South West Creek Precinct 5

Biodiversity Assessment

BHL Group

ecological AUSTRALIA
A TETRA TECH COMPANY

DOCUMENT TRACKING

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Project Manager	Rebecca Ben-Haim
Prepared by	Alex Gorey and Carolina Mora
Reviewed by	Rebecca Ben-Haim
Approved by	David Bonjer
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Template 2.8.1

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Abbreviations

Abbreviation	Description
AHCVV	Additional High Conservation Value Vegetation – vegetation meeting the requirements for ENV that was not mapped in the Growth Centres Conservation Plan
BC Act	*Biodiversity Conservation Act 2016*
CEEC	Critically Endangered Ecological Community
DAWE	Department of Agriculture, Water, and the Environment (now Commonwealth DCCEEW)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DCP	Development Control Plan
DotEE	Department of the Environment and Energy (now DCCEEW)
DPE	Department of Planning and Environment (now DPHI)
DPHI	Department of Planning, Housing, and Infrastructure
DPIE	Department of Planning, Industry and Environment (now DPHI)
ELA	Eco Logical Australia Pty Ltd
ENV	Existing Native Vegetation, as defined in the Growth Centres Conservation Plan
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
IPC & AES	Ian Perkins Consultancy Services and Aquila Ecological Surveys
ILP	Indicative Layout Plan
MNES	Matters of National Environmental Significance
NPWS	NSW National Parks and Wildlife Service
OEH	NSW Office of Environment and Heritage (now DPE – Environment and Heritage)
SCW	South Creek West
SCWLA	South Creek West Land Release area
SWGA	South West Growth Area
TSC Act	*Threatened Species Conservation Act 1995*
TSSC	Threatened Species Scientific Committee

Executive Summary

Eco Logical Australia Pty Ltd (ELA) was engaged by BHL Group to undertake a Biodiversity Assessment for Precinct Planning of the South Creek West (South West) precinct, 'Precinct 5'. The aim of this report is to identify key ecological constraints to assist design of an Indicative Layout Plan (ILP).

Biodiversity Certification of the Growth Centres Conservation Plan identifies a regional offsets package, effectively facilitating the strategic loss of ecological values on 'certified lands' without triggering further assessment under the former *Threatened Species Conservation Act 1995* (TSC Act – now the *Biodiversity Conservation Act 2016* (BC 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 (the then Department of Sustainability, Environment, Water, Population and Communities). Therefore, provided development proceeds in accordance with the Growth Centres Biodiversity Certification Order, the assessment and approval of threatened species and endangered ecological communities under Commonwealth legislation is not required.

The site was found to contain several significant environmental features, including Cumberland Plain Woodland (a critically endangered ecological community under both the BC Act and EPBC Act), River-Flat Eucalypt Forest (an endangered ecological community under the BC Act and critically endangered under the EPBC Act) and habitat features associated with potential habitat for several threatened flora and fauna species.

No vegetation in the precinct was identified in the Draft Growth Centres Conservation Plan 2007. Field survey identified 17.46 ha of Additional High Conservation Value Vegetation (AHCVV) within the subject site. Sub-Precinct 5 is wholly biodiversity certified. Under the Draft Growth Centres Conservation Plan, no Existing Native Vegetation (ENV) within the subject site was counted towards achieving the 2000-hectare conservation outcome.

The precinct, however, contains a total of 17.46 ha of native vegetation that meets the definition of AHCVV therefore, providing opportunity to provide biodiversity outcomes beyond what was anticipated by the biodiversity certification by protecting native vegetation in riparian areas and their adjoining lands where possible.

The ILP will protect 3.26 ha of validated AHCVV, through the protection of native vegetation within the proposed Environmental Conservation area. Through specific DCP and SEPP controls, there are also opportunities to further protect 1.86 ha of AHCVV within the open space network. Further, the ridgetop towards the southern area of the precinct around the water tower is proposed to be revegetated utilising species endemic to Cumberland Plain Woodland and River-flat Eucalypt Forest.

The ILP will also protect 12.79 ha of Cumberland Plain Woodland in varying conditions and 0.18 ha of River-flat Eucalypt Forest within the Environmental Conservation area.

1. Introduction

1.1 Overview

Eco Logical Australia Pty Ltd (ELA) was engaged by BHL Group to undertake a Biodiversity Assessment for Precinct Planning of the South Creek West (South West) Precinct within the South-West Growth Centre.

The South Creek West Land Release Area forms part of the South West Growth Area (SWGA). Given the scale of the release area, the Department of Planning, Housing, and Infrastructure (DPHI) divided it into five distinct precincts numbered 1 – 5. The land to which this Planning Proposal relates to is referred to as Cobbitty Sub-Precinct 5, also known as Precinct 5. It totals approximately 303 hectares (ha) and has been characterised by rural residential and agricultural land uses and activities. BHL group hold approximately 172.75 ha of land in Precinct 5, the area to which this assessment applies.

The precinct was released by the Minister for Planning on 24 November 2017 for urban development. The release formally commenced the rezoning process for land within the precinct, including the subject site.

Precinct 5 is located within the south-west portion of the South Creek West Land Release (SCWLA) area within the suburb of Cobbitty in the Camden LGA. The Precinct adjoins the Lowes Creek Maryland Precinct, which has recently been rezoned to the north, the Pondicherry precinct to the east which is in the process of being rezoned and the growing town centre and suburbs of Oran Park to the south. Figure 1 illustrates the site boundaries of the Cobbitty Precinct and SCWLA.

1.2 Proposal

BHL, as the major landholder in the precinct, seeks to initiate the preparation of a planning proposal for the rezoning of Precinct 5, consistent with the Draft Indicative Layout Plan (ILP). This is to facilitate the orderly redevelopment of 172.74 ha of Precinct 5 into a residential community.

The intended outcome of this Planning Proposal is to amend the current *State Environmental Planning Policy (Precincts – Western Sydney Parkland) 2021* to facilitate the urban development of Precinct 5 as part of the South West Growth Centre as envisaged in the Greater Sydney Commission's Regional Plan and District Plan.

The Draft ILP has been prepared to support the planning proposal and precinct rezoning and has been informed by extensive specialist consultant studies. The site will comprise approx. 2,600 dwellings and a population of approx. 8,000 people within a thriving community supported by a thriving local centre and 19.97 ha of passive and active open space.

The proposed new planning controls comprise amendments to *State Environmental Planning Policy (Precincts – Western Sydney Parkland) 2021* and associated environmental planning instruments including the rezoning of the precinct to reflect land uses shown in the Draft ILP. This Planning Proposal also seeks to introduce a site-specific Schedule to the *Camden Growth Centre Precincts Development Control Plan* to support the Precincts development in accordance with the Draft ILP and supporting technical investigations.

1.3 Background

Following an extensive review by Council (and the APP Group) and the Local Planning Panel, the planning proposal and Biodiversity Assessment have been amended to reflect feedback from the Environment and Heritage Group (EHG) and enable Council endorsement for its progression to gateway. This report addresses the comments and feedback received from EHG, Council and the Local Planning Panel (Table 1).

Table 1: Response to EHG comments

EHG Comment	Response
The need to increase the amount of Additional High Conservation Value Vegetation (AHCVV) being retained within riparian corridor and the Ridgeline Park.	The previous ILP proposed to protect: • 2.94 ha of AHCVV within the Riparian Corridor. • 0.81 ha of AHCVV within the Easement, subject to future Development Control Plan (DCP) controls. • 2.61 ha of AHCVV within Open Space areas, subject to future DCP controls. The current ILP now proposes to protect: • 3.26 ha of AHCVV within the Riparian Corridor, demonstrating an increase from the previous ILP. • 0.15 ha of AHCVV within the Easement, subject to future Development Control Plan (DCP) controls. • 1.71 ha of AHCVV within Open Space areas, subject to future DCP controls. This reduction is due to the required removal of the Ridgeline Park, which is further discussed below. In turn, the current ILP will also protect 12.19 ha of Cumberland Plain Woodland in varying conditions and 0.18 ha of River-flat Eucalypt Forest within the Environmental Conservation area. Further, the ridgetop towards the southern area of the precinct around the water tower is proposed to be revegetated utilising species endemic to Cumberland Plain Woodland and River-flat Eucalypt Forest. It should be noted that the ILP has been updated to reflect Council's amendment to the Oran Park Contribution Plan, finalised by Council at its March 2023 meeting. The major amendment removed land and works associated with the open space areas known as treed hilltop parks in the Oxley Ridge precinct. As such, the Ridgeline Park has been converted to large lot residential, which is considered to be the most suitable land use as it achieves the objectives of retaining the character of a vegetated ridgeline whilst still effectively using the land.
The need to provide greater certainty about the conservation of AHCVV within proposed open space areas	The protection of AHCVV within the Easement and Open Space areas will be guided by specific controls within the DCP. The preparation of the DCP is currently underway and will be exhibited with the Planning Proposal.
The need to relocate proposed detention basins outside of the proposed C2 Zone/riparian corridors and limit proposed drainage works within the C2 zone.	The current ILP has removed the previously proposed online wet basin within the Riparian Corridor, and this has been replaced by an online dry basin. The ILP will allow for protected and rehabilitated watercourses to be established, which will improve their current condition, as currently they receive no observable maintenance and exotic flora species dominate some areas of the Riparian Corridor. Watercourse protection will also allow for an improvement in water quality within the precinct, as revegetation and weed control would create stable beds and banks and a buffer between residential areas and the watercourse. Although the *Controlled Activities – Guidelines for Riparian Corridors on Waterfront Land* (DPE, 2022), do not allow for online dry basins on 3rd and 4th order watercourses, it is noted that:

EHG Comment	Response
	• **All basins will be dry and vegetated:** Any existing native vegetation will be retained and in currently cleared areas the Riparian Corridor will be revegetated to a full-structured vegetation community (Cumberland Plain Woodland or River-flat Eucalypt Forest). This has been reflected in the relevant flood modelling undertaken by J. Wyndham Prince (2024), where a Mannings Value of 0.12 has been assumed. • **All basins will be for temporary flood detention only:** Basin inundation hours will be confirmed upon completion of the flood modelling (J. Wyndham Prince, 2024). It should be noted that the riparian corridors would nevertheless be inundated during storm events even as part of the development of these areas as defined by the NSW Government Growth Centre 2011. • **The basins will have an equivalent Vegetated Riparian Zone (VRZ) for the corresponding watercourse:** The existing VRZ area across the site is 16.89 ha, assuming a 10 m-wide watercourse and associated VRZ through the centreline of the existing farm dam on the 3rd order watercourse. The area of VRZ proposed to be retained under the ILP is 16.91 ha. • **The basins will not be used for water quality treatment purposes:** Water quality management will be undertaken in separate stand-alone devices outside the outer 50% VRZ. The online basins are proposed for water retention only. It is also noted that the Drainage Areas shown within the ILP (Figure 2) have not been counted towards the native vegetation retention values. Further, any road crossings within the Riparian Corridor will include bridges and/or culverts. The type of recreation infrastructure likely to be required within the Riparian Corridor is shown within the Landscape Masterplan (Urbis, 2024).
The proposed zoning of the Ridgeline Park as C4 Environmental Living as opposed to C2 Environmental Conservation which would allow for an increased security of the conservation and restoration of native vegetation	The Ridgeline Park has been removed from the current ILP / precinct to reflect Council policy as discussed above. However, it is noted that ridgetop towards the southern area of the precinct around the water tower is proposed to be revegetated utilising species endemic to Cumberland Plain Woodland and River-flat Eucalypt Forest.
The applicants proposed zoning of Open Space Areas as Low Density Residential as opposed to RE1 Public recreation which would have an increased security for remnant native vegetation.	All Open Space areas are currently zoned RE1 (Public Recreation).

1.4 Methodology Overview

An overview of the methodology is provided below. For full details see Appendix A.

- Database search for threatened species, populations, and ecological communities under the NSW *Biodiversity Conservation Act 2016* (BC Act) and Matters of National Environmental Significance (NES) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Assessment of State and Federal statutory requirements.

- Validation of vegetation threatened species and habitat condition mapping. Assessments include the identification of Additional High Conservation Value Vegetation (AHCVV).
- Assessment of biodiversity values and mapping including analysis and identification of ecological constraints (rated low, moderate, and high).
- Desktop assessment of subject site outside of the survey area.
- Recommendations for the development.

Figure 3 illustrates the location of the precinct ('subject site'). .

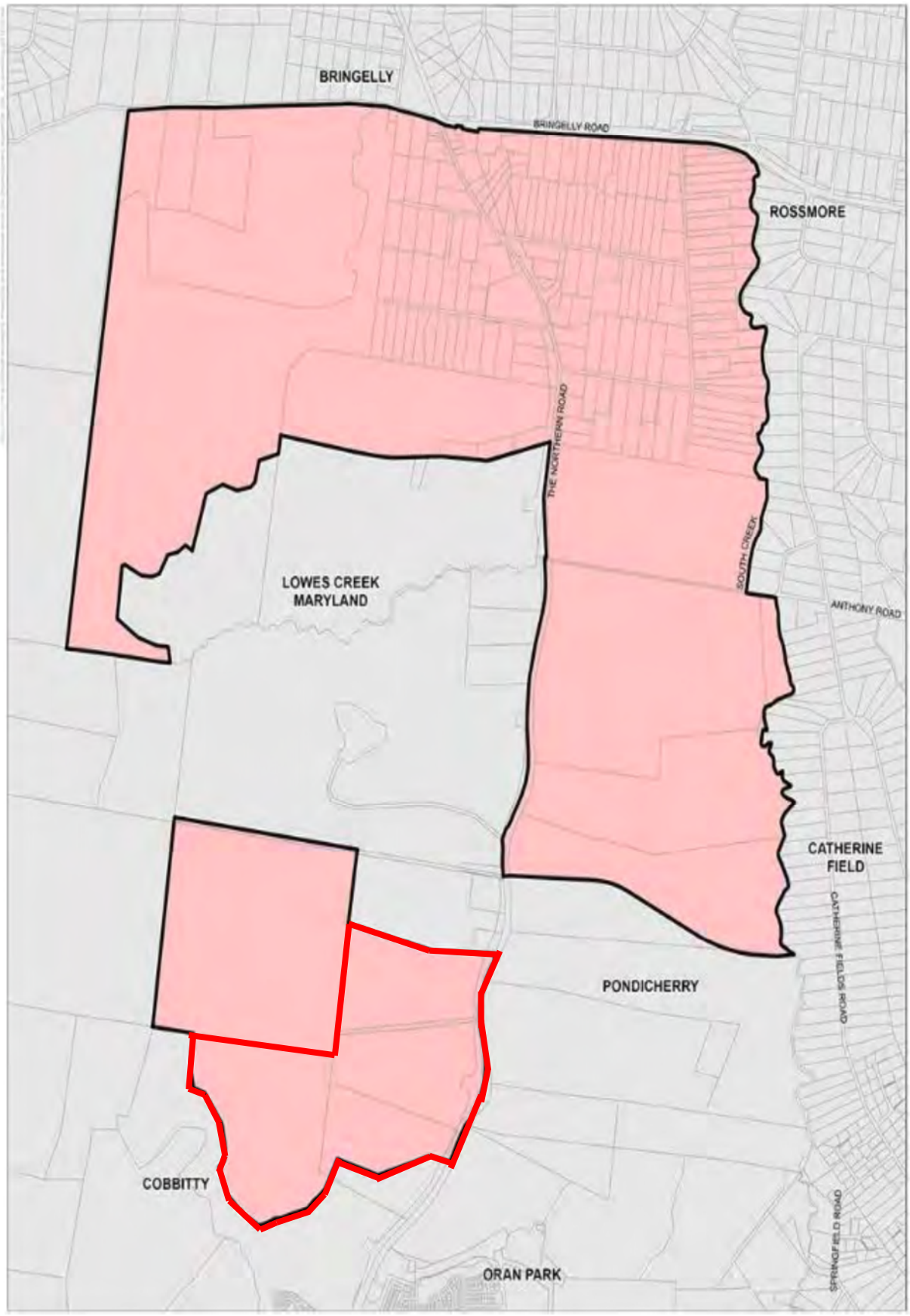

Figure 1: South Creek West release area. Image provided by BHL Group (Red outline represents indicates location of BHL Groups Holding to which this assessment applies (the subject site)

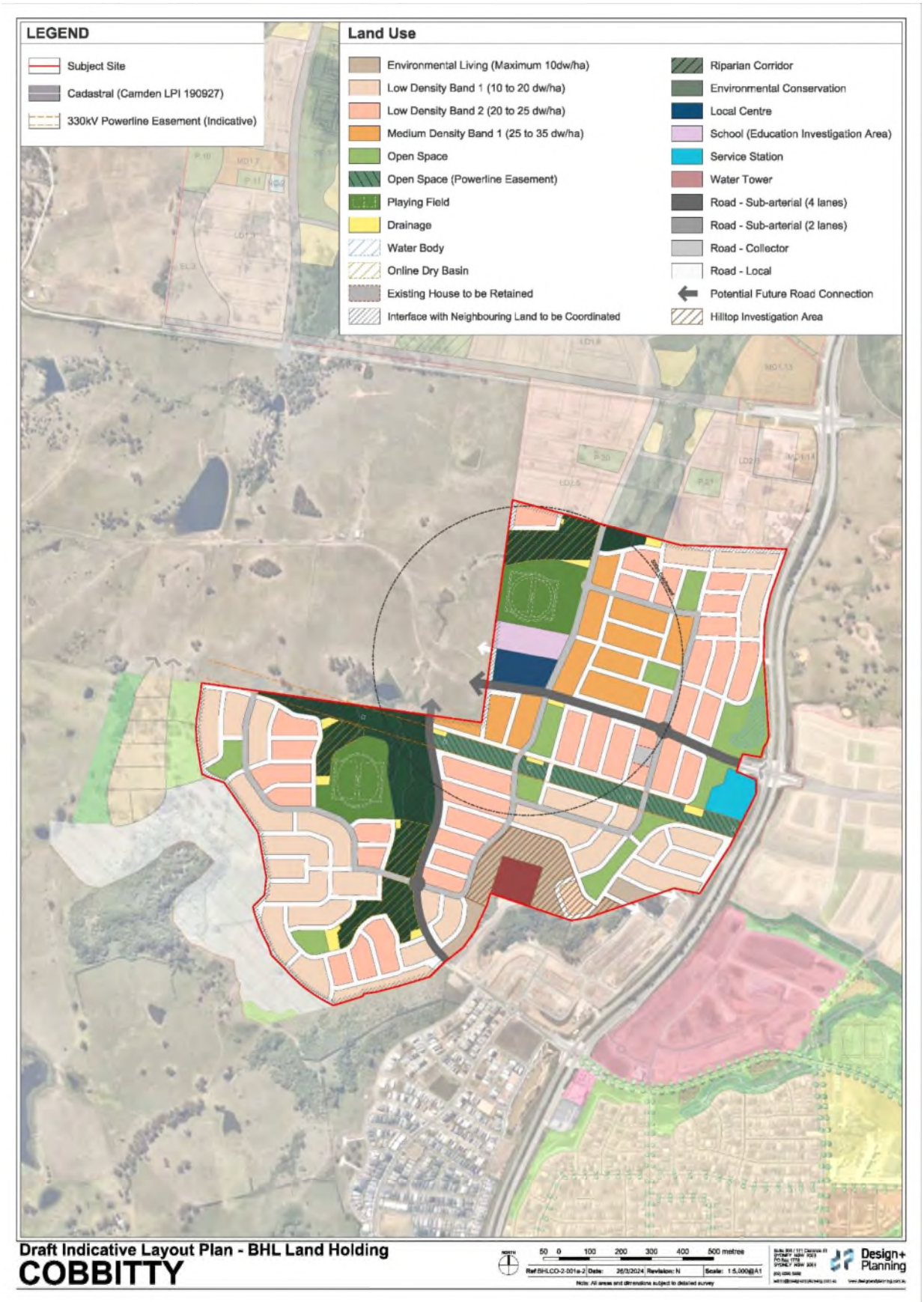

Figure 2: Draft Indicative Layout Plan

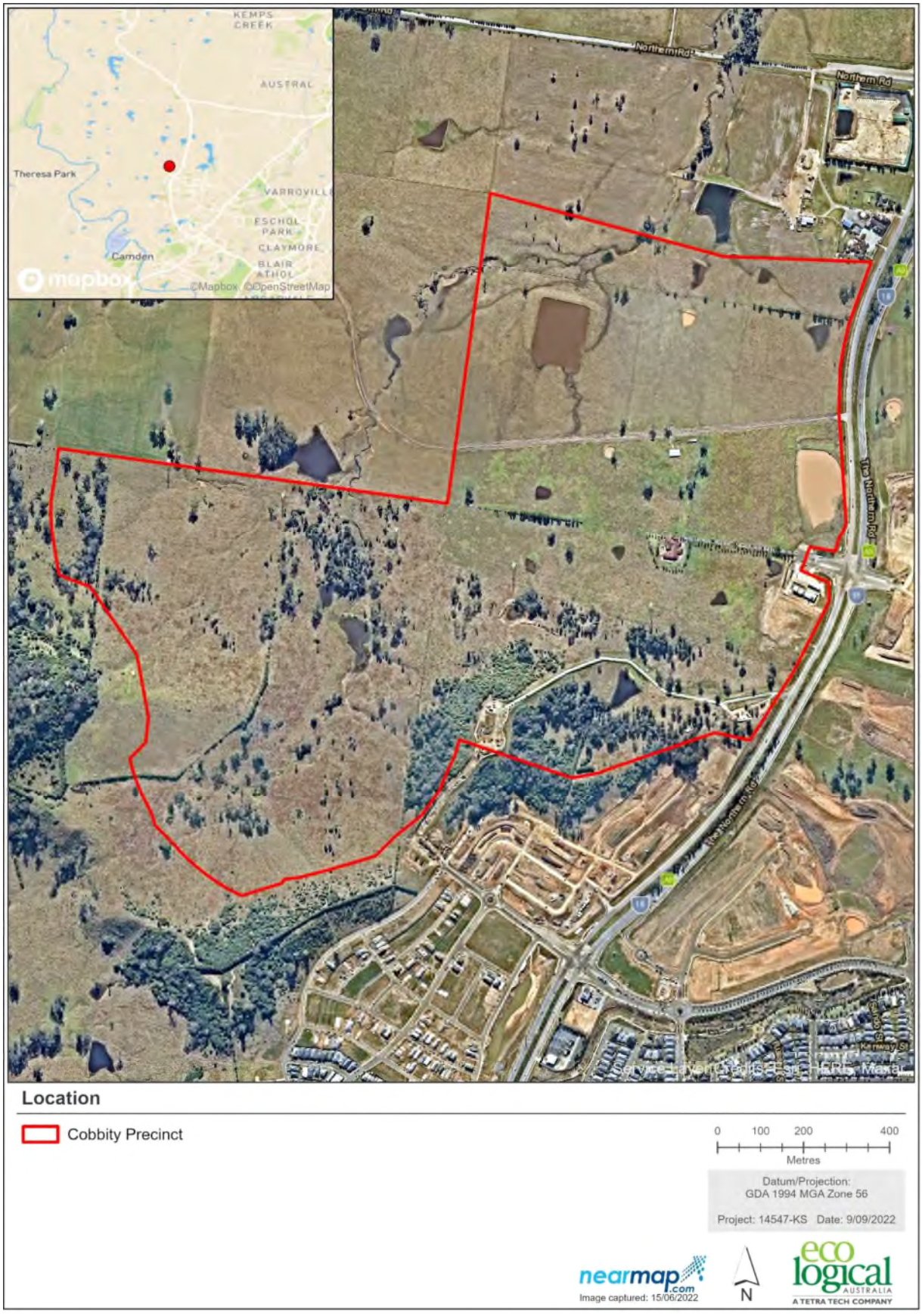

Figure 3: Subject site

2. Statutory Framework

An array of strategic plans, legislation, policies, and guidelines apply to the planning and management of biodiversity 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 Statutory Framework

Table 2 summarises the relevant legislation and policies that apply to the subject site, which are required to be considered.

Table 2: Statutory framework and relevance to this study

Act	Relevance
	Commonwealth
Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)	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. (This was the second stage of the approval of the Strategic Assessment of the Growth Centres under the Commonwealth EPBC Act). 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 regarding 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 Western Parkland City SEPP and Development Control Plans (DCPs), Growth Centres Development Code etc), 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 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 BC Act. This new legislation repealed the 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. Like 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

Act	Relevance
	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. Biodiversity 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. 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 was 'bio-certified' by order of the Minister for the Environment under s.126G of the TSC Act. Under the 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 4. The subject site is required to be assessed against the conditions of the Biodiversity Conservation Order to ensure that the planned rezoning and subsequent development of the subject site complies.
Fisheries Management Act 1994 (FM Act)	The *Fisheries Management Act 1994* (FM Act) aims to conserve, develop, and share the fishery resources of NSW for the benefit of present and future generations. The FM Act defines 'fish' as any marine, estuarine or freshwater fish or other aquatic animal life at any stage of their life history. This includes insects, molluscs (e.g. oysters), crustaceans, echinoderms, and aquatic polychaetes (e.g. beachworms), but does not include whales, mammals, reptiles, birds, amphibians, or species specifically excluded (e.g. some dragonflies are protected under the TSC Act instead of the FM Act). Under this act, if any activity occurs that will block fish passage, then a permit under this Act will be required. Matters relating to this act are discussed in a separate, Riparian Assessment Report.
Water Management Act 2000 (WM Act)	The WM Act has replaced the provisions of the *Rivers and Foreshores Improvement Act 1948*. The WM Act and *Water Act 1912* control the extraction of water, the use of water, the construction of works such as dams and weirs and the carrying out of activities in or near water sources in New South Wales. 'Water sources' are defined very broadly and

Act	Relevance
	include any river, lake, estuary, place where water occurs naturally on or below the surface of the ground and coastal waters. If a 'controlled activity' is proposed on 'waterfront land', an approval is required under the Water Management Act (s91). 'Controlled activities' include: • the construction of buildings or carrying out of works; • the removal of material or vegetation from land by excavation or any other means; • the deposition of material on land by landfill or otherwise; or • any activity that affects the quantity or flow of water in a water source. 'Waterfront land' is defined as the bed of any river or lake, and any land lying between the river or lake and a line drawn parallel to and forty metres (40m) inland from either the highest bank or shore (in relation to non-tidal waters) or the mean high-water mark (in relation to tidal waters). It is an offence to carry out a controlled activity on waterfront land except in accordance with an approval. Matters relating to this act are discussed in a separate, Riparian Assessment Report.
	Environmental Planning Instruments and Other Policies
State Environmental Planning Policy (Precincts – Western Parkland City) 2021 (Western Parkland City SEPP)	The subject site does not contain any ENV mapped under the SEPP and is wholly biodiversity certified. Biodiversity certification is discussed below.
State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP)	**Cumberland Plain Conservation Plan** Although the subject site is within land subject to the Cumberland Plain Conservation Plan (CPCP) under Chapter 13 of the Biodiversity and Conservation SEPP, it is not within any of the respective land categories (i.e., urban capable land or non-certified land) nor is it within a Strategic Conservation Area. **Koala Habitat Protection** The aim of Chapters 3 and 4 of the Biodiversity and Conservation SEPP is to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline. The subject site is not on land to which this applies.
Sydney Region Growth Centres Biodiversity Certification Order (2007)	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 Western Parkland City SEPP. Biodiversity Certification has three main functions. It requires the protection of 2,000 ha of existing native vegetation with the Growth Centres; it allows for development to proceed without further biodiversity assessment at the Development Application (DA) stage on land that is 'biodiversity certified', and it establishes a funding mechanism for conservation outcomes outside of the Growth Centres. To achieve the 2,000-ha protection target, each precinct must protect the 'existing native vegetation' 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 Existing Native Vegetation (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

Act	Relevance
	• 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 subject site is wholly biodiversity certified as shown in Figure 4. The Draft ENV mapped within the precinct is also shown in Figure 6, which shows that there was no ENV mapped within the precinct and therefore no vegetation within the precinct officially contributes 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 ENV, then for the purposes of conditions 7-8 and 11-12 only the area of validated existing native vegetation shall be considered. As no ENV is mapped within the subject site, this does not apply, however Additional High Conservation Value Vegetation (AHCVV) was validated within the subject site which meets the definition of ENV and some of which can be protected under the development. AHCVV is presented in Figure 12.

2.2 Strategic Plans

Table 3 summarises the relevant strategic assessments that apply to the subject site, which should be considered within the Planning Proposal.

Table 3: 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: • 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 two relevant sustainability planning priorities, which coincide and build on the objectives listed within the Greater Sydney Region Plan, being: • 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	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

Strategic Plan	Biodiversity / Sustainability Objectives
Wales (Government Architect NSW, 2020) and Draft Greener Places Design Guide (Government Architects NSW, 2020)	sustainable urban environment by improving community access to recreation and exercise, supporting walking, and cycling connections and improving the resilience of urban areas. 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.

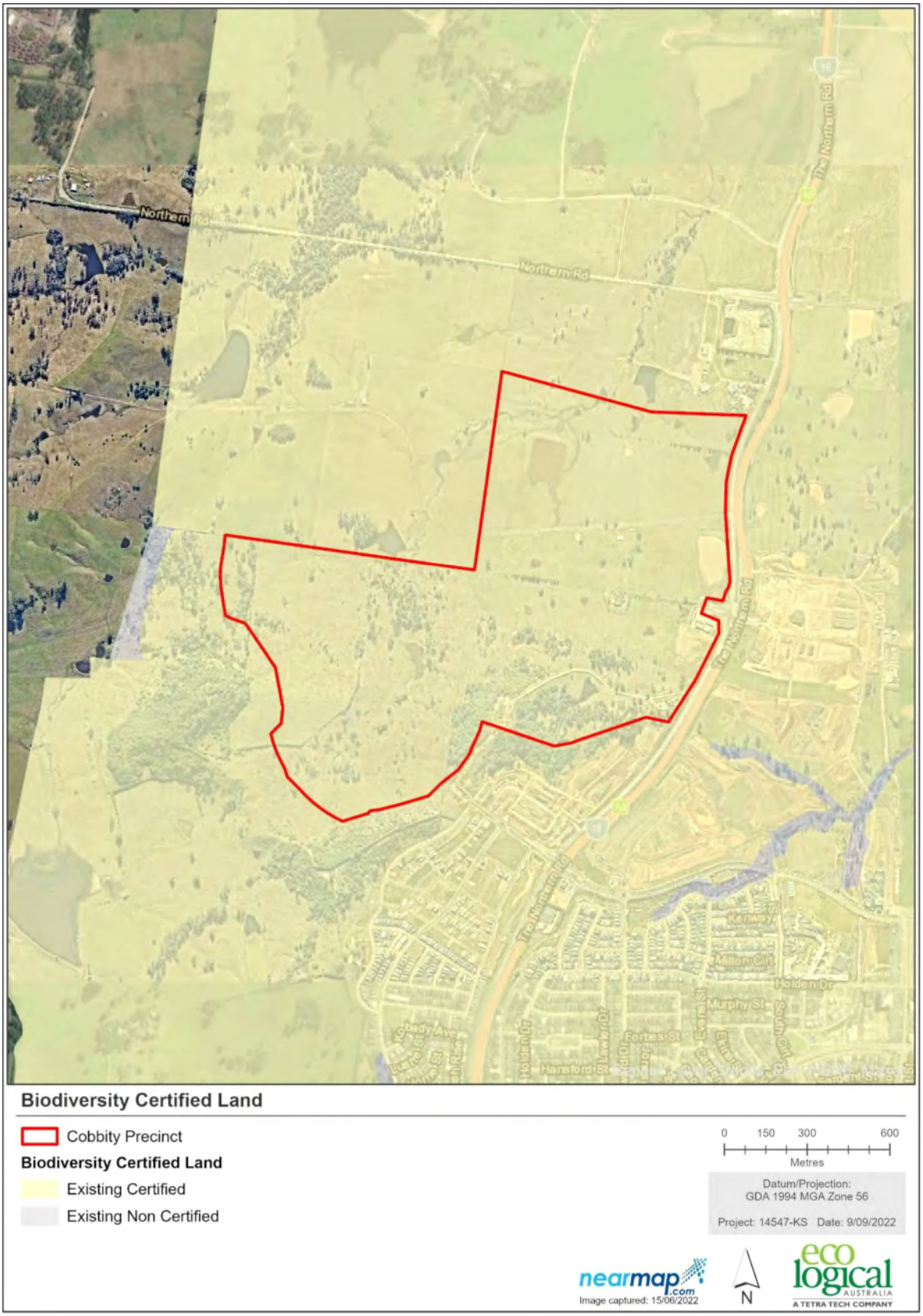

Figure 4: Biodiversity Certification

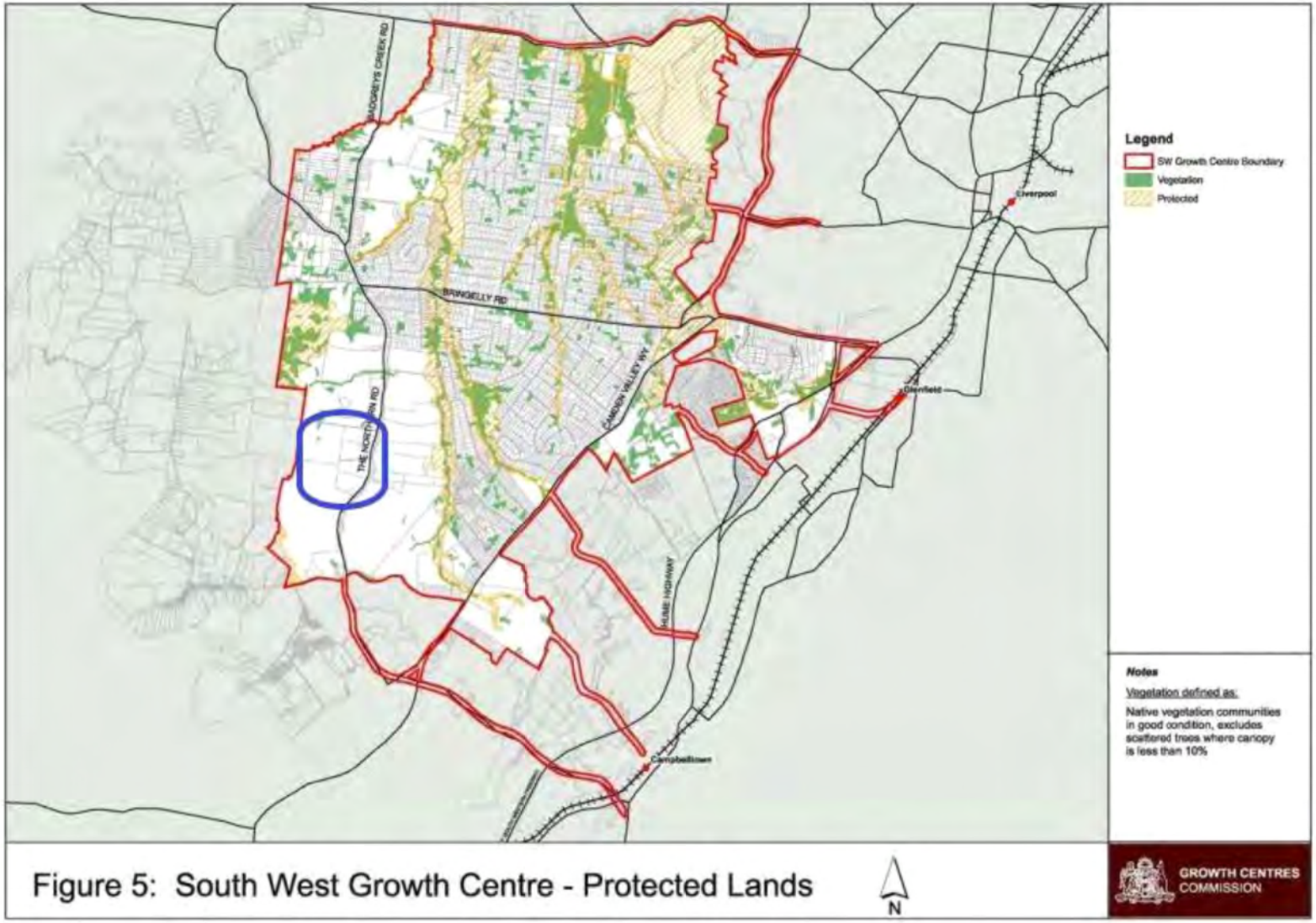

Figure 5: South West Growth Area Protected Lands from Draft Growth Centres Conservation Plan (Growth Centres Commission 2007)

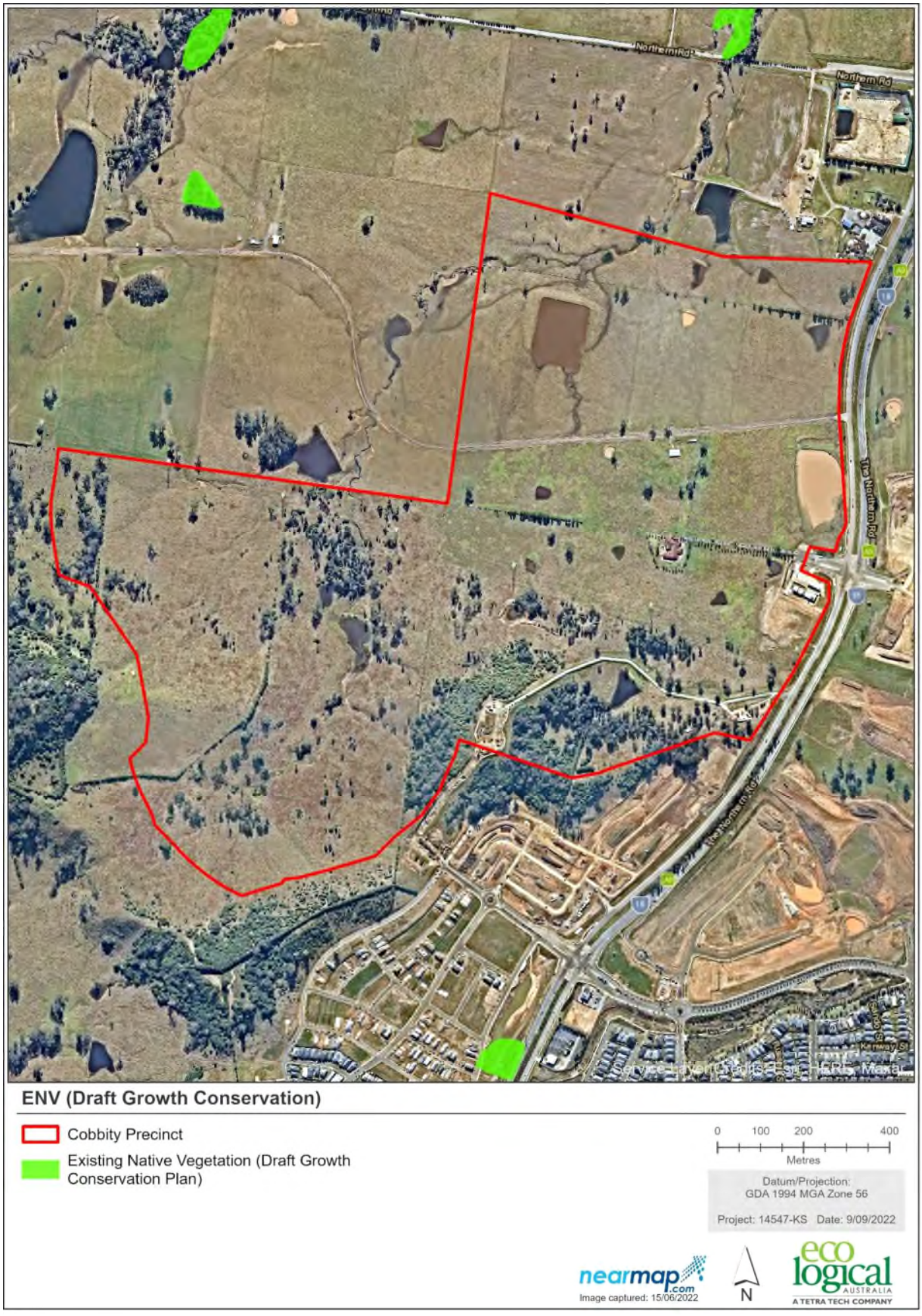

Figure 6: ENV as per Figure 5 of the Growth Centres Conservation Plan within the subject site

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 Atlas of Wildlife Database (5 km radius)
- EPBC Act online Protected Matters Search Tool (5 km radius)
- Native Vegetation Maps of the Cumberland Plain – Interpretation Guidelines (DECC, 2000b)
- Draft Growth Centres Conservation Plan' prepared by Eco Logical Australia (2007) for NSW Growth Centres Commission
- Office of Environment and Heritage (OEH) 2013 vegetation mapping

3.2 Desktop assessment

The north-west portion of the subject site was not field validated as site access was not available. Where land access was not available, the OEH 2013 Vegetation map was updated based on aerial photo interpretation. Vegetation mapping was edited to removed portions mapped over buildings.

A 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

Vegetation was ground-truthed over two days by two ecologists in March 2020. 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 DPIE (2020b) profiles and the Commonwealth listing and conservation advice (where relevant). A threatened species habitat assessment was also conducted across the entire subject site.

A detailed methodology is presented in Appendix A.

4. Results

4.1 Vegetation communities

The following two native vegetation communities were identified within the subject site in varied condition and structure:

- Cumberland Plain Woodland in the Sydney Basin Bioregion / Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

The subject site also contained areas dominated by exotic vegetation. The location of each vegetation community is presented in Figure 7. Each vegetation community, and their varied conditions, are described below.

4.1.1 Cumberland Plain Woodland

Cumberland Plain Woodland in the Sydney Basin Bioregion is listed as a critically endangered ecological community under the BC Act and forms part of the critically endangered ecological community Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest, listed under the EPBC Act.

Cumberland Plain Woodland is 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 (DPIE 2020b). This community is restricted to the Cumberland Plain in the Sydney region and typically contains *Eucalyptus moluccana* (Grey Box), *E. tereticornis* (Forest Red Gum), with *E. crebra* (Narrow-leaved Ironbark), *E. eugenioides* (Thin-leaved Stringybark) and *Corymbia maculata* (Spotted Gum) occurring less frequently. The midstorey is comprised of *Bursaria spinosa* (Blackthorn). Typical groundcover species include *Dichondra repens* (Kidney Weed), *Aristida vagans* (Threeawn Speargrass), *Microlaena stipoides* var. *stipoides* (Weeping Grass), *Themeda triandra* (Kangaroo Grass), *Brunoniella australis* (Blue Trumpet), *Desmodium varians* (Slender Tick-trefoil), *Opercularia diphylla, Wahlenbergia gracilis* (Sprawling Bluebell) and *Dichelachne micrantha* (Shorthair Plumegrass).

Cumberland Plain Woodland within the survey area was observed in five conditions, each detailed in Table 4 below.

Table 4: Different conditions of Cumberland Plain Woodland identified within survey area.

Condition	Description	BC Act	EPBC Act and Justification#
Good (BC Act and EPBC Act)	Cumberland Plain Woodland in this condition was present throughout the southern half of the subject site (Figure 8). These areas were characterised by a canopy dominated by *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus moluccana* (Grey Box). The open midstorey was dominated by exotic species *Lycium ferocissimum* (African Boxthorn) and *Olea europaea* subsp. *18uspidate* (African Olive), with occasional intrusions of *Lantana camara* (Lantana) and *Gomphocarpus fruticosus* (Narrow-leaved Cotton Bush) in some areas. The groundcover was dominated by a large number of native grasses and forbs, including *Microlaena stipoides* (Weeping Grass), *Bothriochloa macra* (Red Grass), *Einadia hastata* (Berry Saltbush) and more. Exotic groundcover species were also present, though to a significantly lesser extent, and included *Eragrostis curvula* (African Lovegrass), *Setaria parviflora* and *Sida acuta* (Spinyhead Sida).	CEEC	CEEC – Cumberland Plain Woodland in this condition met the key diagnostic characteristics for listing under the EPBC Act and met the following condition thresholds: • minimum patch* size is > 0.5 ha • > 50% of the perennial understorey vegetation cover** is made up of native species.
Moderate (BC Act and EPBC Act)	One patch of Cumberland Plain Woodland in moderate condition was present near the southern boundary of the subject site (Figure 8). Cumberland Plain Woodland in this condition contained an assemblage of native species similar to that of the ecological community in good (BC Act and EPBC Act) condition. However, Cumberland Plain Woodland in moderate (BC Act and EPBC Act) condition was characterised by the following: • The midstorey entirely comprised a dense layer of *Olea europaea* subsp. *18uspidate* (African Olive). • The groundcover in this patch was sparser in comparison to patches in Good (BC Act and EPBC Act) condition.	CEEC	CEEC – Cumberland Plain Woodland in this condition met the key diagnostic characteristics for listing under the EPBC Act and met the following condition thresholds: • minimum patch* size is > 0.5 ha • > 30% of the perennial understorey vegetation cover** is made up of native species • contained large trees above large tree benchmark (50 DBH) or trees with hollows.
Good (BC Act)	Three patches of Cumberland Plain Woodland in this condition were identified within the southern half of the subject site (Figure 8). These patches were characterised by a canopy dominated by *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus moluccana* (Grey Box). The midstorey was sparse and included *Bursaria spinosa* (Blackthorn), *Lycium ferocissimum* (African Boxthorn) and *Olea europaea* subsp. *18uspidate* (African Olive), or absent. The groundcover was dominated by native species including *Paspalidium distans*, *Sporobolus creber* (Western Rat-tail Grass), *Glycine tabacina* and *Einadia nutans* (Climbing Saltbush).	CEEC	No – Cumberland Plain Woodland in this condition did not meet condition thresholds because the patch size was <0.5 ha.
Poor (BC Act)	Cumberland Plain Woodland in poor (BC Act) condition was scattered throughout the subject site (Figure 8). Cumberland Plain Woodland in this condition contained an assemblage of canopy and midstorey species like that of the ecological community in good (BC Act) condition. However, Cumberland Plain	CEEC	No – Cumberland Plain Woodland in poor condition did not meet condition thresholds because < 30% of the perennial

Condition	Description	BC Act	EPBC Act and Justification#
	Woodland in poor (BC Act) condition was characterised by the dominance of exotic groundcover species including *Cenchrus clandestinus* (Kikuyu Grass), *Chenopodium album* (Fat Hen) and *Chloris gayana* (Rhodes Grass). Native species were also present in the groundcover, including *Einadia polygonoides*, *Portulaca oleracea* (Pigweed) and *Glycine tabacina*.		understorey vegetation cover** is made up of native species.
Derived Native Grassland (BC Act)	Derived native grasslands which result from the removal of woody strata are included in the BC Act listing of the ecological community (DPIE 2020b). Vegetation in this condition was dominant throughout the southern half of the subject site (Figure 9). These areas were dominated by a diverse range of native grasses and forbs, including *Bothriochloa macra* (Red Grass), *Cymbopogon refractus* (Barbed Wire Grass), *Themeda triandra* (Kangaroo Grass), *Cheilanthes sieberi*, *Desmodium varians* (Slender Tick-trefoil) and *Tricoryne elatior* (Yellow Autumn-lily).	CEEC -	No – Derived grassland and shrublands are not included as part of the nationally listed ecological community.

CEEC = critically endangered ecological community.
 # Based on key diagnostic features and condition thresholds (TSCC 2009).
** 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.*

4.1.2 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 the BC Act and a critically endangered ecological community under the EPBC Act.

The canopy of this ecological community is typically comprised of *Eucalyptus tereticornis* (Forest Red Gum), *E. amplifolia* (Cabbage Gum) and *Angophora floribunda* (Rough-barked Apple) (DPIE 2020b). The mid-storey contains *Acacia parramattensis* subsp. *parramattensis* (Parramatta Wattle), *Casuarina glauca* (Swamp Oak) and *Melaleuca linariifolia* (Flax-leaved Paperbark). Common groundcover species include *Microlaena stipoides* (Weeping Grass)*, Oplismenus aemulus* (Basket Grass)*, Dichondra spp., Entolasia marginata* (Bordered Panic)*, Solanum prinophyllum* (Forest Nightshade)*, Pratia purpurascens* (Whiteroot)*, Echinopogon ovatus* (Forest Hedgehog Grass)*, Desmodium gunnii* (Slender Tick Trefoil)*, Commelina cyanea, Veronica plebeia* (Creeping Speedwell)*.*

Field survey confirmed the presence of three small patches of River-Flat Eucalypt Forest in poor condition along watercourses in the northeast of the survey area (Figure 10). The canopy consisted of scattered *Angophora floribunda* (Rough-barked Apple). The midstorey was absent except for one *Melaleuca decora*. The groundcover was limited to exotic pasture grasses and forbs such as *Cenchrus clandestinus* (Kikuyu Grass) and *Plantago lanceolata* (Lamb's Tongues). This occurrence of the community only conforms to the endangered ecological community listed under the BC Act as the three small patches totalled 0.29 ha and is therefore less than 0.5 ha. Further, the groundcover did not contain 30% native groundcover species.

4.1.3 Exotic Cover

Vegetation mapped as Exotic Cover was prevalent throughout the survey area (Figure 11). Most of this vegetation was characterised by groundcover dominated by exotic pasture grasses. Infestations of *Olea europaea* subsp. *cuspidata* (African Olive) were prominent throughout this vegetation, especially near the southern boundary of the survey area. Canopy surrounding the residential dwelling near the eastern boundary of the survey area consisted almost entirely of planted *Phoenix canariensis* (Canary Island Date Palm).

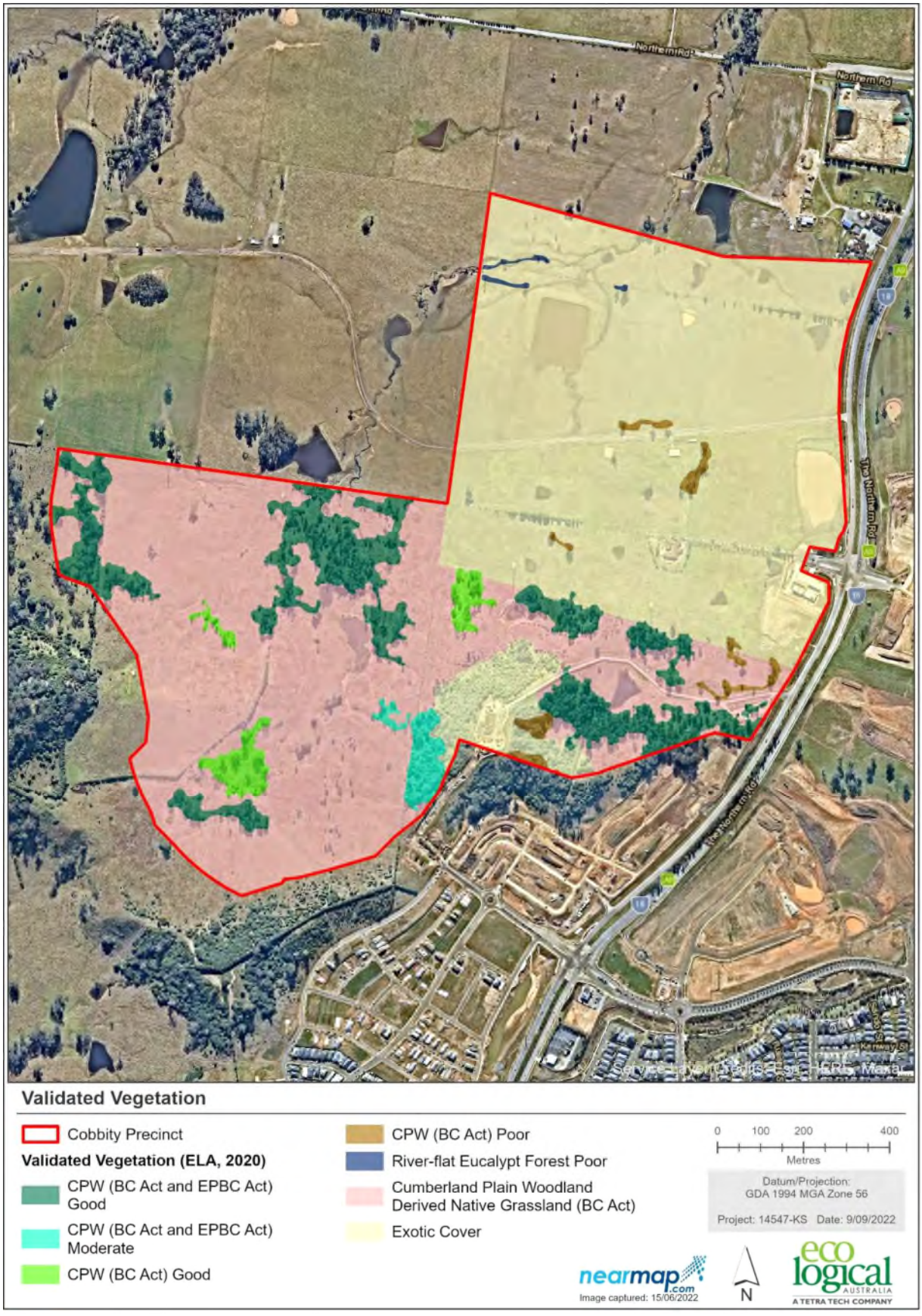

Figure 7: Vegetation communities and conditions identified during field survey.

Figure 8: Cumberland Plain Woodland identified in varying conditions. Top left: Good (BC Act and EPBC Act). Top right: Moderate (BC Act and EPBC Act). Bottom left: Good (BC Act). Bottom right: Poor (BC Act).

Figure 9: Derived Native Grassland (a sub-community of Cumberland Plain Woodland).

Figure 10: Poor condition River-Flat Eucalypt Forest.

Figure 11: Areas of exotic cover

4.1.4 Vegetation Community and Condition Assessment Area Calculations

Area calculations of each vegetation community within the subject site are provided Table 5.

Table 5: Summary of area (ha) occupied by vegetation communities and their condition.

Vegetation community	Condition	Area (ha)
Cumberland Plain Woodland	Good (BC Act and EPBC Act)	15.93
Cumberland Plain Woodland	Moderate (BC Act and EPBC Act)	1.78
Cumberland Plain Woodland	Good (BC Act only)	2.64
Cumberland Plain Woodland	Poor (BC Act only)	1.63
Cumberland Plain Woodland	Derived Native Grasslands (BC Act only)	66.54
River-Flat Eucalypt Forest	Poor (BC Act only)	0.29
	TOTAL Native Vegetation	**88.82**
Exotic Cover	N/A	83.87
	TOTAL	**172.69**

4.2 Validated ENV Area Calculations and Identification of any Further AHCVV

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:

- Validated Existing Native Vegetation.
- Additional High Conservation Value Vegetation: Vegetation which meets criteria a) and b) of the definition of ENV (i.e., a 10% of greater canopy cover and a patch size of greater than 0.5 ha) but was not mapped in the original conservation plan. This is a combination of mapping inaccuracies in the original mapping or changes to the condition and size of the vegetation on site since the Conservation Plan map production.

As the entire site is currently biodiversity certified, the 'existing native vegetation' on the site was not counted as a contribution to the 2,000-ha target for the Growth Centres. Areas of AHVCC within the subject site are presented in Table 6 and Figure 12.

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

	Certified Land	Non-Certified Land	Total
Mapped ENV in Draft Conservation Plan	0	0	**0**
Additional Native Vegetation (AHCVV)	17.46	0	**17.46**

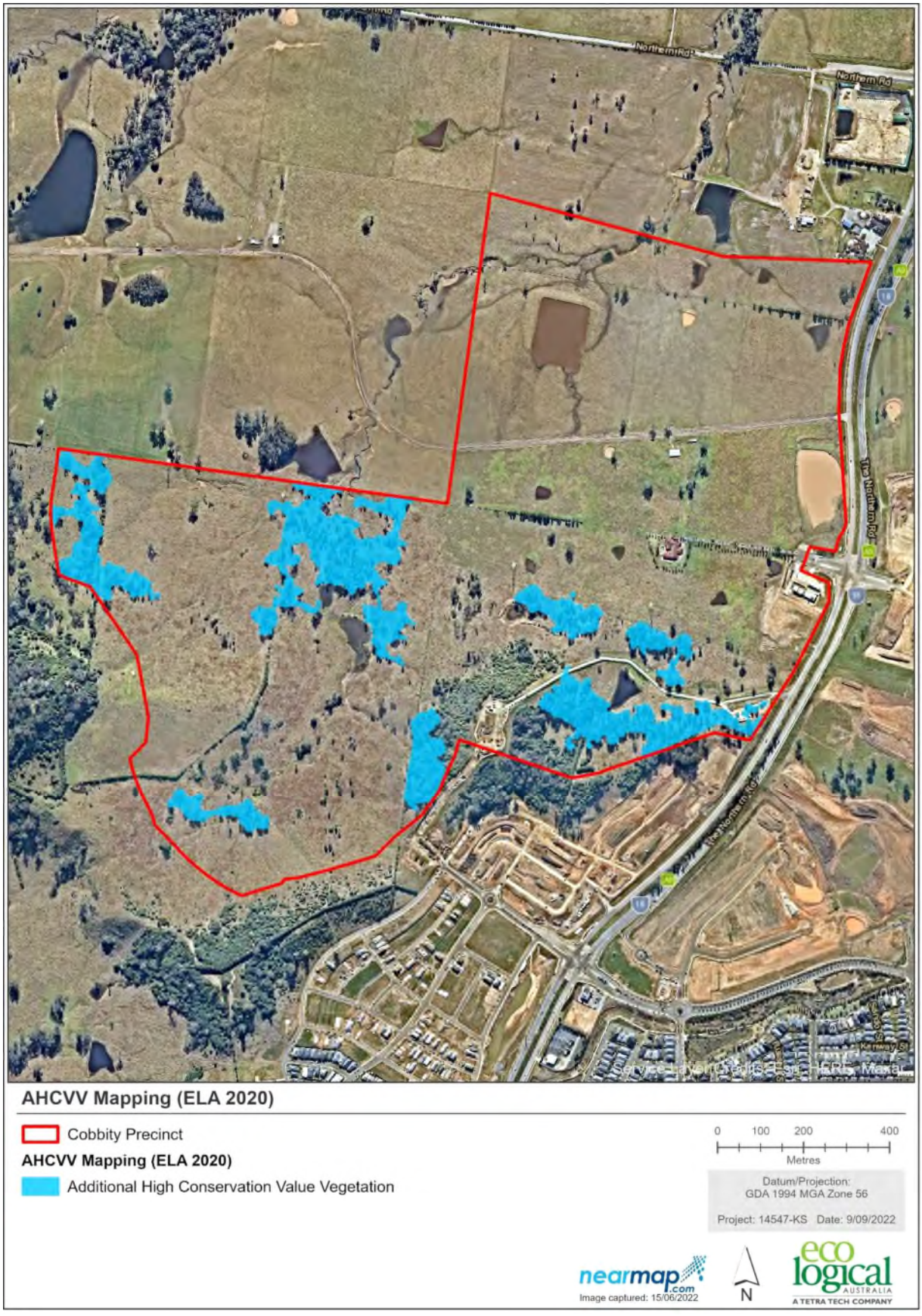

Figure 12: AHCVV within the subject site.

4.3 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 precinct which has been informed by the assessments (desktop and field) conducted in this report. Where land access was not available, the OEH 2013 Vegetation map was used to inform classification. The four classes are shown in Figure 13 and are described below:

- High Recovery Potential – native vegetation mapped as areas that meet the definition of 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 7.

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

Recovery potential class	Area (ha)
High	20.36
Moderate	73.03
Low	1.37
Very Low	77.92

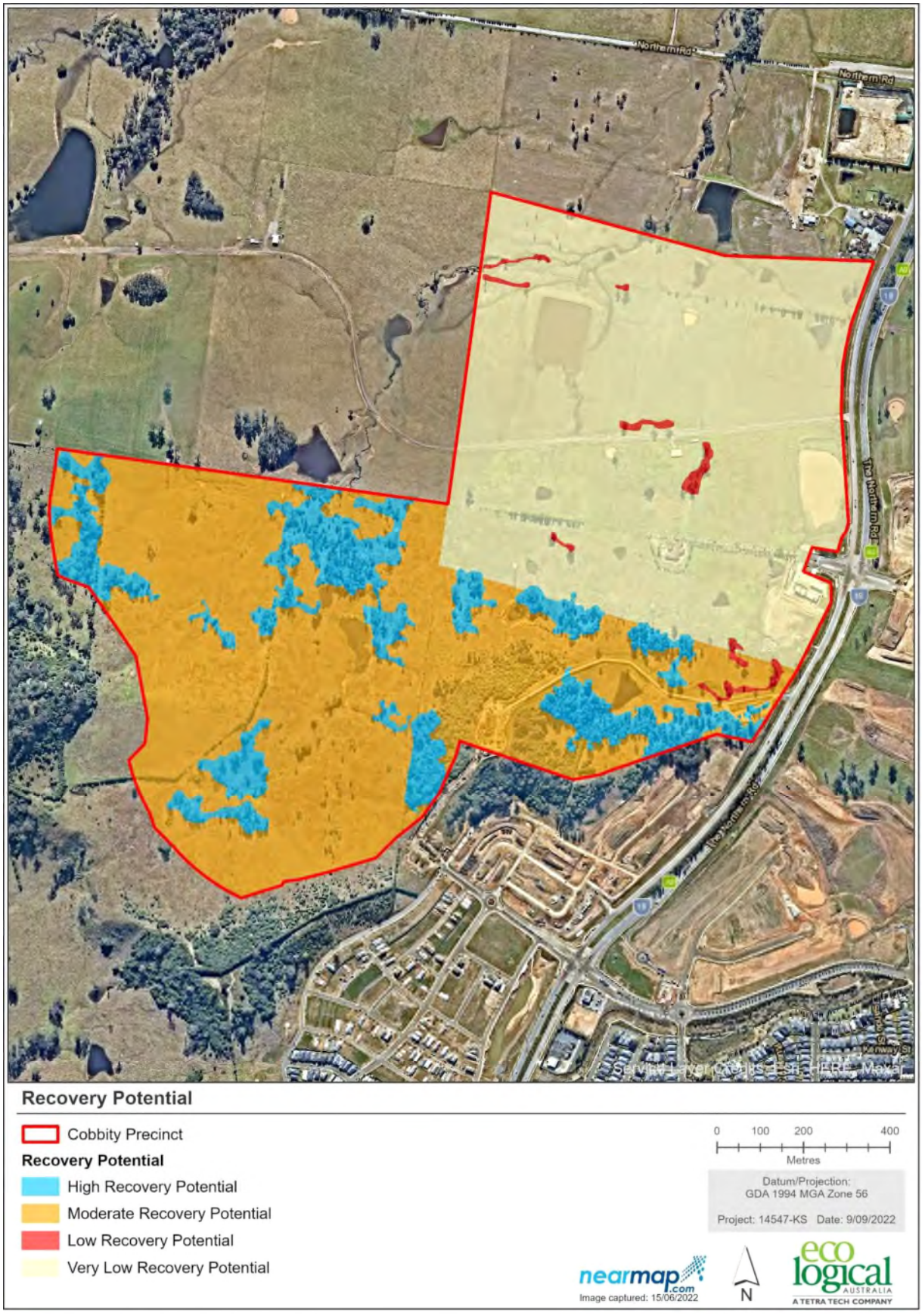

Figure 13: Recovery potential

4.4 Ecological Constraints Assessment

An ecological constraint ranking was derived by assessing size, condition, and recovery potential of an area (see Appendix A). Note that this assessment doesn't consider the fact that the land is currently biodiversity certified.

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.

The results of this analysis are presented in Table 8 and Figure 14.

Table 8: Area of different ecological constraints rankings identified within the subject site

Ecological constraints ranking	Area (ha)
High	20.36
Moderate	67.91
Low	84.42

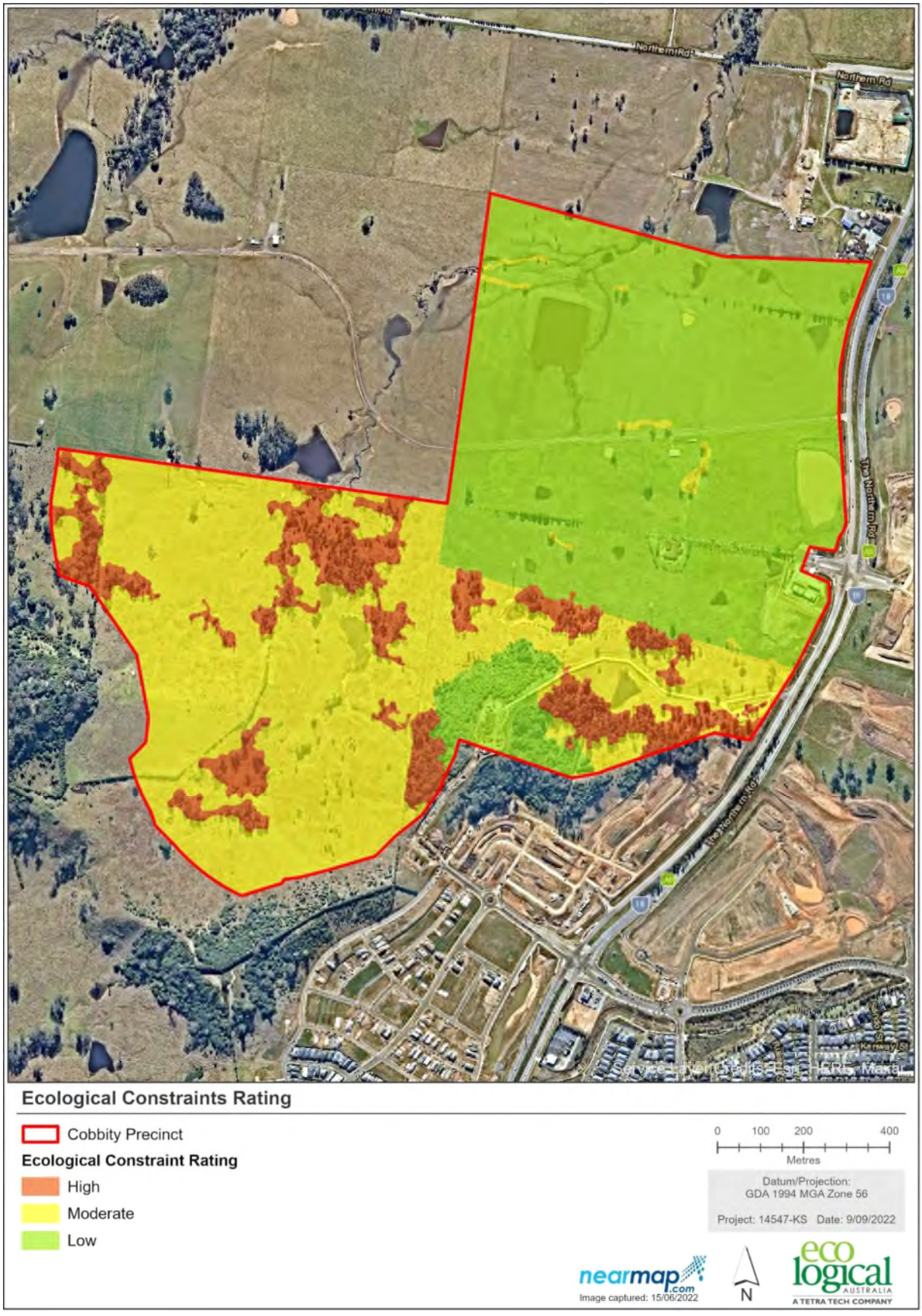

Figure 14: Ecological constraints analysis

4.5 Threatened Species Habitat

The following threatened flora species are associated with Cumberland Plain Woodland and were therefore identified as having the potential to occur within the subject site (Figure 15):

- *Cynanchum elegans*, listed as endangered under the BC Act and EPBC Act
- *Grevillea juniperina* subsp. *juniperina* (Juniper-leaved Grevillea), listed as vulnerable under the BC Act
- *Marsdenia viridiflora* subsp. *viridiflora* (Native Pear), listed as an endangered population under the BC Act
- *Pimelea spicata* (Spiked Rice-flower), listed as endangered under the BC Act and EPBC Act.

Habitat features for several threatened fauna species were identified within the survey area during field survey. These species have also been recorded within 5 km of the survey area (DPIE 2020a). The species and the habitat features relevant to them are presented in Table 9 and Figure 15.

Table 9: Threatened fauna species likely or with the potential to occur in the survey area.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat features
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	The survey area contained open eucalypt woodland and farmland adjoining woodland.
Daphoenositta chrysoptera	Varied Sittella	V	-	The survey area contained open eucalypt woodland.
Glossopsitta pusilla	Little Lorikeet	V	-	The survey area contained open eucalypt woodland and riparian areas.
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	The survey area contained open eucalypt woodland and riparian areas.
Hieraaetus morphnoides	Little Eagle	V	-	The survey area contained open eucalypt woodland and riparian areas.
Lathamus discolor	Swift Parrot	E	CE	Native canopy in the survey area was dominated by *Eucalyptus tereticornis*, a favoured feed tree of this species. .
Meridolum corneovirens	Cumberland Plain Land Snail	E	-	Leaf litter was present at the base of trees within Cumberland Plain Woodland in Good (BC Act and EPBC Act) and Moderate (BC Act and EPBC Act).
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	The survey area contained hollow bearing trees and intact sections of native vegetation.
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	The survey area contained intact sections of native vegetation.
Myotis macropus	Southern Myotis	V	-	The survey area contained hollow bearing trees and intact sections of native vegetation.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat features
Ninox strenua	Powerful Owl	V	-	The survey area contained intact sections of native vegetation.
Phascolarctos cinereus	Koala	E	E	The survey area contained favoured feed tree species *Eucalyptus tereticornis* and *Angophora floribunda*.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	The survey area contained intact sections of native vegetation.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	The survey area contained hollow bearing trees and intact sections of native vegetation.
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	The survey area contained hollow bearing trees and intact sections of native vegetation.

V = vulnerable, E = endangered, CE = critically endangered, - = Not Listed.

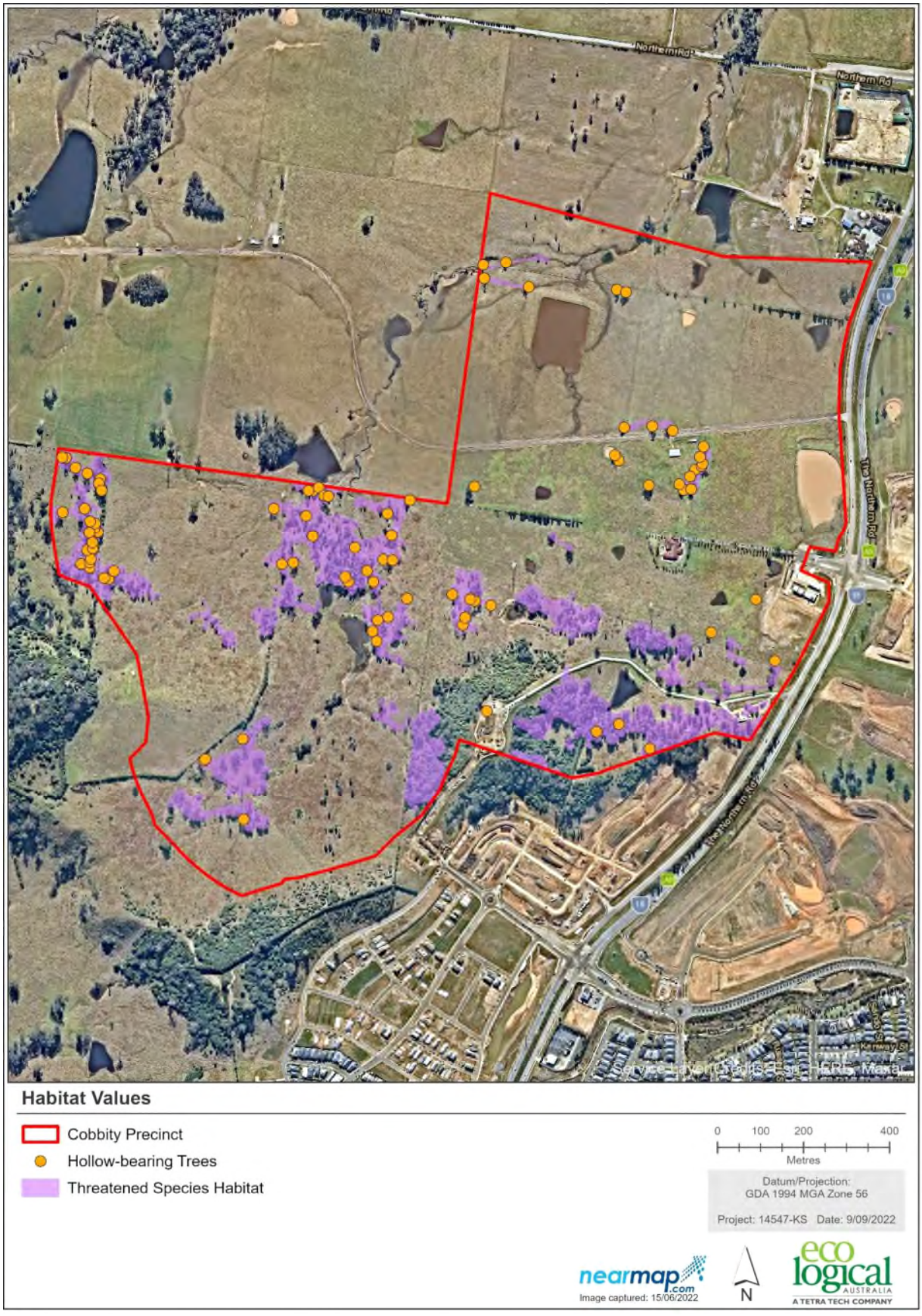

Figure 15: Areas of potential habitat for threatened species

5. Recommendations for Indicative Layout Plan

5.1 Recommendations for consistency with the Biodiversity Certification Order

No vegetation in this precinct counts towards the 2,000-ha target for the Growth Centres. However, the precinct does contain Cumberland Plain Woodland and River-Flat Eucalypt Forest in varying conditions, the protection of which would enhance biodiversity outcomes within the precinct and the broader growth centres. The precinct contains a total of 17.46 ha of native vegetation that meets the definition of AHCVV.

Riparian habitat throughout the site varied in quality but did include areas of Cumberland Plain Woodland and hollow bearing trees, therefore it is recommended that riparian zones be rehabilitated and form the core of the biodiversity outcome for the precinct. This area should be mapped Native Vegetation Retention under the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021*. The riparian corridor / Environmental Conservation Area within the ILP covers a total area of 16.35 ha. Riparian habitat and proposed management strategies is further discussed within the South Creek (South West) Precinct Riparian Assessment (ELA, 2024).

Infestations of *Olea europaea* subsp. *cuspidata* (African Olive), especially prominent near the southern boundary of the survey area, should be cleared. Retaining native canopy in this area of the subject site is recommended where possible.

Table 10 provides the amount of validated AHCVV, Cumberland Plain Woodland and River-flat Eucalypt Forest that will be protected through the ILP, within the Environmental Conservation area, as depicted in Figure 16 and Figure 17. Note this does not include native vegetation within the proposed drainage areas or existing transmission corridor within the riparian corridor.

In addition to what is proposed for protection within the Riparian Corridor, the ILP presents significant opportunities to retain further vegetation within open space areas and the easement. It is noted that the Proponent intends on retaining further native vegetation and validated AHCVV within open space areas through DCP and SEPP controls. Further, the ridgetop towards the southern area of the precinct around the water tower is proposed to be revegetated utilising species endemic to Cumberland Plain Woodland and River-flat Eucalypt Forest. Table 11 outlines the amount of validated AHCVV, Cumberland Plain Woodland and River-flat Eucalypt Forest that may be additionally protected in open spaces.

Protection of AHCVV is also consistent with Connecting with Country principles (Design + Planning 2024), which include riparian corridors in the open space network and the protection of sight lines and viewpoints that are significant to the surrounding environment. Retaining vegetation that is AHCVV and corresponds to the central riparian corridor within the precinct, provides ecological and cultural benefits by preserving natural connections throughout the landscape wherever possible.

Table 10: Amount of native vegetation proposed to be protected in ILP within Environmental Conservation (C2 zoned) area

	Within Precinct (ha)	Protected within Environmental Conservation (ha)	TOTAL Protected (ha)	Percentage Retained
Validated AHCVV	17.46	3.26	3.26	18.66%
Cumberland Plain Woodland (BC Act and EPBC Act)	17.72	3.26	3.26	18.39%
Cumberland Plain Woodland (BC Act)	4.28	0.16	0.16	3.82%
Cumberland Plain Woodland (BC Act – Derived native Grassland)	66.54	9.37	9.37	14.07%
River-flat Eucalypt Forest (BC Act)	0.29	0.18	0.18	62.39%

Table 11: Amount of native vegetation potentially protected in ILP within Open Space areas

	Within Precinct (ha)	Protected within Environmental Conservation (ha)	Potentially Protected within Open Space (ha)	Potentially Protected within Easement (ha)	TOTAL Potentially Protected (ha)	Percentage Potentially Retained
Validated AHCVV	17.46	3.26	1.71	0.15	5.12	29.32%
Cumberland Plain Woodland (BC Act and EPBC Act)	17.72	3.26	1.71	0.15	5.12	28.89%
Cumberland Plain Woodland (BC Act)	4.28	0.16	0.07	0.03	0.27	6.24%
Cumberland Plain Woodland (BC Act – Derived native Grassland)	66.54	9.37	1.78	0.67	11.82	17.76%
River-flat Eucalypt Forest (BC Act)	0.29	0.18	0.00	0.00	0.18	62.39%

5.2 Zoning, ownership, and management

Areas of vegetation that are to be protected or rehabilitated should have adequate protection via the Precinct Plans. The C2 Environment Conservation zone has been typically used in precinct plans for this purpose, although RE1 Recreation may also be used provided there is a clear objective to provide for maintenance or rehabilitation of biodiversity values. Where possible, putting the riparian area in a single public ownership and having it managed for conservation and low-impact recreation is a preferred outcome rather than having the land in multiple ownerships without public access.

The permissible uses within the C2 zone are shown below.

Table 12: Potential Environmental Zones

Zone	Permitted without consent	Permitted with consent	Prohibited
C2 Environmental Conservation	Nil	Drainage; Earthworks; Environmental facilities; Environmental protection works; Flood mitigation works; Information and education facilities; Kiosks; Recreation areas; Roads; Signage; Waterbodies (artificial)	Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any development not specified in item 2 or 3

Some precinct plans under the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021* (e.g., Blacktown Growth Centres Precinct Plan) require a Vegetation Management Plan to be prepared and implemented when residential land adjoining C2 zoned land is developed. If such a clause were to be included in the South Creek West Precinct Plan, its cost implications should be determined. It is therefore prudent to understand the government's expectations for these lands and developing a preferred outcome.

If areas where AHCVV is proposed to be retained within the open space network cannot be zoned C2, planning controls should be put in place within the DCP to ensure protection. Examples, as currently stated in the Camden Growth Centre Development Control Plan, may include:

- Native trees and other vegetation are to be retained where possible by careful planning of development to incorporate trees into areas such as road reserves and private or communal open space.
- All existing indigenous trees shall be retained or replaced where removal is unavoidable. Where approval is given to remove trees, appropriate replacement planting using similar species will be required.

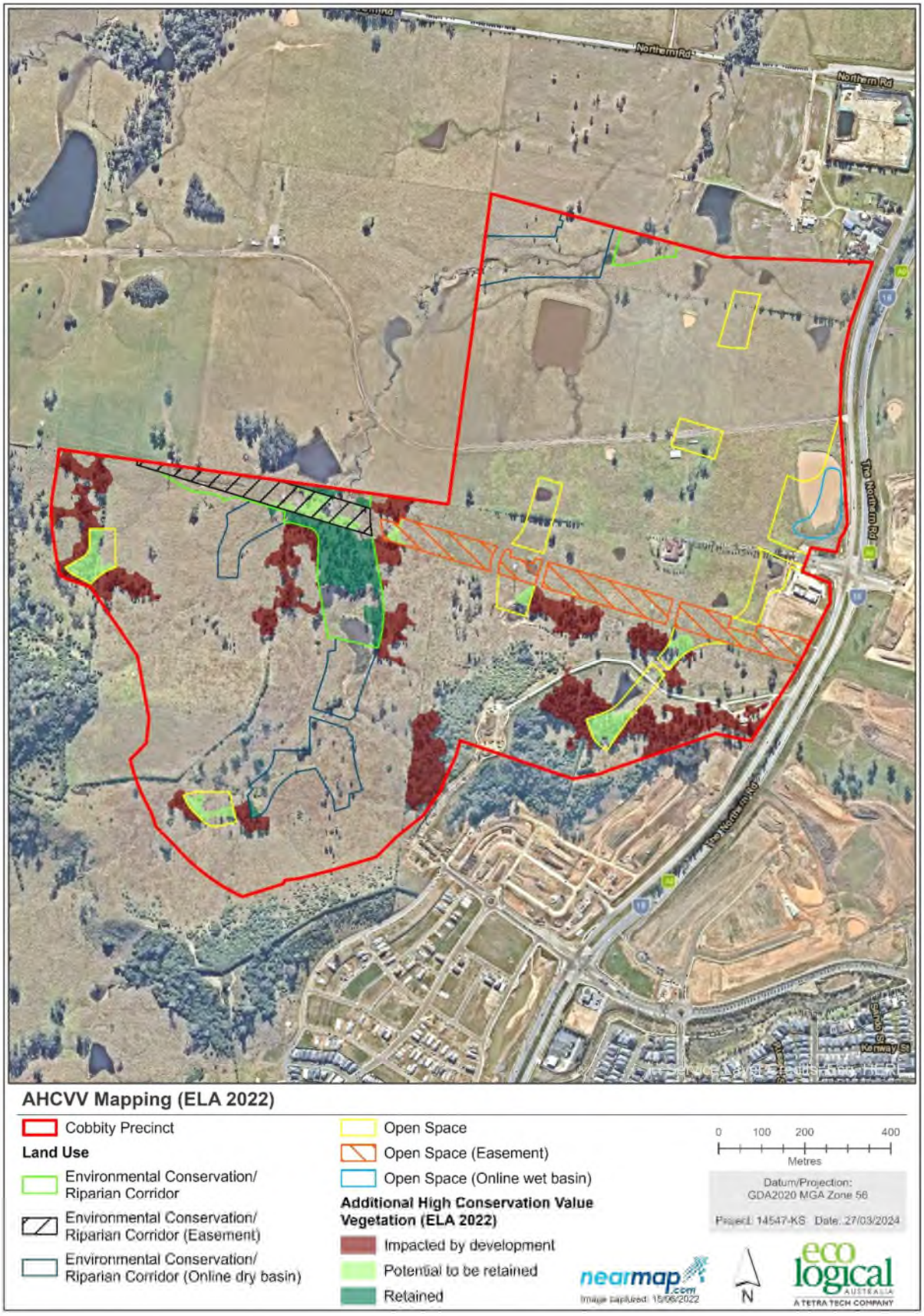

Figure 16: AHCVV to be retained within ILP

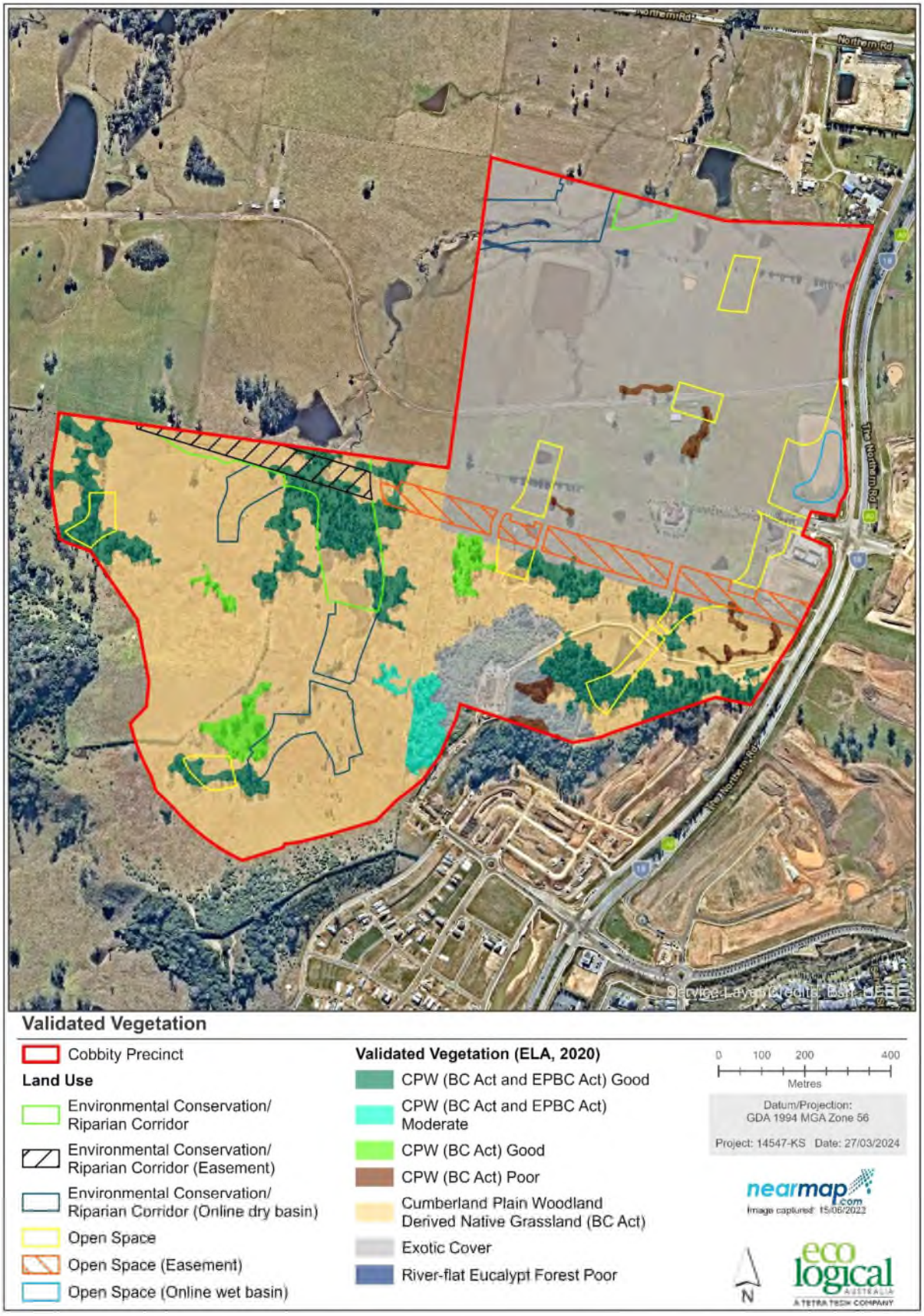

Figure 17: Native vegetation to be retained within ILP

6. Conclusion

The aim of this report is to identify key ecological constraints to assist design of an ILP. The site was found to contain several significant environmental features, including Cumberland Plain Woodland (a critically endangered ecological community under both the BC Act and EPBC Act), River-Flat Eucalypt Forest (an endangered ecological community under the BC Act) and habitat features associated with potential habitat for several threatened flora and fauna species.

No vegetation in the precinct was identified for protection in the Draft Growth Centres Conservation Plan 2007. Desktop assessment and field survey identified 17.46 ha of AHCVV.

The whole of Sub-Precinct 5 is biodiversity certified. Therefore, Sub-Precinct 5 is not obligated to retain any areas of ENV. The precinct, however, contains a total of 17.46 ha of native vegetation that meets the definition of AHCVV therefore, providing opportunity to provide biodiversity outcomes beyond what was anticipated by the biodiversity certification by protecting native vegetation in riparian areas and their adjoining lands where possible.

The ILP will protect 3.26 ha of validated AHCVV, through the protection of native vegetation within the proposed Environmental Conservation area. Through specific DCP and SEPP controls, there are also opportunities to further protect 1.86 ha of AHCVV within the open space network, which would also support Connecting to Country principles (Design + Planning 2024).

The ILP will also protect 12.79 ha of Cumberland Plain Woodland in varying conditions and 0.18 ha of River-flat Eucalypt Forest within the Environmental Conservation area.

7. References

Cropper, S. (1993). Management of Endangered Plants. CSIRO Publications, East Melbourne, Victoria.

Department of the Environment and Energy (DotEE) 2020b. Species Profile and Threats Database. Available http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl .

Design + Planning 2024. Cobbity ILP – Designed with Country [DRAFT ISSUE]. 16 February 2024. Prepared for BHL.

NSW Department of Planning, Industry and Environment (DPIE) 2006. Order to confer biodiversity certification on the State Environmental Planning Policy (Sydney Region Growth Centres) 2006. Available: https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/Orders-register/western-sydney-growth-centres-order.pdf?la=en&hash=18163D2D08ECEA8B5BF9394E77299A102CFF9F47

NSW Department of Planning, Industry and Environment (DPIE) 2020a. Threatened Species Database (5 km radius search). DPIE Sydney, NSW.

NSW Department of Planning, Industry and Environment (DPIE) 2020b. Threatened Species Profiles. Available: http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?

Eco Logical Australia Pty Ltd (ELA) 2003. 'Managing Sydney's Urban Growth: Ecological Assessment South West Subject site'. Unpublished report prepared for Planning NSW. Available: https://www.planning.nsw.gov.au/-/media/Files/DPE/Reports/turner-road-ecological-assessment-2007-03.pdf

Growth Centres Commission 2007. Growth Centres Conservation Plan: Exhibition Draft February 2007. Available: https://www.planning.nsw.gov.au/-/media/Files/DPE/Plans-and-policies/growth-centres-conservation-plan-exhibition-draft-2007-02.pdf

Ian Perkins Consultancy Services and Aquila Ecological Surveys (IPC & AES) (2002). Harrington Park Stage 2. Ecological assessment. Unpublished report for Harpak Pty Ltd. Available: https://www.planning.nsw.gov.au/-/media/Files/DPE/Reports/turner-road-ecological-assessment-2007-03.pdf

NSW Government (n.d.). South Creek West Release Area – Precinct 5: Biodiversity and Riparian Corridors Proposal Request.

NSW National Parks and Wildlife Service (NPWS) 2002. NPWS Annual Report 2001-2002: Conservation assessment. Available: https://www.environment.nsw.gov.au/resources/about/annualReport010201ConservationAssessment.pdf

NSW Office of Environment and Heritage (OEH) 2016. 'The Native Vegetation of the Sydney Metropolitan Area'.

Threatened Species Scientific Committee (TSSC) 2009. Advice to the Minister for the Environment, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on an Amendment to the List of Threatened Ecological Communities under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Available at: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/112-listing-advice.pdf

Appendix A Methodology

A1 Field Survey

Field survey was conducted by ELA ecologists Alex Gorey and Carolina Mora. 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
- 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.

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 AvenzaMaps on a mobile device.

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).

A2 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 13 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 13: 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

A3 Ecological constraints

An ecological constraints analysis based on a methodology previously used by ELA elsewhere in Western Sydney was applied across the subject site. 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 Figure 18. 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 14, Table 15 and Table 16.

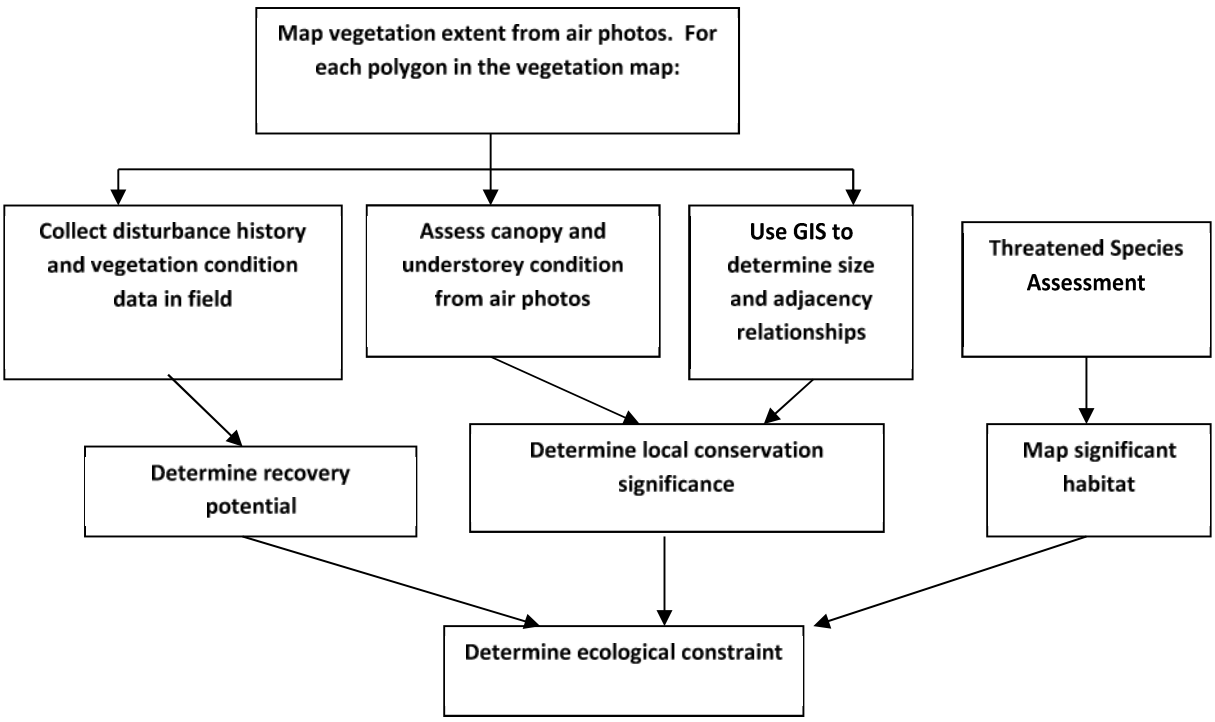

Figure 18: Ecological Constraints Flowchart

Table 14: 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 15: 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 16: 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

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1300 646 131
www.ecoaus.com.au