20 metres asl. It is mainly constrained to within a few kilometres of the coastline, although spatial outliers occur on coastal floodplains that extend some way inland. This community partially overlaps with a range of coastal swamp forests of the central and north coasts, each varying in the frequency and duration of inundation, and substrate characteristics.

Groundwater Dependent Ecosystems (GDE)	Assessment of the potential for the Subject Land to support groundwater dependent ecosystems was carried out using the Commonwealth’s Bureau of Meteorology Groundwater Dependent Ecosystems Atlas (BOM, 2024a). This PCT is associated with a Groundwater Dependent Ecosystems.
BC Act 2016 Status	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and Southeast Corner Bioregions (Endangered) (Section 4.2.1).
EPBC Act 1999 Status	Coastal Swamp Sclerophyll Forest of New South Wales and Southeast Queensland (Endangered) Does not meet eligibility criteria (Section 4.2.2).

4.2 Threatened Ecological Communities

4.2.1 Listing under the Biodiversity Conservation Act 2016 - Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and Southeast Corner Bioregions – endangered ecological community listing

The NSW Scientific Committee (2011) has determined that the EEC, Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and Southeast Corner bioregions, is associated with:

- The Sydney Basin Bioregion, including the Parramatta LGA
- Humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains, and
- An upper storey that is usually dominated by a tree layer of Eucalypts and Paperbarks; *Eucalyptus robusta*, *Melaleuca quinquenervia*, *Melaleuca styphelioides* and, south from Sydney, *Eucalyptus botryoides* and *Eucalyptus longifolia* with other scattered trees species present including *Callistemon salignus* and *Casuarina glauca*.

The vegetation within the Subject Land is dominated by *E. robusta*, with occasional *Melaleuca spp.* and occurs in the Sydney Basin Bioregion along a drainage line associated with a coastal floodplain. Although the vegetation proposed for removal is severely degraded, it has been determined to loosely conform to the Final Determination (Scientific Committee, 2011) and has therefore been determined to form a part of the endangered ecological community.

4.2.2 Listing under the *Environmental Protection and Biodiversity Conservation Act 1999* – Coastal Swamp Sclerophyll Forest of New South Wales and Southeast Queensland ecological community

The vegetation within the Subject Land was determined to loosely conform to the EPBC Act listed Endangered Ecological Community, Coastal Swamp Sclerophyll Forest of New South Wales and Southeast Queensland ecological community on the basis of the following criteria:

- The vegetation is isolated and part of a patch is at least 0.5ha, and
- Contains a mostly native ground cover.

Although the ground layer assessed within the Subject Land was mostly planted and highly limited in variety, the vegetation within the areas to be impacted meet the minimum conditions for the EEC listing. The impacts to the EEC are anticipated to be of low significance and very minimal if any. The results from the assessment of significance are provided in **Appendix D**.

Table 4. Description of vegetation within the Subject Land, that will be impacted by the activity.

Exotic/Ornamental Grasses	
	
Extent within Subject Land (approximate)	0.38ha
Description of the Vegetation within the Subject Land	
<p>This novel vegetation type dominated by exotic, ornamental lawn species such as <i>Axonopus fissifolius</i> amidst occasional environmental weeds, including <i>Trifolium repens</i>. This vegetation type occurred the length of the proposed activity, occasionally beneath the canopy of PCT 4006.</p>	
BC Act 2016 Status	Not listed.
EPBC Act 1999 Status	Not listed.

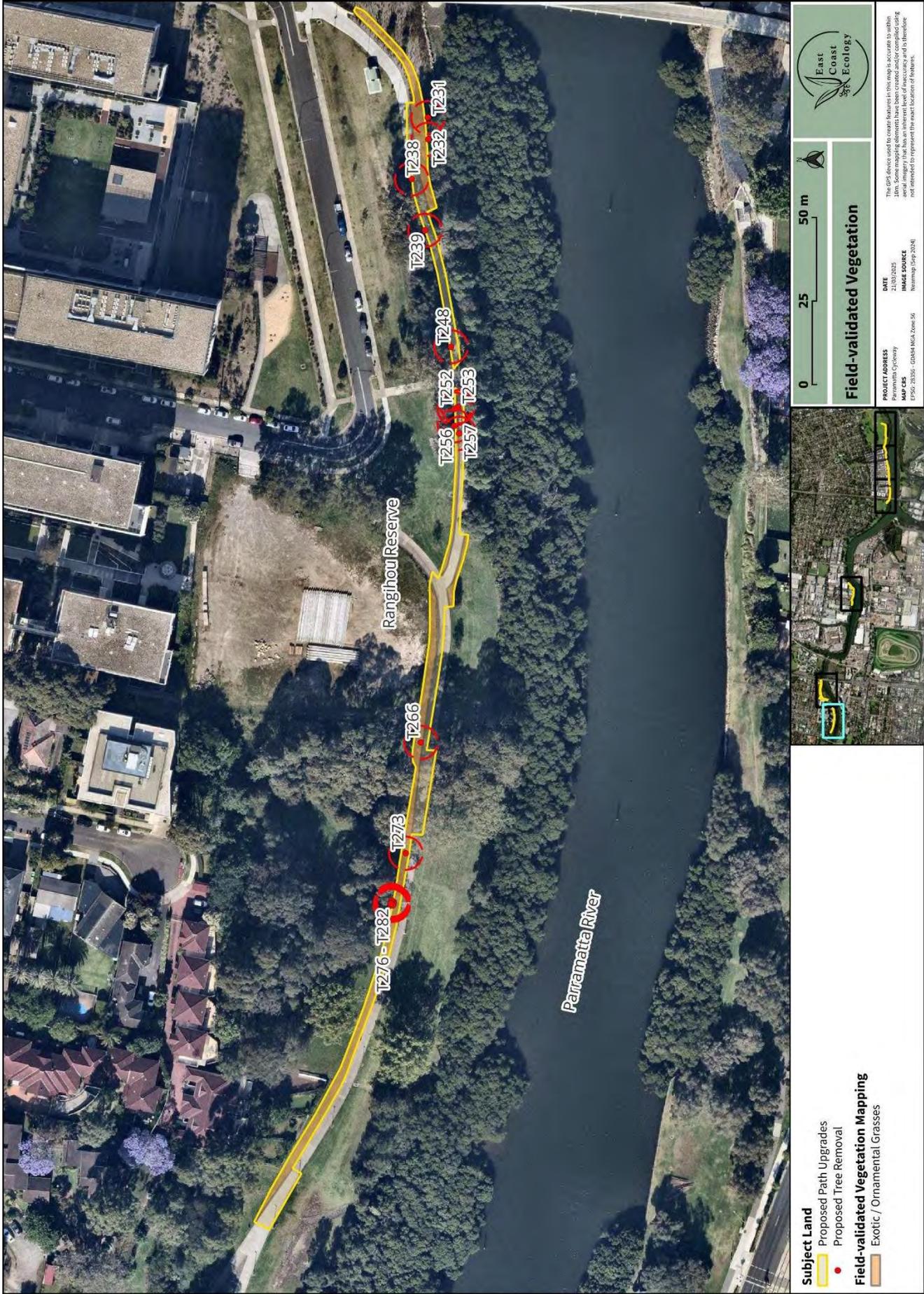


Figure 13. Field-validated Vegetation Mapping within the Subject Land (Rangihou Reserve)

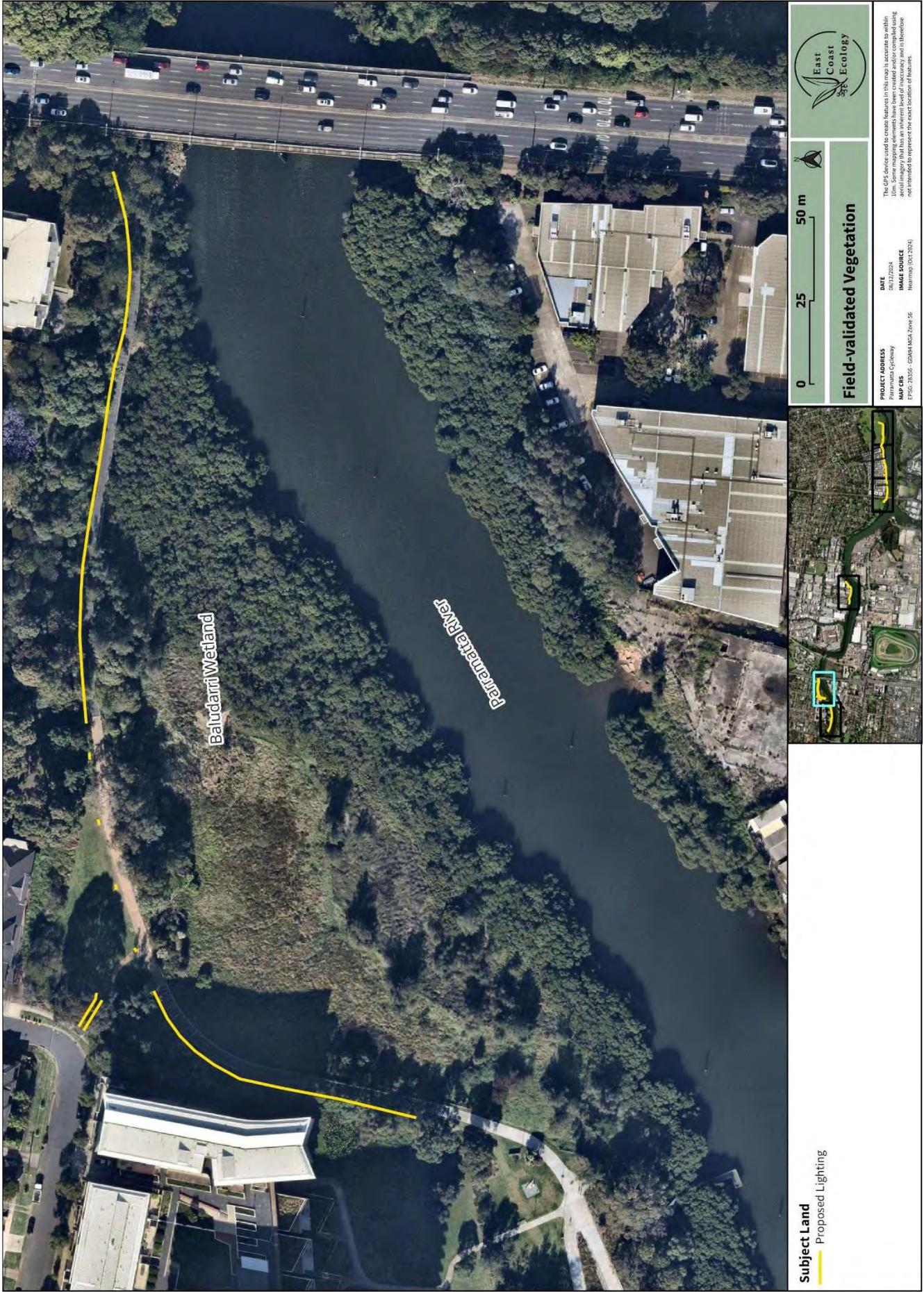


Figure 14. Field-validated Vegetation Mapping within the Subject Land (Baludarrri Wetland)

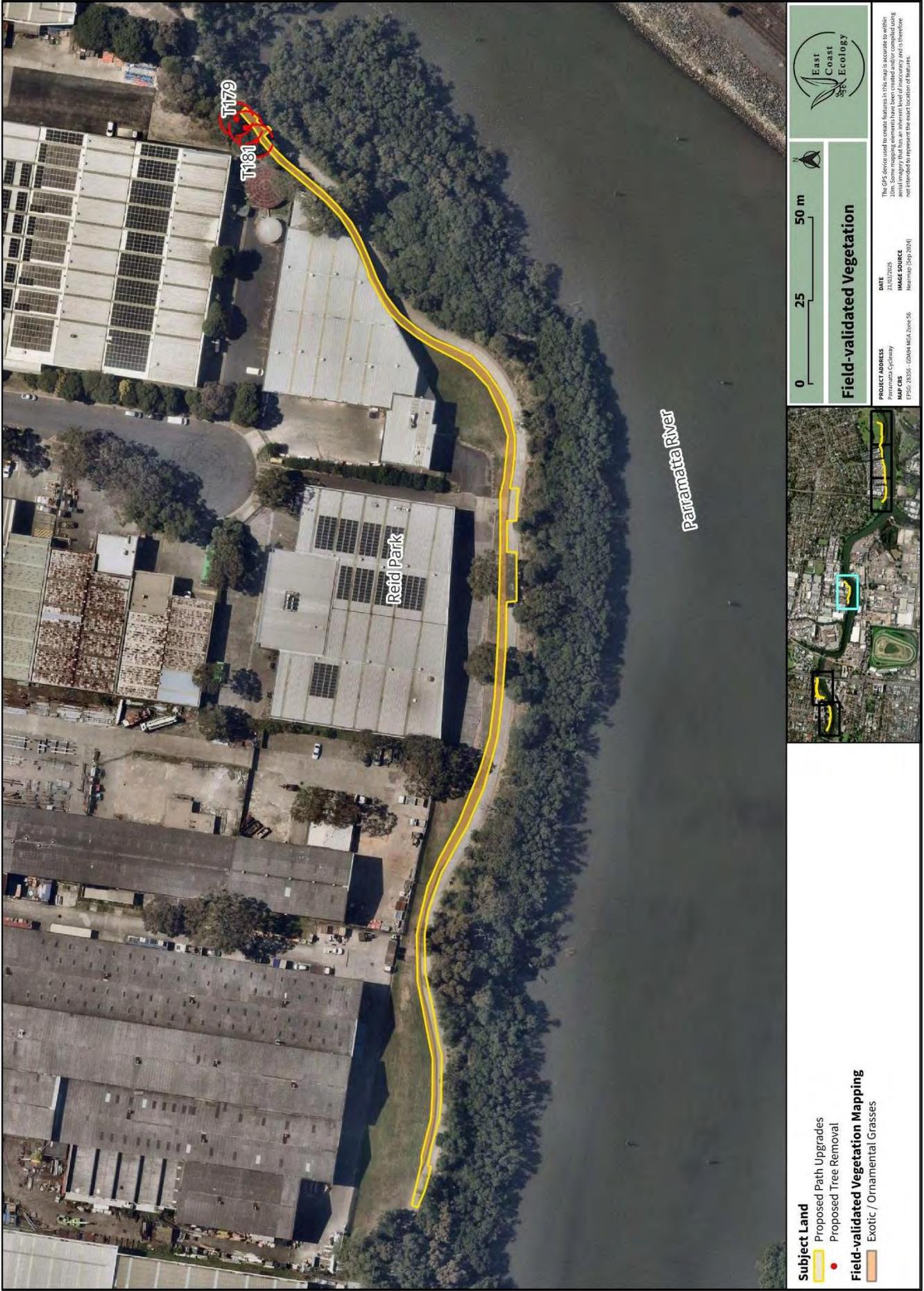


Figure 15. Field-validated Vegetation Mapping within the Subject Land (Reid Park)



Figure 16. Field-validated Vegetation Mapping within the Subject Land (Royal Shores Ermington)



Subject Land

- Proposed Path Upgrades
- Proposed Tree Removal

Field-validated Vegetation Mapping

- Exotic / Ornamental Grasses



Field-validated Vegetation

DATE: 21/02/2025
IMAGE SOURCE: Nearmap (Sep 2014)

PROJECT ADDRESS: Parramatta Cycleway
MAP CRS: EPSG:20351 - GDA94 MGA Zone 56

The GPS service used to create features in this map is accurate to within 1-2 metres. The aerial imagery has an inherent level of inaccuracy and is therefore not intended to represent the exact location of features.



Figure 17. Field-validated Vegetation Mapping within the Subject Land (Royal Shores Ermington)

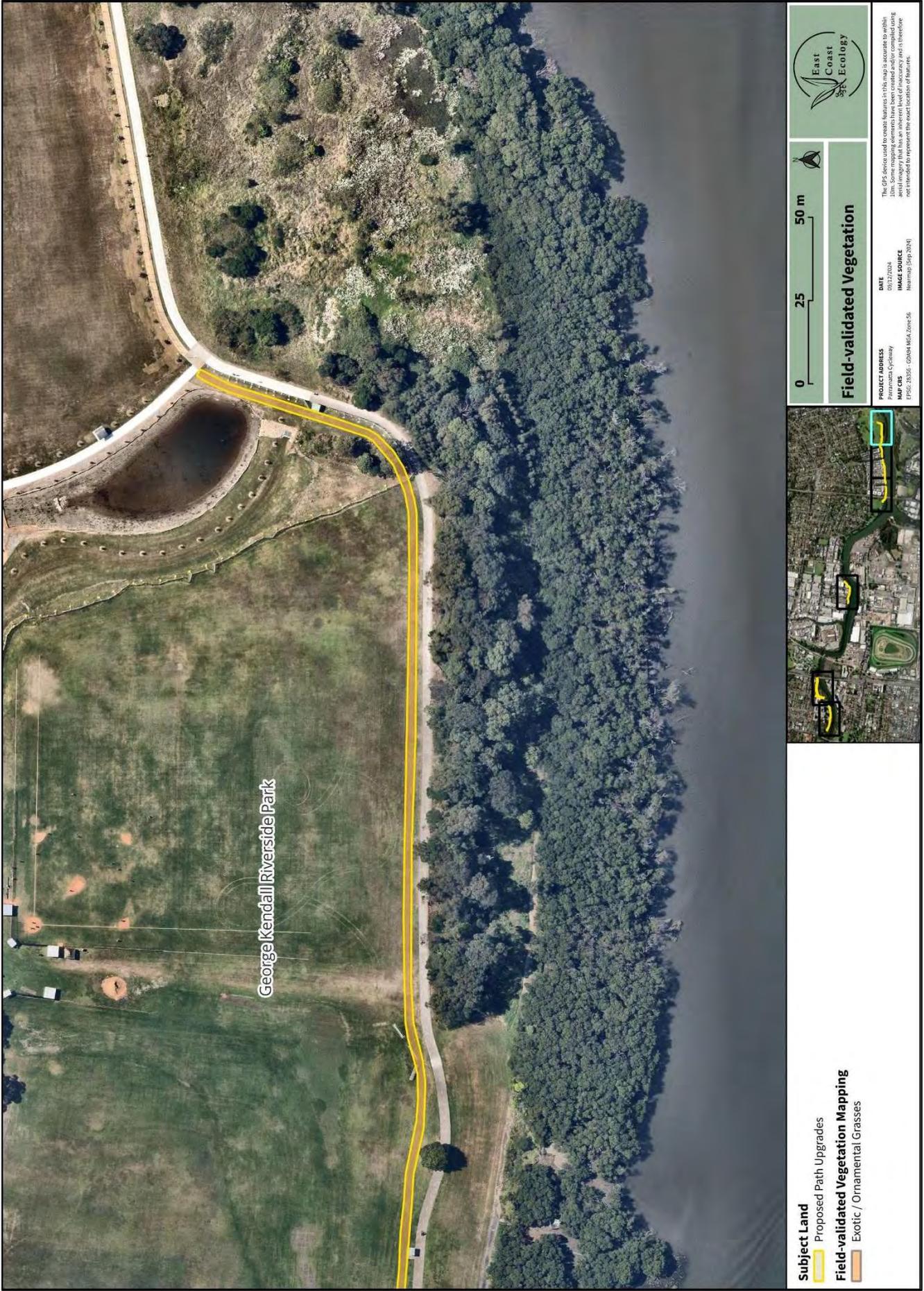


Figure 18. Field-validated Vegetation Mapping within the Subject Land (George Kendall Riverside Park).

5. RESULTS: THREATENED SPECIES

5.1 Threatened Flora

Database searches revealed 18 threatened flora have potential to occur within a ~5km radius of the Subject Land (**Table 5**).

Table 5. Threatened flora with potential to occur within the Subject Land.

Scientific Name	Common Name	BC Act	EPBC Act	Records within 5km
<i>Acacia pubescens</i>	Downy Wattle	V	V	56
<i>Callistemon linearifolius</i>	Netted Bottle Brush	V	-	6
<i>Dillwynia tenuifolia</i>	-	V	-	2
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	-	V	-	52
<i>Grammitis stenophylla</i>	Narrow-leaf Finger Fern	E	-	1
<i>Isotoma fluviatilis</i> subsp. <i>fluviatilis</i>	-	-	X	2
<i>Macadamia integrifolia</i>	Macadamia Nut	-	V	2
<i>Persicaria elatior</i>	Tall Knotweed	V	V	1
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	V	V	9
<i>Pimelea spicata</i>	Spiked Rice-flower	E	E	2
<i>Pomaderris prunifolia</i>	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E	-	8
<i>Rhodamnia rubescens</i>	Scrub Turpentine	E	CE	4
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	E	E	6
<i>Tetratheca glandulosa</i>	-	V	-	1
<i>Triplarina imbricata</i>	Creek Triplarina	E	E	4
<i>Wahlenbergia multicaulis</i>	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham	E	-	8

Scientific Name	Common Name	BC Act	EPBC Act	Records within 5km
	Hills, Canterbury, Hornsby, Parramatta and Strathfield			
<i>Wilsonia backhousei</i>	Narrow-leafed <i>Wilsonia</i>	V	-	100
<i>Zannichellia palustris</i>	-	E	-	6

V – Vulnerable; E – Endangered; EP – Endangered Population; CE – Critically Endangered; X – Extinct

No threatened flora species were identified within the Subject Land. Based on habitat constraints and targeted surveys, no threatened flora species were considered likely to occur within the Subject Land. It is not expected that the proposed activity would pose a significant impact to a nearby viable local population, on the basis that all mitigation measures proposed in this report are adhered to (**Section 7.2**). Further assessment is provided in **Appendix B** of this report.

5.2 Threatened Fauna

Database searches revealed 54 threatened fauna occur, or have potential to occur, within a ~5km radius of the Subject Land (**Table 6**).

Table 6. Threatened fauna with potential to occur within the Subject Land.

Scientific Name	Common Name	BC Act	EPBC Act	Records within 5km
<i>Anthochaera phrygia</i>	Regent Honeyeater	E	CE	7
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V	-	35
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	13
<i>Calidris canutus</i>	Red Knot	-	E	14
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	438
<i>Calidris tenuirostris</i>	Great Knot	V	V	2
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black-Cockatoo	V	V	3
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	E	E	3
<i>Circus assimilis</i>	Spotted Harrier	V	-	12
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	4
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	3

Scientific Name	Common Name	BC Act	EPBC Act	Records within 5km
<i>Epthianura albifrons</i>	White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	E	-	437
<i>Epthianura albifrons</i>	White-fronted Chat	V	-	437
<i>Falco subniger</i>	Black Falcon	V	-	1
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	-	11
<i>Gallinago hardwickii</i>	Latham's Snipe	V	V	1965
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	21
<i>Haematopus longirostris</i>	Pied Oystercatcher	E	-	1
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	-	743
<i>Hieraetus morphnoides</i>	Little Eagle	V	-	18
<i>Hirundapus caudacutus</i>	White-throated Needletail	V	V	51
<i>Ixobrychus flavicollis</i>	Black Bittern	V	-	6
<i>Lathamus discolor</i>	Swift Parrot	E	CE	7
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	V	V	2
<i>Limosa limosa</i>	Black-tailed Godwit	V	E	17
<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	17069
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	E	-	3
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V	-	11
<i>Miniopterus australis</i>	Little Bent-winged Bat	V	-	11
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	-	96
<i>Myotis macropus</i>	Southern Myotis	V	-	53
<i>Neophema pulchella</i>	Turquoise Parrot	V	-	2

Scientific Name	Common Name	BC Act	EPBC Act	Records within 5km
<i>Ninox connivens</i>	Barking Owl	V	-	6
<i>Ninox strenua</i>	Powerful Owl	V	-	306
<i>Numenius madagascariensis</i>	Eastern Curlew	E	CE	40
<i>Oxyura australis</i>	Blue-billed Duck	V	-	2
<i>Pandion cristatus</i>	Eastern Osprey	V	-	13
<i>Petauroides volans</i>	Southern Greater Glider	E	E	1
<i>Petroica boodang</i>	Scarlet Robin	V	-	5
<i>Petroica phoenicea</i>	Flame Robin	V	-	2
<i>Phascolarctos cinereus</i>	Koala	E	E	1
<i>Pommerhelix duralensis</i>	Dural Land Snail	E	E	39
<i>Pseudophryne australis</i>	Red-crowned Toadlet	V	-	2
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	902
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	10
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	V	-	14
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	-	7
<i>Sternula albifrons</i>	Little Tern	E	C	7
<i>Stictonetta naevosa</i>	Freckled Duck	V	-	3
<i>Tringa nebularia</i>	Common Greenshank	E	E	334
<i>Tyto longimembris</i>	Eastern Grass Owl	V	-	2
<i>Tyto novaehollandiae</i>	Masked Owl	V	-	3
<i>Tyto tenebricosa</i>	Sooty Owl	V	-	1
<i>Xenus cinereus</i>	Terek Sandpiper	V	V	1

V – Vulnerable; E – Endangered; EP – Endangered Population; CE – Critically Endangered.

No threatened fauna species were identified within the Subject Land however, this does not rule out the potential for threatened species to still exist within the Subject Land, particularly given no targeted surveys were undertaken.

Based on habitat constraints and the urban nature of the Subject Land (**Appendix B**), no threatened fauna were considered likely to occur and no further assessment was required. Details of the threatened fauna habitat recorded within the Subject Land are included in **Table 7**.

Table 7. Fauna habitat values identified within the Subject Land.

Habitat component	Subject Land
Coarse woody debris	Absent.
Rock outcrops and bush rock	Absent.
Caves, crevices and overhangs	Absent.
Culverts, bridges, mine shafts, or abandoned structures	Absent.
Nectar/lerp-bearing Trees	Present throughout – <i>Melaleuca</i> spp.
Nectar-bearing shrubs	Present nearby – <i>Acacia</i> spp.
Large stick nests	Absent.
Sap and gum sources	Present – <i>Eucalyptus</i> spp.
She-oak fruit	Present throughout – <i>Casuarina</i> spp.
Seed-bearing trees and shrubs	Present throughout – <i>Casuarina</i> spp.
Soft-fruit-bearing trees/shrubs	Absent.
Dense shrubbery and leaf litter	Present throughout.
Tree hollows	Absent- Nestboxes located outside the Subject Land.
Decorticating bark	Absent.
Wetlands, soaks, and streams	Present nearby – Baludarri Wetland.
Open water bodies	Present nearby – Parramatta River..
Estuarine, beach, mudflats, and rocky foreshores	Absent.

5.3 Migratory Species

Database searches revealed seven migratory terrestrial species, or their habitat, are known to occur within the Subject Land (**Table 8**). These species do not breed in Australia.

Table 8. Migratory terrestrial species with potential to occur in the Subject Land.

Species	EPBC Act Status
<i>Cuculus optatus</i> (Oriental Cuckoo)	Migratory, CAMBA, JAMBA, ROKAMBA
<i>Hirundapus caudacutus</i> (White-throated Needletail)	Vulnerable, Migratory, CAMBA, JAMBA, ROKAMBA
<i>Monarcha melanopsis</i> (Black-faced Monarch)	Migratory, Bonn