



North West Treatment Hub - Riverstone

Flora and Fauna Assessment

Prepared for Sydney Water

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Biosis acknowledges the Aboriginal and Torres Strait Islander peoples as Traditional Custodians of the land on which we live and work.

We pay our respects to the Traditional Custodians and Elders past and present and honour their connection to Country and ongoing contribution to society.

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Definitions

BC Act	<i>Biodiversity Conservation Act 2016</i>
Biosecurity Act	<i>Biosecurity Act 2015</i>
BOS	Biodiversity Offsets Scheme
CBD	Central Business District
CEEC	Critically Endangered Ecological Community
Cth DCCEEW	Australian Commonwealth Department of Climate Change, Energy, the Environment and Water
DBH	Diameter at breast height
DCP	Development Control Plan
DPI	Department of Primary Industries
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FM Act	<i>Fisheries Management Act 1994</i>
GIS	Geographic Information System
KTP	Key Threatening Process
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Services
MNES	Matters of National Environmental Significance
NSW	New South Wales
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
PCT	Plant Community Type
SEPP	NSW State Environmental Planning Policy
SIC	Significant Impact Criteria
SIS	Species Impact Statement
Impact area	The area of impact for the proposed works
TEC	Threatened Ecological Community
ToS	Test of Significance
WM Act	<i>NSW Water Management Act 2000</i>

Summary

Biosis Pty Ltd was commissioned by Sydney Water to undertake a flora and fauna assessment to support works being completed at the Riverstone Water Resource Recovery Facility (WRRF). These works are associated with the North West Treatment Hub (NWTB) project (the project), which includes upgrades across the Castle Hill WRRF, Rouse Hill WRRF and Riverstone WRRF to support the population and service growth in the North West Region.

The proposed works will occur within the boundary of the existing Riverstone WRRF (part of Lot 1 DP594977) as well as a linear corridor for the additional effluent pipeline between the Riverstone WRRF and the outfall location at Eastern Creek, running along Bandon Road adjacent to Lot 210 DP830505, Lot 50 DP1295449, and within Lot 2 DP215134 (the study area).

The study area is located approximately 1.5 kilometres west of the Riverstone town centre and approximately 57 kilometres west of the Sydney Central Business District (CBD). The study area comprises both the development footprint associated with the proposed works, as well as a 20-metre buffer. This assessment approach has been undertaken to allow for assessment of both the impact area as well as any additional areas in the broader area which are likely to be indirectly impacted by the proposed works. Identified constraints will be used to guide detailed design, with an emphasis on avoiding impacts where feasible.

The study area is partially located within the North West Growth Area (NWGA) as identified under Chapter 3 of the NSW State Environmental Planning Policy (Precincts-Central River City 2021) (Central River City SEPP). Under the *Order to confer biodiversity certification on the State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (Biodiversity Certification Order) (DECCW 2007), areas mapped as certified land do not require formal biodiversity assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the NSW *Biodiversity Conservation Act 2016* (BC Act). Therefore, the impact assessment completed within the current assessment focusses on areas not mapped as existing certified.

The objective of this flora and fauna assessment is to determine the presence of any threatened ecological communities (TECs) within the study area and, where applicable, assess the impacts of the project on any threatened species, populations and/or ecological communities (entities), or their habitat, listed under the Commonwealth EPBC Act and NSW BC Act.

Ecology values within the study area

This report is an assessment of the potential impact of the proposed works in accordance with the EP&A Act, EPBC Act and BC Act. Key ecological values of the overall study area (which encompasses the impact area) include:

- Plant Community Type (PCT) 3320 - Cumberland Shale Plains Woodland, associated with the following TEC:
 - *Cumberland Plain Woodland in the Sydney Basin Bioregion* (Critically Endangered Ecological Community [CEEC], EPBC Act and BC Act).
- PCT 3448 – Castlereagh Ironbark Forest, associated with the following TEC:
 - *Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion and Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest* (CEEC, EPBC Act and BC Act).

- PCT 4023 - Coastal Valleys Swamp Oak Riparian Forest, associated with the following TEC:
 - *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (Endangered Ecological Community [EEC], EPBC Act and BC Act).
- Planted native vegetation.
- Fauna habitat, including waterways and marginal foraging resources.
- One threatened flora species, Juniper-leaved Grevillea *Grevillea juniperina* subsp. *juniperina* (Vulnerable, BC Act), recorded within the study area within a patch of wholly existing certified land.

The proposed works will not trigger the Biodiversity Offset Scheme (BOS) under the BC Act as described in Section 4 of this report. As consideration of the BOS is not warranted, a Biodiversity Development Assessment Report (BDAR) is not required.

1 Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by Sydney Water to complete a flora and fauna assessment to describe the ecological values and constraints associated with works being completed at the Riverstone WRRF, which is associated with the NWTH project. Biosis previously prepared a flora and fauna assessment to support the NWTH project (Biosis 2022). However, since completing this assessment, it has been determined that additional works are required to increase the Riverstone WRRF treatment capacity from 30 megalitres per day to 41 megalitres per day, which includes extending the construction boundary and vegetation impact area, as well as duplicating the effluent pipeline to accommodate the increased capacity.

The proposed works primarily occur within the Riverstone WRRF facility, and within private property adjacent to Bandon Road. These proposed works also cross open space near the riparian corridor of Eastern Creek. Vegetation along both sides of Bandon Road and the western and southern boundaries of the Riverstone WRRF includes narrow remnants patches of native vegetation that provide habitat connectivity and ecological value.

The study area is partially located within the NWGA as identified under Chapter 3 of the Central River City SEPP. Under the Biodiversity Certification Order (DECCW 2007), areas mapped as existing certified land do not require formal biodiversity assessment under the Commonwealth EPBC Act or the NSW BC Act.

Works proposed to be undertaken will be assessed under Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and this assessment will be used to inform an addendum Review of Environmental Factors (REF) being prepared by Sydney Water.

1.2 Scope of assessment

The objectives of this investigation are to:

- Describe the vascular flora (ferns, conifers, and flowering plants), vertebrate fauna (birds, mammals, reptiles, frogs).
- Map native vegetation and other habitat features.
- Review the implications of relevant biodiversity legislation and policy.
- Identify potential implications of the proposed development and provide recommendations to assist with development design.
- Recommend any further assessments of the site that may be required (such as pre-clearance surveys for threatened species).

1.3 Location of the study area

The study area is located within both the Blacktown City Council Local Government Area (LGA) and the Hawkesbury City Council LGA. The study area is zoned under the Central River City SEPP, with land use zonings including C2 (Environmental Conservation) and SP2 (Infrastructure).

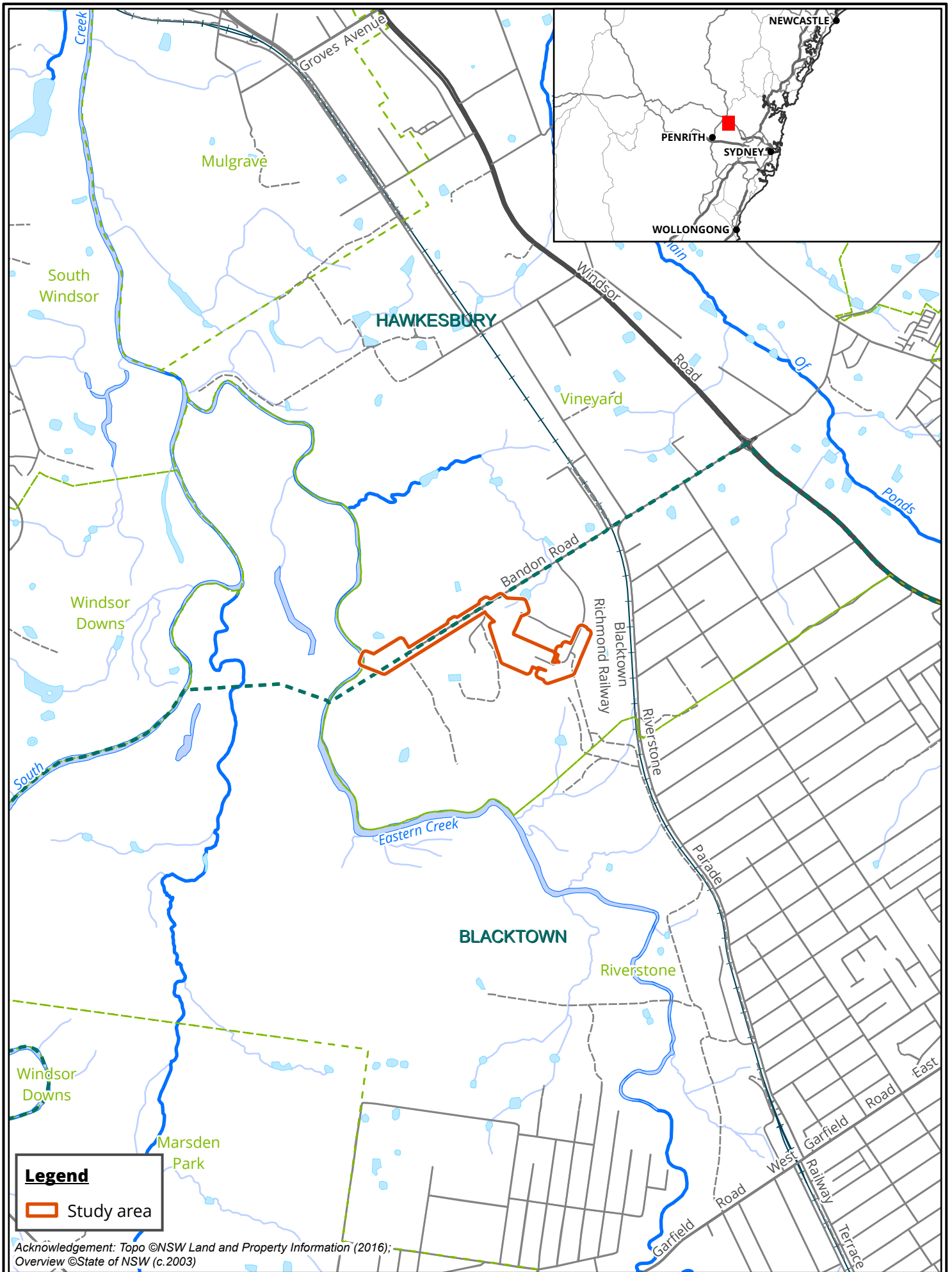
The surrounding land use primarily comprises of wastewater treatment infrastructure, industrial areas, low-to medium-density residential properties, and small-scale agricultural production.

The study area spans across approximately 16.41 hectares, consisting of patches of remnant and cleared vegetation interspersed with existing infrastructure. Vegetation within the study area offers limited connectivity to remnant vegetation to the east and north and along the riparian corridor of Eastern Creek to the west.

The study area is within the:

- Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion (Cumberland subregion).
- Hawkesbury-Nepean River Basin (Hawkesbury catchment).
- Greater Sydney Local Land Services (LLS) Management Area.

The majority of the study area falls within the NWGA as identified under the Central River City SEPP, which includes areas of both certified and non-certified land. Certified areas that are subject to the Biodiversity Certification Order do not require formal biodiversity assessment under the EPBC Act or BC Act. However, portions of the study area that occur on non-certified land, or that fall outside the NWGA entirely, are not subject to the Biodiversity Certification Order and therefore require full biodiversity assessment.



Acknowledgement: Topo ©NSW Land and Property Information (2016);
 Overview ©State of NSW (c.2003)

Figure 1 Location of the study area



2 Methods

2.1 Database and literature review

Prior to completing the field investigation, information provided by Sydney Water as well as other key information was reviewed, including:

- Australian Commonwealth Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW) Protected Matters Search Tool for matters protected by the EPBC Act.
- NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) BioNet Atlas of NSW Wildlife, for items listed under the BC Act.
- The NSW Department of Primary Industries (DPI) Spatial Data Portal for *Fisheries Management Act 1994* (FM Act) listed threatened species, populations and communities
- NSW DPI *Biosecurity Act 2015* for listed priority weeds for the Greater Sydney LLS area.
- EES Vegetation Information System (VIS) mapping, including the State Vegetation Type Map (SVTM) (DPE 2023)

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- *Environment Protection and Biodiversity Conservation Act 1999*.
- *Environmental Planning and Assessment Act 1979*.
- *Biodiversity Conservation Act 2016*.
- *Water Management Act 2000* (WM Act).
- *Biosecurity Act 2015* (Biosecurity Act).
- State Environmental Planning Policy (Biodiversity and Conservation) 2021.
- State Environmental Planning Policy (Precincts-Central River City) 2021.
- *Blacktown Local Environmental Plan 2015* (Blacktown LEP).
- *Blacktown Development Control Plan 2015* (Blacktown DCP).
- *Hawkesbury Local Environmental Plan 2012* (Hawkesbury LEP).
- *Hawkesbury Development Control Plan 2023* (Hawkesbury DCP).

2.2 Field investigation

A field investigation of the study area was undertaken on 14 May by Dylan Mason (Botanist). Vegetation within the study area was surveyed using the random meander technique (Cropper 1993) over one day.

General classification of native vegetation in NSW used in this report is based on the classification system in Keith (2004) which uses three groupings of vegetation: vegetation formation, vegetation class and vegetation type, with vegetation type the finest grouping. The grouping referred to in this report PCT as defined by the Biodiversity Assessment Method (BAM) (DPIE 2020) and has been the standard used across NSW since 2016.

The vegetation types, within the study area, were stratified into PCTs broadly based on previous vegetation mapping, and the vegetation boundaries marked with a hand-held GPS in the field. Appropriate PCTs were

selected on the basis of species composition and structure, known geographical distribution, landscape position, underlying geology, soil type, and any other diagnostic features.

A habitat-based assessment was completed to determine the presence of suitable habitat for threatened species previously recorded (NSW DCCEEW 2025a) or predicted to occur (Cth DCCEEW 2025) within 5 kilometres. This list was filtered according to species descriptions, life history, habitat preference and soil preference to determine those species most likely to be present within the study area.

2.2.1 Permits and licences

The biodiversity assessment was conducted under the terms of Biosis' Scientific Licence issued by NSW DCCEEW under the BC Act (SL100758, expiry date 30 June 2026). Wildlife surveys were conducted under the Secretary's Animal Care & Ethics Committee Approval (TRIM 17.892, expiry date 31 January 2028). Wildlife surveys using conservation detection dogs was conducted under the Secretary's Animal Care & Ethics Committee Approval (RVF24/6512, expiry date 12 December 2027).

3 Results

The study area is located approximately 1.5 kilometres west of the Riverstone town centre, within a landscape characterised by a mix of land uses, including industrial facilities, low- to medium-density residential areas, and rural smallholdings used for agriculture and livestock grazing. The alignment for the proposed effluent pipeline corridor primarily traverses industrial zones but also intersects areas of open space, particularly near the riparian corridor of Eastern Creek.

Regional soil landscape mapping indicates that the study area occurs on both the Berkshire Park and South Creek soil landscapes of the Penrith 1:100,000 map sheet (Bannerman & Hazelton 1990). The Berkshire Park soils landscape is characterised by weakly pedal orange heavy clays and clayey sands, that are often mottled and commonly found with ironstone nodules. The soils exposed within this landscape are influenced by erosion of three depositional phases/formations of tertiary alluvial/colluvial origin of which are derived from sandstone and clay. The South Creek soils landscape is characterised by very deep layered sediments or quaternary alluvium over bedrock or relict soils derived from Wianamatta Group shales and Hawkesbury Sandstone. This landscape occurs along floodplains, valley flats and drainage depressions of the channels on the Cumberland Plain. The composition of the soil is highly influential on the vegetation communities observed.

Native vegetation within the study area is primarily concentrated along the road verge of Bandon Road, as well as along the western and southern boundaries of the Riverstone WRRF. These vegetated areas consist of narrow linear remnants and patches that are influenced by surrounding land uses and infrastructure but may still provide habitat connectivity and ecological value within the modified landscape.

One Juniper-leaved Grevillea *Grevillea juniperina* subsp. *juniperina* (Vulnerable, BC Act) was noted as having been previously recorded within the study area (NSW DCCEEW 2025a, UBM Ecological Consultants 2018). This individual was verified as still occurring along the verge of Bandon Road within an area mapped on existing certified land, as shown on Figure 2.

3.1 Vegetation communities

The vegetation throughout the majority of the study area has been modified by past disturbances which have included historical clearing and weed ingress via the introduction of horticultural plantings. Nonetheless, vegetation of the study area comprises of the following:

- PCT 3320 - Cumberland Shale Plains Woodland, associated with the following TEC:
 - *Cumberland Plain Woodland in the Sydney Basin Bioregion* (CEEC, EPBC Act and BC Act).
- PCT 3448 – Castlereagh Ironbark Forest, associated with the following TEC:
 - *Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion and Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest* (CEEC, EPBC Act and BC Act).
- PCT 4023 - Coastal Valleys Swamp Oak Riparian Forest, associated with the following TEC:
 - *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (EEC, EPBC Act and BC Act).
- Planted native vegetation.
- Exotic vegetation and grassed areas.

A key focus of the field investigation was to assess the vegetation of the study area against the final determinations for the above listed TECs to determine presence or absence. The distribution, structure, floristic composition, and condition of these communities are described in Table 1 to Table 4.

Table 1 PCT 3320

PCT 3320 Cumberland Shale Plains Woodland	
PCT	PCT 3320 – Cumberland Shale Plains Woodland
Extent within study area	Approximately 1.39 ha of PCT 3320 was recorded within the study area.
Conditions	This community was found to occur in both a low condition and planted condition.
Description	<p>Areas of PCT 3320 in a low condition occurred as a tall, open forest with a canopy dominated by Forest Red Gum <i>Eucalyptus tereticornis</i> and Narrow-leaved Ironbark <i>Eucalyptus crebra</i>. The midstorey was sparse and where present, consisted of exotic species, primarily Lantana <i>Lantana camara</i>. Native midstorey species was limited to sporadic occurrences of Native Blackthorn <i>Bursaria spinosa</i>. Native species in the groundcover consisted of Kidney Weed <i>Dichondra repens</i> and Weeping Grass <i>Microlaena stipoides</i> var. <i>stipoides</i>. However, the understorey was also heavily dominated by African Love Grass <i>Eragrostis curvula</i>.</p> <p>Areas of PCT 3320 in a planted condition state within the study area occurred as a moderately tall forest with trees planted in a linear arrangement. These areas comprised almost exclusively of Forest Red Gum with Grey Box <i>Eucalyptus moluccana</i> occurring infrequently. In these areas, the midstorey was very sparse, comprising of Tick Bush <i>Kunzea ambigua</i>. The understorey of these planted condition areas was sparse, comprising mostly of African Lovegrass, with Weeping Grass more common in shaded areas.</p>
Threatened ecological community	<p>NSW BC Act: Listed – CEEC <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i> and the EEC <i>Shale Gravel Transition Forest in the Sydney Basin Bioregion</i>.</p> <p>Justification: All patches of PCT 3320 within the study area meet the criteria for listing for the <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i> CEEC due to the presence of trees characteristic of this TEC and the occurrence of patches on clay soils (NSW Scientific Committee 2009).</p> <p>Commonwealth EPBC Act: Not listed.</p> <p>Justification: No patches of PCT 3320 within the study area were found to meet the criteria for listing for this CEEC as patches were small, fragmented, and all comprised an understorey cover of <30% native species (TSSC 2009).</p>

PCT 3320 Cumberland Shale Plains Woodland

Photo



Photo 1 PCT 3320 in a low condition within the study area



Photo 2 PCT 3320 in a planted conditional state within the study area

Table 2 PCT 3448



PCT 3448 Castlereagh Ironbark Forest	
PCT	PCT 3448 – Castlereagh Ironbark Forest
Extent within study area	Approximately 1.03 ha of this community was recorded within study area
Condition	This community occurred in a planted conditional state.
Description	This community was found to occur as a forest with a dense grassy understorey and a sparse shrub layer. Dominant canopy species within this community included Red Ironbark <i>Eucalyptus fibrosa</i> and Narrow-leaved Ironbark <i>Eucalyptus crebra</i> . The sparse midstry comprised Parramatta Wattle <i>Acacia parramattensis</i> and Tick Bush. The understorey was diverse and included Threawn Speargrass <i>Aristida vagans</i> , Weeping Grass, and Wallaby Grass <i>Rytidosperma racemosum</i> . The twiner Variable Glycine <i>Glycine tabacina</i> was also recorded in this community.
Threatened ecological community	<p>NSW BC Act: Listed - EEC <i>Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion</i> and <i>Shale Gravel Transition Forest in the Sydney Basin Bioregion</i></p> <p>Justification: All patches of PCT 3448 within the study area meet the criteria for listing for both these EECs due to the assemblage of characteristic canopy species and their occurrence on tertiary alluvium within the Cumberland IBRA subregion.</p> <p>Commonwealth EPBC Act: Not listed.</p> <p>Justification: PCT 3448. No patches of PCT 3448 within the study area meet the criteria for listing for the associated TEC as patches were small, fragmented, and all comprised an understorey of <30% cover of native species (TSSC 2009, Department of the Environment 2015).</p>
Photo	 <p>Photo 3 PCT 3448 found in a planted condition state within the study area</p>

Table 3 PCT 4023 at study area

PCT 4023 Coastal Valleys Swamp Oak Riparian Forest	
PCT	4023 – Coastal Valleys Swamp Oak Riparian Forest
Extent within study area	Approximately 0.32 ha of PCT 4023 was recorded within the study area.
Condition	This community was found to occur in a low and planted condition state.
Description	<p>Areas PCT 4023 in a low condition was found to occur as small stands of Swamp Oak <i>Casuarina glauca</i> and Prickly-leaved Tea Tree <i>Melaleuca styphelioides</i> along Eastern Creek and within low damp areas elsewhere within the study area. The understorey was dominated by Panic Veldtgrass <i>Ehrharta erecta</i> and Kikuyu Grass <i>Cenchrus clandestinus</i>, with the exotic species Inkweed <i>Phytolacca octandra</i> and Cobbler's Pegs <i>Bidens pilosa</i> scattered throughout.</p> <p>Areas of planted condition vegetation occurred entirely of stands of Swamp-oak. The understorey was dominated almost exclusively by Kikuyu Grass, with the climber Variable Glycine <i>Glycine tabacina</i> present.</p>
Threatened ecological community	<p>NSW BC Act: Listed - EEC <i>Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>.</p> <p>Justification: All patches of PCT 4023 within the study area were found to meet the criteria for listing for this EEC as the patches were all dominated by Swamp Oak and occurred along Eastern Creek or within low, damp areas within the landscape (NSW Scientific Committee 2011a).</p> <p>Commonwealth EPBC Act: Not listed.</p> <p>Justification: No patches of PCT 4023 within the study area were found to meet the criteria for listing for this EEC as all patches comprised an understorey of <20% non-native species (TSSC 2018).</p>
Photos	 <p style="text-align: center;">Photo 4 PCT 4023 in a low condition within the study area</p>

PCT 4023 Coastal Valleys Swamp Oak Riparian Forest



Photo 5 PCT 4023 in a planted conditional state within the study area

Table 4 Planted native vegetation

Planted native vegetation	
Extent within study area	Approximately 0.33 ha of planted native vegetation was recorded within the study area.
Description	Planted native vegetation within the study area occurred as an open forest comprising juvenile trees, a sparse shrub layer, and a weedy understorey, with trees regularly occurring in rows. Dominant canopy species within patches of planted native vegetation included Spotted Gum <i>Corymbia maculata</i> , Sydney Red Gum <i>Angophora costata</i> , and Lemon-scented Gum <i>Corymbia citriodora</i> . Where this community occurred within the Riverstone WRRF, the canopy was heavily dominated by Sydney Blue Gum <i>Eucalyptus saligna</i> . Shrubs present in this community include Pine-leaved Bottlebrush <i>Callistemon pinifolius</i> and Weeping Bottlebrush <i>Callistemon viminalis</i> . The understorey of this community within the study area was dominated by African Lovegrass and Dallas Grass <i>Paspalum dilatatum</i> . Lantana was frequent amongst planted species within this community.
Threatened ecological community	N/A - This community is not associated with any TECs.

Planted native vegetation

Photo



Photo 6 Planted native vegetation within the study area

Table 5 Exotic vegetation at study area

Exotic vegetation	
Extent within study area	Approximately 9.96 ha of exotic vegetation was recorded with the study area.
Description	<p>Exotic vegetation was found to occur within the study area as cleared exotic grasslands along Bandon Road, as well as cleared grassy areas within adjacent paddocks and landscaped areas within the Riverstone WRRF.</p> <p>Along the roadsides this community was dominated by Rhodes Grass <i>Chloris gayana</i>, Dallas Grass, and African Lovegrass, with Spear Thistle <i>Cirsium vulgare</i> and Cobbler’s Pegs scattered throughout. Within paddocks, exotic vegetation was dominated by Dallas Grass and Kikuyu Grass, with the weeds Umbrella Sedge <i>Cyperus eragrostis</i> and Inkweed more frequent in lower, wetter portions of paddocks and Fireweed <i>Senecio madagascariensis</i> scattered throughout. Within the Riverstone WRRF, exotic vegetation comprised manicured lawns and areas of recently disturbed soils dominated by Kikuyu Grass, Catsear <i>Hypochaeris radicata</i>, and Red-flowered Mallow <i>Modiola caroliniana</i>.</p>
Threatened ecological community	N/A - This community is not associated with any TECs.

Exotic vegetation

Photo



Photo 7 Exotic vegetation within the study area

3.2 Aquatic habitats

Eastern Creek, located at the western portion of the study area, had slight turbidity and moderate stream flow evident at the time of survey. It is a perennial waterway, maintaining flow year-round and supporting continuous aquatic habitat. There are no tributaries within the study area.

Eastern Creek contained a series of pools typically 10 to 15 metres wide and 20 to 30 metres long, connected by small flowing channel sections. Pools were fringed by a mix of native riparian vegetation, including Swamp Oak and Prickly-leaved Tea Tree, alongside aquatic vegetation predominantly composed of *Juncus* and *Typha* species. The western bank of Eastern Creek was treeless and smothered by exotic vegetation including Inkweed *Phytolacca octandra* and Umbrella Sedge *Cyperus eragrostis*.

Large sections of eroded bank were visible, indicative of poor bank stability during higher seasonal flow periods. This instability is considered a result of a combination of degraded riparian vegetation and increased flows associated with urbanisation and cattle grazing in the surrounding areas.

Eastern Creek is a fourth-order Strahler stream (Strahler 1964) and is recognised as key fish habitat under the FM Act.

3.3 Threatened species

Background searches identified 28 threatened flora species and 80 threatened fauna species recorded (NSW DCCEEW 2025a) or predicted to occur (Cth DCCEEW 2025) within 5 kilometres of the study area.

The study area is located within the NWGA, as identified under Chapter 3 of the Central River City SEPP. Under the Biodiversity Certification Order, which confers biodiversity certification on land mapped under the former Growth Centres SEPP, areas mapped as certified land do not require formal biodiversity assessment under the BC Act or the EPBC Act.

While the majority of the study area occurs on certified land, approximately 0.03 hectares of native vegetation along the north-western boundary of the study area is classified as non-certified, and 0.12 ha of native vegetation along the north-western portion lies outside the NWGA boundary entirely. The assessment of threatened species and their habitats provided below applies only to areas of non-certified land and land located outside the NWGA. Certified land within the study area has not been assessed, as it is exempt from formal biodiversity assessment under the BC Act and EPBC Act.

Background research indicates the below species are most likely to occur within non-certified land and areas beyond the NWGA boundary. Species recorded or predicted to occur within five kilometres of the study area, and not listed below, are considered to have a negligible likelihood of occurrence due to the absence of suitable habitat within areas not mapped as certified. This is primarily attributed to the highly modified nature of these areas, which are dominated by exotic pasture, disturbed road reserves, and edge-affected vegetation with limited structural complexity.

Flora

- Downy Wattle *Acacia pubescens* (Vulnerable, EPBC Act and BC Act).
- Juniper-leaved Grevillea *Grevillea juniperina* subsp. *juniperina* (Vulnerable, BC Act).
- Sydney Bush Pea *Pultenaea parviflora* (Vulnerable, EPBC Act and Endangered, BC Act).

Fauna

- Cumberland Plain Land Snail *Meridolum corneovirens* (Vulnerable, BC Act).
- Eastern Coastal Free-tailed Bat *Micronomus norfolkensis* (Vulnerable, BC Act).
- Grey-headed Flying-fox *Pteropus poliocephalus* (Vulnerable, EPBC Act and BC Act).
- Large Bent-winged Bat *Miniopterus orianae oceanensis* (Vulnerable, BC Act).
- Southern Myotis *Myotis macropus* (Vulnerable, BC Act).

Table 6 Assessment of habitat for threatened flora species

Species	Local distribution and habitat requirements	Likelihood of occurrence or impact
Downy Wattle	Downy Wattle has been recorded approximately 2.1 km from the study area, with a total of 23 records within 5 km. This species grows on alluvial soils at the intergrade between shale and sandstone within dry sclerophyll woodland communities.	Suitable habitat for Downy Wattle is present within the study area. However, much of this habitat is located within areas mapped as existing certified land, where formal assessment is not required. The portions of the proposed development footprint outside the certified boundary predominantly consist of low-quality road reserves and exotic pasture, which are heavily impacted by edge effects, weed invasion, and ongoing disturbance. The species was not detected during the current field survey or previous assessments of the Riverstone WRRF (UBM Ecological Consultants 2018). Considering the species' preference for alluvial soils at shale-sandstone intergrades in dry sclerophyll woodland, and the limited extent of suitable habitat outside certified land, its likelihood of occurrence in non-certified areas is assessed as low.

Species	Local distribution and habitat requirements	Likelihood of occurrence or impact
Juniper-leaved Grevillea	Juniper-leaved Grevillea has been recorded within the study area previously (NSW DCCEEW 2025b, UBM Ecological Consultants 2018). This species grows in the Cumberland Plain on alluvial soils and lateritic shale substrates.	<p>Juniper-leaved Grevillea has been previously recorded within the study area and was re-verified during the current field investigation. Habitat is present within PCT 3320 and PCT 3448. However, much of this habitat is located within areas mapped as existing certified land, where formal assessment is not required.</p> <p>Non-certified areas within the proposed development footprint are limited to narrow, disturbed road reserves and exotic pasture, which lack the soil characteristics and vegetation structure typically preferred by this species. Juniper-leaved Grevillea is a visually conspicuous species and readily identifiable when present. Given its detectability and absence from non-certified areas during surveys, along with the degraded condition of available habitat, the likelihood of occurrence in non-certified areas is considered low.</p>
Sydney Bush Pea	A total of 66 records of Sydney Bush Pea occur within 5 km of the study area, mostly within intact vegetation to the west and east. This species grows in dry sclerophyll forests on the Cumberland Plain, occurring mostly on shale, lateritic, or alluvial soils.	<p>Habitat for Sydney Bush Pea is present within the study area, represented by PCT 3320 and PCT 3448. However, much of this habitat is located within areas mapped as existing certified land, where formal assessment is not required.</p> <p>Non-certified areas within the proposed development footprint consist primarily of disturbed road reserves and exotic pasture, which provide low-quality habitat due to edge effects, weed invasion, and ongoing disturbance. Although Sydney Bush Pea is not readily conspicuous, it was not recorded during the current field investigation or in previous assessments of the Riverstone WRRF (UBM Ecological Consultants 2018). Given the degraded condition of habitat in non-certified areas and the species' absence from these portions during targeted surveys, the likelihood of occurrence is considered low.</p>

Table 7 Assessment of habitat for threatened fauna species

Habitat feature	Threatened fauna association	Likelihood of occurrence or impact
Feed trees	Narrow-leaved Apple <i>Angophora bakeri</i> , Narrow-leaved Ironbark, and other flowering perennial species recorded in the study area may provide nectar resources suitable for a range of arboreal and flying fauna (such as Grey-headed Flying-fox) whilst in flower.	Grey-headed Flying Fox was recorded within the study area in 2018 (NSW DCCEEW 2025a, UBM Ecological Consultants 2018), with a further 85 records existing within 5 km. A large colony of Grey-headed Flying-fox is known to occur in Windsor, 5.5 km north of the study area. Due to the presence of suitable resources within the study area, this species has a high likelihood of occurring in the study area, and areas of suitable

Habitat feature	Threatened fauna association	Likelihood of occurrence or impact
		habitat in areas not mapped as certified will be impacted. Impacts have been assessed as part of a NSW Test of Significance (ToS) and Commonwealth Significance Impact Criteria (SIC) assessment, provided in Appendix 1 and 0, respectively.
Hollow-bearing trees	Only one hollow-bearing tree was recorded within non-certified areas of the study area. This may provide marginal roosting habitat for hollow-dwelling microbats such as Southern Myotis and Eastern Coastal Free-tailed Bat.	Both the Eastern Coastal Free-tailed Bat and Southern Myotis have recorded within the study area in 2018 (NSW DCCEEW 2025a, UBM Ecological Consultants 2018). However, no hollow-bearing trees will be removed for the proposed works, and no impact to roosting habitat for either species is expected.
Waterways (creek, river or dam)	Eastern Creek is a Strahler order 4 stream (Strahler 1964) and flows through the north-western portion of the study area. Waterways have the potential to provide foraging habitat for Southern Myotis.	As mentioned above, Southern Myotis was recorded within the study area in 2018 (NSW DCCEEW 2025a, UBM Ecological Consultants 2018). This species is known to utilise waterways for foraging. However, no direct impacts to waterways are expected to occur, and suitable habitat is present across the locality. Therefore, it is unlikely that this species would be impacted by the proposed works.
Leaf litter and woody debris	Leaf litter and fallen logs amongst patches of remnant vegetation are likely to provide habitat for Cumberland Plain Land Snail.	Habitat for the Cumberland Plain Land Snail is not present within areas of non-certified land within the study area. Vegetation subject to assessment (i.e. non-certified areas) do not provide habitat suitable for this species. This species therefore has a low likelihood of occurrence.
Caves and shelters	No caves or significant overhangs which could provide roosting habitat for cave-dwelling species were found within the study area.	Not applicable.
Human-made structures	No human-made structures are located within non-certified areas of the study area.	Not applicable.

Based on the size of the study area, the survey effort is considered comprehensive to assess habitat presence for the species outlined in Table 6 and Table 7.

3.3.1 Priority weeds

Four priority weeds for Greater Sydney LLS, which includes Blacktown and Hawkesbury Council LGAs, have been recorded in the study area, and are listed in Table 8, along with their associated Biosecurity Duty in accordance with the Biosecurity Act.

The Biosecurity Act provides for the identification, classification and control of priority weeds with the purpose of determining if a biosecurity risk is likely to occur. A priority weed is any weed identified in a local

strategic plan, for a region that includes that land or area, as a weed that is or should be prevented, managed, controlled or eradicated in the region.

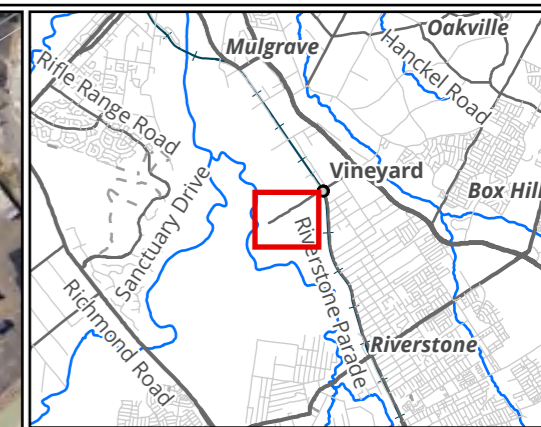
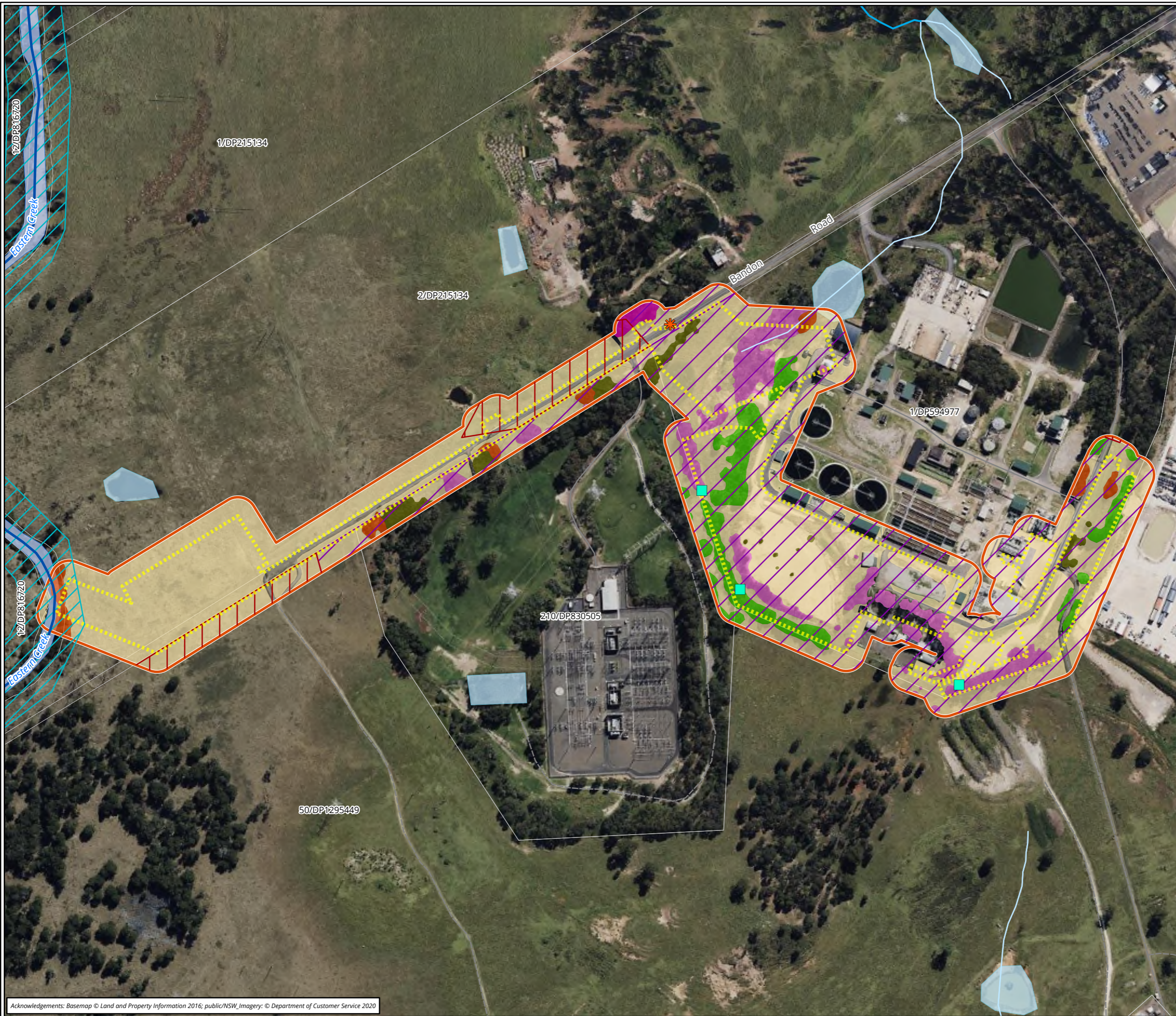
The General Biosecurity Duty as outlined in the Biosecurity Act states:

All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Table 8 Priority weeds within the study area

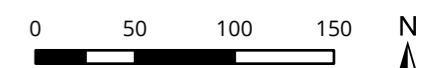
Scientific name	Common name	Relevant biosecurity duty
<i>Rubus fruticosus</i>	Blackberry	General Biosecurity Duty
<i>Cestrum parqui</i>	Green Cestrum	General Biosecurity Duty
<i>Lantana camara</i>	Lantana	General Biosecurity Duty
<i>Senecio madagascariensis</i>	Fireweed	General Biosecurity Duty

To prevent biosecurity impacts from occurring as a result of the presence of the above listed priority weeds within the study area, all practical steps should be taken to control and eradicate the weeds from the study area as per the relevant biosecurity duties outlined above, or prior to or during any future vegetation removal.



- Legend**
- Study area
 - Impact area
 - Lot
 - Key Fish Habitat
 - Bat box
- Growth centre land certification**
- Existing Certified
 - Existing Non Certified
- Threatened species record (BioNet)**
- ✱ *Grevillea juniperina* subsp. *juniperina*
- Strahler stream order**
- 1
 - 2
 - 4
- Vegetation zone**
- 3320_Low
 - 3320_Other
 - 3448_Other
 - 4023_Other
 - Planted native vegetation
 - Exotic vegetation

Figure 2 Ecological features of the study area



Metres
 Scale: 1:3,800@ A3
 Coordinate System:
 GDA2020 MGA Zone 56



Matter: 42346, Date: 10 June 2025,
 Prepared for: DM, Prepared by: Last edited by: jbeckius
 Location: P:\423005\42346\Mapping\42346_Riverstone_NWTH,
 Layout: 42346_F2_EcoFeatures

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4 Assessment against key legislation

4.1 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act is the Australian Government's key piece of environmental legislation. The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (MNES) protected under the Act. Under the EPBC Act, activities that have potential to result in significant impacts on MNES must be referred to the Commonwealth Minister for the Environment and Energy for assessment.

One threatened fauna species (Grey-headed Flying Fox) listed under the EPBC Act was assessed to have a medium or greater potential to occur within the study area, within areas not mapped as existing certified. An assessment against the Significant Impact Criteria (Commonwealth of Australia 2013) has been prepared for this species and concluded that a significant impact was not likely to occur. This conclusion was reached on the basis that impacts are relatively minor and localised and will be restricted to broader foraging habitat only.

4.2 *Biodiversity Conservation Act 2016*

One threatened ecological community (Swamp-oak Floodplain Forest) and one threatened fauna species (Grey-headed Flying-fox) listed under the BC Act have a medium or greater likelihood of occurring within parts of the study area that are not mapped as existing certified under the Biodiversity Certification Order for the NWGA.

Tests of Significance have been prepared for these threatened entities (see Appendix 1) and concluded that a significant impact is not likely to result from the project. This conclusion was made on the basis that as impacts are localised and do not affect entire habitat patches. The areas impacted are limited to foraging habitat, with large, intact vegetation areas remaining undisturbed, providing continued resources and connectivity for fauna. Additionally, the retention of extensive vegetation areas is expected to maintain overall habitat function, minimising potential fragmentation and preserving ecological processes.

4.3 *Water Management Act 2000*

The WM Act provides for the sustainable and integrated management of the state's water for the benefit of both present and future generations based on the concept of ecologically sustainable development. Under the WM Act an approval is required to undertake controlled activities on waterfront land, unless that activity is otherwise exempt under Section 91E. Waterfront land is defined within the Act as the bed of any river, lake or estuary and any land within 40 metres of the riverbanks, lake shore or estuary mean high water mark. The survey area contains two watercourses. This includes Eastern Creek towards the west, which is a Strahler Order 4 creek, and an unnamed watercourse towards the north of the existing Riverstone WRRF, which is a Strahler Order 1 watercourse.

However, as a public authority, Sydney Water does not need to obtain a controlled activity approval from the Natural Resources Access Regulator for any controlled activities that it carries out in, on or under waterfront land. While Sydney Water is exempt from the controlled activity approval process, the design considerations and management measures detailed in the relevant WM Act guidelines (DPE 2022) should be considered.

4.4 Fisheries Management Act 1994

The FM Act provides for the protection and conservation of aquatic species and their habitat throughout NSW. Impacts to threatened species, populations and communities, and critical habitats listed under the FM Act must be assessed through an Assessment of Significance process.

The proposal will not impact the movement of water within areas mapped as Key Fish Habitat (Eastern Creek). Therefore, the proposed works are not expected to result in temporary or permanent blockages to fish passage, and a permit is not required in accordance with section 219 of the FM Act. However, while a permit is not required under section 219 of the FM act, the proposed works may involve dredging and/or reclamation works. Therefore, formal notification to Fisheries NSW may be required in accordance with Section 199 of the FM Act. The requirement of a permit should be confirmed in consultation with Fisheries NSW.

4.5 Local Planning Instruments

LEPs are legal documents that guide planning decisions and controls land use within a specific local government area in Australia. Development Control Plans (DCP) are planning and design guidelines to support the planning controls of the LEP for each LGA.

However, Chapter 2, Division 22, Subdivision 1 (2.159) of the Transport and Infrastructure SEPP specifies that development for the purpose of water supply activities carried out by a public authority is considered development permitted without consent. Given that Sydney Water is a public authority, the SEPP overrides the zoning under the LEP, and the development is permissible without consent.

4.6 State Environmental Planning Policies

4.6.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

The State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure) SEPP aims to facilitate the effective delivery of infrastructure across the State.

Chapter 2 of the SEPP contains planning rules and controls for infrastructure in NSW, such as for hospitals, roads, railways, emergency services, water supply and electricity delivery. This chapter is relevant to this assessment as utility infrastructure is considered as 'development permitted without consent' and 'exempt development', respectively.

4.6.2 State Environmental Planning Policy (Biodiversity and Conservation) 2021

Chapter 3: Koala Habitat Protection 2020

This chapter applies to land zoned RU1, RU2 or RU3. Part of the survey area is mapped as RU1, however the number of native trees within this part of the site constitutes less than 15%. Therefore, this area is not considered potential koala habitat and the requirements laid out by this policy do not apply.

Chapter 4: Koala Habitat Protection 2021

Chapter 4 Koala Habitat Protection aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline.

However, Chapter 4 of the SEPP does not apply to this proposal, as the activity is being carried out under Division 5.1 of the EP&A Act and is classified as development permitted without consent under the Transport and Infrastructure SEPP. As the proposal does not require development consent, the Koala SEPP does not apply.

4.6.3 State Environmental Planning Policy (Precincts – Central River City) 2021

The Central River City SEPP includes the provisions from the previous SEPP (Sydney Region Growth Centres) 2006. The Central River City SEPP establishes the broad framework for the development of four identified growth centres in Western Sydney; the North West Growth Centre, the South West Growth Centre, the Wilton Growth Area, and the Greater MacArthur Growth Area. The aim of this policy was to allow for the co-ordinated release of land for residential, employment and other urban development within the growth centres, in order to ensure high-quality, sustainable and liveable developments. The study area occurs within the North West Growth Centre and includes land designated as certified under this SEPP.

Order to confer biodiversity certification on the State Environmental Planning Policy (Sydney Regional Growth Centres) 2006

In December 2007 the Growth Centres Biodiversity Certification Order for North West Growth Centre and South West Growth Centre was made by the NSW Minister for the Environment. This biodiversity certification was granted under Schedule 7 of the now repealed NSW *Threatened Species Conservation Act 1995*. However, this certification still has effect due to the action of Part 8 Clause 43 of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*. The effects of the conferred biodiversity certification are:

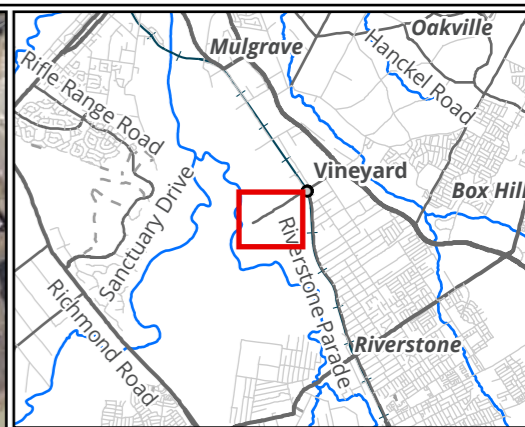
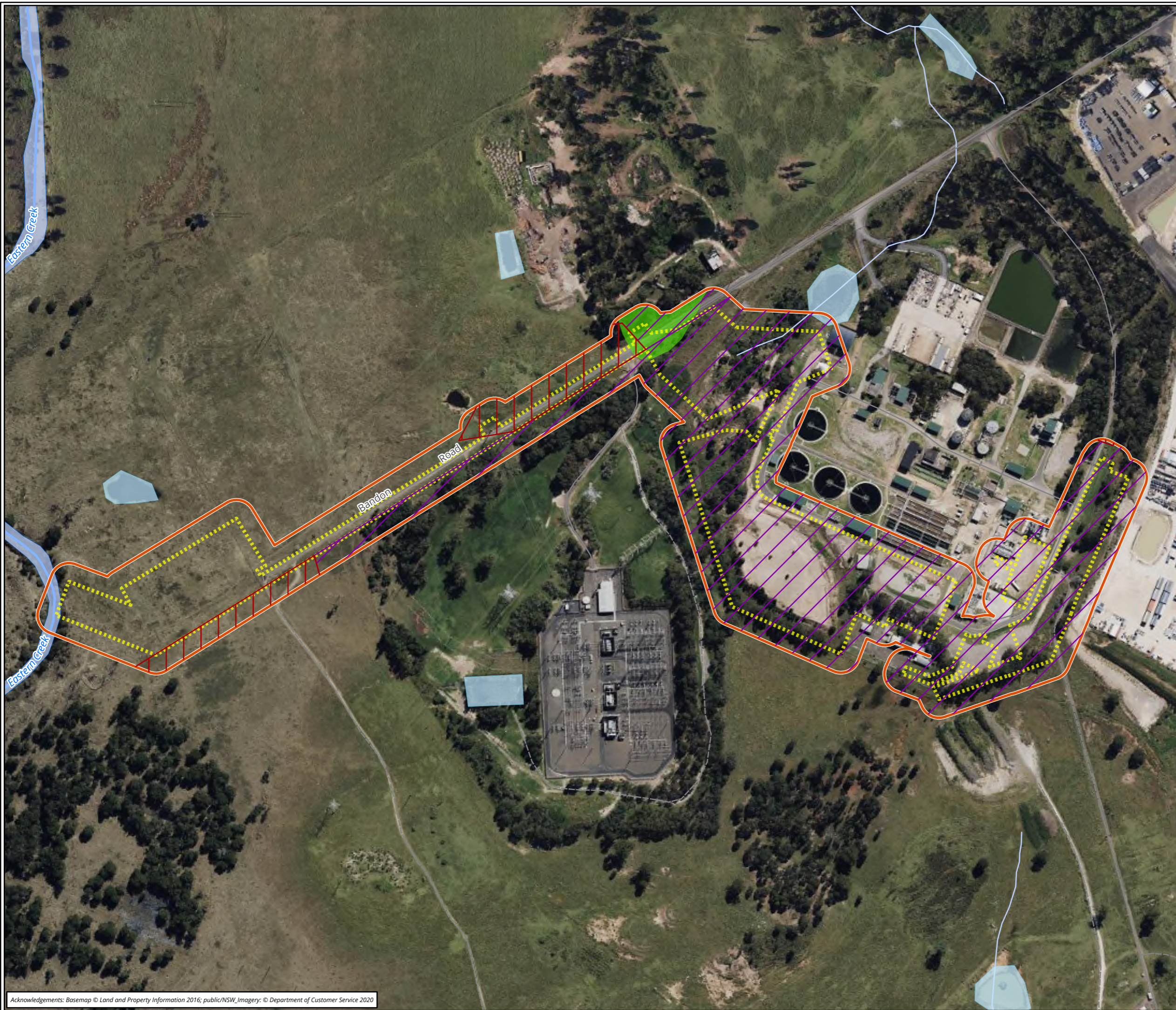
(1) Any development for which development consent is required under the provisions of a biodiversity certified EPI is, for the purposes of the Part 4 of the EP&A Act, taken to be development that is not likely to significantly affect any threatened species, population or ecological community, or its habitat.

The Biodiversity Certification Order also outlines 41 conditions, known as RBMs to ensure consistency with the biodiversity certification for the growth centres during future development. RBMs relevant to this assessment include:

- RBM 5 - *Pursuant to section 126H of the Act, the biodiversity certification of the SEPP is limited to the certified areas.*
 - Developments or activities proposed to be undertaken within the certified areas do not need to undertake assessment of impacts on threatened species, populations and ecological communities, or their habitats, that would normally be required by Part 4 or 5 of the EP&A Act.
- RBM 13 - *If new information becomes available after the biodiversity certification order took effect that demonstrates that the vegetation within an area does not otherwise meet the definition of existing native vegetation, then for the purposes of conditions 7 to 8 and condition 11 to 12 only the area of confirmed existing native vegetation shall be considered*
 - ENV was incorporated into the Western Parkland City SEPP to ensure for the protection of at least 2,000 hectares within the Growth Centres. Field investigations confirmed that ENV is present within the study area. However, it was determined that the extent of ENV differed from what was originally present at the time that the biodiversity certification order took effect. This difference was predominantly due to some patches of vegetation having a canopy that was less than 10%, or areas existing as structures/roads. The extent of the field validated ENV, and how it differs from the ENV originally mapped, is displayed on Figure 3.

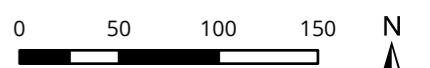
- No areas of field validated ENV in areas mapped as non-certified will be impacted by the proposed works.

No further controls listed within the RBMs are considered relevant to the current assessment, and no further consideration is required.



- Legend**
- Study area
 - Impact area
 - Non-validated ENV
- Growth centre land certification**
- Existing Certified
 - Existing Non Certified

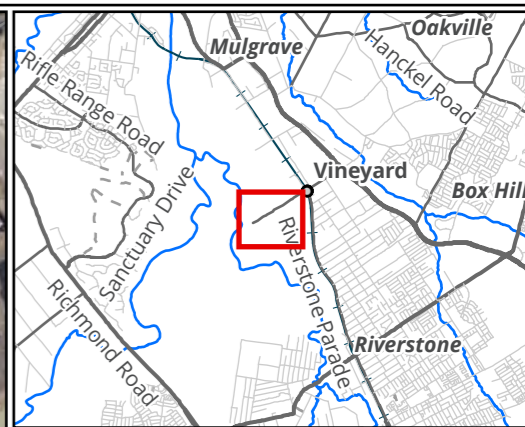
Figure 3.1 Biodiversity certification (ENV)



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 Coordinate System:
 GDA2020 MGA Zone 56

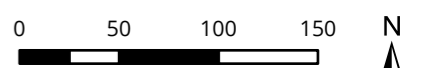


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 Prepared for: DM, Prepared by: Last edited by: jbeckius
 Location: P:\423005\42346\Mapping\42346_Riverstone_NWTH,
 Layout: 42346_F4.1_ENV



- Legend**
- Study area
 - Impact area
 - Field validated ENV
- Growth centre land certification**
- Existing Certified
 - Existing Non Certified

Figure 3.2 Biodiversity certification (ENV)



Metres
 Scale: 1:3,800@ A3
 Coordinate System:
 GDA2020 MGA Zone 56



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 Layout: 42346_F4.2_ENV

4.7 Cumberland Plain Conservation Plan

The Cumberland Plain Conservation Plan (CPCP) is a strategic conservation plan prepared under the SEPP (Biodiversity and Conservation) 2021 that aims to support Western Sydney's growth and the region's native plants and animals. The CPCP maps certified-urban capable land (where development can proceed without further biodiversity approvals) and avoided land (land avoided from development due to high biodiversity values).

Chapter 13 (Strategic Conservation Planning) of SEPP (Biodiversity and Conservation) sets out the planning controls to achieve the development and biodiversity outcomes of the CPCP. There are a number of planning controls that apply to different land categories to support the implementation of biodiversity and development commitments of the CPCP. The land categories are identified as:

- Avoided land.
- Certified-urban capable land.
- Land in a strategic conservation area.

The study area occurs within the CPCP area. While it is not mapped as certified land or avoided land, part of the study area overlaps with land identified as a Strategic Conservation Area. Planning controls relevant to the proposed works and provided by the CPCP include:

- Section 9.1 Ministerial Direction (Strategic Conservation Planning)
 - Aims to protect land with high biodiversity value from the impacts of development.
 - Prevents rezoning of avoided land or the strategic conservation area to urban development zones.
- Cumberland Plain Conservation Plan Guidelines for Infrastructure Development
 - The infrastructure guidelines set out the requirements to avoid, minimise and mitigate impacts on biodiversity from infrastructure activities carried out under Part 5 of the EP&A Act on land identified as avoided land, strategic conservation area and certified – urban capable land.

The ministerial direction aims to protect land with high biodiversity value from the impacts of development. It requires a planning proposal to demonstrate that it protects or enhances biodiversity. This includes native vegetation, threatened ecological communities, Koala habitat and corridors and matters of national environmental significance within the avoided lands or strategic conservation areas.

Cumberland Plain Conservation Plan Guidelines for Infrastructure Development

The 'Cumberland Plain Conservation Plan Guidelines for Infrastructure Development' (infrastructure guidelines) supports strategic conservation planning and the implementation of the CPCP. Development on land to which the CPCP applies must be consistent with the biodiversity approvals under the CPCP. The infrastructure guidelines form the key planning mechanisms designed to ensure development or an activity in the nominated areas is consistent with the biodiversity approvals under the CPCP.

Section 1.6 of the infrastructure guidelines states that these guidelines apply to any infrastructure that is located on avoided land, certified-urban capable land or land in the strategic conservation area. As the proposed works occur in an area mapped within a strategic conservation area (Figure 4), the infrastructure guidelines apply to the proposed works.

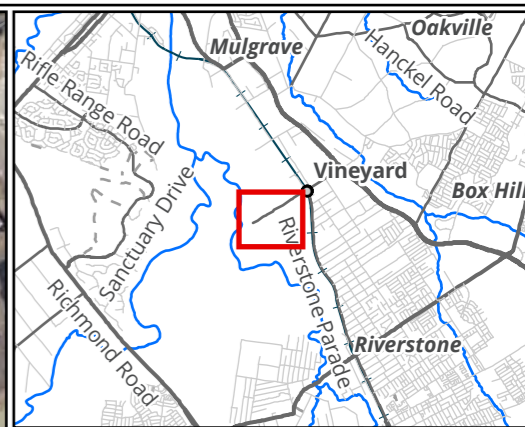
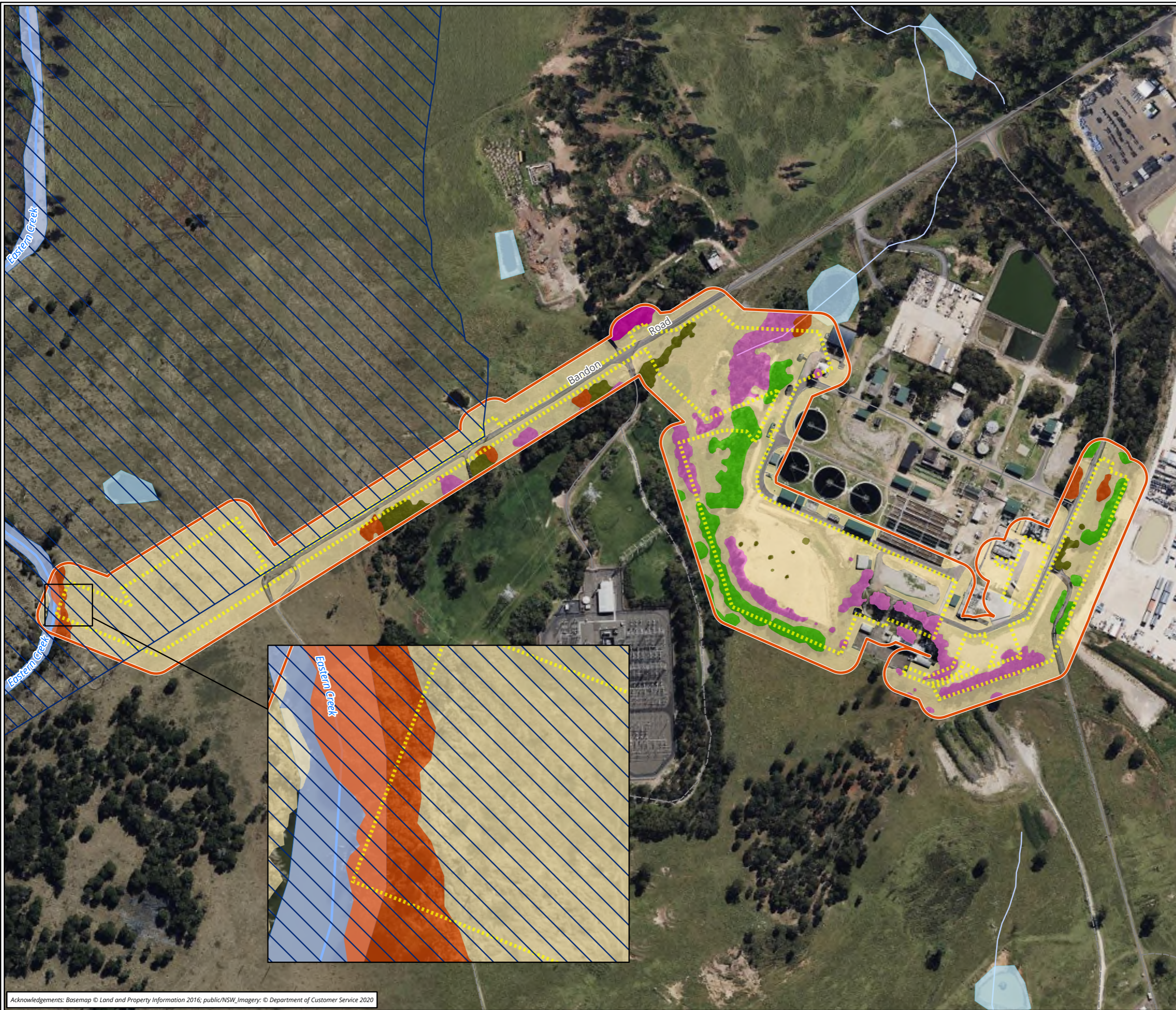
Part 3 of the infrastructure guidelines provides objectives and biodiversity matters to be addressed for Part 5 activities that are being carried out on avoided land, in the strategic conservation area or on certified-urban capable land. It is divided into three sections:

- Section 3.1 relates to activities on avoided land.
- Section 3.2 relates to activities in the strategic conservation area.
- Section 3.3 relates to activities on certified-urban capable land.

Part 3.2 of the infrastructure guidelines is relevant to this assessment. An assessment against section 3.2 of the infrastructure guidelines has been provided below in Table 9.

Table 9 Assessment against Section 3.2 of the CPCP infrastructure guidelines (strategic conservation areas)

Biodiversity Controls - Section 3.2 - Strategic conservation areas	Assessment against the proposal
<ul style="list-style-type: none"> Avoid or minimise any adverse impacts on the biodiversity values of the land. Avoid or minimise any adverse impacts on threatened ecological communities, threatened species and their habitats, both on the site of the activity and on adjoining land in a strategic conservation area. 	<p>The proposed works within the strategic conservation area are largely confined to exotic pasture rather than native vegetation. Cleared and disturbed areas are being utilised where possible, including for the placement of construction facilities. Only a very small area of native vegetation will be impacted. This impact is also limited to the removal of one small tree (White-feather Honeymyrtle <i>Melaleuca decora</i>).</p> <p>Adverse impacts are not anticipated, as the project has been designed to avoid impacts on threatened entities where possible, and to mitigate unavoidable impacts.</p>
<ul style="list-style-type: none"> Avoid or minimise any adverse impacts on habitat connectivity and fauna movement, including koala and wildlife corridors, and links to ecological restoration areas, both on the site of the activity and on adjoining land in a strategic conservation area 	<p>Works within the strategic conservation area are confined to already cleared or disturbed areas and do not intersect mapped wildlife corridors or areas of known fauna movement pathways. Areas to be impacted are primarily limited to exotic grassed areas, which are not considered Koala habitat, and no Koala feed trees within the strategic conservation area will be removed. Connectivity to adjoining ecological restoration areas and broader habitat linkages will be maintained, ensuring fauna movement is not obstructed.</p>
<ul style="list-style-type: none"> Avoid or minimise any adverse impacts on the integrity and resilience of the biophysical, ecological, and hydrological environments, including surface and groundwater, and the quality of the natural flow of water in a riparian corridor 	<p>It is not anticipated that the proposal would adversely impact upon components listed in this criterion, and in the case of surface water quality, is likely to have a beneficial effect post-construction via improvement of the current stormwater system.</p>
<ul style="list-style-type: none"> Avoid or minimise an adverse impact on MNES referred to in Chapter 2, Part 3, Division 1 of the EPBC Act 	<p>A significant impact to any MNES is not considered likely as detailed in section 4.1.</p>
<ul style="list-style-type: none"> Consider the cumulative impact of the activity and other approved activities or development in relation to the land on: <ul style="list-style-type: none"> Matters described in 1-5 of Section 3.2.2 (of the infrastructure guidelines) The potential for the ecological restoration of the land Adjoining land identified as a strategic conservation area. 	<p>The activity has been designed to minimise environmental impacts, with works largely confined to cleared or disturbed land and only a small linear area being removed within the strategic conservation area. No Koala habitat will be affected, and no Koala feed trees will be removed. There are no other approved activities in the surrounding area that will impact these sections of land. Given the limited scale and nature of the proposed works, the activity is unlikely to contribute to any significant cumulative impact on the matters outlined in Section 3.2.2 of the Infrastructure Guidelines, the potential for ecological restoration, or adjoining strategic conservation areas</p>



- Legend**
- Study area
 - Impact area
 - CPCP Strategic Conservation Area
- Vegetation zone**
- 3320_Low
 - 3320_Other
 - 3448_Other
 - 4023_Other
 - Planted native vegetation
 - Exotic vegetation

Figure 4 CPCP Strategic Conservation Area



Metres
 Scale: 1:3,800@ A3
 Coordinate System:
 GDA2020 MGA Zone 56

biosis
 APEM Group

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 Layout: 42346_F3_CPCP

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5 Impact assessment

This section identifies the potential impacts of the proposed works on the ecological values of the study area and includes recommendations to assist Sydney Water to design the development to avoid and minimise impacts on ecological values.

The ecological values impacted by the proposed works are described in Table 10 below, which includes recommendations to assist Sydney Water to design the development to avoid and minimise impacts on ecological values in accordance with *Sydney Water Biodiversity Offset Guidelines* (Sydney Water 2019). These impacts are categorised based on their location within certified land, non-certified land, or areas outside the NWGA boundary.

Table 10 Sydney Water Biodiversity Offset Guidelines Assessment

Ecological value	Impacts	Recommendations
Threatened ecological communities	<p>Existing certified land</p> <p>Direct removal of 2.59 ha of native TECs consisting of:</p> <ul style="list-style-type: none"> 1.36 ha of PCT 3320 (Cumberland Plain Woodland) 1.03 ha of PCT 3448 (Castlereagh Ironbark Forest) 0.20 ha of PCT 4023 (Swamp-Oak Floodplain Forest) <p>Land outside of the NWGA</p> <p>Direct removal of 0.12 ha of PCT 4203 (Swamp-Oak Floodplain Forest).</p>	<ul style="list-style-type: none"> Further risk of impacts to the TECs and individual native trees can be managed by implementing appropriate safeguards in further planning and carrying out the construction works including: <ul style="list-style-type: none"> Avoid clearing of individual native trees if feasible. Minimise all trimming activities and avoid the removal of hollow-bearing limbs. Offsetting for non-certified land/areas outside the NWGA: <ul style="list-style-type: none"> Offsetting to follow <i>Sydney Water Biodiversity Offset Guidelines</i>.
Threatened species habitat	<p>Certified land</p> <p>Direct removal of 2.59 ha of threatened flora/fauna habitat, consisting of:</p> <ul style="list-style-type: none"> Foraging habitat for Grey-headed Flying Fox. Habitat for Cumberland Plain Land Snail. <p>Land outside of the NWGA</p> <p>Direct removal of 0.12 ha of threatened fauna habitat, consisting of foraging habitat for Grey-headed Flying Fox.</p>	<ul style="list-style-type: none"> Removal of hollow-bearing trees and trimming of hollow-bearing limbs is to be avoided wherever possible. Offsetting for non-certified land/areas outside the NWGA: <ul style="list-style-type: none"> Offsetting to follow Sydney Water Biodiversity Offset Guidelines.
Riparian vegetation	<p>Land outside of the NWGA</p> <p>Direct impacts to native riparian vegetation (comprising a portion of the total direct impacts), which includes 0.12 ha of Swamp Oak Floodplain Forest (PCT 4023).</p> <p>No impact to riparian vegetation within the NWGA is expected.</p>	<ul style="list-style-type: none"> Ensure retained vegetation is protected by exclusion fencing and proper erosion and sedimentation controls. Offsetting for non-certified land/areas outside the NWGA: <ul style="list-style-type: none"> Offsetting to follow Sydney Water Biodiversity Offset Guidelines.

6 Conclusion and recommendations

This report is an assessment of the potential impact of the proposed works on ecological values within the study area in accordance with the EP&A Act, EPBC Act, BC Act and the FM Act.

The study area includes a mix of certified land, non-certified land, and areas located outside the NWGA boundary. Under the Biodiversity Certification Order for the NWGA, areas mapped as certified do not require formal assessment under the BC Act or EPBC Act. Accordingly, the following impacts are subject to assessment:

Non-certified land:

- Direct removal of 0.97 ha of exotic vegetation, existing as exotic pasture.

Land outside of the NWGA:

- Direct removal of 2.98 ha of exotic vegetation, existing as exotic pasture.
- Direct removal of native TECs, consisting of:
 - 0.12 ha of PCT 4023 (Swamp-Oak Floodplain Forest EEC).
- Direct removal of 0.12 ha of threatened fauna habitat, which consists of foraging habitat for Grey-headed Flying Fox.

Significance assessments were completed to consider potential impacts to both the Grey-headed Flying Fox and the Swamp-oak Floodplain Forest EEC. Both entities were determined to have a medium or greater likelihood of occurring within parts of the study area that are not mapped as certified under the Biodiversity Certification Order for the NWGA. These assessments, including a Commonwealth SIC under the EPBC Act and ToS under the NSW BC Act, concluded that a significant impact is not likely to result from the project. This conclusion was made on the basis that:

- Impacts are minor, localised, and limited to small areas of foraging habitat.
- Entire habitat patches will not be removed.
- Large, intact vegetation areas will remain undisturbed, maintaining ecological function and connectivity.

This project will not result in a significant impact on threatened species, populations or communities listed under the BC Act, and therefore the BOS is not triggered, and a BDAR is not required.

Sydney Water's standard safeguards, provided in Table 11 below, are designed to comprehensively address potential environmental impacts throughout the project. Developed through extensive experience, these safeguards cover key areas such as vegetation management, fauna protection, erosion control, and waste handling. They ensure compliance with regulations while promoting best practice environmental management. Their flexibility allows for site-specific adaptation, providing confidence that impacts will be effectively minimised and managed. Site-specific recommendations are also provided in Table 12.

Table 11 Sydney Water environmental safeguards

Safeguard category	Safeguard information	Location
Topography, geology and soils		
2.1	<p>Appropriate erosion and sediment control measures should be installed at all sites to avoid sedimentation of receiving water bodies or other indirect impacts to surrounding biodiversity values including:</p> <ul style="list-style-type: none"> • Divert surface runoff away from disturbed soil and stockpiles. • Install sediment and erosion controls before construction starts. • Reuse topsoil where possible and stockpile separately. • Inspect controls at least weekly and immediately after rainfall. • Rectify damaged controls immediately. • Remove controls once surfaces have been stabilised, including removing trapped sediment in drainage lines. 	All locations
2.2	Minimise ground disturbance and stabilise disturbed areas progressively.	All locations
2.6	Stop work during heavy rainfall or in waterlogged conditions when there is a risk of sediment loss off site.	All locations
2.7	Sweep up any sediment/soil transferred off site at least daily, or before rainfall.	All locations
2.7	Eliminate ponding and erosion by restoring natural landforms to the pre-works condition.	All locations
Water and drainage		
3.1	Use appropriate controls to avoid potential sedimentation to waterbodies (e.g. floatation boom).	All locations
3.3	<p>Minimise the impacts to creeks where creek crossings are required. Prior to construction the methodology will be assessed based on:</p> <ul style="list-style-type: none"> • Geotechnical and constructability issues (e.g. depth of cover, potential for future scouring). • Construction footprint and duration. • Ease of reinstatement. • Environmental issues (flora and fauna, geomorphology, contamination, heritage, water quality and hydrology). • Any issues raised during consultation with Department of Primary Industries. 	All locations
3.6	Bund potential contaminants and store on robust waterproof membrane, away from drainage lines.	All locations
3.8	Locate portable site amenities away from watercourses or drainage lines.	All locations
3.16	Conduct refuelling, fuel decanting and vehicle maintenance in compounds where possible. If field refuelling is necessary, designate an area away from waterways and drainage lines with functioning spill kits close by.	All locations
Flora and fauna		
4.2	Residual impacts to native vegetation and trees will be offset in accordance with the Sydney Water Biodiversity Offset Guideline.	All Non-BioCertified locations

Safeguard category	Safeguard information	Location
4.5	Minimise vegetation clearance and disturbance, including impacts to standing dead trees and riparian zones. Where possible, limit clearing to trimming rather than the removal of whole plants.	All locations
4.6	Physically delineate vegetation to be cleared and/or protected on site and install appropriate signage prior to works commencing.	All locations
4.7	Adjust methodology (e.g. avoid area, hand excavate, implement exclusion fencing) to protect sensitive areas where possible (such as mature trees, known threatened species, populations or ecological communities).	All locations
4.8	Protect trees in accordance with the requirements of Australian Standard 4970-2009 for the Protection of Trees on Development Sites. Do not damage tree roots unless absolutely necessary, and engage a qualified arborist where roots >50mm are impacted within the Tree Protection Zone.	All locations
4.11	Retain dead tree trunks, bush rock or logs in-situ unless they are in the impact area and moving is unavoidable. Reposition material elsewhere on the site or approved adjacent sites. If native fauna is likely to be present, a licenced ecologist should inspect the removal and undertake fauna relocation.	All locations
4.12	Inspect vegetation for potential fauna prior to clearing or trimming. If fauna is present, or ecological assessment has determined high likelihood of native fauna presence, including removal of hollow-bearing trees, engage a licenced ecologist to inspect and relocate fauna before works.	All locations
4.13	If native fauna is encountered on site, stop work and allow the fauna to move away un-harassed. Engage a licenced ecologist if assistance is required to move fauna	All locations
4.14	Avoid impeding/blocking fish passage. Retain snags and natural obstructions in waterways where possible.	All locations
4.17	Stop work immediately and notify the Sydney Water Project Manager if any threatened species (flora or fauna) is discovered during the works. Work will only recommence once the impact on the species has been assessed and appropriate control measures provided.	All locations
4.19	Manage biosecurity in accordance with: <ul style="list-style-type: none"> • <i>Biosecurity Act 2015</i> (see NSW Weedwise), including reporting new weed infestations or invasive pests. • Contemporary bush regeneration practices, including disposal of sealed bagged weeds to a licenced waste disposal facility. 	All locations
4.21	To prevent spread of weeds: <ul style="list-style-type: none"> • Clean all equipment including PPE prior to entering or leaving the work sites. • Wrap straw bales in geo-fabric to prevent seed spread. 	All locations
4.27	Minimise impacts on native vegetation in non-certified areas, native vegetation retention areas and areas outside the growth centre. Options to consider where feasible include: <ul style="list-style-type: none"> • Alternative construction methodologies (under bore vegetation and waterways, compressed construction corridors). • avoiding impact to hollow bearing and habitat trees. 	All locations

Safeguard category	Safeguard information	Location
4.28	Vegetation removal must not occur until the following are complete: <ul style="list-style-type: none"> • The area to be removed has been physically delineated. • The Contractor's Environmental Representative has confirmed consistency with approval documentation. • Pre-clearing surveys, if relevant. • Written authorisation to commence clearing from Sydney Water Project Manager. 	All locations

Table 12 Project specific safeguards

Safeguard information
<p>All site personnel will be briefed during toolbox talks on ID characteristics of Grey-headed Flying Fox. They will also be instructed to immediately cease works if any individuals are observed roosting in vegetation scheduled for removal, and to notify the site supervisor or environmental representative.</p>
<p>If feasible, the individual Juniper-leaved Grevillea located within certified land can be salvaged and translocated to the offset area at the Riverstone WRRF. While not a legislative requirement, this measure may support retention of the species within the broader landscape. Any translocation should follow a translocation plan prepared by a suitably qualified ecologist and include appropriate site preparation, timing, and follow-up monitoring.</p>
<p>The existing microbat bat box within the WRRF (see Figure 2) should be relocated if required for removal. A suitable nearby retained vegetated area should be selected in consultation with an ecologist. The relocation should occur outside the maternity season (typically September to January), and an ecologist should inspect the box beforehand to confirm whether it is occupied and advise on timing.</p>

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Appendix 1 Tests of Significance

Grey-headed Flying Fox *Pteropus poliocephalus* (Vulnerable species)

Grey-headed Flying-fox is listed as Vulnerable under the BC Act. Grey-headed Flying-fox population movements trend with the distribution of plants with similar flowering and fruiting times, support regular annual cycles of migration (Eby & Law 2008). Therefore, population dispersal is often associated with flowering Myrtaceae species dependant on seasonality. This species feeds on a variety of preferred Eucalypt and non-Eucalypt species depending on a number of factors including location, vegetation type, and vegetation condition.

Grey-headed Flying-fox habitat within the study area

Vegetation within the study area is primarily limited to planted native vegetation, which provides potential foraging habitat for Grey-headed Flying Fox. No Grey-headed Flying-foxes were recorded during field investigations (although no targeted surveys were undertaken) and no breeding camps are present. However, there are known records of the species within 50 metres of the study area and across the greater locality (OEH 2019a).

The project will result in the clearing of up to 0.12 hectares of vegetation that may provide potential foraging habitat for Grey-headed Flying-fox. As the native vegetation within the study area may be used as foraging habitat by individuals, a test for determining whether the project is likely to significantly affect the species in accordance with Section 7.3 of the BC Act has been undertaken below in Table A.12.

Table 13 Test of Significance for Grey-headed Flying-fox

Test of Significance for Grey-headed Flying-fox
<i>In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</i>
<p>Impacts likely to have an adverse effect on Grey-headed Flying-fox resulting from the project include loss, modification and fragmentation of habitat. Potential habitat to be removed is limited to the removal of a very small area (0.12 ha) of Swamp-oak Floodplain Forest. Potential habitat for Grey-headed Flying-Fox within the study area is largely fragmented from areas of significant remnant vegetation. Vegetation to be impacted for the proposed works (0.12 ha) is considered to be minimal and unlikely to be important to the life cycle of the species given its location. However, it may provide occasional foraging or shelter habitat.</p> <p>The 0.12 ha of vegetation to be impacted, forming potential foraging habitat for Grey-headed Flying-fox proposed for removal, includes foraging species. The removal of these trees will minimally reduce the availability of foraging resources within the immediate area. Higher quality vegetation for Grey-headed Flying-fox habitat occurs within the broader locality along Eastern creek, which will remain viable post-works. Recommendations have also been included for the protection of trees to be retained where possible within the study area to ensure potential impacts to Grey-headed Flying-fox habitat are minimised.</p> <p>The species is highly mobile and relatively widespread, roosting and maternity sites are well documented and conspicuous. No roosting or breeding habitat was recorded during field investigations. No camps have previously been recorded within the study area and no roosting flying-foxes were present during field investigation. Given the vegetation removal is confined to a small patch of planted native vegetation, and that the majority of surrounding larger trees are to be retained, it is unlikely to become further fragmented or isolated from other areas of habitat as a result of the proposed activity. Foraging opportunities for the species will remain within retained habitat. Considering the above, it is unlikely that</p>

Test of Significance for Grey-headed Flying-fox

the project will have an adverse effect on the life cycle of Grey Headed Flying-fox such that a viable local population of the species is likely to be placed at risk of extinction.

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

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable. Not an ecological community.

In relation to the habitat of a threatened species or ecological community:

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

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.

The project will result in the removal of 0.12 ha of native vegetation forming potential foraging habitat for Grey-headed Flying-fox.

Given the vegetation removal is limited to small-medium native trees in a disturbed area, and that the majority of larger surrounding trees are to be retained, any potential Grey-headed Flying-fox habitat is unlikely to become fragmented or isolated from other areas of habitat as a result of the proposed works.

The clearing of 0.12 ha of potential Grey-headed Flying-fox foraging habitat is considered unlikely to significantly contribute to any fragmentation of habitat given the high mobility of the species and trees to be retained within and adjacent to the study area. Higher quality foraging habitat is available along the riparian corridor of Eastern creek.

The national population of the Grey-headed Flying-fox is considered a single population as it is a highly mobile species. Up to 0.12 ha of native vegetation forming potential foraging habitat for this species is to be removed. Given the small area and fragmented nature of the vegetation within the study area, it is unlikely to be heavily utilised as foraging habitat. The species prefers large intact vegetation corridors. The removal of vegetation from the study area is unlikely to significantly impact the species, such that the long-term survival of the species within the locality is placed at risk.

Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The project will not impact on an area declared as of outstanding biodiversity value (either directly or indirectly).

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Key threatening processes relevant to Grey-headed Flying-fox consist of the following:

- Loss of roosting and foraging sites.

Test of Significance for Grey-headed Flying-fox

- Electrocution on powerlines, entanglement in netting and on barbed-wire.
- Heat stress.
- Conflict with humans.
- Incomplete knowledge of abundance and distribution across the species' range.

The removal of 0.12 ha of potential foraging habitat for the species will result in a reduction of potential foraging resources within the study area. However, the majority of larger trees within and adjacent to the study area are to be retained. Given the small area and fragmented nature of the vegetation within the study area, it is unlikely to be heavily utilised as foraging habitat. Therefore, given the minor nature of the project and low relative importance of the potential habitat, the project is not considered to significantly contribute to the key threatening process of loss of foraging sites for the species.

No roosting sites have been recorded within the study area and therefore, the project will not contribute to loss of roosting sites.

The project does not involve the installation or maintenance of powerlines, netting or barbed-wire fences and will not contribute to this threat. The project is located within an already urbanised area and conflict with humans is not expected to increase due to the proposal.

As such, it is unlikely that the project will increase the impact of a key threatening process for Grey-headed Flying-fox.

Conclusion.

In consideration of the above five factors (a-e), the proposed activity is not likely to significantly impact Grey-headed Flying-fox within the study area or wider locality, as:

- The proposed works will result in the clearing of 0.12 ha of planted native vegetation forming foraging habitat for Grey-headed Flying-fox. Given the availability of foraging resources to remain within the study area, the clearing of vegetation within study area is not considered to constitute a significant impact.
- The vegetation to be impacted occurs as a previously disturbed, fragmented and low-quality example of habitat and will not result in fragmentation.
- The project does not significantly contribute to a KTP for Grey-headed Flying-fox.

As such further assessment of impact in the form of a SIS or BDAR is not required.

Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (EEC)

Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions is listed as an EEC under the BC Act. The community is associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains.

The composition of Swamp Oak Floodplain Forest is primarily determined by the frequency and duration of waterlogging and the level of salinity in the groundwater. Composition also varies with latitude. The structure of the community may vary from open forests to low woodlands, scrubs or reedlands with scattered trees. This community is generally dominated by the Swamp Oak *Casuarina glauca*. The understorey is characterised by frequent occurrences of vines, *Parsonsia straminea*, *Geitonoplesium cymosum* and *Stephania japonica* var. *discolor*, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter. The composition of the ground stratum varies depending on levels of salinity in the groundwater.

Historically, areas of Swamp Oak Floodplain Forest have been extensively cleared or modified, primarily for grazing and agriculture. Swamp Oak Floodplain Forest is continually threatened by land clearing and remaining stands are severely fragmented and degraded.

Swamp Oak Floodplain Forest within the study area

Swamp-oak Floodplain Forest aligns with PCT 4023 within the study area. A total of 0.12 ha of Swamp Oak Floodplain Forest occurs within the study area. The local occurrence can be broadly defined as the patch of the community that occurs within the study area and extends into adjacent vegetation in a contiguous manner, including patches that occur in the vicinity up to 100 – 200 metres that are considered to be connected via lack of barriers for movement of genetic material.

An assessment of the impacts of this vegetation in accordance with the threatened species test of significance is provided in Table A.13 below.

Table 14 Test of Significance for Swamp Oak Floodplain Forest

Test of Significance for Swamp Oak Floodplain Forest
<p><i>In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</i></p>
<p>Not applicable, not a threatened species.</p>
<p><i>In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:</i></p> <p><i>(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or</i></p> <p><i>(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.</i></p>
<p>The local occurrence of Swamp Oak Floodplain Forest is over 50 ha in size. The proposed works will involve only minor removal (0.12 ha) within the mapped extent of the community. This activity is not expected to result in the removal or mortality of any canopy trees, nor will it significantly alter the structure, composition, or function of the community. Accordingly, the proposed works are not considered likely to result in an adverse effect on the extent of the ecological community such that its local occurrence would be placed at risk of extinction.</p> <p>Surrounding Swamp Oak Floodplain Forest not directly impacted, may be subject to indirect impacts as a result of sediment run-off, weed exposure, etc. Appropriate sediment and weed control protocols will be implemented during the construction of the project. Within the study area, Swamp Oak Floodplain Forest occurs in a fragmented and highly modified landscape. The community is in low condition, having been historically cleared and subsequently re-established through planting. Native canopy species are present; however, structural and floristic diversity is limited, and the understorey is dominated by introduced species. With appropriate sediment and weed control, the proposed works are unlikely to reduce species diversity or simplify community structure beyond what is already occurring. Where necessary, vegetation to be retained will be protected in accordance with the requirements of Australian Standard 4970-2009 for the Protection of Trees on Development Sites (Council of Australian Standards 2009).</p> <p>The vegetation to be directly impacted is limited to small trees and shrubs and does not comprise any ecological components critical to the survival of the EEC in the locality due to its low condition state. The adjacent areas of the community within the broader area will remain intact and are unlikely to suffer substantial changes in the composition.</p>

Test of Significance for Swamp Oak Floodplain Forest

In relation to the habitat of a threatened species or ecological community:

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

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.

The proposed works will result in a minimal amount of removal within the mapped area of Swamp Oak Floodplain Forest. This area exists primarily as a monoculture of planted Swamp Oak *Casuarina glauca* with little to no ground cover and is already subject to edge effects resulting from the fragmented and urban landscape within which it occurs. Areas of contiguous vegetation to that being removed will be retained, and the nature of this impact will not substantially reduce the habitat available to the EEC in the locality, nor will it result in isolation or fragmentation of habitats. The importance of the habitat impacted is also considered negligible due to existing disturbance, little structural and species diversity, and its occurrence on the edge of a patch of vegetation. Where necessary, vegetation to be retained will be protected in accordance with the requirements of *Australian Standard 4970-2009 for the Protection of Trees on Development Sites* (Council of Australian Standards 2009). In addition, appropriate sediment and weed control is to be implemented to minimise indirect impacts. As such, this level of impact is considered negligible and will not lead to the local occurrence of Swamp Oak Floodplain Forest being placed at risk of extinction.

Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

To date no area of outstanding biodiversity value has been declared within the proposal's impact area.

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposed works have the potential to result in the following key threatening process which is listed under the Schedule 4 of the BC Act, and to which are considered relevant to Swamp Oak Floodplain Forest:

- Clearing of native vegetation.

Given direct impacts are minimal and indirect impacts are to be appropriately managed, the proposal is unlikely to increase the impact of any key threatening processes. Areas of Swamp Oak Floodplain Forest contiguous with the study area will be retained.

Conclusion.

The proposed works are unlikely to significantly impact Swamp Oak Floodplain Forest for the following reasons:

- The proposed works are localised and the study area has already been exposed to a number of disturbances which are unlikely to be further exacerbated by the proposed works.
- The proposed works is unlikely to significantly alter floristic or structural diversity of the retained portions of the EEC.
- The localised nature of the proposed works will not significantly trigger or exacerbate any key threatening processes.

Application of the BOS or preparation of a SIS is therefore not required.

Appendix 2 Significant Impact Criteria assessments

Grey-headed Flying-Fox *Pteropus poliocephalus* – Vulnerable species

The Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act. The Grey-headed Flying-fox trends with the distribution of plants with similar flowering and fruiting times, support regular annual cycles of migration. It can be associated with flowering eucalyptus dependant on seasonality. Key threats to the Grey-headed Flying-fox include habitat fragmentation and habitat degradation, low levels of mortality, exploitation and competition. The species is largely impacted by urban growth displacing individuals.

Grey-headed Flying-fox within the study area

Previous records of the Grey-headed Flying-fox exist in the surrounding locality (164 records within 5 kilometres of the study area, with the most recent recorded in 2025 and the closest record was recorded within the study area.

The study area contains several known feed tree species for the Grey-headed Flying-fox. Due to the presence of potential foraging habitat, a self-assessment of the impacts of the species in accordance with the *Matters of National Environmental Significance Significant impact guidelines* is provided below.

Table 15 SIC assessment for Grey-headed Flying-fox (Vulnerable)

SIC assessment for vulnerable species
<p>Lead to the long-term decrease in the size of an important population of a species.</p> <p>While the proposal will result in the removal of potential foraging resources for Grey-headed Flying-fox, the total area of habitat being removed is considered moderate quality, non-breeding habitat. The species prefers large, consolidated vegetation communities that produce significant foraging resources. Further to this records of Grey-headed Flying-fox within the local surrounding area are not considered to be an important population (CoA 2013) as:</p> <ul style="list-style-type: none"> • The study area is not key breeding habitat as no camps are present • The study area is unlikely to provide key foraging habitat due to its small and fragmented extent. Higher quality habitat is available in the surrounding landscape. • The study area does not support a camp and therefore a population that is necessary for the species' genetic diversity is not present. • The study area is not near the limit of the species' range. <p>While the project will result in the removal of potential foraging resources for Grey-headed Flying-fox, the total area of habitat being removed is considered low quality, non-breeding habitat. The species prefers large, consolidated vegetation communities that produce significant foraging resources. Given the scale of the impact, and amount of low-quality foraging habitat to be removed (0.12 ha), it is unlikely that it will lead to a long-term decrease in the size of an important Grey-headed Flying-fox population.</p>
<p>Reduce the area of occupancy of an important population.</p> <p>The species is highly mobile and relatively widespread, roosting and maternity sites are well documented and conspicuous. No roosting or breeding habitat was recorded during field assessment in the study area. Due to the small area, limited number of potential feed trees to be removed and no known camps within the study area, the overall area of occupancy of the species is likely to remain unchanged. The species will continue to forage in retained habitat around the construction footprint and the development will not represent a barrier to the movement of individuals.</p>

SIC assessment for vulnerable species

Fragment an existing important population into two or more populations.

The national population of the Grey-headed Flying-fox is considered a single population as it is a highly mobile species. The study area contains planted native vegetation. The species will likely continue to utilise the retained planted vegetation found outside of the construction footprint and across the local area.

No camps have previously been recorded within the study area and no roosting flying-foxes were present during field investigation. Given the highly mobile nature of the species (known to travel up to 50 km whilst foraging), and the habitat available in the locality, the proposed removal of up to 0.12 ha of potential foraging habitat for the species will not fragment an existing important population into two or more populations.

Adversely affect habitat critical to the survival of a species.

Habitat critical to the survival of the Grey-headed Flying-fox includes important breeding and foraging resources. Breeding occurs within camps and no camps were recorded during the field investigations of the study area. Foraging resources may constitute habitat critical for the survival of Grey-headed Flying-fox and may include areas with highly productive winter flowering tree species. It is considered unlikely that a relatively small patch of planted native trees within the study area would constitute habitat critical to the survival of the Grey-headed Flying-fox for the following reasons:

- No camps will be impacted by the proposed development.
- Planted native trees within the study area are considered unlikely to be selected as a roosting site in the future as the vegetation patch is relatively small and fragmented from larger areas of habitat. The species prefers large intact vegetation corridors.

Disrupt the breeding cycle of an important population.

While the project may result in the removal of vegetation utilised for foraging by the species, the project will not result in the disruption to the breeding cycle of any local Grey-headed Flying-fox population or the species as a whole, as no camps have been recorded in the study area and the proposed works will be limited to 0.12 ha. The project will not provide further disturbance from noise or lighting pollution that will substantially interfere with the species' ability to reproduce successfully as the study area is not within close proximity to breeding areas. Grey-headed Flying-foxes will continue to breed in camps unaffected by vegetation loss and as a result the breeding cycle of the population will not be disrupted.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Grey-headed Flying-foxes are assumed to utilise the study area on occasion for foraging. The project will only impact a small area of planted trees which may provide foraging resources at certain times of the year. The project will not impact on any existing camps and is unlikely to have an impact on nearby camps as this small patch is unlikely to produce sufficient foraging resources to support a large number of Flying-foxes. A higher-quality patch of native vegetation occurs to the south west in Agnes Banks providing greater foraging resources within the locality, therefore the project will only impact a very small number of resources within the broader landscape.

The study area is considered unlikely to be suitable for a future camp as the study area is already partially fragmented and likely too small to support a camp.

The proposed development will remove up to 0.12 ha of potential foraging habitat, this will not fragment or isolate the population. The vegetation within and contiguous with the study area is situated within an urbanised area and is already considered fragmented from larger areas of remnant habitat. The relatively small areas of planted vegetation to be removed is unlikely to result in further isolation of habitat. While the project will result in the removal of trees, some of which may be used by the species, this level of loss is not likely to result in the decline of the species at a national scale.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

SIC assessment for vulnerable species

The proposed works is unlikely to introduce or exacerbate invasive species within the study area. It is unlikely that the project would result in the establishment of a new invasive species if soil transportation mitigation measures are followed during construction. The proposed action is unlikely to exacerbate the current level of invasive species threat operating within the study area.

Introduce disease that may cause the species to decline.

The project is unlikely to result in the introduction of a disease that could reduce the reproductive output of Grey-headed Flying-foxes in or near the study area.

Interfere substantially with the recovery of the species.

Actions considered likely to substantially interfere with the recovery of the Grey-headed Flying-fox as determined by key threats to the species (DEW 2021) are as follows:

- Habitat loss and fragmentation including important foraging species such as Forest Red Gum.
- Winter Foraging resources are limited to a narrow coastal strip in QLD and northern NSW.
- Spring foraging resources are considered critical to the survival of the species.
- Exploitation – shooting of Grey-Headed Flying-foxes to protect fruit crops involves death of the individual and indirect death as a result of shooting of pregnant and lactating females.
- Competition and hybridisation – indirect competition by Black Flying-fox which has had a range expansion in the past.
- Pollutants, electrocution and pathogens. A disproportionately higher number of lactating females are killed by electrocution on power lines.

The project will result in the removal of up to 0.12 ha of potential foraging habitat. The project will not further fragment habitat for the Grey-headed Flying-fox and will not significantly contribute to the loss of habitat.

The proposed development will not result in activities likely to result in exploitation of the species as the project involves upgrades to already existing infrastructure. The proposed development is not likely to increase incidence of competition or hybridisation. The project is therefore unlikely to substantially interfere with the recovery of the Grey-headed Flying-fox.

Conclusion.

In consideration of the above significant impact criteria, the proposed activity is not likely to significantly impact Grey-headed Flying-fox within the study area or wider locality. No camps or potential breeding habitat was identified during the site investigations and the proposed impacts will be limited to the removal of 0.12 ha of potential foraging habitat for the species only. A Commonwealth referral is not recommended for impacts to these species.

