



**NSW National Parks and Wildlife Service**

# **Balgownie Mountain Bike Track Network**

**Draft review of environmental factors**





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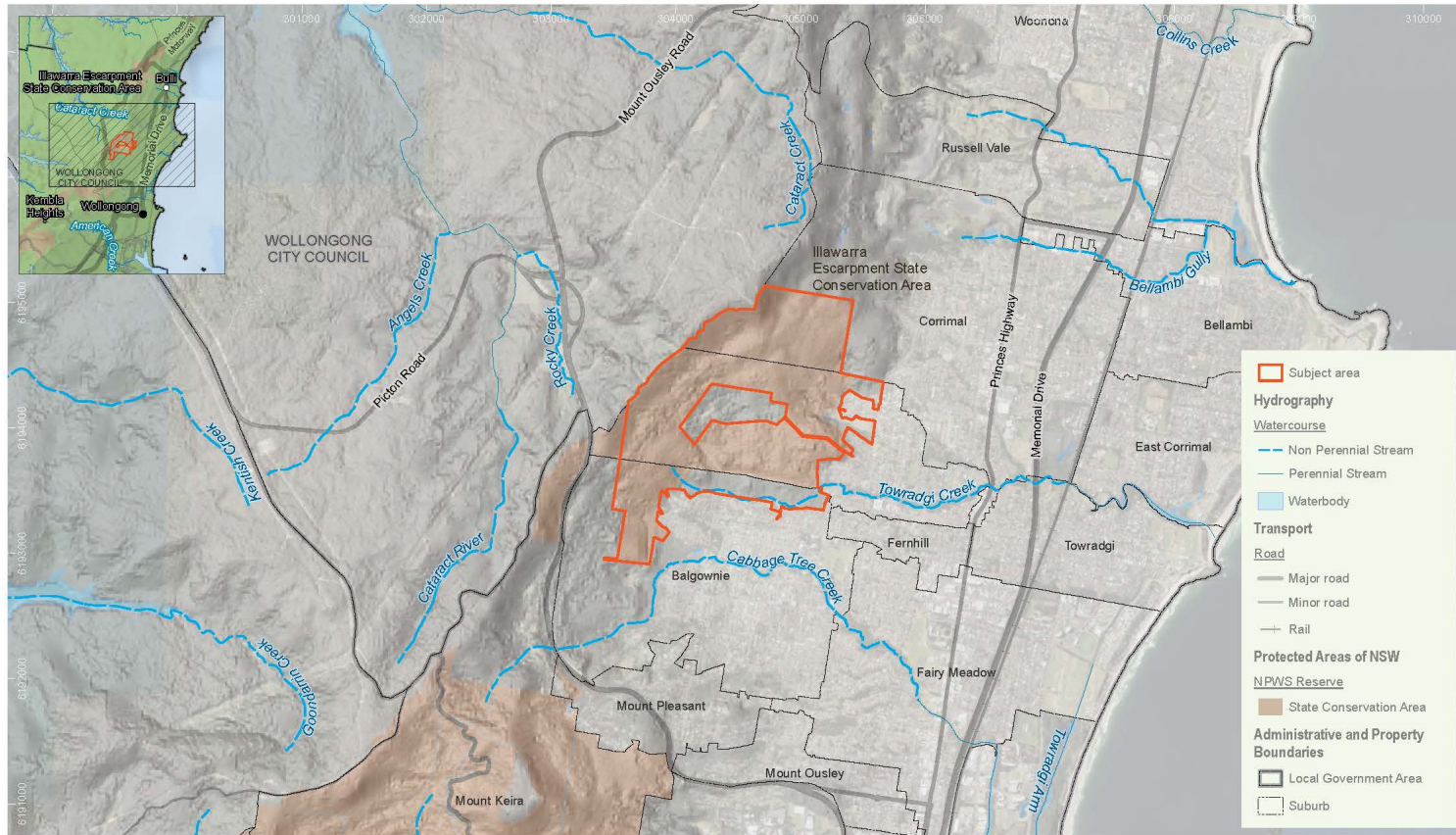
# 1. Brief description of the proposal

<p><b>Proposal name and brief outline</b></p> <p>Note: further detail is provided in Section 6</p>	<p>Balgownie Mountain Bike Track Network</p> <p>The proposed Balgownie Mountain Track Network will consist of 26.94 km of tracks. The network includes 13.28 km of existing unsanctioned tracks, 3.36 km of existing access tracks (including the Lower Escarpment Fire Trail), and 10.30 km of new tracks.</p> <p>For the purposes of this REF, these lands are defined to be the 'proposal area' (Figure 1).</p>
<p><b>Lands within proposal</b></p>	<p>Illawarra Escarpment State Conservation Area (SCA) and adjacent road reserves (owned by Wollongong City Council and Crown Lands) are depicted as blank corridors within the proposal area in Figure 1.</p>
<p><b>NPWS Area</b></p>	<p>Illawarra Highlands Area</p>
<p><b>Location of activity</b></p>	<p>Illawarra Escarpment below Brokers Point and adjacent to Balgownie, henceforth referred to as the 'proposal area'.</p>
<p><b>Council area</b></p>	<p>Wollongong City Council (WCC)</p>
<p><b>NSW State electorate</b></p>	<p>Wollongong</p>
<p><b>Proposed commencement date</b></p>	<p>September 2023</p>
<p><b>Proposed completion date</b></p>	<p>September 2024</p>
<p><b>Estimated duration of proposal</b></p>	<p>12 months for construction duration; perpetual operational phase.</p>

## 2. Proponent's details

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# Balgownie Mountain Bike Track Network – draft review of environmental factors



WGS 1984 Web Mercator

Niche PM: Kai Whitaker  
Niche Proj. #: 7262  
Client: NPWS

**Location Map**  
Balgownie Mountain Bike Trail Network REF

**Figure 1**

publicNSW\_Imagery © Department of Customer Service 2020/Terrain Multi-Directional Hillshade: Airbus/USGS/NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodatabyrsen,GSA,GSI and the GIS User Community/World\_Ocean\_Base: NIWA, GeosciencesAustralia, Esri, DeLorme, NaturalVue/World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS | Watercourses, Waterbodies, Road and Rail alignments, Protected areas of NSW © Spatial Services 2021. | Niche uses GDA2020 as standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS 1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are presented in GDA2020, using the relevant MGA zone.

**Figure 1** Location of proposed track network



## 3. Permissibility and assessment pathway

### 3.1 Permissibility under NSW legislation

#### 3.1.1 National Parks and Wildlife Act 1974

##### Objects of the National Parks and Wildlife Act (s 2A)

The *National Parks and Wildlife Act 1974* (NPW Act) provides the legal framework for the conservation of habitats, ecosystems and ecosystem processes, biodiversity, landforms, landscapes, wild rivers, and historic and cultural objects, places and features in New South Wales (NSW). It provides for the legal protection of plants and animals and reservation of national parks and other places of natural, cultural and social value and specifies such areas are to be managed in accordance with the principles for each particular reserve type and a management plan. The Act specifies that the purpose of reserving land as a national park is to identify, protect and conserve areas containing outstanding or representative ecosystems, natural or cultural features or landscapes or phenomena that provide opportunities for public appreciation and inspiration, and sustainable visitor or tourist use and enjoyment. The Act (with the exception of Part 6) is administered by the NSW National Parks and Wildlife Service (NPWS).

In accordance with section (s) 2A, the proposal is considered to have minor negative impacts on the conservation of nature, and of objects, places or features of cultural value.

The proposal is generally consistent with s 2A(1)(a) and (1)(b) of the Act in relation to conservation of natural and cultural values. The principles of ecologically sustainable development have been considered by minimising clearing from the creation of new tracks by careful choice of location and by incorporating existing unsanctioned tracks into the network where practicable. In this review of environmental factors (REF), the term ‘unsanctioned’ refers to trails that are not authorised or are otherwise not legal.

The existing tracks have value to the mountain biking community. By formalising existing trails and incorporating them into the proposed network, the proposal would reduce the likelihood of new unsanctioned tracks being created. By creating a formalised network, the proposal will enable NPWS to close and rehabilitate remaining unsanctioned trails.

Potential impacts of new tracks have been reduced by careful assessment and planning of tracks to avoid areas of the highest ecological value.

The proposal will specifically meet s 2A(1)(c) of the Act to increase the public appreciation, understanding and enjoyment of the area’s natural and cultural heritage by providing improved access and services.

##### Reserve management principles (s 30E to 30K)

The proposal is consistent with the reserve management principles for state conservation areas (s 30G), specifically s 30G(2)(e): to provide for sustainable visitor or tourist use and enjoyment that is compatible with the conservation of the state conservation area’s natural and cultural values and with uses permitted under other provisions of this Act in such areas.

The proposed activity aims to:

- promote the public understanding and appreciation of the natural and cultural values of the state conservation area

- allow for sustainable tourist and visitor use and enjoyment, while protecting the natural and cultural heritage.

## Plan of management

The *Illawarra Escarpment State Conservation Area Plan of Management (PoM)* (OEH 2023) applies to the proposal area. Section 3.2 of the PoM outlines management directions for the park, which includes the following.

Management direction	How the proposal is concordant
Protect the natural character, biodiversity and scenic qualities of the park.	By incorporating selected unsanctioned tracks into a formal network, the proposal will allow NPWS to manage these trails by implementing environmental impact mitigation measures.  Creation of a sustainable network of new and upgraded existing tracks will allow closure of the remaining unsanctioned tracks and reduce likelihood of new unauthorised tracks being constructed.
Seek holistic management of the escarpment across land tenures to protect its important values.	The proposal has been designed to encourage existing users of unsanctioned tracks to use the formal network. This approach will shift usage from unmanaged and unsanctioned tracks onto formalised trails, which have been designed to avoid and mitigate environmental impacts and can be managed as part of the wider NPWS asset base. Reduced likelihood of creation of new unsanctioned tracks being constructed.
<p>The PoM addresses the issue of cyclists forming numerous illegal tracks through the park, many of which are on steep and unstable slopes that are prone to erosion.</p> <p>An action in the PoM is for NPWS to develop a mountain bike strategy that provides a sustainable single-track mountain bike network in the park. Mountain bike tracks that are not included in the strategy are planned to be closed and rehabilitated.</p>	<p>The proposal has been designed in accordance with the <i>Illawarra Escarpment Mountain Bike Strategy</i> (NPWS 2022).</p> <p>By creating a formalised track network, the proposal will enable NPWS to close and rehabilitate the remaining unsanctioned tracks. Rehabilitation of these remaining unsanctioned tracks is not within the scope of this REF and will be subject to a separate environmental assessment.</p>
Conserve significant cultural heritage features and facilitate ongoing use of suitable sites.	<p>The proposal seeks to conserve significant cultural heritage features by establishing a formal track network and to discourage future creation of unauthorised tracks, which can have adverse cultural heritage impacts.</p> <p>The preparation of management and mitigation measures, detailed in the <i>Aboriginal cultural heritage assessment report</i> (Niche Environment and Heritage 2022a at Attachment A), considered comments received from the registered Aboriginal parties during the consultation process. These comments include those related to cultural considerations surrounding salvage works and the handling of artefacts, as well as the cultural significance of all sites.</p> <p>The track has been designed to avoid known Aboriginal cultural heritage sites identified during site surveys as part of the <i>Aboriginal cultural heritage</i></p>

Management direction	How the proposal is concordant
	<i>assessment report</i> (Niche Environment and Heritage 2022a at Attachment A).
Provide for sustainable use that is compatible with the park’s values and management purposes, integrated with facilities located on adjacent lands.	<p>The proposal seeks to implement a pragmatic approach to addressing environmental impacts from the unsanctioned development of mountain bike tracks, while also addressing the demand for legitimate mountain bike usage within the proposal area.</p> <p>It is considered that the proposal will have a net beneficial environmental and usage outcome, compared to the impacts from unsanctioned tracks and the resources required to prevent and control illegal mountain bike track use.</p>
Recognise and respond to the proximity of urban populations, minimise conflict between park users and engage with new user groups.	There is considerable demand for mountain bike tracks within the proposal area ( <i>Illawarra Escarpment Mountain Bike Strategy</i> , NPWS and WCC 2022). The proposal seeks to establish a well-designed track network large enough to accommodate existing and anticipated usage that would minimise conflict with other users of the Illawarra Escarpment SCA (for example, bushwalkers and surrounding community).

### Leasing, licensing and easement provisions (Part 12)

Part 12 of the NPW Act is not applicable to the proposal as there are no leases, licences or easements required for the proposal.

### NPWS management powers and responsibilities

The proposal is concordant with s 12 of the NPW Act in relation to NPWS management powers and responsibilities, specifically:

- (b) the conservation and protection of wildlife (including threatened species, populations and ecological communities, and their habitats)
- (f) the provision of facilities and opportunities for sustainable visitor or tourist use and enjoyment on land reserved under this Act.

### 3.1.2 Biodiversity Conservation Act 2016

The activity is consistent with the biodiversity conservation objectives of the *Biodiversity Conservation Act 2016* (BC Act).

The proposal meets the objectives of the BC Act by maintaining a healthy, productive and resilient environment according to the principles of environmentally sustainable development.

Impacts to biodiversity were avoided or mitigated during the design phase and as part of this REF by:

- undertaking detailed field investigations
- analysing multiple mountain bike track alignments with the aim of minimising environmental impacts
- upgrading existing tracks where feasible

- incorporating track design and features that minimise erosion and sedimentation impacts
- undertaking extensive on-ground micro-siting and track alignment marking during pre-construction to avoid mature or hollow-bearing trees and other habitat features
- using elevated structures to span sensitive terrestrial habitats
- flagging of tracks and micro-siting prior to construction.

Construction impacts will be minimised by confining construction activities to a clearly defined narrow corridor, using sensitive construction techniques, airlifting materials and equipment into the site, and storing construction materials within pre-surveyed laydown areas.

An ecological assessment of this area (Niche Environment and Heritage 2022b at Attachment B) included formal assessments of significance (tests of significance under s 7.3 of the BC Act) as part of the ecological assessment to determine if the proposal will have a significant impact on threatened biodiversity. These assessments concluded that threatened ecological communities and threatened fauna species listed under the BC Act are unlikely to be significantly affected by the proposal.

### **3.1.3 Rural Fires Act 1997**

The proposed works are consistent with the provisions of the *Rural Fires Act 1997*. Under this Act, NPWS is a prescribed fire authority and is responsible for the control and suppression of all fires on lands that it manages. This management is subject to the *Illawarra Escarpment State Conservation Area Fire Management Strategy* (DECC 2009a).

Part 4 of the Act deals with the prevention and minimisation of the spread of bushfires throughout the state. The potential for the proposal to be a bushfire risk is considered in Section 9.3 of the REF.

The proposed works are consistent with the objectives of protecting life and property and protection of the environment the relevant reserve fire management strategy.

## **3.2 Environmental Planning and Assessment Act 1979**

### **Assessment pathway**

The *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP) removes the need for development consent under Part 4 of the EP&A Act (for example, council approval) for most activities in NPWS parks. Instead, the environmental impacts of the proposal must be considered under Part 5, Division 5.1 of the Act, with s 5.5 imposing a duty on NPWS to consider those impacts before authorising or carrying out the development.

The project is comprised mostly of NPWS land (Illawarra Escarpment SCA). Other tenures covered by this REF include Crown Lands reserves. The planning pathway for these tenures is detailed below (refer to Figure 1).

### **NPWS Land (Illawarra Escarpment SCA)**

A section of the project in the Illawarra Escarpment SCA (the proposal) may be undertaken without Part 4 development consent under the provisions of s 2.73(1)(a) of the Transport and Infrastructure SEPP, as it is:

- on land reserved under the NPW Act or acquired under Part 11 of the NPW Act



- for a purpose authorised under the NPW Act.

### Crown Lands

Where the proposal is located on Crown Land reserves, it may be undertaken without Part 4 development consent under the provisions of s 2.109(1) of the Transport and Infrastructure SEPP, which states:

Development for the purpose of a road or road infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land.

Road infrastructure facilities are defined by those purposes listed in s 2.108 of the Transport and Infrastructure SEPP, which includes road related areas as defined under the *Roads Transport Act 2013*. Section 4 of this Act includes the following as definitions of a road related area:

- an area that is open to the public and is designated for use by cyclists or animals
- an area that is not a road and that is open to or used by the public for driving, riding or parking vehicles.

The Crown Lands reserves adjacent to the Illawarra Escarpment SCA are zoned C1 under the Wollongong Local Environmental Plan (LEP) 2009, which permits, without consent, authorised uses under the NPW Act. The proposal on the council reserves is permissible under the *Illawarra Escarpment State Conservation Area Plan of Management* and the proposal overall is a use authorised under the NPW Act. The proposal is consistent with and supports infrastructure, which is authorised within the Illawarra Escarpment SCA. Therefore, the proposal is in accordance with the land use table as defined by zone C1 of the Wollongong Local Environmental Plan 2009.

Prior to works being undertaken, NPWS will be required to obtain a licence, or a gazettal as NPWS land, for the occupation and usage of the adjacent Crown Lands reserves.

NPWS will be required to enter into a formal agreement with Crown Lands (as landowner of the adjacent reserves) under s 146(3) of the NPW Act to carry out works on non-NPWS land.

The proposal is not designated development under Schedule 3 of the Environmental Planning and Assessment Regulation 2021 or the *SEPP (Resilience and Hazards) 2021*.

No part of the project is considered 'state significant infrastructure' under the *State Environmental Planning Policy (Planning Systems) 2021*, nor is it similar to such an activity.

The development of mountain bike tracks is not declared to be exempt development under the Transport and Infrastructure SEPP or any other environmental planning instrument.

### 3.2.2 Consistency with relevant strategic plans

Two strategic plans made under Division 3.1 of the EP&A Act are relevant to the activity. These are the *Illawarra–Shoalhaven Regional Plan 2041* and the *Wollongong Local Strategic Planning Statement 2020*. Both plans recognise the importance of the Illawarra Escarpment and provide strategic direction for the ongoing conservation of the escarpment's important natural, cultural and scenic values.

The proposal will achieve this outcome by closing unsanctioned tracks while providing a fully featured track network with environmental mitigation measures incorporated into the design. It represents a pragmatic approach to addressing the environmental impacts of unsanctioned mountain bike tracks along the Illawarra Escarpment.

## 3.3 Other relevant legislation

### 3.3.3 Coal Mine Subsidence Compensation Act 2017

Not applicable. The proposal is not in an area that is mapped as a mine subsidence district.

### 3.3.4 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) relates to the conservation of fishery resources.

The Department of Primary Industries (DPI) Fisheries assesses applications for dredging and reclamation works which may harm marine vegetation and cause obstruction of fish passage in accordance with Part 7 of the FM Act and the Policy and Guidelines for Fish Habitat Conservation and Management (2013 Update).

Dredging includes works that involve excavating land submerged by water (water land), moving or removing material onto or from water land. Reclamation works means using materials, for example, sand, soil, gravel, timber or rocks to fill reclaimed water land or depositing such material on water land to construct something over water land.

There are 2 locations where the proposed tracks cross a second order stream (both Towradgi Creek). Towradgi Creek is not classed as 'key fish habitat' for fish passage.

The proposal will not affect fish passage, fish habitat or marine vegetation. Refer to the ecological assessment (Attachment B) for further detail. A permit under the FM Act is therefore not required for the proposal. However, NPWS will provide a copy of the draft REF to DPI Fisheries for comment. Any mitigation measures and safeguards proposed by DPI Fisheries will be incorporated into the construction environmental management plan (CEMP).

### 3.3.5 Heritage Act 1977

Six listed heritage items are either within or near the proposal area. These sites are:

- listed under the *Wollongong Local Environment Plan 2009*
  - #6480 – Illawarra Escarpment Landscape Conservation Area
  - #61046 – Corrimal Colliery
  - #5986 – House 'The Ridge'
- listed under the *State Environmental Planning Policy (Illawarra Regional Environmental Plan No.1). 1986*
  - Corrimal Colliery – Head frame No 1
  - Corrimal Colliery – No 1 shaft surface structures
  - Corrimal incline features (including the Line of old incline, Line of later incline, Haulage braking system).

These sites were assessed in a statement of heritage impact (Niche Environment and Heritage 2023c at Attachment C), using the criteria outlined in *Assessing heritage significance* (Heritage Office 2000). Based on this assessment, the proposed works will likely have no or little impact on the heritage items. Sites within and adjacent to the REF area were included to ensure direct and indirect impacts were assessed.

### 3.3.6 Marine Estate Management Act 2014

Not applicable. The proposal does not affect or directly adjoin a marine park or aquatic reserve.

### 3.3.7 Environment Protection and Biodiversity Conservation Act 1999

The activity is on land that may contain the following, or the activity may affect:

- nationally listed threatened species and ecological communities
- listed migratory species.

Threatened and migratory species and threatened ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) that may be affected by the proposal have been assessed in Section 9.7 and in the ecological assessment (Attachment B). Threatened species and ecological communities listed under the EPBC Act are unlikely to be significantly impacted by the proposal.

## 3.4 Consistency with NPWS policy

In relation to the Illawarra Escarpment SCA, the activity is consistent with NPWS policies as described below.

Policy name	How proposal is consistent
<i>Cycling Policy 2020</i>	The proposal is consistent with the NPWS <i>Cycling Policy</i> , which generally permits cycling on park roads and management tracks in state conservation areas. Cycling on walking tracks is prohibited for safety and environmental reasons. The proposal seeks to provide mountain bike experiences for a range of different skill levels in accordance with the <i>Illawarra Escarpment Mountain Bike Strategy</i> (NPWS and WCC 2022). The track network has been designed to minimise environmental impacts and to foster user appreciation for the natural and cultural heritage values of the Illawarra Escarpment SCA. The proposal will also incorporate a large volume of existing unsanctioned tracks with demonstrated value to the mountain biking community. Incorporating these tracks into the proposed track network will allow NPWS to mitigate environmental impacts while retaining tracks that are valued by the mountain bike community.
<i>Landslides and Rockfalls Policy</i>	The proposal is supported by a geotechnical assessment (Terra Insight 2023 at Attachment F), which includes systematic identification of landslide and rockfall hazards, and assessment of risks.  The proposed track network has been designed to prioritise safety with regards to landslides and rockfalls.
<i>Visitor Safety Policy</i>	The proposal will seek to improve safety for users of the Illawarra Escarpment SCA by creating a formal single-use (cyclists only) trail network. The proposal will allow mountain bike usage to be focused on a purpose-built track network, minimising the potential for park user conflicts.  Rather than not permitting mountain bike activity in the Illawarra Escarpment SCA, the proposal takes a pragmatic approach to addressing increases in mountain bike riding regarding the safety of both riders and other users (such as bushwalkers).

## 3.5 Summary of licences and approvals

### Approvals under the National Parks and Wildlife Act

#### Brief description of the type of approval sought

Internal NPWS approval or authorisation is required, including expenditure.

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#### 3.5.2 Publication triggers

The REF will be published following its determination as NPWS, as the determining authority, considers that it is in the public interest to publish the review in accordance with s 171(4)(c) of the Environmental Planning and Assessment Regulation.



## 4. Consultation – general

A working group was established in 2015 to investigate mountain bike opportunities on the Illawarra Escarpment to address the growing demand, help protect environmental and cultural values and avoid conflicts with other users by guiding the sustainable development and use of approved tracks. The working group originally included representatives from Wollongong City Council, Destination Wollongong, Illawarra Mountain Bike Alliance, University of Wollongong and NPWS.

The working group provided advice on an Illawarra Escarpment mountain bike feasibility study that Wollongong City Council commissioned in 2017. The desktop study was informed by constraints mapping, which used information from environmental studies and input from riders and other stakeholders.

Following the feasibility study, NPWS engaged a mountain bike track planning and design firm (Dirt Art) to assist in the preparation of the *Illawarra Escarpment Mountain Bike Concept Plan* (Dirt Art 2018). The plan was informed by environmental studies, field investigations and input from Wollongong City Council, the Illawarra Mountain Bike Alliance, Destination Wollongong and other stakeholders.

Informed by the *Illawarra Escarpment Mountain Bike Concept Plan* (Dirt Art 2018), the *Illawarra Escarpment Mountain Bike Strategy* (NPWS 2022) was exhibited for public comment in December 2018. The draft strategy proposed the development of formal mountain bike networks at Balgownie, Mount Keira and Mount Kembla. Adverse environmental assessments, Aboriginal community feedback and general public feedback led NPWS and Wollongong City Council to develop a revised mountain bike strategy and track networks.

Consultation feedback from the *Illawarra Escarpment Mountain Bike Strategy* (NPWS 2022) has been used to inform this proposal.

### 4.1 Consultation required under Transport and Infrastructure SEPP

#### 4.1.1 Local council (sections 2.10, 2.11, 2.12 and 2.14)

The proposal is on land that:

- contains heritage items listed under the LEP (refer to Sections 3.3.3 and 8.4.9 of this document)
- is accessed via local council infrastructure.

The *Statement of heritage impact* (Attachment C) was provided to Wollongong City Council for review. Furthermore, Wollongong City Council is a member of the NPWS Illawarra Mountain Bike Advisory Group for the proposal.

#### 4.1.2 National park or other C1-zoned land (sections 2.15(2)(a) and 2.15(2)(b))

The proposal is development on land zoned C1 National Parks and Nature Reserves. It includes (in the case of council and Crown Lands road reserves) C1-zoned land adjacent to that reserved under the NPW Act.

The proposal will be considered under the NPW Act. As NPWS is the proponent, NPWS will place the REF on public exhibition and will consider submissions prior to finalising the REF.

The REF will be assessed by the Department of Planning and Environment – Biodiversity Conservation Division (BCD) as per the recommendation from NPWS. NPWS will make a final determination on the REF in consideration of matters raised by the BCD.

#### **4.1.3 Roads or maritime (section 2.15(2)(c) or section 2.122(3))**

Not applicable. The activity will not involve fixed or floating structures in or over navigable waters. Nor is the activity a ‘traffic-generating development’ as per Schedule 3 of the *Transport and Infrastructure SEPP 2022*.

#### **4.1.4 Siding Spring Observatory (section 2.15(2)(d))**

Not applicable. The activity will not increase the amount of artificial light in the night sky within 200 km of the Siding Spring Observatory.

#### **4.1.5 Defence communications buffer (section 2.15(2)(e))**

Not applicable. The proposal is not located within the buffer around the defence communications facility near Morundah as mapped under the Lockhart, Narrandera or Urana LEPs.

#### **4.1.6 Mine subsidence area (section 2.15(2)(f))**

Not applicable. The activity is not on land in a mine subsidence district within the meaning of the *Coal Mine Subsidence Compensation Act 2017*.

## **4.2 Consultation requirements under NPW Act for leases and licences**

Not applicable. No leases or licences under the NPW Act are required for the proposal.

## **4.3 Targeted consultation**

### **Adjacent landowners**

NPWS has contacted landholders immediately adjacent to the proposal, including consultation with the landholder located in the centre of the proposal area (see Figure 2).

### **4.3.2 Interest groups and/or notification**

An advisory group was established as part of the consultation for the proposal. This was comprised of representatives from organisations listed in Table 1. The Illawarra Mountain Bike Advisory Group held meetings at key stages throughout the development of the proposal on 31 October 2019, 12 November 2019, 10 December 2019, 11 February 2020, 25 February 2020, 07 October 2020, 17 November 2020, 1 October 2021, 21 October 2021, 26 June 2022, 15 December 2022.

Information on the environmental assessment process was provided by NPWS in the advisory group meetings. The advisory group was also consulted during the public exhibition of the REF (refer Section 4.3.4).

NPWS and WCC met with the community on 1 April 2023 to discuss the project, including the proposed tracks, potential parking, amenities building and upgrades to the footpaths and

cycle network. NPWS and WCC also met with local riders on 21 November 2022 and youth riders on 7 December 2022. During the engagement workshop, the riders discussed how they currently use the site, including their connection to the mountain bike jumps known as ‘Possums’. NPWS also engaged with a local adaptive mountain bike rider on 31 January to discuss the best way to support ‘adaptive riding’ and the requirements for the tracks at Balgownie and Mount Kembla, which have been designed for adaptive use.

**Table 1 Illawarra Mountain Bike Advisory Group organisations**

Advisory group organisations	
Destination Sydney Surround South	Destination Wollongong
Illawarra Escarpment Alliance	Illawarra Local Aboriginal Lands Council
Illawarra Mountain Bike Alliance	National Parks and Wildlife Service
National Parks Association	Office of Sport
South32	Sydney Water
Trail Care	WaterNSW
Wollongong City Council	Mount Kembla Community member

## 5. Consultation – Aboriginal communities

### 5.1 Native title consultation requirements

The land is not subject to an Indigenous land use agreement under the *Native Title Act 1993* (NT Act).

The South Coast People (Tribunal file no. NC2017/003) were the only native title claimants regarding the proposed activity. The South Coast People were sent a notification letter on 18 May 2021, in accordance with Subdivision J (to the extent that it applies) of the *Native Title Act 1993*. They were provided an opportunity to comment on the proposed works within 28 days of receipt of the letter. NPWS did not receive a response.

### 5.2 Other consultation with Aboriginal communities

The Illawarra Escarpment SCA is not under a joint management arrangement. In accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010a), the Aboriginal community were consulted as part of the *Aboriginal cultural heritage assessment report* (Attachment A) for the proposed activity. Consultation included providing notification to interested parties, providing information on the proposal, participation in field surveys, seeking cultural advice, and review of the Aboriginal cultural heritage assessment (Niche 2023 at Attachment A).

Public access to the Aboriginal cultural heritage assessment (Attachment A) will be restricted to registered Aboriginal parties.



## 6. Proposed activity (or activities)

### 6.1 Location of activity

<b>Lands within proposal</b>	Illawarra Escarpment State Conservation Area (SCA) and Crown Lands road reserves
<b>Description of location</b>	Area between Brokers Point and Balgownie referred to as the ‘proposal area’ in this REF (Figure 1)
<b>Site commonly known as</b>	Illawarra Escarpment
<b>Lot/DP</b>	Multiple (refer to Figure 1)

The proposed Balgownie Mountain Bike Track Network is located along the Illawarra Escarpment to the west of the Wollongong suburbs of Corrimal and Tarrawanna, and north of Balgownie (Figure 1). The proposed mountain bike network is 26.94 km in length. The majority of tracks are located on NPWS land within the Illawarra Escarpment SCA, managed by NPWS. One small lot is Crown Land managed by WCC (Figure 2).

### 6.2 Description of the proposed activity

#### 6.2.1 Proposed track network

The proposed Balgownie Mountain Bike Track Network (the network) is 26.94 km in length, including 10.30 km of new tracks (Table 2). The network is located along the Illawarra Escarpment to the west of the Wollongong suburbs of Corrimal and Tarrawanna, and north of Balgownie (Figure 2). Most of the trails are located on NPWS land within the Illawarra Escarpment SCA, managed by NPWS. The trail network also traverses Wollongong City Council Land and several road reserves owned by Crown Land.

Several existing unsanctioned tracks (13.28 km in length) are proposed to be incorporated into the track network to minimise environmental impacts from creating new tracks. A further 3.36 km of existing access tracks will be incorporated into the track network, which are comprised of vehicle access trails, including the Lower Escarpment Fire Trail.

This REF considers the construction and ongoing maintenance of 26.94 km of track. Existing tracks that were incorporated into the network require modification to meet the International Mountain Bike Association (IMBA) track standards as set out in the *Australian mountain bike trail guidelines* (MTBA 2019). The proposed upgrades will result in improved drainage and erosion control, safety, and reduced edge impacts to the surrounding land. The success of the proposed track network will allow unsanctioned tracks within the proposal area that do not form part of the proposed network to be closed and rehabilitated by NPWS.

The proposed network is designed to provide a variety of track categories, riding options and routes with the possibility of creating unique loops that suit an individual rider’s ability and/or preference (Table 3 and Figure 2).

Multiple network entry points will provide suitable access to the network and will enable riders to easily access the ride start point of their choice. Climbing tracks (ascending tracks) enable riders to return to the top of the network without using public roads.

**Table 2 Comparison of existing unsanctioned tracks and new proposed tracks that will be included in the proposal**

Track types	Sum of length (km)
Proposed new track	10.30
Existing unsanctioned tracks	13.28
Existing access tracks	3.36
<b>Total</b>	<b>26.94</b>

**Table 3 Summary of track categories included in the proposed track network**

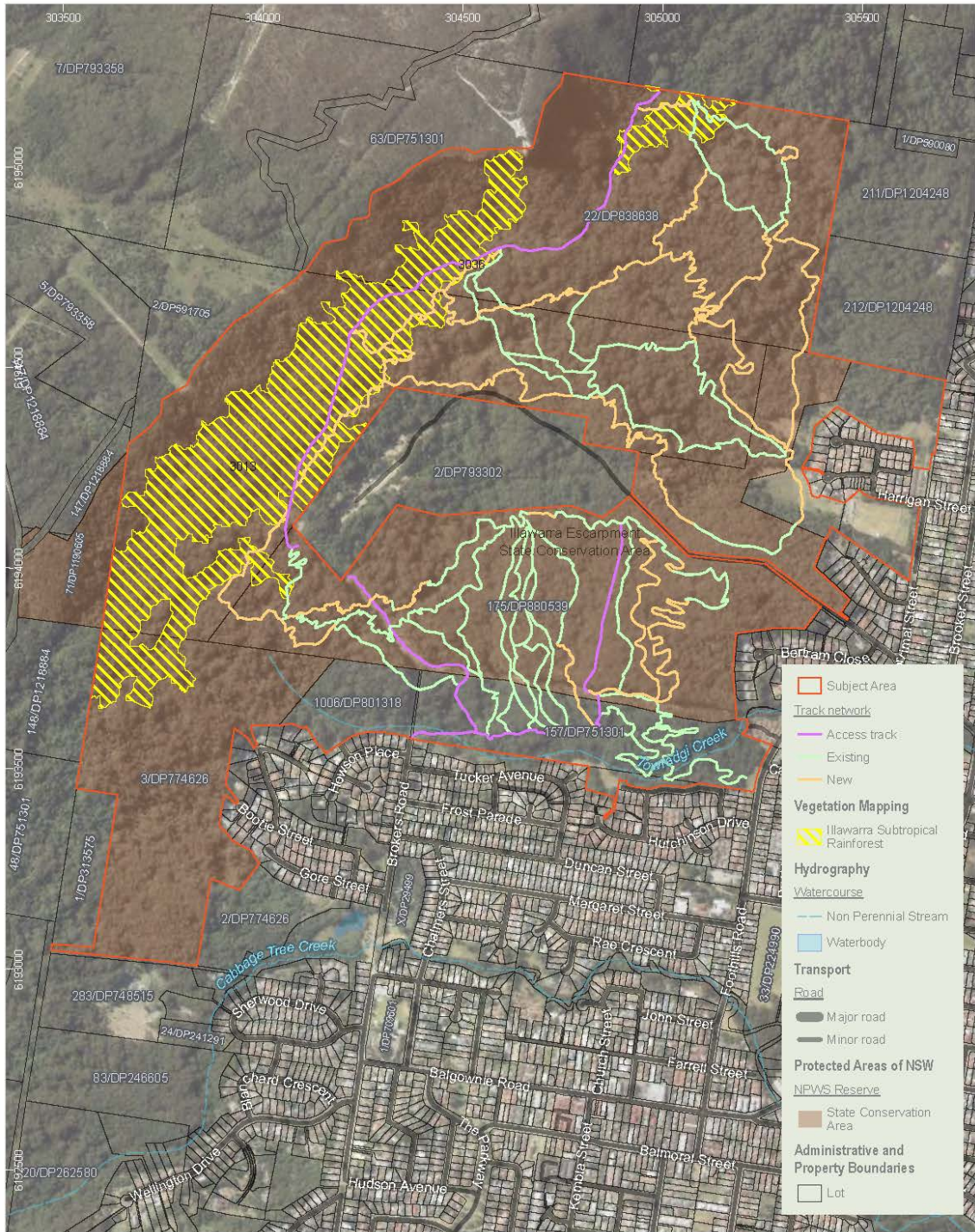
Track type	Skill level	Length (km)
Existing access tracks	All	3.36
Black	Advanced	3.65
Blue	Intermediate	3.43
Light blue	Beginner to intermediate	5.31
Green	Beginner	5.35
Red (climbing)	Intermediate to advanced	4.79
Dirt Jump Corridor	Intermediate to advanced	0.19
Two-way	Various	0.87
<b>Total</b>		<b>26.94</b>

See also Figure 2.



Figure 2 Proposed track network design showing track categories





**TEC and trail network map**  
**Balgownie Mountain Bike Project REF**

**niche**  
 Environment and Heritage

0 200  
 m  
 WGS 1984 Web Mercator

Niche PM: Kai Whitaker  
 Niche Proj. #: 7262  
 Client: NPWS

**Figure 3**

**Figure 3 Proposed new tracks and existing unsanctioned tracks to be incorporated into the network (threatened ecological communities also depicted)**



## Preliminary assessment and design

A preliminary assessment of the proposal was conducted in 2022 by Synergy Trails (Synergy). Existing unsanctioned mountain bike tracks were initially mapped and verified in the field within the proposal area by NPWS and Synergy. Extensive field investigations were then conducted by NPWS and Synergy to map the proposed network by identifying existing tracks that were suitable to be incorporated and where new tracks will be required to create a functional track network.

## Environmental assessment and design revisions

The following environmental assessments were conducted as part of this REF:

- Aboriginal heritage assessment (Niche 2023a at Attachment A) – not publicly available due to cultural privacy
- ecological assessment (Niche 2023b at Attachment B)
- historic heritage assessment (Niche 2023c at Attachment C)
- geotechnical assessment (Terra Insight 2023 at Attachment D).

Field surveys conducted as part of these assessments informed the final design of the proposal. Following the initial ecological assessment, the proposal design was revised to remove approximately 2 km of new track that traversed a parcel of Illawarra Subtropical Rainforest in the Sydney Basin Bioregion, which is listed as a threatened ecological community (TEC) under the BC Act and as critically endangered under the EPBC Act.

Additional minor revisions to the proposal were made in consideration of the outcomes of the Aboriginal heritage, historic heritage, ecological and geotechnical assessments. Further detail is provided in each attachment.

### 6.2.2 Activity footprint

The activity footprint (size of the area of impact) for the proposal is comprised of the footprints of the network and the temporary material laydown areas (further details in Section 6.2.5 and Table 6). The construction width required for each track is generally 1.5 m, except for two-way tracks that require a 2.5 m width. Existing access tracks do not require clearing outside the existing track corridor. The area required for each laydown area is 5 x 5 m (25 m<sup>2</sup>). The approximate operational width of tracks will be 0.9 m (except for two-way tracks, which will be approximately 2.5 m in width).

### 6.2.3 Proposed construction methods, materials and equipment

The proposed construction methods will be based on the conditions of each section of track. Different grades of track require different degrees of construction depending on topography.

## Ground truthing and detail design

- Ground truthing of a 20 m track corridor (10 m either side of track) with NPWS staff will optimise track design and alignment to minimise ecological disturbance.
- The track will be marked with micro-flags at approximately 2 m intervals along the track centreline.
- NPWS staff, or a suitably qualified person, will ensure fallen trees marked for cutting/removal from the track alignment are not habitat for threatened fauna.

## Clearing the track alignment

- Clearing of the marked track of vegetation will be done with brush cutters and chainsaws.
- In areas free of weeds, cleared vegetation will be stockpiled off-track within material laydown areas for use as brush matting to remediate access areas and degraded unsanctioned tracks. Where weeds are present, cleared vegetation will be bagged and removed from the site to be discarded at a licensed facility.
- All track corridors (new and existing) will be cleared to a height of 2.4 m. The track corridors will also be checked for overhanging branches and hollows. An arborist will be consulted regarding any trees of concern. Overhanging vines that encroach on the track corridor will be tied back (rather than trimmed).
- Fallen trees will be cut back between 0.5 m and 1 m from the track alignment.
- Any cut timber will be stockpiled for re-use in track construction or habitat creation within the project area.
- Where required, rocks within the track alignment will be relocated for use as technical track features and filters (see Bennett Murada Architects 2021 at Attachment E for detailed descriptions). The relocation of in situ rock will be subject to further habitat assessment and approval by NPWS.
- Organic material will be relocated for use in berms and other track structures to encourage regrowth.

## Materials deposition

- Where suitable, track construction materials will be brought to the site by helicopter to designated material laydown areas (shown on Figure 2).
- Where practicable, construction materials will be brought to the laydown areas via access roads.
- Material laydown areas will be located in existing cleared areas.

## Cutting the track in

- Excavation will commence at critical surface water movement points. Machinery and techniques used for the excavation will depend on the track category and terrain.
- Machine excavation will start at the beginning of the track, and the critical surface water movement points will be marked. The excavator will be a zero-swing type, allowing for machinery excavation works to be confined within the marked track corridor.
- Hand excavation will start at critical surface water movement points.
- Soil and rocks will be dug out and relocated to build the base track between features. Table 5 lists proposed construction materials.
- Technical track features and filters will be installed in locations along the track that assist with surface water management.
- Technical track features and filters will also be located in relation to natural rock formations and other landscape features.
- Soil and rocks will be dug out and relocated to build the base track between features.
- Construction on existing fire/access tracks will be within the existing corridor.
- Bridges and watercourse crossings will be constructed using designs detailed in Attachment E.

## Finishing the track

- Once the alignment is complete, the track will be compacted (hardened) by hand (shovel, rake-hoe) or plate compactor.
- Rock armouring will be installed along the track in locations with a high potential for erosion. The rock armouring will nominally be comprised of 200 to 300 mm thick sandstone cobbles, embedded within the operational width of the track (0.9 to 1.2 m) with a maximum 6 mm gap between each cobble. Rock-armoured sections will have a nominal outslope of 5%.
- Stockpiled organic material will be reinstated around the track alignment.
- Signage will be installed at the entrance and exit of each track, and at each track junction. Specifications and requirements for signage will be governed by a signage management plan to be developed by NPWS.
- Tracks will be test ridden and adjustments to geometry made to optimise the experience and meet IMBA standards, levels and criteria as per *Australian mountain bike trail guidelines* (MTBA 2019).
- There are sections within the trail network that have a relatively high proportion of weeds. Construction in these areas will require careful handling of weed material and may require revegetation. Such works will be in accordance with the construction environmental management plan (CEMP).

**Table 4 Summary of proposed construction equipment, impact and safeguards**

Equipment	Description	Machine-built tracks	Hand-built tracks	Associated track staff	Impact/mitigation
Narrow track excavator	<ul style="list-style-type: none"> <li>1.8 tonne mini-excavator</li> <li>overall width of 1.5 m</li> </ul>	Yes	No	<ul style="list-style-type: none"> <li>Licensed operator</li> <li>2 track crew on hand tools</li> </ul>	<ul style="list-style-type: none"> <li>Track crew hand finishing and compacting soil with machine to minimise potential for soil erosion</li> <li>Fuel management – spill kits will be kept with machine at all times, and track staff fully trained in their use</li> <li>Machine will be thoroughly washed down prior to use on the site to avoid bringing in contaminants</li> </ul>
Power carrier	<ul style="list-style-type: none"> <li>Petrol engine</li> <li>Payload capacity 500 kg</li> <li>Maximum incline 25° with 350 kg payload</li> <li>Overall dimensions 214 x 65 x 110 cm (LxWxH)</li> <li>Weight 200 kg</li> </ul>	Yes	No	<ul style="list-style-type: none"> <li>1 operator (no licence required)</li> </ul>	<ul style="list-style-type: none"> <li>Track tread minimises impact to ground surface</li> <li>Spill kit and secure fuel storage nearby at all times</li> </ul>
Plate compactor	<ul style="list-style-type: none"> <li>Petrol engine</li> <li>Weight 56 kg</li> </ul>	Yes	Yes	<ul style="list-style-type: none"> <li>1 operator (no licence required)</li> </ul>	<ul style="list-style-type: none"> <li>Spill kit and secure fuel storage nearby at all times</li> </ul>
Brush cutter	<ul style="list-style-type: none"> <li>Petrol engine</li> </ul>	Yes	Yes	<ul style="list-style-type: none"> <li>1 operator (no licence required)</li> </ul>	<ul style="list-style-type: none"> <li>Stockpile cut vegetation off-track for use as brush matting</li> <li>Clear all track corridors (new and existing) to a height of 2.4 m</li> <li>Stockpile or relocate cut timber for reuse in track construction or habitat creation</li> <li>Spill kit and secure fuel storage nearby at all times</li> </ul>
Chain saw	<ul style="list-style-type: none"> <li>Petrol engine</li> </ul>	Yes	Yes	<ul style="list-style-type: none"> <li>1 operator (no licence required)</li> </ul>	<ul style="list-style-type: none"> <li>Stockpile cut vegetation off-track for use as brush matting</li> </ul>



Equipment	Description	Machine-built tracks	Hand-built tracks	Associated track staff	Impact/mitigation
					<ul style="list-style-type: none"> <li>• Fallen trees will be cut back between 0.5 and 1 m from the track alignment</li> <li>• Spill kit and secure fuel storage nearby at all times</li> </ul>
Portable generator	<ul style="list-style-type: none"> <li>• Petrol engine</li> </ul>	Yes	Yes		<ul style="list-style-type: none"> <li>• Spill kit and secure fuel storage nearby at all times</li> </ul>
Handheld power tools	<ul style="list-style-type: none"> <li>• Electrical power tools including angle grinders, drills, hammers</li> <li>• Run on generator power / battery</li> </ul>	Yes	Yes	<ul style="list-style-type: none"> <li>• 1 operator (no licence required)</li> </ul>	<ul style="list-style-type: none"> <li>• Battery tools preferred</li> <li>• Overnight recharge avoids need for generator on track</li> </ul>
Handheld power tools	<ul style="list-style-type: none"> <li>• Electrical circular saw with vacuum collection attachment</li> <li>• Run on generator power</li> </ul>	Yes	Yes	<ul style="list-style-type: none"> <li>• Track crew trained in safe and sustainable use</li> </ul>	<ul style="list-style-type: none"> <li>• Avoids spread of fibre-reinforced plastic dust while cutting</li> </ul>
Hand tools	<ul style="list-style-type: none"> <li>• Shovels</li> <li>• McCleod's tool (rakehoe)</li> <li>• Mattocks</li> <li>• Rock hammers</li> <li>• Rakes</li> <li>• Hand rock tools (chisels, hammers and scutches)</li> </ul>	Yes	Yes	<ul style="list-style-type: none"> <li>• Track crew trained in safe and sustainable use.</li> </ul>	

**Table 5 Summary of proposed construction materials**

Material type	Description
Rock	In situ rock will be used where available and permissible If approved, locally found rock will be used. Otherwise, approved local sandstone will be imported where required
Structural steel	Hot dip galvanised steel elements with hot dip galvanised fixings

Material type	Description
Fibre-reinforced plastic	Site cutting of this material will be undertaken with a vacuum-equipped circular saw to minimise spread of dust
Fall protection mesh	Safety netting for flyovers and bridges
Timber	All timber structure and decking will be H4 treated pine (with FSC compliance)
Powder-coated aluminium signage panels	In accordance with NPWS Signage Manual

## 6.2.4 Receipt, storage and onsite management for materials used in construction

### Materials handling and storage

Wherever practicable, equipment and materials will be delivered to one or more secure site compounds on NPWS land and stored at this location until required on the track corridor. A location for the site compound(s) is yet to be determined. The site will, however, be located within an existing cleared area, that is, an area where no disturbance would be required.

The site compound(s) will meet the requirements of exempt development under s 2.111 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*. Each construction compound will be assessed under Conservation Risk Assessment(s) (CRA) in accordance with NPWS exempt development procedures, and would be managed in accordance with the project construction environmental management plan (CEMP).

Material laydown areas will also be located on flat, existing disturbed areas throughout the network (Figure 2). These sites will be suitable for helicopter delivery of construction materials. Tools and materials will be transferred by hand, electric bike and power carriers from the site compound to the active work site or to laydown areas along the track under construction. Materials delivered this way will be used as quickly as practicable.

Where possible and with minimal impact, vehicles (utes and SUVs) will transport tools and materials to the worksite, or designated areas close by.

### Safety and security – public and contractors

Existing tracks will be closed at the entrances and exits prior to the commencement of work. Signage will be installed to notify the public of the works.

Each worksite along the track alignment area will be fenced with temporary construction fencing.

All machinery, tools and associated items will be stored in secure locked toolboxes at strategic locations along the track corridor, which can be helicopter dropped into location with materials.

All track construction staff will have appropriate personal protective equipment, be appropriately trained in the work they are executing, be properly covered by appropriate workers compensation and other relevant insurances, and undertake all work in accordance with an approved safe work method statement.

The contractor will follow all current COVID-safe measures and procedures required by NSW Health and NPWS. The contractor will have an appropriate COVID safety plan in place.

## Site compound – track construction will be staged from a secured compound

The compound(s) will include:

- a relocatable site office building with site security, emergency response, meeting and telecommunications facilities
- portable toilet and wash facilities
- a lockable shipping container for tool, fuel and material storage
- staff parking for vehicles
- loading and unloading and stockpile areas for materials
- bin set for general office waste and recycling
- secured fencing for machinery storage.

One or more compounds may be used during track construction, depending on construction program and construction requirements. Potential locations (subject to construction requirements and landowner consent) include:

- Doonan Place Reserve
- land adjacent to Brokers Road
- Miners Memorial Park
- land adjacent to Tarrawanna Soccer Oval.

Following the completion of works, each site compound will be decommissioned, and the sites will be rehabilitated.

### 6.2.5 Earthworks or site clearing including extent of vegetation to be removed

In this REF and supporting assessments, the proposed new tracks were assessed as 'primary clearing', and the existing unsanctioned tracks incorporated into the network were assessed as 'secondary clearing'. Existing access tracks (Table 2) will not require any further clearing. The vegetation impacts from material laydown areas will be a temporary disturbance.

Tracks will generally require a construction width of 1.5 m, except for six two-way tracks that require a 2.5 m construction width. Laydown areas will require an area of 5 m x 5 m.

The proposal will result in the removal of approximately 3.45 ha of native vegetation. This will be comprised of 1.55 ha of primary clearing (new tracks) and 1.90 ha of secondary clearing (existing tracks). The proposal will also result in 0.0150 ha of temporary impacts to native vegetation at material laydown areas. No mature trees will be removed during the construction work. The canopy layer will not be removed, and only the immediate groundcover and understorey vegetation will be affected where any clearing takes place.

Table 6 provides a breakdown of disturbance according to each plant community type (PCT) (see Section 8.3.6 for details of vegetation within the proposal area).

**Table 6 Summary of construction impacts to each plant community type**

Plant community type	Primary clearing track for construction (ha)	Secondary clearing track for construction (ha)	Temporary disturbance for laydown areas (ha) (number of zones)	Total impact area (ha)
Illawarra Lowland Subtropical Rainforest (PCT 3013) (TEC)*	0.214	0.0434		0.260

Plant community type	Primary clearing track for construction (ha)	Secondary clearing track for construction (ha)	Temporary disturbance for laydown areas (ha) (number of zones)	Total impact area (ha)
Illawarra Escarpment Warm Temperate Rainforest (PCT 3028)	0.044	0.00731		0.0513
South Coast Warm Temperate–Subtropical Rainforest (PCT 3036) (TEC)*	0.0294	0.00115		0.0305
Illawarra Escarpment Bangalay x Blue Gum Wet Forest (PCT 3153)	1.26	1.85	0.0125 (5 sites)	3.12
Illawarra North–Pittwater Bangalay Moist Forest (PCT 3155)		0.00335		0.00335
<b>Native vegetation (PCT) subtotal</b>	<b>1.55</b>	<b>1.90</b>	<b>0.0125</b>	<b>3.46</b>
Non-native vegetation	0.0342	0.0598		0.0940
Native vegetation planted		0.0540		0.0540
<b>Non-PCT subtotal</b>	<b>0.0342</b>	<b>0.114</b>		<b>0.148</b>
<b>Grand total</b>	<b>1.58</b>	<b>2.02</b>	<b>0.0125</b>	<b>3.61</b>

Calculations are based on a clearing width of 1.5 m, except for six two-way tracks that require a 2.5 m width. Numbers are rounded to 3 significant figures.

\*Within the proposal area, PCT 3013 and PCT 3036 correspond to PCT 906 under the previous vegetation mapping scheme (DPE 2016).

## 6.2.6 Sustainability measures – including choice of materials and water/energy efficiency

The track network is designed to incorporate natural features as track features (see Attachment E).

Where available and permitted by NPWS policy, in situ rock material will be used to construct track features (such as rock armouring).

The track network is designed in accordance with IMBA track standards as set out in the *Australian mountain bike trail guidelines* (MTBA 2019), with the aim of creating a sustainable track network (Table 7). Design principles for the track network aim to reduce erosion and sedimentation.

**Table 7 Design features of the track network**

Design feature	Detail
Fully featured trail network	The track network is designed to attract riders away from the unsanctioned and unsustainable tracks along the Illawarra Escarpment. The track network is designed to be fully featured to discourage the creation of new unsanctioned tracks. The inclusion of advanced tracks is particularly important to achieve this.

Design feature	Detail
Interconnected network	The proposed track network is designed to disperse riders throughout the network, spreading (rather than concentrating) and thereby reducing the severity of impacts in particular areas.
Linear design	The linear nature of the tracks means impact can be minimised and limited in its extent. The tracks have been designed to incorporate natural features where possible. The IMBA standards used to design the track also require a relatively small corridor for construction and operation.
Utilisation of existing tracks	Incorporation of existing unsanctioned tracks into the network, where suitable, will minimise the requirement for clearing and other environmental disturbances. These tracks can be upgraded to meet sustainability and environmental requirements.
Sustainable track grades	The tracks have been designed at a sustainable grade to control the speed of riders and surface water runoff. Track grade reversals will be used as drainage features, which are highly effective and low maintenance features.
Bridge	Bridges are used to cross drainage lines and can be scaled as required. The proposed bridges are minimal in design (Attachment E).
Rock armouring	This is used to mitigate erosion and can be installed as bed-level crossings for small ephemeral drainage lines instead of raised bridges.
Rock-armoured culvert drain	This is used to drain water from the track surface and provide scour protection from drainage.
Waste management	All construction waste produced at the worksite including material offcuts, food scraps, packaging and other debris will be removed or relocated daily to designated lift areas, stored in double layered heli-bags and secured for scheduled removal.
Weather	Daily reference will be made to weather risk and referred to a management process included in the safe work method statement.
Bushfire	Daily reference will be made to bushfire risk and referred to a bushfire management process included in the safe work method statement.
Active maintenance	An active maintenance program will be conducted to keep tracks clear and to identify drainage problems causing muddiness or erosion. This will help keep riders on the tracks and limits environmental impacts within the assessed corridor.
User involvement in maintenance	NPWS to work with the mountain bike community to include them in the process of ongoing care and maintenance of the track network. This helps generate ownership, responsibility and connection with both the land and the tracks.
Signage and education material	Signage throughout the network will provide information about the values of the surrounding environment and encourage users to not leave the tracks.



## **6.2.7 Construction timetable and staging and hours of operation**

The expected construction time is 12 months.

Track construction will be undertaken between 7:00 am and 5:30 pm on weekdays, and 7:00 am and 12:00 pm on Saturdays. No work will be undertaken on Sundays or public holidays. All activities will be undertaken in accordance with the *Interim construction noise guideline* (DECC 2009b) and the *Draft construction noise guideline* (EPA 2020).

Construction will be sequenced so that sections of track are completed before progressing to the next section, following the methodology outlined in Section 6.2.3. Depending on conditions, multiple sections may be worked on simultaneously by different work crews. The sequencing of works will involve depositing materials at laydown areas on a sequential basis, which will minimise storage times.

## **6.2.8 Track maintenance and renewal**

### **Track maintenance regime**

The proposal includes a regular maintenance program to ensure the proposed track network has a minimal impact on the environment, and to mitigate the impacts that arise from use of new tracks. The regime for this maintenance program will be incorporated into the NPWS asset management system and implemented for the life of the project. Maintenance efforts will be concentrated in the initial stages of the use of the tracks and following rainfall events.

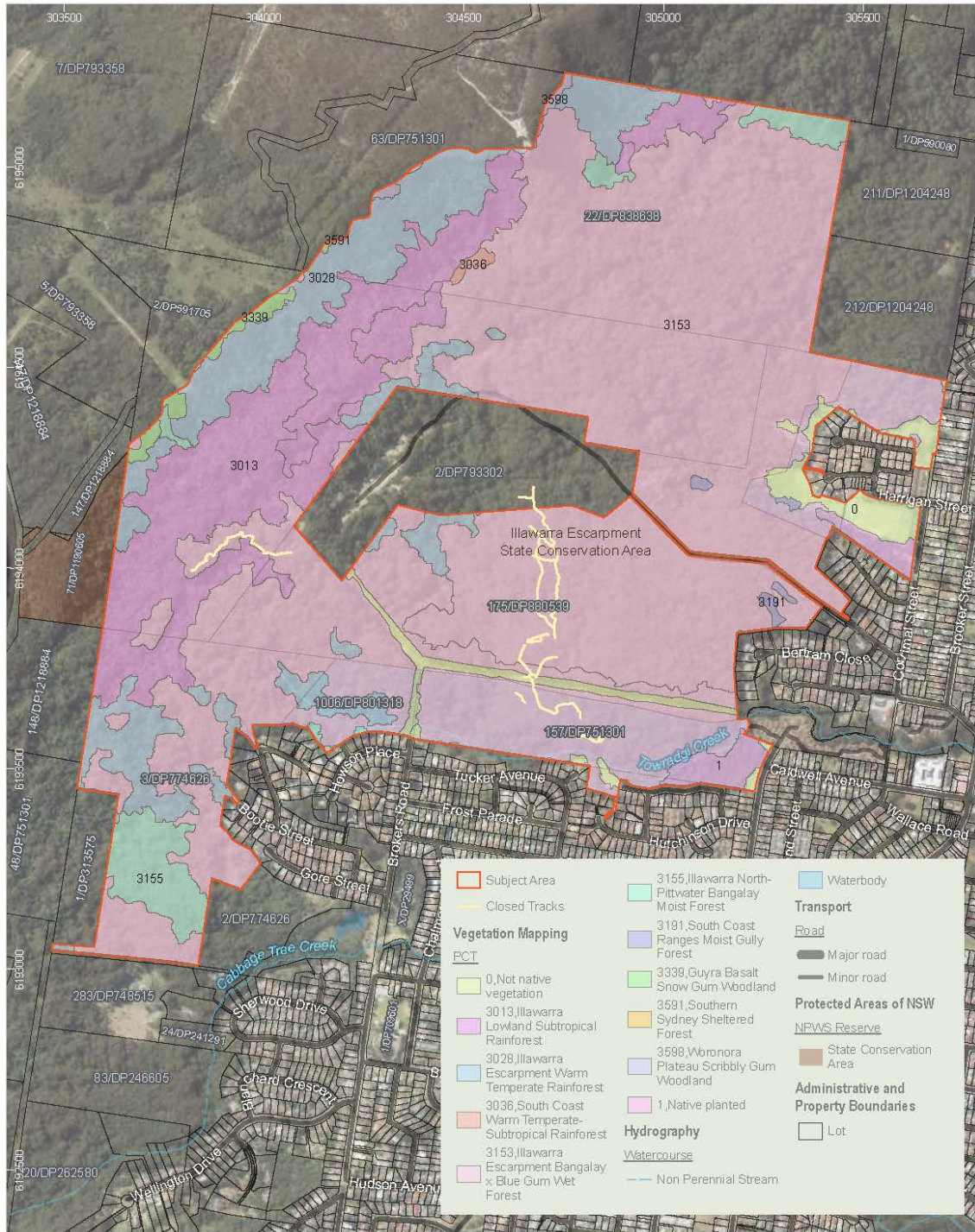
### **Maintenance impacts and impact mitigation**

All work during the maintenance period will be undertaken to the same operational standards as the original construction. This is to ensure that ongoing impacts to the environment from noise, waste, habitat impact and erosion associated with track operations are minimised.

Maintenance and replacement schedules are to consider the life cycle of materials that may harm the environment prior to any obvious signs of decay, for example, fibre-reinforced plastic. These schedules will also be incorporated into the NPWS asset management system.

### **Rehabilitation of unsanctioned tracks**

There are many existing unsanctioned tracks within the proposal area, including the group of trails known as 'Possums', which will not be incorporated into the track network (Figure 4). These unsanctioned tracks will be progressively rehabilitated by NPWS in accordance with a rehabilitation management plan.



WGS 1984 Web Mercator

**Unsanctioned tracks proposed for rehabilitation**  
Balgownie Mountain Bike Project REF

Niche PM: Kai Whitaker  
Niche Proj. #: 7262  
Client: NPWS

**Figure 4**

public/NSW\_Imagery © Department of Customer Service 2020/Terrain: Multi-Directional Hillshade: Airbus,USGS,NOAA,NASA,CGIAR,NCEAS,NLS,DS,NMA,Geodatasystems,GSA,OSI and the GIS User Community | Watercourses, Waterbodies, Road and Rail alignments: Protected areas of NSW © Spatial Services 2021. | Niche uses ©2020 as a standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid 5k marks and labels shown around the border of the map are presented in GDA2020, using the relevant MGA zone.

**Figure 4 Unsanctioned tracks proposed for rehabilitation**

## 7. Reasons for the activity and consideration of alternatives

### 7.1 Objectives and reasons for the proposal

A key goal of the Illawarra Escarpment Mountain Bike Track Network is to provide a formal, sustainable alternative to the construction and use of unsanctioned mountain bike tracks along the Balgownie area, particularly those at nearby Mount Keira. Without proper design features, unsanctioned tracks are unsustainable and can cause adverse safety, environmental and cultural impacts.

The proposed Balgownie Mountain Bike Track Network was designed with consideration of the physical, environmental, and cultural constraints identified by NPWS and stakeholder groups in response to the *Illawarra Escarpment Mountain Bike Strategy* (NPWS and WCC 2022). It aims to provide safe, sustainable recreation for a broad range of mountain bike riders on a variety of track types that comprise all levels of the International Mountain Bike Association (IMBA) trail gradings. This will ensure the network can accommodate a broad range of rider experience and skill levels.

The project is likely to increase the number and type of visitors to the proposal area and surrounding region and may therefore increase the enjoyment and appreciation of nature, which is consistent with the objectives of the NPW Act.

### 7.2 Consideration of alternatives

#### 7.2.1 Alternatives to the proposal

##### Do nothing

There is a demonstrated demand for mountain bike tracks within the area. This has led to the development of unsanctioned tracks, which resulted in environmental impacts.

The do-nothing option will result in increased erosion of the existing unsanctioned tracks leading to more environmental impacts. This will also result in ongoing safety concerns and fewer recreational opportunities. The do-nothing option is inconsistent with the current PoM and is likely to result in ongoing environmental harm.

##### Close unsanctioned tracks

This option would involve closing existing and widely used unsanctioned tracks without providing alternative options for riders. Although this will allow for the rehabilitation of unsanctioned tracks, it is likely to be expensive, resource-intensive, and any short-term environmental benefits would be offset by the creation of new unsanctioned tracks. Furthermore, this option would have a negative social impact on mountain bike riders within the local area.

##### Formalise existing unsanctioned tracks

This option would involve only upgrading and formalising suitable existing unsanctioned tracks without developing new tracks. This option would allow only existing cleared areas to be utilised, reducing vegetation-clearing requirements. However, excluding the creation of new tracks would limit the functionality and interconnectivity of the track network.

## **7.2.2 Justification for preferred option**

The proposal allows for the closure of some unsanctioned tracks, while providing a fully featured track network with environmental mitigation measures incorporated into the design. It represents a pragmatic approach in addressing the environmental and cultural impacts of unsanctioned mountain bike tracks along the Illawarra Escarpment in the Balgownie area.

The inclusion of new tracks within the proposal is considered necessary to create a track network commensurate with current and anticipated demand.

The proposal would meet the management directions of the Illawarra Escarpment SCA PoM 2023 (refer to Section 3.1 for more detail).



## 8. Description of the existing environment

### 8.1 Methods

Determining the characteristics of the proposal area involved the following activities:

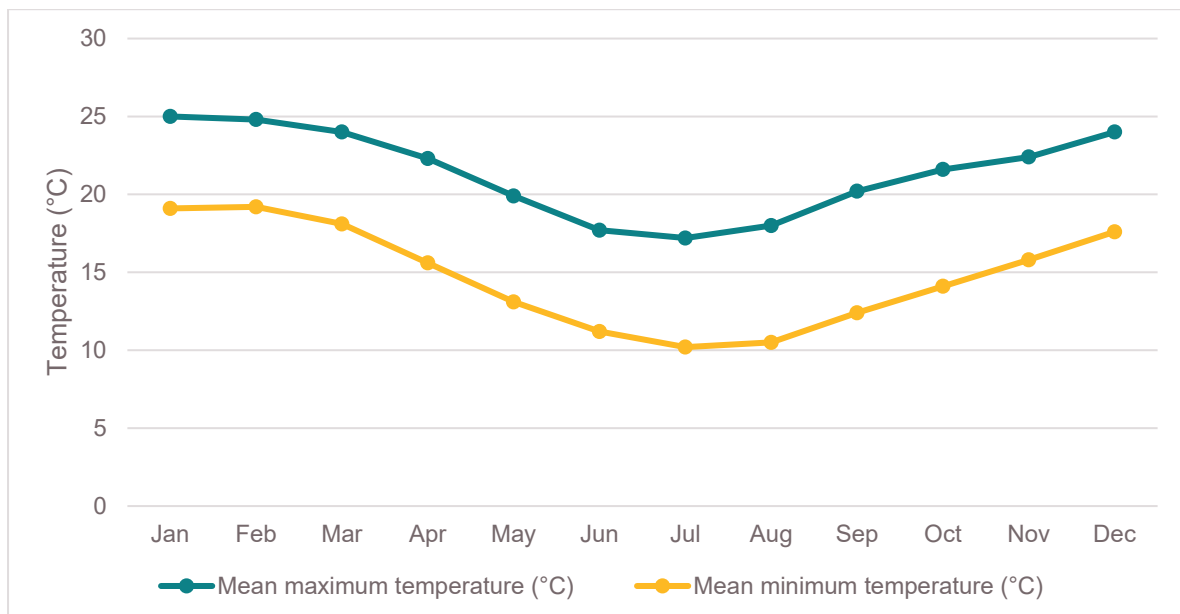
- review of relevant literature
- search of government databases for listed natural and cultural heritage matters of conservation significance
- review of mapping of vegetation, geology, soils, and watercourse mapping
- review of ecological processes and distribution of species within the bioregion
- field surveys and analysis of results
- evaluation of the likelihood of matters of conservation significance to occur.

This REF is supported by several specialist assessments (see Section 13), which include:

- Aboriginal cultural heritage assessment (Niche Environment and Heritage 2022a at Attachment A) – not publicly available due to cultural privacy
- ecological assessment (Niche Environment and Heritage 2022b at Attachment B)
- statement of heritage impact (Niche Environment and Heritage 2022d at Attachment E)
- geotechnical and landslide risk assessment (Terra Insight 2022 at Attachment F).

### 8.2 Climate

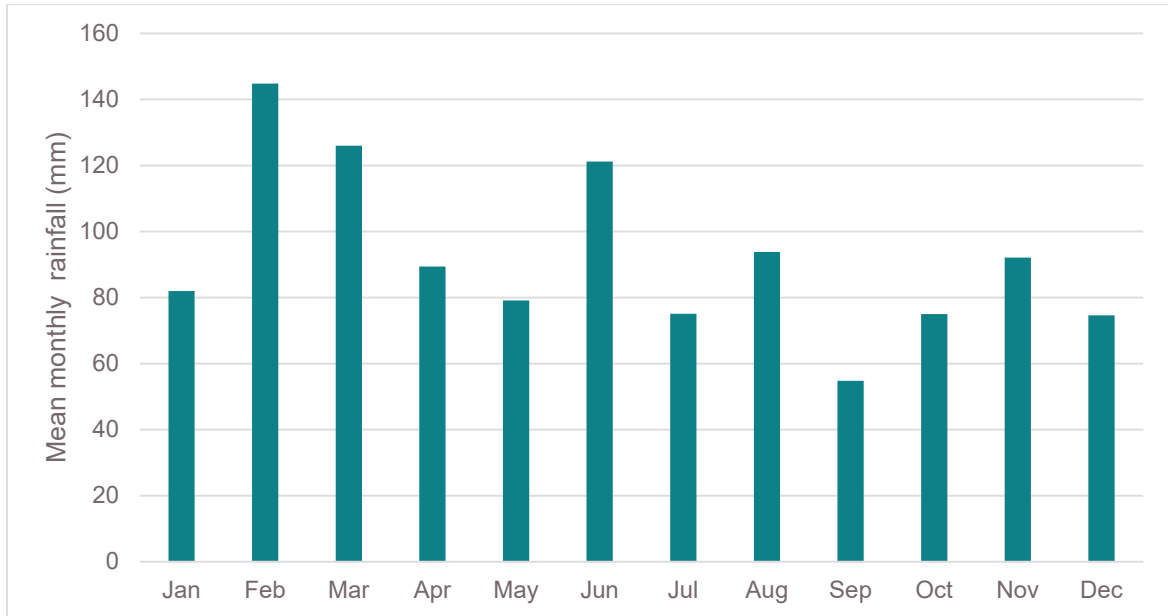
The climate in Wollongong is generally warm and temperate. In Wollongong, the mean annual maximum temperature is 21.4°C. The mean annual minimum temperature is 14.7°C (Graph 1). The mean annual rainfall in Wollongong is 1,127.9 mm (Bellambi automatic weather station [AWS]). Precipitation is the lowest in September, with a mean of 54 mm. In February, the precipitation reaches its peak, with an average of 144.8 mm. If practicable, construction for the project should be scheduled to avoid high rainfall months (February, March and June) (see Graph 2).



Source: Bureau of Meteorology August 2021.

**Graph 1** Mean monthly temperatures for Wollongong (Bellambi AWS)





Source: Bureau of Meteorology August 2021.

**Graph 2** Mean monthly rainfall for Wollongong (Bellambi AWS)

## 8.3 Natural values

### 8.3.1 Geology, geomorphology and topography

The proposal area is underlain by sedimentary rock layers known as the Illawarra Coal Measures Group on the mid to lower slopes of the Illawarra Escarpment, and the Narrabeen Group on the mid to upper slopes of the escarpment.

The Illawarra Coal Measures and Narrabeen Group occur in the Sydney Basin. They formed during the late Permian period and early Triassic period, respectively. The Illawarra Coal Measures formed in a lower delta plain and alluvial fan environment. The Narrabeen Group formed in a fluvial environment. These strata are up to 500 m to 600 m thick each and are typically near-horizontally bedded.

The Illawarra Coal Measures are composed mainly of shale, quartz-lithic sandstone, conglomerate rocks, chert, with sporadically carbonaceous mudstone and coal seams.

The Narrabeen Group composed mainly of quartz-rich sandstone, shale and mudstone.

The lower slopes of the site are underlain by recently deposited alluvial valley deposits, which are expected to be underlain by the Illawarra Coal Measures Group at depth. Notable features in the geological mapping include the following:

- The site is intersected by the Bulli Coal, Balgownie Coal, Wongawilli Coal, Tongarra Coal and Woonona Coal Seams.
- The Corrimal Fault is mapped through the middle of the site in a northwest to southeast direction. The fault is a strike slip fault and is not known to be recently active.

The topography of the proposal area is characterised primarily by moderate to steep slopes (>35%). The proposal area spans 2 main soil landscapes: Illawarra Escarpment and Gwynneville (described further in Section 8.3.2).

#### Reference material

- Geotechnical and landslide risk assessment (Terra Insight 2023 at Attachment D)
- Figure 5 Geology of the proposal area.

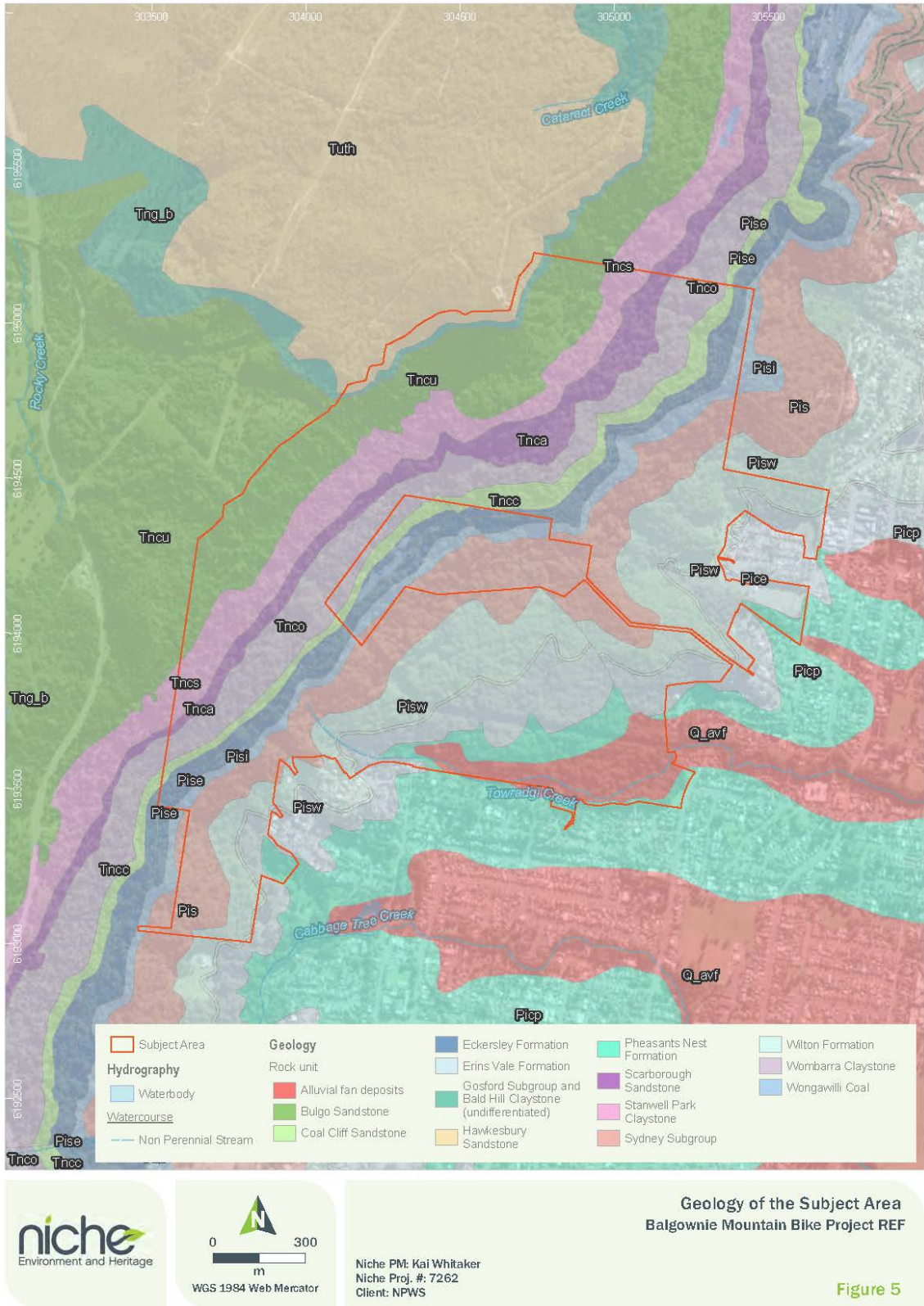


Figure 5 Geology of the proposal area

### **8.3.2 Soil types and properties (including contamination)**

The proposal area spans 2 main soil landscapes: Illawarra Escarpment and Gwynneville.

The Illawarra Escarpment landscape, which comprises 62.47% of the proposal area, is located along the upper slopes of the Illawarra Escarpment. The geology is characterised by Quaternary talus, blocks of sandstone, deep colluvial detritus and soil materials. The topography of the Illawarra Escarpment is mainly steep to very steep slopes (20–50%) and is mostly populated by uncleared tall open forest (wet sclerophyll forest) and closed forest (rainforest). Large landslips are common.

The Gwynneville landscape, which comprises 36.42% of the proposal area, is located on the lower slopes of the Illawarra Escarpment. The geology is characterised by Illawarra Coal Measures, resistant interbedded quartz-lithic sandstone, grey siltstone and claystone, clay and laminite. Its topography consists of undulating to steep hills (3–25%). Landform elements include broad to moderate ridges, steeply inclined to moderately inclined foot slopes, and isolated rises on the coastal plain.

The main limitations to development associated with the Illawarra Escarpment Soil Landscape are:

- stoniness
- low water-holding capacity
- moderately reactive soils
- steep slopes
- mass movement (slope instability), rock fall, and erosion hazards due to surface water runoff.

The main limitations to development associated with the Gwynneville Soil Landscape are:

- localised stoniness
- moderate soil erodibility
- stable to slightly reactive surface movement potential
- steep slopes
- mass movement and localised rockfall hazards
- erosion hazards.

The soils on the escarpment slopes are derived from weathered shales and claystone and colluvium from landslides. They are typically nutrient rich but are rated as an extreme erosion hazard as they are prone to mass movement owing to the high rainfall and steep gradients (Hazelton and Tille 1990). Vegetation and plant roots enhance soil stability on the escarpment slopes, particularly in rainforest communities where the dense root systems are close to the surface. The retention of vegetation is therefore critical to the retention of soils and land stability.

A key focus of the track network design is to minimise erosion, reduce drainage line crossings, and follow the natural contours of the landscape where possible. The track network is designed to efficiently drain water from the track surfaces, minimising the potential for the proliferation of small stream and gully erosion. Mitigation measures such as rock armouring and raised tracks will be installed at targeted locations throughout the track network.

Moist sections of track are more susceptible to enhanced erosion, track widening and the formation of ruts (Evju et al. 2021). Poorly drained or moist sections of track may encourage riders to bypass the track, causing further environmental impacts (Stavi and Yizhaq 2020). Thus, erosion mitigation measures such as rock armouring and raised tracks will be focused on moist areas of the network.

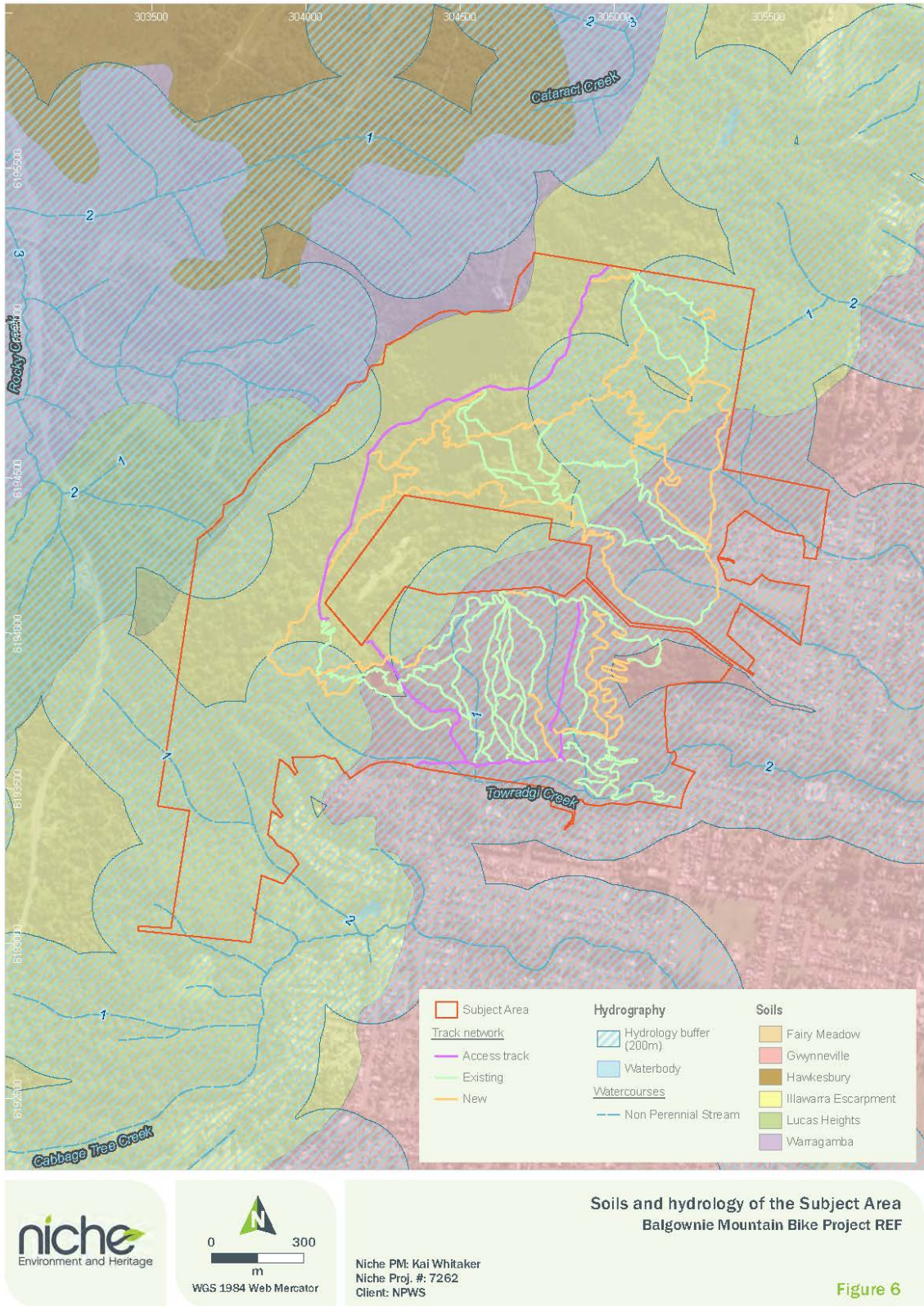


Steep sections of track are also more susceptible to erosion. In these sections, track design will incorporate rock armouring where feasible. Steep downhill sections will also be designed to control rider speed, which also serves to slow surface runoff.

The monitoring and maintenance of the track network within the 12 months following construction will be particularly important to ensure the effectiveness of erosion mitigation measures, as the track surface hardens due to compaction. During this period, additional resources such as rock or timber may be required to improve sections of track.

### **Reference material**

- Figure 6 Soils and hydrology of the proposal area
- Geotechnical assessment (Terra Insight 2023 at Attachment D).



**Figure 6** Soils and hydrology of the proposal area

### **8.3.3 Watercourses, waterbodies and wetlands (including their catchment values)**

The watershed from the proposal area runs east into the Towradgi Creek catchment, which enters the ocean at Corrimal Beach.

A total of 18 watercourse crossings, locations where the proposed track network crosses a watercourse, were identified within the proposal area. These crossings are comprised of 16 first order streams and 2 second order streams. These crossings were assessed for consideration of erosion controls and fauna habitat (including aquatic habitat) as part of the proposal (see Section 3.4 of the ecological assessment at Attachment B).

First order streams are geomorphologically classified as a 'Headwater' (NSW River Styles database), with bedrock at the base and on the margins which limits vertical and horizontal erosion. The first order streams in the proposal area provide little aquatic habitat (consisting of shallow pools) but were flowing during the time of the survey. These ephemeral watercourses are suitable for bed-level bike crossings and small hardened creek crossings (see Attachment E for design details).

There are 2 locations where the proposed tracks cross a second order stream, Towradgi Creek, which is not classed as key fish habitat for fish passage. One of the second order streams is mapped, and was confirmed in the field as 'Low Sinuosity Fine Grained' River Style. This River Style has no valley margin controls and is laterally unconfined. The banks can erode during large flow events if the hydrology has been altered and riparian vegetation cleared. Some sections of Towradgi Creek had rehabilitation work to address bank collapse (rip rap and rock groins). The 2 crossings over Towradgi Creek will require construction of a medium or large bridge to cross the creek (see Attachment E for design details).

Appropriate environmental safeguards will be implemented for the installation of crossings and bridges (for example, silt curtains, sediment fences, booms) that are consistent with *Managing urban stormwater: soils and construction* guidelines (4th edition Landcom 2004, also known as the 'blue book') to ensure that there is no escape of turbid plumes into the adjacent aquatic environment.

#### **Reference material**

- Ecological assessment (Niche Environment and Heritage 2023b at Attachment B)
- Figure 2 Site map.

### **8.3.4 Coasts and estuaries**

Although the proposal area is located within the Illawarra coastal region, the proposal is not located within the coastal zone. Coastal processes and estuaries are therefore not relevant to the proposal area and are not considered in this REF.

### **8.3.5 Areas of outstanding biodiversity value or critical habitat**

Areas of outstanding biodiversity value (AOBV) and critical habitat are declared under both the BC Act and EPBC Act. No critical habitat or areas of outstanding biodiversity value (AOBV) are relevant to the proposal area and will not be affected by the project.

### **8.3.6 Vegetation**

Current vegetation mapping (DPE 2023a) shows 6 native plant community types (PCT) occurring within or close to the track network that are likely to be directly impacted by the proposal:



- PCT 3013 Illawarra Lowland Subtropical Rainforest
- PCT 3028 Illawarra Escarpment Warm Temperate Rainforest
- PCT 3036 South Coast Warm Temperate–Subtropical Rainforest
- PCT 3153 Illawarra Escarpment Bangalay x Blue Gum Wet Forest
- PCT 3155 Illawarra North–Pittwater Bangalay Moist Forest
- PCT 3327 Illawarra Lowland Red Gum Grassy Forest.

Non-native vegetation is also mapped.

Based on the outcome of the ecological assessment field surveys (Niche 2023 at Attachment B), the vegetation mapping conducted for the region (DPE 2023a) is considered relatively accurate except for some PCT boundary adjustments, and the erroneous mapping of PCT 3327. As such, Niche has revised the PCT mapping layer for the proposal area to carry out the level of biodiversity assessment required for the proposal (Figure 7). Five PCTs and 2 non-PCTs are present within, and close to, the proposal’s footprint (Table 8). The extent of each of the 5 PCTs within the proposal area is provided in Table 8.

Two of the PCTs within the proposal area comprise the threatened ecological community (TEC) Illawarra Subtropical Rainforest in the Sydney Basin Bioregion (ISR) (PCT 3013 and PCT 3036 – Table 8). This TEC is listed as Endangered under the BC Act and forms part of the Illawarra–Shoalhaven Subtropical Rainforest of the Sydney Basin Bioregion under the EPBC Act, which is listed as critically endangered.

The original track network design consisted of 3.3 km that intersected ISR. Based on advice provided as part the ecological assessment (Attachment B), the final track network design was reconfigured and now includes 2.4 km of track that intersects ISR (Figure 3).

A threatened species test of significance (ToS) under the BC Act (Appendix 2) and Assessment of Significance (AoS) under the EPBC Act (Appendix 3) have been undertaken for the ISR TEC, a summary of which is provided in Section 9.2.

Where feasible, existing unsanctioned tracks have been incorporated into the track network. These tracks will require ‘secondary clearing’ (as defined in section 6.2.5) and have been utilised to limit the impact on areas of mature native vegetation. The proposed new tracks will require ‘primary clearing’ within mature native vegetation, and would generally require a construction clearing width between 1.5 m. The canopy layer will not be removed, and only the immediate groundcover and mid storey/shrub-layer will be affected. Where practicable, raised trail will be installed to reduce vegetation impacts.

Thurston and Reader (2001) demonstrated that the impacts from both hikers and mountain bikers were spatially confined to the centreline of tracks. If vegetation impacts are to be contained to the designated corridor, it is imperative that the track network is inspected and maintained.

**Table 8 Summary of plant community types (PCTs) and threatened ecological communities within the proposal area**

PCT name	PCT #	TEC	BC Act listing	EPBC Act listing	Extent within proposal area (ha)
Illawarra Lowland Subtropical Rainforest	3013*	Illawarra Subtropical Rainforest in the Sydney Basin Bioregion	E	CE	36.4
Illawarra Escarpment Warm Temperate Rainforest	3028	-	-	-	28.4



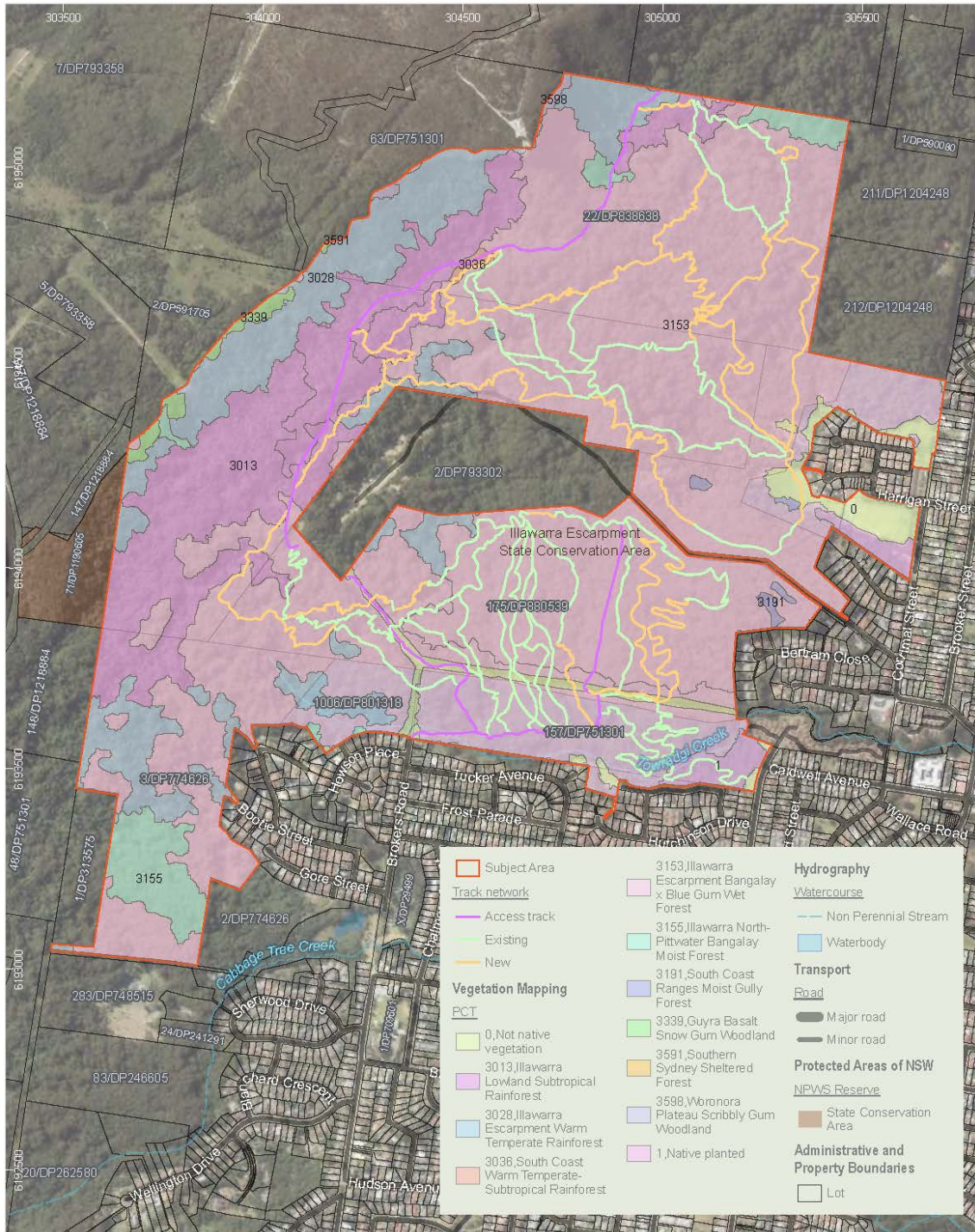
PCT name	PCT #	TEC	BC Act listing	EPBC Act listing	Extent within proposal area (ha)
South Coast Warm Temperate–Subtropical Rainforest	3036*	Illawarra Subtropical Rainforest in the Sydney Basin Bioregion	E	CE	0.4
Illawarra Escarpment Bangalay x Blue Gum Wet Forest	3153	-	-	-	161.3
Illawarra North–Pittwater Bangalay Moist Forest	3155	-	-	-	7.7
<b>Total (PCT assigned)-</b>					<b>234.2</b>
Non-native vegetation	-	-	-	-	7.5
Native planted vegetation	-	-	-	-	3.2
<b>Total (non PCT assigned)</b>					<b>10.7</b>

CE = critically endangered, E = endangered

\*Within the proposal area, PCT 3013 and PCT 3036 correspond to PCT 906 under the previous vegetation mapping scheme (DPE 2016).

### Reference material

- Ecological assessment (Niche Environment and Heritage 2023b at Attachment B)  
See also ‘Appendix 1 – Likelihood of occurrence table’ in Attachment B
- Figure 3 Threatened ecological communities in the proposal area
- Figure 7 Vegetation (plant community types) within the proposal area



WGS 1984 Web Mercator

**PCTs**  
**Balgownie Mountain Bike Project REF**

Niche PM: Kai Whitaker  
Niche Proj. #: 7262  
Client: NPWS

**Figure 7**

Figure 7 Vegetation (plant community types) within the proposal area

### 8.3.7 Plants and animals

#### Threatened flora

A total of 29 threatened flora, as listed under the BC Act and/or EPBC Act, were considered in this assessment (refer to Appendix 1 of Attachment B). This list was derived from the database searches outlined in Section 2.1. Of the species listed in Appendix 1, 3 are considered to have a High or Moderate likelihood of occurrence in the proposal area (Table 9). These species are:

- *Cynanchum elegans* (white-flowered wax plant)
- *Rhodamnia rubescens* (scrub turpentine)
- *Senna acclinis* (rainforest cassia).

Field surveys found no threatened flora in the proposal area. Potentially affected threatened flora and their habitats are assessed in Section 4.3 of Attachment B.

#### Threatened fauna

A total of 137 threatened and migratory fauna were previously recorded (DPE 2023c) or are predicted to have habitat (DCCEEW 2023a) within the locality (Appendix 1 of Attachment B). This list was derived from the database searches outlined in Section 2.1. Of the species listed in Appendix 1, 17 species were considered to have a moderate to high likelihood of occurrence in the proposal area and 3 were confirmed present (Table 9).

Two migratory fauna species recorded during the ecological assessment field survey were:

- black-faced monarch (*Monarcha melanopsis*)
- rufous fantail (*Rhipidura rufifrons*).

Both the black-faced monarch and rufous fantail are listed as migratory under the EPBC Act.

**Table 9 Threatened and migratory species with a moderate to high likelihood of occurrence within the proposal area**

Common name	Scientific name	Likelihood of occurrence	BC Act	EPBC Act
Giant burrowing frog	<i>Heleioporus australiacus</i>	Moderate	V	V
Green and golden bell frog	<i>Pseudophryne australis</i>	Moderate	V	-
Stuttering frog	<i>Mixophyes balbus</i>	Moderate	E	V
Black bittern	<i>Ixobrychus flavicollis</i>	Moderate	V	-
Black-faced monarch	<i>Monarcha melanopsis</i>	Present	-	M
Gang-gang cockatoo	<i>Callocephalon fimbriatum</i>	High	V	-
Glossy black-cockatoo	<i>Calyptorhynchus lathami</i>	High	V	-
Olive whistler	<i>Coracina lineata</i>	Moderate	V	-
Powerful owl	<i>Ninox strenua</i>	High	V	-
Sooty owl	<i>Tyto tenebricosa</i>	Moderate	V	-
Eastern false pipistrelle	<i>Falsistrellus tasmaniensis</i>	Moderate	V	-
Eastern pygmy-possum	<i>Cercartetus nanus</i>	Moderate	V	V
Greater broad-nosed bat	<i>Scoteanax rueppellii</i>	Moderate	V	-
Greater glider	<i>Petauroides volans</i>	Moderate	E	E
Grey-headed flying-fox	<i>Pteropus poliocephalus</i>	High	V	V
Rufous fantail	<i>Rhipidura rufifrons</i>	Present	-	M

Common name	Scientific name	Likelihood of occurrence	BC Act	EPBC Act
Southern myotis	<i>Myotis macropus</i>	Moderate	V	-
Yellow-bellied glider	<i>Petaurus australis</i>	Moderate	V	V

V = Vulnerable, E = Endangered, M = Migratory  
Present species are highlighted.

## Threatened fauna habitat

### Forest habitat

Forest habitat provides a wide range of food and shelter for vertebrate fauna. Trees from the family Myrtaceae (mostly *Eucalyptus* spp.) generally dominate the upper canopy across the proposal area and supply direct food (foliage, nectar, exudates) and indirect food (arthropods) for a range of vertebrates, particularly birds and arboreal mammals.

In wetter, more protected sites, both threatened ecological communities (TECs) include forest habitat that is dominated by rainforest canopy species such as *Schizomeria ovata* and *Doryphora sassafras*. Understorey species include *Diospyros australis*, *Pittosporum multiflorum*, *Cryptocarya glaucescens* and *Livistona australis*. These rainforest areas provide a range of flower, fruit and nectar feeding opportunities for a range of species and have a greater diversity of flora species, including ferns, vines, forbs and epiphytes.

In some drier areas of eucalypt forest, particularly along small ridges or spurs, black she-oak (*Allocasuarina littoralis*) occurs as a dominant understorey species. *Allocasuarina* species are a preferred feeding resource for the State and Commonwealth listed (vulnerable) glossy black-cockatoo. The proposed track network is not expected to result in the removal of any black she-oak trees.

Tree hollows (formed in dead trees and mature trees) provide nesting and roosting habitat for hollow-dwelling fauna and are an important habitat component of native forests. Tree hollows were seen throughout the proposal area, generally at a moderate density. These are likely to provide suitable den and nesting habitat for a range of birds, arboreal mammals and microbats. Locally recorded threatened species that require tree hollows for roosting and/or breeding include the powerful owl and eastern coastal free-tailed bat (*Micronomus norfolkensis*).

No hollow-bearing trees or mature trees will be impacted by the project.

The creeks and 2 artificial wetlands provide habitat for aquatic species such as frogs, some macroinvertebrates and waterbirds. The wetlands provide suitable foraging habitat for the southern myotis.

### Termite mounds

One termite mound was observed within the proposal area during the field survey. The termite mound will be avoided by the proposed works and therefore is unlikely to be impacted by the project.

## Reference material

- Ecological assessment (Niche Environment and Heritage 2021b at Attachment B).



## 8.4 Cultural values

### 8.4.1 Aboriginal cultural heritage

Due to the low number of surveys and archaeological studies completed primarily within the proposal area, an extensive Aboriginal Heritage Information Management System (AHIMS) search found no previously recorded Aboriginal cultural heritage sites located within the proposal area, but 2 sites were located within 500 m of the proposal area. This does not necessarily reflect the distribution of Aboriginal cultural heritage sites within the area but highlights the lack of archaeological surveys conducted within the Illawarra Escarpment landscape. This may be due to the difficulty of the steep terrain and/or lack of previous development within the area necessitating development-driven Aboriginal heritage assessments.

A survey of the proposed track network was undertaken by Niche heritage consultants and registered Aboriginal parties between 7 and 11 November 2022, in accordance with the *Code of practice for archaeological investigation of Aboriginal objects in New South Wales* (DECCW 2010b). One open campsite (Balgownie AFT1) and one potential archaeological deposit (PAD – Balgownie PAD 1) were identified within the proposed track corridor during the survey. In addition, 3 mature trees with scars were inspected during the field inspection, however, the scarring of these was determined to be natural.

The proposed track network was revised by NPWS to avoid the site where evidence of actual and potential Aboriginal occupancy was found and site extent was recorded for both Balgownie AFT 1 (AHIMS ID #TBC) and Balgownie PAD 1 (AHIMS ID #TBC).

Recommendations resulting from the consultation completed during the Aboriginal cultural heritage assessment are presented in Section 9 of Attachment A.

Note that access to the Aboriginal cultural heritage assessment (Attachment A) is restricted to registered Aboriginal parties and is not subject to public exhibition.

### Reference material

- Aboriginal cultural heritage assessment (Niche Environment and Heritage 2022a at Attachment A).

### 8.4.2 National/state/local historic heritage values

The proposal area is mostly within a large and undeveloped native bushland remnant, which encircles the former Corrimal Colliery pit top (excluded from the proposal area). Several access roads (now fire trails) and powerline easements cross the proposal area, along with a perennial stream to the south of the proposal area (Towradgi Creek). Brokers Nose trig point and lookout is located to the north and above the level of the proposal area. Due to the nature of the environment, ground coverage is very high, and native vegetation is very dense in some places, resulting in very low visibility. The ground in the proposal area was mostly covered in soil and leaf debris, with an occasional natural bush rock outcrop on the ground surface. Several items related to mining activities were discovered across some sections of the proposal area.

The historic heritage assessment (Attachment D) determined that there is a low to moderate chance of archaeological resources across the proposal area. The areas that have been identified as having archaeological resources are those feature areas identified during the heritage site inspection, which relate to the early period of mining, particularly the 'Old Train Track' which is the site of the 'old incline' and other mining-related features (refer to Section 4 of the historic heritage assessment at Attachment D).



Seven heritage items were identified within 200 m of the proposal area (Table 10). These sites were assessed using the criteria outlined in *Assessing heritage significance* (Heritage Office 2000). Based on the statement of heritage impact (Attachment E), the proposed works will likely have no or little impacts on the heritage items. However, mitigation measures, detailed in Section 8 of the statement of heritage impact (Attachment E), should be taken to ensure these sites are protected.

**Table 10 Summary of historic heritage items within 200 m of the proposal area**

Item #	Item name	Statutory listing	Level of significance	Relationship to the proposal area
6480	Illawarra Escarpment Landscape Conservation Area	Wollongong LEP 2009	Local	The proposal area is within a part of this conservation area. This report will examine potential impacts to this item.
#61046	Corrimal Colliery*	Wollongong Local Environmental Plan 2009	Local	The proposal area surrounds this curtilage and its access road. Some evidence related to this item extends out of the curtilage into the proposal area. This report will examine potential impacts to this item.
N/A	Corrimal Colliery - Head frame No 1	SEPP: Illawarra REP No.1	Local	This feature is located outside of the proposal area – 2km to the northwest, although the location is not given in the listing document. It marks the location of the Corrimal Colliery No.1 Vent Shaft site. Will not be affected by the project.
N/A	Corrimal Colliery - No 1 shaft surface structures	SEPP: Illawarra REP No.1	Local	This feature group is located outside of the proposal area – 2 km to the northwest, although the location is not given in the listing document. It marks the location of the Corrimal Colliery No.1 Vent Shaft site. Will not be affected by the project.
N/A	Corrimal incline features: (including the Line of old incline, Line of later incline, Haulage braking system).	SEPP: Illawarra REP No.1	Local	These features are associated with the Corrimal Colliery Pit Top Local heritage item but are located across the proposal area. This report will examine potential impacts to this item group.
#5986	House 'The Ridge'	Wollongong Local Environmental Plan 2009	Local	Located outside of the proposal area at 7–9 Hawthorn Street, outside of visual range. Will not be affected by the project.
#61046	Corrimal Colliery*	Wollongong Local Environmental Plan 2009	Local	The proposal area surrounds this curtilage and its access road. Some evidence related to this item extends out of the curtilage into the proposal area.

## Reference material

- Statement of heritage impact (Niche Environment and Heritage 2022c at Attachment C).

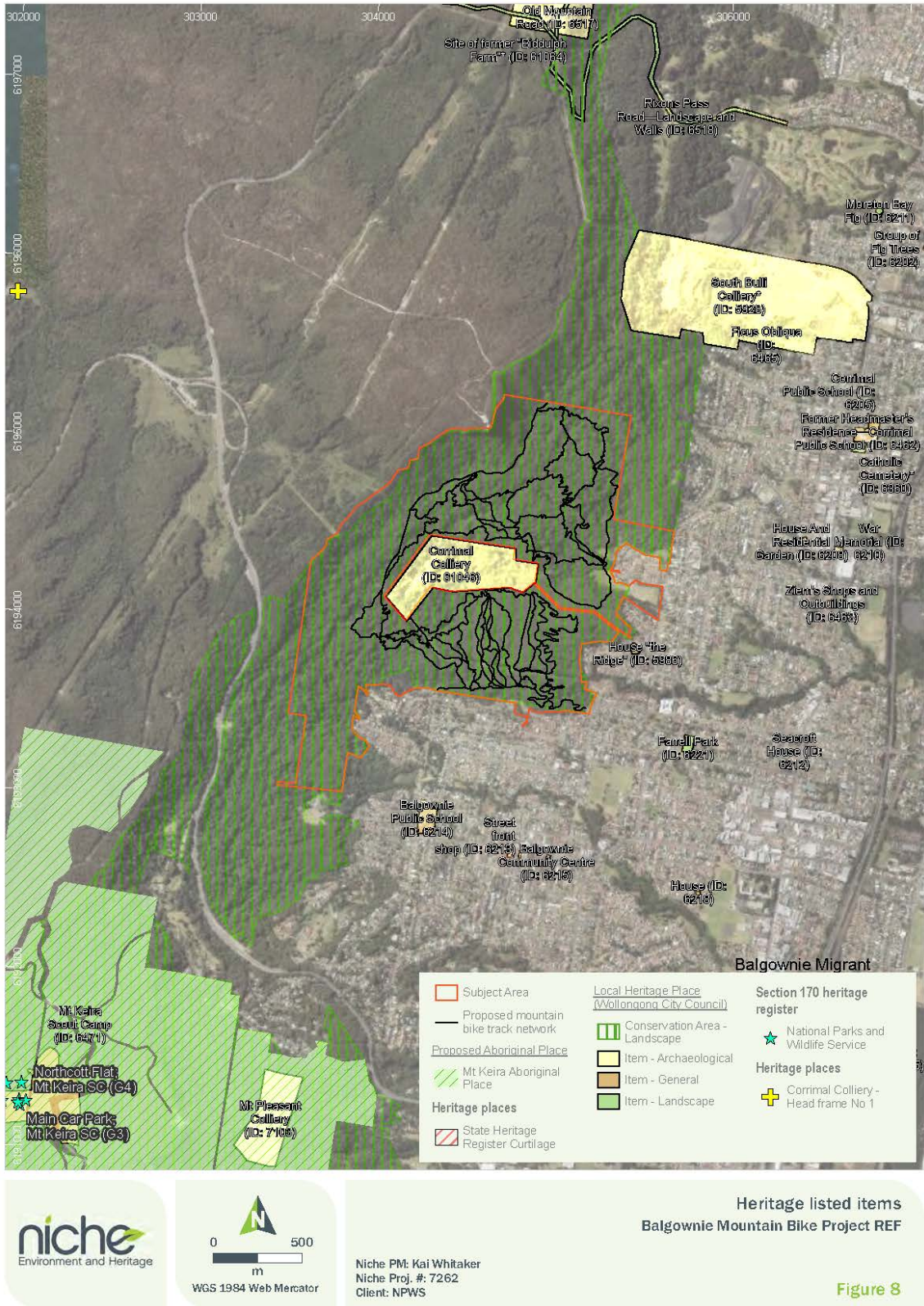


Figure 8 Heritage listed items

## 8.5 Social values

### 8.5.1 Recreation values

The Illawarra Escarpment SCA forms part of a system of protected lands and open space that caters for a wide spectrum of outdoor recreation in the Illawarra. It is subjected to heavy recreational pressure owing to the large neighbouring population in the Wollongong area and the coastal communities to the north and south. It is easily accessed from Sydney and elsewhere via main roads and public transport.

The escarpment contains spectacular scenery and rainforests, diversity of wildflowers and native birds, a variety of cultural and historic heritage, picnic facilities, scenic views, and a network of walking tracks and tracks for cycling. These attractions provide a strong contrast to the urban attractions of Wollongong and other coastal communities and have the potential to be important for ecotourism in the Illawarra.

Because the escarpment is a fragile environment due to its steep slopes, erodible soils, considerable cultural heritage and significant moist forests, it is vital for use to be sustainable in order to protect the area's important conservation, recreation and education values. Hazards, such as cliffs, land instability and disused mines, also limit the types and extent of recreational opportunities that can be provided.

Mountain biking has grown in popularity in the Illawarra and across New South Wales over the last decade, with a strong interest in mountain bike 'single tracks' emerging near urban and regional centres. Single tracks are narrow, often winding tracks only wide enough to accommodate riders in single file. In recent years, the demand for mountain bike single tracks has resulted in cyclists riding on walking tracks in the Illawarra Escarpment SCA and forming numerous unsanctioned tracks throughout the proposal area.

The proposed track network has been designed to mitigate erosion impacts and to provide separation of users for safety and amenity. This REF is also supported by a geotechnical and landslide risk assessment (Attachment D).

### 8.5.2 Scenic and visually significant areas

The Illawarra Escarpment is the dominant landform of the Illawarra region and is listed as a Scenic Landscape of Statewide Significance on the Register of the National Trust of Australia (NSW). It provides a dramatic backdrop to Wollongong and other settlements on the coastal plain.

The Illawarra Escarpment also provides opportunities for views over the coastal plain. The main escarpment lookouts are outside the Illawarra Escarpment SCA, between Mount Keira and Sublime Point. Lookouts within the park are Longview Lookout (Stanwell Tops), Robertson Lookout (south of Mount Keira) and Mount Kembla Lookout.

### 8.5.3 Education and scientific values

The wide range of natural and cultural attributes, and proximity to educational institutions, including the University of Wollongong, offer unique opportunities for education and research.

Research into the park's natural and cultural features has provided a wealth of scientific and other information, but large gaps in knowledge remain. A better understanding of Aboriginal use and heritage values, biodiversity, fire ecology, landforms, historical land use, natural hazards and human impacts will improve conservation and sustainable use of the area.



## 8.5.4 Interests of external stakeholders

This draft REF will be placed on public exhibition for 28 days. NPWS will consider submissions prior to finalising the REF.

## 8.6 Matters of national environmental significance

Matters of environmental significance under the EPBC Act that are likely to be affected by the proposal include nationally listed migratory species, threatened species, and ecological communities.

### 8.6.1 Proposed buffer

A 10 km buffer of the proposal area was examined on 5 November 2022 using the EPBC Act Protected Matters Search Tool (Department of Climate Change, Energy, the Environment and Water 2023a). The following species and communities were recorded or are considered to have a moderate or greater likelihood of occurring within the proposal area.

**Table 11 Matters of national environmental significance with moderate or higher likelihood of occurrence within the proposal area**

Common name	Scientific name	EPBC Act status	Likelihood of occurrence within the proposal area
Black-faced monarch	<i>Monarcha melanopsis</i>	Migratory	Present
Giant burrowing frog	<i>Heleioporus australiacus</i>	Vulnerable	Moderate
Green and golden bell frog	<i>Litoria aurea</i>	Vulnerable	Moderate
Grey-headed flying-fox	<i>Pteropus poliocephalus</i>	Vulnerable	High
Scrub turpentine	<i>Rhodamnia rubescens</i>	Critically endangered	High
White-flowered wax plant	<i>Cynanchum elegans</i>	Endangered	High
Illawarra Subtropical Rainforest in the Sydney Basin Bioregion threatened ecological community		Critically endangered	Present

### Reference material

- Ecological assessment (Niche Environment and Heritage 2023b at Attachment B).

## 9. Impact assessment

### 9.1 Physical and chemical impacts during construction and operation

Potential impacts	Applicable?*	Impact level (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Soil quality or land instability	<input checked="" type="checkbox"/>	Low; negative	<p>The construction phase of the proposed activity will result in minor and temporary disturbance to the soil structure/land stability due to vegetation clearing for development of new tracks, upgrading sections of existing tracks, installation of track features, and installation of drainage features.</p> <p>During the operational phase it is considered that the design features of the Illawarra Escarpment Mountain Bike Track Network (the network) will provide adequate mitigation of any potential soil erosion impacts from track use. A maintenance regime will aid in identifying any dysfunctional drainage features requiring repair, especially following major rainfall events. Considering these factors, it is likely that where existing unsanctioned trails will be upgraded, soil quality and land stability would be improved. This will be a positive impact.</p> <p>Furthermore, the geotechnical assessment (Attachment D) indicated there were no specific geotechnical hazard features necessitating deviation or rerouting of tracks.</p> <p>The geotechnical assessment recognised that the occurrence of rapid landslides such as debris flows that are typically associated with intense rainfall events could locally damage track infrastructure.</p> <p>It is likely that some of the tracks traverse slow moving landslides exhibiting soil creep behaviour (see Attachment D), however these features are unlikely to</p>	<p><b>Construction phase</b></p> <p>Sediment control measures are to be in place prior to any vegetation clearing and track works and will be maintained until runoff catchments are stabilised. Sediment controls are to be inspected regularly by the relevant contractor and by NPWS staff. Sediment control measures will also be implemented for the storage of any spoil as required in accordance with 'the blue book', <i>Managing urban stormwater, soils and construction vol 1 and 2A</i> (Landcom 2004).</p> <p>The proposed construction works will be largely carried out using handheld tools and equipment (for example chainsaws and brush cutters). A mini-excavator will also be used, which will be the largest on-ground machine used for construction.</p> <p>Soil disturbance will be minimised by clearly demarcating the track alignments during the ground-truthing stage of the proposal.</p> <p>All machinery is to be free from any fuel or other pollutant residues, with connections and hoses inspected regularly.</p> <p>Contractors are to have, and be competent in the use of, petrochemical spill kits for use of any spillage during the construction. NPWS is to be notified of any spills and the action taken to contain them.</p> <p>Clearing and excavation works will not be conducted during high rainfall periods. The weather will be monitored during the proposed works period and works will cease, and open areas stabilised, if heavy rainfall is forecast.</p>



Potential impacts	Applicable?*	Impact level (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			<p>result in damage to the tracks that could affect serviceability.</p> <p>Periodic inspection and maintenance of the tracks will be required to manage these hazards.</p> <p>A geohazard risk assessment is included in the geotechnical assessment (Attachment D).</p> <p>Taking the above reasons into account and the proposed safeguards and mitigation measures, there may be an overall low impact on soil quality and/or land stability as a result of the proposed activity.</p>	<p>Erosion and sediment control measures are to be implemented and maintained to:</p> <ul style="list-style-type: none"> <li>• prevent sediment moving offsite and sediment-laden water entering any watercourse, drainage lines or drain inlets</li> <li>• reduce onsite water velocity and capture sediment</li> <li>• minimise the amount of material transported from site to surrounding pavement surfaces</li> <li>• if required, divert clean water around the site, in accordance with the blue book.</li> </ul> <p>A construction environmental management plan (CEMP) will be prepared by the construction contractor to the satisfaction of NPWS. The CEMP will detail all safeguards and mitigation measures related to the construction phase of the proposal.</p> <p><b>Operational phase</b></p> <p>Drainage features, rock armouring and other track features have been integrated into the design of the track network to minimise the potential for erosion and sedimentation (see Attachment E for details and Appendix 1 for indicative locations).</p> <p>Entries and exits of drainage features will be rock armoured to minimise potential soil erosion and runoff. Crossings will be positioned perpendicular to drainage lines.</p> <p>The proposed track network is designed to disperse riders through the network, spreading (rather than concentrating) and thereby reducing potential soil impacts.</p> <p>Regular inspections of the track network will be implemented to ensure all drainage features are functioning correctly.</p> <p>Long-term maintenance schedules are to consider the lifecycle of materials that may harm the environment (for example, fibre-reinforced plastic).</p>

Potential impacts	Applicable?*	Impact level (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Physical or chemical damage to a waterbody, watercourse, wetland or natural drainage system (due to runoff or pollution)	<input checked="" type="checkbox"/>	Low; negative	<p>The proposed track network is designed to follow the landscape contours. Drainage line crossings have been minimised, with only 2 second order crossings requiring bridge construction proposed. All other drainage line crossings are first order ephemeral watercourses requiring either raised track or rock-armoured crossings. These types of crossings will involve minimal physical alteration of the drainage line and are not likely to alter flow characteristics.</p> <p>No third order streams are located within the proposal area.</p> <p>Taking the above reasons into account, and the proposed safeguards and mitigation measures, it is likely the proposed activities would have a negligible impact on waterbodies, watercourses, wetlands or natural drainage systems.</p>	<p>A rehabilitation management plan will be developed for the closure and rehabilitation of unsanctioned tracks (not included in the track network) within the Illawarra Escarpment SCA.</p> <p>As above</p> <p>The track network is designed to efficiently drain water from the track surface onto armoured or vegetated areas off-track (see Attachment E and Appendix 1).</p> <p>Drainage features, rock armouring and other track features have been integrated into the design of the track network (see Attachment E for details) to minimise the potential for erosion and sedimentation. These features will have rock-armoured entries and exits to minimise potential sediment runoff.</p> <p>Bridges and raised track will be installed in sections of track that cross drainage features or where pooling occurs (see Attachment E for details).</p> <p>Track mats or similar will be utilised for machinery access over sensitive areas. Machinery can cross perpendicular to drainage lines if required.</p>
Changed flood or tidal regimes, or affects from flooding	<input checked="" type="checkbox"/>	Negligible	<p>The track network has been designed to minimise drainage line crossings where possible. Where required, drainage crossings have been designed to minimise impacts to the aquatic environment.</p> <p>Taking the above reasons into account and the proposed safeguards and mitigation measures, there may be an overall negligible impact to flood and/or tidal regimes as a result of the proposed activity.</p> <p>Decommissioning of unsanctioned tracks is likely to improve downslope impacts of concentrated water flow along unsanctioned tracks.</p>	<p>Track structures such as bridges or raised track are designed to not alter flow regimes.</p> <p>Bed-level rock crossings to be installed where appropriate.</p> <p>Sediment control measures will be installed prior to any track works. These controls will be maintained until runoff catchments are stabilised. Sediment controls will be inspected regularly by the relevant contractor and by NPWS staff.</p> <p>Tracks have been designed to minimise increases in runoff velocity and concentration.</p>
Changes to coastal processes and coastal hazards, including those	<input type="checkbox"/>	NA	Coastal processes are not relevant to the proposal, including climate change or sea level rise projections.	

Potential impacts	Applicable?*	Impact level (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
under climate change projections (e.g., sea level rise)				
The use, storage or transport of hazardous substances, or use or generation of chemicals which may build up residues in the environment	☒	Negligible	<p>The proposed activity will not involve the use and transport of hazardous substances and the use of chemicals that may build up residues in the environment, including waterways, and potentially harm fauna.</p> <p>The hazardous substances and chemicals to be used in the construction and maintenance of the track network include fuels and oils for machinery use.</p> <p>Fibre-reinforced plastic can also release hazardous material into the environment when it degrades, which can affect soil and water quality.</p> <p>Given the limited use of hazardous substances and the control measures to be implemented, it is likely that the proposal would have a negligible impact through the generation and transportation of hazardous substances.</p>	<p>The proposed construction works will be largely carried out using handheld tools (for example, chainsaws and brush cutters). A mini-excavator will also be used, however, this will be the largest on-ground machine used for construction.</p> <p>Maintenance will be scheduled to account for the lifespan of track materials such as fibre-reinforced plastic.</p> <p>All machinery is to be free from any fuel and other pollutant residues, with connections and hoses inspected regularly.</p> <p>Re-fuelling will be undertaken at least 40 m away from third order streams.</p> <p>Contractors are to have, and be competent in the use of, petrochemical spill kits for use of any spillage during the construction. The NPWS is to be notified of any spills and the action taken to contain them.</p> <p>Construction works will not be carried out during or within 2 days of heavy rainfall.</p> <p>The maintenance schedule will consider the lifespan of track materials such as fibre-reinforced plastic, ensuring that they are replaced before expiry.</p>
Generation or disposal of gaseous, liquid or solid wastes or emissions	☒	Negligible	<p>The proposal is likely to involve the generation of gaseous and solid wastes and emissions. Gaseous emissions will be generated during construction and maintenance from the use of machinery and equipment, although this is expected to be minor.</p> <p>During the operational phase, human waste will be generated. Toilet facilities will be provided outside of the proposal area so will be assessed in a separate Part 5 assessment.</p>	<p>As above</p> <p>During the construction phase, human faecal waste will be completely contained in portable toilets, subject to regular servicing to empty and prevent overflow, and disposed offsite as per legislative requirements.</p>

Potential impacts	Applicable?*	Impact level (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Emissions of dust, odours, noise, vibration or radiation	<input checked="" type="checkbox"/>	Negligible	<p>The proposal will generate vegetation and excavated fill waste. This type of waste will be minimised through reuse during the construction phase where appropriate.</p> <p>Taking the above reasons into account and the proposed safeguards and mitigation measures, there may be an overall negligible impact by the generation or disposal of gaseous, liquid or solid wastes or emissions as a result of the proposed activity.</p> <p>Dust and other airborne fine particles may result from the track construction works. However, given the relatively small construction footprint is dispersed over a large area, it is likely that dust generation would be negligible.</p> <p>Helicopter activity during the construction phase will involve the generation of noise. However, helicopter operations will be spread out over the entire duration of the construction schedule to deliver materials progressively as required. This type of schedule is also designed to limit the number of materials stored at the site.</p>	<p>The track network has been designed to minimise new clearing by utilising existing unsanctioned tracks.</p> <p>Construction methods will be largely by hand and a small excavator, thus reducing noise.</p> <p>Helicopter delivery of materials will be scheduled over the entire course of the construction schedule to limit periods of intense helicopter activity.</p> <p>All activities will be undertaken in accordance with the <i>Interim construction noise guideline</i> (DECC 2009b) and the <i>Draft construction noise guideline</i> (EPA 2020).</p>

## 9.2 Biodiversity impacts during construction and operation

Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Effects on any declared area of outstanding biodiversity value (under the BC Act) or critical habitat (under the FM Act)	<input type="checkbox"/>	NA	NA	
Clearing or modification of vegetation, including ecological communities and plant community types of conservation significance	<input checked="" type="checkbox"/>	Low; negative	<p>The proposed new tracks have been assessed as 'primary clearing', while the existing tracks incorporated into the network have been assessed as 'secondary clearing'.</p> <p>The proposal will result in the removal of approximately 3.45 ha of native vegetation clearing, comprised of 1.55 ha of primary clearing (new tracks) and 1.90 ha of secondary clearing (existing tracks). The proposal will also result in 0.0125 ha of temporary impacts to native vegetation at material laydown areas (see Table 7 for a detailed breakdown according to PCT).</p> <p>Native vegetation clearing requirements include the clearing of 0.288 ha of Illawarra Subtropical Rainforest TEC, comprised of 0.244 ha of primary clearing and 0.0445 ha of secondary clearing.</p> <p>No mature trees will be removed during the construction work. The canopy layer will not be removed, and only the immediate groundcover and understorey vegetation will be affected where any clearing takes place.</p> <p>An additional 0.148 ha of exotic or planted native vegetation will be subject to clearing.</p> <p>All areas disturbed temporarily will be regenerated post-works.</p> <p>There will be no removal of any canopy trees throughout the entire proposal area, allowing for the avoidance of</p>	<p>Only the immediate ground cover and understory vegetation will be modified or removed within track construction corridors.</p> <p>No mature or hollow-bearing trees will be removed.</p> <p>Prior to the clearing works, each track will be clearly marked and demarcated.</p> <p>Micro-siting of the track will be implemented to avoid mature trees and shrubs.</p>



Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Endanger, displace or disturb terrestrial or aquatic fauna, including fauna of conservation significance, or create a barrier to their movement	☒	Low; negative	<p>many of the direct impacts such as loss of shade and shelter or breeding opportunities.</p> <p>A test of significance (BC Act) and assessment of significance (EPBC Act) for the Illawarra Subtropical Rainforest TEC were conducted and are presented in Attachment B (see Appendix 2 and Appendix 3, respectively). The assessments conclude that the proposal is unlikely to have a significant impact on the TEC due to the linear clearing of understorey vegetation only, which is unlikely to lead to fragmentation or isolation of the TEC. The proposal is unlikely to place the Illawarra Subtropical Rainforest TEC at risk of extinction.</p> <p>All 17 threatened fauna species with potential or known occurrence in the proposal area may have potential foraging habitat within the proposed track corridors. However, the extensive areas of vegetation immediately adjacent to the proposal area are likely to provide a variety of habitat features, such as hollow-bearing trees, stags, termite mounds, dense shrubs and mature trees.</p> <p>Furthermore, the proposal will not remove any hollow-bearing trees, stags, mature trees or termite mounds. It will utilise existing tracks or will avoid these features when creating new sections of track. Therefore, it is unlikely that the proposal would result in a significant loss of critical habitat features or direct impacts to any threatened fauna species.</p> <p>A test of significance (BC Act) was conducted for both the stuttering frog and giant burrowing frog (see Appendix 2 in Attachment B) as they were considered to have a high likelihood of occurring within the proposal area. Also considered was the proximity of the proposed works to ephemeral drainages or potential impacts due to construction works. An assessment of significance (EPBC Act) was also conducted for the giant burrowing frog and green and golden bell frog, which are listed</p>	<p>Where possible the track network has been designed to incorporate existing tracks.</p> <p>There will be no clearing of any canopy trees throughout the entire proposal area. This will avoid potential impacts such as loss of shade and shelter or breeding opportunities.</p> <p>Removal of logs and tree stumps will be avoided.</p> <p>Prior to construction, the track alignment will be sited to avoid mature trees (including the threatened subject flora) and significant habitat features.</p> <p>A rehabilitation management plan will be developed for the closure and rehabilitation of unsanctioned tracks (not included in the track network) within the Illawarra Escarpment SCA.</p>

Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			<p>under the EPBC Act (see Appendix 3 in Attachment B). Given the avoidance of high-quality habitat and minimal impacts to aquatic habitat through construction design, these assessments concluded that the proposal is unlikely to have a significant impact on these species.</p>	
Significant effects on protected flora, including conservation significance	☒	Negligible	<p>Three threatened subject flora are considered to have potential habitat (or known presence) within the proposal area:</p> <ul style="list-style-type: none"> <li>• white-flowered wax plant (<i>Cynanchum elegans</i>)</li> <li>• Illawarra socketwood (<i>Daphnandra johnsonii</i>)</li> <li>• rainforest cassia (<i>Senna acclinis</i>).</li> </ul> <p>Given they can be detected at any time of year (and were not detected during site surveys), it is considered unlikely that these species are present within the corridor of the proposed tracks. However, there is potential for them to occur in the broader proposal area.</p> <p>It is considered unlikely that the threatened subject flora would be impacted by the proposal.</p>	<p>Prior to construction, the track alignment will be sited to avoid mature trees (including the threatened subject flora). A suitably qualified ecologist or NPWS personnel will be present during the track alignment siting to ensure that protected flora will be avoided.</p> <p>A rehabilitation management plan will be developed for the closure and rehabilitation of unsanctioned tracks (not included in the track network) within the Illawarra Escarpment SCA.</p>
Contribute to a key threatening process to biodiversity or ecological integrity as listed under the BC Act or FM Act	☒	Low; negative	<p>The 39 key threatening processes (KTPs) that are listed on the BC Act and/or EPBC Act as of February 2023 and are applicable to terrestrial environments, are shown in Table 14 of Attachment B.</p> <p>Of these, 10 KTPs relate to invasive ecological processes that have the potential to be transported by works plant and machinery. The proposed works will avoid all possible invasive processes by the quarantining and cleaning of plant and machinery prior to entry to the escarpment area. Once present within the proposal area, machinery will stay at site until the proposed works are completed.</p> <p>The only KTP that will occur as a result of the proposal is the removal of 3.45 ha of understorey native vegetation, comprised of 1.55 ha of primary clearing (new tracks) and</p>	<p>There will be no clearing of any canopy trees throughout the entire proposal area, allowing for many of the direct impacts such as loss of shade and shelter or breeding opportunities to be avoided.</p> <p>Prior to construction, the track alignment will be sited to avoid mature trees (including the threatened subject flora) and to clearly define the track footprint.</p> <p>Where required, vines (for example wonga vine, <i>Pandorea pandorana</i>, and scrambling lily, <i>Geitonoplesium cymosum</i>) will be tied back using suitable materials as to not harm the individual plants.</p> <p>A rehabilitation management plan will be developed for the closure and rehabilitation of unsanctioned tracks (not included in the track network) within the Illawarra Escarpment SCA.</p>

Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			<p>1.90 ha of secondary clearing (existing tracks). Considering the linear nature of the tracks, and the incorporation of existing tracks into the network, it is likely that the contribution of the proposal to KTPs would be low.</p> <p>Furthermore, the proposal is considered to likely reduce the creation of illegal mountain bike tracks along the Illawarra Escarpment and allow NPWS to rehabilitate unsanctioned tracks.</p>	
Introduction of pathogens priority weeds, vermin, feral species ( <i>Biosecurity Act 2015</i> ) or genetically modified organisms into an area	<input checked="" type="checkbox"/>	Low; negative	<p>The proposal will increase the potential for the introduction of weeds and pathogens (such as <i>Phytophthora cinnamomi</i> and myrtle rust) in the proposal area (and adjacent areas) during the construction and operational phases.</p> <p>The importing of materials for the construction and ongoing maintenance of the proposed activity has the potential to introduce species, pathogens or disease, although this is partly avoided by using in situ materials where possible.</p> <p>Taking the above reasons into account and the proposed safeguards and mitigation measures, it is likely that the proposal would result in an overall negligible impact with the introduction of noxious weeds, vermin, feral species and genetically modified organisms as a result of the proposed activity.</p>	<p>Use of in situ rock material where possible and authorised by NPWS.</p> <p>Materials used in the construction and ongoing maintenance stages of the proposed activity are to be free of any potential invasive species, pathogens or diseases.</p> <p>A weed management plan will be developed for use in the construction phase of the proposal. The plan will need to consider the clearing of tracks in areas where exotic species are present and the sequencing of works to not enhance the spread of weeds.</p> <p>Any cleared material from exotic species will be removed from the proposal area and disposed of appropriately.</p> <p>Weed and pest management for the proposed track is to be carried out in accordance with the NPWS standard policy and procedures, as part of routine operations.</p> <p>Vehicles and machinery will be checked and cleaned prior to moving between sites.</p>
Effects on joint management agreement (including stewardship site) under the BC Act or FM Act	<input type="checkbox"/>	NA	NA	

## 9.3 Community impacts during construction and operation

Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or N/A)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Effects on community services or infrastructure	<input checked="" type="checkbox"/>	Medium; positive	<p>The proposed track network will provide high-quality mountain biking infrastructure for visitors to the proposal area.</p> <p>The implementation of the track network will ultimately result in unsanctioned tracks (those not being incorporated into the network) being closed and rehabilitated.</p> <p>Considering that the proposal will provide additional recreational infrastructure, it is likely to improve community services and infrastructure overall.</p>	None required.
Effects on sites of importance to local or the broader community for their recreational or other values or access to these sites	<input checked="" type="checkbox"/>	Medium; positive	<p>The proposed track network is expected to increase visitors to the Illawarra Escarpment SCA, an important site to the local and broader community, and a valued site for bushwalking. The track network will provide enhanced recreational access and opportunities to the area for all levels of mountain biking. It is also designed to keep riders on the network, therefore minimising rider and walker interaction.</p> <p>The track network is not designed nor expected to discourage walking within the Illawarra Escarpment SCA. Given the current level of mountain bike riding on unsanctioned tracks, it is likely that the track network will provide better certainty for walkers regarding where mountain biking will be taking place.</p> <p>Considering the above reasons, the proposed activity may have an overall medium positive impact on the broader community in relation to recreational and other values.</p>	<p>Track network is designed to be single use (cyclists only) to avoid impacts to bushwalkers.</p> <p>Track network is designed to keep riders on the network rather than on other tracks (such as walking tracks).</p> <p>Adequate signage to notify both walkers and riders of nearby tracks and intersections.</p>

Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or N/A)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Effects on economic factors, including employment, industry and property value	<input checked="" type="checkbox"/>	Low; positive	The project is likely to result in economic benefits from increased tourism, increased spending by mountain bike riders, and the economic benefits of increased health.	None required.
Impact on the safety of the community	<input checked="" type="checkbox"/>	Low; negative	<p>There is an inherent risk with mountain biking as an activity. The section of trails and jumps known as 'Possums' is noted as a safety risk with recorded incidents of accidents resulting in hospitalisation. NPWS will be rehabilitating this area. The formalised track network will be constructed to IMBA standards to maximise the safety of riders.</p> <p>The closure and rehabilitation of unsanctioned tracks can improve safety outcomes, as most riders can use formalised tracks with known access points and routes for emergency and first aid response.</p> <p>There are current safety issues resulting from conflict with bushwalkers and mountain bikers. Improvements to community safety will be achieved by creating a formal network designed to be single use (for mountain biking), reducing potential for interaction with walkers.</p>	<p>Track network designed to IMBA standards for safety and sustainability catering for a range of skill categories.</p> <p>Track network designed to be single use (for mountain biking) to avoid impacts to bushwalkers.</p> <p>Track network is designed to keep riders on the network rather than on other tracks (such as walking tracks).</p> <p>Adequate signage to notify both walkers and riders of nearby tracks and intersections.</p> <p>Signage will also highlight hazards along the track.</p> <p>Regular track inspections and maintenance schedule will ensure track features are functioning correctly.</p> <p>NPWS will develop a notification procedure prior to any works commencing, and such procedures will be reviewed as required.</p> <p>The proposed activity will comply with NPWS safety procedures.</p> <p>NPWS will consult with emergency services for input into safety procedures.</p>
Bushfire risk	<input checked="" type="checkbox"/>	Negligible	<p>The proposed activity is likely to result in increased visitation to the area, which would increase the potential bushfire risk.</p> <p>However, this risk is minimised with smoking being prohibited in NPWS reserves and bushfire plans with strategies incorporating visitor activity restrictions during periods of high fire danger.</p> <p>The use of machinery during the project's construction phases could pose a bushfire risk. However, these risks</p>	<p>Daily pre-work checks of bushfire risk rating, to be incorporated into the CEMP.</p> <p>No work will be conducted on total fire ban days.</p> <p>Construction machinery and equipment are not to be stored in areas of high fuel loads (for example, long grass).</p> <p>Interpretive material will include information about bushfire risk.</p>



Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or N/A)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			will be mitigated by following NPWS construction procedures regarding bushfire risk. These procedures will be incorporated into the CEMP.	
Effects on the visual or scenic landscape	<input checked="" type="checkbox"/>	Low; negative	<p>During the construction phase, there will be a temporary visual impact from the activity of work crews, helicopter material drops and storage of materials.</p> <p>Temporary signage will also be used to notify the public of the works.</p> <p>The track network is designed to enhance the rider experiences through immersion in the natural environment. As such, the network has been designed to have a minimal footprint, with operational widths for single tracks (the majority of tracks) to be less than 1 m.</p> <p>Signage will not obstruct any views and will be designed to have a low visual impact. The tracks are not likely to be visible in views of the escarpment.</p> <p>Therefore, the project is unlikely to have more than a low negative visual or scenic impact.</p>	<p>Low-impact design principles, including minimal footprint, and incorporation of natural features as track features.</p> <p>Track network signage designed to have low visual impact.</p>
Noise, pollution, visual impact, loss of privacy, glare or overshadowing to members of the community, particularly adjoining landowners	<input checked="" type="checkbox"/>	Negligible	<p>The project is likely to cause increased noise and visual impact to adjacent landowners through an anticipated increase in visitation to the proposal area. There may also be a loss of privacy to the immediate neighbours of the track network.</p> <p>NPWS (reports) indicate that the Illawarra Escarpment SCA is already a popular site for visitors, partly due to the large neighbouring population in the Wollongong area and the coastal communities in the north and south, and mountain bike riders using existing unsanctioned tracks.</p> <p>By creating a formal track network, the project will likely create more certainty to the local community about where mountain biking is permitted and can be expected.</p>	<p>The NPWS will develop a notification procedure prior to any works commencing to inform the local community about the construction for the proposal.</p> <p>Track construction will be undertaken between 7:00 am to 5:30 pm on weekdays, and 7:00 am to 12:00 pm on Saturdays. No work will be undertaken on Sundays or public holidays.</p>

Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or N/A)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			The signage used throughout the network will be designed to reduce glare for non-intended viewers.	

## 9.4 Natural resource impacts during construction and operation

Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or N/A)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Degradation of the park or any other area reserved for conservation purposes	<input checked="" type="checkbox"/>	Medium; negative	<p>The track network has been designed to have minimal impact on the natural resources of the proposal area and the proposed alignment of the network tracks has been designed to minimise vegetation clearing. Initial field surveying and mapping of the proposed network has identified alignments that avoid ecological constraints. During the construction phase, the alignment of the tracks will be micro-sited to avoid mature and hollow-bearing trees.</p> <p>The proposal will result in the removal of approximately 3.45 ha of native vegetation, comprised of 1.55 ha of primary clearing (new tracks) and 1.90 ha of secondary clearing (existing tracks).</p>	<p>Track alignments identified through extensive field reconnaissance with NPWS to avoid ecological and landscape constraints.</p> <p>Track network designed to follow natural landscape contours to reduce erosion potential.</p> <p>Track network has been designed to be sustainable, including the installation of rock armouring and drainage features to mitigate erosion and soil degradation.</p> <p>Track network design has incorporated existing unsanctioned tracks into the network, where feasible, to reduce the clearing requirements for new tracks.</p> <p>Materials used in the construction and operational maintenance phases are to be free of any potential invasive species, pathogens or diseases. For example, any fill for the proposed activity is to be certified free from contaminants or weed propagules that could negatively affect adjacent habitats. All imported materials for the proposed activity are to be in accordance with NPWS biosecurity management procedures.</p> <p>A weed management plan will be developed by NPWS for the construction phase. The weed management plan will be incorporated into the CEMP.</p>
Effects on the use of, or the community's ability to use, natural resources	<input checked="" type="checkbox"/>	Medium; positive	<p>The project will ultimately enhance the local and broader community's ability to use and experience the Illawarra Escarpment SCA. The track network is designed to provide tracks for a variety of mountain bike rider skill levels.</p> <p>The track network has been designed to minimise potential interaction between riders and walkers.</p>	<p>The track network has been designed as single use to avoid potential impacts with walkers.</p> <p>Signage will be installed throughout the network to indicate track usage type.</p> <p>The track network has been designed to reduce rider speed where tracks approach their terminus or where tracks intersect.</p>

Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or N/A)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Wastage, destruction or depletion of natural resources including water, fuels, timber or extractive materials	<input checked="" type="checkbox"/>	Negligible	<p>The proposal will result in the removal of approximately 3.45 ha of native vegetation, comprised of 1.55 ha of primary clearing (new tracks) and 1.90 ha of secondary clearing (existing tracks). The track network has been designed to incorporate existing unsanctioned tracks where suitable.</p> <p>Where NPWS approves, rock will be sourced from the proposal area for use as track features, such as rock armouring. This would reduce the amount of rock that would be imported for the project.</p> <p>Milled timber will be required for some track features.</p> <p>The project is also designed to discourage and prevent the future development of unsanctioned mountain bike tracks. The project will also involve the rehabilitation of the unsanctioned tracks that are not incorporated into the track network, including those at Mount Keira. This would constitute a positive impact.</p> <p>Considering the above reasons, it likely that the project would have a negligible impact on natural resources.</p>	<p>The track network has been designed to incorporate suitable existing tracks to avoid new vegetation clearing.</p> <p>Cleared vegetation that is free of weeds, will be stockpiled off-track for use as brush matting to remediate access areas and degraded unsanctioned tracks on completion.</p> <p>Imported rock will be sourced from a certified supplier and will be consistent with the geology of the proposal area.</p>
Sustainable and efficient use of water and energy	<input checked="" type="checkbox"/>	Negligible	<p>The project will require the use of machinery during the construction phase.</p> <p>During the operational phase, energy use will be limited to the maintenance of the track network.</p>	All machinery will be in good working condition.



## 9.5 Aboriginal cultural heritage impacts during construction and operation

Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or N/A)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Disturbed ground surface or any culturally modified trees	<input checked="" type="checkbox"/>	Low; negative	<p>The proposed works will involve varying levels of ground disturbance within the proposal area associated with the construction of the new tracks, formalisation and upgrade of existing tracks and the construction of supporting infrastructure and services. The proposed works therefore have the potential to directly harm Aboriginal objects and/or sites located within the proposal area.</p> <p>No previously recorded Aboriginal cultural heritage sites were located within the proposal area, however, one open campsite (Balgownie AFT1, AHIMS #TBC) and one Potential Archaeological Deposit (Balgownie PAD 1, AHIMS #TBC ) were identified during the visual inspection within the proposed track corridor.</p> <p>The proposed track corridor has been modified by NPWS to avoid the site centroid and recorded site extent for both Balgownie AFT 1 (AHIMS ID #TBC) and Balgownie PAD 1 (AHIMS ID #TBC). Therefore, the proposal is unlikely to cause harm to the known Aboriginal heritage sites within the proposal area.</p> <p>Management and mitigation measures are also warranted to ensure continued compliance with the NPW Act. Consideration and discussion of management and mitigation options are provided in Table 2 of the Aboriginal cultural heritage assessment (Attachment A).</p> <p>Where harm to Aboriginal sites and objects cannot be avoided, an Aboriginal heritage impact permit (AHIP) in accordance with the NPW Act will be required.</p>	<p>No culturally modified trees will be removed or trimmed as part of the proposal.</p> <p>Implement the recommendations in the Aboriginal cultural heritage assessment (Attachment A).</p> <p>The proposed track corridor has been modified by NPWS to avoid the site centroid and recorded site extent for both Balgownie AFT 1 (AHIMS ID #TBC) and Balgownie PAD 1 (AHIMS ID #TBC). Therefore, the proposal is unlikely to cause harm to the known Aboriginal heritage sites within the proposal area.</p> <p>If any Aboriginal sites are observed during the construction phase of the proposed activity, then work is to cease immediately and NPWS is to be notified. A thorough assessment is to be carried out in accordance with the <i>Guide to investigating, assessing, and reporting on Aboriginal cultural heritage in NSW</i> (OEH 2011), and the <i>Code of practice for archaeological investigation of Aboriginal objects in New South Wales</i> (DECCW 2010b).</p> <p>A rehabilitation management plan will be developed for the closure and rehabilitation of unsanctioned tracks (not included in the track network) within the Illawarra Escarpment SCA.</p>
Effects on known Aboriginal objects or Aboriginal places	<input checked="" type="checkbox"/>	Low; negative	<p>It is noted that Mount Keira, a registered Aboriginal Place, is located 1.5 km southwest of the proposal area.</p>	<p>Implement the mitigation measures and recommendations in the Aboriginal cultural heritage assessment and cultural values assessment (Attachment A).</p>

Potential impacts	Applicable?*	Likelihood of impact (negligible, low, medium or high; negative or positive; or N/A)	Reasons (describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)	Safeguards/mitigation measures
<p>Effects on areas:</p> <ul style="list-style-type: none"> <li>- within 200 m of watercourses</li> <li>- within a sand dune system</li> <li>- on a ridge top, ridge line or headland</li> <li>- within 200 m below or above a cliff face</li> <li>- within 20 m of or in a cave, rock shelter or a cave mouth</li> </ul>	☒	Low; negative	<p>The proposal will affect areas within 200 m of waters, on a ridge top or ridge line, and within 200 m below or above a cliff face. There will be disturbance to the ground surface in these areas.</p> <p>Taking the proposed safeguards and mitigation measures, there may be an overall low negative impact to these areas as a result of the proposal.</p>	Implement the mitigation measures and recommendations in the Aboriginal cultural heritage assessment and cultural values assessment (Attachment A).
<p>Effects on wild resources that are used or valued by the Aboriginal community or access to these resources</p>	☒	Low; negative	<p>The proposal is likely to increase visitation to the proposal area. However, the area is already open for public use.</p> <p>As the proposed tracks are single use riding tracks, this may negatively impact access to the Illawarra Escarpment SCA.</p>	Implement the mitigation measures and recommendations in the Aboriginal cultural heritage assessment and cultural values assessment (Attachment A).
<p>Changes to access to culturally sensitive locations</p>	☒	Low; negative	<p>The proposal is likely to increase visitation to the proposal area.</p> <p>As the proposed tracks are single use riding tracks, this may negatively impact access to the Illawarra Escarpment SCA.</p>	Implement the mitigation measures and recommendations in the Aboriginal cultural heritage assessment and cultural values assessment (Attachment A).

## 9.6 Other cultural heritage impacts during construction or operation

Potential impacts	Applicable?*	Likely impact (negligible, maintenance, minor, major, contentious; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Impacts on places, buildings, landscapes or moveable heritage items	<input checked="" type="checkbox"/>	Low; negative	On the basis of the statement of heritage impact (Attachment C) as determined by the NSW Heritage Office Criteria (NSW Heritage Office 2001), the proposed works will likely have no or little impacts on the heritage items except for the identified features relating to the former mining works; 'old' incline, 'Old Train Line' and other identified features where direct impacts are likely. These heritage items have largely been avoided as part of revisions to the proposal.	Any approvals required under the Heritage Act will be obtained. Implement the mitigation measures and recommendations in the statement of heritage impact (Attachment C). If any historic heritage items or places are observed during the construction phase of the proposed activity, work is to cease immediately, the NPWS is to be notified and appropriate measures are to be implemented.
Impacts on vegetation of cultural landscape value (for example, gardens and settings, introduced exotic species, or evidence of broader remnant land uses	<input type="checkbox"/>	NA	NA	

## 9.7 Matters of national environmental significance under the EPBC Act

Likely impacts on matters of national environmental significance, including:	Applicable?*	Impact level (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Listed threatened species or ecological communities)	<input checked="" type="checkbox"/>	Low; negative	There is one TEC (Illawarra Subtropical Rainforest) and 2 threatened fauna species (giant burrowing frog and green and golden bell frog) listed under EPBC Act with the potential to be impacted by the proposal.	Only the immediate ground cover and understory vegetation will be modified or removed within track construction corridors. No mature or hollow-bearing trees will be removed.

Likely impacts on matters of national environmental significance, including:	Applicable?*	Impact level (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
Listed migratory species	<input type="checkbox"/>	NA	<p>The EPBC Act assessment concludes that the Illawarra Subtropical Rainforest (ISR) habitat to be impacted is classed as habitat critical to the survival of the TEC.</p> <p>Native vegetation clearing requirements include the clearing 0.288 ha of Illawarra Subtropical Rainforest TEC, comprised of 0.244 ha of primary clearing and 0.0445 ha of secondary clearing.</p> <p>No mature trees will be removed during the construction work. The canopy layer will not be removed, and only the immediate groundcover and understorey vegetation will be affected where any clearing takes place.</p> <p>All other areas of ISR have been avoided. Therefore, based on EPBC Act significant impact guidelines, the project is not likely to have a significant impact on ISR. Mitigation measures have been recommended which include leaving the canopy and any large shrubs intact and implementing a weed management plan.</p> <p>The proposed action will remove up to 3.45 ha of native vegetation through both primary and secondary clearing, some of which may provide habitat for the giant burrowing frog and green and golden bell frog. However, given that impacts are relatively minor, the proposal is likely to continue to provide habitat for the species. The proposal is therefore considered unlikely to have a significant impact on the giant burrowing frog and the green and golden bell frog.</p>	<p>Prior to the clearing works, each track will be clearly marked. Micro-siting of the track will be implemented to avoid mature trees and shrubs.</p> <p>A weed management plan will be developed and implemented for the construction phase of the proposal.</p> <p>Track network has been designed to incorporate existing tracks where feasible.</p> <p>Following the construction phase, material drop zones and laydown areas will be regenerated to prevent potential weed invasion and unauthorised access.</p>
The ecology of Ramsar wetlands?	<input type="checkbox"/>	NA	NA	
Commonwealth marine environment	<input type="checkbox"/>	NA	NA	



Likely impacts on matters of national environmental significance, including:	Applicable?*	Impact level (negligible, low, medium or high; negative or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
World Heritage values of world heritage properties	<input type="checkbox"/>	NA	NA	
The national heritage values of national heritage places	<input type="checkbox"/>	NA	NA	

## 9.8 Cumulative impacts

There are several other projects currently in development or planned for Illawarra Escarpment SCA and neighbouring lands. These include the Illawarra Escarpment Mountain Bike Track Network (between Mount Keira and Mount Kembla) and the Great Southern Walk. As the Great Southern Walk will be located well to the north of the mountain bike network, it is considered the impacts of its development will not interact with those of the proposal under consideration by this REF.

The Illawarra Escarpment Mountain Bike Track Network proposal will result in the removal of 6.54 ha of native vegetation, of which 0.45 ha consists of ISR. Only the immediate ground cover and understory vegetation will be modified or removed, comparable to the type of impact for this proposal. Where practicable, a raised trail will be installed to reduce vegetation impacts. While these projects are not considered likely to have a significant impact on the environment, it is critical that NPWS develop robust monitoring and maintenance regimes for the track network proposals.

As noted in Section 7, NPWS has committed to close and rehabilitate 20.05 km of unsanctioned tracks (that will not be incorporated into the proposal) within the Illawarra Escarpment SCA. It is worth noting that 1 km of track traversing the Illawarra Subtropical Rainforest TEC (comprised of PCT 3013; previously classified as PCT 906) will be rehabilitated, which would constitute a positive impact.

The rehabilitation of unsanctioned tracks (including the Balgownie area) is not within the scope of this REF and will be subject to further investigation and assessment by NPWS. The rehabilitation will be conducted in accordance with a vegetation rehabilitation management plan, which will include:

- mapping of the extent of native and exotic vegetation
- mapping of threatened flora
- mapping of noxious and environmental weed zones
- identification of native vegetation rehabilitation potential for disturbed areas
- detail of suitable techniques and locations for revegetation.

The positive cumulative impact from the rehabilitation on native vegetation is significant.

## **10. Proposals requiring additional information**

Under the Guidelines for preparing a review of environmental factors, no additional information is required.

## 11. Summary of impacts and conclusions

**Table 12** Summary of impacts

Category of impact	Significance of impacts		
	Extent of impact	Nature of impact	Environmentally sensitive features
Physical and chemical	Low; negative	Soil disturbance/Sourcing rock	Highly erodible soils
	Low; negative	Anthropogenic/sedimentation	
	Negligible	Minor flooding	
	Negligible	Fuels and oils	
	Negligible	Waste from machinery and humans	
	Negligible	Dust, odours, noise	
Biological	Low; negative	Vegetation modification or clearing	TECs, threatened flora and fauna
	Low; negative	Ongoing disturbance	
	Low; negative	Vegetation modification or clearing	
	Low; negative	Weed introduction	
Natural resources	Low; negative	Vegetation modification or clearing/Ground disturbance	Conservation area Conservation area/local community TECs and threatened flora and fauna
	Medium; positive	Increased and improved visitor use	
	Low; negative	Vegetation modification or clearing	
	Low; negative	Water and energy efficiency	
Community	Medium; positive	Improved infrastructure	Visual amenity Conservation area Local economy Park visitors Park visitor/Neighbours Visual and scenic amenity Neighbours
	Medium; positive	Improved access/Increased visitor use	
	Medium; positive	Increased opportunities	
	Low; negative	Cliff lines and other hazards	
	Low; negative	Fire risk	
	Low; negative	Amenity	
Cultural heritage	Low; negative	Ground disturbance	Aboriginal objects
	Low; negative	Increased visitation and ground disturbance	
	Low; negative	Affect access to wild resources which are used or valued by the Aboriginal community	
	Low; negative	Affect access to culturally sensitive locations	

Based on the summary of impacts in Table 22, it is concluded that a significant effect on the environment is unlikely, and an environmental impact statement is not required. This REF has considered each of the factors listed in s 171 of the Environmental Planning and Assessment Regulation in coming to this conclusion.

There is not likely to be a significant effect on threatened species, populations, ecological communities or their habitats, within the meaning of the BC Act, and a species impact statement is not required. Formal tests of significance under s 7.3 of the BC Act have been conducted as part of the ecological assessment (Attachment B) and confirm that TECs and threatened fauna and flora species are unlikely to be significantly affected by the proposal.

The activity is not likely to have a significant impact on matters of national environmental significance listed under EPBC Act. Formal assessments of significance, under the EPBC Act's significant impact criteria, have been conducted as part of the ecological assessment (Attachment B). These conclude that TEC and threatened species listed under the EPBC Act and listed migratory species are unlikely to be significantly affected by the proposal.

The activity will not require certification to the *Building Code of Australia, Disability (Access to Premises – Buildings) Standards 2010* or Australian Standards in accordance with the NPWS Construction Assessment Procedure.



## 12. Supporting documentation

Documentation supporting this application is detailed below, including attachment number. Access to the cultural values assessment and Aboriginal cultural heritage assessment (Attachment A) is restricted to registered Aboriginal parties.

Attachment	Document title	Author	Date
A	Aboriginal cultural heritage assessment	Niche Environment and Heritage	February 2023a
B	Ecological assessment	Niche Environment and Heritage	March 2023b
C	Statement of heritage impact	Niche Environment and Heritage	February 2023c
D	Geotechnical assessment and landslide risk assessment	Terra Insight	March 2023
E	Track network built features guide	Bennett Murada Architects	August 2021

## 13. Declarations

As the person responsible for the preparation of the REF, I certify that, to the best of my knowledge, this REF is in accordance with the EP&A Act, the EP&A Regs and the Guidelines approved under section 170 of the EP&A Regs, and the information it contains is neither false nor misleading.

Signature



Name (printed)

Kai Whitaker

Position

Environmental Approvals Consultant (Niche Environment and Heritage)

Date

22 March 2023

**By endorsing the REF, the proponent confirms that the information in the REF is accurate and adequate to ensure that all potential impacts of the activity can be identified.**

Signature

Name (printed)

Position

Date

Seal (if signing under seal):

## References

- DECC (Department of Environment and Climate Change NSW) (2009a) 'Illawarra Escarpment State Conservation Area fire management strategy', DEC, Sydney.
- DECC (2009b) 'Interim construction noise guideline [PDF 1.2MB], DECCW, Sydney South.
- DECCW (Department of Environment, Climate Change and Water NSW) (2010a) 'Aboriginal cultural heritage consultation requirements for proponents 2010', DECCW, Sydney South.
- DECCW (2010b) 'Code of practice for archaeological investigation of Aboriginal objects in New South Wales', DECCW, Sydney South.
- Dirt Art (2018) 'Illawarra Escarpment Mountain Biking Concept Plan [PDF 2.4MB], Dirt Art.
- DPI (Department of Primary Industries NSW) (2013) 'Policy and guidelines for fish habitat conservation and management' (updated 2013), NSW DPI.
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- NPWS and Wollongong City Council (2018) 'Draft Illawarra Escarpment mountain bike strategy: a joint project between National Parks and Wildlife Service and Wollongong City Council', Office of Environment and Heritage, Sydney.
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- NPWS (2022) 'Draft Illawarra Escarpment Mountain Bike Strategy Development alternatives to Mt Keira – preliminary assessment of O'Briens Drift to Mount Kembla precinct', NSW National Parks and Wildlife Service, Sydney.
- OEH (Office of Environment and Heritage) (2018) 'Illawarra Escarpment State Conservation Area plan of management', OEH, Sydney.
- OEH (2022) 'Guide to investigating, assessing, and reporting on Aboriginal cultural heritage in NSW', OEH, Sydney.
- MTBA (Mountain Bike Australia) (2019) 'Australian mountain bike trail guidelines', MTBA, Australia.

Stavi I and Yizhaq H (2020) 'Applying geomorphic principles in the design of mountain biking singletracks: conceptual analysis and mathematical modeling', *Land*, 9:442, 10.3390/land9110442.

Synergy Trails (2020) [Illawarra Escarpment mountain bike concept plan \[PDF 39MB\]](#), Synergy Trails Pty Ltd.

Thurston E and Reader R (2001) 'Impacts of experimentally applied mountain biking and hiking on vegetation and soil of a deciduous forest', *Environmental Management*, 27:397–409, doi.org/10.1007/s002670010157.

## More information

- [Indigenous land use agreements](#)
- NPWS policies and procedures:
  - [Cycling Policy](#)
  - [Landslides and Rockfalls Policy](#)
  - [Visitor Safety Policy](#)
- Acts, regulations, and environmental planning instruments:
  - [Biodiversity Conservation Act 2016](#)
  - [Biosecurity Act 2015](#)
  - [Environmental Planning and Assessment Act 1979, Division 5.1](#)
  - [Environmental Planning and Assessment Regulation 2021, s 171](#)
  - [Fisheries Management Act 1994](#)
  - [National Parks and Wildlife Act 1974](#)
  - [State Environmental Planning Policy \(Resilience and Hazards\) 2021, Chapter 2 Coastal management](#)
  - [State Environmental Planning Policy \(Biodiversity and Conservation\) 2021, Chapter 8 Sydney drinking water catchment](#)
  - [State Environmental Planning Policy \(Transport and Infrastructure\) 2021, s 2.73\(1\)\(a\)](#)

# Abbreviations

Abbreviation	Term
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal heritage impact permit
CEMP	Construction environmental management plan
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
FM Act	<i>Fisheries Management Act 1994</i>
IMBA	International Mountain Bike Association
KTP	Key threatening processes
LEP	Local environmental plan
NorBE	Neutral or beneficial effects
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NPWS	National Parks and Wildlife Service
NSW	New South Wales
PCT	Plant community type
PoM	Plan of management
PPE	Personal protective equipment
REF	Review of environmental factors
RFS	Rural Fire Services
SCA	State Conservation Area
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
TEC	Threatened ecological communities



## Appendices

- Attachment A – Aboriginal Cultural Heritage Assessment Report – Balgownie Mountain Bike Track Network (not publicly available), Niche Environment and Heritage
- Attachment B – Ecological Assessment – Balgownie Mountain Bike Track Network, Niche Environment and Heritage
- Attachment C – Statement of Heritage Impact – Balgownie Mountain Bike Network, Niche Environment and Heritage
- Attachment D – Report on Preliminary Geotechnical Assessment – Balgownie Mountain Bike Trail Network, Balgownie, NSW, Terra Insight
- Attachment E – Balgownie Mountain Bike Track Network – Built features details, Synergy Trails