Western Sydney Aerotropolis - Biodiversity Assessment

Western Sydney Planning Partnership

ecological AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au

DOCUMENT TRACKING

Project Name	Western Sydney Aerotropolis - Biodiversity Assessment
Project Number	20SYD - 15519
Project Manager	Rebecca Ben-Haim
Prepared by	Rebecca Ben-Haim and Carolina Mora
Reviewed by	David Bonjer
Approved by	David Bonjer
Status	**Final**
Last saved on	**10 December 2021**

This report should be cited as 'Eco Logical Australia 2020. *Western Sydney Aerotropolis - Biodiversity Assessment*. Western Sydney Planning Partnership

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Western Sydney Planning Partnership

Template 2.8.1

Contents

List of Figures

List of Tables

Abbreviations

Abbreviation	Description
AHCVV	Additional High Conservation Value Vegetation
BC Act	*Biodiversity Conservation Act 2016*
CEEC	Critically Endangered Ecological Community
DAWE	Department of Agriculture, Water and the Environment (previously DotEE)
DCP	Development Control Plan
DotEE	Department of the Environment and Energy (now DAWE)
DPIE	Department of Planning, Industry and Environment
ELA	Eco Logical Australia Pty Ltd
ENV	Existing Native Vegetation, as defined in the Biodiversity Certification Order for Sydney Region Growth Centres
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
MNES	Matters of National Environmental Significance
NPWS	NSW National Parks and Wildlife Service
OEH	NSW Office of Environment and Heritage (known now as DPIE)
Sydney Region Growth Centres SEPP	*State Environmental Planning Policy (Sydney Region Growth Centres) 2006*
TSC Act	*Threatened Species Conservation Act 1995*
TSSC	Threatened Species Scientific Committee
WSA SEPP	*State Environmental Planning Policy (Western Sydney Aerotropolis) 2020*

Executive Summary

Eco Logical Australia Pty Ltd (ELA) was engaged by the Western Sydney Planning Partnership (WSPP) to undertake a Biodiversity Assessment for Precinct Planning of part of the Western Sydney Aerotropolis subject to the St*ate Environmental Planning Policy (Sydney Region Growth Centres) 2006* (Sydney Region Growth Centres SEPP). This includes the Aerotropolis Core Precinct and part of the Badgerys Creek and Wianamatta-South Creek Precincts, south of Elizabeth Drive (the 'Subject Site'). The aim of this report is to identify key ecological constraints and opportunities to assist Precinct Planning.

Biodiversity Certification of the Sydney Region Growth Centres identifies a regional offsets package, effectively ensuring the protection of 2,000 ha of native vegetation within the Growth Centres and facilitating the strategic loss of ecological values on 'certified lands' without triggering further assessment under the former *Threatened Species Conservation Act 1995* (TSC Act). This strategic loss is offset through the retention and management of areas of higher ecological value across the Growth Centres and through a levy that will be used to protect and manage areas of high ecological value outside of the Growth Centres. A Strategic Assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was approved by the Commonwealth (Department of Sustainability, Environment, Water, Population and Communities (SEWPaC). Therefore, provided development proceeds in accordance with the Sydney Region Growth Centres Biodiversity Certification Order, the assessment and approval of threatened species and endangered ecological communities under Commonwealth legislation is not required at the Development Application stage.

Parts of the subject site have been cleared for agricultural, residential, or industrial purposes. Field survey indicated that vegetation within the subject site consisted largely of cleared areas of exotic pasture. Remnant native vegetation was present in reserves and parts of rural lots. Where remnant native vegetation was present, the following Threatened Ecological Communities (TECs) were identified in varying conditions:

- Cumberland Plain Woodland, listed as Critically Endangered under the State *Biodiversity Conservation Act 2016* (BC Act) and Commonwealth EPBC Act;
- River-Flat Eucalypt Forest, listed as Endangered under the State BC Act and nominated for listing under the Commonwealth EPBC Act;
- Castlereagh Swamp Woodland, listed as Endangered under the State BC Act; and
- Castlereagh Shale-gravel Transition Forest listed as Endangered under the State BC Act and Critically Endangered under the Commonwealth EPBC Act.

Field survey did not identify any threatened flora species however, the subject site contains habitat for the following threatened flora species:

- *Acacia pubescens* (Downy Wattle)
- *Cynanchum elegans*
- *Dillwynia tenuifolia*
- *Grevillea juniperina* subsp. *juniperina* (Juniper-leaved Grevillea)
- *Marsdenia viridiflora* subsp. *viridiflora* (Native Pear)
- *Persoonia nutans* (Nodding Geebung)
- *Pimelea spicata* (Spiked Rice-flower)
- *Pultenaea parviflora*

Field survey identified one threatened fauna species, being *Meridolum corneovirens* (Cumberland Plain Land Snail). Multiple shells were found within the south-west of the subject site, within the Aerotropolis Core precinct. The subject site also contains habitat for the following threatened fauna species:

- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
- *Calyptorhynchus lathami* (Glossy Black-Cockatoo)
- *Chalinolobus dwyeri* (Large-eared Pied Bat)
- *Chthonicola sagittata* (Speckled Warbler)
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Gallinago hardwickii* (Latham's Snipe)
- *Glossopsitta pusilla* (Little Lorikeet)
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)
- *Haliaeetus leucogaster* (White-bellied Sea-Eagle)
- *Hieraaetus morphnoides* (Little Eagle)
- *Lathamus discolor* (Swift Parrot)
- *Meridolum corneovirens* (Cumberland Plain Land Snail)
- *Merops ornatus* (Rainbow Bee-eater)
- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
- *Miniopterus australis* (Little Bent-winged Bat)
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
- *Myotis macropus* (Southern Myotis)
- *Ninox connivens* (Barking Owl)
- *Ninox strenua* (Powerful Owl)
- *Phascolarctos cinereus* (Koala)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat).

Biodiversity outcomes within the subject site are driven by multiple strategic objectives including:

- the need to maintain parity with the Sydney Region Growth Centres Biodiversity Certification Order. This requires the protection of a minimum 67.31 ha of vegetation mapped in the draft Growth Centres Conservation Plan (2007); and
- to deliver the vision of a Parkland City and maintain Wianamatta-South Creek as a regionally significant ecological corridor, which is identified both within the Greater Sydney Region Plan (Greater Sydney Commission, 2018) and the Western Sydney District Plan (Greater Sydney Commission, 2018).

The Draft Growth Centres Conservation Plan 2007 identified 67.31 ha of 'Existing Native Vegetation' (ENV) to be protected within the subject site. This was based on the amount of ENV on non-certified land. Desktop assessment and field survey validated 58.58 ha of previously identified ENV within non-biodiversity certified lands, resulting in a shortfall of 8.73 ha of ENV, most likely due to small amounts of clearing since the original mapping was undertaken and analysis of aerial photos being undertaken at a finer scale.

The Sydney Region Growth Centres Biodiversity Certification Order defines 'protection' or 'protected' as:

> *'land that is protected by a land use zoning under an environmental planning instrument or public ownership arrangements that provide for the protection of biodiversity values as a priority, or another arrangement that provides in-perpetuity security for biodiversity on the subject land'.*

The *State Environmental Planning Policy (Western Sydney Aerotropolis) 2020* (WSA SEPP) proposes to protect native vegetation via clause 27 which requires consent for the removal for any native vegetation in the Environment and Recreation Zone identified on the High Biodiversity Value map in the SEPP. Further, subclause 27(7) does not allow for the clearing of existing native vegetation as defined by the relevant biodiversity measures under the repealed Part 7 of Schedule 7 to the *Threatened Species Conservation Act 1995*. It is understood that the WSA SEPP will amend the zoning and High Biodiversity Value maps as each Precinct Plan is made.

One of the objectives of the Environment and Recreation zoning is to 'protect and conserve the environment, including threatened and other species of native fauna and flora and their habitats, areas of high biodiversity significance and ecological communities'. Clause 27(7) states: *This clause does not authorise the clearing of existing native vegetation within the meaning of the relevant biodiversity measures under Part 7 of Schedule 7 to the repealed Threatened Species Conservation Act 1995*. The wording of clause 27 is different to the ENV protection clauses in the Sydney Region Growth Centres SEPP. Consideration should be given to achieving greater consistency between ENV clauses between the two SEPPs. Furthermore, the WSA SEPP does not currently include a clause prohibiting the clearing of protected native vegetation by public authorities during the undertaking of activities not requiring consent (similar to Clause 18A of the Sydney Region Growth Centres SEPP). However, it is noted that the proposed amendment to the WSA SEPP, as mentioned in the Western Sydney Aerotropolis Explanation of Intended Effect October 2021, states,

> *'it is proposed the WSA SEPP be amended to include an additional clause, consistent with clause 18A of the Growth Centres SEPP, which will permit public authorities to clear land in the Aerotropolis. This will require written notice from a public authority that they intended to carry out development to achieve specified outcomes. The public authority will need to provide their advice to the Department of Planning, Industry and Environment (DPIE) and take into consideration any response to the notice received within 21 days.'*

Consideration should also be given to ensure impacts to ENV for infrastructure works are undertaken in consultation with the Department of Planning, Industry and Environment (DPIE) and offset in accordance with *Relative Biodiversity Measure (RBM) 8 of the Order to Confer Biodiversity Certification on the State Environmental planning Policy (Sydney Region Growth Centres) 2006.*

Within the subject site, the Environment and Recreation zoning and clause 27(7) of the Western Sydney Aerotropolis SEPP will protect 56.09 ha of ENV within currently non-biodiversity certified lands and 12.72 ha of ENV within currently biodiversity certified lands, totalling 68.81 ha.

Additionally, the proposed open space network within the Badgerys Creek and Aerotropolis Core Precincts will protect a further 23.19 ha of ENV on currently biodiversity certified lands and 0.39 ha of ENV on currently non-biodiversity certified lands, equating to a total of 23.58 ha ENV. It is recommended that these areas are zoned Environment and Recreation and therefore protected under clause 27(7) of the WSA SEPP and are also incorporated within the High Biodiversity Values mapping.

The above protection would deliver a surplus of ENV of 25.08 ha within the subject site. Additionally, there is 30.41 ha of Additional High Conservation Value Vegetation (AHCVV) present within the Wianamatta-South Creek Precinct, of which 10.80 ha has been field validated. AHCVV is defined as meeting the same criteria as ENV (i.e., a 10% or greater canopy cover and a patch size of 0.5 ha or more) however, was not mapped in the original Draft Conservation Plan 2007.

Overall, the Precinct Plan has succeeded in incorporating the majority of the subject site's biodiversity values with the planning and will enable the regionally important north to south biodiversity corridors to be retained and rehabilitated in the future as well as create east to west habitat linkages that will become essential in the future, once revegetated.

1. Introduction

1.1 Description of the Project

The Western Sydney Aerotropolis will become home to global industries that will provide jobs of the future within a cool, green, and connected Western Parkland City. To achieve the vision for the Aerotropolis, an innovative landscape-led approach is proposed that interweaves urban planning, landscape, and urban design. To implement the vision, each precinct will have a Precinct Plan, providing a spatial representation of high-level land uses, environmental assets, and transport infrastructure.

As part of the NSW Government's commitment to delivering the Western Parkland City, the draft *Cumberland Plain Conservation Plan* (DPIE, 2020) (CPCP) has been devised to ensure the region's threatened flora and fauna is protected while at the same time supporting the needs of the community through the creation of conservation lands and green spaces. However, the draft CPCP (DPIE, 2020) excludes parts of Western Sydney Aerotropolis that overlap with the South West Growth Area, the Western Sydney International Airport, and the eastern part of Mamre Road Precinct (Figure 1-1).

Eco Logical Australia Pty Ltd (ELA) was therefore engaged by the Western Sydney Planning Partnership (WSPP) to undertake a Biodiversity Assessment for Precinct Planning for areas of the Western Sydney Aerotropolis which are excluded from the draft CPCP (DPIE, 2020) and subject to the St*ate Environmental Planning Policy (Sydney Region Growth Centres) 2006* (Sydney Region Growth Centres SEPP) (Figure 1-2). This includes the Aerotropolis Core Precinct and part of the Badgerys Creek and Wianamatta-South Creek Precincts, south of Elizabeth Drive within the initial precincts (Figure 1-3; the 'Subject Site').

The vision for each of the assessed precincts is summarised below.

1.1.1 Aerotropolis Core

The Aerotropolis Core will be a diverse, dynamic, and sustainable global airport city with attractive places for workers, residents, and visitors. It will be a place of choice to do business, a new employment-focused metropolitan centre with an industry focus on advanced manufacturing, research and development and industry led educational facilities. The Aerotropolis Core will also take advantage of its proximity to the airside and facilitate development of a cutting-edge aerospace and defence industries.

The Precinct will be centred around a new Sydney Metro station and be supported by retail, creative industries, civil and cultural facilities, and world-class public open spaces. The Wianamatta–South Creek corridor will be a shaded, central lifestyle feature. Housing will be integrated with local services, retail and compatible commercial development that activates the ground plane.

1.1.2 Badgerys Creek

Directly adjoining the Airport to the east, the Badgerys Creek Precinct will support airport operations, the new urban centre in the Aerotropolis Core to the south and the Northern Gateway to the west and north west. The precinct will meet demand for a range of employment generating uses that benefit from its proximity to airport operations and the new urban centre, but do not require direct access to high-capacity public transport.

The precinct will be in a green setting with new green linkages and active transport opportunities between Badgerys Creek to the west and Wianamatta–South Creek to the east. Development should take advantages of views to these creek lines surrounding the precinct.

1.1.3 Wianamatta-South Creek

The Wianamatta–South Creek Precinct boundary has generally defined using 1 in 100 chance per year flood level data from Liverpool City Council and Penrith City Council which includes areas containing protected existing native vegetation. In some areas the precinct is wider than the 1 in 100 chance per year flood to ensure a functional green area. In response to the Independent Community Commissioner's recommendations to consider the rationalisation of Environment and Recreation zoned land, it is proposed to replace the Environment and Recreation land use zone for a portion of land south of Elizabeth Drive, along the eastern edge of Wianamatta-South Creek and the entirety of Kemps Creek. These areas are to remain in the precinct but be excluded from the initial precincts and are therefore removed from the study area of this document.

The Precinct is an important part of the broader Wianamatta–South Creek corridor, defined in the Region Plan vision for the corridor as the defining spatial element of the Western Parkland City. Protection of the Wianamatta–South Creek Precinct allows planning for the Aerotropolis to be structured around the landscape. The retention of water in the landscape, protection of significant remnant vegetation, and other Blue– Green Grid elements such regional parks will enable the greening of the Aerotropolis. Connectivity from Wianamatta–South Creek and its tributaries into the adjacent precincts will be landscaped to create extended green corridors, whilst noting the need to limit wildlife attraction within the vicinity of the Airport.

1.2 Aims and Objectives

The aim of this assessment was to identify key ecological features and constraints within the subject site to inform the rezoning and precinct planning process, as well as to provide recommendations with respect to terrestrial ecosystem management.

The specific objectives of this assessment were to:

- Undertake a biodiversity assessment to inform the precinct planning process and development of the Precinct Plan. This involved identifying and assessing the existing ecological constraints within the subject site and analysis of ecological values particularly regarding identifying areas of high, moderate, and low ecological value.
- Ensure the statutory requirements for the protection, restoration and enhancement of threatened species, populations, ecological communities, and their habitats will be met.
- Provide recommendations for achieving innovative and cost-effective management frameworks for ecological issues, which enable long term conservation and management while facilitating development outcomes for the subject site.
- Ensure the precinct planning is consistent with the terms of the Biodiversity Certification granted under the Sydney Region Growth Centres SEPP, which includes the Relevant Biodiversity Measures outlined in the Biodiversity Certification Order.
- Ensure that precinct planning is consistent with the endorsed Sydney Growth Centres Strategic Assessment Program under the *Environment Protection and Biodiversity Conservation Act 1999*

(EPBC Act), including the commitments for Matters of National Environmental Significance (MNES) protected under the EPBC Act.

- Ensure that precinct planning is consistent with the objectives identified in strategic plans, including, *The Greater Sydney Region Plan, A Metropolis of Three Cities* (Greater Sydney Commission, 2018); *Our Greater Sydney 2056 – Western Sydney District Plan* (Greater Sydney Commission, 2018); the *Draft Greener Places Design Guide* (Government Architects NSW, 2020) and the *Western Sydney Aerotropolis Plan* (Western Sydney Planning Partnership, 2021).

1.3 Subject Site

Figure 1-2 and Figure 1-3 illustrate the broad location of the 'subject site'.

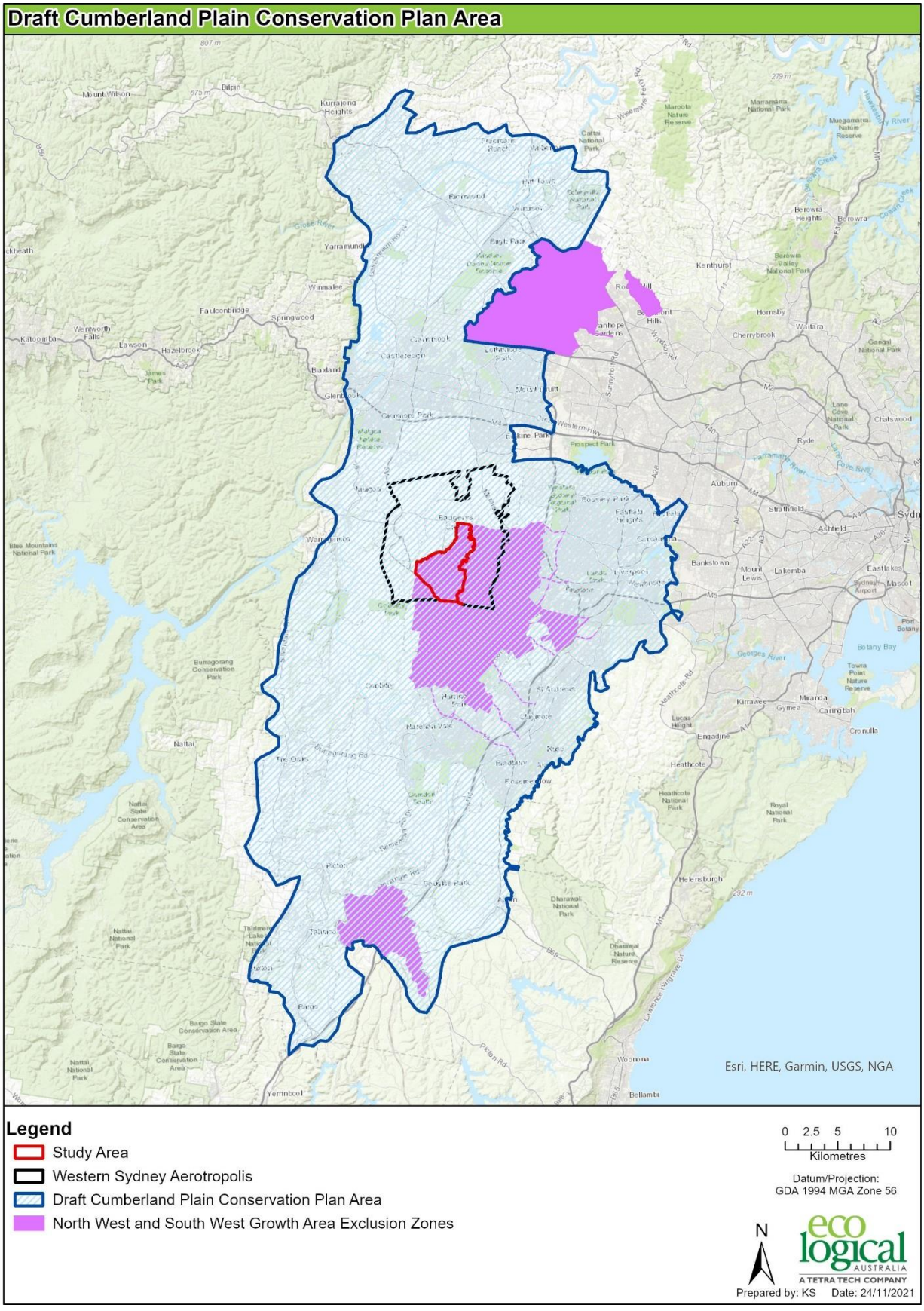

Figure 1-1: Location of study area within the draft Cumberland Plain Conservation Plan area

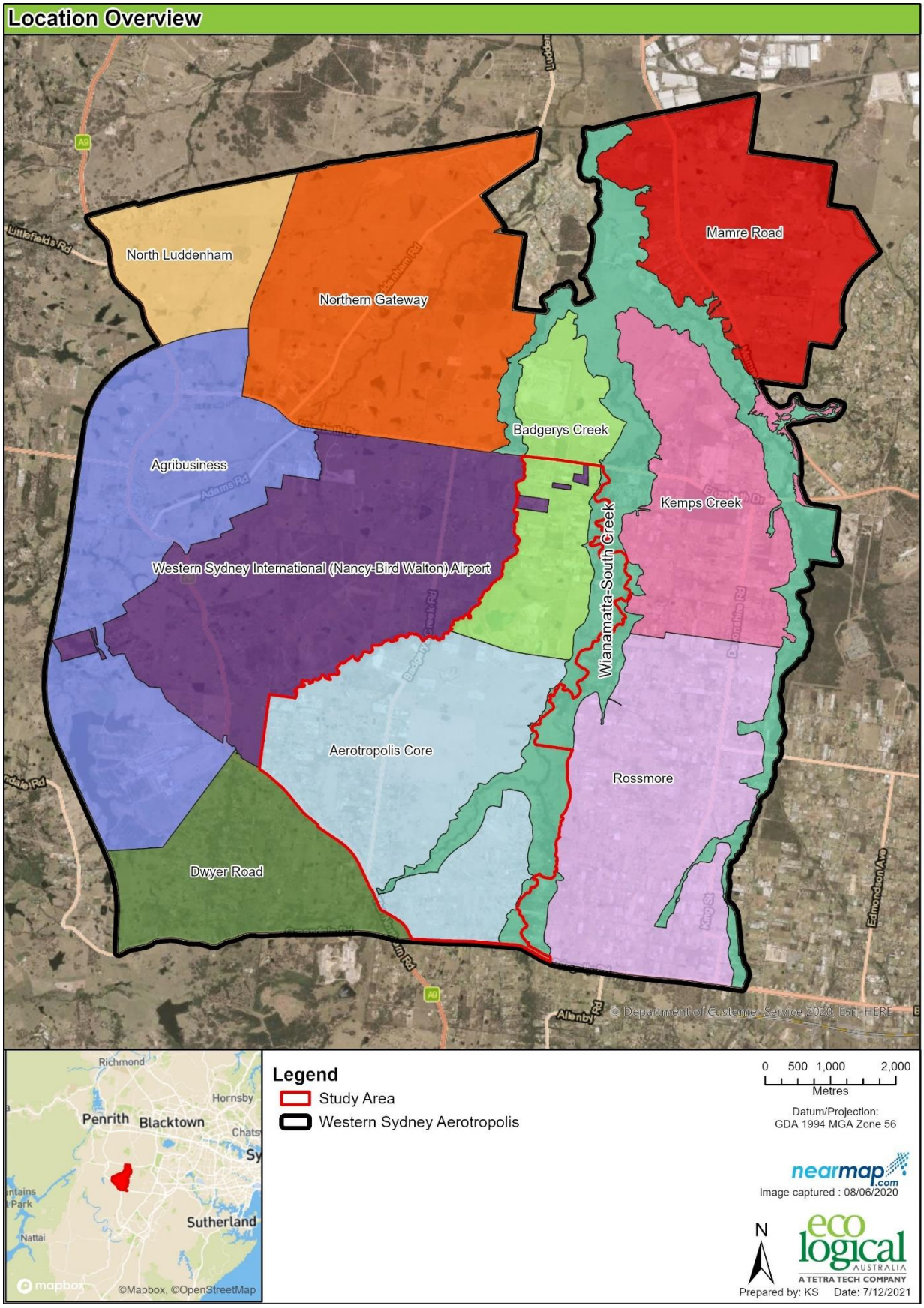

Figure 1-2: Western Sydney Aerotropolis and precincts

Figure 1-3: Location of subject site

2. Statutory Framework and Strategic Assessments

A substantial array of strategic plans, legislation, policies, and guidelines apply to the assessment, planning and management of ecological issues within the subject site. This information was reviewed and used to identify priority issues and approaches for the subject site and are summarised below.

2.1 Strategic Plans

Table 2-1 summarises the relevant strategic assessments that apply to this study are the subject site, which are required to be considered within the Precinct Plan.

Table 2-1: Strategic plans and relevance to this study

Strategic Plan	Biodiversity / Sustainability Objectives
The Greater Sydney Region Plan, *A Metropolis of Three Cities* (Greater Sydney Commission, 2018)	The Greater Sydney Region Plan, *A Metropolis of Three Cities* (Greater Sydney Commission, 2018) is built on a vision of three cities where most residents live within 30 minutes of their jobs, education and health facilities, services, and great places. To meet the needs of a growing and changing population the vision seeks to transform Greater Sydney into a metropolis of three cities: • The Western Parkland City. • The Central River City. • The Eastern Harbour City. The Plan includes directions and objectives for liveability and sustainability, productivity, and infrastructure within Greater Sydney, including two sustainability objectives, which are most relevant to this study, being: • a cool and green parkland city in the Wianamatta South Creek corridor; • biodiversity is protected, urban bushland and remnant vegetation is enhanced; • urban tree canopy cover is increased; and • the Green Grid links parks, open spaces, bushland and walking and cycling paths. The Plan is supported by five District Plans, which provide greater details regarding conservation objectives, including the Western Sydney District Plan.
Our Greater Sydney 2056 – Western Sydney District Plan (Greater Sydney Commission, 2018)	The Western Sydney District Plan is a 20-year plan to manage economic, social and environmental growth and provides a guide for implementing the Greater Sydney Region Plan at a district level. The Plan outlines three relevant sustainability planning priorities, which coincide and build on the objectives listed within the Greater Sydney Region Plan, being: • creating a Parkland City urban structure and identify with South Creek as a defining spatial element; • protecting and enhancing bushland and biodiversity; and • increasing urban tree canopy cover and delivering Green Grid connections.
Greener Places - An Urban Green Infrastructure Design Framework for New South Wales (Government Architect NSW, 2020) and Draft Greener Places Design Guide	Greener Places is a design framework to guide the planning, design, and delivery of green infrastructure in urban areas across NSW. It aims to create a healthier, more liveable, and sustainable urban environment by improving community access to recreation and exercise, supporting walking, and cycling connections and improving the resilience of urban areas.

Strategic Plan	Biodiversity / Sustainability Objectives
(Government Architects NSW, 2020)	The Draft Greener Places Design Guide framework provides information on how to design, plan, and implement green infrastructure in urban areas throughout NSW. The draft guide provides a consistent methodology to help State and local government, and industry create a network of green infrastructure. This study focuses on one of the three major components of the green infrastructure network, being bushland and waterways. Five key strategies have been developed to connect, protect, restore, enhance, and create urban habitat as an integral part of how urban areas are planned, constructed, and maintained, which include: • protect and conserve ecological values; • restore disturbed ecosystems to enhance ecological value and function; • create new ecosystems; • connect people to nature; and • connect urban habitats.
The Draft Cumberland Plain Conservation Plan – A Conservation Plan for Western Sydney to 2056 (DPIE, 2020)	The Draft Cumberland Plain Conservation Plan identifies strategically important biodiversity areas within the Cumberland subregion to offset the biodiversity impacts of future urban development, while ensuring a vibrant and liveable city. Similar to the Sydney Region Growth Centres, The Plan has been developed to meet requirements for strategic biodiversity certification under the BC Act and strategic assessment under the EPBC Act. The Plan is part of the NSW Government's commitment to delivering the Western Parkland City, consistent with the Greater Sydney Commission's strategic vision described in its *Greater Sydney Region Plan: A Metropolis of Three Cities* and Western City District Plan. It will protect the region's threatened plants and animals and support the needs of the community through the creation of new conservation lands and green spaces close to homes. The Plan will achieve this through a conservation program that includes 28 commitments and 141 actions designed to improve ecological resilience and protect biodiversity. The Conservation Program highlights include: • Protect, in perpetuity, a minimum of 5,475 ha of impacted native vegetation communities. • Undertake up to 1,370 ha of ecological restoration of threatened ecological communities, achieving up to 25% of the conservation target for impacted native vegetation. • Secure important koala movement corridors by establishing the Georges River Koala Reserve. • Prioritise and investigate the establishment of two new reserves in the Wollondilly and Hawkesbury local government areas -Gulguer Reserve Investigation Area and The Confluence Reserve Investigation Area. • Protect up to 11,000 ha in new conservation lands to deliver in-perpetuity biodiversity outcomes, improve ecological resilience and connectivity and increase green space reserves for community to enjoy. It is noted that the Plan excludes parts of Western Sydney Aerotropolis that overlap with the South West Growth Area, including the subject site.
The Western Sydney Aerotropolis Plan (Western Sydney Planning Partnership, 2020)	The Western Sydney Aerotropolis Plan sets the planning framework for the Western Sydney Aerotropolis as Australia's next global gateway, built around the Western Sydney International Airport. The Aerotropolis will be framed around a landscape-led approach, where Wianamatta–South Creek, large regional parks and an expansive network of green and blue corridors shape the city's structure and building. The Plan outlines the intended zoning of the subject site, being:

Strategic Plan	Biodiversity / Sustainability Objectives
	• Enterprise. • Mixed Use. • Infrastructure. • Environment and Recreation. The following strategic outcomes are expected, relating to sustainability and biodiversity: • provide an urban tree canopy along open space corridors, major roads and streets to contribute to the 5 million trees for Greater Sydney by 2030 program; • provide blue and green corridors of private and public open space with active and passive recreation and community facilities; and • maximise connections to the Wianamatta–South Creek corridor, Blue–Green Grid and regional parks.

2.2 Statutory Framework

Table 2-2 summarises the relevant legislation and policies that apply to this study are the subject site, which are required to be considered within the Precinct Plan.

Table 2-2: Statutory framework and relevance to this study

Legislation / Policy	Relevance
	Commonwealth
Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)	The Commonwealth EPBC Act establishes a process for assessing the environmental impact of activities and developments where MNES may be affected. The EPBC Act lists endangered ecological communities, threatened and migratory species that have the potential to occur, or are known to occur on a site. On 28 February 2012, the Commonwealth Minister for the Environment announced the program of development related activities within the Growth Centres that had been approved under the Growth Centres Strategic Assessment. Specifically, *"All actions associated with the development of the Western Sydney Growth Centres as described in the Sydney Region Growth Centres Strategic Assessment Program Report (Nov 2010) have been assessed at the strategic level and approved in regard to their impact on the following matters of national environmental significance (MNES):* • *World Heritage Properties* • *National Heritage Places,* • *Wetlands of International Importance,* • *Listed threatened species, populations and communities, and* • *Listed migratory species."* This approval essentially means that the Commonwealth is satisfied that the conservation and development outcomes that will be achieved through development of the Growth Centres Precincts will satisfy their requirements for environmental protection under the EPBC Act. Therefore, provided development activity proceeds in accordance with the Growth Centres requirements (such as the Biodiversity Certification Order, the Sydney Region Growth Centres SEPP and Development Control Plans (DCPs) and Growth Centres Development Code), then there is no requirement to assess the impact of development activities on MNES and hence no requirement for referral of activities to the Commonwealth. The requirement for assessment and approval of threatened species and

Legislation / Policy	Relevance
	endangered ecological communities and the other MNES issues listed above under the EPBC Act has now been "turned off" by the approval of the Strategic Assessment.
	State
Biodiversity Conservation Act 2016 (BC Act)	In November 2016 the NSW parliament passed the *Biodiversity Conservation Act 2016* (BC Act). This new legislation repealed the *Threatened Species Conservation Act* 1995 (TSC Act) and took effect 25 August 2017. Among other things, the BC Act introduces new requirements for biodiversity assessment and requires proponents to offset significant biodiversity impacts through the purchase and retirement of biodiversity credits. The government has recently exhibited regulations that provide further detail on the changes as well as establish the transitional arrangements. Similar to the TSC Act, the BC Act aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The BC Act is integrated with the *Environmental Planning and Assessment Act 1979* (EP&A Act) and requires consideration of whether a development (Part 4 of the EP&A Act) or an activity (Part 5 of the EP&A Act) is likely to significantly affect threatened species, populations and ecological communities or their habitat. The schedules of the Act list species, populations and communities as endangered or vulnerable. New species, populations and communities are continually being added to the schedules of the BC Act. All developments, land use changes or activities need to be assessed to determine if they will have the potential to significantly impact on species, populations or communities listed under the Act. Bio-certification was introduced under the TSC Act (s.126G) to confer certification on an environmental planning instrument if the Minister is satisfied that it will lead to the overall improvement or maintenance of biodiversity values – typically at a landscape scale. Under the new BC Act, existing biodiversity certified areas remain valid following the repealed TSC Act. The effect of granting certification is that any development or activity requiring consent (Under Part 4 and 5 of the EP&A Act) is automatically 'development that is not likely to significantly affect threatened species'. This certification removes the need to address threatened species considerations and the test of significance (s.7.3 of the BC Act), including the preparation of species impact statements (SIS) for Part 5 activities or triggering the Biodiversity Offset Scheme (BOS) for Part 4 developments.
	Environmental Planning Instruments and Other Policies
State Environmental Planning Policy (Sydney Region Growth Centres) 2006 (Sydney Region Growth Centres SEPP)	Key to the assessment and protection of biodiversity values in the Sydney Region Growth Centres is the Biodiversity Certification (under the BC Act) of the Sydney Region Growth Centres SEPP. The Biodiversity Certification has three main functions. It requires the protection of 2,000 ha of Existing Native Vegetation (ENV) within the Growth Centres; it allows for development to proceed without further biodiversity assessment at the Development Application stage on land that is 'biodiversity certified', and it establishes a funding mechanism for conservation outcomes outside of the Growth Centres. The Sydney Region Growth Centres SEPP was 'bio-certified' by order of the Minister for the Environment under s.126G of the TSC Act. Under the new BC Act, existing biodiversity certified areas remain valid following the repealed TSC Act. The Minister's certification was based on the overall improvement or maintenance of biodiversity values and the mechanism for achieving this is outlined in the *Growth Centres Conservation Plan* (Eco Logical Australia, 2007) and the conditions for bio-certification are documented in the Ministers order for consent. Areas which are currently biodiversity certified and non-biodiversity certified are shown in Figure 2-1. The assessed precincts (being Aerotropolis Core, part of Badgerys Creek and part of Wianamatta-South Creek) are required to be assessed against the conditions of the

Legislation / Policy	Relevance
	Biodiversity Conservation Order to ensure that the planned rezoning and subsequent development of the precincts complies. This is undertaken through the completion of a Biodiversity Certification Consistency Report.
Sydney Region Growth Centres Biodiversity Certification Order (2007)	To achieve the 2,000-ha protection target, each precinct must protect the ENV on non-biodiversity certified land, or an equivalent amount on certified land. The (Draft) Growth Centres Conservation Plan (2007) assessed native vegetation across the entire Growth Centres area and identified ENV, defined as areas of indigenous trees (including mature and saplings) that: • had 10 % or greater over-storey canopy cover present, • were ≥ 0.5 ha in area, and • were identified as "vegetation" on maps 4 and 5 of the (Draft) Growth Centres Conservation Plan, at the time the biodiversity certification order took effect, subject to condition 13. The ENV mapped within the subject site is shown in Figure 2-2. This figure highlights that there was previously 67.31 ha of ENV on non-certified land within the subject site, which contributed to the 2,000-ha target. Clause 13 of the biodiversity-certification details the ground-truthing requirements for ENV; namely, 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 7-8 and 11-12 only the area of validated existing native vegetation shall be considered.
Growth Centres Development Code 2006	The Growth Centres Development Code guides the planning and urban design in the North West and South West Growth Areas. The Development Code includes objectives and provisions that support the retention of as much native vegetation, habitat, and riparian areas within the precinct through incorporation into land use planning outcomes such as lower density development in these areas, subdivision patterns, road design, local parks, and other areas required to be set aside for community uses without adversely affecting the development yield of areas. As a requirement under the Development Code, the subject site will need to demonstrate how the biodiversity and other values of areas identified by the Sydney Region Growth Centres SEPP will be protected, maintained, and enhanced. Key issues will include boundary management (e.g. buffers to surrounding development), bush fire and water sensitive urban design (WSUD) (GCC 2006).
State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 (WSA SEPP)	The WSA SEPP facilitates the development in the Western Sydney Aerotropolis, while at the same time ensuring protection of trees, vegetation, soil quality and the health of all waterways. To do this, biodiversity will be protected through the following mechanisms: • Environment and Recreation zoning. • High Biodiversity Values mapping. • Biodiversity related Development Control Plan controls. One of the main objectives of the Environment and Recreation zoning is to '*protect and conserve the environment, including threatened and other species of native fauna and flora and their habitats, areas of high biodiversity significance and ecological communities*'. The WSA SEPP ensures this through Clause 27(4), which prohibits the clearing of native vegetation mapped either within the Environment and Recreation Zoning or High Biodiversity Values map, unless it can be proven that clearing will not cause significant impacts to biodiversity and the loss of remnant vegetation is compensated by revegetation. To maintain consistency with existing biodiversity certification measures, additional planning controls may be added within the WSA SEPP, similar to Clauses 6.2 and 6.3 found

Legislation / Policy	Relevance
	within the appendices of the Sydney Region Growth Centres SEPP. These controls will ensure that the native vegetation in these areas cannot be cleared.
The Western Sydney Aerotropolis Development Control Plan 2020 – Phase 1 (Western Sydney Planning Partnership, 2020)	The Development Control Plan (DCP) contains numerous objectives and performance outcomes for biodiversity, native vegetation, and high ecological value waterways. These objectives are outlined in Table 2-3.

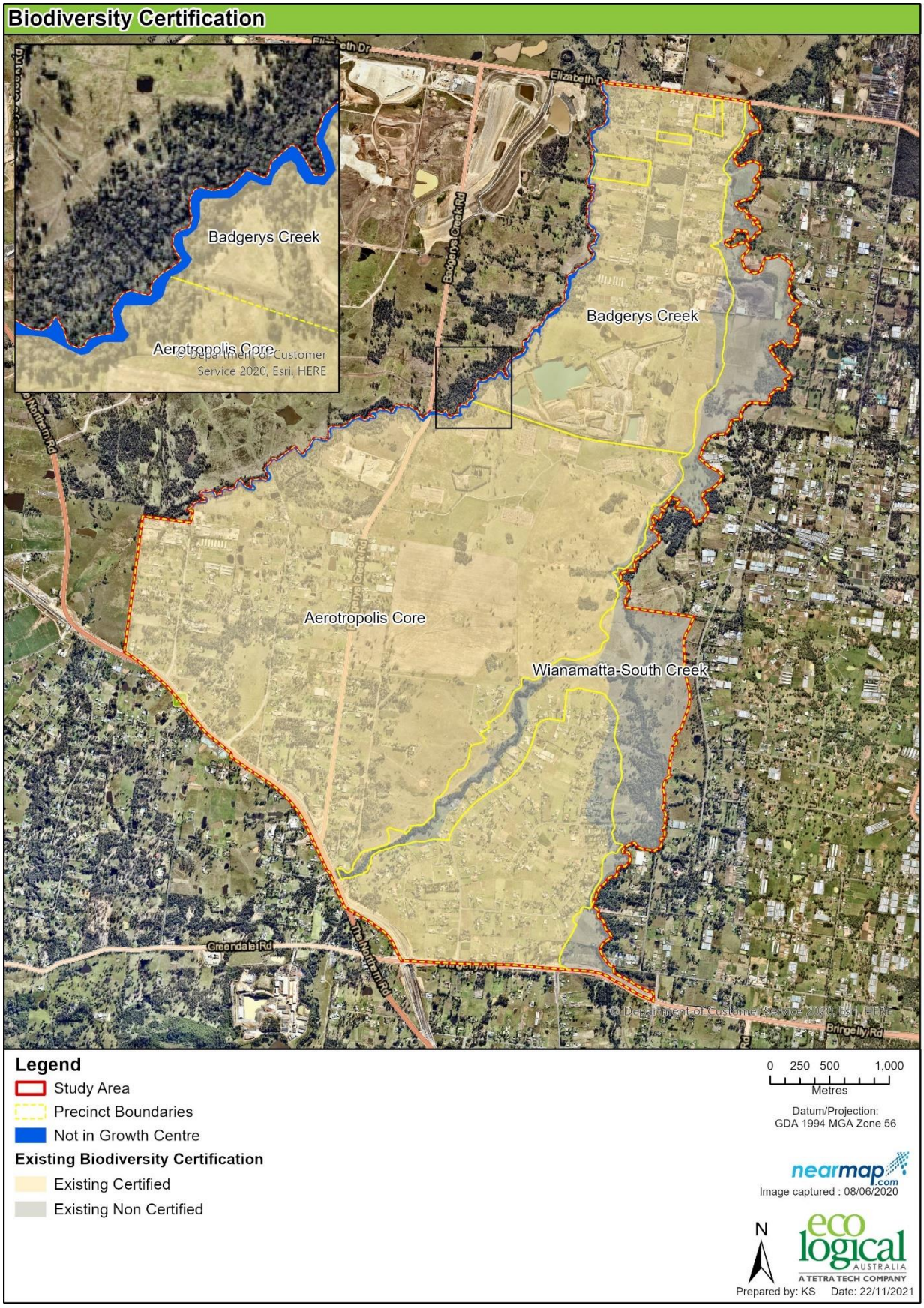

Figure 2-1: Biodiversity certified lands within the subject site

Figure 2-2: Existing Native Vegetation originally mapped within the Draft Conservation Plan 2007

2.3 Summary of Statutory and Strategic Objectives

Based on the above discussion, Table 2-3 below outlines a summary of the statutory and strategic objectives this study aims to achieve. Whilst inherent biodiversity values are acknowledged as requiring protection, trees and natural systems are clearly being acknowledged as having a critical role in in delivering aesthetic, recreational, and other environmental requirements for the precinct.

Table 2-3: Summary of statutory and strategic objectives

Strategic Plan / Statutory Policy or Legislation	Objectives	Study Objective Code
	Strategic Objectives	
The Greater Sydney Region Plan, *A Metropolis of Three Cities* (Greater Sydney Commission, 2018)	Create a cool and green parkland city within the Wianamatta-South Creek Precinct corridor through the results of this study and the South Creek Corridor Project.	WSC01
	Ensure biodiversity is protected and urban bushland and remnant vegetation is enhanced, through the following measures: • supporting landscape-scale biodiversity conservation and the restoration of bushland corridors; • managing urban bushland and remnant vegetation as green infrastructure; and • managing urban development and urban bushland to reduce edge-effect impacts.	BC01
	Increase urban tree canopy cover through expanding urban tree canopy cover in the public realm.	TC01
	Ensuring the Green Grid links parks, open spaces, bushland and walking and cycling paths through the delivery of the Greater Sydney Green Grid priority corridors.	GG01
Our Greater Sydney 2056 – Western Sydney District Plan (Greater Sydney Commission, 2018)	Create a Parkland City urban structure and identity with South Creek as a defining spatial element through implementation of the South Creek Corridor Project and use of the following design principles: • orientate urban systems towards the creek corridor; • create a transect of creek-oriented place types and things to do; • build a network of everyday uses within a walkable creek catchment; and • provide creek connections and encourage waterfront activity.	WSC01
	Protect and enhance bushland and biodiversity by: • supporting landscape-scale biodiversity conservation and the restoration of bushland corridors; • managing urban bushland and remnant vegetation as green infrastructure; and • managing urban development and urban bushland to reduce edge-effect impacts.	BC01

Strategic Plan / Statutory Policy or Legislation	Objectives	Study Code	Objective
	Increase urban tree canopy cover and deliver Green Grid connections through progressively refining the detailed design and delivery of the Greater Sydney Green Grid priority corridors and projects important to the District. This includes The South Creek priority corridor.	GG01	
Draft Greener Places Design Guide (Government Architects NSW, 2020)	Protect and conserve existing remnant ecosystems to prevent further habitat and biodiversity loss.	BC01	
	Restore disturbed ecosystems to enhance ecological value and function through bushland regeneration, weed management and creating habitat corridors within the built form through gardens, street verges and parks.	BC02	
	Create new ecosystems where habitat linkages are needed such as Water-Sensitive Urban Design (WSUD) and green infrastructure.	BC03	
	Connect people to nature through recreation, education and bushwalking through incorporation of waling tracks, picnic areas and lookouts.	BC04	
	Improve species diversity and genetic health through connecting habitat, allowing the capacity of species to move between habitats improve.	BC05	
The Western Sydney Aerotropolis Plan (Western Sydney Planning Partnership, 2020)	Provide an urban tree canopy along open space corridors, major roads, and streets to contribute to the 5 million trees for Greater Sydney by 2030 program. Provide blue and green corridors of private and public open space with active and passive recreation and community facilities. Maximise connections to the Wianamatta–South Creek corridor, Blue–Green Grid and regional parks.	GG01	
	Statutory Objectives		
Growth Centres Conservation Plan 2007	Protect at least 67.31 ha of ENV.	SRGC01	
The Western Sydney Aerotropolis Development Control Plan 2019 – Phase 1 (Western Sydney Planning Partnership, 2020)	Avoid, minimise, and mitigate impacts to biodiversity from future development.	BC01	
	Enhance landscape connectivity through conservation and restoration of native vegetation, wildlife habitat and migration corridors to enable plant and animal communities to survive in the long term, whilst not conflicting with aviation safety.	BC05	
	Improve the biodiversity and ecological values of the area by addressing indirect and prescribed impacts across the Aerotropolis.	BC02	
	Ensure ecological function of the landscape is maintained to provide benefits to the natural and human environment.	BC06	
	Manage weeds and pests in strategic locations to reduce landscape threats to biodiversity.	BC02	

3. Methods

3.1 Literature Review

A desktop literature review was undertaken by ELA to determine the location and extent of previous surveys, identify the constraints within the subject site and evaluate the presence of any threatened species, populations and ecological communities listed under the BC Act and the Commonwealth EPBC Act that could potentially occur within the subject site. The following documentation and mapping were reviewed:

- Aerial photography of the subject site
- NSW BioNet Atlas of Wildlife Database (10 km radius)
- EPBC Act online Protected Matters Search Tool (10 km radius)
- Native Vegetation Maps of the Cumberland Plain – Interpretation Guidelines (DECC, 2000b)
- Draft Growth Centres Conservation Plan (2007) for NSW Growth Centres Commission
- Office of Environment and Heritage (2013 and 2016) vegetation mapping.
- Growth Centres Progress Review (DAJ Environmental, 2016).
- Western Sydney Growth Centres – Clearing and Compliance Audit Report (EcoPlanning, 2019).

3.2 Desktop Assessment

Where land access was not available, the OEH 2013 and OEH 2016 Vegetation Map was updated based on aerial photo interpretation. Vegetation mapping was edited to remove portions mapped over buildings or cleared lands. The desktop assessment was conducted to determine the following:

- Potential vegetation communities.
- Potential for patches of vegetation to meet the definition of AHCVV or ENV.
- Potential threatened species habitat.
- Potential constraints and recovery potential.

3.3 Field survey

Where accessible, vegetation was 'ground-truthed' between 25th August – 14th September 2020 by five ELA ecologists. Lands that were accessed are outlined in Appendix A. A basic floristic survey of the precinct was undertaken to confirm the vegetation communities present, including their condition and extent. This survey included classification of native vegetation communities in accordance with the DPIE profiles (2020b) and the Commonwealth conservation and listing advice (where relevant). Floristic and vegetation integrity plot data was also gathered in accordance with the Biodiversity Assessment Methodology (BAM) to aid in Plant Community Type (PCT) identification, condition and recovery potential.

Overall, approximately 10.2% of the existing ENV within the study area was field validated.

Targeted flora surveys were undertaken within parts of the Wianamatta-South Creek Precinct to satisfy Condition 12 of the Biodiversity Certification Order.

A detailed methodology can be found in Appendix A.

4. Results

4.1 Landscape Features

Parts of the subject site have been cleared for residential or industrial purposes. Vegetation within the subject site consisted largely of cleared areas of exotic pasture. Remnant native vegetation was present in reserves and parts of rural lots.

4.1.1 IBRA Bioregion and Subregion

The subject site is located within the Sydney Basin IBRA Bioregion and the Cumberland Subregion.

4.1.2 Native Vegetation Extent

The total extent of native vegetation within the subject site is 336.45 ha, equating to approximately 15.96% of the total area.

4.1.3 Habitat Connectivity

Soils within the Cumberland Subregion are generally fertile compared to surrounding Hawkesbury Sandstone landscapes, which has resulted in extensive clearing of native vegetation for agriculture and more recently, urban development. Because of this, approximately 13% of the pre-1970 extent of native vegetation in the Cumberland Subregion remains intact and in good condition (DECCW, 2011). Remaining vegetation is generally highly fragmented, which larger patches restricted to reserves, riparian corridors, and areas not suitable for agriculture.

Within the subject site, native vegetation is present along the riparian corridors of South Creek, Kemps Creek and Thompsons Creek and their tributaries, and within protected areas south of Elizabeth Drive (Figure 4-1).

4.2 Vegetation Communities

Four native vegetation communities were identified within the subject site through desktop assessment and field survey. Areas of exotic cover were also present within the subject site; these areas were not consistent with any remnant native vegetation communities. Table 4-1 below summaries each vegetation community and equivalent PCT, the extent of each vegetation community and conservation significance. The extent of each vegetation community is also illustrated in Figure 4-2. Detailed vegetation maps can be found in Appendix B.

Descriptions of each vegetation community, including broad condition states, are further discussed below. These descriptions are based on areas that were field validated only, and have been generalised, with a focus on dominant species, to capture similarities in occurrences of each vegetation community across the entire subject site. Individual patches of the same vegetation community in the same condition may vary slightly in their species assemblage. A full species list of flora identified within vegetation plots is included in Appendix D. Conditions were assigned based on soil disturbance and native ground, mid-storey, and canopy cover. Three conditions are described below and further detailed in Appendix A:

- **Good condition**: Characteristic native species dominant in all structural layers (ground, mid-storey, and canopy)

- **Moderate condition**: Characteristic native species present in all structural layers, however the abundance of native species in the ground cover and mid-storey was sparse, with increased amounts of exotic species in these layers
- **Low condition**: Characteristic native canopy species present, ground cover dominated by exotic species, mid-storey layer absent or comprised of exotic species, soil disturbance evident.

Table 4-1: Vegetation communities within the subject site

Vegetation Community	Plant Community Type	Area (ha)	BC Status	EPBC Status
Cumberland Plain Woodland	**849:** Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion **850**: Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	163.26	CE	CE
River-Flat Eucalypt Forest*	**835:** Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	164.62	E	CE
Castlereagh Shale-Gravel Transition Forest	**724:** Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion	8.57	E	CE
	TOTAL (ha)	**336.45**		

CE – CRITICALLY ENDANGERED
E – ENDANGERED

Figure 4-1: Landscape features within the subject site

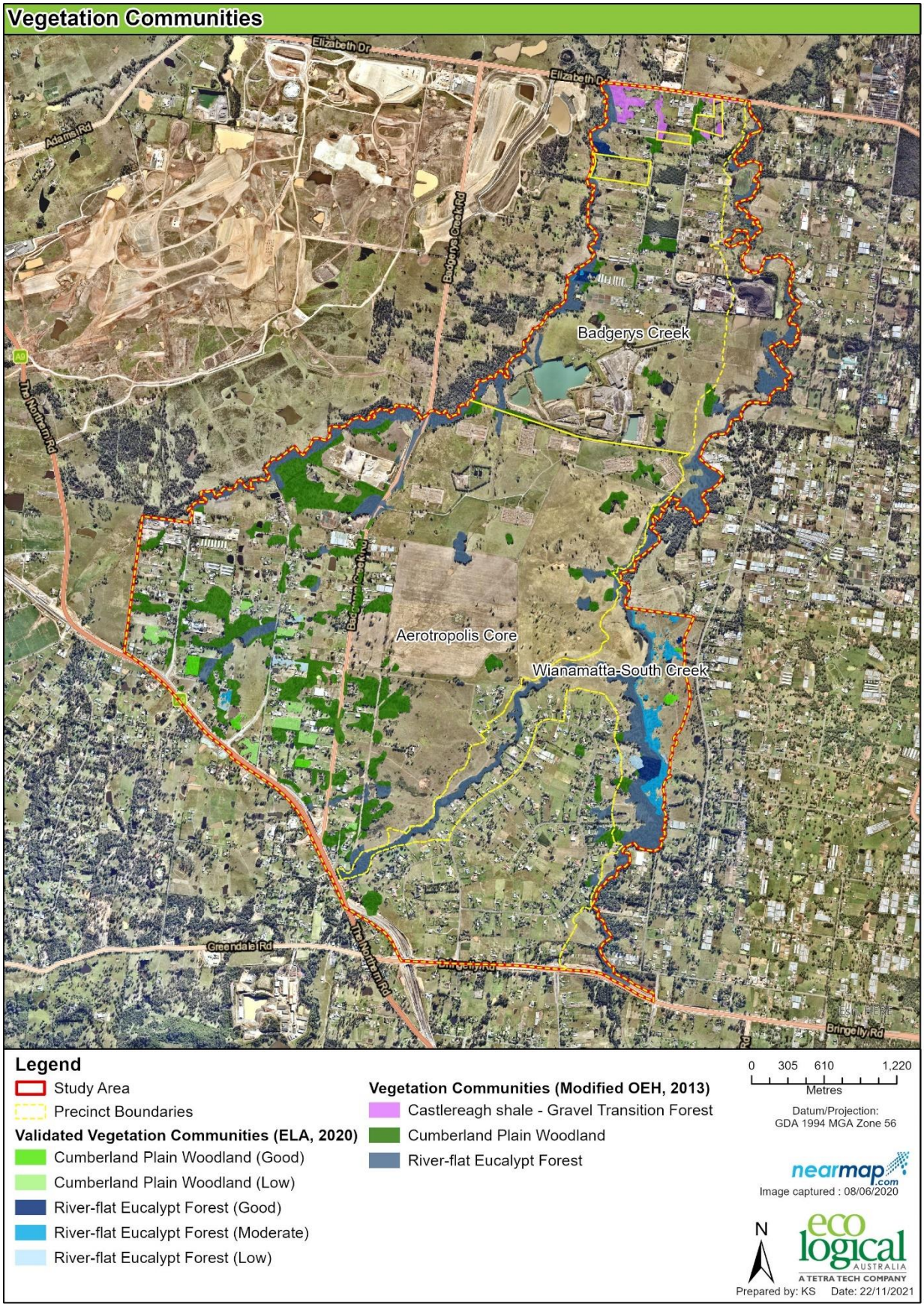

Figure 4-2: Vegetation communities within the subject site (ELA, 2020)

4.2.1 Cumberland Plain Woodland

Cumberland Plain Woodland in the Sydney Basin Bioregion is a critically endangered ecological community under both State (BC Act) and Commonwealth (EPBC Act) legislation, under the name Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. Cumberland Plain Woodland is generally described as an open eucalypt woodland with an open shrub layer and grassy ground cover and is commonly found on clay-loam soils derived from the Wianamatta shale. This community is restricted to the Cumberland Plain in Greater Sydney. Cumberland Plain Woodland within the subject site was observed in varying conditions, each detailed in Table 4-2 below. Patches of vegetation which also met the condition thresholds under the EPBC Act were also given a Condition Category. For a further explanation of EPBC Act condition categories and thresholds, refer to Appendix E.

Table 4-2: Conditions of Cumberland Plain Woodland identified within subject site

Condition	EPBC Act Condition	Area (ha)	Description	Photo
Good	A (4.09 ha)	4.35	Occurrences of Cumberland Plain Woodland in good condition were limited within the subject site. The canopy was dominated by *Eucalyptus moluccana* (Grey Box) and *Eucalyptus tereticornis* (Forest Red Gum). The mid-storey was intact and dominated by *Bursaria spinosa* subsp. *spinosa* (Blackthorn), *Acacia falcata* (Hickory Wattle) and *Dodonaea viscosa* subsp. *viscosa* (Sticky Hop-bush) were also present. The groundcover was dominated by native grasses and forbs, including *Lomandra filiformis* subsp. *filiformis* (Wattle Mat-rush), *Microlaena stipoides* var. *stipoides* (Weeping Grass), *Aristida vagans* (Threeawn Speargrass) and *Brunoniella australis* (Blue Trumpet). Exotic species were scattered in small densities throughout the mid-storey and ground, including *Olea europaea* subsp. *cuspidata* (African Olive), *Senecio madagascariensis* (Fireweed) and *Setaria parviflora*. Four patches (corresponding to 4.09 ha of vegetation associated with BAM Plots 1,2 ,3 and 8 of Cumberland Plain Woodland in good condition met the condition thresholds for listing under the EPBC Act as Condition A for the following reasons: • Minimum patch size is ≥0.5ha; • ≥50% of the perennial understorey vegetation cover is made up of native species.	

Condition	EPBC Act Condition	Area (ha)	Description	Photo
			One patch of Cumberland Plain Woodland in good condition did not meet the condition thresholds for listing under the EPBC Act because it was too small (≤0.5 ha) and isolated from other native vegetation remnants.	
Low	N/A	10.36	The canopy was dominated by *Eucalyptus moluccana* (Grey Box) and *Eucalyptus tereticornis* (Forest Red Gum). The midstorey was largely absent except for scattered occurrences of *Olea europaea* subsp. *cuspidata* (African Olive). The ground cover was dominated by exotic species, including *Senecio madagascariensis* (Fireweed), *Chloris gayana* (Rhodes Grass) and *Sida rhombifolia* (Paddy's Lucerne), with scattered native species, including *Microlaena stipoides* (Weeping Grass) and *Einadia hastata* (Berry Saltbush). Occurrences of Cumberland Plain Woodland in low condition did not meet the condition thresholds for listing under the EPBC Act because ≤30% of the perennial understorey vegetation cover is made up of native species.	
	TOTAL	**14.71**		

4.2.2 River-Flat Eucalypt Forest

River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions is listed as an endangered ecological community under State legislation (BC Act). In 2016, River-Flat Eucalypt Forest was nominated for listing as a threatened ecological community under Commonwealth legislation (EPBC Act) as Coastal Floodplain Eucalypt Forest of Eastern Australia. Conservation Advice for this ecological community has been drafted, public consultation closed in August 2019, and the nomination is currently being assessed. River-flat Eucalypt Forest within the subject site was observed in varying conditions, each detailed in Table 4-3 below.

Table 4-3: Conditions of River-flat Eucalypt Forest identified within the subject site

Condition	Area (ha)	Description	Photo
Good	7.54	Occurrences of River-Flat Eucalypt Forest in good condition were characterised by the dominance of characteristic native species in the ground, mid and upper strata. The canopy was dominated by *Eucalyptus amplifolia* (Cabbage Gum), *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus moluccana* (Grey Box) and *Angophora floribunda* (Rough-barked Apple). Smaller trees, *Casuarina glauca* (Swap oak) *Melaleuca decora*, were also present. The mid-storey varied in density throughout the subject site and was dominated by the native shrub *Bursaria spinosa* subsp. *spinosa* (Blackthorn). Small exotic shrubs, including *Sida rhombifolia* (Paddy's Lucerne) and *Cestrum parqui* (Green Cestrum) were also present. The groundcover was dominated by native grasses, forbs and scramblers, including *Microlaena stipoides* (Weeping Grass), *Dichondra repens* (Kidney Weed) and *Clematis aristata* (Old Man's Beard). Exotic species were also scattered throughout the groundcover, including *Ehrharta erecta* (Panic Veldtgrass), *Stellaria media* (Common Chickweed), and *Plantago lanceolata* (Lamb's Tongues).	

Condition	Area (ha)	Description	Photo
Moderate	13.77	The canopy layer of River-Flat Eucalypt Forest in moderate condition was dominated by the same native species listed above. This condition was characterised by the dominance of exotic species in the mid-storey and groundcover. The mid-storey was partially cleared in some patches and dominated by weed incursions of *Sida rhombifolia* (Paddy's Lucerne), *Bidens Pilosa* (Cobblers Pegs), *Solanum mauritianum* (Wild Tobacco Bush) and *Cestrum parqui* (Green Cestrum). *Bursaria spinosa* subsp. *spinosa* (Blackthorn) was scattered throughout. Ground cover was partially mown or grazed in some patches and dominated by exotic species, including those listed above.	

Condition	Area (ha)	Description	Photo
Low	3.91	The canopy layer of River-Flat Eucalypt Forest in low condition was dominated by the same native species characteristic of the vegetation community in good and moderate condition. This condition was characterised by a history of disturbance, evident in areas where the native mid-storey had been cleared and weedy ground cover was growing over areas of fill. Smaller shrubs present included *Sida rhombifolia* (Paddy's Lucerne), *Bidens Pilosa* (Cobblers Pegs) and *Verbena officinalis* (Common Verbena). Exotic ground cover species included, *Eragrostis curvula* (African Lovegrass), *Cirsium vulgare* (Spear Thistle) and *Senecio madagascariensis* (Fireweed).	
TOTAL	**25.22**		

4.2.3 Castlereagh Shale-Gravel Transition Forest

Castlereagh Shale-Gravel Transition Forest is listed as an endangered ecological community under State legislation (BC Act) and critically endangered community under Commonwealth legislation (EPBC Act). The canopy typically includes *Eucalyptus fibrosa* (Red Ironbark) and a variety of other eucalyptus depending on the location. The shrub layer includes *Melaleuca decora*, *Bursaria spinosa* (Blackthorn) and *Daviesia ulicifolia* (Gorse Bitter Pea). The ground cover is a mix of grasses, sedges and herbs.

This community has been previously mapped within the subject site, however, was not field validated. Therefore, a detailed description on condition has not been provided.

4.3 Threatened Species Habitat

No threatened flora species were identified opportunistically or during targeted survey. However, threatened flora species associated with native vegetation identified within the subject site and recorded within 10 km of the subject site were identified as having the potential to occur within the subject site. These species are presented in Figure 4-4 and Table 4-4.

Table 4-4: Threatened flora species with the potential to occur in the subject site

Scientific name	Common name	BC Act Status	EPBC Act Status	Habitat features present within subject site	BioNet records
Acacia pubescens	Downy Wattle	V	V	Cumberland Plain Woodland	1,763
Cynanchum elegans	-	E1	E	Cumberland Plain Woodland	20
Dillwynia tenuifolia	-	V, E2	-	Cumberland Plain Woodland	17,590
Grevillea juniperina subsp. *juniperina*	Juniper-leaved Grevillea	V	-	Cumberland Plain Woodland	5,238
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	V	V	Shale Sandstone Transition Foreest	276
Marsdenia viridiflora subsp. *viridiflora*	Native Pear	E2	-	Cumberland Plain Woodland	560
Persoonia nutans	Nodding Geebung	E1	E	Shale sandstone transition communities	39
Pimelea spicata	Spiked Rice-flower	E1	E	Cumberland Plain Woodland	2,147
Pultenaea parviflora	-	E1	V	Shale Gravel Transition Forest	3,590

V = Vulnerable, E = Endangered, E1 = Endangered, E2 = Endangered Population, CE = Critically Endangered, - = Not Listed.

Shells of *Meridolum corneovirens* (Cumberland Plain Land Snail) were identified within the subject site during survey. A list of threatened fauna species with the potential to occur within the subject site was compiled based on habitat features identified within the subject site during field survey and records within the subject site or within 10 km of the subject site. These species, and the habitat features relevant to them, are presented in and Table 4-5 and Figure 4-5.

Table 4-5: Threatened fauna species with the potential to occur in the subject site

Scientific name	Common name	BC Act Status	EPBC Act Status	Habitat features present within subject site	BioNet records
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	Open eucalypt woodland and farmland adjoining woodland	99
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-	Open eucalypt woodland	22
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	*Casuarina* and *Allocasuarina* species	25
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Intact sections of native vegetation	9
Chthonicola sagittata	Speckled Warbler	V	-	Open eucalypt woodland	54

Scientific name	Common name	BC Act Status	EPBC Act Status	Habitat features present within subject site	BioNet records
Daphoenositta chrysoptera	Varied Sittella	V	-	Open eucalypt woodland	162
Gallinago hardwickii	Latham's Snipe	-	M	Dams	22
Glossopsitta pusilla	Little Lorikeet	V	-	Open eucalypt woodland and riparian areas	21
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Hollow bearing trees and intact sections of native vegetation.	37
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	Open eucalypt woodland and riparian areas	36
Hieraaetus morphnoides	Little Eagle	V	-	Open eucalypt woodland and riparian areas	32
Lathamus discolor	Swift Parrot	E	CE	*Eucalyptus tereticornis*, a favoured feed tree of this species.	423
Meridolum corneovirens	Cumberland Plain Land Snail	E	-	Leaf litter was present at the base of trees within Cumberland Plain Woodland and River-Flat Eucalypt Forest	1,322
Merops ornatus	Rainbow Bee-eater	-	M	Open forests, woodland and farmland	31
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	Hollow bearing trees and intact sections of native vegetation	144
Miniopterus australis	Little Bent-winged Bat	V	-	Hollow bearing trees and intact sections of native vegetation	6
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	Hollow bearing trees and intact sections of native vegetation	116
Myotis macropus	Southern Myotis	V	-	Hollow bearing trees and intact sections of native vegetation	79
Ninox connivens	Barking Owl	V	-	Hollow bearing trees and intact sections of native vegetation	7
Ninox strenua	Powerful Owl	V	-	Hollow bearing trees and intact sections of native vegetation	31
Phascolarctos cinereus	Koala	V	V	Favoured feed tree species, including *Eucalyptus tereticornis* and *Angophora floribunda*	43
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Intact sections of native vegetation	513
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Hollow bearing trees and intact sections of native vegetation	6
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Hollow bearing trees and intact sections of native vegetation	57

V = Vulnerable, E = Endangered, CE = Critically Endangered, M= Migratory, - = Not Listed.

Figure 4-3: Habitat features and threatened species identified within field validated areas only

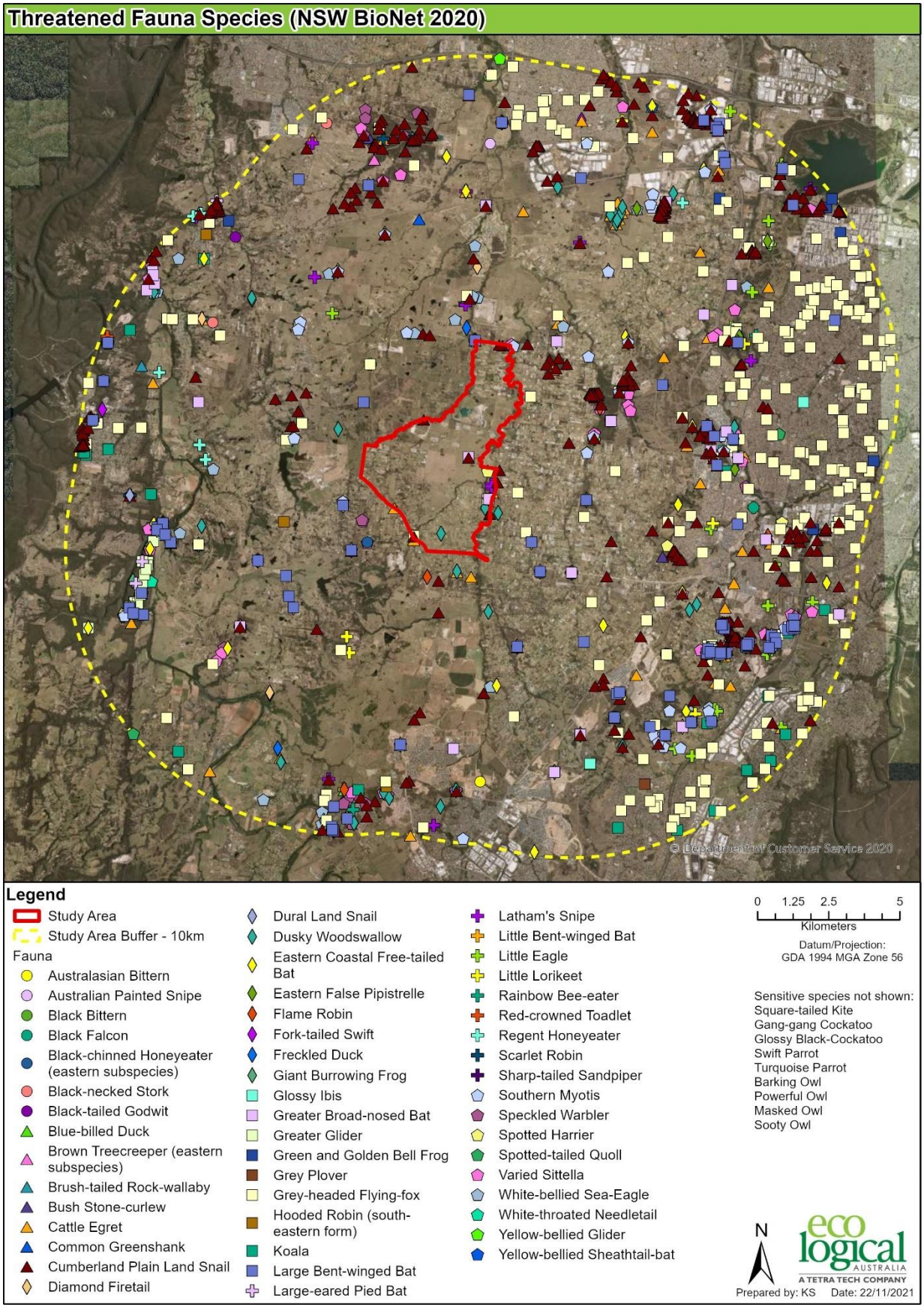

Figure 4-4: Threatened flora species identified within 10 km of the subject site (NSW BioNet 2020)

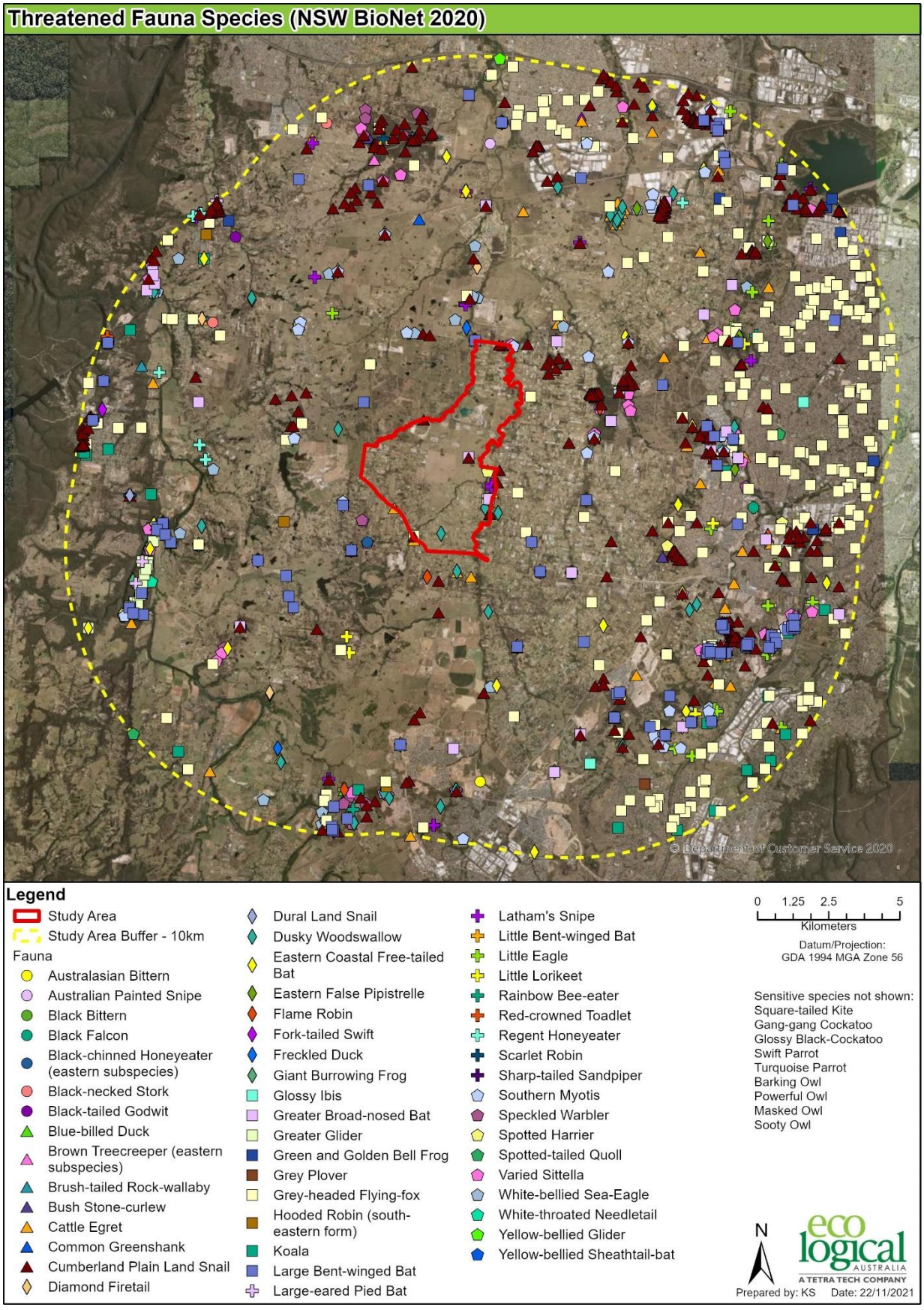

Figure 4-5: Threatened fauna species identified within 10 km of the subject site (NSW BioNet 2020)

4.4 Validated Existing Native Vegetation and Identification of Additional High Conservation Value Vegetation

Desktop aerial photo analysis and field survey was undertaken to validate the extent of the mapped 'Existing Native Vegetation' to confirm whether it still existed. This process resulted in the following classifications:

- Existing Native Vegetation originally mapped within Draft Growth Centres Conservation Plan 2007
- Validated Existing Native Vegetation
- Additional High Conservation Value Vegetation (note that AHCVV is defined as meeting the same criteria as ENV (i.e. a 10% or greater canopy cover and a patch size of 0.5 ha or more) however, was not mapped in the original Draft Conservation Plan 2007. These areas may not have been originally mapped due to mapping inaccuracies or changes to the condition and size of the vegetation since the production of the Draft Conservation Plan 2007 map).

Approximately 67.31 ha of vegetation in the precinct was identified in the Draft Growth Centres Conservation Plan 2007 within non-biodiversity certified lands and will therefore require protection. Most of these lands are within the Winamatta-South Creek Precinct. Desktop assessment and field survey validated 58.58 ha of previously identified ENV within non-biodiversity certified lands, resulting in a shortfall of 8.73 ha of ENV. This is outlined in Table 4-6 and Figure 4-6 below. To maintain parity with the Biodiversity Certification Order, the 8.73 ha shortfall will need to be made up by protecting other patches of ENV in the subject site.

Table 4-6: Amount of ENV and AHCVV in subject site (ha)

	Certified Land	Non-Certified Land	Total
Mapped ENV in Draft Conservation Plan	141.76	67.31	**209.07**
Validated ENV (desktop analysis and field validated)	67.46	58.58	**126.04**
AHCVV (ELA field validated)	10.64	11.14	**21.78**
AHCVV (desktop study)	39.36	23.16	**62.53**

This is further discussed in Section 5.3.

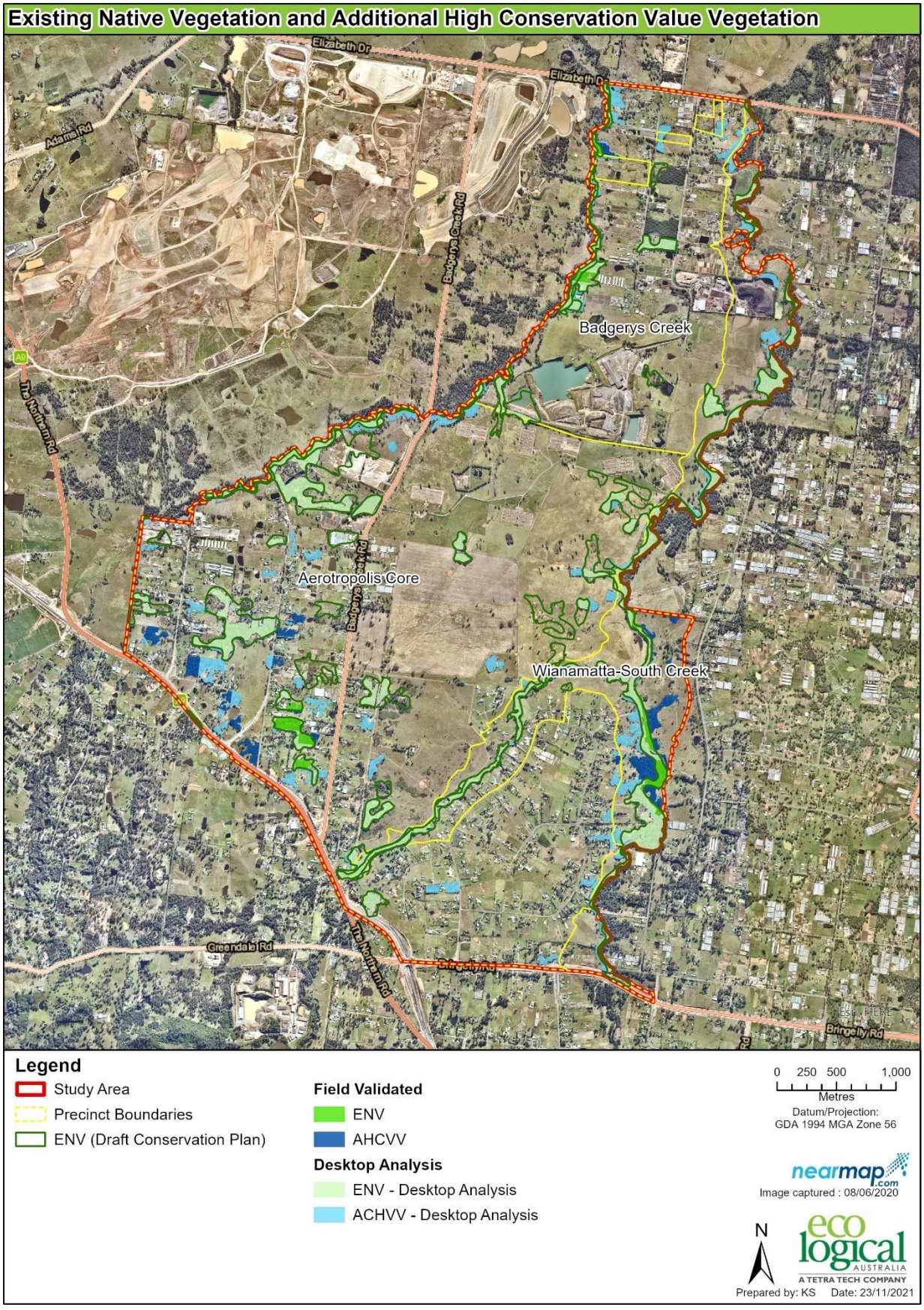

Figure 4-6: ENV and AHCVV within the subject site

4.5 Recovery Potential

Recovery potential relates to the ability of the land to be managed for an improvement in the condition of the remnant vegetation and to increase linkages (wildlife corridor) between extant stands of vegetation. Identifying areas of recovery potential is consistent with the aims of the BC Act; to protect and encourage the recovery of threatened species, populations and communities listed under the Act.

With appropriate management actions, areas identified as having a moderate recovery potential would improve the condition of threatened species habitat and ecosystem connectivity within the precinct. Management actions would need to be on-going and facilitate the natural regeneration of the over-storey and/or regeneration of native species (grasses, herbs and forbs) in the seed bank.

Four classes of recovery potential have been identified within the subject site which has been informed by the assessments (desktop and field) conducted in this report. Where land access was not available, the OEH 2013 and 2016 Vegetation map was used to inform classification. The four classes are shown in Figure 4-7 and are described below:

- **High Recovery Potential:** Native vegetation mapped as areas that meet the definition of ENV or AHCVV which generally have native canopy cover of greater than 10% and contained native species in each structural layer
- **Moderate Recovery Potential:** Other areas of native vegetation with some canopy, less structural complexity and a higher level of weed infestation or ongoing disturbance
- **Low Recovery Potential:** Areas which show some potential for natural regeneration. Some native species present in some structural layers, very high level of weed infestations, not all structural layers present
- **Very Low Recovery Potential:** All other areas including cleared and heavily cultivated and/or pasture improved areas.

Area calculations of each recovery potential class within the subject site are presented in Table 4-7.

Table 4-7: Area of different recovery potential classes identified within the subject site.

Recovery potential class	Area (ha)
High	298.39
Moderate	60.22
Low	0.42
Very Low	1,749.3

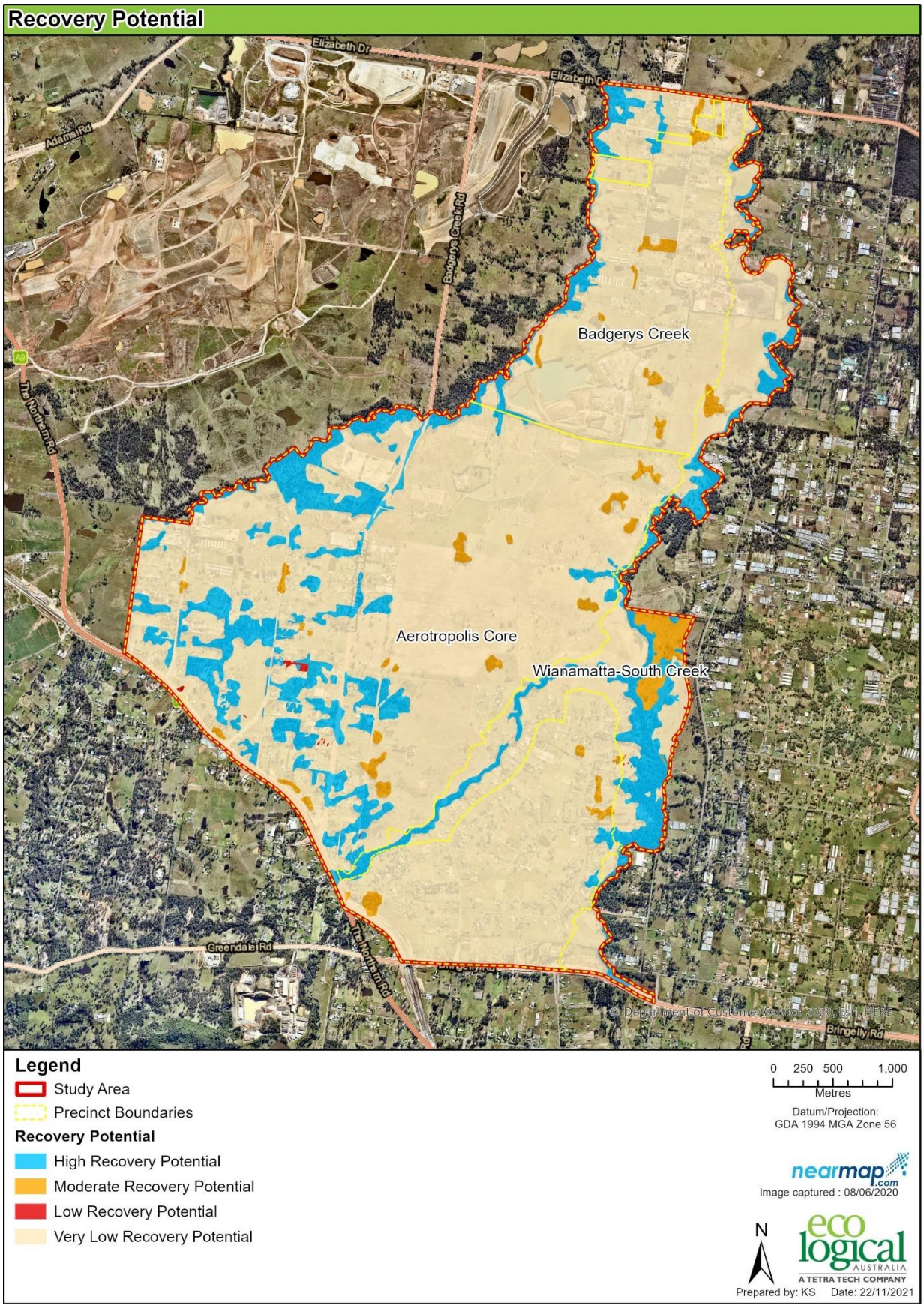

Figure 4-7: Recovery potential within the subject site

4.6 Ecological Constraints Assessment

An ecological constraint ranking was derived applying an amended methodology that has been used elsewhere in Western Sydney (see Appendix A of this report). This method combines size, condition, connectivity and recovery potential into a single ecological constraint value. The results of this analysis are in Table 4-8 and Figure 4-8. The majority of vegetation within the subject site is ranked as having high biodiversity value by virtue of it being an Endangered or Critically Endangered Ecological Community. These constraints are based on ecological values and do not take account of the Biodiversity Certification Order which shows that the site is partially biodiversity certified under the BC Act.

Broadly the rankings are as follows:

- **High constraint:** High ecological value, relatively large areas of good quality, well connected vegetation
- **Moderate constraint:** Moderate ecological value, smaller areas of good quality vegetation or large areas of poorer quality vegetation
- **Low constraint:** Low ecological value, areas infested with weeds and exotics, with a low recovery potential or completely cleared or developed.

Table 4-8: Constraints summary within the subject site

Ecological constraint	Area (ha)
High	298.39
Moderate	60.64
Low	2,108.33

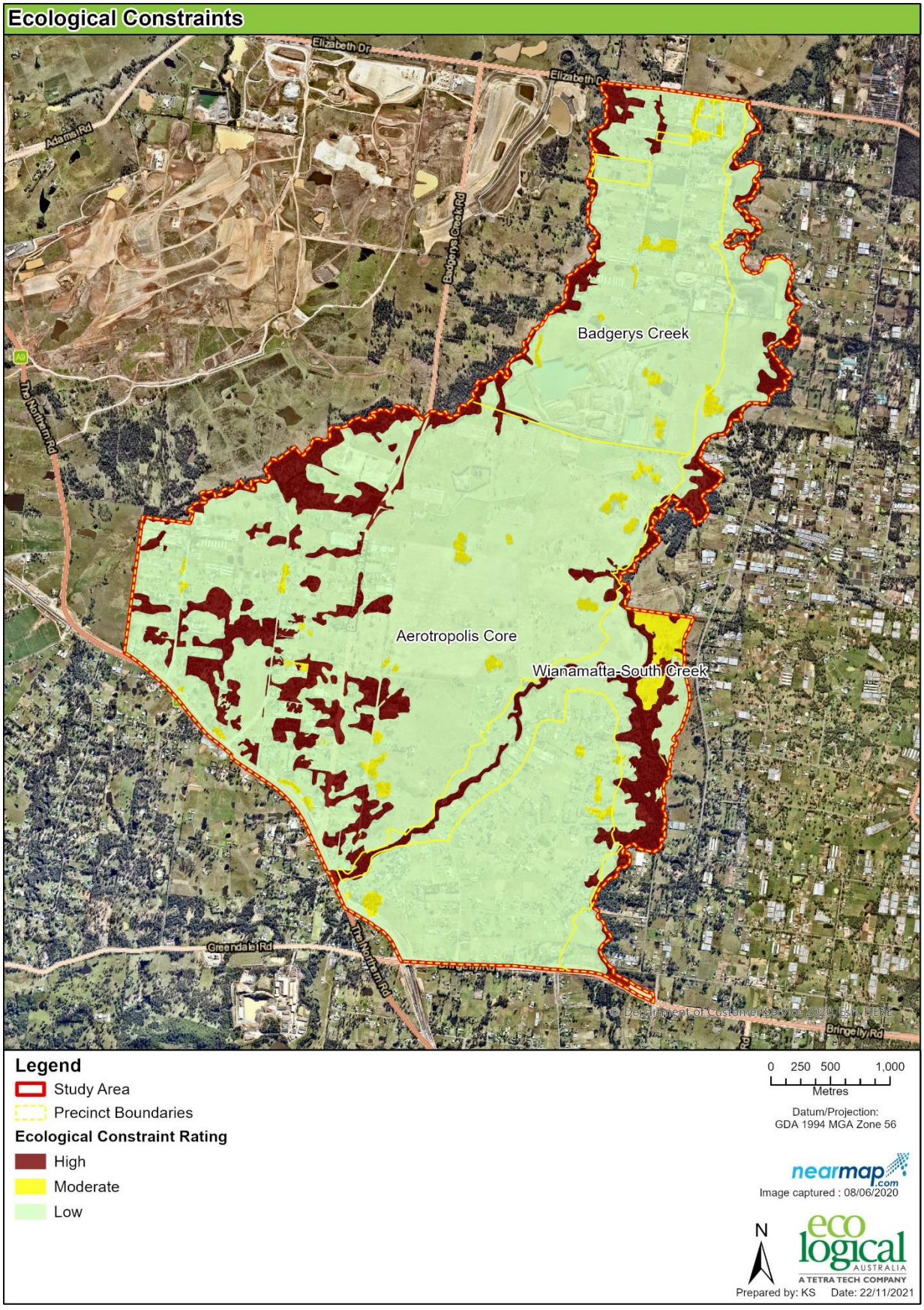

Figure 4-8: Ecological constraints analysis in regards to conservation value

5. Outcomes of Precinct Plan

5.1 Overview of the Precinct Plan

The Precinct Plan for the Aerotropolis Core precinct and part of the Badgerys Creek and Wianamatta-South Creek precincts, subject to this study is shown in Figure 5-1.

The Precinct Plan was prepared with the biodiversity and sustainability strategic objectives of the Western Sydney District Plan in mind, ensuring the notion of a Parkland City is front and centre. This has been captured through the retention of the South Creek, Kemps Creek and Thompsons Creek riparian corridors, which are considered defining spatial elements in multiple strategic objectives and often referred to as the 'ecological spine' of the Western Parkland City.

Furthermore, the open space network has been devised, utilising patches of remnant native vegetation as a base, and planning building envelopes, streets, and main roads away from these areas, ensuring biodiversity is protected but also allowing for urban bushland and remnant vegetation to be enhanced.

The Precinct Plan has created a Green Grid that links the existing north to south biodiversity corridors to proposed parks, open spaces, and other areas of remnant native vegetation. In turn, creating east to west corridors that will enhance biodiversity in the future.

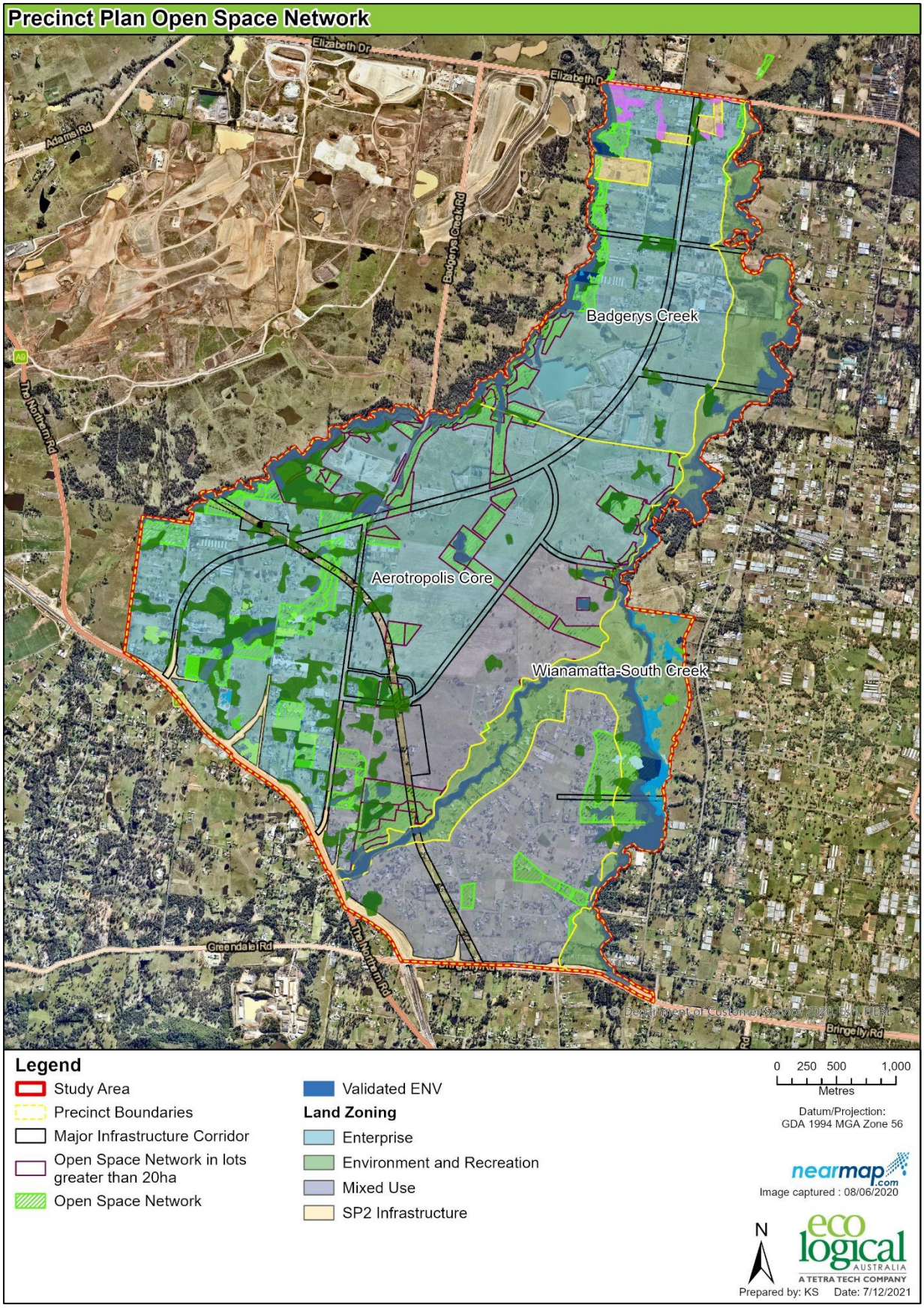

Figure 5-1: Precinct Plan open space network (Hassell, 2021) and Western Sydney Aerotropolis zoning (WSA SEPP)

5.2 Consistency with Strategic Plans

Table 5-1 summarises how the Precinct Plan for the subject site will be consistent with relevant Strategic Assessment objectives.

Table 5-1: Consistency with Strategic Assessment objectives relating to biodiversity

Study Objective Code	Objective	Consistency
WS01	Create a Parkland City urban structure and identity with South Creek as a defining spatial element through implementation of the South Creek Corridor Project and use of the following design principles: • orientate urban systems towards the creek corridor; • create a transect of creek-oriented place types and things to do; • build a network of everyday uses within a walkable creek catchment; and • provide creek connections and encourage waterfront activity.	The South Creek, Thompsons Creek and Kemps Creek riparian corridors have all been zoned 'Environment and Recreation' The application of this zoning recognises the importance of the riparian corridors and immediate surrounds in supporting the vision for the Wianamatta-South Creek Precinct to underpin a cool, green Western Parkland City. Within this zoning, key areas of native vegetation with high biodiversity value will be identified for conservation, restoration, or enhancement through additional mapping within the WSA SEPP such as the High Biodiversity Values mapping or similar. The WSA SEPP will also ensure adequate clauses are included to ensure the protection of areas of high biodiversity value in perpetuity. This will ensure the major north to south biodiversity corridors within the Precinct will not only be retained however, rehabilitated and enhanced in the future in accordance with a Riparian Management Strategy (Sydney Water, 2021). Furthermore, the Precinct Plan has created open space linkages to further promote east to west biodiversity connectivity through the retention of native vegetation and creation of local parks and recreation areas. It is understood that areas of high biodiversity value within the open space network will also be rezoned to 'Environment and Recreation' in the future.
GG01	Deliver Green Grid connections through progressively refining the detailed design and delivery of the Greater Sydney Green Grid priority corridors and projects important to the District. This includes The South Creek priority corridor and Kemps Creek Nature Reserve.	Some areas of open space, which do not currently contain remnant native vegetation will be revegetated in accordance with the Recommended Planted Species List, which has been devised by subject matter experts within local and State government to ensure there is a balance between the parkland vision and wildlife management in the Aerotropolis. Revegetation, in accordance with the Riparian Management Strategy (Sydney Water, 2021), will prioritise utilising diagnostic species found within the remnant ecological communities present within the subject site, where possible. For a list of recommended species, please refer to Appendix C.

Study Objective Code	Objective	Consistency
TC01	Increase urban tree canopy cover through expanding urban tree canopy cover in the public realm.	Some areas of open space and along the road network, which do not currently contain remnant native vegetation will be revegetated in accordance with the Recommended Planted Species List, which has been devised by subject matter experts within local and State government to ensure there is a balance between the parkland vision and wildlife management in the Aerotropolis. This will in turn, increase tree canopy cover within the public realm and urban environments. Existing native trees within the urban footprint have been considered in the Precinct Plan design and many are proposed to be retained within open space areas.
BC01	Protect and enhance bushland and biodiversity by: • supporting landscape-scale biodiversity conservation and the restoration of bushland corridors; • managing urban bushland and remnant vegetation as green infrastructure; and • managing urban development and urban bushland to reduce edge-effect impacts.	The Precinct Plan will protect large intact areas of native vegetation through the Environment and Recreation Zoning and open space network. It is understood that some areas of the Wianamatta-South Creek Precinct will also be rehabilitated, where appropriate, in the future. As depicted in Figure 5-1, open space areas have been placed along the eastern boundaries of the Badgerys Creek and Aerotropolis Core Precincts, to create a buffer between the conserved bushland within the Wianamatta-South Creek Precinct and developable areas. In turn, reducing the impacts associated with edge-effects such as introduction of exotic species, intrusion of feral animals, pollution, erosion, and habitat fragmentation.
BC02	Restore disturbed ecosystems to enhance ecological value and function through bushland regeneration, weed management and creating habitat corridors within the built form through gardens, street verges and parks.	As shown in Figure 4-2, there are currently large areas of cleared lands within the Wianamatta-South Creek Precinct. These areas have also been identified as having very low recovery potential, if left to regenerate with no interference (Figure 4-7). Therefore, large areas of this Precinct will require extensive rehabilitation and revegetation to aid in the Precinct becoming a healthy, regionally important 'ecological spine'.
BC03	Create new ecosystems where habitat linkages are needed such as Water-Sensitive Urban Design (WSUD) and green infrastructure.	The open space network will not only protect existing east to west habitat linkages within the subject site, however, will also allow for new ecosystems to be created through the revegetation of diagnostic species found within the ecological communities identified within the subject site within local parks. Street plantings will also aim to utilise endemic species, where possible.
BC04	Connect people to nature through recreation, education and bushwalking through incorporation of waling tracks, picnic areas and lookouts.	Connecting people to place will be achieved through low-impact recreational facilities within the Wianamatta-South Creek Precinct such as walking tracks and picnic areas. Furthermore, the

Study Objective Code	Objective	Consistency
		proposed open space network will create east to west linkages allowing the public to gain access to the riparian corridors.
BC05	Enhance landscape connectivity and improve species diversity and genetic health through connecting habitat, allowing the capacity of species to move between habitats to improve, whilst not conflicting with aviation safety.	The creation of the open space network will create a Green Grid within the subject site, improving landscape connectivity in the future, once open space areas are revegetated and maintained. The north to south connectivity will be both retained and enhanced, ensuring the regional importance of this biodiversity corridor is protected. It is noted that any proposed revegetation will be in accordance with the Recommended Planted Species List, which has been devised by subject matter experts within local and State government to ensure there is a balance between the parkland vision and wildlife management and aviation safety in the Aerotropolis. Future rehabilitation strategies will ensure adaptive implementation of any management regimes, ensuring 'climate ready' provenances of 'diagnostic' and priority species are considered. Where climate ready provenances are not available, revegetation strategies should aim to maximise genetic diversity to support climate change adaptation and increase the likelihood of long-term health and persistence of biodiversity.

5.3 Consistency with Statutory Framework

Table 5-2 summarises how the Precinct Plan for the subject site will be consistent with relevant legislation and policy requirements.

Table 5-2: Consistency with Strategic Assessment objectives relating to biodiversity

Study Objective Code	Requirement	Consistency
SRGC01	Protect at least 67.31 ha of ENV	Approximately 67.31 ha of vegetation in the precinct was identified in the Draft Growth Centres Conservation Plan 2007 within non-biodiversity certified lands and will therefore require protection. Most of these lands are within the Winamatta-South Creek Precinct. Assuming all ENV will be protected within areas zoned as Environment and Recreation ENV present within areas zoned Environment and Recreation, which includes the Wianamatta-South Creek Precinct, the Precinct Plan will currently protect 56.09 ha of ENV within non-biodiversity certified lands and 12.72 ha of ENV within biodiversity certified lands, totalling 68.81 ha. This will result in a surplus of 1.5 ha. The proposed open space network within the Badgerys Creek and Aerotropolis Core Precincts will also aim protect an additional 23.19 ha of ENV on currently biodiversity certified lands and 0.39 ha of ENV

Study Objective Code	Requirement	Consistency
		on currently non-biodiversity certified lands, equating to a total of 23.58 ha ENV. If these lands are required to be counted towards the overall target, future planning controls will need to ensure that appropriate land uses, or zoning are given to these areas to ensure protection in-perpetuity. It is recommended that the open space network, in particular where ENV is present and proposed to be retained, is zoned Environment and Recreation, and specific clauses relating to ENV, similar to Clause 27(7) detailed within the WSA SEPP, apply. However, the wording of clause 27 is different to the ENV protection clauses in the Sydney Region Growth Centres SEPP. Consideration should be given to achieving greater consistency between ENV clauses between the two SEPPs. Furthermore, the WSA SEPP does not include a clause prohibiting the clearing of protected native vegetation by public authorities during the undertaking of activities not requiring consent (similar to Clause 18A of the Sydney Region Growth Centres SEPP). Consideration should also be given to ensure impacts to ENV for infrastructure works are undertaken in consultation with DPIE and offset in accordance with *Relative Biodiversity Measure (RBM) 8 of the Order to Confer Biodiversity Certification on the State Environmental planning Policy (Sydney Region Growth Centres) 2006.* The above would provide a surplus of ENV of 25.08 ha within the subject site.
BC06	Ensure ecological function of the landscape is maintained to provide benefits to the natural and human environment. Conserve and manage the remaining native vegetation and contribute to the increase of habitat and tree canopy cover within the Aerotropolis. Ensure that native vegetation contributes to the character and amenity of Aerotropolis.	There is currently approximately 336.45 ha of native vegetation present within the subject site. The Precinct Plan has been devised to ensure remnant native vegetation is retained, where possible within the open space network and the Wianamatta-South Creek corridor. This has resulted in the retention of 217.93 ha of native vegetation, equating to 64.77% of the currently existing amount. Furthermore, revegetation within the open space network, private lands, and street network, with a prioritisation of endemic species from remnant ecological community, will further increase habitat and tree canopy cover within the Precinct. This will allow for the vision of the Parkland City to be implemented and uphold.

5.4 Native Vegetation Rehabilitation

A Riparian Revegetation Strategy is being prepared by Sydney Water in collaboration with DPIE. The below should be read in conjunction with this Strategy.

5.4.1 Wianamatta-South Creek Precinct

Wianamatta–South Creek is the longest freshwater stream in Greater Sydney and a defining element of the Western Parkland City and the Aerotropolis. Its catchment includes most of Western Sydney's Cumberland Plain. As the Aerotropolis transforms, the catchment will be renewed and improved using a risk-based approach to manage the cumulative effects of development on the health of catchments, as defined the Western City District Plan.

Cumberland Plain Woodland, River-Flat Eucalypt Forest and Castlereagh Shale-Gravel Transition Forest were identified within the subject site through desktop assessment and field survey. These native vegetation communities were present in a variety of conditions and therefore vary in their recovery potential. Overall, however, a significant proportion of the precinct was identified as having high or moderate recovery potential.

The portion within the Growth Centres of the Wianamatta–South Creek Precinct is approximately 322.60 ha in size and will require active management across the whole area to restore the Precinct into a healthy, resilient ecological spine of the Aerotropolis.

The rehabilitation works for this Precinct should be focused on weed control, assisted regeneration and revegetation. Based on the recovery potential and existing native vegetation within this precinct, this study has separated the Precinct into 3 management zones, each with differing objectives and management strategies (Table 5-3).

Table 5-3: Proposed management objectives and priorities for the Wianamatta-South Creek Precinct

Management Zone	Objectives and Priorities
One: Weed Control and Rehabilitation	Management Zone One consists of native vegetation communities with high recovery potentially, which contain diagnostic species in most strata. This Zone will have the capability to regenerate with proper weed management. The main priorities recommended are: • Target removal of priority and environmental weeds. • Control of exotic grasses and other exotic species. • Monitor native vegetation and weed densities.
Two: Weed Control and Minor Revegetation	Management Zone Two consists of native vegetation communities with moderate recovery potentially, which contain diagnostic species in the canopy and mid-storey strata. The groundcover is generally characterised by exotic grasses and/or environmental weeds, which may require minor revegetation works to 'fill in gaps'. The main priorities recommended are: • Target removal of priority and environmental weeds. • Control of exotic grasses and other exotic species. • Minor revegetation works, including groundcover species. • Monitor native vegetation and weed densities.
Three: Weed Control and Revegetation	Management Zone Three consists of exotic vegetation or degraded native vegetation with very low recovery potential. This Zone will require extensive revegetation to rehabilitate back to the ecological communities that were once present. The main priorities recommended are: • Target removal of priority and environmental weeds • Control of exotic grasses and other exotic species • Tubestock planting following weed control in all areas of low resilience • Monitor native vegetation and weed densities.

5.4.2 Rehabilitation and Revegetation Constraints

5.4.2.1 Wildlife Strike Risks

Revegetation and rehabilitation of conservation areas will be required to consider the Wildlife Management Assessment Report (Avisure, 2020) to ensure the risk of wildlife strike from operating aircraft at Western Sydney International (Nancy-Bird Walton) Airport is mitigated, once the airport is operational. A summary of some of the landscaping recommendations are provided below. Some of the recommendations are inconsistent with bush regeneration principles which seek to restore bush using endemic species. Once precinct plans are finalised, site specific Vegetation Management Plans are

recommended to identify planting lists and densities that restore natural bushland as much as possible, whilst not increasing aviation risk.

- *Select landscape plants that minimise the attraction of birds and flying foxes.*
- *Do not plant trees and shrubs which bear edible berries, fruits, seeds or nuts, or flower profusely.*
- *Avoid species from the Proteaceae family. Commonly used landscaping species include, Banksia spp., Grevillea spp., Hakea spp. The nectar produced by these species can attract flying-foxes and various nectar feeding (nectivorous) birds such as lorikeets.*
- *Avoid species from the Myrtaceae family. Commonly used landscaping species include Callistemon spp., Corymbia, Eucalyptus spp., Lophostemon spp., Melaleuca spp., Syzygium spp., Xanthostemon spp. Many species in this family produce large volumes of nectar that can be highly attractive to flying foxes and various nectivorous birds. Studies at other airports have shown significant response to flowering Melaleuca by flying foxes that have created severe strike risks.*
- *Avoid species from the Moraceae family. Commonly used landscaping species include Ficus spp (Figs) due to their decorative and aesthetic appeal. Fig fruits are highly attractive to flying fox and other fruit eating (frugivorous) birds.*
- *Avoid palm species. These extend across a range of families and should only be used when a strict documented regime of regular fruit/flower cluster removal occurs.*
- *Avoid clumps of trees and shrubs because they provide more shelter and more concentrated feeding areas than individual or small groups of plants.*
- *Apply the following conditions when planting trees along access and other roads to the airport:*
  - *Maximum mature height of any tree: 10m.*
  - *No more than 5 trees planted in any one group.*
  - *Average interval between tree groups not less than 200m.*
  - *Minimum interval between tree groups is 100m.*
  - *Single trees are planted >50m to any other single tree or tree groups.*
  - *Trees constitute no more than 5% of total tree/shrub plantings.*
- *Apply the following conditions to shrub plantings:*
  - *Shrubs do not exceed 5m mature height.*
  - *Shrubs which produce nectar, fruits or seed (e.g. Banksia, Grevillea, Hakea) are not planted in groups of more than 5 per group and such groups are not be planted <50m to specimens of the same species or groups of any species which may similarly attract birds or flying-fox at the same time of the year.*
- *Use low prostrate ground cover plants, avoiding profusely fruiting or seeding species. Use ground cover species rather than grasses to reduce the wildlife attraction and minimise ongoing maintenance costs.*
- *Avoid grasses that produce a lot of seed for rough grass or soil stabilisation*.

A recommended species list, based on the existing vegetation communities within the subject site and recommendations within the Wildlife Management Assessment Report (Avisure, 2019) is provided in Appendix C.

5.4.2.2 Climate Change

Climate change may become a significant threat to biodiversity in the near future and impact on the success of future rehabilitation and revegetation strategies for the Precinct through the following means (DECCW, 2010):

- A reduction in the geographic range of certain species.
- Changes in population dynamics and survival.
- Increased opportunity for range expansion of invasive species.
- Increased likelihood of extreme weather events and fire.

As part of the draft CPCP, Macquarie University undertook a quantitative evaluation that modelled how climate change will affect the suitability of habitat for numerous Cumberland subregion species (Biosis, 2020). Although there still remains a high level of uncertainty on how climate change will impact on specific biodiversity values, the evaluation concluded that it would have a significant impact on the availability of suitable habitat within the Cumberland subregion for the vast majority of species assessed.

To facilitate adaptation of biodiversity to climate change, the study recommended four main principles to implement (Biosis, 2020). Such principles are outlined in Table 5-4, as well as how the Precinct Plan will ensure consistency.

Table 5-4: Principles for managing biodiversity under climate change (Biosis, 2020)

Principles (Biosis, 2020)	Consistency
Protect the largest and most viable patches	The size of a patch of native vegetation is known to positively correlate with many ecological functions such as species richness, genetic diversity and adaptation or natural disturbance. Therefore, ensuring protection of large, good condition native vegetation will aid in managing biodiversity under climate change. The Precinct Plan will ensure that large intact areas of native vegetation within the Wianamatta-South Creek corridor will be protected in the future, with opportunities to further enhance such patches through revegetation.
Maintain and improve habitat connectivity	Ensuring habitat connectivity will aid in species dispersal which in turn, will aid in adaptation to differing climate change scenarios. The Precinct Plan will ensure habitat connectivity is maintained within the Wianamatta-South Creek corridor, with opportunities to further enhance such patches through revegetation. Furthermore, the creation of the open space network will also create east to west habitat corridors allowing for further habitat connectivity beyond the Precinct boundary.
Reduce the impacts of other threats	Reducing key existing threats will also aid in facilitating adaptation to climate change through enhancing resilience. This can be done through managing connectivity of fragmented ecosystems, effective invasive species management and appropriate controls of disturbance regimes. It is envisaged that appropriate management regimes over the Wianamatta-South Creek Precinct will be implemented in the future. Not only will this include rehabilitation works and revegetation, however, also include appropriate weed and potentially pest management.
Manage uncertainty through adaptive management.	Future rehabilitation strategies for the Wianamatta-South Creek Precinct will ensure adaptive implementation of any management regimes. When choosing appropriate species for revegetation within the Precinct, revegetation plans should consider incorporating 'climate ready'

Principles (Biosis, 2020)	Consistency
	provenances of 'diagnostic' and priority species, where available and appropriate. Where climate ready provenances are not available, revegetation strategies should aim to maximise genetic diversity to support climate change adaptation and increase the likelihood of long-term health and persistence of biodiversity.

6. Conclusion

The aim of this study is to identify key ecological constraints to assist design of a Precinct Plan. The subject site was found to contain several significant environmental features, including three TECs in differing conditions and suitable habitat for numerous threatened flora and fauna species.

To maintain parity with the Biodiversity Certification Order, approximately 67.31 ha of ENV in the subject site will require protection. Most of these lands are within the Winamatta-South Creek Precinct. Desktop assessment and field survey validated 58.58 ha of previously identified ENV within non-biodiversity certified lands, resulting in a shortfall of 8.73 ha of ENV.

This study has assumed that all ENV present within areas zoned Environment and Recreation, which includes the Wianamatta-South Creek Precinct, will be retained and rehabilitated where necessary. The Environment and Recreation zoning will therefore protect 56.09 ha of ENV within non-biodiversity certified lands and 12.72 ha of ENV within biodiversity certified lands, totalling 68.81 ha. This will result in a surplus of 1.5 ha.

The biodiversity protection areas in the proposed open space network of the Badgerys Creek and Aerotropolis Core Precincts will also aim protect an additional 23.19 ha of ENV on currently biodiversity certified lands and 0.39 ha of ENV on currently non-biodiversity certified lands, equating to a total of 23.58 ha ENV. To ensure the protection of this vegetation in-perpetuity, biodiversity protection areas within the open space network are required to be zoned Environment and Recreation and/or specific development controls relating to ENV will be required to be included within the WSA SEPP.

The above will provide a surplus of 25.08 ha of ENV within the subject site.

Overall, the Precinct Plan has succeeded in incorporating the majority of the subject site's biodiversity values with the planning and will enable the regionally important north to south biodiversity corridors to be retained and rehabilitated in the future as well as create east to west habitat linkages that will become essential in the future, once revegetated.

Appendix A Methodology

A1 Site Access

Table 6-1 and Figure 6-1 below outline which lands within the subject site were accessible during field survey.

Table 6-1: Sites accessed during field survey

Lot	DP
6	DP 1217247
14	DP 1217247
3	DP 1218381
4	DP 235917
5	DP 243539
3	DP 243539
9	DP 249262
2	DP 249262
4	DP 250684
1016	DP 258344
6	DP 2650
5	DP 2650
39	DP 2650
6	DP 3050
16	DP 3050
2	DP 567978
1	DP 567978
103	DP 572133
522	DP 785782
81	DP 864799

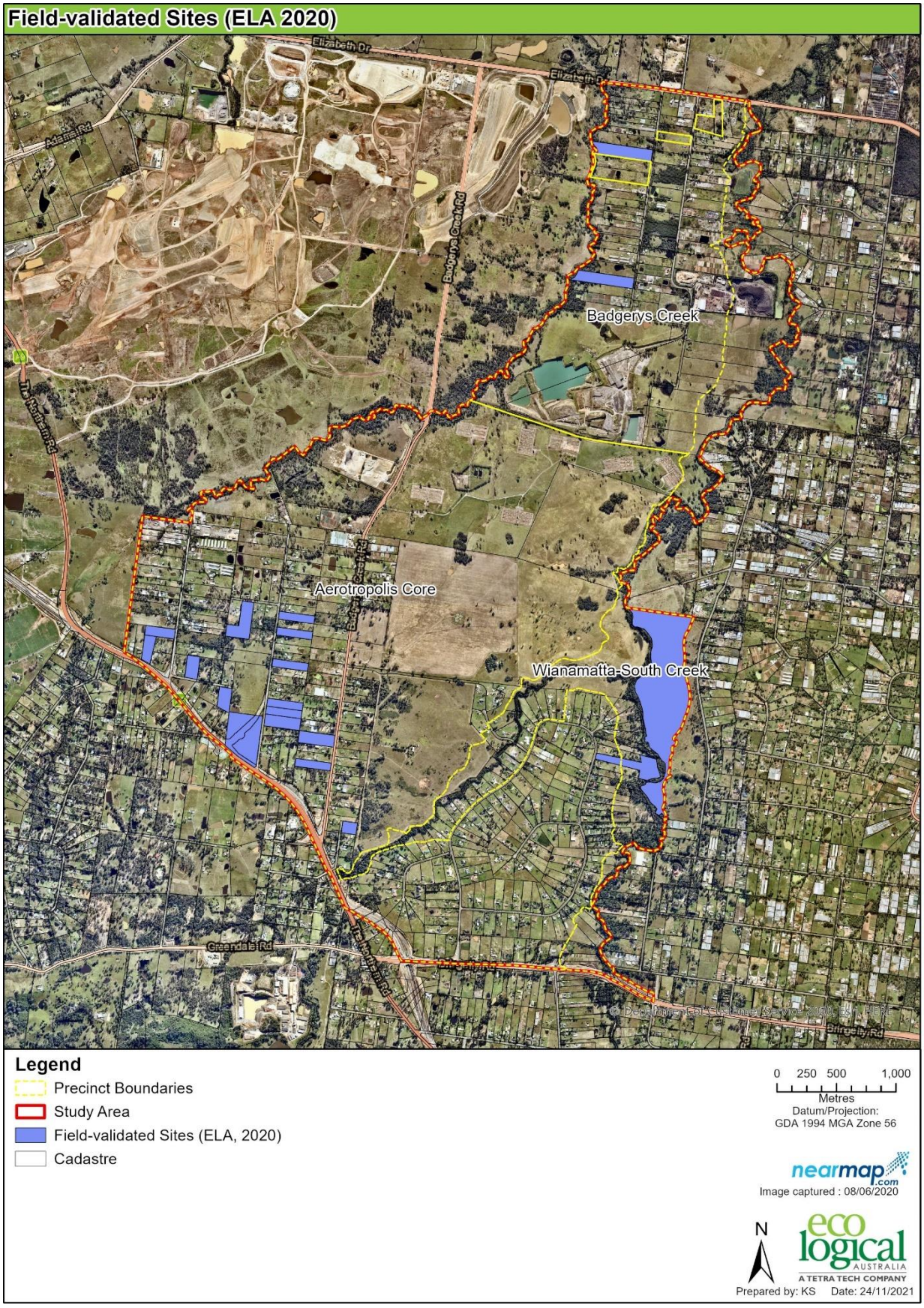

Figure 6-1: Sites accessed during field survey

A2 Field Survey Methodology

Field survey was conducted by ELA ecologists Alex Gorey, Carolina Mora, Stacey Wilson, Belinda Failes and Mike Lawrie. The survey area was traversed using the random meander method (Cropper 2003) and focused on the following:

- Classification of vegetation not previously mapped as ENV
- Identification of additional high conservation value vegetation (AHCVV)
- Identification of condition of native vegetation
- An assessment of habitat significance for threatened flora and fauna species
- Targeted flora surveys within the Wianamatta-South Creek Precinct
- Hollow bearing tree (HBT) identification
- Incidental sightings of flora and fauna.

When vegetation community boundaries differed to those previously mapped or were not previously mapped, they were documented using digital maps. Floristic summaries were composed for areas of vegetation not previously mapped to determine the type of native vegetation community (where applicable) and to assess the condition of the vegetation. Occurrences of Cumberland Plain Woodland were assessed against the EPBC Act listing advice.

A total of 20 full-floristic vegetation plots and vegetation integrity plots were undertaken throughout the subject site in accordance with the Biodiversity Assessment Method (BAM). Full-floristic vegetation plots were used to identify PCTs and threatened ecological communities, vegetation integrity plots were undertaken to assess the composition, structure and function components of each vegetation condition. Plot data is presented in Appendix D.

The presence of threatened fauna species identified as having potential to occur in the survey area was determined through a habitat assessment. Where important habitat features, such as hollow bearing trees, rocky outcrops, deep leaf litter, waterways or abandoned buildings were observed, their location was noted. Hollow bearing trees, where present, were marked spatially using a handheld GPS unit.

Targeted flora surveys were undertaken within the Wianamatta-South Creek Precinct, where Condition 12 of the Biodiversity Certification Order applies, for the following species:

- *Acacia pubescens* (Downy Wattle)
- *Grevillea parviflora* subsp. *parviflora* (Small-flower Grevillea)
- *Persoonia nutans* (Nodding Geebung).

Targeted survey was undertaken in accordance with *NSW Guide to Surveying Threatened Plants* (DPIE 2020) and within the seasonal requirements outlined in the BAM Calculator and Threatened Biodiversity Data Collection. Targeted flora surveys involved parallel field traverses with a separation width of approximately 10 m within areas of open vegetation and 5 m in areas of dense vegetation.

A3 Recovery potential

Using information collected in the field 'recovery potential' is determined for each area of vegetation. This is defined as "the anticipated capacity of (an) area to recover to a state representative of its

condition prior to the most recent disturbance event" (IPC & AES 2002). Table 6-2 outlines the decision rules used in this step, resulting in a ranking of High, Moderate, Low or Very Low recovery potential for each vegetation remnant.

Table 6-2: Recovery potential matrix (ELA 2003)

Current condition and land use	Past land use and disturbance	Soil Condition	Vegetation	Recovery Potential
Cleared (no woodland canopy). Includes *Bursaria* thickets in grassland	Recently cleared (<2 years)	Unmodified or largely natural. Uncultivated.	Native dominated	High
			Exotic dominated	Moderate
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Either	Low
	Historically cleared (>2 years) and consistently managed as cleared.	Unmodified or largely natural. Uncultivated.	Native dominated	Moderate
			Exotic dominated	Low
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Either	Very Low
Wooded/Native Canopy present or regenerating	No recent clearing of understorey	Unmodified or largely natural. Uncultivated.	Native understorey relatively intact or in advanced state of regeneration. Native dominated.	High
			Native understorey significantly structurally modified, absent or largely absent. Includes areas dominated by African Olive.	Moderate
			Exotic dominated	Low
		Moderately modified by long term grazing or mowing.	Native dominated	Low
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Native understorey significantly structurally modified, absent or largely absent. Includes areas dominated by African Olive.	Very Low
			Native understorey present. Heavily weed invaded.	Low
	Understorey patchily intact	Disturbed	Native dominated	Moderate
			Exotic dominated	Low

Current condition and land use	Past land use and disturbance	Soil Condition	Vegetation	Recovery Potential
	Recent clearing of understorey and or native understorey significantly structurally modified due to existing land use (e.g. Mowing, grazing).	Unmodified or largely natural. Uncultivated.	Native dominated. If no vegetation present, assume native dominated.	High
			Exotic dominated	Moderate
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Native dominated	Low
			Exotic dominated	Very Low

A4 Ecological constraints

An ecological constraints analysis based on a methodology previously used by ELA in the Sydney Region Growth Centres was applied across the survey area. An ecological constraints analysis is a stepped analysis of the environmental values of an area. It provides a combined measure of ecological values and is increasingly used as a basis for negotiations over locations, types and densities of land development. It includes measurement of:

- The legislative status of vegetation communities;
- the structural condition of vegetation remnants;
- type and severity of disturbance and associated recovery potential;
- connectivity between remnants on and off site;
- the size of the vegetation remnant; and
- the value of the remnant as threatened species habitat.

The steps involved in this type of ecological constraints analysis are illustrated in Appendix A. Vegetation mapping is combined with field survey work, threatened species assessment, recovery potential and the NPWS (2002) conservation significance assessment methodology to determine the relative level of ecological value or constraint across a site.

Information derived from the recovery potential, conservation significance and threatened species calculations are combined to determine ecological constraint. The process for combining this information is detailed on Table 6-7, Table 6-8 and Table 6-9.

A5 Survey Limitations

This assessment was not intended to provide an inventory of all species present across the survey area but instead an overall assessment of its ecological values. The survey was conducted with an emphasis on threatened species, threatened ecological communities and key fauna habitat features. It is important to note that some species may not have been detected within the survey area during the inspection as they may be cryptic or seasonal and only detectable during flowering or during breeding. In this case the likelihood of their occurrence has been assessed based on the presence of potential habitat.

The field survey was undertaken using hand-held GPS units. It should be noted that these units can have errors in accuracy of up to 20 m (subject to availability of satellites on the day).

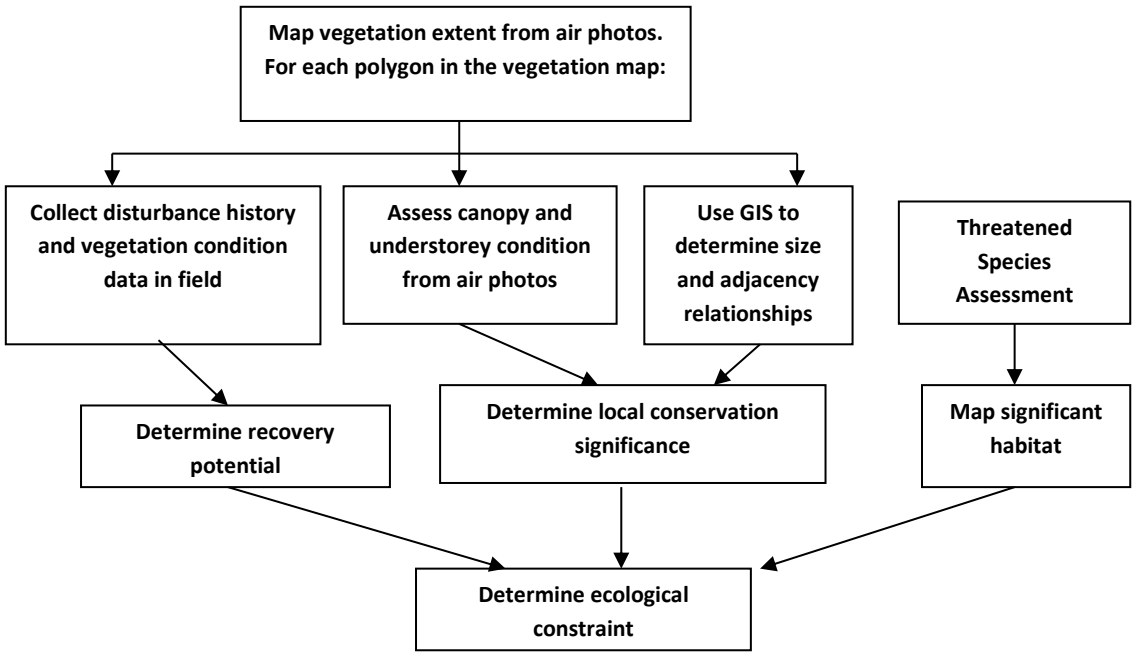

Figure 6-2: Ecological Constraints Flowchart

Table 6-3: Conservation significance matrix (NSW NPWS, 2002)

Community type	Condition code	Patch size^	Connectivity	Code	Conservation significance
Endangered Ecological Community (Critically endangered) (CEEC)	ABC, TX or Txr	Any	Any	C3	Core
	Txu	Any	Any	URT	Urban remnant trees (critically endangered communities)
Endangered Ecological Community (EEC)	ABC (with Understorey in good or moderate condition)	> 10 ha	Any	C1	Core
		< 10 ha	Adjacent to C1 or CEEC	C2	Core
			Adjacent to S1	S2	Support for core
			None	O	Other remnant vegetation
	TX or Txr, ABC (with poor Understorey condition)	Any	Adjacent to any Core	S1	Support for core
			None	O	Other remnant vegetation
	Txu	Any	Any	O	Other remnant vegetation

^ Patch size is based on a 15m adjacency analysis

A = Dominant canopy species, understorey characteristics, disturbance and reliability all coded.

B = Tree cover species only with some overstorey and/or understorey integrity. Dominant canopy species and reliability coded. May have understorey code.

C = As for A or B except the dominant canopy species are non-eucalypts

Tx = Tree cover only with agriculture but no major urban or suburban development. Most have dominant canopy species coded.

Txr = Tree cover with rural residential development. Most have dominant canopy species coded.

Txu = Tree cover only with urban development. Most have dominant canopy species coded.

Table 6-4: Decision matrix step one

Recovery Potential					
Conservation Significance		High	Moderate	Low	Very Low
	Core	High	High	High	High
	Support for core	High	Moderate	Moderate	Low
	Other	Moderate	Moderate	Low	Low

Table 6-5: Decision matrix step two

Combined Recovery Potential and Conservation Significance (result of Table above)				
Threatened Species Assessment		High	Moderate	Low
	Known (High)	High	High	High
	Likely (Moderate)	High	Moderate	Moderate
	Nil (Low)	High	Moderate	Low

Table 6-6: Recovery potential matrix (Eco Logical Australia, 2003)

Current condition and land use	Past land use and disturbance	Soil Condition	Vegetation	Recovery Potential
Cleared (no woodland canopy). Includes *Bursaria* thickets in grassland	Recently cleared (<2 years)	Unmodified or largely natural. Uncultivated.	Native dominated	High
			Exotic dominated	Moderate
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Either	Low
	Historically cleared (>2 years) and consistently managed as cleared.	Unmodified or largely natural. Uncultivated.	Native dominated	Moderate
			Exotic dominated	Low
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Either	Very Low
Wooded/Native Canopy present or regenerating	No recent clearing of understorey	Unmodified or largely natural. Uncultivated.	Native understorey relatively intact or in advanced state of regeneration. Native dominated.	High
			Native understorey significantly structurally modified, absent or largely absent. Includes areas dominated by African Olive.	Moderate
			Exotic dominated	Low
		Moderately modified by long term grazing or mowing.	Native dominated	Low
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Native understorey significantly structurally modified, absent or largely absent. Includes areas dominated by African Olive.	Very Low
			Native understorey present. Heavily weed invaded.	Low
	Understorey patchily intact	Disturbed	Native dominated	Moderate
			Exotic dominated	Low

Current condition and land use	Past land use and disturbance	Soil Condition	Vegetation	Recovery Potential
	Recent clearing of understorey and or native understorey significantly structurally modified due to existing land use (e.g. Mowing, grazing).	Unmodified or largely natural. Uncultivated.	Native dominated. If no vegetation present, assume native dominated.	High
			Exotic dominated	Moderate
		Modified. Heavily cultivated and/or pasture improved. Imported material.	Native dominated	Low
			Exotic dominated	Very Low

Table 6-7: Conservation significance matrix (NSW NPWS, 2002)

Community type	Condition code	Patch size^	Connectivity	Code	Conservation significance
Endangered Ecological Community (Critically endangered) (CEEC)	ABC, TX or Txr	Any	Any	C3	Core
	Txu	Any	Any	URT	Urban remnant trees (critically endangered communities)
Endangered Ecological Community (EEC)	ABC (with Understorey in good or moderate condition)	> 10 ha	Any	C1	Core
		< 10 ha	Adjacent to C1 or CEEC	C2	Core
			Adjacent to S1	S2	Support for core
			None	O	Other remnant vegetation
	TX or Txr, ABC (with poor Understorey condition)	Any	Adjacent to any Core	S1	Support for core
			None	O	Other remnant vegetation
	Txu	Any	Any	O	Other remnant vegetation

^ Patch size is based on a 15m adjacency analysis

Table 6-8: Decision matrix step one

Recovery Potential					
Conservation Significance		High	Moderate	Low	Very Low
	Core	High	High	High	High
	Support for core	High	Moderate	Moderate	Low
	Other	Moderate	Moderate	Low	Low

Table 6-9: Decision matrix step two

Combined Recovery Potential and Conservation Significance (result of Table above)				
Threatened Species Assessment		High	Moderate	Low
	Known (High)	High	High	High
	Likely (Moderate)	High	Moderate	Moderate
	Nil (Low)	High	Moderate	Low

Appendix B Detailed Figures

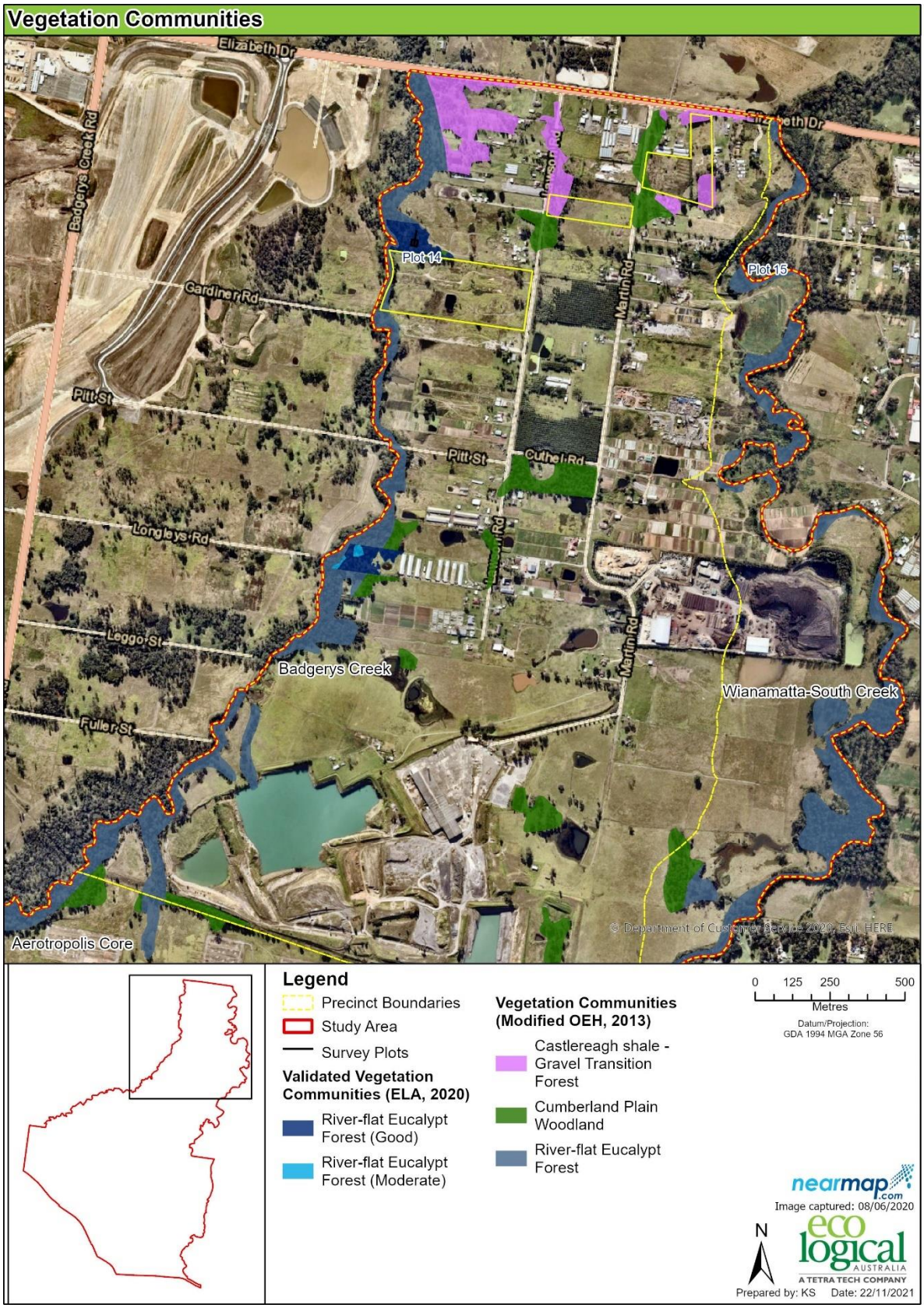

Figure 6-3: Detailed vegetation communities within the study area – Map Series One of Five

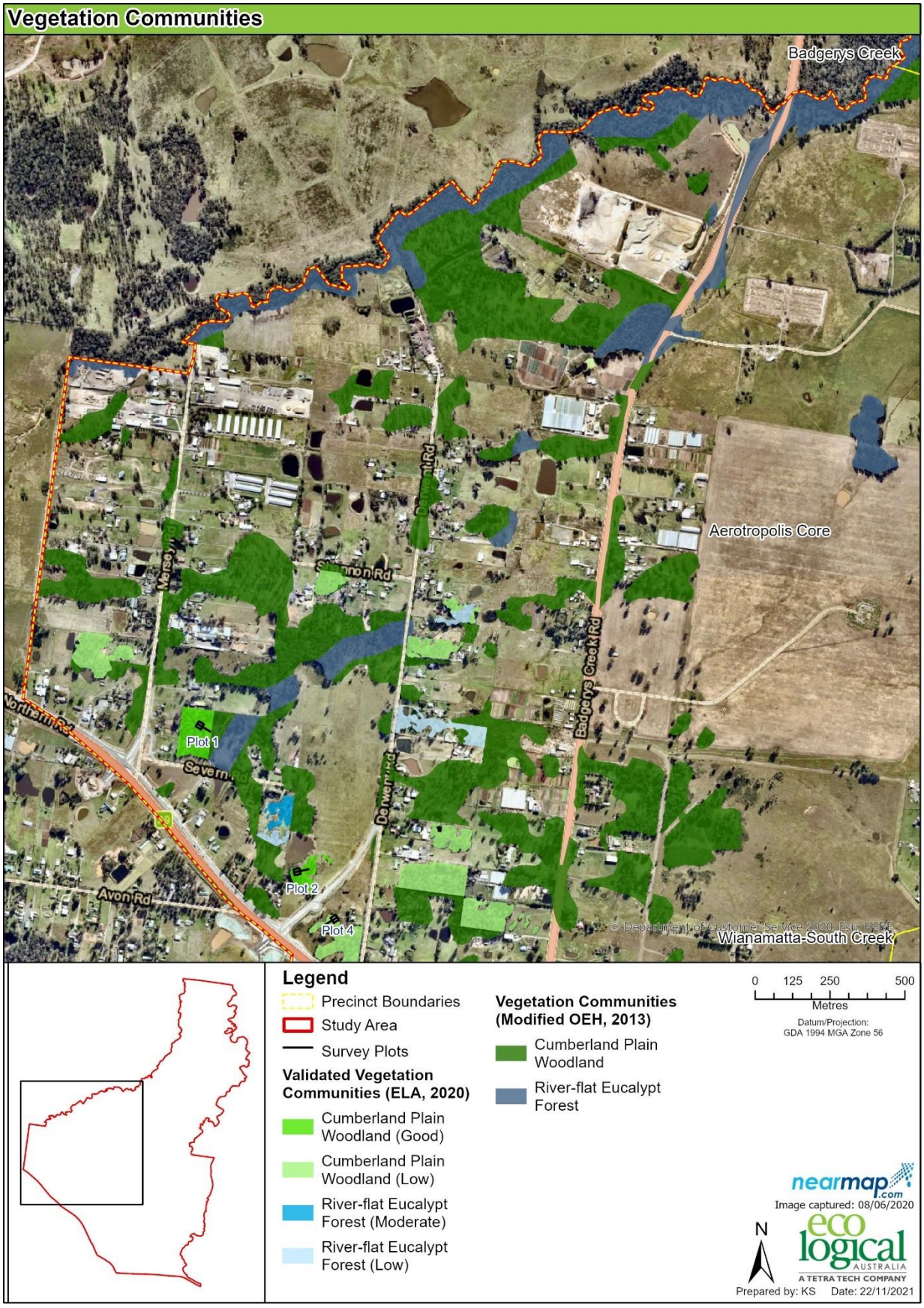

Figure 6-4: Detailed vegetation communities within the study area– Map Series Two of Five

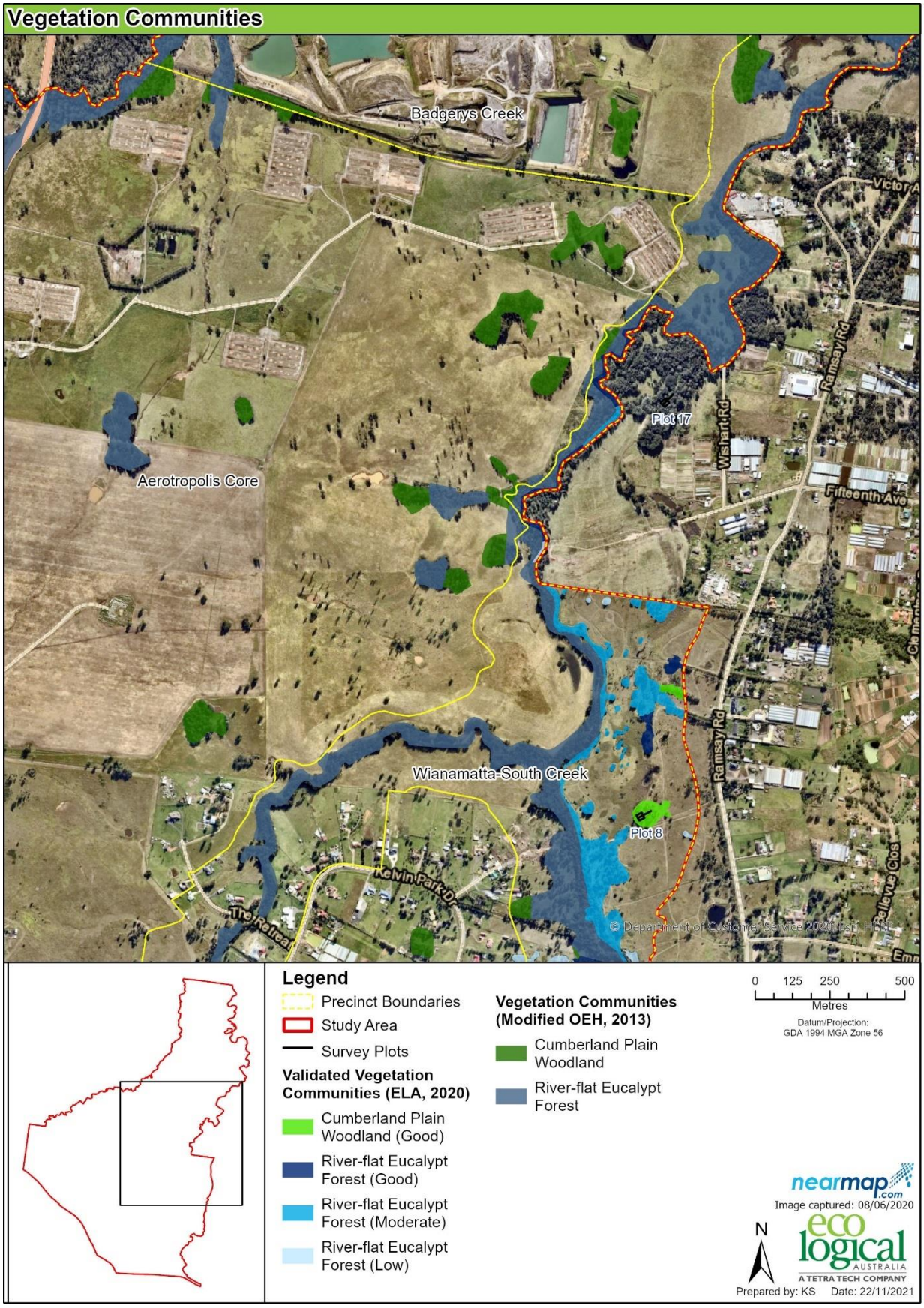

Figure 6-5: Detailed vegetation communities within the study area– Map Series Three of Five

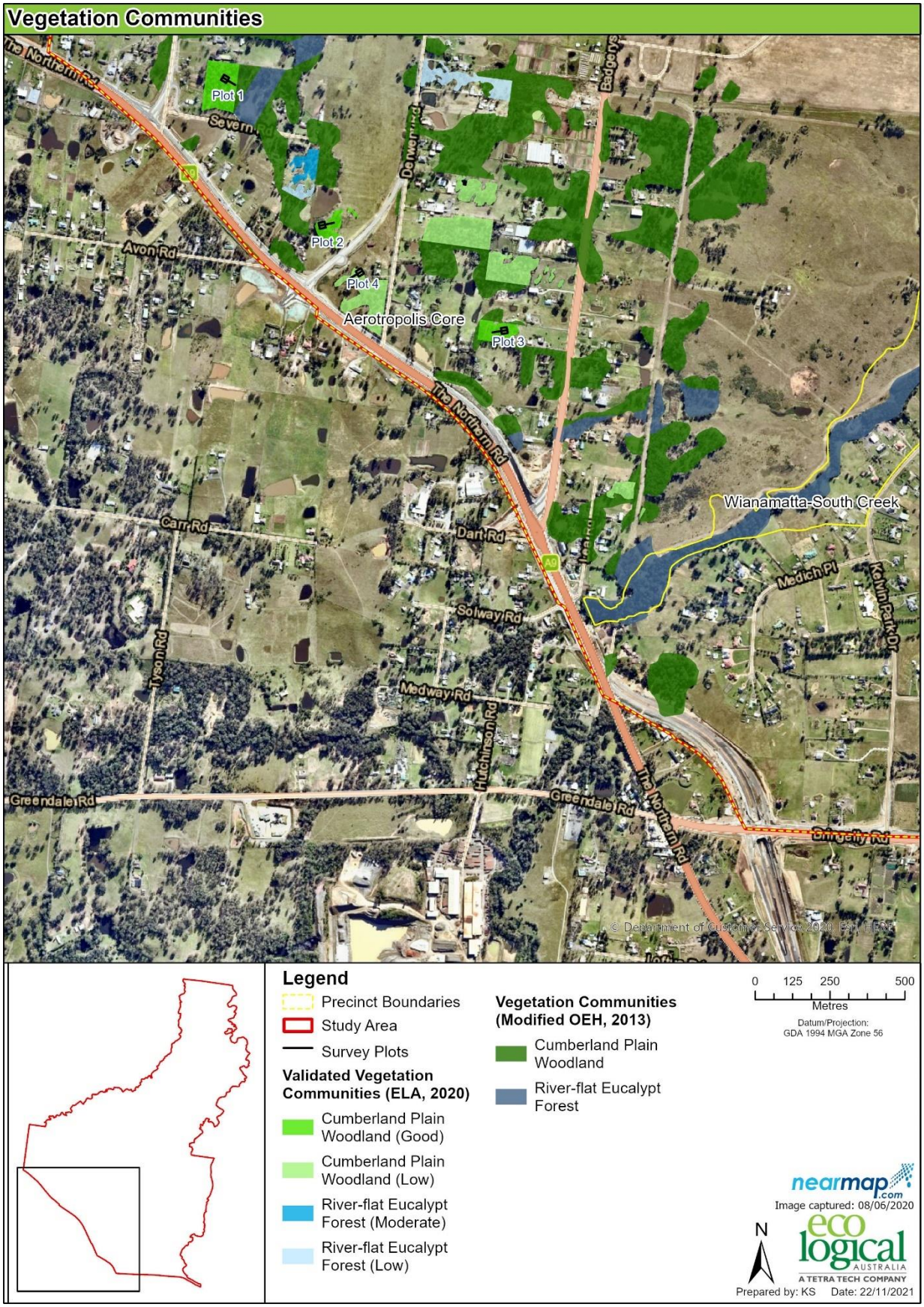

Figure 6-6: Detailed vegetation communities within the study area– Map Series Four of Five

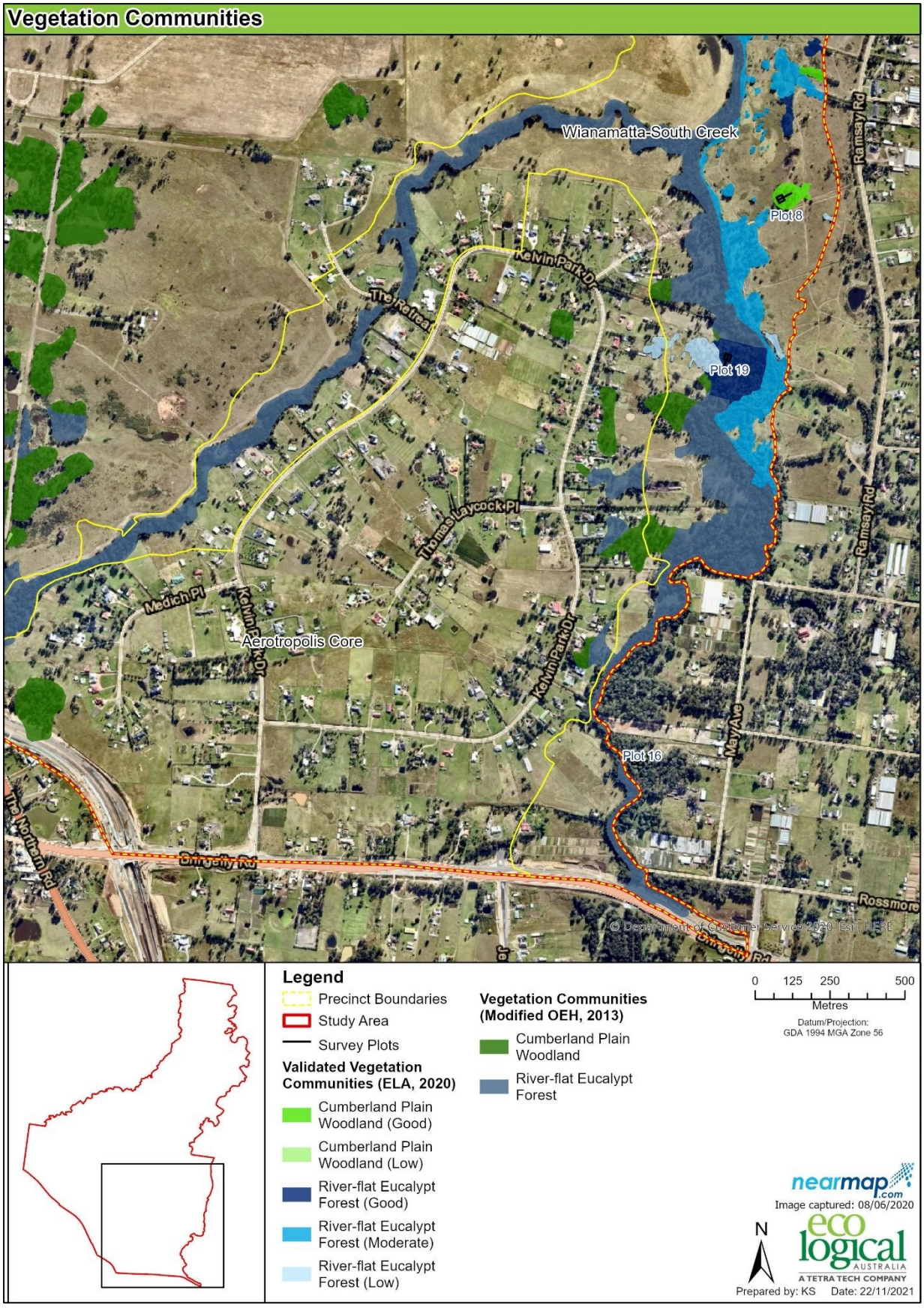

Figure 6-7: Detailed vegetation communities within the study area– Map Series Five of Five

Appendix C Recommended Species List

Life Form	Scientific Name	Common Name	Vegetation Community			Concurrence with Proposed Landscape Species List
			Cumberland Plain Woodland	River-flat Eucalypt Forest	Shale-Gravel Transition Forest	
Tree/Canopy Species	*Angophora floribunda*	Rough-barked Apple		X		Only where merit-based assessment demonstrates it is suitable.
	Angophora subvelutina	Broad-leaved Apple		X		Only where merit-based assessment demonstrates it is suitable.
	Casuarina cunninghamiana subsp. cunninghamiana	River Oak		X		Yes
	Casuarina glauca	Swamp Oak		X		Yes
	Eucalyptus amplifolia	Cabbage Gum	X	X		Only where merit-based assessment demonstrates it is suitable.
	Eucalyptus crebra	Narrow-leaved Ironbark	X			Only where merit-based assessment demonstrates it is suitable.
	Eucalyptus eugenioides	Thin-leaved Stringybark	X			Only where merit-based assessment demonstrates it is suitable.
	Eucalyptus fibrosa	Broad-leaved Red Ironbark			X	Not specified.
	Eucalyptus moluccana	Grey Box	X	X		Only where merit-based assessment demonstrates it is suitable.
	Eucalyptus parramattensis subsp. parramattensis	-				Not specified.
	Eucalyptus tereticornis	Forest Red Gum	X	X		Only where merit-based assessment demonstrates it is suitable.
Shrub Species	*Acacia decurrens*	Sydney Green Wattle	X			Yes
	Acacia falcata	-	X			Not specified.
	Acacia floribunda	White Sally		X		Not specified.
	Acacia implexa	Hickory Wattle	X			Only where merit-based assessment demonstrates it is suitable.
	Acacia longifolia	Sydney Golden Wattle				Not specified.
	Acacia parramattensis	Parramatta Wattle	X	X		Yes
	Breynia oblongifolia	Coffee Bush		X		Yes
	Bursaria spinosa	Blackthorn	X	X	X	Yes
	Daviesia ulicifolia	Gorse Bitter Pea	X		X	Yes
	Dillwynia sieberi	-	X			Not specified.
	Dodonaea viscosa subsp. *cuneata*	Wedge-leaf Hop-bush	X			Yes
	Exocarpos cupressiformis	Native Cherry	X			Not specified.
	Indigofera australis	Australian Indigo	X			Yes
	Lissanthe strigosa	Peach Heath			X	Not specified.

Life Form	Scientific Name	Common Name	Vegetation Community			Concurrence with Proposed Landscape Species List
			Cumberland Plain Woodland	River-flat Eucalypt Forest	Shale-Gravel Transition Forest	
	Melaleuca decora	-		X	X	Only where merit-based assessment demonstrates it is suitable.
	Melaleuca linariifolia	Narrow-leaved Paperbark				Not specified.
	Melaleuca nodosa	Prickly-leaved Paperbark				Not specified.
	Melaleuca styphelioides	Prickly-leaved Tea Tree		X		Only where merit-based assessment demonstrates it is suitable.
	Ozothamnus diosmifolius	Rice Flower		X		Not specified.
	Pultenaea villosa	Hairy Bush-pea				Not specified.
	Trema aspera	Native Peach		X		Not specified.
Sedges, Rushes, Reeds and Grasses	*Agrostis avenacea*	Blown Grass				Not specified.
	Aristida ramosa	Purple Wiregrass	X			Yes (subject to monitoring and/or maintenance plan).
	Aristida vagans	Threeawn Speargrass	X		X	Not specified.
	Bothriochloa macra	Red Grass	X			Yes (subject to monitoring and/or maintenance plan).
	Carex appressa	Tall Sedge		X		Yes (subject to monitoring and/or maintenance plan).
	Carex inversa	-	X			Not specified.
	Chloris truncata	Windmill Grass	X			Yes (subject to monitoring and/or maintenance plan).
	Cyperus gracilis	Slender Flat-sedge		X		Not specified.
	Dichelachne micrantha	Shorthair Plumegrass	X	X	X	Yes (subject to monitoring and/or maintenance plan).
	Echinopogon caespitosus var. caespitosus	Tufted Hedgehog Grass	X	X		Not specified.
	Echinopogon ovatus	Forest Hedgehog Grass	X	X		Yes
	Eleocharis sphacelata	Tall Spike-rush		X		Not specified.
	Entolasia marginata	Bordered Panic	X	X		Yes
	Entolasia stricta	Wiry Panic		X		Yes
	Eragrostis brownii	Brown's Lovegrass				Not specified.
	Fimbristylis dichotoma	Common Fringe-sedge	X			Not specified.
	Gahnia clarkei	Tall Saw-sedge		X		Not specified.
	Hypoxis hygrometrica	Golden Weather-grass				Not specified.
	Imperata cylindrica var. major	Blady Grass	X	X		Yes (subject to monitoring and/or maintenance plan).
	Isolepis inundata	Swamp Club-sedge		X		Not specified.
	Juncus kraussii subsp. australiensis	Sea Rush		X		Not specified.
	Juncus usitatus	Common Rush	X	X		Yes (subject to monitoring and/or maintenance plan).
	Lepidosperma laterale	Variable Swordsedge			X	Not specified.
	Lomandra filiformis	-	X	X	X	Yes (subject to monitoring and/or maintenance plan).
	Lomandra longifolia	Spiny-head Mat-rush		X		Yes (subject to monitoring and/or maintenance plan).
	Lomandra multiflora subsp. multiflora	-	X	X	X	Yes

Life Form	Scientific Name	Common Name	Vegetation Community			Concurrence with Proposed Landscape Species List
			Cumberland Plain Woodland	River-flat Eucalypt Forest	Shale-Gravel Transition Forest	
	Microlaena stipoides var. stipoides	Weeping Meadow Grass	X	X	X	Yes (subject to monitoring and/or maintenance plan).
	Opercularia diphylla	-			X	Not specified.
	Oplismenus imbecillis	Basket Grass		X		Not specified.
	Panicum simile	Two Colour Panic			X	Not specified.
	Paspalidium distans	-	X	X		Not specified.
	Poa labillardieri	Tussock Grass	X			Yes (subject to monitoring and/or maintenance plan).
	Rytidosperma caespitosum	Whitetop	X			Not specified.
	Rytidosperma racemosa var. *racemosum*	Wallaby Grass	X			Not specified.
	Rytidosperma tenuior	-	X			Not specified.
	Schoenoplectus mucronatus	A Club Sedge		X		Not specified.
	Schoenoplectus validus	River Club-sedge		X		Not specified.
	Schoenus apogon	Common Bog-rush				Not specified.
	Themeda australis	Kangaroo Grass	X	X	X	Yes (subject to monitoring and/or maintenance plan).
Groundcover Species (~0-1.5 m) & Vines/Scramblers	*Asperula conferta*	-	X			Yes
	Brunoniella australis	Blue Trumpet	X		X	Yes
	Centella asiatica	Indian Pennywort	X	X		Not specified.
	Cheilanthes sieberi subsp. sieberi	Poison Rock Fern	X	X	X	Not specified.
	Clematis glycinoides	Old Man's Beard	X			Yes
	Commelina cyanea	Creeping Christian	X	X		Yes
	Desmodium varians	Slender Tick-trefoil	X	X		Yes (subject to monitoring and/or maintenance plan).
	Desmodium gunnii	Slender Tick-trefoil			X	Not specified.
	Dianella longifolia	Blue Flax-lily	X			Yes (subject to monitoring and/or maintenance plan).
	Dianella revoluta	Blue Flax-lily			X	Not specified.
	Dichondra repens	Kidney Weed	X	X	X	Yes
	Geranium solanderi	Native Geranium	X	X		Not specified.
	Goodenia hederacea	Forest Goodenia			X	Yes
	Goodenia paniculata	Branched Goodenia				Not specified.
	Glycine clandestina	Twining Glycine	X	X		Not specified.
	Glycine microphylla	Small-leaf Glycine	X	X		Not specified.
	Glycine tabacina	-	X	X		Not specified.
	Gratiola pedunculata	-				Not specified.
	Hardenbergia violacea	Purple Coral Pea	X	X		Yes
	Hydrocotyle peduncularis	-				Yes
	Hypericum gramineum	St John's Wort			X	Not specified.
	Oxalis perennans	-			X	Not specified.

Life Form	Scientific Name	Common Name	Vegetation Community			Concurrence with Proposed Landscape Species List
			Cumberland Plain Woodland	River-flat Eucalypt Forest	Shale-Gravel Transition Forest	
	Plectranthus parviflorus	Cockspur Flower	X	X		Yes
	Poranthera microphylla	-			X	Not specified.
	Pratia purpurascens	White Root	X		X	Yes
	Pultenaea microphylla	-	X			Not specified.
	Solanum prinophyllum	Forest Nightshade	X	X		Not specified.
	Wahlenbergia gracilis	Sprawling Bluebell			X	Not specified.

Appendix D Vegetation Plot Data

Table 6-10: Species matrix (species recorded by plot)

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
M	TG	*Acacia decurrens*								0.3						1		0.1						
M	SG	*Acacia falcata*			0.2																			
G	SG	*Acacia* spp. (seedling)											0.1								0.1			
G		*Acer* spp.	*					0.1						0.1										
G		*Acetosa sagittata*	*	1											0.1									
G	FG	*Ajuga australis*						0.1							0.1									
G		*Aloe* spp.					0.1																	
G	FG	*Alternanthera denticulata*											0.1									0.1		
G		*Lysimachia arvensis*	*		0.2	0.1	0.1		0.1				0.1	0.1	0.1									
G	TG	*Angophora floribunda*																	2					
M/U	TG	*Angophora subvelutina*									3	5	5	0.5					2	3	2		3	
G		*Araujia sericifera*	*	1	0.1	0.1	0.1			0.1		0.1							0.1	0.1	0.1		0.1	
G	GG	*Aristida racemosa*			0.3		0.5	0.5				70												

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G	GG	*Aristida* spp.																					1	
G	GG	*Aristida vagans*			0.5	0.1	5			0.1														
G		*Asparagus aethiopicus*	*	1															0.1			0.2		
G		*Asparagus asparagoides*	*	1	0.1		0.1					0.1	0.1	0.1		0.1	0.1			4		0.1	0.5	
G	FG	*Asperula conferta*			0.1								0.1							0.1			0.1	
G		*Aster* spp.	*																			0.1		
G		Asteraceae	0				0.1																	
G		*Avena* spp.	*											0.2										
G		*Axonopus compressus*	*			0.1																		
G		*Axonopus fissifolius*	*	1							2													
G		*Bidens pilosa* var. *pilosa*	*						0.1			0.1	0.5	0.5		0.1	0.1		0.2	5	0.1	0.1	0.1	
G	GG	*Bothriochloa macra*																					0.1	
G	GG	*Bothriochloa* spp.						0.1																
G		*Brassica* spp.	*											0.1			0.1							
G		*Briza minor*	*														0.1							
G		*Bromus catharticus*	*								5											0.7		

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G	GG	*Bromus* spp.																					0.1	
G	FG	*Brunoniella australis*			0.5		1	0.1		0.1			0.1			0.5				0.2		0.1		
G		*Bryophyllum delagoense*	*	1				30																
M	SG	*Bursaria spinosa* subsp. *spinosa*			5		1			0.3		15	0.2	0.2		15		5		1	3		7	
G	SG	*Calotis dentex*			0.1																			
G		*Camellia* spp.	*								0.5													
M	GG	*Carex appressa*																		0.1			0.2	
U	TG	*Casuarina cunninghamiana* subsp. *cunninghamiana*																	1	1	10			
U	TG	*Casuarina glauca*								7			0.6	0.2		3	1				10	10		
G		*Cenchrus clandestinus*	*	1		0.1			70					80				0.5	0.1					
G	FG	*Centella asiatica*							0.1				0.1	0.1		0.1					0.1		0.1	0.1
G		*Cerastium* spp.	*														0.1	0.2	0.1	0.1	0.1			
G		*Cestrum parqui*	*	1	0.1					0.1				0.1					5					
G	EG	*Cheilanthes sieberi* subsp. *sieberi*					0.1	0.1		0.1		0.2						0.1						

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G		*Chenopodium album*	*												0.1								0.1	
G		*Chloris gayana*	*	1					5					0.3										
G	GG	*Chloris truncata*					0.1																	
G	GG	*Chloris ventricosa*			0.1	0.1	0.2	5																
G		*Cirsium vulgare*	*		0.1	0.1	0.1	0.1		0.1			0.1	0.1	0.1	0.1	0.1			0.1	0.1		0.1	0.1
G	OG	*Clematis aristata*														0.2	0.1				0.1			
G	OG	*Clematis glycinoides* var. *glycinoides*																	0.1	0.1				
G	FG	*Commelina cyanea*								0.1			0.1				0.1	0.1		0.1		5	0.1	
G		*Conyza bonariensis*	*				0.1	0.1	0.1				0.1	0.1		0.1	0.1	0.1					0.1	
G		*Conyza* spp.	*								0.1													
G		*Coreopsis lanceolata*	*								0.1													
G	FG	*Cotula australis*			0.1	0.1	0.1	0.2	0.1	0.1	3	0.2	0.1		0.1	0.1	0.1				0.1			40
G		*Cyclospermum leptophyllum*	*																		0.1			0.1
G	FG	*Cymbonotus lawsonianus*			0.1	0.1	0.1																	
G	GG	*Cynodon dactylon*						0.2	5	0.1	10	0.1	0.1	0.2	2			1				0.1	0.1	5
G		*Cyperus congestus*	*																			1		

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G		*Cyperus eragrostis*	*	1					0.2				0.1		0.1									
G	GG	*Cyperus gracilis*				0.1	0.1		0.1			0.1	0.1			0.1		0.2					0.1	0.1
G	GG	*Cyperus* spp.																0.1						
G		*Daucus carota*	*														0.1						0.1	
G	OG	*Desmodium varians*			0.2	0.1	0.1					0.2				0.1	0.1						0.1	
G	FG	*Dianella revoluta* var. *revoluta*										0.1												
G	FG	*Dichondra repens*			0.1	0.1	0.1	0.1	0.1			0.2	2	0.1		0.3	0.3			0.2	0.1	0.1	0.1	30
M	SG	*Dillwynia sieberi*					0.2																	
G	SG	*Dodonaea viscosa* subsp. *viscosa*			0.1		0.1																	
G	GG	*Echinopogon caespitosus* var. *caespitosus*											0.1			0.1								
G		*Ehrharta erecta*	*	1		0.2				1				0.1		0.1	50	1	0.1	2	0.2	0.3	0.1	0.5
G	FG	*Einadia hastata*				0.1	0.1									0.1	0.1		0.1	0.1	0.1	0.1	0.1	
G	FG	*Einadia nutans* subsp. *nutans*																0.3		0.1				
G	FG	*Einadia polygonoides*			0.1		0.2	0.1		0.1						0.1			0.1					

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G	FG	*Einadia trigonos* subsp. *trigonos*							0.1	0.1									0.1					
G	GG	*Entolasia marginata*											0.1			0.1				0.1				
G	GG	*Entolasia stricta*			0.1																			
G	GG	*Eragrostis brownii*				0.1																		
G		*Eragrostis curvula*	*	1											0.1									
G	GG	*Eragrostis leptostachya*																0.2						
U	TG	*Eucalyptus amplifolia* subsp. *amplifolia*								15		30	30			25		15			2		15	
U	TG	*Eucalyptus crebra*									2													
U	TG	*Eucalyptus eugenioides*																	2				2	
U	TG	*Eucalyptus longifolia*															3							
U	TG	*Eucalyptus moluccana*			15	8	10	10			1						1	2						3
U	TG	*Eucalyptus tereticornis*				30		10	25				3	20	25		3		5			10		
G	FG	*Euchiton sphaericus*									0.1													

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G	FG	*Euchiton* spp.				0.1	0.1	0.1				0.1												
G	FG	*Euphorbia* spp.									0.1			0.1										
G		*Euryops chrysanthemoides*	*										1	0.1	0.1									
G		*Facelis retusa*	*				0.1					0.1			0.1	0.1	0.1							
G		*Galium aparine*	*							0.1			0.1			0.1			0.1			0.1		
G	FG	*Galium binifolium* subsp. *binifolium*																0.1						
G	FG	*Galium* spp.														0.1								
G		*Gamochaeta calviceps*	*														0.1	0.1			0.1		0.1	0.1
G		*Gamochaeta pensylvanica*	*																		0.1			
G	FG	*Geranium homeanum*													0.1									
G	OG	*Glycine clandestina*																			0.1			
G	OG	*Glycine microphylla*											0.1											
G	OG	*Glycine tabacina*			0.1	0.1		0.1		0.1		0.2		0.1		0.1		0.1		0.1	0.1		0.2	0.1
G		*Gomphocarpus fruticosus*	*		0.1								0.1											

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G	OG	*Hardenbergia violacea*												0.1										
G	FG	*Hydrocotyle tripartita*															0.1							
G		*Hypochaeris albiflora*	*																		0.1			
G		*Hypochaeris radicata*	*		0.1	0.1	0.1	0.1				0.1						0.1					0.1	0.2
M		*Jacaranda mimosifolia*	*								1													
G	GG	*Juncus usitatus*				0.1			0.3				0.1	0.1			0.1	0.1		0.2		0.1	0.1	
G		*Lactuca serriola* f. *serriola*	*							0.1					0.1									
G		*Lamiaceae*	0														0.1							
G		*Lamium amplexicaule*	*																					0.1
G		*Lantana camara*	*	1																3				
G		*Lepidium africanum*	*								0.1													
G		*Ligustrum lucidum*	*	1																4				
G/M		*Ligustrum sinense*	*	1									0.5	0.1	0.1				0.1	3				
G		Liliaceae	0		0.1		0.1									0.1								

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G	FG	*Lobelia purpurascens*								0.1			0.1	0.1			0.1				0.1	0.1	0.1	0.1
G	GG	*Lomandra cylindrica*																0.2						
G	GG	*Lomandra filiformis* subsp. *filiformis*			15	0.1	0.2	0.1				0.1				0.1	0.1						0.1	
G	GG	*Lomandra longifolia*								0.2							0.1							
G	GG	*Lomandra multiflora* subsp. *multiflora*										0.1	0.1										0.1	
G		*Lotus angustissimus*	*																					0.1
G	FG	*Lotus australis*				0.1		0.1				0.1												
G		*Lycium ferocissimum*	*	1						0.1										0.5				
G		*Lysimachia arvensis*	*														0.2		0.1		0.1			
G		*Malva parviflora*	*								0.1				0.1									
G		*Medicago polymorpha*	*					0.1			0.5			0.1	0.1		0.1						0.1	
G		*Medicago sativa*	*																		0.1		0.1	

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G	SG	*Melaleuca decora*															20							35
G	SG	*Melaleuca linariifolia*																				1		
G	SG	*Melaleuca styphelioides*																	2				0.5	
G	GG	*Microlaena stipoides* var. *stipoides*			0.8	10	0.1	15	0.1	95		5	25	0.2		70	3	50	80	2	85	0.2	35	0.1
G		*Modiola caroliniana*	*			0.1	0.1	0.1		0.1			0.1		0.1		0.1							0.1
G		*Morus alba*	*																			0.3		
G		*Olea europaea* subsp. *cuspidata*	*		0.2		2	0.1									5			3		2	1	
G	SG	*Olearia viscidula*																				0.2		
G		*Onopordum* spp.	*						0.1							0.1								
G	FG	*Opercularia diphylla*			0.1	0.1	0.1	0.1																
G	GG	*Oplismenus aemulus*							0.1				0.2			0.2						0.2		0.1
G	GG	*Oplismenus imbecillis*																	0.1	0.1		0.1		
G		*Opuntia* spp.	*		0.1		0.1																	
G	FG	*Oxalis perennans*			0.1	0.1	0.1	0.1	0.1	0.1		0.1	0.1			0.1	0.1	0.1	0.1				0.1	0.5

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G	FG	*Oxalis* spp.										0.1												
G	OG	*Pandorea pandorana* subsp. *pandorana*														0.1								
G	GG	*Panicum simile*				0.1	0.1																	
G	OG	*Parsonsia straminea*											0.1			0.1								
G	GG	*Paspalidium distans*			0.1	0.1	0.1	0.2		0.1													1	
G		*Paspalum dilatatum*	*	1	0.1			0.1				0.1		0.1	0.1		0.2	0.1			0.1		0.1	
G		*Pavonia hastata*	*																	0.2				
G	FG	*Persicaria decipiens*																				0.6		
G	FG	*Persicaria* spp.															0.1							
G	SG	*Phyllanthus hirtellus*																					0.1	
G		*Phytolacca octandra*	*															0.1			0.1	0.1		
G	FG	*Plantago gaudichaudii*			0.1			0.1				0.1												
G		*Plantago lanceolata*	*								0.1		0.1	0.2	0.1	0.1	0.1			0.1				0.1

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G		*Plantago major*	*			0.1		0.2							0.1									
G	FG	*Plectranthus parviflorus*								0.1						0.1		0.1	0.1		0.1			
G	FG	*Plectranthus* spp.												0.1			0.1							
G		*Poa annua*	*			0.1					0.2		0.1		0.1						0.1			0.1
G	FG	*Poranthera microphylla*																					0.1	
G	FG	*Portulaca oleracea*											0.1		0.1									
G	FG	*Ranunculus inundatus*																				0.1		
G		*Ranunculus muricatus*	*																					0.1
G		*Ranunculus repens*	*	1																		0.1		
G	FG	*Ranunculus sessiliflorus* var. *sessiliflorus*											0.1											
G		*Richardia* spp.	*					0.1																
G	FG	*Rumex brownii*																			0.1			
G		*Rumex obtusifolius*	*																			0.2		
G	FG	*Rumex* spp.				0.1		0.1	0.1				0.1				0.1							
G	GG	*Rytidosperma tenuius*				0.1	0.1	0.2																

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G		*Senecio madagascariensis*	*	1	0.1	1	0.5	0.2		0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.1			0.2		0.1	
G		*Senna pendula*	*	1						0.3														
G		*Setaria parviflora*	*		0.1	0.1	0.1	5	0.1	0.1			0.2	0.1	0.1	0.1	0.2	0.1	0.1		0.1	0.5	0.1	0.1
G/M		*Sida rhombifolia*	*		0.1	0.1		0.1		0.2			0.1	0.1		0.1	0.1	0.2	5	15	1		0.2	
G	FG	*Sigesbeckia orientalis* subsp. *orientalis*																						
G		*Sisymbrium* spp.	*																0.1		0.1			
G		*Solanum linnaeanum*	*		0.1	0.1	0.1	0.1	0.1	0.1			0.1	0.1	0.1	0.1	0.1	0.1	0.1		0.1		0.1	
G		*Solanum nigrum*	*			0.1	0.1	0.2		0.1		0.1	0.1			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
G	FG	*Solanum prinophyllum*								0.1		0.1				0.2	0.1	0.1		0.1	0.1	0.1	0.1	0.1
G		*Solanum pseudocapsicum*	*		0.1	0.1	0.1		0.1	0.1		0.1								0.3	0.2	0.2		
G	FG	*Solanum* spp.																	0.1					
G		*Soliva sessilis*	*										0.1		0.1									
G		*Sonchus oleraceus*	*		0.1	0.1	0.1	0.2		0.1	0.2		0.1	0.1	0.1	0.1	0.1	0.1			0.1	0.1	0.1	
G	GG	*Sporobolus creber*				0.1																	0.1	
G		*Stachys arvensis*	*												0.1									

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G	FG	*Stackhousia viminea*					0.1																	
G		*Stellaria media*	*			0.1					0.5				0.1		0.2					0.1		
G		*Stenotaphrum secundatum*	*	1							5													1
G		*Taraxacum officinale*	*						0.1		0.1		0.1		0.1		0.1		0.1		0.1			0.1
G	FG	*Tetragonia tetragonioides*																						
G	GG	*Themeda triandra*			0.1	0.1	0.1					0.2											0.5	
G		*Tradescantia fluminensis*	*	1						0.5			0.2			0.1	0.3	0.1	0.1	1	0.2			
G		*Trifolium dubium*	*																					0.1
G		*Trifolium repens*	*											0.1			0.1							0.1
G		*Trifolium* spp.	*																	0.1	0.1			
G	GG	*Typha orientalis*																						
G		*Verbascum* spp.	*																					
G		*Verbena bonariensis*	*		0.1							0.1	0.1	0.1			0.1							
G		*Verbena officinalis*	*												0.1						0.1			0.1
G		*Veronica persica*	*										0.1	0.1										

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) by plot																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G		*Vicia sativa* subsp. *sativa*	*						0.1								0.3							0.1
G		*Vinca major*	*	1										0.2										
G		*Vulpia* spp.	*								5													
G	FG	*Wahlenbergia gracilis*			0.1		0.1			0.1		0.1	0.1			0.1	0.1				0.1			

Key: U = Upper, M= Middle, G = Ground. EG = Fern, FG = Forb, GG = Grass & grasslike, OG = Other, SG = Shrub, TG = Tree.

Table 6-11: Vegetation integrity data (Composition, Structure and function)

Plot location data						
Plot no.	**PCT**	**Condition**	**Zone**	**Easting**	**Northing**	**Bearing (°)**
1	849	Good	56	288887	6244672	116
2	849	Good	56	289210	6244175	55
3	849	Good	56	289841	6243827	275
4	849	Low	56	289353	6244024	224
5	835	Low	56	289830	6243077	270
6	835	Good	56	293259	6245995	150
7	849	Low	56	295867	6244644	236
8	835	Good	56	292856	6244345	0
9	849	Good	56	296715	6248162	245
10	1067	Moderate	56	296608	6248019	315
11	1067	Moderate	56	296621	6247829	250
12	1067	Low	56	296709	6248303	162
13	835	Good	56	296679	6247932	355
14	1067	Moderate	56	292336	6248962	335
15	835	Good	56	293516	6248929	190
16	835	Good	56	292368	6242468	72
17	835	Low	56	292939	6245728	13
18	835	Good	56	294581	6242580	10
19	835	Moderate	56	292689	6243828	195
20	835	Moderate	56	296711	6248575	264

Composition (number of species)						
Plot no.	**Tree**	**Shrub**	**Grass**	**Forb**	**Fern**	**Other**
1	1	4	8	10	0	2
2	2	0	12	10	0	2
3	1	3	11	12	1	1
4	2	0	8	12	1	1
5	1	0	5	10	0	0
6	3	1	5	10	1	1
7	2	0	1	4	0	0
8	1	1	7	10	1	2
9	3	2	8	17	0	2
10	2	1	4	8	0	2
11	1	0	1	7	0	0
12	3	1	6	11	0	5
13	4	1	4	14	0	2
14	3	1	7	6	1	1
15	5	1	2	6	0	1
16	2	1	5	7	0	2
17	4	2	1	9	0	3
18	2	2	5	9	0	0
19	3	3	13	9	0	2
20	1	1	4	6	0	1

Structure (total cover %)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	15.0	5.4	17.0	1.4	0.0	0.3
2	38.0	0.0	11.1	1.1	0.0	0.2
3	10.0	1.3	6.6	2.2	0.1	0.1
4	20.0	0.0	21.3	1.3	0.1	0.1
5	25.0	0.0	5.6	1.0	0.0	0.0
6	22.3	0.3	95.5	1.0	0.1	0.1
7	3.0	0.0	10.0	3.3	0.0	0.0
8	30.0	15.0	75.6	1.2	0.2	0.4
9	33.6	0.3	25.8	3.7	0.0	0.2
10	20.2	0.2	0.6	0.9	0.0	0.2
11	25.0	0.0	2.0	0.7	0.0	0.0
12	29.0	15.0	70.6	1.8	0.0	0.6
13	8.0	20.0	3.3	1.7	0.0	0.2
14	17.1	5.0	51.8	0.8	0.1	0.1
15	12.0	2.0	80.1	0.6	0.0	0.1
16	4.0	1.0	2.5	0.9	0.0	0.2
17	24.0	3.1	85.0	0.9	0.0	0.3
18	20.0	1.2	0.7	6.3	0.0	0.0
19	20.0	7.6	38.5	0.9	0.0	0.3
20	3.0	35.0	5.3	70.8	0.0	0.1

Function												
Plot no.	Large Trees (DBH > 50 cm)	Hollow trees	Litter Cover (%)	Length Fallen Logs (m)	Tree Stem 5-9 cm	Tree Stem 10-19 cm	Tree Stem 20-29 cm	Tree Stem 30-49 cm	Tree Stem 50-79 cm	Tree Stem 80+ cm	Tree Regen	High Thread Weed Cover (%)
1	1	0	60.6	0	1	1	1	1	1	0	1	0.5
2	3	1	24.6	0	1	1	1	1	1	0	0	1.4
3	0	0	21	7	1	1	1	0	0	0	1	0.7
4	2	2	5	0	1	1	1	0	1	0	1	30.3
5	0	0	13.6	16	1	1	1	1	0	0	0	75.2
6	1	1	44	14	1	1	1	1	0	1	1	2.2
7	0	0	0.6	0	0	1	1	1	0	0	0	7.1
8	1	1	14	7	0	1	0	1	1	0	1	0.5
9	2	1	19.4	5	1	1	1	1	1	0	1	1.0
10	1	0	1.8	0	1	1	1	1	1	0	1	81.1
11	4	5	1	0	0	0	1	1	1	0	0	0.5
12	3	0	44	4.5	1	1	1	1	1	0	1	0.4
13	2	0	0	0	1	1	1	1	1	0	1	50.8
14	1	3	42.6	9.4	0	1	1	1	1	0	1	1.8
15	1	0	3.8	17	1	1	1	1	0	0	1	5.6
16	3	0	28.6	22.5	1	1	1	1	0	0	1	17.6
17	0	0	3.6	10	1	1	1	1	0		1	0.8
18	2	0	33.4	43.5	1	1	1	1	1	0	1	0.7
19	2	1	76.2	5	1	1	1	1	1	0	1	0.9

Function												
20	0	0	24	0	0	0	1	1	0	0	0	1.5

For stem size classes: 0 = Absence, 1 = Presence.

Figure 6-8: Start (left) and end (right) of Plot 1: Cumberland Plain Woodland (Good)

Figure 6-9: Start (left) and end (right) of Plot 2: Cumberland Plain Woodland (Good)

Figure 6-10: Start (left) and end (right) of Plot 3: Cumberland Plain Woodland (Good)

Figure 6-11: Start (left) and end (right) of Plot 4: Cumberland Plain Woodland (Low)

Figure 6-12: Start (left) and end (right) of Plot 5: River-Flat Eucalypt Forest (Low)

Figure 6-13: Start (left) and end (right) of Plot 6: Cumberland Plain Woodland (Good)

Figure 6-14: Start (left) and end (right) of Plot 7: River-Flat Eucalypt Forest (Good)

Figure 6-15: Start (left) and end (right) of Plot 8: Castlereagh Swamp Woodland (Low)

Figure 6-16: Start (left) and end (right) of Plot 9: Cumberland Plain Woodland (Good)

Figure 6-17: Start (left) and end (right) of Plot 10: Castlereagh Swamp Woodland (Moderate)

Figure 6-18: Start (left) and end (right) of Plot 11: Castlereagh Swamp Woodland (Moderate)

Figure 6-19: Start (left) and end (right) of Plot 12: Castlereagh Swamp Woodland (Low)

Figure 6-20: Start (left) and end (right) of Plot 13: River-Flat Eucalypt Forest (Good)

Figure 6-21: Start (left) and end (right) of Plot 14: Castlereagh Swamp Woodland (Moderate)

Figure 6-22: Start (left) and end (right) of Plot 15: River-Flat Eucalypt Forest (Good)

Figure 6-23: Start (left) and end (right) of Plot 16: River-Flat Eucalypt Forest (Good)

Figure 6-24: Start (left) and end (right) of Plot 17: River-Flat Eucalypt Forest (Low)

Figure 6-25: Start (left) and end (right) of Plot 18: River-Flat Eucalypt Forest (High)

Figure 6-26: Start (left) and end (right) of Plot 19: River-Flat Eucalypt Forest (Moderate)

Figure 6-27: Start (left) and end (right) of Plot 20: River-Flat Eucalypt Forest (Moderate)

Appendix E Commonwealth Assessment (EPBC Act)

Cumberland Plain Woodland is a critically endangered ecological community under the EPBC Act and therefore a MNES. The definition of this community varies between Commonwealth and State legislation. Table 6-12 outlines the condition thresholds for patches that meet EPBC Cumberland Plain Woodland condition.

Table 6-12: EPBC Act condition thresholds for patches that meet the description for Cumberland Plain Woodland

Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	
Category and rationale	**Thresholds**
A. Core thresholds that apply under most circumstances: patches with an understorey dominated by natives and a minimum size that is functional and consistent with the minimum mapping unit size applied in NSW.	Minimum patch size* is ≥0.5ha; **AND** ≥50% of the perennial understorey vegetation cover** is made up of native species.
OR	
B. Larger patches which are inherently valuable due to their rarity	The patch size is ≥5 ha; **AND** ≥ 30% of the perennial understorey vegetation cover is made up of native species
OR	
C. Patches with connectivity to other large native vegetation remnants in the landscape	The patch size is ≥0.5 ha; **AND** ≥30% of the perennial understorey vegetation cover is made up of native **AND** The patch is contiguous with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species) that is ≥ 5 ha in area.
OR	
D. Patches that have large mature trees or trees with hollows (habitat) that are very scarce on the Cumberland Plain.	The patch size is ≥ 0.5 ha in size; **AND** ≥ 30% of the perennial understorey vegetation cover is made up of native species; **AND** The patch has at least one tree with hollows per hectare or at least one large tree (≥80 cm diameter at breast height) per hectare from the upper tree layer species outlined in the Description in Appendix A.

** A patch is defined as a discrete and continuous area that comprises the ecological community.*

*** Perennial understorey vegetation cover includes vascular plant species of the ground and shrub layers with a lifecycle of more than two growing seasons. Cover excludes annuals, cryptogams, leaf litter or exposed soil*

1300 646 131
www.ecoaus.com.au