Greenvalleys Mountain Bike Trail Planning Proposal Flora and Fauna Assessment

Greenvalleys Mountain Bike Park Pty Ltd

ecological AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au

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Project Manager	Hugh Shouldice
Prepared by	Joseph Gleeson and Ali Jeffery
Reviewed by	Frank Lemckert
Approved by	Bethany Lavers
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Template 2.8.1

Contents

List of Figures

List of Tables

Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
BV Map	Biodiversity Values Map
CEEC	Critically Endangered Ecological Community
DCP	Development Control Plan
DBH	Diameter at Breast Height
Cth DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
DPI	Department of Industries
DDP	Dam De-watering Plan
DPE	Department of Planning and Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
FM Act	*Fisheries Management Act 1994*
HBT	Hollow-bearing Tree
LEP	Local Environmental Plan
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NRAR	Natural Resources Access Regulator
PCT	Plant Community Type
SAII	Serious and Irreversible Impacts
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community
VMP	Vegetation Management Plan
WM Act	*Water Management Act 2000*

1. Introduction

1.1. Background

Eco Logical Australia Pty Ltd (ELA) was engaged by Greenvalleys Mountain Bike Park Pty Ltd to prepare a Flora and Fauna Assessment to support a Planning Proposal at 2926 Illawarra Highway, Tongarra, Lot 1 DP 881927 (Greenvalleys Mountain Bike Park). The Planning Proposal seeks to include the existing mountain bike park facility into Schedule 1 (Allowance Clause) of the Shellharbour Local Environmental Plan 2013 and thereby permit use of the existing mountain bike park as a *"Recreation Facility (Outdoor)"* pursuant to Clause 2.5 of the Shellharbour LEP 2013.

The existing Mountain Bike Park is within the eastern part of the study area, which has previously been permitted by Council on a temporary basis pursuant to the provisions of Clause 2.8 of the Shellharbour LEP 2013 (DA0328/2016). The proposal seeks to enable the mountain bike facility to operate on a permanent basis.

ELA has previously prepared two (2) Flora and Fauna Assessments (FFA) for Greenvalleys, as follows:

- 2011 Flora and Fauna Assessment Report (ELA 2011):

Eco Logical Australia Pty Ltd (ELA) was engaged by Greenvalleys Mountain Bike Park Pty Ltd to prepare a FFA report to accompany a rezoning and subsequent development application for a mountain bike riding facility at Lot 1 DP 881927, Illawarra Highway Tongarra. Under this assessment, approval was sought for a shuttle road, downhill mountain bike trail and car park.

- 2019 Flora and Fauna Assessment Report (ELA 2019):

Eco Logical Australia Pty Ltd (ELA) was engaged by Greenvalleys Mountain Bike Park Pty Ltd to prepare a FFA to accompany an application to modify an Existing Temporary Use permit (DA0328/2016) to allow the operation for an additional two years of mountain bike riding facilities / activities including competition races at 2926 Illawarra Highway, Tongarra (Lot 1 DP 881927).

- 2024 Flora and Fauna Assessment Report (ELA 2024):

This report addresses direct and indirect impacts of ten (10) existing bike tracks with a 1m width and a 5m buffer zone on either side of the tracks and associated infrastructure including spectator access zones, competitor access, marshalling zones, parking, shuttle road and sediment control. The proposal would not result in further vegetation removal. Areas outside of the eastern portion of the study area will retain their current land zoning under the LEP with no additional permitted use proposed in these areas.

1.2. Planning Proposal

This Flora and Fauna Assessment (FFA) has been prepared by Eco Logical Australia (ELA) Pty Ltd on behalf of Greenvalleys Mountain Bike Park Pty Ltd to support a Planning Proposal. The study area is located on the southern part of land at 2926 Illawarra Highway, Tongarra, Lot 1 DP 881927 (see Figure 1). The Greenvalleys Mountain Bike Park (GVMTBP) is located within the eastern part of the study area and extends south as far as Lakeview Road. The proposal seeks to:

- Enable the mountain bike facility at the site to operate on a permanent basis. It is the Mountain Bike Park in its existing form that is proposed to operate on a permanent basis – NO new bike trails or other development works are proposed.
- Amend the *SP2 Infrastructure – Classified Road* Zone that applies to the part of the site that includes the Mountain Bike Park facility. Specifically, the intended outcome is to reduce the width of this zone with the affected land being rezoned as *RU1 Primary Production* – consistent with land to the south.

The part of the site located to the north of the Illawarra Highway does not form part of the Planning Proposal. The Planning Proposal seeks to reduce the width of the SP2 Infrastructure zone that affects the Mountain Bike Park. This involves also reducing the extent of the associated underlying Road Widening Order (RWO). The proposed rezoning is from SP2 to RU1 Primary Production, which is consistent with adjacent land to the south. No new land uses are proposed in relation to this land zoning adjustment. The purpose of the zoning change is to enable the existing Mountain Bike Park to achieve compliance with the requirement that there should be no permanent infrastructure located within the RWO (with the exception of overflow car parking). All other planning controls applying to the site will remain unchanged.

Associated facilities for the existing Mountain Bike Park include: spectator access zones, competitor access, marshalling zones, parking, shuttle road and sediment control. The ten tracks vary in width, therefore, to simplify the assessment, a standard 1 m width was applied to assess the impact area of the bike tracks as a worst-case scenario. Indirect impacts have been considered in this assessment, which was defined to potentially occur within a 5 m buffer zone on either side of the bike tracks.

1.3. Purpose

This report outlines the terrestrial and riparian ecological constraints across the study area and assesses the impacts of the permanent use of ten existing bike tracks. This includes information relating to relevant environmental planning instruments, threatened species and ecological communities, entry requirements into the Biodiversity Offset Scheme (BOS) and implications of the scheme, if any, for the Planning Proposal.

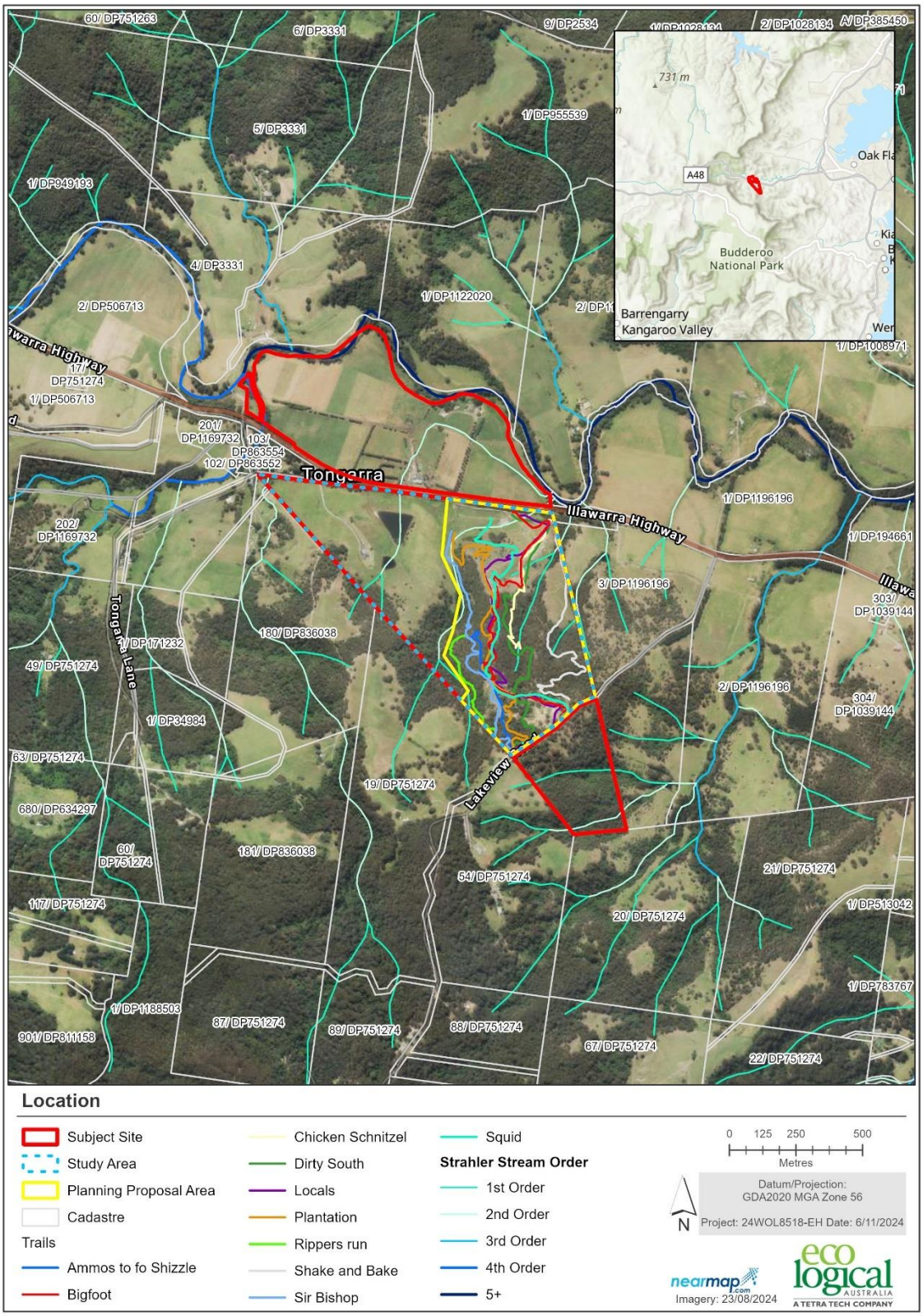

Figure 1: Location of Greenvalleys Mountain Bike Park and its bike tracks

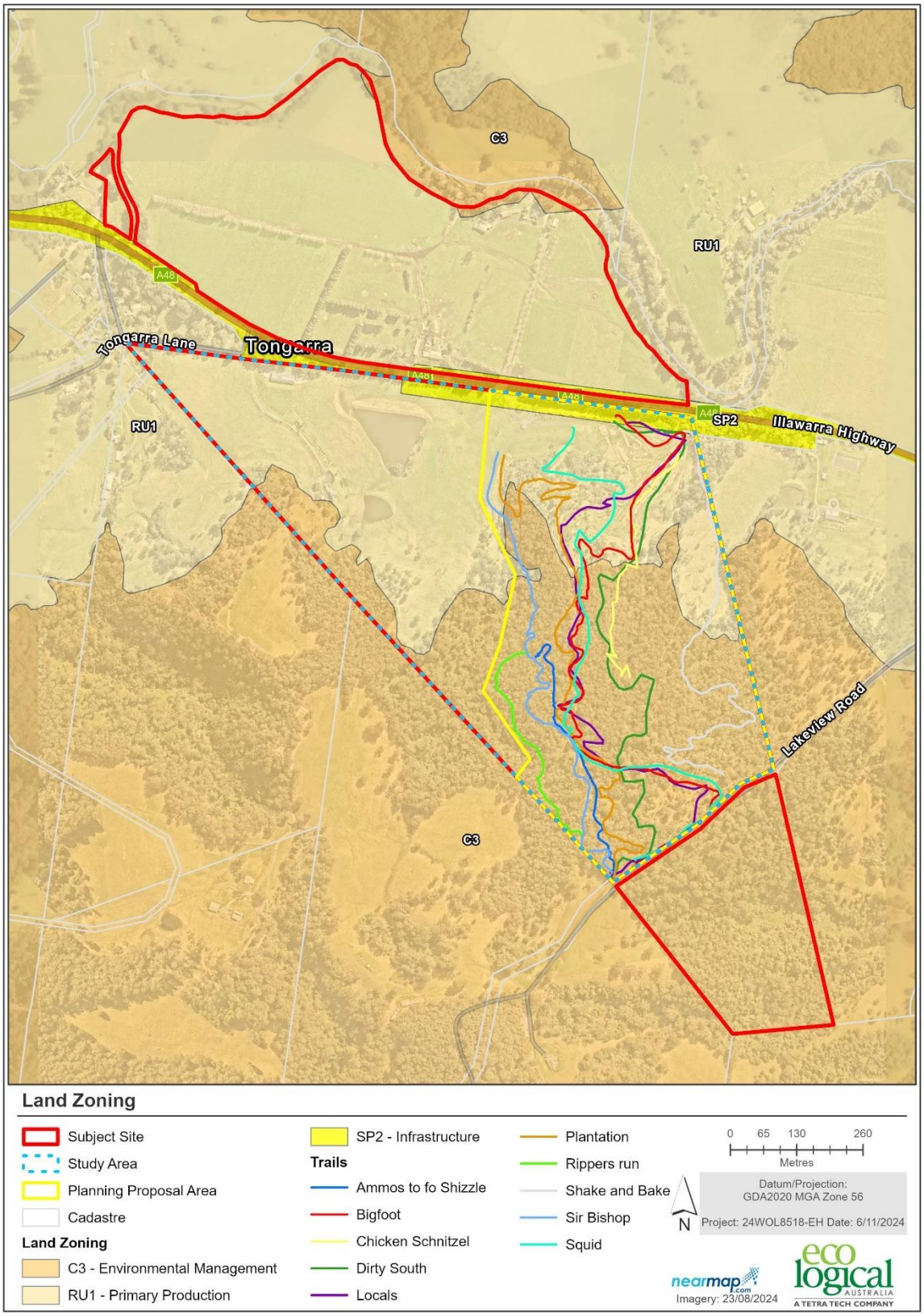

Figure 2: Land use zoning of the study area under the Shellharbour LEP

2. Legislative context

Table 1: Legislative context

Name	Relevance to the project
Commonwealth	
***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**	The EPBC Act aims to protect Matters of National Environmental Significance (MNES) including wetlands of international importance, threatened species and communities and listed migratory species. An action that may or is likely to have a significant impact on MNES should be referred to the Commonwealth to determine whether it is a Controlled Action that requires approval from the Commonwealth. The MNES that have been considered during this assessment are: • Listed threatened species and communities • Listed migratory species. Depending on the scale of impacts to MNES listed under the EPBC Act, works outside of the scope of the Planning Proposal may require a referral under the EPBC Act. MNES of particular relevance include Illawarra and South Coast Lowland Forest and Woodland TEC within the study area.
State	
***Environmental Planning and Assessment Act 1979* (EP&A Act)**	The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals. This Act provides for the creation of State Environmental Planning Policies (SEPPs), Local Environmental Plans (LEPs) and Development Control Plans (DCPs). Planning proposals are assessed under Part 3 of the EP&A Act. It is typical for planning proposals to consider the Biodiversity Offset Scheme (BOS). More information on this is discussed below.
***Biodiversity Conservation Act 2016* (BC Act)**	The BC Act outlines the assessment requirements to determine whether a proposed activity (under Part 4 of the EP&A Act) is likely to significantly affect threatened species or ecological communities or their habitats, under section 7.3, and whether the Biodiversity Offsets Scheme (BOS) will be triggered. It is an expectation of many local Councils that these impacts be considered in planning proposals (under Part 3 of the EP&A Act). If the Planning Proposal exceeds the BOS thresholds as set out in Part 7 of the Act and Part 7 of the *Biodiversity Conservation Regulation 2017* (BC Regulation), are required to undertake the ecological assessment in accordance with the Biodiversity Assessment Method (BAM), including the preparation of a Biodiversity Development Assessment Report (BDAR). The triggers to enter the BOS include: • Clearing of native vegetation above the area threshold permitted for the minimum lot size i. <0.25 clearing threshold (for a minimum lot size of less than 1 ha) ii. <0.5 ha clearing threshold (for a minimum lot size of 1 ha to less than 40 ha) • Affecting land that is mapped as having high biodiversity value on the Biodiversity Values (BV) map • If the Planning Proposal is determined to have a significant impact on any threatened flora, fauna or ecological communities determined through the application of s7.3 of the Act.

Name	Relevance to the project
Biodiversity Conservation Regulation 2017	The Biodiversity Values Map (BV Map) identifies land with high biodiversity value, as defined by the *Biodiversity Conservation Regulation 2017*. There is no BV land that intersects the study area. The BV land that does exist, intersects the part of Lot 1 that is south of Lakeview Road, which is not part of the study area for this Planning Proposal.
Fisheries Management Act 1994 (FM Act)	The objects of the FM Act are to conserve, develop and share the fishery resources of the State for the benefits of present and future generations. The Act provides protection and approval processes for activities which may impact on threatened species, protected marine vegetation or involve dredging, reclamation or obstruction of fish passage. Please refer to the Riparian Assessment report (ELA 2024), which discusses Key Fish Habitat in the study area and the FM Act.
***Biosecurity Act 2015* (BS Act)**	The *Biosecurity Act 2015* provides a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers. Implementation of the Act for weeds is supported by Regional Strategic Weed Management Plans (RSWMP) developed for each region in NSW. Priority weeds and Weeds of National Significance (WoNS) within the study area are identified in this assessment to highlight potential weed management issues.
***Water Management Act 2000* (WM Act)**	The main objective of the *Water Management Act 2000* (WM Act) is to manage NSW water in a sustainable and integrated manner that will benefit current generations without compromising future generations' ability to meet their needs. The WM Act is administered by NSW DCCEEW Water and establishes an approval regime for activities within waterfront land, defined as the land 40 m from the highest bank of a river, lake or estuary. A Controlled Activity Approval (CAA) is typically required for work within waterfront land. Development constraints for the study area in association with the WM Act are outlined in this report to identify potential riparian considerations for the Planning Proposal. Please refer to the Riparian Assessment report (ELA 2024), which discusses Key Fish Habitat in the study area and the FM Act. At DA stage, riparian areas will require vegetated riparian zones (VRZ) either side of the stream, of widths according to their Strahler stream order: • 1st order = 10m • 2nd order = 20m • 3rd order = 30m • 4th order = 40m The width of these VRZs is illustrated in Figure 6 will be considered in the development application stage. The Riparian Assessment (ELA, 2024) addresses the constraints of the study area in relation to the WM Act.
Environmental Planning Instruments	
State Environmental Planning Policy (Biodiversity and Conservation) 2021	This new State Environmental Planning Policy (SEPP) came into effect on March 1 2022 and among others has consolidated the following SEPPs: • Sydney Drinking Water Catchment SEPP 2011 (now chapter 8) • The Vegetation in Non-Rural Areas SEPP 2017 (now chapter 2) • Koala Habitat Protection SEPP 2021 (SEPP KHP) (now chapter 4). The study area is not mapped within the Sydney drinking water catchment and therefore this chapter of the SEPP does not apply. The Vegetation in Non-Rural Areas SEPP 2017 aimed to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation. The provisions of this SEPP have been included in the Biodiversity and Conservation SEPP in Chapter 2. Chapter

Name	Relevance to the project
	2 applies to development that does not require consent. The Planning Proposal relates to land in a rural area and no vegetation removal is proposed. Chapter 4: Koala Habitat Protection 2021 (SEPP KHP) contains the land-use planning and assessment framework for Koala habitat within the Metropolitan Sydney and Central Coast. Chapter 4 aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline. Shellharbour LGA is not listed in Schedule 2 of the Biodiversity and Conservation SEPP. Furthermore, this report assesses the biodiversity constraints for the Planning Proposal area that seeks to enable the permanent use of an existing mountain bike park facility - no vegetation removal is proposed. Therefore the Chapter 4 does not apply to the study area.
State Environmental Planning Policy (Resilience and Hazards) *2021*	The study area is not located within land to which this SEPP applies.
Shellharbour City Council Local Environment Plan 2013 (LEP)	The objective of the planning proposal is for the approval of an additional permitted use for private recreation existing Mountain Bike Park. The Planning Proposal will need to adhere to the planning objectives of each land zone. The study area is zoned RU1 and C3 under the Shellharbour City Council LEP. Within these zones, a temporary use permit is permissible with consent. The site is also covered by the Biodiversity Overlay which requires consideration of matters listed in section 6.5. Council will need to consider if the Planning Proposal is likely to have; • any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and • any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and • any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and • any adverse impact on the habitat elements providing connectivity on the land, and • any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development. This is addressed in section 5 of this report.

3. Methodology

3.1. Literature and data review

Information from the previous FFA (ELA 2019) was used as the basis for this assessment, including findings from extensive field surveys. Additional field surveys were considered to not be required for this assessment. However, database searches conducted for the previous FFA are greater than 6 months old and were updated for this assessment.

A desktop review of relevant background literature and databases was undertaken in order to identify ecological values.

The following information and data sources were reviewed as part of the desktop review.

- BioNet (Atlas of NSW Wildlife) database search (5 km) for threatened species, endangered populations listed under the BC Act (NSW DCCEW 2024a).
- EPBC Act Protected Matters Search Tool (PMST) (5 km) for Matters of Environmental Significance (MNES) listed under the EPBC Act (Cth DCCEEW 2024).
- NSW Threatened Species Profiles (NSW DCCEW 2024c).
- NSW State Vegetation Type Map (NSW DCEEW 2024d)
- NSW Bionet Information System (VIS) Classification (NSW DCCEEW 2024e)
- Previous Flora and Fauna Assessment Reports prepared by ELA (ELA 2011 & 2019).
- Hydroline Spatial Dataset (DCCEEW 2022).
- Soil Landscapes of the Kiama 1:100,00 Sheet Map (Department of Conservation and Land Management, Sydney 1992).
- Shellharbour Local Environmental Plan 2013 updated maps.

Aerial photography of the study area and surrounds were also used to investigate the extent of native vegetation cover and landscape features in the study area.

The BioNet Atlas (5 km radius) and Protected Matters Search Tool (5 km radius) searches were performed around the co-ordinates -34.581262, 150.700785 on 17 November 2022. The results of these searches were combined to produce a list of threatened flora, fauna and ecological communities considered likely to occur or utilise the study area. The likelihood of occurrence for each species was determined using recent records, the likely presence of suitable habitat and knowledge of the species' ecology. A list of species (defined as "yes", "likely" or having "potential") was then used to inform the need for any targeted surveys. The terms for the likelihood of occurrence are listed in Appendix B.

3.2. Field Survey

Flora and fauna surveys of the study area were undertaken as part of a previous FFA (ELA 2019a) on 27 August and 4 October 2019 by three ELA ecologists for a total of 28 person hours. The results of this survey were used in this assessment and are considered valid because it was undertaken within 5 years in accordance with the Threatened Biodiversity Survey and Assessment Guidelines (DPE 2004). The site was more recently revisited on 18 July 2024 by ELA Ecologists Joseph Gleeson and Bronwyn Callaghan to validate the vegetation consistent with the updated NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) East Coast Plant Community Type classifications. A previous flora

and fauna survey of the study area was undertaken on 18 March 2011 by ELA ecologist Ryan Smithers (ELA 2011).

The study area was traversed on foot and focused on the following:

- Validation of existing vegetation mapping, assigning vegetation mapping to Plant Community Types (PCTs), determining the condition of PCTs present and assessing whether they conform to any Threatened Ecological Communities (TECs).
- Identification of habitat features for potential threatened flora and fauna species within the study area, including hollow bearing trees, woody debris, wetland areas or creek lines.
- Targeted survey for *Solanum celatum.*
- Opportunistic fauna sightings.

3.2.1. Flora Survey Methods

Detailed botanical surveys were conducted within the study area on 27 August 2019 and 4 October 2019 by ELA ecologists Meredith Henderson, Alex Gorey and Rachel Brown. The site was more recently revisited on 18 July 2024 by ELA Ecologists Joseph Gleeson and Bronwyn Callaghan.

The study area was traversed on foot to identify the vegetation communities present. Where the boundaries of vegetation communities differed from those mapped, they were modified using hard copy maps or using a rugged tablet with spatial data digitally amended.

3.2.2. Threatened fauna habitat assessment

The presence of threatened fauna species identified during the literature and data review as being likely or having potential to occur in the study area was determined through a habitat assessment. Where important habitat features such as rock outcrops, tree hollows, dams, ponds, streams, deep leaf litter or abandoned buildings were observed, their location was noted. Hollow bearing trees, where present, were marked spatially using either a handheld GPS unit or Avenza Maps on a mobile phone.

3.2.3. Targeted survey for *Solanum celatum*

Targeted survey for *Solanum celatum* were conducted throughout the study area using the random meander method. When an individual was identified, photographs of the specimen were taken and the location marked spatially using either a handheld GPS unit or Avenza Maps on a mobile phone.

3.2.4. Opportunistic fauna observations

Opportunistic fauna surveys involved observations of animal activity, habitat surveys and searches for indirect evidence of fauna. Diurnal mammal searches were conducted throughout the study area, with emphasis on searches for scats, tracks, burrows, diggings and scratchings. Bird and reptile searches were conducted across the study area, involving both visual and aural detection of species. Specific searches were conducted for habitats or resources of relevance for those threatened fauna species known from the general region, or species, which might be anticipated to occur given the vegetation communities and habitats present. Opportunistic records of all fauna species observed were maintained throughout the survey period, and an inventory was compiled of all species recorded during the investigations.

3.2.5. Survey limitations

Targeted survey for threatened flora and fauna species (with the exception of *Solanum celatum*) considered likely to occur was not conducted during the field survey. Instead, an assessment of habitat features was undertaken to determine the suitability of the study area to provide habitat. This was considered sufficient to assist in determining whether any threatened species were likely to be present.

The results of fauna surveys can be optimised by conducting investigations over a long period to compensate for the effects of unfavourable weather, seasonal changes and climatic variation. In general, the longer the survey the more species will be detected. Results can also be improved by using a wide range of techniques, since some species are more likely to be detected by a particular method. Such techniques include scat analysis, small-cage trapping, pitfall trapping, hair tubing and harp trapping. However, surveys are subject to constraints that determine the amount of time allocated, the methods used and the timing of the work. Thus, the results should be viewed in the light of these limitations. The fauna detected during the survey period are a guide to the fauna present, but are not a definitive list of the species occurring in the study area. Nevertheless, the techniques used in this investigation are considered adequate to assess the effects of the proposal on fauna and flora species.

4. Results

4.1. Literature and data review

4.1.1. Biodiversity mapping

Sensitive biodiversity mapped under the Biodiversity Values Map (BV Map) and natural resources mapped under Council's *Natural Resources - Terrestrial Biodiversity* mapping are shown on Figure 3.

All the native vegetation within the study area is mapped under Council's *Natural Resources – Terrestrial Biodiversity* mapping. The study area does not contain BV mapped areas (Figure 3).

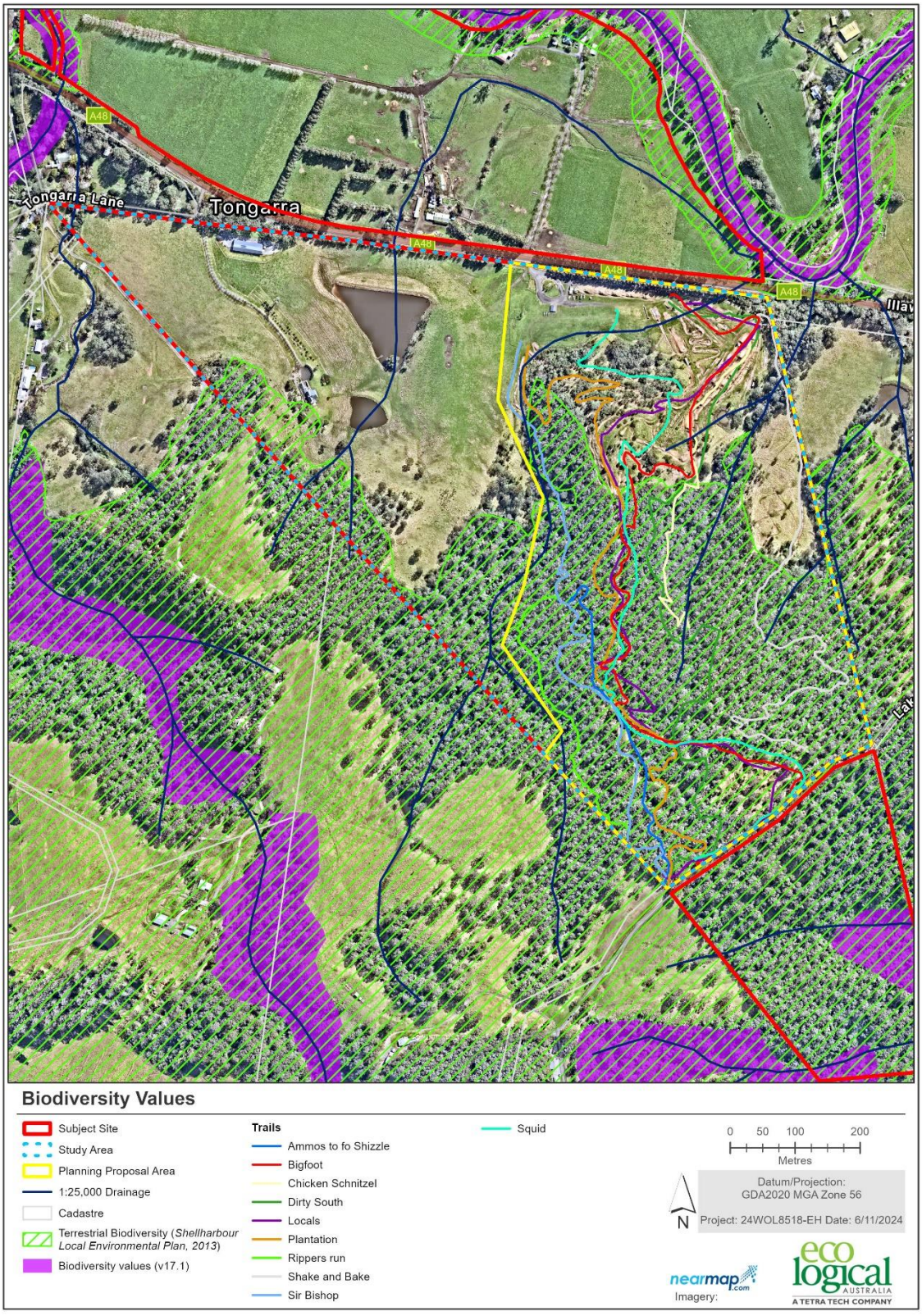

Figure 3: Biodiversity Values Map (NSW DCCEEW 2024a) and Terrestrial Biodiversity mapping (Shellharbour LEP)

4.1.2. Mapped vegetation communities

NSW State Vegetation Type mapping within the study area is shown in Figure 4. This shows two PCTs as occurring within the study area:

- PCT 3327 Illawarra Lowland Red Gum Grassy Forest
- PCT 3078 Illawarra Lowland Wet Vine Forest.

PCT 3327 is associated with a Threatened Ecological Community (TEC): *Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion,* which is listed as an Endangered Ecological Community (EEC) under the BC Act. It is also associated with the community *Illawarra and South Coast Lowland Forest and Woodland* ecological community which is listed as a Critically Endangered Ecological Community (CEEC) under the EPBC Act.

PCT 3078 is associated with the TEC: *Illawarra Subtropical Rainforest in the Sydney Basin Bioregion*, which is listed as Endangered Ecological Community (EEC) under the BC Act. It is also associated with the community *Illawarra – Shoalhaven Subtropical Rainforest of the Sydney Basin Bioregion* which is listed as a CEEC under the EPBC Act.

A previous Fauna and Flora Assessment Report by ELA (2011) for Greenvalleys Mountain Bike Park, identified the following vegetation communities:

- Red Gum – Stringybark Forest
- Red Gum- White Box Forest
- Pasture with Occasional Remnant Trees and Regrowth
- Improved Pasture.

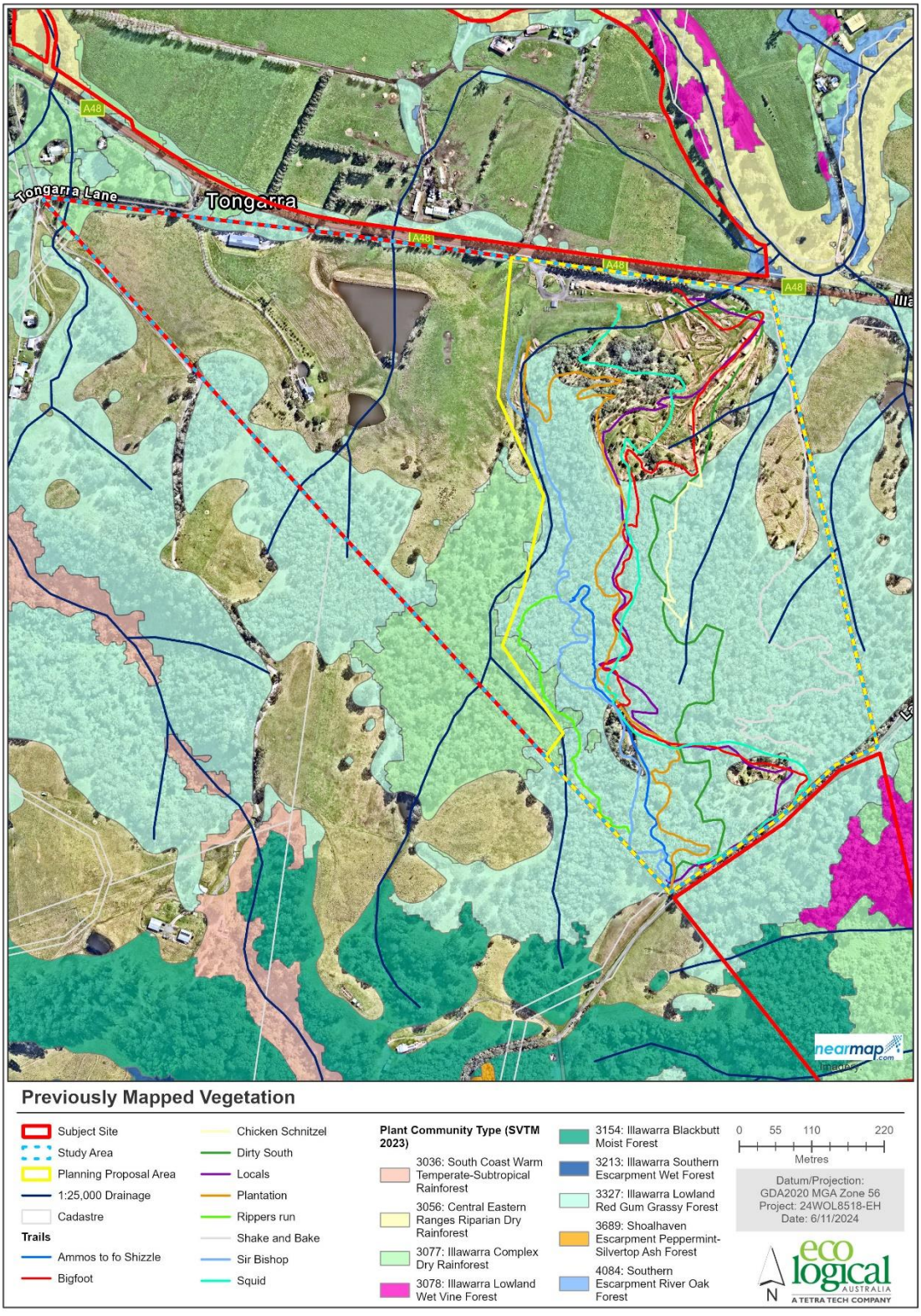

Figure 4: NSW State Vegetation Type Map (SVTM) (source: NSW DCCEEW 2024c)

4.1.3. Threatened species records

The BioNet Atlas (NSW DCCEW 2024a) and PMST searches (DCCEEW 2022a) identified a total of four TECs, 65 threatened fauna species and 42 threatened flora species that have been recorded within, or having the potential to occur within, a 5 km radius of the study area (full list in Appendix B). Of these, 29 fauna species and 12 flora species have records within 5 km of the study area (Figure 5). Using this data, a Likelihood of Occurrence assessment was conducted (Appendix B). This assessment was used to inform the likelihood each species has of occurring within the study area.

Multiple *Solanum celatum* individuals have been previously recorded within the study area (Figure 5).

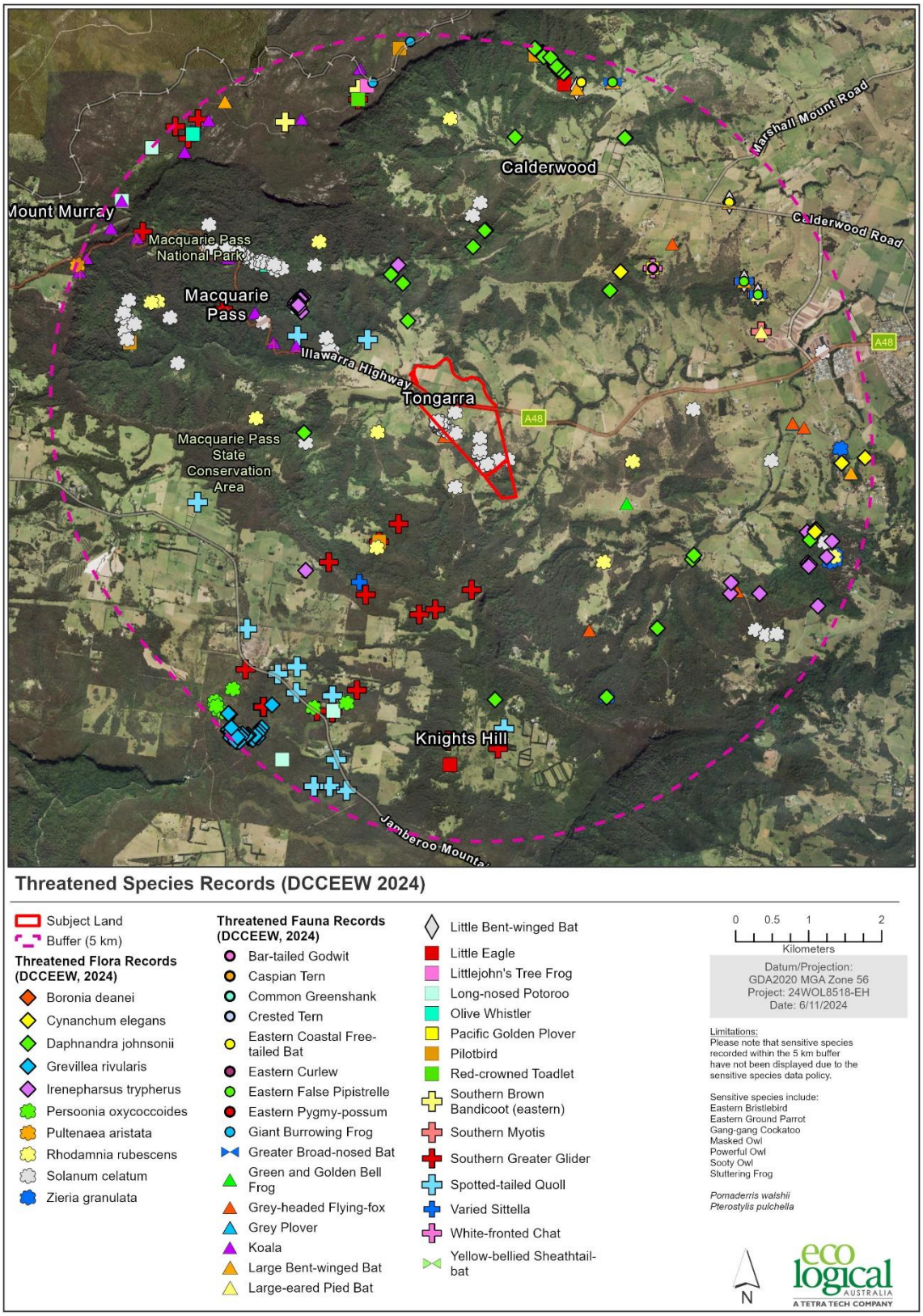

Figure 5: Threatened flora and fauna previously recorded within 5 km of the study area (NSW DCEEW 2024a)

4.1.4. Watercourses

Under the Water Management Act 2000 (WM Act), 'waterfront land' includes all land within 40 m of a mapped 'river' when measured from the top of bank. The riparian corridor is the vegetated width required for each stream classification using the Strahler stream order method (Table 2). A riparian corridor comprises a vegetated riparian zone (VRZ) on each side, plus the channel width.

Table 2: Recommended riparian corridor widths (NRAR 2018)

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

Macquarie Rivulet and ten tributaries, comprising both first and second order streams, were mapped to the north east of the study area (DPI Hydroline Spatial Dataset). The study area intersects waterfront land and associated riparian buffers at multiple locations throughout the study area (Figure 6).

4.1.5. Key Fish Habitat

Macquarie Rivulet and ten tributaries, comprising both first and second order streams, were mapped to the north east of the study area (DPI Hydroline Spatial Dataset). No Key Fish Habitat (KFH) is mapped within the study area (Figure 6).

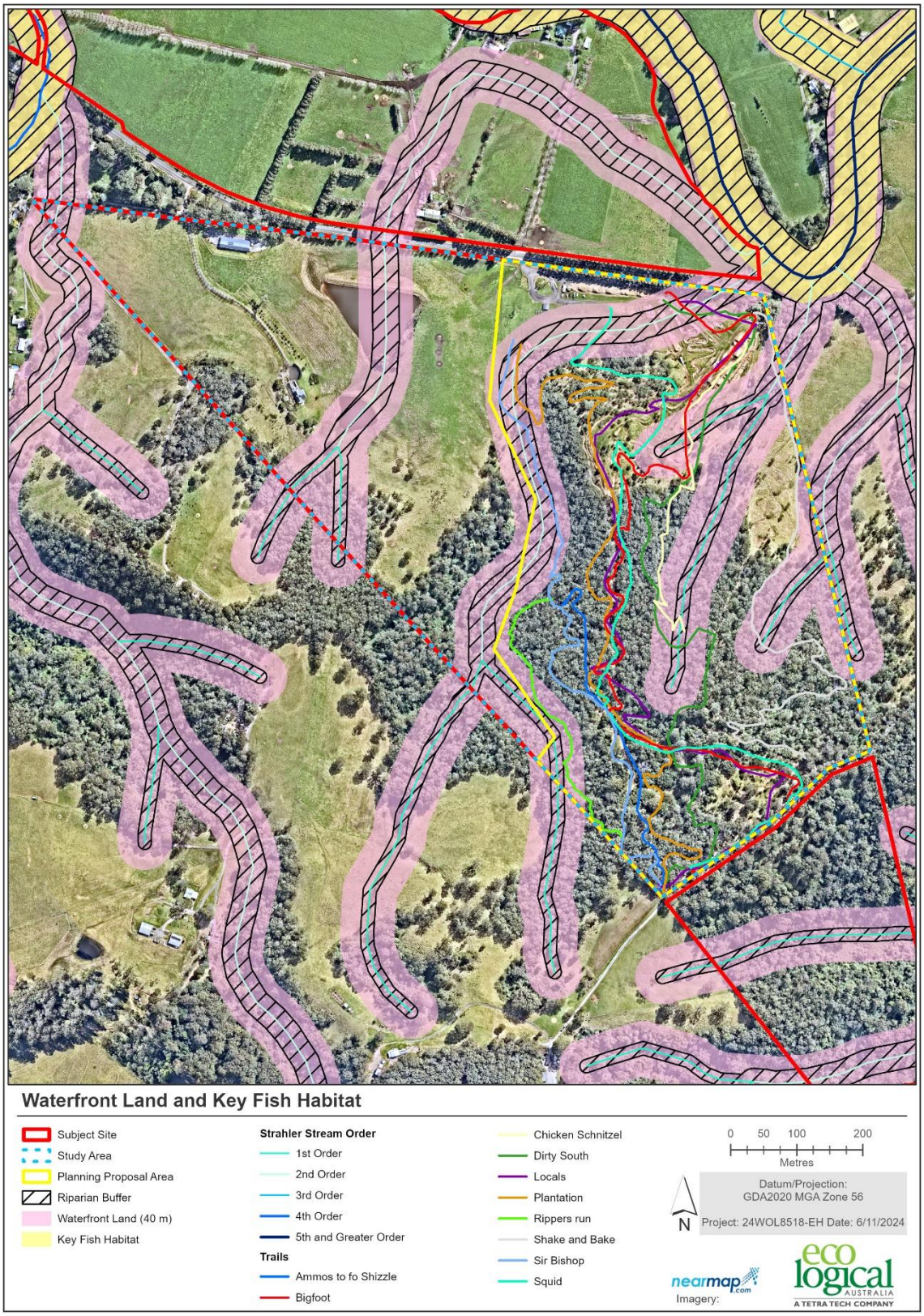

Figure 6: Mapped watercourses and their associated buffers and KFH within the study area

4.1.6. Topography, Geology and Soils

The landscape in the study area comprises steep to very steep hills with broad colluvial benches on latite with a slope gradient >30%. It is underlain by Cambewarra Latite Member which comprises felsic latite with scattered olivine basanite outcrops. The dominant soils in the study area include reddish brown sandy clay loams and areas with a dark grey-brown slightly sandy-silty topsoil, underlain by a grey brown loam and clay loam. The topsoils are well structured and have moderate erodibility, with subsoils being low erodibility (Hazleton 1992).

The steep parts of the study area contain slopes between 15 and 18 degrees. Given the moderate erodibility of the soils, there is potential for erosion in areas not stabilised by vegetation. All bike trails are therefore potential sources of erosion, particularly at turns, switchbacks and where cross gradients are high.

4.2. Field survey results

The study area comprises a mix of heavily disturbed land with improved and native grazing pastures and less disturbed areas that continue to support native forests and woodland. The disturbances observed within the study area include:

- historic clearing of portions of the study area for grazing and in places exotic pasture establishment
- weed invasion, particularly by *Lantana camara* (Lantana) in the remnant vegetation
- internal tracks for motorised vehicle access
- clearing and soil disturbance in association with the ten existing bike tracks within the study area.

4.2.1. Validated vegetation communities

Vegetation within the study area was validated by ELA ecologists Meredith Henderson, Alex Gorey and Rachel Brown on 27 August 2019 and 4 October during the FFA (ELA 2019a). ELA Restoration Ecologist Max Massa visited the study area on 07 and 08 June 2021 to confirm vegetation present and assess any changes in the condition of the vegetation. The site was more recently revisited on 18 July by ELA Ecologists Joseph Gleeson and Bronwyn Callaghan to validate the vegetation consistent with the updated NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) East Coast Plant Community Type classifications. Targeted searches for threatened flora species *Solanum celatum* were also undertaken on the study area. The vegetation occurring within the study area included the following which is also shown in Figure 7:

- *Illawarra Lowlands Grassy Woodland*, an endangered ecological community listed under the *Biodiversity Conservation Act 2016* (BC Act) and also *Illawarra and South Coast Lowland Forest and Woodland,* which is listed as critically endangered under the *Environment Protection and Biodiversity Act 1999* (EPBC Act).
- Cleared land.

PCT 3327 ILLAWARRA LOWLAND RED GUM GRASSY FOREST

Illawarra Lowland Red Gum Grassy Forest occurs within the study area in three condition states: regeneration, moderate and high. The community occurs as a forest or woodland, with foliage cover of

the main canopy greater than 10%. The local expression of the community is influenced by geology and soils, drainage and aspect, site history and current management (DotEE 2016).

A very tall sclerophyll open forest with a mid-stratum of soft-leaved shrubs and small trees and a grassy ground layer, found on foothills of the Illawarra coast. The canopy almost always includes *Eucalyptus tereticornis*, which is very frequently associated with stringybark eucalypts (*Eucalyptus eugenioides* or *Eucalyptus globoidea*). A sparse shrub to small tree layer almost always includes one or more species of acacias, of which *Acacia maidenii* is the most frequent, commonly with *Breynia oblongifolia*. The mid-dense ground cover typically includes forbs, grasses, twiners and a sedge, very frequent species including *Dichondra repens*, *Geitonoplesium cymosum*, *Pandorea pandorana* subsp. *pandorana*, *Carex longebrachiata*, *Desmodium varians* and *Microlaena stipoides*. This PCT has a relatively restricted distribution, from foothills west of Wollongong south to Nowra and west to Kangaroo Valley. It occurs at low elevations of below 200 metres asl on wet coastal foothills, where mean annual rainfall typically exceeds 1100 mm. Many records are on Shoalhaven Group sediments, often on the Broughton Formation or on Berry Siltstone, but it is also recorded from other geologies. It is related floristically to PCT 4052, which is another coastal red gum forest occurring on undulating hills from Conjola to Bega. This community grades spatially into PCT 3330 which occurs on low elevation flats with somewhat impeded drainage and commonly includes Eucalyptus longifolia and Melaleuca decora.

PCT 3327 was present in the study area in poor to moderate condition. A dense cover of *Lantana camara* was present in the midstorey across the majority of the study area. Areas of PCT 3327 in 'Poor' condition was more heavily disturbed from previous clearing and contained a higher cover of weeds and exotics under a native canopy. Areas of PCT 3327 'regenerating' was highly disturbed with a lack of canopy and high cover of weeds exotics amongst native species in the understorey.

The canopy consisted of *Eucalyptus tereticornis*, *Eucalyptus eugenioides, Eucalyptus quadrangulata, Angophora floribunda, Eucalyptus bosistoana* and *Eucalyptus longifolia*. The midstorey was diverse and contained *Acacia maidenii*, *Acacia binervata*, *Brachychiton populneus subsp populneus*, *Myrsine howittiana, Myrsine variabilis, Notelaea venosa, Olearia viscidula, Streblus brunonianus*, *Diospyros australis*, *Ozothamnus diosmifolius*, *Indigofera australis, Pittosporum revolutum* and *Pittosporum undulatum*. The groundcover was dominated by grasses, forbs and sedges including *Echinopogon ovatus, Eragrostis brownii, Desmodium brachypodum, Pandorea pandorana, Glycine clandestina, Eustrephus latifolius, Rubus parvifolius, Cheilanthes distans, Lomandra longifolia, Gahnia aspera, Poa labillardieri* and *Microlaena stipoides* var. *stipoides* (Figure 8).

PREVIOUSLY CLEARED LAND

There has been previous clearing within the broad areas of retained native vegetation, which was limited to the areas of existing mountain bike tracks. The tracks had been cleared of vegetation and the groundcover consisted of bare ground. Cleared land does not form part of a native vegetation community. Cleared land was also present in areas that had been historically cleared for grazing and other agricultural activities. These areas were typically dominated by exotic pasture grasses and broad-leaved weeds. No vegetation is sought to be cleared as part of the Planning Proposal.

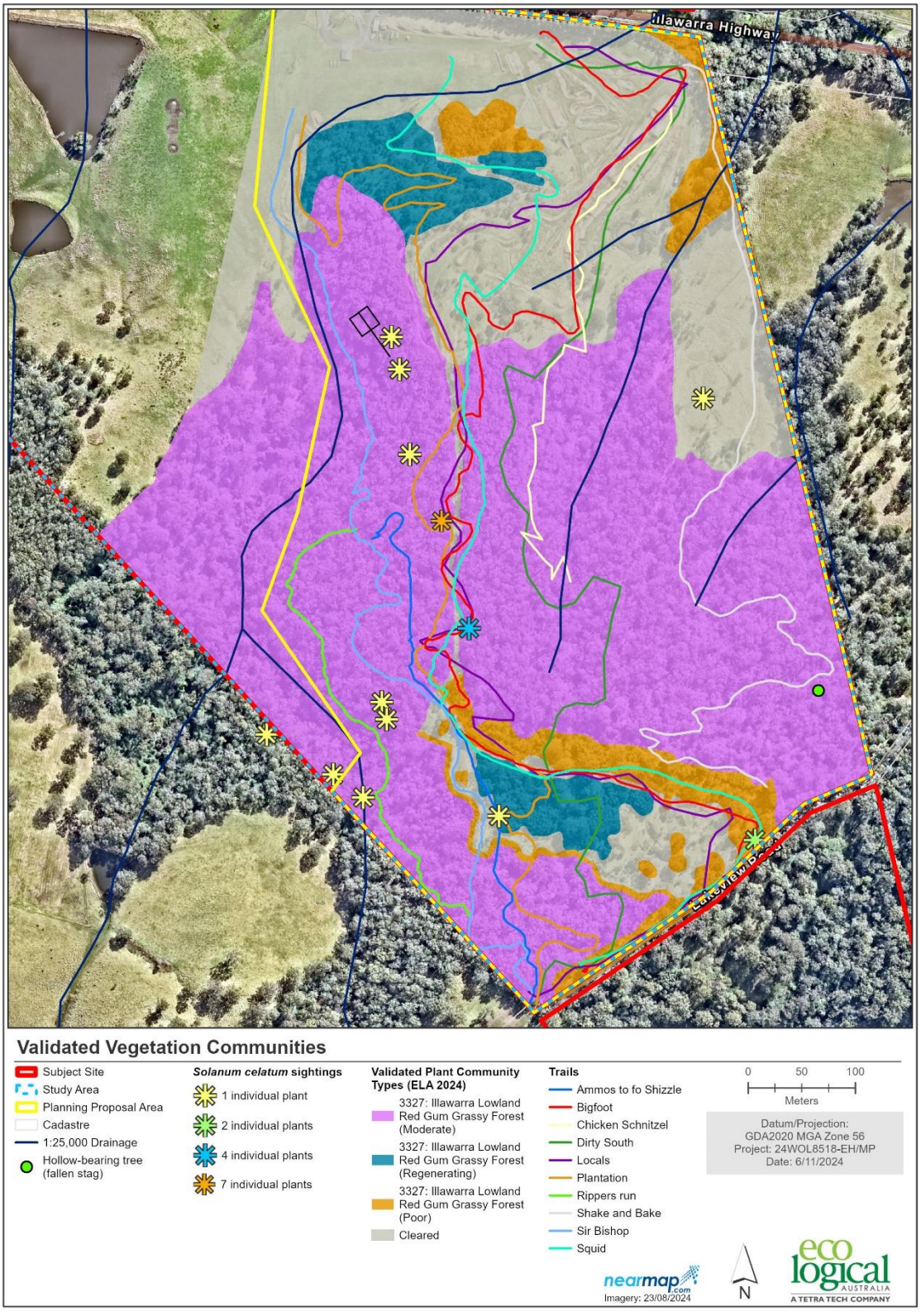

Figure 7: Validated vegetation with the ten (10) existing bike trails within the Planning Proposal Area

Figure 8: Illawarra Lowlands Grassy Woodland within study area with bike track corridor visible

4.2.2. Threatened ecological communities

The TECs occurring within the study area include the following, which is shown in Figure 11:

- *Illawarra Lowlands Grassy Woodland*, an endangered ecological community listed under the *Biodiversity Conservation Act 2016* (BC Act) and also *Illawarra and South Coast Lowland Forest and Woodland,* which is listed as critically endangered under the *Environment Protection and Biodiversity Act 1999* (EPBC Act).

All of the validated vegetation within the study area of this community has been determined to meet the EPBC Act definition of the community. The vegetation in good condition community was considered condition A: High condition class in accordance with the EPBC Act because:

- the patch size was > 2 ha
- there was 50% of the total understorey vegetation cover was comprised of native species
- the patch contained at least 6 native plant species per 0.5 ha in the ground layer (confirmed through plot data).

4.2.3. Threatened species

A total of 19 individuals of *Solanum celatum* were identified across the study area during survey (Figure 9 and Figure 10). This species was identified in areas of Illawarra and South Coast Lowland Forest and Woodland, and in some cases was identified in areas that had been previously disturbed. Both juvenile and mature individuals were identified. This species is listed as endangered under the BC Act and is restricted to an area from Wollongong to just south of Nowra, and west to Bungonia (OEH, 2018).

All areas of Illawarra and South Coast Lowland Forest and Woodland are considered potential habitat for *Solanum celatum*.

Figure 9: *Solanum celatum* identified next to a bike track within study area

Figure 10: Close-up view of *Solanum celatum* from Figure 5

4.2.4. Fauna habitat

The study area contained 12 hollow bearing trees (Figure 13) which are likely to provide habitat for microchiropteran bats, arboreal mammals and forest birds.

The Illawarra and South Coast Lowland Forest and Woodland in the study area is likely to provide foraging habitat for a range of threatened fauna species including:

- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)
- *Hieraaetus morphnoides* (Little Eagle)
- *Miniopterus australis* (Little Bentwing-bat)
- *Myotis macropus* (Southern Myotis)
- *Ninox strenua* (Powerful Owl)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat).

4.2.5. Opportunistic fauna sightings

During field survey, a total of 22 birds, three frogs, one native mammal and one exotic deer species were identified in the study area.

Table 3: Fauna species identified within study area

Scientific Name	Common Name	Native	Exotic
Acanthiza pusilla	Brown Thornbill	Y	
Acanthorhynchus tenuirostris	Eastern Spinebill	Y	
Alisterus scapularis	Australian King-Parrot	Y	
Anthochaera carunculata	Red Wattlebird	Y	
Anthochaera chrysoptera	Little Wattlebird	Y	
Artamus cyanopterus	Dusky Woodswallow	Y	
Cacatua sanguinea	Corella	Y	
Cervus spp.	Deer		Y
Colluricincla harmonica	Grey Shrike-thrush	Y	
Cracticus tibicen	Australian Magpie	Y	
Crinia signifera	Common Eastern Froglet	Y	
Dacelo novaeguineae	Kookaburra	Y	
Limnodynastes peronii	Striped Marsh Frog	Y	
Litoria dentata	Bleating Tree Frog	Y	
Manorina melanocephala	Noisy Miner	Y	
Meliphaga lewinii	Lewin's Honeyeater	Y	
Milvus migrans	Black Kite	Y	
Ocyphaps lophotes	Crested Pigeon	Y	
Petaurus breviceps (dead)	Sugar Glider	Y	
Platycercus elegans	Crimson Rosella	Y	
Philemon corniculatus	Noisy Friarbird	Y	
Psophodes olivaceus	Eastern Whipbird	Y	
Rhipidura albiscapa	Grey Fantail	Y	
Strepera graculina.	Currawong	Y	
Trichoglossus moluccanus	Rainbow Lorikeet	Y	
Vanellus miles	Masked Lapwing	Y	
Zosterops lateralis	Silvereye	Y	

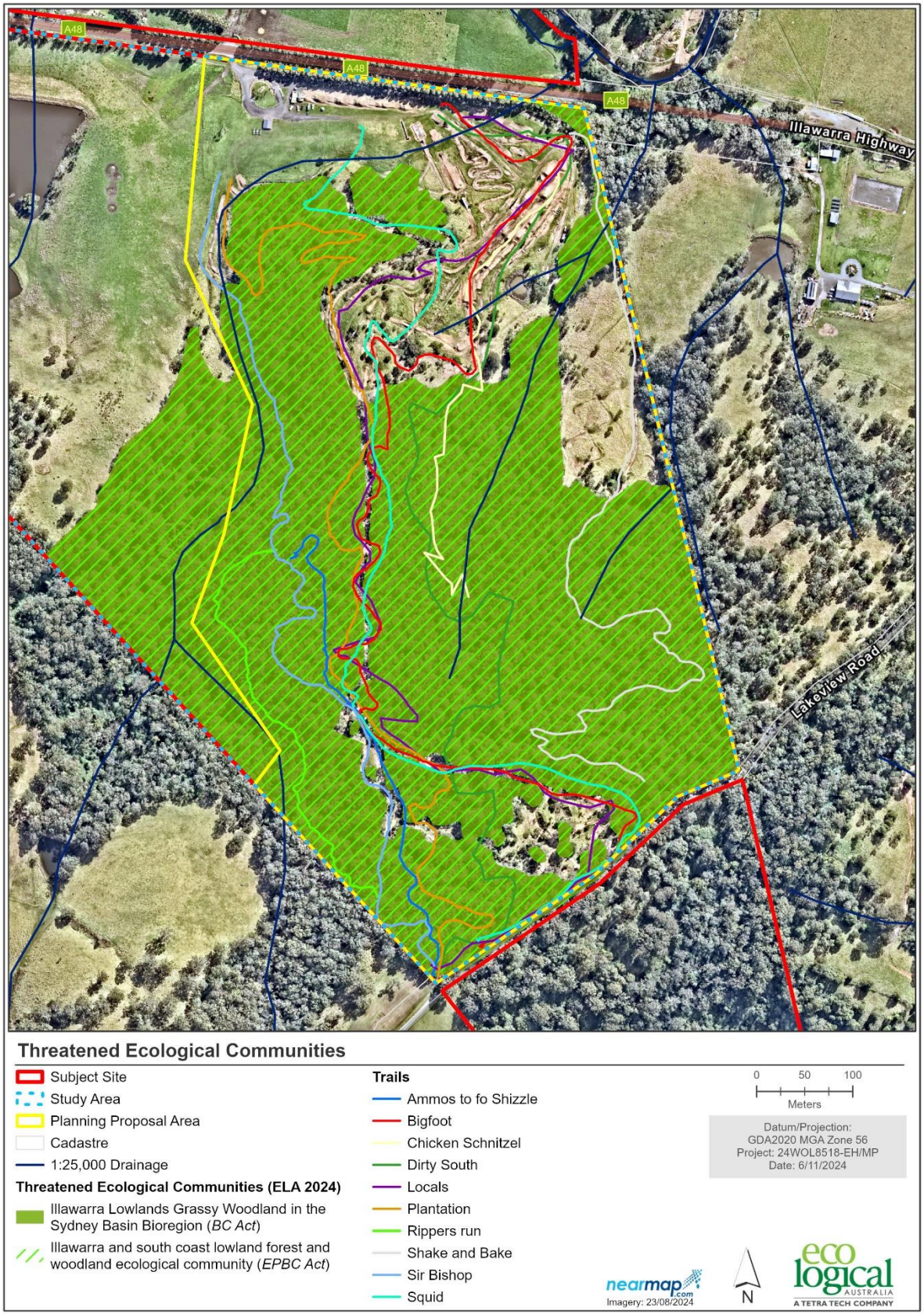

Figure 11: Threatened ecological communities within the study area

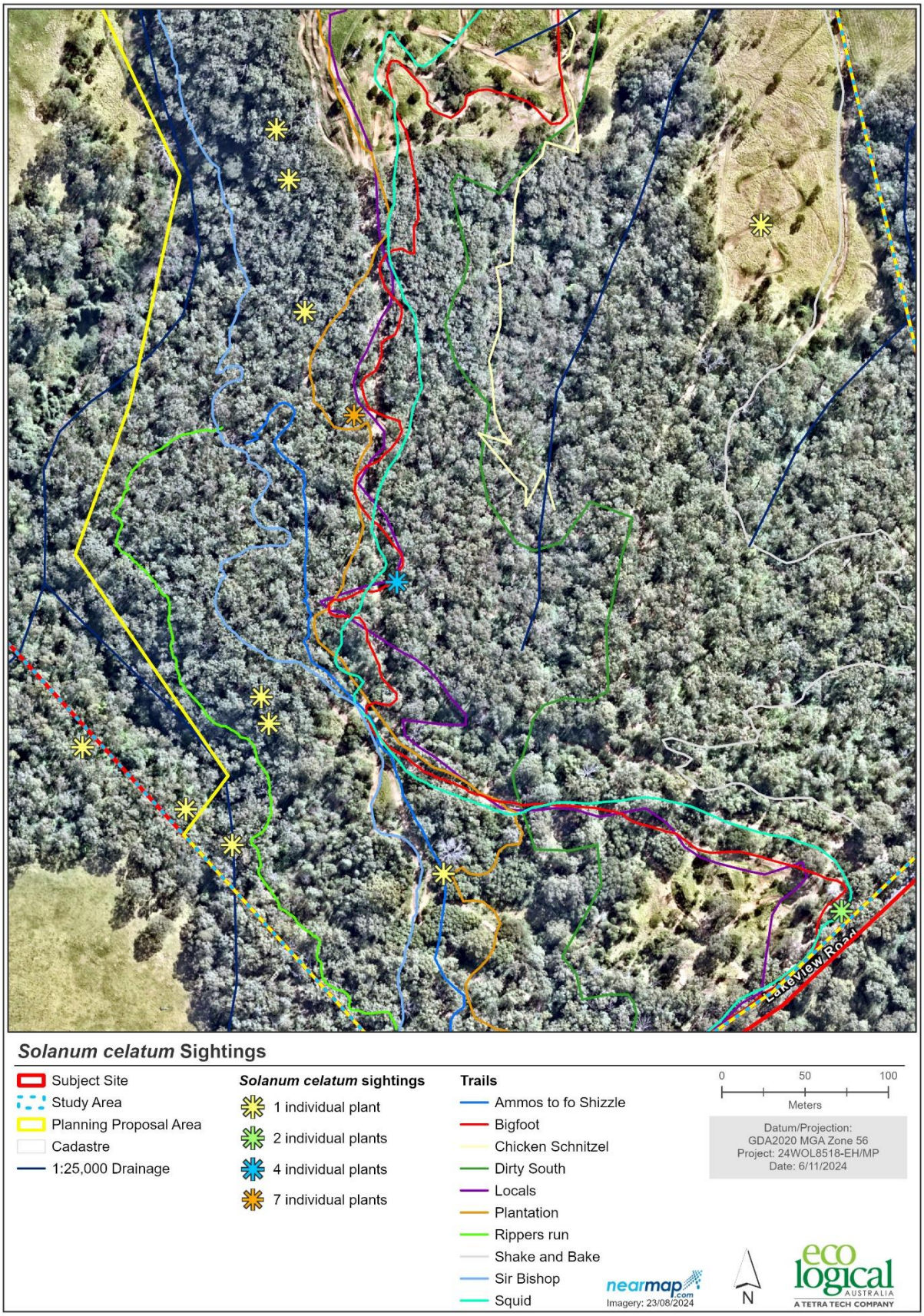

Figure 12: *Solanum celatum* sightings within the study area

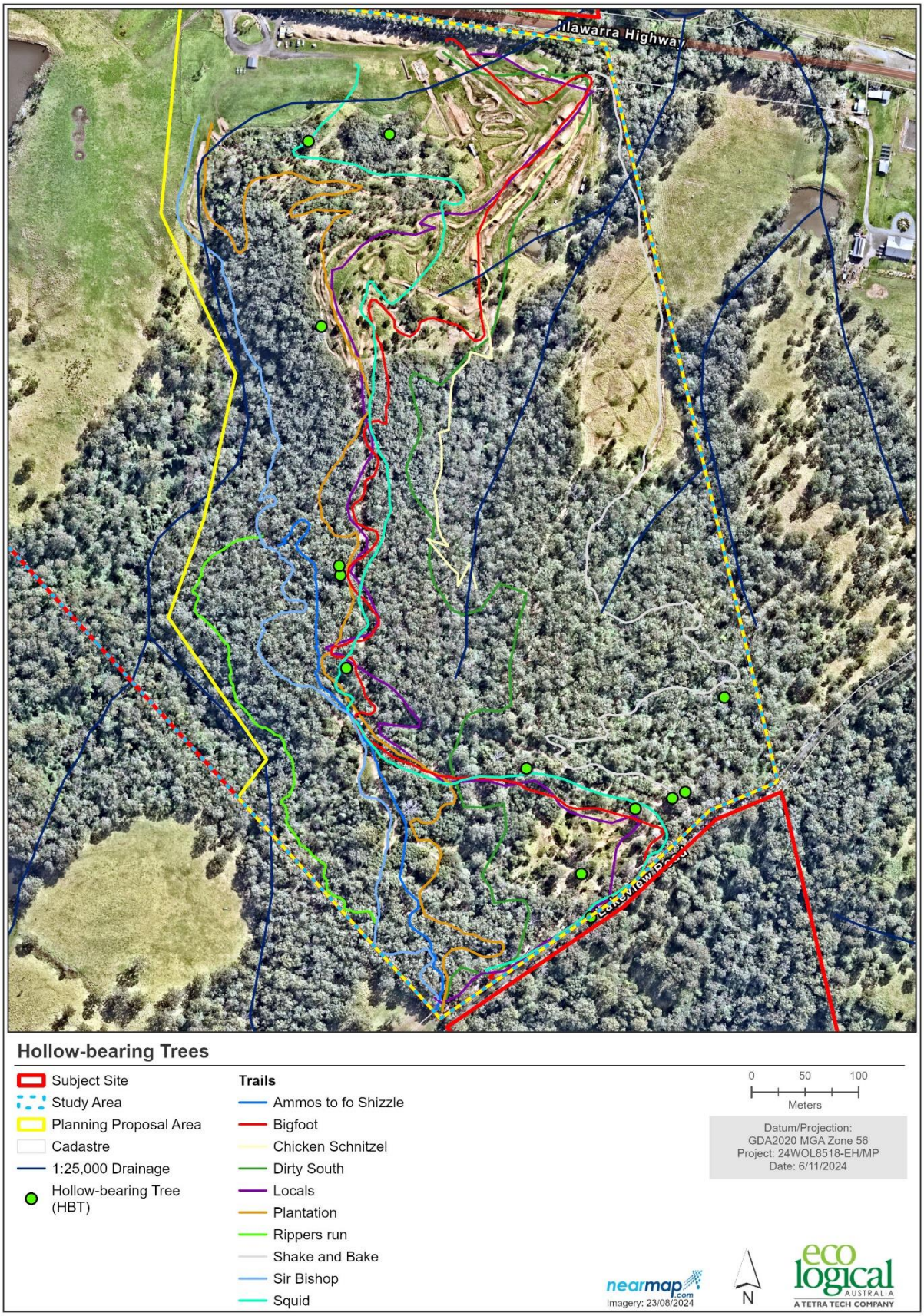

Figure 13: Hollow bearing trees recorded within the study area

4.2.6. Biosecurity Act 2015

The BS Act provides a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers. While the Act provides for all biosecurity risks, implementation of the Act for weeds is supported by Regional Strategic Weed Management Plans (RSWMP) developed for each region in NSW. Two priority weeds were identified within the site; *Lantana camara* (Lantana) and *Senecio madagascariensis* (Fireweed).

5. Ecological constraints and opportunities

5.1. Flora and Fauna Assessment

The ecological constraints of the study area have been assessed based on the ecological features and values criteria listed in Table 4. This table has been used to assign the overall ecological constraints of the study area, which are illustrated in Figure 14.

Table 4: Ecological constraint classes, ecological features and report section in which they are addressed

Ecological Constraint	Ecological features/values
Low	• Non-native vegetation • Areas dominated by weeds • Highly disturbed landscapes with low fauna habitat value • Cleared land and houses
Moderate	• Planted native vegetation or non-threatened vegetation communities • First order Riparian corridors without TECs • Farm dams (potential foraging habitat for threatened species) • Stepping-stone habitat or local wildlife corridors for highly mobile species
High	• Vegetation mapped as TEC under the BC Act or EPBC Act • Vegetation identified as a SAII entity • Land mapped on the Biodiversity Values map • Riparian corridors with TECs • Non-threatened vegetation communities that form regional habitat corridors • Habitat features (including HBTs) that support potential habitat for threatened flora species, or potential foraging habitat for threatened fauna species listed under the BC Act or EPBC Act. • Threatened flora species listed under the BC or EPBC Acts (*Solanum celatum*)

All of the validated native vegetation within the study area meets the definition as 'high constraint' based on their status as vegetation corresponding with a threatened ecological community listed under the BC Act or EPBC Act. The TEC present on-site is also an SAII candidate entity under the BC Act. The presence of threatened flora species *Solanum celatum* within the study area also poses a high constraint. Further, the riparian corridors throughout the study area pose a moderate constraint.

First and second order watercourses (without TECs) are considered moderate constraint as these can be exempt from Controlled Activity Approval (CAA) requirements if DPE Water is convinced that they do not exhibit features of a defined channel with bed and bank, and therefore is not waterfront land for the purposes of the WM Act. Dams within the study area are considered moderate constraint as they provide potential foraging habitat for threatened fauna species, which would trigger impact assessment requirements.

The remaining areas have been mapped as low constraint as they do not contain native vegetation, habitat features, waterfront land or riparian corridors. Instead, they are cleared land that provide low threatened species habitat.

5.2. Ecological opportunities

The Planning Proposal does not involve the removal of vegetation and seeks the permanent use of an existing Mountain Bike Park in its current form. No new tracks or development is proposed as part of the Planning Proposal. The Planning Proposal also has the opportunity to retain and protect the biodiversity values within the study area. A Vegetation Management Plan (VMP) would be submitted if the planning proposal is approved. The VMP would be implemented to outline management strategies to minimise the impact of the operation to vegetation on-site including threatened flora species *Solanum celatum* located on-site.

The recovery and management of the Illawarra Lowlands Grassy Woodland within the subject land should be undertaken consistent with a recommended VMP prepared by a suitably qualified person and approved by Council. The VMP should address a number of matters including, but not limited to, the promotion of the recovery and long-term viability of the local occurrence of the Illawarra Lowlands Grassy Woodland, weed control, fire management, grazing, access, and a monitoring program.

Direct disturbances to the Illawarra Lowlands Grassy Woodland within the subject land will be limited by:

- There is no removal of native vegetation as part of the Planning Proposal.
- Using best practice sediment control measures.
- Protecting the ILGW during the operation of the bike park, by ensuring that no building materials, machinery or other substances will be stored in areas of native vegetation to avoid physical damage to the vegetation.

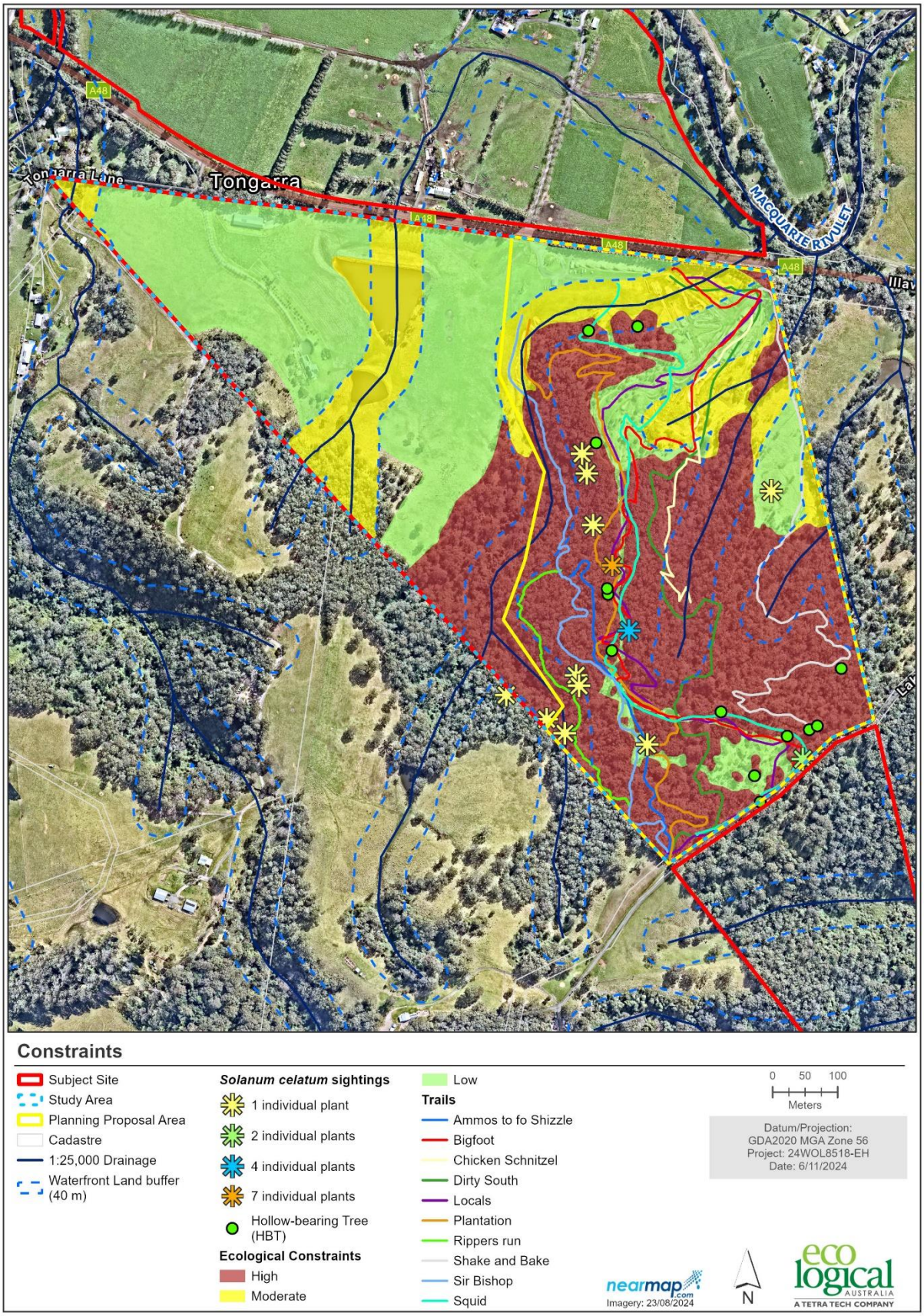

Figure 14: Ecological constraints within the study area

6. Impact Assessment

The Planning Proposal does not involve the removal of vegetation and seeks approval for the permanent use of an existing Mountain Bike Park in its current form. No new tracks or development are proposed as part of the Planning Proposal.

Subject to the approval of the Planning Proposal, the subsequent Development Application will not seek the removal of vegetation, nor will it seek to establish any new tracks or physical works.

Any physical works outside of the existing Mountain Bike Park area will require an appropriate biodiversity impact assessment report, which may require further biodiversity considerations, which are outlined in Appendix D.

6.1. Summary of Impacts

6.1.1. Direct impacts

There has been previous clearing within the broad areas of retained native vegetation, which was limited to the areas of existing mountain bike tracks. The tracks had been cleared of vegetation and the groundcover consisted of bare ground. Cleared land does not form part of a native vegetation community. Cleared land was also present in areas that had been historically cleared for grazing and other agricultural activities. These areas were typically dominated by exotic pasture grasses and broad-leaved weeds. No vegetation is sought to be cleared as part of the Planning Proposal.

6.1.2. Indirect impacts

Indirect impacts likely to occur are:

- edge effects on native vegetation, primarily from riders leaving the tracks accidently during use
- spread of weeds
- spread of Lantana
- sedimentation and erosion from exposed tracks.

6.1.3. NSW BC Act

If a species, population or ecological community listed under Schedules 1 or 2 of the BC Act is likely to be affected, the factors set out to establish if there is likely to be a significant impact on that species, population, ecological community or habitat, must be assessed. Section 7.3 of the BC Act sets out five factors that must be addressed as part of a Test of Significance. This enables a decision to be made as to whether there is likely to be a significant impact on the species and if a BDAR is required. If a significant impact is determined, a BDAR will need to be prepared. However, the proposal for the ongoing use of the existing Greenvalleys Mountain Bike does not trigger the Biodiversity Offsets Scheme (BOS) given the following:

- No clearing of vegetation is proposed by the Planning Proposal.
- The eastern part of the study area does not include any land mapped as having high biodiversity value by Biodiversity Values (BV) mapping.

- No significant impacts on any threatened flora, fauna or ecological communities have been identified as a consequence of the Planning Proposal (refer to Sections 6.1.4 to 6.1.6).

6.1.4. Threatened ecological communities

One threatened ecological community was identified in the study area during survey, Illawarra Lowland Grassy Woodland (listed as Illawarra and South Coast Lowland Forest and Woodland under the EPBC Act). This community is listed as endangered under the BC Act. Tests of Significance were applied to this threatened ecological community and determined that the proposal is unlikely to constitute a significant impact on Illawarra Lowlands Grassy Woodland (Appendix C).

6.1.5. Threatened Flora

One threatened flora species was identified in the Planning Proposal area during field survey; *Solanum celatum*. A Test of Significance was applied to this threatened flora species and determined that the proposal is unlikely to constitute a significant impact on the *Solanum celatum* species (Appendix C).

6.1.6. Threatened Fauna

No threatened fauna species were identified in the Planning Proposal during the field survey. The Planning Proposal area provides significant potential foraging, shelter, denning, nesting, breeding or roosting habitat for any threatened or migratory fauna. The proposal will not require the removal of any hollow-bearing trees or other potentially important fauna habitat resources. Similar habitats to those present in the study area are widespread within the locality and will continue to be available for fauna species.

The Illawarra and South Coast Lowland Forest and Woodland in the study area is likely to provide foraging habitat for the following threatened fauna species:

- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)
- *Hieraaetus morphnoides* (Little Eagle)
- *Miniopterus australis* (Little Bentwing-bat)
- *Myotis macropus* (Southern Myotis)
- *Ninox strenua* (Powerful Owl)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat).

Although these species are likely to occur, the foraging habitat for these species would not be directly affected, and the indirect impacts would not affect the integrity of the foraging habitat, therefore no tests of significance or assessment of significance were applied.

6.1.7. Key threatening processes

There are two key threatening processes associated with the proposal:

- Invasion of native plant communities by exotic perennial grasses
- Invasion, establishment and spread of *Lantana camara L. sens. lat* (Lantana).

6.1.8. EPBC Act

The EPBC Act contains provisions to protect Commonwealth Land and Matters of National Environmental Significance (MNES) listed by the Act, including World Heritage properties, Ramsar wetlands, threatened species, migratory species, nuclear actions and the Commonwealth marine environment. Under this Act a proposal may require assessment and/or approval from the Commonwealth Environment Minister if it involves an action that has, will have, or is likely to have, a significant impact on a matter of national environmental significance.

Administrative guidelines have been produced to assist proponents in determining whether an action should be referred to the Commonwealth Environment Minister for a decision on whether approval is required. The proposal does not involve the clearing and/or modification of indigenous vegetation or construction works, which does not constitute an action defined by the EPBC Act.

The Planning Proposal area contains one critically endangered ecological community as listed as matters of National Environmental Significance on the schedules of the EPBC Act. Following consideration of the administrative guidelines for determining significance for matters of national environmental significance that may occur in the Planning Proposal Area, it is concluded that the proposal is unlikely to have a significant impact on any matter of national environmental significance, and that a referral to the Commonwealth Environment Minister is not required.

6.1.9. Threatened ecological communities

One endangered ecological community was identified in the Planning Proposal during the field survey; Illawarra and South Coast Lowland Forest and Woodland. This community is community is listed as critically endangered under the EPBC Act. Assessments of Significance were applied to this threatened ecological community and determined that the Planning Proposal is unlikely to constitute a significant impact on Illawarra and South Coast Lowland Forest and Woodland.

6.1.10. Threatened flora

No threatened flora species under the EPBC Act were identified within the study area.

6.1.11. Threatened fauna and migratory species

No threatened fauna or migratory species under the EPBC Act were identified within the study area.

6.1.12. Shellharbour LEP - Clause 6.5

Clause 6.5 of the Shellharbour LEP aims to maintain terrestrial biodiversity values by:

- protecting native fauna and flora, and protecting the ecological processes necessary for their continued existence, and encouraging the conservation and recovery of native fauna and flora and their habitats.

Development must not be granted unless the consent authority is satisfied that the development has been designed to mitigate, manage and avoid impacts on native ecological values. The development must be consistent with the objectives outlined in **Table 5**. The proposal is consistent with the objectives of Clause 6.5.

Table 5: Clause 6.5 Terrestrial Biodiversity objectives and reasoning

Objectives	Reasoning
any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and	The species likely to utilise the study area are all highly mobile and would utilise a range of foraging resources in the area. Threated flora species *Solanum celatum* was identified in the Planning Proposal area. However, the Planning Proposal is to recognise the permanent use of existing Mountain Bike track and therefore does result in the removal of any existing vegetation.
any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and	The Planning Proposal does not seek to remove vegetation that exists within the existing Mountain Bike Park.
any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and	The ten bike tracks are existing and would not cause major fragmentation, disturbance or diminishing of the biodiversity, structure, function and composition of the land. The trails are only 1 m wide, hence the disturbance does not limit the ability of fauna to forage and distribute throughout the vegetation in the locality. There will only be indirect impacts to the study area during the operation of the bike park.
any adverse impact on the habitat elements providing connectivity on the land, and any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.	The fauna species likely to utilise the study area are highly mobile, would rely on a range of foraging resources and would not be significantly impacted by the proposal. Sediment and erosion control measures have been recommended to prevent indirect impacts to Illawarra Lowlands Grassy Woodland

7. Conclusion

Eco Logical Australia Pty Ltd (ELA) was engaged by Greenvalleys Mountain Bike Park Pty Ltd to prepare a Flora and Fauna Assessment to support a Planning Proposal for land at 2926 Illawarra Highway, Tongarra, Lot 1 DP 881927 (the study area). The proposal is to include an additional permitted use for the property under Schedule 1 of the Shellharbour City Council Local Environment Plan 2013, namely private recreation and thus to enable a permanent use of an existing Mountain Bike Park Facility. This biodiversity assessment was prepared to support the planning proposal and identify any biodiversity constraints.

The eastern portion of the study area currently operates as a mountain bike park under a temporary use permit (DA0328/2016). Implementing a private recreation additional use permit would allow the permanent use of the eastern portion of the study area as a Mountain Bike Park. Impacts assessed would be from the permanent use of the eastern portion of the study area as a mountain bike park which includes continuing use of an existing downhill mountain bike trails and associated facilities, including parking, shuttle road, and sediment control. Direct and indirect impacts of ten bike tracks with a 1 m width and a 5 m buffer zone on either side of the tracks and associated infrastructure including parking, shuttle road, and sediment control have been outlined in this report.

A desktop review and field survey were undertaken of the study area to identify ecological constraints. The desktop review identified applicable planning instruments pertaining to the use of the area as a mountain bike park, past land use for the area, previous vegetation mapping available for the park area and records of threatened species previously recorded from within and surrounding study area and that may impact the Planning Proposal. The field survey included validation of previous vegetation mapping, identification of vegetation communities and vegetation condition zones, as well as fauna habitat assessments.

The study area is a mix of cleared land and remnant native vegetation - Illawarra and South Coast Lowland Forest and Woodland. This vegetation community corresponds to the following TEC:

- Illawarra Lowlands Grassy Woodland which is listed as endangered under the BC Act and
- Illawarra and South Coast Lowland Forest and Woodland listed under the EPBC Act.

This TEC within the study area is in good condition and meets the minimum requirements of the EPBC Act definition of Illawarra and South Coast Lowland Forest and Woodland (high condition class).

The field survey also identified the presence of *Solanum celatum* within the study area which is listed as endangered under the BC Act. A total of 13 *Solanum celatum* individuals were recorded, including four juvenile plants within the previously cleared bike track.

While no threatened fauna species were identified during the field survey, several habitat features were identified that would provide habitat for a number of threatened species.

High constraints within the study area include threatened ecological communities, the threatened flora species (*Solanum celatum*), potential habitat for threatened fauna and a Serious and Irreversible Impact (SAII) entity. The Planning Proposal is for the permanent use of existing Mountain Bike Park and does not seek to change/alter/impact *Solanum celatum*.

Macquarie Rivulet and ten tributaries, comprising both first and second order streams, were mapped adjacent to, or overlapping with the study area (DPI Hydroline Spatial Dataset). The proposed bike tracks intersect riparian buffers (as prescribed by the Department of Planning and Environment -Water (DPE) within the study area. Riparian constraints for the planning proposal are addressed in a riparian assessment conducted by ELA (ELA 2024).

The findings of this report, found that the Planning Proposal:

- Does not require clearing of vegetation and therefore there are no direct impacts to the flora and fauna within the eastern part of the study area.
- Is unlikely to have a significant impact on any matter of national environmental significance and that a referral to the Commonwealth Environment Minister is not required.
- Does not trigger the BOS and therefore no BDAR is required.
- Does not remove any hollow-bearing trees.
- Does not directly impact foraging habitat for any threatened or migratory fauna species.

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Appendix A Flora species identified within study area

Table 6: Flora species identified within the study area

Scientific name	Common Name	Native	Exotic
Acacia binervia	Coast Myall	Y	
Acacia maidenii	Maiden's Wattle	Y	
Adiantum formosum	Giant Maidenhair	Y	
Ageratina adenophora	Crofton Weed		Y
Angophora floribunda	Rough-barked Apple	Y	
Araujia sericifera	Moth Vine		Y
Austrostipa spp.	Speargrass	Y	
Bidens Pilosa	Cobblers Pegs		Y
Breynia oblongifolia	Coffee Bush	Y	
Carex appressa	Tall Sedge	Y	
Cenchrus clandestinus	Kikuyu Grass		Y
Cheilanthes distans	Bristly Cloak Fern	Y	
Conyza bonariensis	Fleabane		Y
Cymbopogon refractus	Barbed-wire Grass	Y	
Cynodon dactylon	Couch		Y
Desmodium varians	Slender Tick-trefoil	Y	
Dichondra repens	Kidney Weed	Y	
Echinopogon ovatus	Forest Hedgehog Grass	Y	
Ehrharta erecta	Panic Veldtgrass		Y
Einadia hastata	Berry Saltbush	Y	
Entolasia stricta	Wiry Panic	Y	
Eragrostis brownii	Brown's Lovegrass	Y	
Eragrostis curvula	African Lovegrass		Y
Eucalyptus bosistoana	Coast Grey Box	Y	
Eucalyptus eugenioides	Thin-leaved Stringybark	Y	
Eucalyptus longifolia	Woollybutt	Y	
Eucalyptus sparsifolia	Narrow-leaved Stringybark	Y	
Eucalyptus tereticornis	Forest Red Gum	Y	
Gahnia aspera	Rough Saw-edge	Y	
Geitonoplesium cymosum	Scrambling Lily	Y	
Geranium homeanum		Y	
Glycine clandestine	Love Creeper	Y	
Glycine tabacina	Love Creeper	Y	

Scientific name	Common Name	Native	Exotic
Hardenbergia violacea	Hardenbergia	Y	
Imperata cylindrica	Blady Grass	Y	
Indigofera australis	Australian Indigo	Y	
Juncus usitatus		Y	
Lantana camara	Lantana		Y*
Lomandra longifolia	Basket Grass	Y	
Lysimachia arvensis	Scarlet Pimpernel		Y
Melaleuca styphelioides	Prickly-leaved Tea Tree	Y	
Microlaena stipoides var. *stipoides*	Weeping Rice Grass	Y	
Modiola caroliniana	Red-flowered Mallow		Y
Oplismenus imbecillis	Basket Grass	Y	
Oxytes brachypoda	Large Tick-trefoil	Y	
Ozothamnus diosmifolius	Paper Daisy	Y	
Pandorea pandorana	Wonga-wonga Vine	Y	
Paspalum dilatatum	Caterpillar Grass		Y
Passiflora edulis	Passionfruit		Y
Pittosporum undulatum	Sweet Pittosporum	Y	
Plantago lanceolata	Ribwort		Y
Rubus parvifolius	Native Raspberry	Y	
Senecio madagascariensis	Fireweed		Y*
Sida rhombifolia	Paddy's Lucerne		Y
Solanum celatum		Y	
Solanum prinophyllum	Forest Nightshade	Y	
Sporobolus africanus	Parramatta Grass		Y
Tagetes minuta	Stinking Roger		Y
Themeda triandra	Kangaroo Grass	Y	
Verbena bonariensis	Purpletop		Y

* Weeds of National Significance

Appendix B Likelihood of occurrence table

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the site inspection and professional judgement. Some Migratory or Marine species identified from the Commonwealth database search have been excluded from the assessment, due to lack of habitat. The terms for likelihood of occurrence are defined below:

- "known" = the species was or has been observed on the site
- "likely" = a medium to high probability that a species uses the site
- "potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- "unlikely" = a very low to low probability that a species uses the site
- "no" = habitat on site and in the vicinity is unsuitable for the species.

A test of significance was conducted for threatened species or ecological communities that were recorded within the study area or had a higher likelihood of occurring and were not recorded during the site visit. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the study area intermittently for foraging. For these fauna species, the habitat present and likely to be affected is not considered to be important to the threatened species, particularly in relation to the amount of similar habitat remaining in the surrounding landscape. As such, a test of significance in reference to State or Commonwealth legislation was not considered necessary.

The records column refers to the number of records occurring within 5 km of the study area, as provided by the Atlas of NSW Wildlife (BioNet) and Protected Matters Search Tool database search.

Information provided in the habitat associations' column has primarily been extracted (and modified) from the NSW Threatened Species Profiles.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
ENDANGERED ECOLOGICAL COMMUNITIES						
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion / Illawarra and South Coast Lowland Forest and Woodland		**E**	**CE**	**Illawarra coastal plain and escarpment foothills. Recorded from the LGAs of Wollongong, Shellharbour and Kiama, and Shoalhaven. Occurs in near coastal areas below about 200 metres on gently undulating terrain. Occurs on Berry Siltstone, Budgong Sandstone and Quaternary Alluvium.**	**Known**	**Yes**
Illawarra Subtropical Rainforest in the Sydney Basin Bioregion		E	CE	Illawarra coastal plain and escarpment foothills, rarely extending onto the upper escarpment slopes. Recorded from the local government areas of Wollongong, Shellharbour, Shoalhaven and Kiama. Mainly occurs between Albion Park and Gerringong, but outlying occurrences extend south to the Shoalhaven River and west into the Kangaroo Valley. Usually found on Permian volcanic rocks, but can occur on a range of rock types.	No	No
Robertson Rainforest in the Sydney Basin Bioregion			CE	Restricted distribution in the eastern parts of the Southern Highlands of NSW. There are two main occurrences of the community within this distribution: on the Robertson Plateau around the town of Robertson and on the higher parts of the Cambewarra Range further to the south. Occurs almost exclusively on highly fertile soils derived from basalt and basanite. Appears to be restricted to the Robertson Basalt; no observations of the community have been recorded on the surrounding Wianamatta Shale. Found at altitudes of between 500 to 700 metres.	No	No
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions			E	Coastal floodplains of NSW. Known from parts of the Local Government Areas of Tweed, Byron, Lismore, Ballina, Richmond Valley, Clarence Valley, Coffs Harbour, Bellingen, Nambucca, Kempsey, Hastings, Greater Taree, Great Lakes, Port Stephens, Maitland, Newcastle, Cessnock, Lake Macquarie, Wyong, Gosford, Pittwater, Warringah, Hawkesbury, Baulkham Hills, Hornsby, Lane Cove, Blacktown, Auburn, Parramatta, Canada Bay, Rockdale, Kogarah, Sutherland, Penrith, Fairfield, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Wollongong, Shellharbour, Kiama, Shoalhaven, Eurobodalla and Bega Valley. Associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats,	No	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
				drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Generally occurs below 20 m elevation.		
FAUNA						
Anthochaera phrygia	**Regent Honeyeater**	**E4A**	**CE**	**Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of *Casuarina cunninghamiana* (River Oak).**	**Potential**	**Yes**
Aphelocephala leucopsis	Southern Whiteface	V	V	Southern whiteface occur across most of mainland Australia south of the tropics, from the north- eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range. Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains.	No. Outside general distribution, lack of suitable habitat	No
Botaurus poiciloptilus	Australasian Bittern	E1	E	Found over most of NSW except for the far north-west. Permanent freshwater wetlands with tall, dense vegetation, particularly *Typha* spp. (bullrushes) and *Eleocharis* spp. (spikerushes).	No. Lack of suitable habitat	No
Calidris acuminata	Sharp-tailed Sandpiper		V, M	Sharp-tailed sandpipers occur within all states of Australia. They are found mostly in the south-east and are widespread in both inland and coastal locations. The species also occurs in both freshwater and saline habitats. The species utilises fresh and hypersaline environments, feeding along the edge of water on mudflats, coastal and inland wetlands, and sewage ponds. After rainfall events, the species may also feed on areas of agricultural pasture	No. Lack of suitable habitat	No
Calidris canutus	Red Knot, Knot		E, M	Birds arrive between September and October and leave between March and April, with a small number of individuals overwintering. In NSW it is recorded in small numbers along some of the major river estuaries and	No. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
				sheltered embayments of the coastline, in particular the Hunter River estuary. In NSW the Red Knot mainly occurs in small numbers on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours and sandflats and sandy beaches of sheltered coasts. It is occasionally found on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms and is a rare visitor to terrestrial saline wetlands and freshwater swamps.		
Calidris ferruginea	Curlew Sandpiper	E1	CE, M	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin. Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	No. Lack of suitable habitat	No
Callocephalon fimbriatum	**Gang-gang Cockatoo**	**V**		**In NSW, distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. Isolated records known from as far north as Coffs Harbour and as far west as Mudgee. Tall mountain forests and woodlands in summer; in winter, may occur at lower altitudes in open eucalypt forests and woodlands, and urban areas.**	**Potential**	**Yes**
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	V	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods.	No. Lack of suitable habitat	No
Cercartetus nanus	**Eastern Pygmy-possum**	**V**		**The Eastern Pygmy-possum is found in south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be**	**Potential**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
				preferred, except in north-eastern NSW where they are most frequently encountered in rainforest.		
Chalinolobus dwyeri	**Large-eared Pied Bat**	**V**	**V**	**Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.**	**Potential**	**Yes**
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	V	V, M	In NSW, the species has been recorded between the northern rivers and the Illawarra, with most records coming from the Clarence and Richmond estuaries. Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders.	No. Lack of suitable habitat	No
Climacteris picumnus victoriae	Brown Treecreeper (south-eastern)	V	V	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey.	Unlikely.	No
Daphoenositta chrysoptera	**Varied Sittella**	**V**		**Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, mallee and *Acacia* woodland.**	**Potential**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Dasyornis brachypterus	Eastern Bristlebird	E1	E	There are three main populations: Northern - southern Qld/northern NSW, Central - Barren Ground NR, Budderoo NR, Woronora Plateau, Jervis Bay NP, Booderee NP and Beecroft Peninsula and Southern - Nadgee NR and Croajingalong NP in the vicinity of the NSW/Victorian border. Central and southern populations inhabit heath and open woodland with a heathy understorey. In northern NSW, habitat comprises open forest with dense tussocky grass understorey.	No. Lack of suitable habitat	No
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Unlikely.	No
Epthianura albifrons	White-fronted Chat	V		In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas. Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground.	Unlikely.	No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		South-east coast and ranges of Australia, from southern Qld to Victoria and Tasmania. In NSW, records extend to the western slopes of the Great Dividing Range. Tall (greater than 20m) moist habitats.	Unlikely	No
Falco hypoleucos	Grey Falcon	V	V	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	No. Outside general distribution.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Gallinago hardwickii	Latham's Snipe, Japanese Snipe		V, M	The species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia, including the Adelaide plains, Mount Lofty Ranges, and the Eyre Peninsula. Most birds spend the non-breeding period at sites located south of the Richmond River in New South Wales. Latham's snipe feed in soft mudflats or shallow water typically at night, early morning, or evening	No. Lack of suitable habitat	No
Grantiella picta	Painted Honeyeater	V	V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests.	No. Lack of suitable habitat	No
Heleioporus australiacus	**Giant Burrowing Frog**	**V**	**V**	**South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.**	**Potential**	**Yes**
Hieraaetus morphnoides	**Little Eagle**	**V**		**Throughout the Australian mainland, with the exception of the most densely-forested parts of the Dividing Range escarpment. Open eucalypt forest, woodland or open woodland, including sheoak or *Acacia* woodlands and riparian woodlands of interior NSW.**	**Potential**	**Yes**
Hirundapus caudacutus	**White-throated Needletail**		**M**	**All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.**	**Potential**	**Yes**
Hoplocephalus bungaroides	**Broad-headed Snake**	**E1**	**V**	**Largely confined to Triassic and Permian sandstones within the coast and ranges in an area within approximately 250 km of Sydney. Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands.**	**Potential**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Isoodon obesulus obesulus	**Southern Brown Bandicoot (eastern)**	**E1**	**E**	**Found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River. Heath or open forest with a heathy understorey on sandy or friable soils.**	**Potential**	**Yes**
Keyacris scurra	Key's Matchstick Grasshopper	E	E	Its northern boundaries in the NSW Central Tablelands and Slopes are poorly defined with a very low survey effort, with recent records around Bathurst the northernmost, but it ranges southwards into parts of Victoria, notably in the Omeo district. Typically found in native grasslands and grassy woodlands but it has also been recorded in other vegetation associations usually containing a native grass understory (especially kangaroo grass Themeda triandra) and known food plants (particularly Asteraceae).	Unlikely	No
Lathamus discolor	**Swift Parrot**	**E1**	**CE**	**Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands.**	**Potential**	**Not identified, possible foraging habitat**
Limosa lapponica	Bar-tailed Godwit		V, M	The bar-tailed godwit has been recorded in the coastal areas of all Australian states. It is widespread in the Torres Strait and along the east and south-east coasts of Queensland, NSW and Victoria. The bar-tailed godwit (western Alaskan) usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. They prefer exposed sandy or soft mud substrates on intertidal flats, banks and beaches. On Heron Island, Qld they have been seen feeding on insect larvae among the roots of Casuarina	Unlikely. Lack of suitable habitat	No
Litoria aurea	Green and Golden Bell Frog	E1	V	Since 1990, recorded from ~50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region. Marshes, dams and stream-sides, particularly those containing Typha spp. (Bullrushes) or *Eleocharis* spp. (Spikerushes). Some populations occur in highly disturbed areas.	Unlikely. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Litoria littlejohni	Littlejohn's Tree Frog	V	V	Plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest south to Buchan in Victoria. The species has not been recorded in southern NSW within the last decade. Breeding habitat is the upper reaches of permanent streams and perched swamps. Non-breeding habitat is heath-based forests and woodlands	No. Lack of suitable habitat	No
Litoria watsoni	Southern Heath Frog, Watson's Tree Frog	E	E	Within NSW the distribution of L. watsoni is fragmented. There are few specimens recorded between Nadgee NP, in the far south-east of the state, and Monga NP and no specimens between Monga and the one population know from a fire dam in Yadboro State Forest. The Morton plateau population covers the largest area inhabited by the species but is separated from the Budderoo population to the north. This species breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation, and hunts for invertebrate prey either in shrubs or on the ground.	Unlikely. Lack of suitable habitat	No
Melanodryas cucullata cucullata	South-eastern Hooded Robin, Hooded Robin (south-eastern)	E	E	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	Unlikely. Lack of suitable habitat	No
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V		The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.	Unlikely. Lack of suitable habitat	No
Miniopterus australis	**Little Bentwing-bat**	**V**		**East coast and ranges south to Wollongong in NSW. Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub.**	**Potential**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		Large Bent-winged bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	Unlikely. Lack of suitable habitat	No
Mixophyes balbus	**Stuttering Frog, Southern Barred Frog (in Victoria)**	**E**	**V**	**Stuttering Frogs occur along the east coast of Australia from southern Queensland to north-eastern Victoria. Considered to have disappeared from Victoria and to have undergone considerable range contraction in NSW, particularly in south-east NSW. It is the only Mixophyes species that occurs in south-east NSW and in recent surveys it has only been recorded at three locations south of Sydney. Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.**	**Potential**	**Yes**
Myotis macropus	**Southern Myotis**	**V**		**In NSW, found in the coastal band. It is rarely found more than 100 km inland, except along major rivers. Foraging habitat is waterbodies (including streams, or lakes or reservoirs) and fringing areas of vegetation up to 20m.**	**Potential**	**Yes**
Neophema chrysogaster	Orange-bellied Parrot	CE	CE	The Orange-bellied Parrot breeds in the south-west of Tasmania and migrates in autumn to spend the winter on the mainland coast of south-eastern South Australia and southern Victoria. There are occasional reports from NSW, with the most recent records from Shellharbour and Maroubra in May 2003. It is expected that NSW habitats may be being more frequently utilised than observations suggest. Typical winter habitat is saltmarsh and strandline/foredune vegetation communities either on coastlines or coastal lagoons.	Unlikely. Lack of suitable habitat	No
Neophema chrysostoma	Blue-winged Parrot	V	V	Blue-winged parrots breed on mainland Australia south of the Great Dividing Range in southern Victoria from Port Albert in Gippsland west to Nelson, and sometimes in the far south-east of South Australia, and the north-western, central and eastern parts of Tasmania. Blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy	Unlikely. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
				woodlands and are often found near wetlands both near the coast and in semi-arid zones		
Neophema pulchella	**Turquoise Parrot**	**V**		**Occurs along the length of NSW from the coastal plains to the western slopes of the Great Dividing Range. Eucalypt and cypress pine open forests and woodlands, ecotones between woodland and grassland, or coastal forest and heath.**	**Potential**	**Yes**
Ninox strenua	**Powerful Owl**	**V**		**In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains. Woodland, open sclerophyll forest, tall open wet forest and rainforest.**	**Potential**	**Yes**
Notamacropus parma	**Parma Wallaby**	**V**	**V**	**The species once occurred in north-eastern NSW from the Queensland boarder to the Bega area in the southeast. Their range is now confined to the coast and ranges of central and northern NSW from the Gosford district to south of the Bruxner Highway between Tenterfield and Casino. Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest.**	**Potential**	**Yes**
Numenius madagascariensis	Eastern Curlew		CE, M	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records. Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	No. Lack of suitable habitat	No
Pachycephala olivacea	Olive Whistler	V		In NSW chiefly occurs around Barrington Tops and the MacPherson Ranges, and from the Illawarra south to Victoria. In the south it is found inland to the Snowy Mountains and the Brindabella Range. Mostly inhabits wet forests above about 500m.	No. Outside geographic distribution	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Petauroides volans	**Southern Greater Glider**	**E**	**E**	**The Southern Greater Glider occurs in eastern Australia, in eucalypt forests and woodlands, where it has a broad distribution from around Proserpine in Queensland, south through NSW and the Australian Capital Territory into Victoria. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe.**	**Potential**	**Yes**
Petaurus australis australis	**Yellow-bellied Glider (south-eastern)**	**V**	**V**	**The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.**	**Potential**	**Yes**
Petrogale penicillata	Brush-tailed Rock-wallaby	E1	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	No. Lack of suitable habitat	No
Petroica boodang	Scarlet Robin	V		In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	No. Lack of suitable habitat	No
Pezoporus wallicus wallicus	Eastern Ground Parrot	V		In NSW, found in small numbers on the north coast (Broadwater, Bundjalung, Yuraygir NPs) and Myall Lakes on the central coast. Larger populations found on south coast, particularly Barren Grounds NR, Budderoo NP, the Jervis Bay area and Nadgee NR. Small numbers are recorded at Morton and Ben Boyd NP and other areas on the south coast. Coastal or subcoastal low heathland and sedgeland.	No. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Phascolarctos cinereus	Koala	V	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands. Eucalypt woodlands and forests.	No. Lack of suitable habitat	No
Pluvialis fulva	Pacific Golden Plover		M	It migrates south to Asia, Australasia, and Pacific islands in August and September, and stays until April or May. A rare vagrant to western Europe. It forages on tundra, in mowed grass, and on beaches and tidal flats.	No. Lack of suitable habitat	No
Pluvialis squatarola	Grey Plover		M	Regular summer migrant to coastal Australia, including NSW. Rarely inland, on passage. Mudflats, saltmarsh, tidal reefs and estuaries.	No. Lack of suitable habitat	No
Potorous tridactylus	Long-nosed Potoroo	V	V	In NSW it is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Coastal heaths and dry and wet sclerophyll forests.	No. Lack of suitable habitat	No
Pseudomys novaehollandiae	New Holland Mouse		V	Fragmented distribution across eastern NSW. Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	No. Lack of suitable habitat	No
Pseudophryne australis	Red-crowned Toadlet	V		Confined to the Sydney Basin, from Pokolbin in the north, the Nowra area to the south, and west to Mt Victoria in the Blue Mountains. Open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings.	No. Lack of suitable habitat	No
Pteropus poliocephalus	**Grey-headed Flying-fox**	**V**	**V**	**Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.**	**Potential**	**Yes**
Pycnoptilus floccosus	Pilotbird	V	V	Pilotbirds are endemic to south-east Australia. Lowland Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests	No. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
				of eastern Australia, to Dandenong near Melbourne. Pilotbirds are strictly terrestrial, living on the ground in dense forests with heavy undergrowth		
Rostratula australis	Australian Painted Snipe	E1	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams and nearby marshy areas.	No. Lack of suitable habitat	No
Saccolaimus flaviventris	**Yellow-bellied Sheathtail-bat**	**V**		**There are scattered records of this species across the New England Tablelands and North West Slopes. Rare visitor in late summer and autumn to south-western NSW. Almost all habitats, including wet and dry sclerophyll forest, open woodland, open country, mallee, rainforests, heathland and waterbodies.**	**Potential**	**Yes**
Scoteanax rueppellii	**Greater Broad-nosed Bat**	**V**		**Both sides of the great divide, from the Atherton Tableland in Qld to north-eastern Victoria, mainly along river systems and gullies. In NSW it is widespread on the New England Tablelands. Woodland, moist and dry eucalypt forest and rainforest.**	**Potential**	**Yes**
Stagonopleura guttata	Diamond Firetail	V	V	The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Cental and South Western Slopes and the North West Plains and Riverina. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands.	No. Lack of suitable habitat	No
Thinornis rubricollis rubricollis	Hooded Plover	E4A	V	Occurs in coastal NSW north to Sussex Inlet. Occasional records from the Shoalhaven River, Comerong Beach and Lake Illawarra. Sandy ocean beaches, tidal bays and estuaries, rock platforms, rocky or sand-covered reefs, and small beaches in lines of cliffs. Also use near-coastal saline and freshwater lakes and lagoons.	No. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Tringa nebularia	Common Greenshank, Greenshank		E,M	The common greenshank is widespread in coastal regions, occurs in all types of wetlands, and has one of the widest distribution of any shorebird in Australia. The common greenshank forages at the edge of wetlands, in soft mud on mudflats, in channels, or within shallows around the edge of waterbodies.	No. Lack of suitable habitat	No
Tyto novaehollandiae	**Masked Owl**	**V**		**Recorded over approximately 90% of NSW, excluding the most arid north-western corner. Most abundant on the coast but extends to the western plains. Dry eucalypt forests and woodlands from sea level to 1100 m.**	**Potential**	**Yes**
Tyto tenebricosa	Sooty Owl	V		Occupies the easternmost one-eighth of NSW, occurring on the coast, coastal escarpment and eastern tablelands. Dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.	No. Lack of suitable habitat	No
FLORA						
Acacia baueri subsp. aspera	null	V	E	Restricted to the Sydney region, occurring on the Kings Tableland in the central Blue Mountains and with sporadic occurrences on the Woronora Plateau in the Royal National Park, Mt. Keira district and at Wedderburn. Occurs in low, damp heathlands, often on exposed rocky outcrops over a wide range of climatic and topographical conditions.	No. Not identified	No habitat
Acacia bynoeana	Bynoe's Wattle	E1	V	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Heath or dry sclerophyll forest on sandy soils.	No. Not identified	No habitat
Allocasuarina glareicola	null	E	E	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Grows in Castlereagh woodland on lateritic soil. Found in open woodland with Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla and Melaleuca decora. Common associated understorey species include Melaleuca nodosa, Hakea dactyloides, Hakea sericea, Dillwynia tenuifolia, Micromyrtus minutiflora, Acacia elongata, Acacia brownei, Themeda australis and Xanthorrhoea minor.		

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Arthropteris palisotii	Lesser Creeping Fern	E		Located on the Illawarra Escarpment, North-eastern NSW and also in Queensland. Occurs in rainforest, mainly on tree trunks.		
Boronia deanei	Deane's Boronia	V	V	Scattered populations between the far south-east of NSW and the Blue Mountains (including the upper Kangaroo River near Carrington Falls, the Endrick River near Nerriga and Nalbaugh Plateau). Wet heath, often at the margins of open forest adjoining swamps or along streams. Also found in drier open forest on poorly drained peat soils.	No. Not identified	No habitat
Caladenia tessellata	Thick Lip Spider Orchid	E1	V	Currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. Grassy sclerophyll woodland on clay loam or sandy soils, or low woodland with stony soil.	Potential	Yes
Calochilus pulchellus	Pretty Beard Orchid, Pretty Beard-orchid	E	E	All currently known sites are within the Shoalhaven Local Government Area. Occurrence in small, widely separated colonies is not unusual in the genus. The cryptic nature of the species, with a single leaf above ground for only a few months and a flowering stem lasting a few days or a week, makes detection difficult for most of the year. At Vincentia the species grows in low Scribbly Gum dominated woodland with a low wet heath understorey. The soil is a sandy loam overlying sandstone. In Booderee National Park it grows in a tall heathy association. In Morton National Park on the Little Forest Plateau it occurs in low heath among scattered clumps of emergent eucalypts and Banksia in shallow coarse white sand over sandstone, in a near-escarpment area subject to strong orographic precipitation.		
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	In NSW, recorded mainly on coastal and near coastal ranges north from Victoria to near Forster, with two isolated occurrences inland north-west of Grafton. Coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest.	Unlikely. Not identified, minimal habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Cynanchum elegans	White-flowered Wax Plant	E1	E	Restricted to eastern NSW, from Brunswick Heads on the north coast to Gerroa in the Illawarra region, and as far west as Merriwa in the upper Hunter River valley. Dry rainforest; littoral rainforest; *Leptospermum laevigatum-Banksia integrifolia subsp. integrifolia* (Coastal Tea-tree–Coastal Banksia) coastal scrub; *Eucalyptus tereticornis* (Forest Red Gum) or *Corymbia maculata* (Spotted Gum) open forest and woodland; and *Melaleuca armillaris* (Bracelet Honeymyrtle) scrub.	Unlikely. Not identified, not ideal habitat	No
Daphnandra johnsonii	Illawarra Socketwood	E1	E	Restricted to the Illawarra region, in the Shoalhaven, Kiama, Shellharbour and Wollongong areas. Rainforest and moist eucalypt forest on rocky hillsides and gullies of the Illawarra lowlands, occasionally extending onto the upper escarpment slopes.	Not identified.	No
Genoplesium baueri	Bauer's Midge Orchid	E1	E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. Dry sclerophyll forest and moss gardens over sandstone.	Unlikely. Lack of suitable habitat	No
Grevillea raybrownii	null	V	V	Generally occurs on ridgetops and, less often, slopes and benches of Hawkesbury Sandstone and Mittagong Formation.	Unlikely. Lack of suitable habitat	No
Grevillea rivularis	Carrington Falls Grevillea	CE	CE	The Carrington Falls Grevillea is confined to the Carrington Falls area on the upper Kangaroo River west of Kiama, within Budderoo National Park. The Carrington Falls Grevillea is found mainly on moist creek-sides on sandstone in open heath or eucalypt woodland.	Unlikely. Lack of suitable habitat	No
Haloragis exalata subsp. exalata	Wingless Raspwort, Square Raspwort	V	V	Square Raspwort occurs in 4 widely scattered localities in eastern NSW. It is disjunctly distributed in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Square Raspwort appears to require protected and shaded damp situations in riparian habitats.	Unlikely. Lack of suitable habitat	No
Hibbertia acaulothrix	null		E	Hibbertia acaulothrix is known from several widely separated localities in New South Wales (NSW), from Wadbilliga National Park in the Southern Tablelands, through the NattaiWollondilly area in the Southern Central Tablelands, to the Mt Baker and Mt Coricudgy (Wollemi) area in northern part of the Central Coast and Tablelands. Hibbertia acaulothrix is found on	Unlikely. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
				rocky outcrops and has been recorded growing in Eucalyptus sieberi woodland or in association with Allocasuarina littoralis (black she-oak), Corymbia gummifera (red bloodwood), and Leptospermum trinervium (flaky-barked tea-tree)		
Irenepharsus trypherus	Illawarra Irene	E1	E	Recorded within the local government areas of Kiama, Shellharbour, Shoalhaven, Tallaganda, Wingecarribee, and Wollongong, including Minnamurra Falls, the Jamberoo area, and Morton and Macquarie Pass National Parks. Moist sclerophyll forest, *Backhousia myrtifolia* (Ironwood) thickets, and rainforest, on steep rocky slopes near cliff lines and ridge tops.	Unlikely. Lack of suitable habitat	No
Leucopogon exolasius	Woronora Beard-heath		V	Leucopogon exolasius is endemic to the Sydney region and central coast of NSW occurring within the Sydney Metro and Hawkesbury–Nepean Natural Resource Management Regions. This species inhabits woodland on sandstone (DECC, 2005) and prefers rocky hillsides along creek banks up to 100 m altitude.	Unlikely. Lack of suitable habitat	No
Melaleuca biconvexa	Biconvex Paperbark	V	V	Only found in NSW, populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Damp places, often near streams or low-lying areas on alluvial soils.	No. Outside geographic distribution	No
Persicaria elatior	Tall Knotweed	V	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). Beside streams and lakes, swamp forest or disturbed areas.	No. Lack of suitable habitat	No
Persoonia glaucescens	Mittagong Geebung	V	V	The Mittagong Geebung's historical distribution places the northern and eastern limit at Couridjah (Thirlmere Lakes), the southern limit at Fitzroy Falls and the western limit at High Range. The Mittagong Geebung grows in woodland to dry sclerophyll forest on clayey and gravely laterite. The preferred topography is ridge-tops, plateaux and upper slopes. Aspect does not appear to be a significant factor.	No. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Persoonia hirsuta	Hairy Geebung	E1	E	Scattered distribution around Sydney, from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	No. Lack of suitable habitat	No
Persoonia oxycoccoides		E	E	Persoonia oxycoccoides is endemic to New South Wales where it is currently known from the Wingecarribee Shire in the south-eastern portion of the Central Tablelands, with the easternmost records in the municipality of Kiama, and a south-western outlier at Tallong in Goulburn-Mulwaree Shire in the Southern Tablelands. Heath to dry sclerophyll eucalypt forest, at 600 to 700 m altitude, on acid, sandy soils derived from sandstone. The species can also occur in the margins of montane swamps within wet heath	No. Lack of suitable habitat	No
Pimelea spicata	Spiked Rice-flower	E1	E	Two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Lansdowne to Shellharbour to northern Kiama). Well-structured clay soils. *Eucalyptus moluccana* (Grey Box) communities and in areas of ironbark on the Cumberland Plain. Coast Banksia open woodland or coastal grassland in the Illawarra.	Potential	Yes
Pomaderris brunnea	Rufous Pomaderris, Brown Pomaderris	E	V	Brown Pomaderris is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria. Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	Unlikely. Lack of suitable habitat	No
Pomaderris cotoneaster	Cotoneaster Pomaderris	E	E	Cotoneaster Pomaderris has a very disjunct distribution, being known from the Nungatta area, northern Kosciuszko National Park (near Tumut), the Tantawangalo area in South-East Forests National Park and adjoining freehold land, Badgery's Lookout near Tallong, Bungonia State Conservation Area, the Yerranderie area, Kanangra-Boyd National Park, the Canyonleigh area and Ettrema Gorge in Morton National Park. Cotoneaster Pomaderris has been recorded in a range of habitats in	Unlikely. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
				predominantly forested country. The habitats include forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs.		
Pomaderris walshii	Carrington Falls Pomaderris	E4A		Known only from the upper catchment of the Kangaroo River, above the escarpment near Robertson within the Sydney Basin Bioregion. Riparian habitat varying from shrubland to open grassy forest.	No. Outside geographic distribution	No
Prasophyllum affine	Jervis Bay Leek Orchid, Culburra Leek-orchid, Kinghorn Point Leek-orchid	E	E	Jervis Bay Leek Orchid is currently known from three areas south-east of Nowra on South Coast. These are Kinghorne Point, Wowly Gully near the town of Callala Bay, and near the township of Vincentia. Grows on poorly drained grey clay soils that support low heathland and sedgeland communities. The underground dormant tubers commence shooting in mid winter and leaves are known to have emerged above ground by June.	Unlikely. Lack of suitable habitat	No
Prasophyllum fuscum	Tawny Leek-orchid, Slaty Leek-orchid	CE	V	The type specimen is from "moist meadows towards the Georges River" in the Sydney area. The species is likely to be extinct from this area. Harden (1993) states that it is confined to the Blue Mountains area. However, some authorities believe Prasophyllum species from this area are not P. fuscum, but an undescribed species. In addition, some authorities believe it is identical to P. uroglossum which occurs in the Wingecarribee area. Grows in moist heath, often along seepage lines. The known population grows in moist sandy soil over sandstone amongst sedges and grasses in an area that appears to be regularly slashed by the local council.	Unlikely. Lack of suitable habitat	No
Prostanthera densa	Villous Mintbush	V	V	This species has been recorded from the Currarong area in Jervis Bay, Royal National Park (Marley), Cronulla, Helensburgh and Port Stephens (Nelson Bay). The Sydney and Royal National Park populations were thought possibly extinct, but the species is now known to occur at Bass and Flinders Point in Cronulla. Prostanthera densa generally grows in sclerophyll forest and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone, and rocky slopes near the sea.	Unlikely. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Pterostylis gibbosa	Illawarra Greenhood	E1	E	Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra). Open forest or woodland, on flat or gently sloping land with poor drainage.	Unlikely. Habitat not ideal	No
Pterostylis pulchella	Waterfall Greenhood	V	V	Found only at Fitzroy Falls, Belmore Falls, upper Bundanoon Creek (Meryla) and Minnamurra Falls. Cliff faces close to waterfalls and creek banks, and mossy rocks alongside running water.	No. Lack of suitable habitat	No
Pterostylis saxicola	Sydney Plains Greenhood	E	E	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. There are very few known populations and they are all very small and isolated. Two populations occur within a conservation reserve (Georges River National Park; Scheyville NP). Occurs primarily on the Cumberland Plain along an ecological gradient from clay soils derived from Ashfield Shale to thin accumulations of humus rich sandy soils on Hawkesbury Sandstone sheets and rock shelves. Habitat ranges from grassy woodland on flat to gently sloping landscapes on shale soils, to open-forest on hilly landscapes on transitional soils, and woodland on the rims and steep sides of river valleys on sandstone soils. The species has also been recorded outside the Cumberland Plain in grassy woodland on Devonian slate.	No. Lack of suitable habitat	No
Pultenaea aristata	null	V	V	Prickly Bush-pea is restricted to the Woronora Plateau, a small area between Helensburgh, south of Sydney, and Mt Kiera above Wollongong. The species occurs in either dry sclerophyll woodland or wet heath on sandstone.	No. Lack of suitable habitat	No
Rhizanthella slateri	Eastern Underground Orchid	V	E	Occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest.	No. Lack of suitable habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Rhodamnia rubescens	Scrub Turpentine, Brown Malletwood	CE	CE	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of R. rubescens typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	No. Lack of suitable habitat	No
Rhodomyrtus psidioides	Native Guava	CE	CE	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	No. Lack of suitable habitat	No
Solanum celatum		**E1**		**Restricted to an area from Wollongong to just south of Nowra, and west to Bungonia. Rainforest clearings and wet sclerophyll forests.**	**Known**	**Yes**
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	Only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Subtropical and littoral rainforest on gravels, sands, silts and clays.	No. Lack of suitable habitat	No
Thelymitra kangaloonica	Kangaloon Sun Orchid	CE	CE	Thelymitra kangaloonica (Thelymitra sp. Kangaloon) is only known to occur on the southern tablelands of NSW in the Moss Vale / Kangaloon / Fitzroy Falls area at 550-700 m above sea level. It is known to occur at three swamps that are above the Kangaloon Aquifer. It is found in swamps in sedgelands over grey silty grey loam soils	No. Lack of suitable habitat	No
Xerochrysum palustre	Swamp Everlasting, Swamp Paper Daisy		V	Found in Kosciuszko National Park and the eastern escarpment south of Badja. Also found in eastern Victoria. Grows in swamps and bogs which are often dominated by heaths.	No. Outside general distribution	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution / Habitat	Likelihood of occurrence	Potential for further assessment
Thesium australe	Austral Toadflax	V	V	In eastern NSW it is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. Grassland on coastal headlands or grassland and grassy woodland away from the coast.	Potential	Yes
Zieria granulata	Illawarra Zieria	E1	E	Restricted to the Illawarra region, primarily on the coastal lowlands between Oak Flats and Toolijooa. Sclerophyll forest, scrub, woodland and rainforest margins. Typically on rocky ridges and outcrops in shallow volcanic soils, also moist slopes of the Illawarra escarpment and low-lying areas on Quaternary sediments.	Not identified.	No

BC Act: E1 = Endangered, E2 = Endangered Population, E4 = Extinct, E4A = Critically Endangered, V = Vulnerable

EPBC Act: M = Migratory, CE = Critically Endangered, E = Endangered, V = Vulnerable, X = Extinct

Appendix C Vegetation Integrity Plot Data

Species	Common Name	Exotic	High Threat Weed	Growth Form	Plot 1		
					Stratum	Cover	Abundance
Acacia maidenii	Maiden's Wattle			Tree (TG)	m	2	20
Adiantum aethiopicum	Common Maidenhair			Fern (EG)	g	3	2000
Ageratina riparia	Mistflower	*	*		g	0.1	5
Angophora floribunda	Rough-barked Apple			Tree (TG)	u	2	1
Araujia sericifera	Moth Vine	*	*		g	0.1	10
Bidens pilosa var. pilosa		*			g	0.2	20
Blechnum neohollandicum				Fern (EG)	g	1	100
Brachychiton populneus subsp. populneus				Tree (TG)	m	0.2	1
Breynia oblongifolia	Coffee Bush			Shrub (SG)	g	0.1	2
Carex longebrachiata				Grass & grasslike (GG)	g	5	1000
Cheilanthes sieberi subsp. sieberi	Rock Fern			Fern (EG)	g	0.1	5
Cirsium vulgare	Spear Thistle	*			g	0.1	5
Clematis aristata	Old Man's Beard			Other (OG)	g	0.1	1
Conyza spp.	A Fleabane	*			g	0.2	50
Cyanthillium cinereum		*			g	0.1	5
Desmodium rhytidophyllum				Forb (FG)	g	0.3	50
Dichondra repens	Kidney Weed			Forb (FG)	g	5	2000
Digitaria parviflora	Small-flowered Finger Grass			Grass & grasslike (GG)	g	1	500
Echinopogon ovatus	Forest Hedgehog Grass			Grass & grasslike (GG)	g	0.5	500

Species	Common Name	Exotic	High Threat Weed	Growth Form	Plot 1		
					Stratum	Cover	Abundance
Entolasia marginata	Bordered Panic			Grass & grasslike (GG)	g	0.5	1000
Eucalyptus eugenioides	Thin-leaved Stringybark			Tree (TG)	u	20	6
Eucalyptus quadrangulata	White-topped Box			Tree (TG)	u	15	2
Euchiton involucratus	Star Cudweed			Forb (FG)	g	0.1	5
Eustrephus latifolius	Wombat Berry			Other (OG)	m	0.1	2
Galium leptogonium				Forb (FG)	g	0.1	5
Gamochaeta spp.		*			g	0.2	100
Geitonoplesium cymosum	Scrambling Lily			Other (OG)	g	0.1	5
Geranium solanderi var. solanderi				Forb (FG)	g	0.2	500
Glycine clandestina	Twining glycine			Other (OG)	g	0.1	20
Gomphocarpus fruticosus	Narrow-leaved Cotton Bush	*			m	0.1	2
Hibbertia scandens	Climbing Guinea Flower			Other (OG)	g	0.5	50
Hypericum gramineum	Small St John's Wort			Forb (FG)	g	0.1	20
Hypochaeris radicata	Catsear	*			g	0.1	5
Imperata cylindrica	Blady Grass			Grass & grasslike (GG)	g	3	500
Lantana camara	Lantana	*	*		m	40	100
Ligustrum lucidum	Large-leaved Privet	*	*		g	0.2	20
Lobelia purpurascens	whiteroot			Forb (FG)	g	0.1	10
Lysimachia arvensis	Scarlet Pimpernel	*			g	0.2	100
Melicope micrococca	Hairy-leaved Doughwood			Shrub (SG)	g	0.1	1
Melicytus dentatus	Tree Violet			Shrub (SG)	m	2	5
Microlaena stipoides var. stipoides	Weeping Grass			Grass & grasslike (GG)	g	5	1000

Species	Common Name	Exotic	High Threat Weed	Growth Form	Plot 1		
					Stratum	Cover	Abundance
Myrsine howittiana	Brush Muttonwood			Shrub (SG)	m	10	50
Myrsine variabilis				Shrub (SG)	g	0.1	1
Notelaea venosa	Veined Mock-olive			Shrub (SG)	m	0.3	2
Olearia viscidula	Wallaby Weed			Shrub (SG)	m	0.5	2
Opercularia diphylla	Stinkweed			Forb (FG)	g	0.1	10
Oplismenus aemulus				Grass & grasslike (GG)	g	20	2000
Oxalis perennans				Forb (FG)	g	0.2	100
Pandorea pandorana subsp. pandorana	Wonga Wonga Vine			Other (OG)	g	0.2	10
Passiflora edulis	Common Passionfruit	*			g	0.3	2
Pittosporum revolutum	Rough Fruit Pittosporum			Shrub (SG)	g	0.3	2
Pittosporum undulatum	Sweet Pittosporum			Shrub (SG)	m	0.2	1
Plantago debilis	Shade Plantain			Forb (FG)	g	0.3	100
Poa labillardierei var. labillardierei	Tussock			Grass & grasslike (GG)	g	5	1000
Pseuderanthemum variabile	Pastel Flower			Forb (FG)	g	0.1	10
Rubus parvifolius	Native Raspberry			Shrub (SG)	g	0.1	5
Senecio madagascariensis	Fireweed	*	*		g	0.2	100
Sigesbeckia orientalis subsp. orientalis	Indian Weed			Forb (FG)	g	1	500
Solanum mauritianum	Wild Tobacco Bush	*			g	0.1	5
Solanum prinophyllum	Forest Nightshade			Forb (FG)	g	0.1	2
Sonchus oleraceus	Common Sowthistle	*			g	0.1	1
Streblus brunonianus	Whalebone Tree			Tree (TG)	m	1	3

Species	Common Name	Exotic	High Threat Weed	Growth Form	Plot 1		
					Stratum	Cover	Abundance
Verbena bonariensis	Purpletop	*			g	0.1	5

Appendix D – Biodiversity Considerations for works outside of the Greenvalleys Mountain Bike Park

For any physical works that proposed outside the existing Mountain Bike Park, a further biodiversity assessment report will be required to address the following:

Biodiversity offset scheme

Biodiversity Offset scheme triggers

The Biodiversity Offset Scheme (BOS) can be triggered by the following:

- Any impacts to native vegetation within areas mapped as 'high biodiversity values' (as per the Biodiversity Values Map). The study area did not include BV mapped areas.
- Native vegetation clearing thresholds:
  - >0.25 ha clearing threshold (for a minimum lot size of less than 1 ha)
  - >0.5 ha clearing threshold (for a minimum lot size of 1 ha to less than 40 ha)
  - >1 ha clearing threshold (for a minimum lot size of 40 ha to less than 1000 ha).
- Significant impacts to threatened species or threatened ecological communities, determined through the application of a test of significance consistent with s7.3 of the BC Act.

Under the BC Act, a development must demonstrate that impacts to biodiversity have been avoided, minimised and mitigated prior to any offsets being considered. The study area contains the following threatened entities listed below:

Threatened ecological communities:

- *Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion*
- *Illawarra and south coast lowland forest and woodland ecological community*

Threatened flora:

- *Solanum celatum*

Significant impacts to these entities will need to be determined through the application of a test of significance consistent with s7.3 of the BC Act.

If a future development triggers the BOS, a Biodiversity Development Assessment Report (BDAR) would be required to accompany a DA. The BDAR will require field survey and report preparation consistent with the Biodiversity Assessment Method 2020 (BAM), as well as the calculation of any necessary offsets using the online BAM tool. Targeted surveys, if required, may add to the length of the assessment process, particularly if there are seasonal requirements (see below).

BAM: Chapter 7 – Avoid or minimise impacts on biodiversity values

Based on the current layout, if the additional permitted land use as private recreation proposed by this Planning Proposal were approved, future operation of the mountain bike park would have the potential

to trigger the BOS. Future operation of the mountain bike park may require detailed assessments in the form of a BDAR in accordance with the BAM. Chapter 7 of the BAM sets out guidance on how proponents can demonstrate they have undertaken reasonable measures to avoid or minimise impacts of the proposed development, activity or clearing on biodiversity values, in accordance with section 6.12 of the BC Act. Inadequate consideration of avoiding and/or minimising biodiversity impacts can compromise the approval of a development application. Feasible alternatives that have been considered as part of the design process should be discussed in any future assessments in order to demonstrate impacts to biodiversity have been minimised during the design stage.

Potential measures that could be undertaken to avoid and minimise impacts to biodiversity are as follows:

- Minimise bike track widths.
- Rehabilitate areas of remnant native vegetation through the implementation of a VMP.
- Construct bridges over watercourses which the bike tracks intersect.

Targeted surveys for threatened species

Under the BAM, targeted survey may be required for threatened species listed as species credit species. Potential habitat for the following threatened species was identified as present in the study area. If the BOS is triggered, targeted survey may be required to identify the presence of threatened species within the study area and determine offsets required. Targeted survey may be required for the following threatened species which were determined as potential or likely to occur within the study area (Appendix B):

- *Anthochaera phrygia* (Regent Honeyeater)
- *Chalinolobus dwyeri (*Large-eared Pied Bat)
- *Heleioporus australiacus* (Giant Burrowing Frog)
- *Hieraaetus morphnoides* (Little Eagle)
- *Hoplocephalus bungaroides* (Broad-headed Snake)
- *Lathamus discolor* (Swift Parrot)
- *Miniopterus australis* (Little Bentwing-bat)
- *Myotis macropus* (Southern Myotis)
- *Ninox strenua* (Powerful Owl)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Tyto novaehollandiae* (Masked Owl)
- *Caladenia tessellata* (Thick Lip Spider Orchid)
- *Pimelea spicata* (Spiked Rice-flower)
- *Thesium australe* (Austral Toadflax)
- *Isoodon obesulus obesulus* (Southern Brown Bandicoot (eastern)
- *Callocephalon fimbriatum* (Gang-gang Cockatoo)

Matters of National Environmental Significance

Under the EPBC Act, works likely to affect Matters of National Environmental Significance (MNES) may be considered to be a ‘controlled action’. Application of the significant impact criteria would be required

at the DA stage. The proponent would also be required to undertake a self-assessment to decide whether a referral to the Minister is required.

Illawarra and south coast lowland forest and woodland ecological community is a MNES within the study area. Therefore, impacts to these MNES need to be assessed.

Serious and Irreversible Impacts

Illawarra Lowlands Grassy Woodland is identified as an entity at risk of serious and irreversible impacts (SAII) under the BC Act. SAII entities are those that are most at risk of extinction from potential development. Four principles have been designed to identify impacts which are likely to contribute significantly to the risk of extinction of a threatened species or ecological community in NSW (DPIE 2019). These are impacts that:

- will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline
- will further reduce the population size of the species that is currently observed, estimated, inferred or reasonably suspected to have a very small population size, or will further degrade or disrupt an ecological community that is already observed, inferred or reasonably suspected to be severely degraded or disturbed
- impact on the habitat of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution
- impact on a species or ecological community that is unlikely to respond to measures to improve habitat and vegetation integrity and is therefore irreplaceable.

Illawarra Lowlands Grassy Woodland is a listed ecological community entity at risk of SAII, due to meeting the second principle outlined above. Therefore, any vegetation within the study area that has been mapped as Illawarra Lowlands Grassy Woodland (as defined by the BC Act) will be subject to SAII entity requirements; that is, any applications for development under Part 4 of the EP&A Act must be assessed by the decision-maker. If the decision-maker forms the opinion that the proposal is likely to have a serious and irreversible impact on the candidate SAII entity, it must refuse the application.

The BC Act recognises that there are some types of SAII that the community expects will not occur except where the consent authority considers that this type of impact is outweighed by the social and economic benefits that the development will deliver to the State. Thus, Council must form an opinion at the DA stage as to whether the proposed impacts (direct and indirect) to the community would constitute SAII. If Council determines the impacts to be SAII, it must refuse the DA.

Any proposed development should avoid impacts to SAII entities to reduce approvals risk. When preparing a biodiversity assessment, proposed impacts should consider the *Guidance to assist a decision-maker to determine a serious and irreversible impact* (DPIE, 2019d), clause 6.7 of the BC Reg and section 9.1 of BAM.

Riparian zones

The study area occurs on 'waterfront land' defined under the WM Act (within 40 m from top of bank). All earthworks within 40 m of a watercourse would be considered a controlled activity under the WM

Act. It is anticipated that a controlled activity approval would be required for works within waterfront land within the study area.

Macquarie Rivulet and ten tributaries, comprising both first and second order streams, were mapped adjacent to, or overlapping with the study area. The study area intersects DPE Water riparian buffers within the study area (Figure 6). If meeting the definition of a 'river' under the WM Act, these streams would be classed as waterfront land. However, the *Guidelines for controlled activities on waterfront land* state that where a watercourse does not exhibit features of a defined channel with bed and bank, DPE Water may determine that the watercourse is not waterfront land for the purposes of the WM Act. Evidence such as photos and site inspection must support the determination by DPE Water. Some of the mapped first order streams within the study area may not meet the definition of a 'river' under the WM Act (see ELA riparian assessment, 2022). It is recommended that the client seeks confirmation from DPE Water that the portions of the Hydroline considered to not meet the definition of a river can be treated as such.

Shellharbour LEP – Clause 6.5

All the vegetation within the study area is mapped under *Council's Natural Resources – Terrestrial Biodiversity* mapping. Clause 6.5 of the Shellharbour LEP aims to maintain terrestrial biodiversity values by: protecting native fauna and flora, and protecting the ecological processes necessary for their continued existence, and encouraging the conservation and recovery of native fauna and flora and their habitats.

Future development must not be granted unless the consent authority is satisfied that the development has been designed to mitigate, manage and avoid impacts on native ecological values. The development must be consistent with the objectives outlined in Table 4. The proposal is consistent with the objectives of Clause 6.5.

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A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au