



NSW National Parks and Wildlife Service

Illawarra Escarpment Mountain Bike Project – Network 1, Mount Kembla

Review of environmental factors



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1. Brief description of the proposal

<p>Proposal name and brief outline</p> <p>Note: further detail is provided in Section 6</p>	<p>Illawarra Escarpment Mountain Bike Track Network 1, Mount Kembla on National Parks and Wildlife Service (NPWS) lands</p> <p>This review of environmental factors (REF) considers the environmental impacts of that part of the Illawarra Escarpment Mountain Bike Track Network 1, Mount Kembla, that may be established without development consent under the <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act). This is largely that part of the proposal which will be developed on NPWS-managed lands, as depicted in Figure 1. For the purposes of this REF, these lands are defined to be the ‘proposal area’.</p> <p>Other parts of the track network, as shown in this figure and detailed in the <i>Illawarra Escarpment mountain bike strategy</i> (NPWS 2022), will be subject to development consent from Wollongong City Council. Some minor ancillary infrastructure, declared to be exempt development under the EP&A Act may occur without the need for environmental assessment.</p>
<p>Lands within proposal</p>	<p>Illawarra Escarpment State Conservation Area (SCA) and adjacent road reserves (owned by Wollongong City Council and NSW Crown Lands); depicted as blank corridors within the proposal area in Figure 1.</p>
<p>NPWS Area</p>	<p>Illawarra Highlands Area</p>
<p>Location of activity</p>	<p>Illawarra Escarpment SCA between Mount Keira and Mount Kembla, henceforth referred to as the ‘proposal area’</p>
<p>Council area</p>	<p>Wollongong City Council</p>
<p>NSW State electorate</p>	<p>Wollongong</p>
<p>Proposed commencement date</p>	<p>December 2022</p>
<p>Proposed completion date</p>	<p>July 2024</p>
<p>Estimated duration of proposal</p>	<p>24 months for construction phase; perpetual operational phase.</p>

2. Proponent’s details

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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) seeks to conserve nature, including 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 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 NPW 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. It provides for the legal protection of plants and animals. 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 principles of ecologically sustainable development have been considered.

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 proposed track network has been designed to minimise environmental impacts by careful choice of location and by incorporating existing unsanctioned tracks into the network where practicable, to minimise clearing from the creation of new tracks. In this review of environmental factors (REF), the term 'unsanctioned' refers to existing tracks that are not authorised or are otherwise not legal.

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

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 with provision of 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, whilst protecting the natural and cultural heritage.

Plan of management

The *Illawarra Escarpment State Conservation Area plan of management (PoM)* (OEH 2018) 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 unsanctioned tracks into a formal network, the proposal would allow NPWS to manage these tracks by implementing environmental impact mitigation measures. Creation of a sustainable network of new and upgraded existing tracks allowing closure of unsanctioned tracks and reduced 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 carefully designed to encourage existing users of unsanctioned tracks to use the formal network. This approach would shift usage from unmanaged and unsanctioned tracks onto formalised tracks, which have been sustainably designed to avoid and mitigate environmental impacts and can be managed as part of the wider NPWS asset base.
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. An action in the PoM is for NPWS to develop a mountain bike strategy that provides a sustainable mountain bike single-track network in the park. Mountain bike tracks that are not included in the strategy are planned to be closed and rehabilitated.	The proposal has been designed in accordance with the <i>Illawarra Escarpment mountain bike strategy</i> (NPWS 2022). By creating a formalised track network, the proposal would enable NPWS to close and rehabilitate the remaining unsanctioned tracks. Rehabilitation of the remaining unsanctioned tracks not being formalised is not within the scope of this REF and will be subject to separate environmental assessment.
Conserve significant cultural heritage features and facilitate ongoing use of suitable sites.	The proposal seeks to conserve significant cultural heritage features by establishing a formal track network and discourage future creation of unauthorised tracks, which can have adverse cultural heritage impacts. The proposal has avoided culturally significant areas on Mount Kembla and Mount Keira based on feedback on the <i>Draft Illawarra Escarpment mountain bike strategy</i> (NPWS and WCC 2018). However, the proposal would still be conducted within the Djembla Djeera Cultural Landscape, which is regarded to be of very high significance for its social and spiritual value to past, present and future generations (Waters Consultancy 2022 at Appendix 4 of Attachment A).

Management direction	How the proposal is concordant
<p>Provide for sustainable use that is compatible with the park's values and management purposes, integrated with facilities located on adjacent lands.</p>	<p>Management and mitigation measures, detailed in the <i>Aboriginal cultural heritage assessment report</i> (Niche Environment and Heritage 2022a at Attachment A), have been prepared in consideration of 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 artefactual materials, as well as the cultural significance of all sites.</p> <p>The proposal seeks to implement a pragmatic approach to addressing environmental impacts from the unsanctioned development of mountain bike tracks, whilst also addressing the demand for legitimate mountain bike usage within the proposal area.</p> <p>It is considered that the proposal would 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>
<p>Recognise and respond to the proximity of urban populations, minimise conflict between park users and engage with new user groups.</p>	<p>It is recognised that there is a considerable demand for mountain bike tracks within the proposal area (<i>Illawarra Escarpment mountain bike strategy</i> NPWS and WCC 2022; Element Environment 2022 at Attachment B). The proposal seeks to establish a track network large enough to accommodate existing and anticipated usage, whilst also focusing mountain bike usage onto well-designed tracks that minimise conflict with other users of the Illawarra Escarpment SCA (for example, bushwalkers and surrounding community).</p>

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. It will be managed by NPWS into the future.

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 would meet 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 have been avoided or mitigated during the design phase and as part of this REF by:

- detailed field investigations
- analysis of 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
- extensive on-ground micro-siting and track alignment marking during pre-construction to avoid mature or hollow-bearing trees and other habitat features
- use of elevated structures to span sensitive terrestrial habitats
- pre-construction flagging of tracks and micro-siting.

During 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 – *Ecological assessment Illawarra Escarpment mountain bike concept plan planning and assessment services* (Niche Environment and Heritage 2022b at Attachment C) – was undertaken. Formal assessments of significance (tests of significance under s 7.3 of the BC Act) have been conducted as part of the ecological assessment to determine whether the proposal will have a significant impact on threatened biodiversity. These assessments have concluded that threatened ecological communities (TECs) 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

3.2.1 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.

Due to the complexity and the multi-tenure nature of the project, the Illawarra Escarpment Mountain Bike Track Network 1, Mount Kembla (the track network) is therefore being assessed under the EP&A Act in separate components:

1. The first component, to be assessed in this REF under Part 5, Division 5.1 of the EP&A Act, comprises mostly NPWS land (i.e. the Illawarra Escarpment SCA). Other tenures covered by this REF include council and NSW Crown Lands reserves. The planning pathway for these tenures is detailed below. Refer Figure 1.
2. The second component, to be assessed under Part 4 of the EP&A Act, will cover the sections of the track on non-NPWS tenured lands owned by Sydney Water, South32 and Wollongong City Council. This component will include some ancillary features, such as amenities.
3. The third component comprises minor, ancillary infrastructure located on Wollongong City Council land. This component only includes elements declared to be exempt development under the Transport and Infrastructure SEPP.

An overview of these tenures is shown in Table 1, including the assessment and approval pathway for components on those land holdings. A detailed summary of track lengths for each land tenure is provided in Section 6.2.1. The specialist assessments that have been prepared to support this REF considered the cumulative impacts of the entire track network and were used to inform this section. However, these specialist assessments and this REF do not consider ancillary features (such as amenities, parking etc.) that may be installed at a later date. These are unknown at the time of preparing the REF. As these would be located outside of the Illawarra Escarpment SCA, such features would be assessed in separate Part 4 assessments or be exempt development and so not require assessment.

Table 1 Summary of assessment according to land tenure

Land tenure	Part 5 assessment (REF)	Part 4 assessment (development application)
NPWS Illawarra Escarpment SCA	Yes	N/A
Wollongong City Council (reserved land)	Yes	N/A
NSW Crown Lands	Yes	N/A
Sydney Water	N/A	Yes
South32	N/A	Yes (including lands within the Sydney Drinking Catchment)
Wollongong City Council	N/A	Yes (except elements declared to be exempt development)

NPWS land (Illawarra Escarpment SCA)

That part of the project in 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 both:

- on land reserved under the NPW Act or acquired under Part 11 of the NPW Act
- for a purpose authorised under the NPW Act.

Wollongong City Council land

Where the proposal is located on council land reserves adjacent to the Illawarra Escarpment SCA, it may be undertaken without Part 4 development consent under the provisions of s 2.73(3)(a) of the Transport and Infrastructure SEPP, as the proposal is for the following purposes:

- roads, pedestrian pathways, cycleways, single-storey car parks, ticketing facilities, viewing platforms and pedestrian bridges
- recreation areas and recreation facilities (outdoor), but not including grandstands.

The council land reserves adjacent to the Illawarra Escarpment SCA are zoned as C1 under the *Wollongong Local Environment Plan 2009* (LEP), which permits, without consent, uses authorised under the NPW Act. The proposal on the council reserves is permissible under the Illawarra Escarpment SCA PoM 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 – zone C1 of the Wollongong LEP 2009.

As council is the landowner of the adjacent reserves, NPWS will need to seek permission from council to conduct works.

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

Crown lands

Where the proposal is located on NSW Crown Lands 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 listed in s 2.108 of the Transport and Infrastructure SEPP, which includes road related area as defined under the *Roads Transport Act 2013*. Section 4 of the 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 land reserves adjacent to the Illawarra Escarpment SCA are zoned as C1 under the Wollongong LEP 2009, which permits, without consent, uses authorised under the NPW Act. The proposal on the council reserves is permissible under the Illawarra Escarpment SCA PoM 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 – zone C1 of the Wollongong LEP 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 land reserves.

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

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

No part of the project as a whole is 'state significant infrastructure' under the *State Environmental Planning Policy (Planning Systems) 2021*, nor is it of a similar kind 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* (DPIE 2021) and the *Wollongong local strategic planning statement 2020* (WCC 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 would achieve this outcome by allowing for the closure of 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 impacts of unsanctioned mountain bike tracks along the Illawarra Escarpment.

3.3 Other relevant legislation

3.3.1 Coal Mine Subsidence Compensation Act 2017

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

3.3.2 Fisheries Management Act 1994

The proposal will involve the excavation of or deposition in 'water land', that is, land submerged by water (whether permanently or intermittently).

Under s 199 of the *Fisheries Management Act 1994* (FM Act), a public authority must, before it carries out or authorises the carrying out of dredging work or reclamation work, give written notice of the proposed work, and consider any matters raised.

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

NPWS will provide written notification to the Department of Primary Industries (DPI) Fisheries and that department will be issued with a copy of this REF to ensure all required relevant mitigation measures and safeguards have been identified. These safeguards will be incorporated into the construction environmental management plan for the proposal.

The proposal will not affect fish passage, fish habitat or marine vegetation. Refer to the ecological assessment (Attachment C) for further detail. Hence, a permit under the FM Act is not required for the proposal.

3.3.3 Heritage Act 1977

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

- Listed under the Wollongong LEP 2009
 - #6480 – Illawarra Escarpment Landscape Conservation Area

- #6409 – Kembla Heights Mining Village Heritage Conservation Area
- #7105 – Mount Kembla Colliery including site of mine workings, portal, mine air shaft and pit pony stables
- Additional sites listed under the NPWS Heritage and Conservation Register (under s 170 asset of the *Heritage Act 1977*)
 - #11950 – House remains
 - #2147 – Remnants of Original O’Brien’s Road (potential site).

These sites were assessed in a historic heritage assessment (Niche Environment and Heritage 2022c at Attachment D) and statement of heritage impact (Niche Environment and Heritage at Attachment E), using the criteria outlined in *Assessing heritage significance* (Heritage Office 2000). Based on this assessment, the proposed works will likely have no or little impacts on the heritage items. Sites within and adjacent to the REF area were included to ensure direct and indirect impacts were assessed.

It is noted that the locally listed site, Mount Kembla Colliery, is currently being assessed for listing on the State Heritage Register. This site is addressed in the statement of heritage impact (Niche Environment and Heritage at Attachment E).

3.3.4 Marine Estate Management Act 2014

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

3.3.5 Environment Protection and Biodiversity Conservation Act 1999 (Cth)

The activity is on land that contains 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 C). 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 (links to the policies are provided in the ‘More information’ section).

Policy name	How proposal is consistent
Cycling policy	The proposal is consistent with the NPWS cycling policy. In accordance with the policy, cycling is generally permitted 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 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 would also incorporate a large

Policy name	How proposal is consistent
	volume of existing unsanctioned tracks with demonstrated value to the mountain biking community. Incorporating these tracks into the proposed track network would allow NPWS to mitigate environmental impacts, while retaining tracks that are valued by the mountain bike community.
Landslides and rockfalls policy	The proposal is supported by a geotechnical assessment (GHD 2022 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.
Visitor safety policy	The proposal would seek to improve safety for users of the Illawarra Escarpment SCA by creating a formal single-use (i.e. cyclists only) track network. The proposal would 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 with regards to the safety of both riders and other users (such as bushwalkers).

3.5 Summary of licences and approvals

3.5.1 Approvals under the National Parks and Wildlife Act

Brief description of the type of approval sought

Internal NPWS approval or authorisation, including expenditure.

Potentially an Aboriginal heritage impact permit, depending on the declaration of the nominated Djeera Mount Keira and Five Islands Aboriginal Place.

3.5.2 Publication triggers

The REF will be published following determination, though publication triggers due to required permits or approvals, as listed in Table 2, are currently unclear.

Table 2 Triggers for publication of the review of environmental factors

Permit or approval	Applicable?
Fisheries Management Act, ss 144, 201, 205 or 219	No
Heritage Act, s 57 (commonly known as a s 60)	No
National Parks and Wildlife Act, s 90 (Aboriginal heritage impact permit)	Potentially
Protection of the Environment Operations Act 1997, ss 47–49 or 122	No

4. Consultation – general

The proposal is the result of an iterative process and affects adjoining land tenures (Table 1 and Figure 1), requiring a broad range of collaboration and consultation.

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, using 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 *Draft Illawarra Escarpment mountain bike strategy* (NPWS and WCC 2018) 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 *Draft Illawarra Escarpment mountain bike strategy* (NPWS and WCC 2018) has been used to finalise the mountain bike strategy (NPWS 2022) and 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 local environmental plan (LEP) (refer to Sections 3.3.3 and 8.4.9)
- is accessed via local council infrastructure.

Wollongong City Council was provided the historic heritage assessment (Attachment D) and statement of heritage impact (Attachment E) for review.

Furthermore, Wollongong City Council is a member of the NPWS Illawarra Escarpment Mountain Bike Advisory Group for the project. In consultation with council, the design of the track network was amended to accommodate a road crossing of Harry Graham Drive. The change in crossing location was required to enhance the safe crossing of riders at Harry Graham Drive. Further assessment of this crossing (and other off-park components of the proposal) will be included in the separate Part 4 assessment.

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 NSW 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 placed the REF on public exhibition and has considered submissions prior to finalising the REF.

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

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

Not applicable. As stated previously, ancillary infrastructure such as parking and amenities will be assessed separately under a Part 4 assessment with Wollongong City Council as the consent authority.

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 dark 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*. However, it is noted that previous mine workings are located within the proposal area. These mine workings are further described in Attachment F.

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

4.3.1 Public agencies

WaterNSW

An early version of the proposal included tracks traversing through the Metropolitan Special Area, which is identified on the Sydney Drinking Water Catchment Map designated Schedule 1 land under Chapter 8 of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021*.

At the request of WaterNSW, a risk assessment workshop (facilitated by AXYS consulting) was held on 18 October 2021 between Niche Environment and Heritage, WaterNSW and NPWS. Following the risk assessment, alternative routes for the proposal were considered.

Exclusion of public access to protected drinking water supply catchments and storages is recognised as one of the primary control measures for the protection of water quality and public health. As such, an alternate route, avoiding the Metropolitan Special Area, was investigated during early 2022. Following additional geotechnical, ecological and Aboriginal cultural heritage assessments, the alternate route was adopted into the proposal.

The current proposal avoids traversing the Metropolitan Special Area. Nevertheless, NPWS recognises that the proposal would take place adjacent to the drinking water catchment. A neutral or beneficial effects assessment (Niche Environment and Heritage 2021 at Attachment G), has been prepared to support this REF.

It is also noted that the track head at the northern extent of the network is within the Metropolitan Special Area (Figure 1) and would be subject to further Part 4 assessment. Consultation with WaterNSW has indicated their in-principal support for that component provided it meets their requirements for development to have neutral or beneficial effect on water quality.

Sydney Water

Sydney Water has been a member of the advisory group for the proposal (Table 3). A section of the track network would traverse Sydney Water land (Lot 112 / DP751287) (Figure 1). This section of track network is not included as part of this REF as it is not on NPWS tenured land; it is considered as a cumulative impact in Section 9.8.

4.3.2 Adjacent landowners

NPWS has contacted landholders immediately adjacent to the proposal.

4.3.3 Interest groups and/or notification

As part of the consultation for the proposal, an advisory group was established, comprised of representatives from organisations listed in Table 3. The Illawarra Escarpment Mountain Bike Advisory Group has held meetings at key stages throughout the development of the proposal. Meetings were held on the following dates:

- 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.

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).

Table 3 Illawarra Escarpment 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
Track Care	WaterNSW
Wollongong City Council	Mount Kembla Community member Vivien Twyford

4.3.4 Wider community consultation and/or notification of works

A social impact comment was prepared to support the preparation of the REF. The impact comment has incorporated the outcomes of initial community consultation conducted by Wollongong City Council, random opt-out surveys within the localities near the proposal, and targeted surveys (refer to Attachment B for details). This consultation informed the proposal and the draft REF.

The draft REF was exhibited in July 2022 for a period of 4 weeks. In response, 85 written submissions were received highlighting various matters. The main themes raised in submissions are as follows:

- biodiversity and ecology negative impacts
- safety concerns
- soils, erosion and impacts on slope stability
- impacts on local residents and other users due to increased traffic
- historic/cultural/Aboriginal heritage impacts
- fining, stopping, deterring riders and rehabilitating illegal tracks as an alternative to a legal network
- implementing more signage and education for riders and users
- investigation of more appropriate areas for a mountain bike network
- contradicting NPWS's mission/purpose
- avoid prioritising cyclists over other users
- REF underestimating key issues and inadequate investigation of impacts
- insufficient engagement with Aboriginal and local communities, key stakeholders
- unclear extent of expenditure for ongoing costs and maintenance
- impacts of severe weather and climate change (increased frequency of severe weather events)
- integration of existing tracks, add more tracks and new infrastructure
- health, wellbeing and economic benefits

In response, the following changes were made to the proposal and REF:

- In the draft REF, only a limited amount of detail was able to be provided regarding unsanctioned track rehabilitation. NPWS has since conducted mapping of unsanctioned tracks that are planned for rehabilitation. Details of the proposed rehabilitation of unsanctioned tracks have been included in a Section 9.8.2 Cumulative impacts.
- Impacts to Illawarra-Shoalhaven Subtropical Rainforest TEC were highlighted in submissions on the draft REF (see Section 6.2.2 for impact quantification). Where suitable, adjustments to the track alignment were made to avoid Illawarra-Shoalhaven Subtropical Rainforest. Approximately 100 m of proposed new track was diverted to avoid a small pocket of Illawarra-Shoalhaven Subtropical Rainforest.

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*.

The South Coast People (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) and Subdivision K (where it applies to newly acquired sections of the park) of the of the *Native Title Act 1993*, and provided them with an opportunity to comment on the proposed works, within 28 days of receipt of the letter. NPWS has received no 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 notification to interested parties, providing information on the proposal, and seeking cultural advice.

Public access to the cultural values assessment and Aboriginal cultural heritage assessment (Attachment A) will be restricted to registered Aboriginal parties and nominated Knowledge Holders.

It must be noted that there is a pending proposal for Mount Keira area to be declared an Aboriginal place under the NPW Act. This is addressed further in the Aboriginal cultural heritage assessment (Attachment A). Works in a declared Aboriginal place would trigger the need for an Aboriginal heritage impact permit under s 90 of the NPW Act.

6. Proposed activity (or activities)

6.1 Location of activity

Lands within proposal	Illawarra Escarpment State Conservation Area (SCA)
Description of location	Area between Mount Keira and Mount Kembla referred to as the 'proposal area' in this REF
Site commonly known as	Mount Kembla Illawarra Escarpment
Lot/DP	Multiple (refer to Figure 1)

The proposed Illawarra Escarpment Mountain Bike Track Network is located along the Illawarra Escarpment, to the west of the Wollongong suburbs of Figtree and Cordeaux Heights, and south-west of Wollongong and Mount Keira / Keiraville (Figure 1). The proposed mountain bike network is approximately 51 km in total length, spanning multiple land tenures. The majority of tracks are located on NPWS land within the Illawarra Escarpment SCA, managed by NPWS. Other lands within the proposed Illawarra Escarpment Mountain Bike Track Network include those owned by:

- Sydney Water
- South32
- Wollongong City Council
- NSW Crown Land.

The track network will also traverse several road reserves, only some of which are under the control of council and NSW Crown Lands.

This REF includes only those sections of the track network within NPWS estate (i.e. Illawarra Escarpment SCA), as indicated on Figure 1. Cumulative impacts of the network as a whole are discussed in Section 9.8.

6.2 Description of the proposed activity

6.2.1 The proposed track network

The proposed Illawarra Escarpment Mountain Bike Track Network 1 – Mount Kembla (the track network) is 50.95 km in total length, including 31.61 km of new tracks (Table 4). A number of existing unsanctioned tracks (19.34 km in total length) are proposed to be incorporated into the track network to minimise environmental impacts from creating new tracks.

This REF considers the 43.88 km of track located predominantly within NPWS land (referred to as the proposal area) (Table 4) and their ongoing maintenance into the future. The remaining track on non-NPWS land is addressed as a cumulative impact in Section 9.8. The existing tracks that have been incorporated into the network require modification to meet the International Mountain Bike Association (IMBA) track standards as set out in the *Australian mountain bike track guidelines* (MTBA 2019). The proposed upgrades would result in improved drainage and erosion control, safety and reduced edge impacts to ecology. The success of the proposed track network would allow unsanctioned tracks within the proposal area, that do not form part of the proposed network, including Mount Keira, to be closed and rehabilitated by NPWS.

The proposed track network is structured in 3 distinct interconnected tiers (Table 5). Each of the tiers can be ridden individually or as an interconnected network. The network is designed to enable a large variety of riding options and routes, with the possibility of creating unique loops that suit an individual rider’s ability and/or preference.

The track network includes a range of track categories (Table 6 and Figure 2a–c) to provide for differing rider abilities. Each of the maps in Figure 2a–c shows a different section of the proposal area, running from east to west. Figure 3 shows the proposed new tracks and the existing unsanctioned tracks that will be formalised and become part of the network.

Multiple network entry points and dispersed parking (details to be determined through Wollongong City Council traffic management study) will provide suitable access to the track network and will enable riders to easily access the ride start point of their choice. Climbing tracks enable riders to cycle into the network from surrounding suburbs, including Mount Kembla and Mount Keira, Keiraville, Cordeaux Heights and Farmborough Heights.

Table 4 Comparison of existing unsanctioned tracks and new proposed tracks in Network 1 – Mount Kembla

Track types	Part 5 (this REF) (km)	Part 4 (separate assessment and considered as cumulative impacts) (km)	Sum of length (km)
Existing track*	16.28	3.07	19.34
Proposed new track	27.61	4.00	31.61
Total	43.88	7.07	50.95

Numbers have been rounded to 2 decimal points.

*Includes existing unsanctioned tracks and fire/access tracks.

Table 5 Track network sections

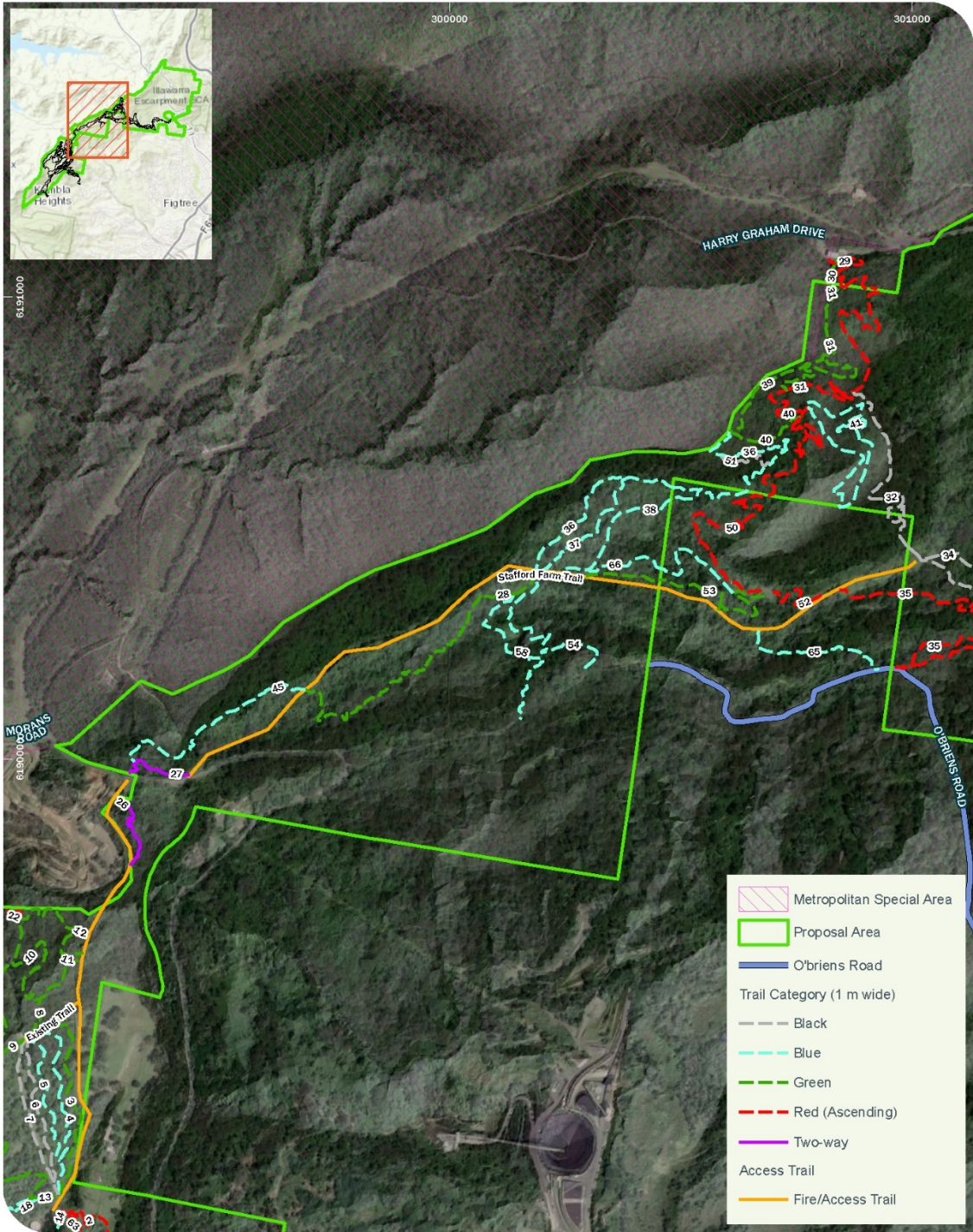
Track network tiers	Description
Upper tier	O’Briens Drift track head with a short flowing cross-country network and descending track to the mid-tier. It is also the start location for the advanced full-length descents. The entire track network can be accessed from the Mount Keira foothills in proximity to the Mount Keira Rural Fire Services (RFS) station. The entire network is therefore linked internally by climbing track and management tracks, minimising the need for mountain bikers to access tracks via the road.
Mid tier	Located behind the motocross track in NPWS land above Kembla Heights and comprises the bulk of the track network with a range of tracks available for different riding genres and skill levels. This area has the greatest variety of track types and is specifically designed to provide diversity of track types and difficulty levels.
Lower tier	Descending track network into Kembla Village for more experienced riders, including a return climb to Harry Graham Drive.

Table 6 Summary of track categories included in Network 1 – Mount Kembla (inclusive of all land tenures)

Track type	Skill level	Number	Length (km)
Existing fire/access tracks	All	3	3.30
Black tracks	Advanced	13	7.43
Blue tracks	Intermediate	23	20.64
Green tracks	Beginner	12	5.43
Red (climbing) tracks	Intermediate to Advanced	13	13.60
Two-way tracks	Various	4	0.55
Total		69	50.95

Numbers have been rounded to 2 decimal points.

Track colour grades have been defined as per *Illawarra Escarpment mountain bike concept plan* (Synergy Trails 2020). See also Figure 2.



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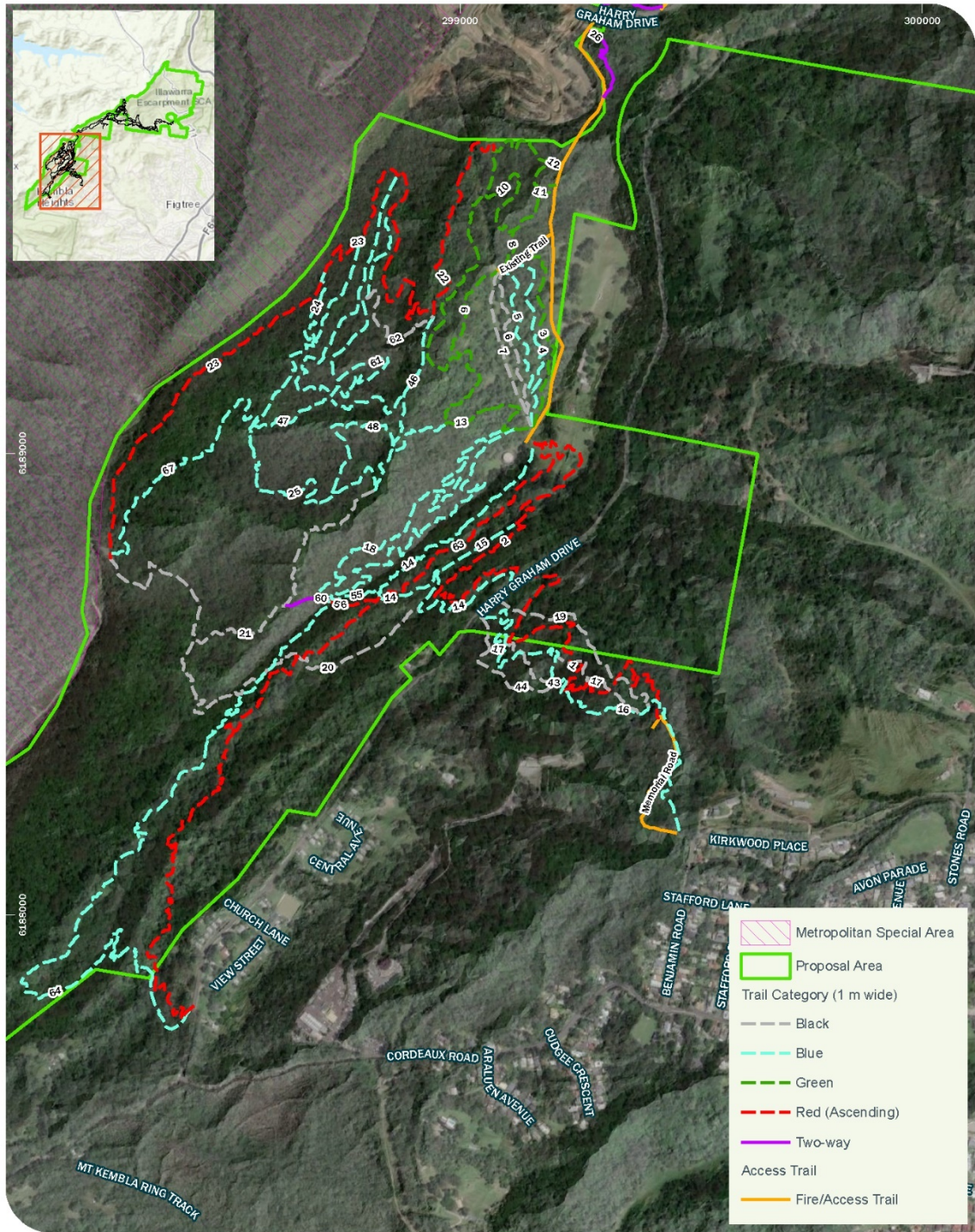
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Trail Network
Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
Niche Proj. #: 6486
Client: National Parks and Wildlife Service

Figure 2

Figure 3 Proposed track network design showing track categories – central proposal area



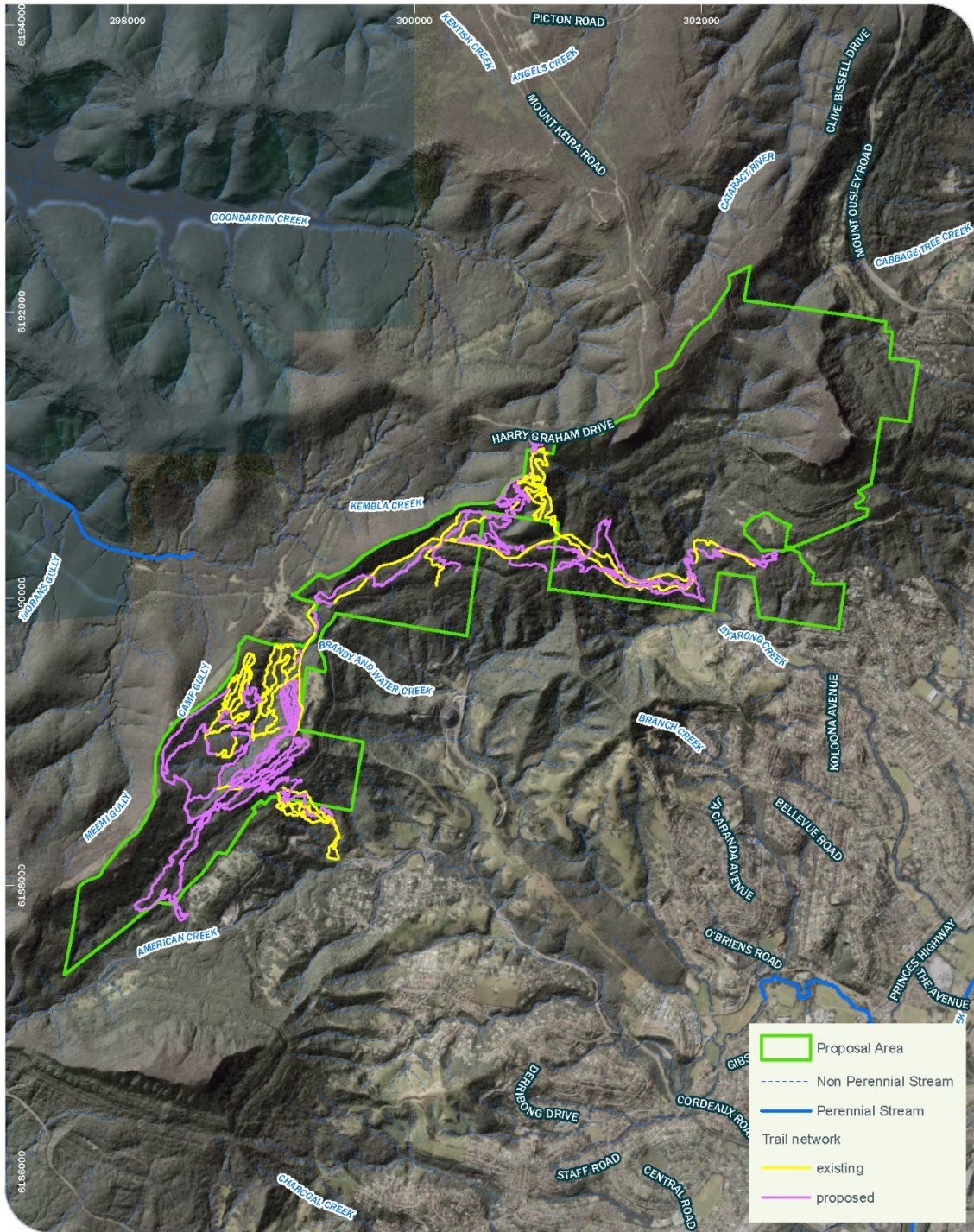
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Trail Network
Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
Niche Proj. #: 6486
Client: National Parks and Wildlife Service

Figure 2

Figure 4 Proposed track network design showing track categories – western proposal area



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Existing and new trails
Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
Niche Proj. #: 6486
Client: National Parks and Wildlife Service

Figure 3

Figure 5 Proposed new tracks and existing unsanctioned tracks to be incorporated into the network

Preliminary assessment and track network design

A preliminary assessment of the proposed track network was conducted by NPWS (NPWS 2020). Existing unsanctioned mountain bike tracks were initially mapped within the proposal area by NPWS, using the following data sources:

- NPWS GIS data
- published track data (including Strava, Track Forks and All Tracks)
- Illawarra Mountain Bike Alliance (pers. comm. Geoff Parker, Gary Pesavento).

A desktop constraints assessment (NPWS 2020) was used to evaluate the proposal area for track suitability and to inform field investigations.

Extensive field investigations were conducted by NPWS and Synergy Trails (Synergy) to map the proposed track network by identifying existing tracks that were suitable to be incorporated, and to identify where new tracks would be required to create a functional track network. Some of the field investigations were also attended by Illawarra Local Aboriginal Land Council and Wollongong City Council.

6.2.2 The activity footprint (size of the area of impact)

Different track categories require different widths for construction and operation (Table 7). Construction categories in Table 6 are made up of a combination of the track category (e.g. Black) and construction type (e.g. hand). The activity footprint for the proposal is comprised of the track network footprint and the construction material laydown areas footprint (Table 8).

The activity footprint for the entire project will include clearing for the tracks and other ancillary infrastructure to be assessed under Part 4 of the EP&A Act.

Table 7 Summary of track construction categories and associated widths in Network 1 – Mount Kembla

Construction category	Track type	Part 5 (this REF) (km)	Total length (km)	Construction width (m)	Operational width (m)
Hand	Black	4.24	5.37	1.2	0.9
Hand	Blue	6.50	6.87	1.2	0.9
Hand	Green	0.09	0.09	1.2	0.9
Hand	Red (Ascending)	2.58	3.95	1.2	0.9
Machine	Black	2.06	2.06	1.5	0.6
Machine	Blue	11.72	13.76	1.5	0.9
Machine	Green	4.88	5.34	1.5	0.9
Machine	Red (Ascending)	8.90	9.65	1.5	0.9
Machine	Two-way	0.55	0.55	2.5	2
Machine	Access Track	2.36	3.30	4	4
	Total	43.88	50.95	–	–

Table 8 Estimated activity footprint for Network 1 – Mount Kembla

Assessment	Sum of primary clearing (new tracks) for construction (ha)	Sum of secondary clearing (existing tracks) for track construction (ha)	Sum of temporary disturbance from laydown areas (ha) (number of zones in italics)	Total impact area (ha)
Part 5 (this REF)	3.91	1.96	0.13 (52 zones)	6.00
Part 4 (development application for non-NPWS land)	0.51	0.28	0.03 (10 zones)	0.82
Total	4.43	2.24	0.16 (62 zones)	6.82

Numbers have been rounded to 2 decimal points.

6.2.3 Proposed construction methods, materials and equipment

The proposed construction methodology would be based on the conditions of each section of track. Different grades of track require different degrees of construction (Table 6).

Ground truthing and detail design

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

Clearing the track alignment

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

- Organic material would be relocated for use in berms and other track structures to encourage regrowth.

Materials deposition

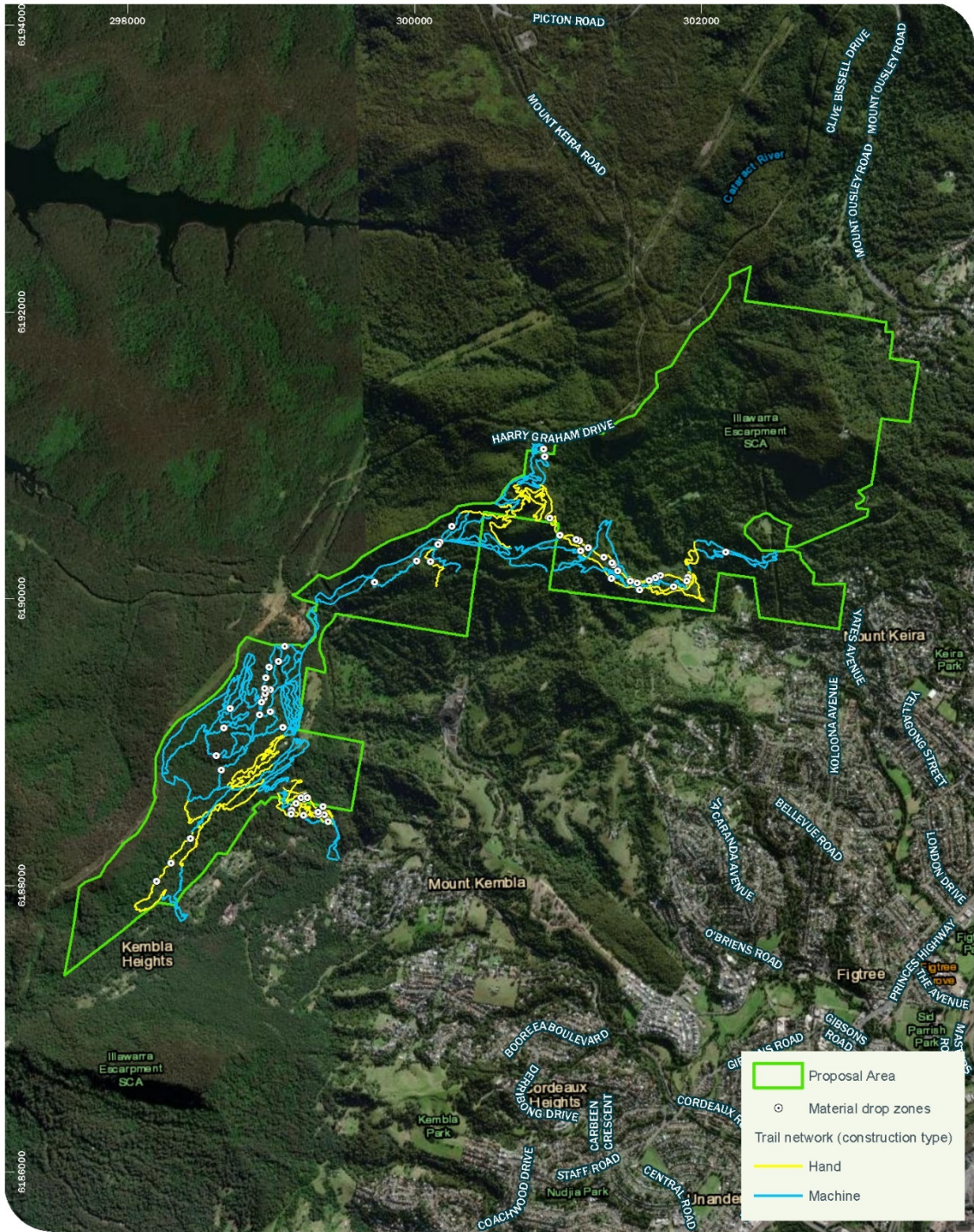
- Where suitable, track construction materials would be brought to the site by helicopter to designated material laydown areas (shown on Figure 4).
- Where practicable, construction materials would be brought to the laydown areas via access roads.
- Material laydown areas will be located in existing cleared areas.

Cutting the track in

- Excavation would commence at critical surface water movement points. Machinery and techniques used for the excavation would depend on the track category (and construction method), as per Table 9. Track sections have been mapped as hand-built or machine-built (Figure 4 and Table 7).
- 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 then be dug and relocated to build the base track between features. Table 10 lists proposed construction materials.
- Technical track features and filters would be installed in locations along the track that assist with surface water management (Appendix 1 and Appendix 2 in the REF). Each of the maps in Appendix 1 show the bridges, drainage features and rock armouring for a different section of the proposal area, running from east to west. Appendix 2 maps show the track features and signage for these same sections of the proposal area.
- Technical track features and filters would also be located in relation to natural rock formations and other landscape features.
- Soil and rocks would then be dug and relocated to build the base track between features.
- Once the alignment is complete, the track would be compacted by hand (shovel, rake-hoe) or plate compactor.
- Construction on existing fire/access tracks would be within the existing corridor.

Finishing the track

- Stockpiled organic material would be reinstated around the track alignment.
- Signage would be installed at the entrance and exit of each track; and at each track junction (Appendix 2). Specifications and requirements for signage will be governed by a signage management plan to be developed by NPWS.
- Tracks would be test ridden, and adjustments to geometry made to optimise the experience and meet standards, levels and criteria.
- There are sections within the track network that have a relatively high proportion of weeds. Construction in these areas would require careful handling of weed material and may require revegetation. Such works will be in accordance with the construction environmental management plan.



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Niche Proj. #: 6486
Client: National Parks and Wildlife Service

Construction methodology
Illawarra Escarpment Mountain Bike Concept Plan

Figure 4

Figure 6 Hand-built and machine-built tracks, and location of helicopter drop zones (material laydown areas)

Table 9 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"> 1.8 tonne mini-excavator 1.2 m track width with overall width of 1.5 m 	Yes	No	<ul style="list-style-type: none"> Licensed operator 2 track crew on hand tools 	<ul style="list-style-type: none"> Track crew hand finishing and compacting soil with machine to minimise potential for soil erosion Fuel management – spill kits will be kept with machine at all times, and track staff fully trained in use Machine will be thoroughly washed down prior to use on the site to avoid bringing in contaminants
Power carrier	<ul style="list-style-type: none"> Petrol engine Payload capacity 500 kg Maximum incline 25° with 350 kg payload Overall dimensions 214 x 65 x 110 cm (LxWxH) Weight 200 kg 	Yes	No	<ul style="list-style-type: none"> 1 operator (no licence required) 	<ul style="list-style-type: none"> Track tread minimises impact to ground surface Spill kit and secure fuel storage nearby at all times
Plate compactor	<ul style="list-style-type: none"> Petrol engine Weight 56 kg 	Yes	Yes	<ul style="list-style-type: none"> 1 operator (no licence required) 	<ul style="list-style-type: none"> Spill kit and secure fuel storage nearby at all times
Brush cutter	<ul style="list-style-type: none"> Petrol engine 	Yes	Yes	<ul style="list-style-type: none"> 1 operator (no licence required) 	<ul style="list-style-type: none"> Stockpile cut vegetation off-track for use as brush matting Clear all track corridors (new and existing) to a height of 2.4 m Stockpile or relocate cut timber for re-use in track construction or habitat creation Spill kit and secure fuel storage nearby at all times

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

Table 10 Summary of proposed construction materials

Material type	Description
Rock	In situ rock would be used where available and permissible. Where permission for use of locally found rock is in place, it will be used. Otherwise, approved local sandstone will be imported where required
Structural steel	Hot dip galvanised steel elements with hot dip galvanised fixings
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 standard

6.2.4 Receival, storage and on-site management for materials used in construction

Materials handling and storage

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

The site compound(s) would meet the requirements of exempt development under s 2.111 of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*. The construction of the compound(s) will be managed in accordance with the project construction environmental management plan.

Material laydown areas would also be located on flat, existing cleared areas throughout the track network (Figure 4). These sites would be suitable for helicopter delivery of construction materials. Tools and materials will be transferred from the site compound to the active work site or to laydown areas along the track under construction by hand, electric bike and power carriers. Materials delivered this way will be used as quickly as practicable.

Where possible 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

Prior to the commencement of work, existing tracks would be closed at the entrances and exits. Signage would be installed to notify the public of the works.

At each worksite along the track alignment, the 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, these can be helicopter dropped into location with materials.

All track construction staff will have appropriate personal protective equipment (PPE), 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 consist of:

- 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:

- O'Brien's Drift track head
- Mount Kembla track head at Wollongong Motorcycle Club
- Kembla Village at Mount Kembla Bowling and Recreation Club
- Stafford's Farm.

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 have been assessed as 'primary clearing', whilst the existing tracks incorporated into the network have been assessed as 'secondary clearing'. No mature trees will be removed during the construction work. The vegetation impacts from material laydown areas would be temporary disturbance (see Attachment C for more details). The construction techniques to be employed require a wider corridor than the nominal operational width of each track. Table 11 provides a breakdown of disturbance according to each plant community type (PCT) confirmed in the field surveys using the most recent available vegetation mapping for the proposal area: Illawarra PCT Vegetation Map (DPIE 2016) (see Section 2.3 of Attachment C for details on methodology). Table 12 shows the nominal operational footprint of the proposal according to each PCT.

Post-construction, the nominal operational footprint will result in permanent impacts to a total of 3.60 ha of native vegetation (Table 12). Although impacts assessments have considered the construction footprint of 5.76 ha (comprised of 3.98 ha of primary clearing and 1.96 ha of secondary clearing).

Table 11 Summary of construction impacts on each plant community type (PCT) in the proposal area

Plant community type	Primary clearing (new tracks) for construction (ha)	Secondary clearing (existing tracks) for construction (ha)	Temporary disturbance for laydown areas (ha) (Number of zones)	Total impact area (ha)
878 Gully Gum – Sydney Peppermint – Yellow Stringybark moist open forest of coastal escarpments, southern Sydney Basin Bioregion	1.00	0.77	0.02 (7 zones)	1.78
905 Lilly Pilly – Coachwood warm temperate rainforest on moist sheltered slopes and gullies, Sydney Basin Bioregion and South East Corner Bioregion	0.72	0.49	0.05 (18 zones)	1.25
*906 Lilly Pilly – Sassafras – Stinging Tree subtropical/warm temperate rainforest on moist fertile lowlands, southern Sydney Basin Bioregion	0.35	0.05	0.01 (5 zones)	0.42
1156 Silvertop Ash – Red Bloodwood – Sydney Peppermint heathy open forest on moist sandstone plateaux, southern Sydney Basin Bioregion	0.01	Nil	Nil	0.01
1245 Sydney Blue Gum x Bangalay – Lilly Pilly moist forest in gullies and on sheltered slopes, southern Sydney Basin Bioregion	1.73	0.65	0.06 (22 zones)	2.43
Native vegetation total	3.80	1.96	0.13 (52 zones)	5.89
Blank Unmapped PCT area inundated with invasive flora species (mapped as cleared NPWS 2002b)	0.11	Nil	Nil	0.11
Grand total	3.91	1.96	52	6.00

Numbers have been rounded to 2 decimal points.

Impact calculations for other land tenures, not included in this REF, are presented in Section 9.8.

*PCT 906 corresponds to the Illawarra Subtropical Rainforest in the Sydney Basin Bioregion TEC.

Table 12 Summary of the operational footprint of the proposal area with regards to plant community type on NPWS land

Plant community type	Operational footprint (ha)
878 Gully Gum – Sydney Peppermint – Yellow Stringybark moist open forest of coastal escarpments, southern Sydney Basin Bioregion	1.09
905 Lilly Pilly – Coachwood warm temperate rainforest on moist sheltered slopes and gullies, Sydney Basin Bioregion and South East Corner Bioregion	0.72
*906 Lilly Pilly – Sassafras – Stinging Tree subtropical/warm temperate rainforest on moist fertile lowlands, southern Sydney Basin Bioregion	0.29
1156 Silvertop Ash – Red Bloodwood – Sydney Peppermint heathy open forest on moist sandstone plateaux, southern Sydney Basin Bioregion	0.03
1245 Sydney Blue Gum x Bangalay – Lilly Pilly moist forest in gullies and on sheltered slopes, southern Sydney Basin Bioregion	1.43
Blank Unmapped PCT area inundated with invasive flora species (mapped as cleared, NPWS 2002b)	0.06
Grand total	3.60

Numbers have been rounded to 2 decimal points.

Impact calculations for other land tenures, not included in this REF, are presented in Section 9.8.

*PCT 906 corresponds to the Illawarra Subtropical Rainforest in the Sydney Basin Bioregion TEC.

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

The track network has been designed to incorporate natural features as track features (see Attachment H).

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

The track network has been designed in accordance with IMBA track standards as set out in the *Australian mountain bike track guidelines* (MTBA 2019), with the aim of creating a sustainable track network (Table 13). Design principles for the track network are aimed at reducing erosion and sedimentation.

Table 13 Design features of the track network

Design feature	Detail
Fully featured track 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.
Interconnected network	The proposed track network is designed to disperse riders through 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.

Design feature	Detail
	The IMBA standards used to design the track also require a relatively small corridor.
Utilisation of existing tracks	Incorporation of existing unsanctioned tracks into the network, where suitable, would 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 rider and surface water run-off speed. Track grade reversals would be used as drainage features; grade reversals are highly effective and low maintenance features.
Bridge	Used to cross drainage lines. Can be scaled as required. The proposed bridges are minimal in design (Attachment H).
Rock armouring	Used to mitigate erosion. Can be installed as bed-level crossings for small ephemeral drainage lines instead of raised bridges.
Rock-armoured culvert drain	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 daily; 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 would be conducted in order to keep tracks clear. Inspections would identify drainage problems causing muddiness or erosion. Such a maintenance program serves to keep riders on the tracks and limit environmental impacts within the assessed corridor.
User involvement in maintenance	Mountain bikers can be included 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 themselves.
Signage and education material	Signage throughout the network would 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

Track construction would be undertaken between 7 am and 5:30 pm on weekdays, and 7 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 is expected to take place over 18 months.

Construction would 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 would involve depositing materials at laydown areas on a sequential basis, minimising storage times.

6.2.8 Track maintenance and renewal

Track maintenance regime

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 proposal includes a regular maintenance program. 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 tracks' use, and following rainfall events.

Maintenance impacts and impact mitigation

All work undertaken 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 take into account 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 a number of existing unsanctioned tracks within the proposal area that will not be incorporated into the track network. These unsanctioned tracks will be progressively rehabilitated by NPWS.

7. Reasons for the activity and consideration of alternatives

7.1 Objectives and reasons for the proposal

The proposed Illawarra Escarpment Mountain Bike Track Network aims to provide safe, sustainable recreation for a broad range of mountain bike riders on a variety of track types. The track network has been designed with consideration to the physical, environmental and cultural constraints identified by NPWS and stakeholder groups during preparation of the *Draft Illawarra Escarpment mountain bike strategy* (NPWS and WCC 2018) (refer to Table 14).

The project is likely to increase the number and type of visitors to the proposal area and the surrounding region and therefore increase the enjoyment and appreciation of national parks consistent with the objectives of the NPW Act. The track network comprises all levels of the IMBA track gradings, ensuring that the network would accommodate a broad range of rider skills levels.

A key goal of the Illawarra Escarpment Mountain Bike Track Network 1, Mount Kembla is to provide a formal sustainable alternative to the building and use of unsanctioned mountain bike tracks along the Illawarra Escarpment, particularly those at nearby Mount Keira. Without proper design features, unsanctioned tracks are unsustainable and can cause adverse safety, environmental and cultural impacts.

The design of the proposed track network considers both existing and new riders, and the future direction that mountain biking will take due to technological advances and the increasing popularity of the activity.

Table 14 Track network design considerations

Category	Description
Environment	<ul style="list-style-type: none"> • Utilise existing track corridors where feasible (Table 4) • Integration of bush regeneration as part of the track network development • Environmental constraints mapping used to inform initial track network • Track corridors verified in-field with NPWS officers • Flexible track corridors – allow micro-siting of tracks to avoid mature trees • Well-designed track network to keep riders on-track, avoiding potential off-track impacts • Track features designed to remove water from the track and minimise erosion – mitigation measures (such as rock armouring and raised track) to be used where required • Extensive desktop mapping and field verification of track features
Aboriginal cultural heritage	<ul style="list-style-type: none"> • No tracks in network on Mount Keira or Mount Kembla • Access into proposed track network from the foothills of Mount Keira to minimise unsanctioned riding on Mount Keira • Consultation with Aboriginal community, including extensive site surveys (Attachment A)

Category	Description
Physical constraints	<ul style="list-style-type: none"> • Fieldwork mapping viable track corridors • Include a range of categories to accommodate different rider skill levels • Desktop assessment of physical constraints and landscape • Use of hardened track for sustainability where required • Assessment of direction of travel (mountain bikers)
Land tenure	<ul style="list-style-type: none"> • Consultation with landholders • Avoiding WaterNSW Metropolitan Special Area – tracks within Schedule 1 land have been removed from the proposal
Rider requirements and safety	<ul style="list-style-type: none"> • Design focus on removing riders from the road • Designed in accordance with IMBA standards • Geotechnical assessment (refer to Attachment F) to confirm track alignment is at minimal risk of landslide or steep slope impacts • Designed track network to be single-use (i.e. cyclists only) to separate riders from walkers • Designed to accommodate a variety of riders, including an adequate volume of advanced tracks to discourage future construction of unsanctioned tracks • Consultation with Wollongong City Council for road safety • Appropriate signage to inform riders and Illawarra Escarpment SCA visitors • Track network to meet community needs/expectations • Rerouting or closing existing tracks that intersect with pedestrian pathways

7.2 Consideration of alternatives

7.2.1 Alternatives to the proposal

Do nothing

The option to not develop a formalised mountain bike network in the Illawarra Escarpment is considered to be unrealistic and environmentally negligent. There is a demonstrated demand for mountain bike tracks within the region. This demand has led to the development of unsanctioned tracks, which has resulted in environmental impacts.

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

Close unsanctioned tracks

This option would involve closing an extensive array of existing and widely used unsanctioned tracks, without providing alternative options for riders. Although this option would allow for the rehabilitation of unsanctioned tracks, it is unlikely that any environmental benefits would be sustained. Given the high demand for mountain bike tracks in the area, it is likely that new unsanctioned tracks would be built. This option is likely to be expensive and resource-intensive, whilst only providing short-term results. Furthermore, this option would most certainly 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.

Aboriginal community members provided strong negative feedback on the *Draft Illawarra Escarpment mountain bike strategy* (NPWS and WCC 2018), particularly regarding unsanctioned tracks on Mount Keira. This negative feedback has been reiterated within the Aboriginal cultural heritage assessment (Attachment A) and the cultural values assessment for the proposal (Appendix 4 of Attachment A). Thus, it is not considered appropriate to propose formal mountain biking tracks on Mount Keira.

7.2.2 Justification for preferred option

The proposal allows for the closure of unsanctioned tracks, whilst 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. The inclusion of new tracks within the proposal, including the tracks adjacent to Kembla Heights, is considered necessary to design a track network commensurate with current and anticipated demand, whilst accommodating the rehabilitation of unsanctioned tracks on Mount Keira, which NPWS have committed to closing and rehabilitating.

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

8. Description of the existing environment

8.1 Methods

Determining the existing environment of the proposal area involved the following methods:

- review of relevant literature
- search of government databases for listed natural and cultural heritage matters of conservation significance
- review mapping of vegetation, geology, soils and watercourses
- review of ecology and distribution of species within the bioregion
- conduct field surveys and analysis of results
- advice from the NPWS
- evaluate 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)
- cultural values assessment report (Waters Consultancy 2022 at Appendix 4 of Attachment A)
- social impact comment (Element Environment 2022 at Attachment B)
- ecological assessment (Niche Environment and Heritage 2022b at Attachment C)
- historic heritage assessment (Niche Environment and Heritage 2022c at Attachment D)
- statement of heritage impact (Niche Environment and Heritage 2022d at Attachment E)
- geotechnical and landslide risk assessment (GHD 2022 at Attachment F).

8.1.1 Proposal area orientation

Environmental and heritage assessment of the track network has been conducted as part of this REF. Initially, the proposal area was investigated over 3 days between 10 May to 14 May 2021 by:

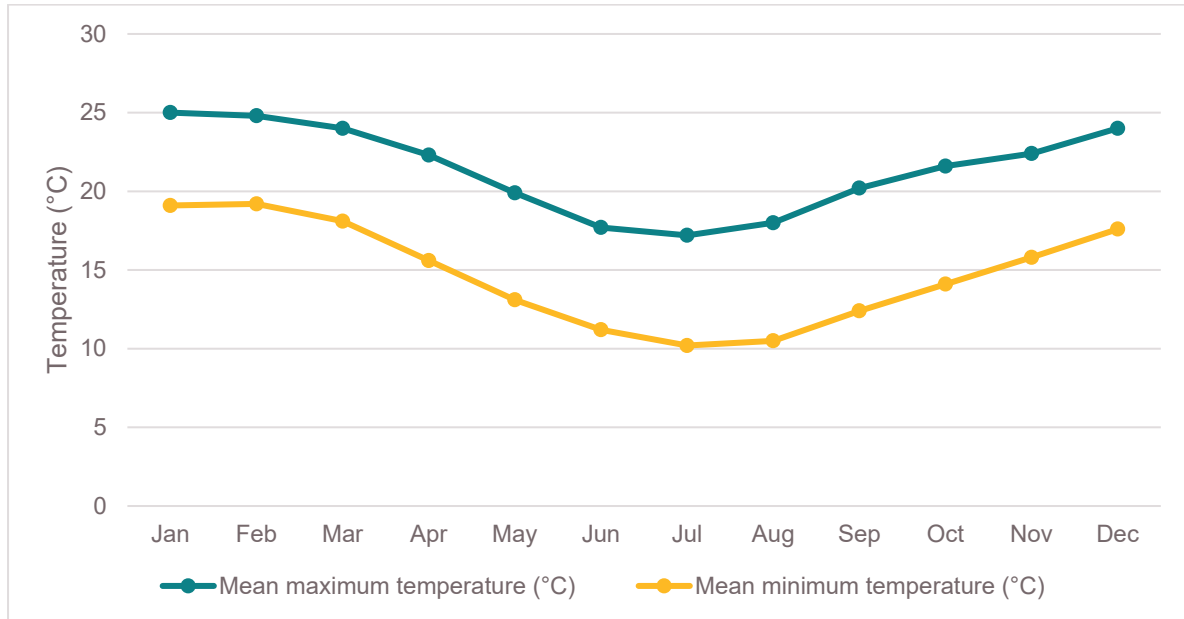
- Niche Environment and Heritage employees – Freya Gordon (Senior Ecologist), Sarah Hart (Ecologist), Kai Whitaker (Environmental Approvals) and Sarah McGuinness (Heritage)
- GHD employees – David Field (Geologist) and Jon Thompson (Senior Geologist)
- NPWS representative – Jamie Erskine
- Synergy Trails representative – Adrian Main.

The orientation survey was aimed at traversing the entire network to gain an in-depth understanding of the scope of works and to refine and inform further specialist assessments. The information collected during these 3 days has also been incorporated into the relevant specialist assessments.

The nominated helicopter drop zones and material laydown areas were identified by Synergy Trails during additional site assessments. Further verification of the sites was conducted by Niche Environment and Heritage (see Attachment C).

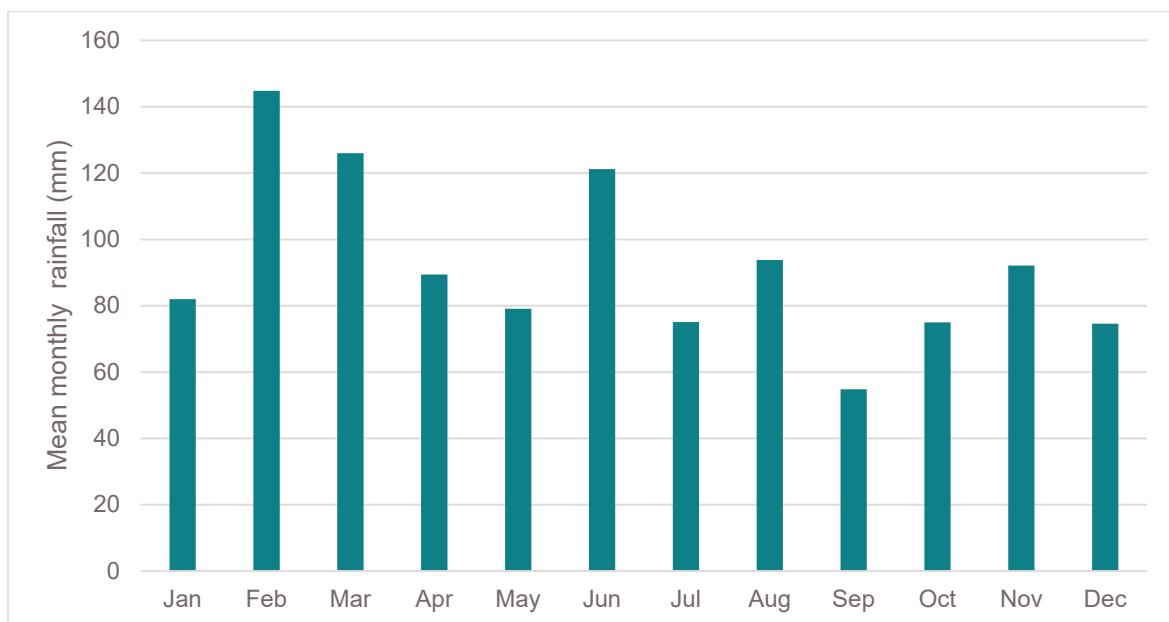
8.2 Climate

The climate in Wollongong is mild, and 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 topography the proposal area is situated within is characterised primarily by moderate to steep slopes (> 35%), which are key features of the Illawarra Escarpment. There are differences identified within the geology and topography of the proposal area as the proposed tracks span 4 different landscapes: Warragamba, Gwynneville, Hawkesbury and Illawarra Escarpment.

The geology of the Warragamba landscape consists primarily of the Narrabeen Group, which is fine-grained lithic sandstone occasionally interbedded with thin shale lenses. Its topography is characterised as narrow convex crests, ridges and steep colluvial side slopes on Narrabeen sandstone. Local reliefs are approximately 80 to 130 m, with slopes generally higher than 35%. Tall open forest populates the area (wet sclerophyll forest). This soil landscape generally has slopes that are too steep for rock overhangs suitable for Aboriginal sites. On more moderately inclined slopes from 25 to 30%, Aboriginal sites may be located.

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

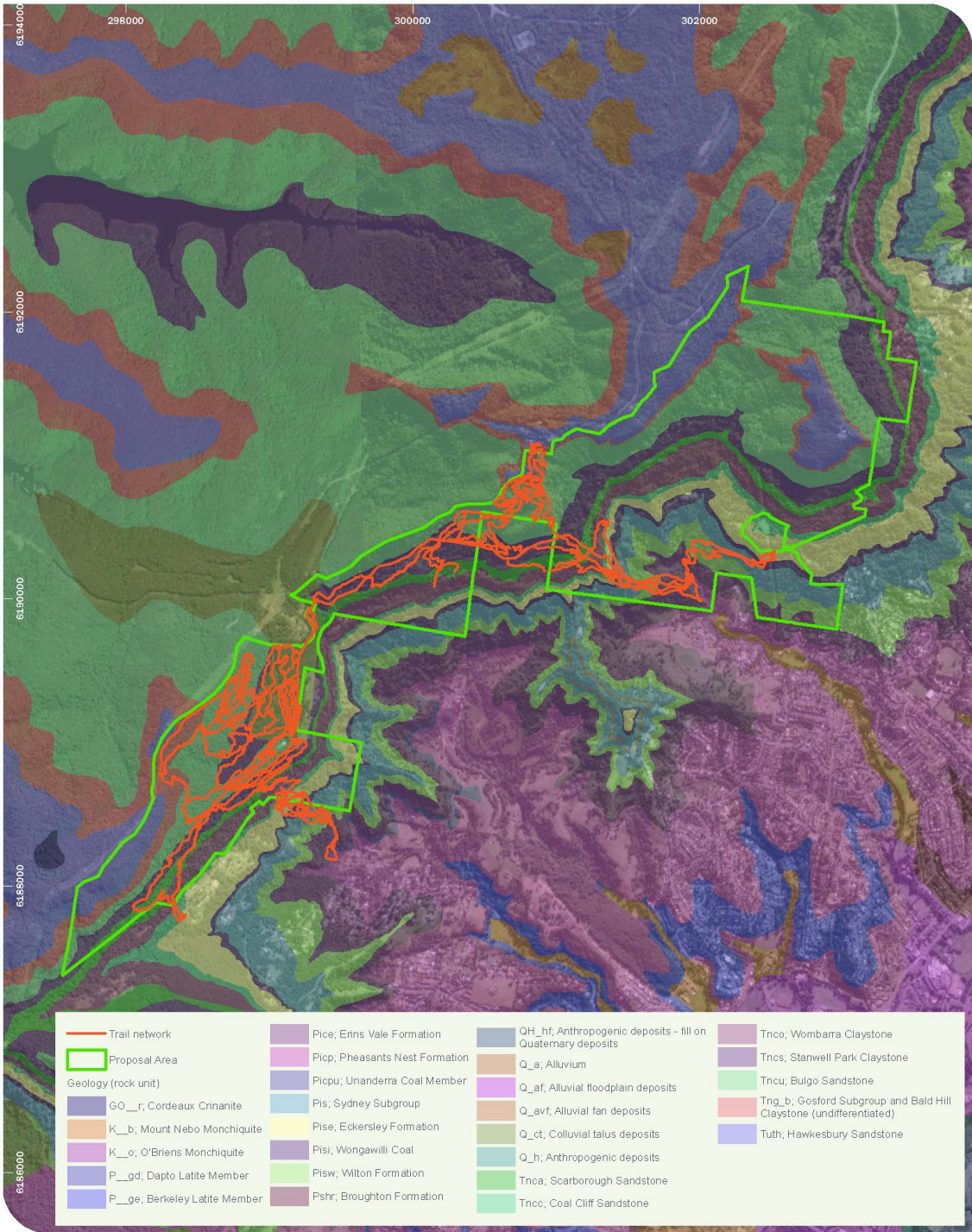
The geology of the Illawarra Escarpment landscape, of which a large percentage (> 40%) of the proposal area is located, is characterised as Quaternary talus, blocks of sandstone, deep colluvial detritus and soil materials. The topography of the Illawarra Escarpment is mainly steep to very steep slopes (20 to 50%). Large landslips are common and are mostly populated by uncleared tall open forest (wet sclerophyll forest) and closed forest (rainforest). Refer to Attachment F for a detailed landslide assessment.

The Hawkesbury landscape is the least prevalent landscape that the new proposed tracks span across. The geology of the landscape consists of Hawkesbury sandstone, medium to coarse grained quartz sandstone with minor shale and laminite lenses. The topography is rugged with rolling to very steep hills on Hawkesbury sandstone (> 25%). It features narrow crests and ridges, narrow incised valleys and steep side slopes. This soil landscape is archaeologically sensitive as the blocks and weathered scarps provide suitable overhangs to be used for shelter. Within these overhangs there is often suitable surfaces for art, as well as floor space for the accumulation of archaeological deposit.

The proposed track network has been designed to follow the natural contours of the landscape, reducing potential impacts such as erosion and sedimentation. Advanced Black tracks within the network have been designed to utilise steep sections within the proposal area.

Reference material

- Geotechnical and landslide risk assessment (GHD 2022 at Attachment F)
- Figure 5 Geology of the proposal area



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m
GDA 1994 MGA Zone 56

Geology
Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
Niche Proj. #: 6486
Client: National Parks and Wildlife Service - South Coast Branch

Figure 5

Figure 7 Geology of the proposal area

8.3.2 Soil types and properties (including contamination)

The proposal area spans 4 soil landscapes: Warragamba, Gwynneville, Hawkesbury and Illawarra Escarpment (Figure 6). The soil characteristics of each soil landscape is summarised in Table 15.

Table 15 Soil landscapes within the proposal area

Soil landscape	Characteristics
Warragamba	The Warragamba soil landscape is characterised by dark brown loamy sand, dark reddish-brown clayey sand and pedal clay.
Gwynneville	Soils are generally shallow (50–100 cm) brown podzolic soils and xanthozems on upper slopes, lithosols on simple slopes, and shallow brown earths on mid slopes and lower slopes.
Illawarra Escarpment	Soils consist of deep colluvial soils, red and brown podzolic soils on mid slopes. Siliceous sands occur along drainage lines and lithosols occur where the talus is recent.
Hawkesbury	Soils include lithosols/siliceous sands, earthy sands, yellow earths, yellow and red podzolic soils and siliceous sands.

The soils on the escarpment slopes are derived from the weathered shales and claystone and colluvium from landslides. They are typically nutrient-rich but rated an extreme erosion hazard and prone to mass movement (Hazelton and Tille 1990) owing to the high rainfall and steep gradients. 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 critical to the retention of soils and land stability.

A key focus of the track network design is erosion minimisation and mitigation. The network has been designed to follow the natural contours of the landscape, where possible, to minimise erosion and reduce drainage line crossings. The track network is designed to efficiently drain water from the track surfaces, minimising the potential for the proliferation of rill and gully erosion. Mitigation measures, such as rock armouring and raised track, will be installed at targeted locations throughout the track network (Appendix 1).

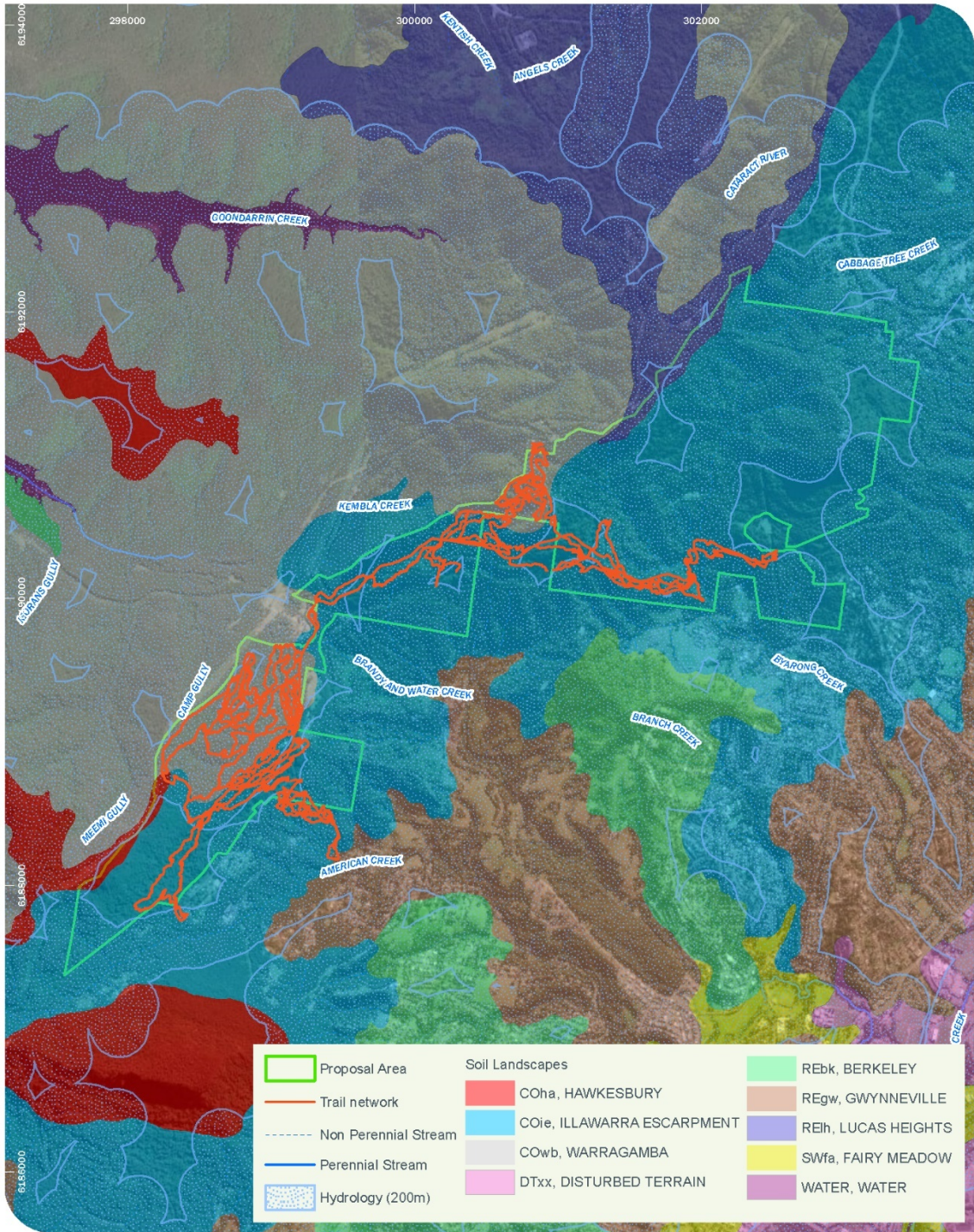
Moist sections of track are more susceptible to enhanced erosion, track widening and rutting (Evju et al. 2021). Poorly drained or moist sections of track may encourage riders to bypass the track, causing further environmental impacts (Stavi and Yizhaq 2020). Thus, erosion mitigation measures such as track hardening and raised track 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 track hardening measures mentioned above. Steep downhill sections will also be designed to control rider speed, which also serves to slow surface run-off.

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 (GHD 2022 at Attachment F)



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GDA 1994 MGA Zone 56

Soil landscapes and hydrology in the local area
Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
Niche Proj. #: 6486
Client: National Parks and Wildlife Service - South Coast Branch

Figure 6

World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 8 Soils and hydrology of the proposal area

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

Major waterways (3rd order and higher) in the proposal area catchment include Byarong Creek, American Creek, and Brandy and Water Creek. Within the proposed track network, a total of 56 watercourse crossings were identified. These crossings have been assessed for consideration of erosion controls and fauna habitat (including aquatic habitat) as part of the project (see Section 3.4 of the ecological assessment at Attachment C).

The proposed track crossings are located on mostly 1st and 2nd order watercourses, which provided either little aquatic habitat (consisting of shallow pools) or were mostly dry at the time of the survey. These ephemeral watercourses are suitable for erosion control measures and most do not require culvert waterway crossings. Most of these crossings would consist of bed-level rock-armoured crossings or raised track bridges (see Attachment H).

There are 5 locations where the proposed track crosses a 3rd order stream (tributaries of American Creek and Byarong Creek), which are classed by the FM Act as key fish habitat and Class 2 – moderate key fish habitat for fish passage. In accordance with DPI guidelines (DPI 2013), a suitable crossing for these locations could include a bridge, arch structure or culvert. The 2 crossings along American Creek are on existing access paths outside of NPWS land. Currently, works are not proposed for these American Creek crossings. The 3 crossings over 3rd order sections of Byarong Creek would require construction of a small bridge to cross the creek (see Attachment H for detailed design). Bridge designs for the proposal are based on the designs outlined in Attachment H. Differences in bridge design relate to the size and scale of the structure, whilst the structures remain effectively the same. Bridge choices for each crossing would be finalised during the ground truthing and detailed design phase of the proposal.

All 3rd order sections of the creeks were flowing at the time of the survey, however, fish passage was limited as there were either dry sections fed by smaller tributaries or the water was flowing rapidly along a steep gradient.

For the installation of bridges over 3rd order streams, environmental safeguards (e.g. silt curtains, sediment fences, booms) are to be installed consistent with *Managing urban stormwater: soils and construction* (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 2021b at Attachment C)
- Figure 6 Soils and hydrology of the proposal area

8.3.4 Coasts and estuaries

The proposal area spans an ecological transition zone near Mount Keira and Mount Kembla.

The zone contains the northern or southern distributional limits of many coastal plant communities and wildlife species (NPWS 2002a).

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

8.3.6 Vegetation

There are 6 different plant community types (PCTs) that intersect with the REF area. See Figure 7a–j. Each of the maps in Figure 7a–j show the PCTs for a different section of the proposal area, running from east to west. One of these, PCT 906, comprises the threatened ecological community (TEC) Illawarra Subtropical Rainforest in the Sydney Basin Bioregion.

Approximately 0.42 ha of the Illawarra Subtropical Rainforest TEC intersects with the total construction footprint track network within the REF area (Table 11); and 0.29 ha of the operational footprint (Table 12).

This vegetation is considered part of the Illawarra Subtropical Rainforest TEC (see Figure 8), which is listed as endangered under the BC Act and forms part of Illawarra-Shoalhaven Subtropical Rainforest of the Sydney Basin Bioregion listed under the EPBC Act as critically endangered. PCT 906, which align with the both the state and Commonwealth listed TECs, would be directly impacted as a result of the project.

Where feasible, existing unsanctioned tracks have been incorporated into the track network. These tracks would require ‘secondary clearing’ and have been utilised to limit the impact on areas of mature native vegetation. The proposed new tracks would require ‘primary clearing’ within mature native vegetation, would generally require a construction clearing width between 0.9 m and 1.5 m, depending on the track category (see Table 6). Only Track 59 (a 2-way track) would require a 2 m clearing width for a length of 61 m. The canopy layer would not be removed, and only the immediate groundcover and mid storey/shrub-layer would be affected.

Thurston and Reader (2001) showed that the impacts from both hikers and mountain bikers were spatially confined to the centreline of tracks.

Table 16 Summary of plant community types (PCTs) and threatened ecological communities in the proposal area (NPWS land)

PCT name	PCT #	Threatened ecological community	BC Act	EPBC Act	Extent within proposal area (ha)
Gully Gum – Sydney Peppermint – Yellow Stringybark moist open forest of coastal escarpments, southern Sydney Basin Bioregion	878	N/A	–	–	54.48
Lilly Pilly – Coachwood warm temperate rainforest on moist sheltered slopes and gullies, Sydney Basin Bioregion and South East Corner Bioregion	905	N/A	–	–	67.52
Lilly Pilly – Sassafras – Stinging Tree subtropical/warm temperate rainforest on moist fertile lowlands, southern Sydney Basin Bioregion	906	Illawarra Subtropical Rainforest in the Sydney Basin Bioregion	E	CE	44.14

PCT name	PCT #	Threatened ecological community	BC Act	EPBC Act	Extent within proposal area (ha)
Silvertop Ash – Red Bloodwood – Sydney Peppermint heathy open forest on moist sandstone plateaux, southern Sydney Basin Bioregion	1156	N/A	–	–	0.83
Sydney Blue Gum x Bangalay – Lilly Pilly moist forest in gullies and on sheltered slopes, southern Sydney Basin Bioregion	1245	N/A	–	–	141.97
Weeds and exotics	–	N/A	–	–	0.52

CE = critically endangered, E = endangered.

Numbers have been rounded to 2 decimal points.

Reference material

- Ecological assessment (Niche Environment and Heritage 2021b at Attachment C)
 - see also ‘Appendix 1 – Likelihood of occurrence table’ in Attachment C
- Figure 7a–j Vegetation (plant community types) within the proposal area
- Figure 8 Threatened ecological communities in the proposal area

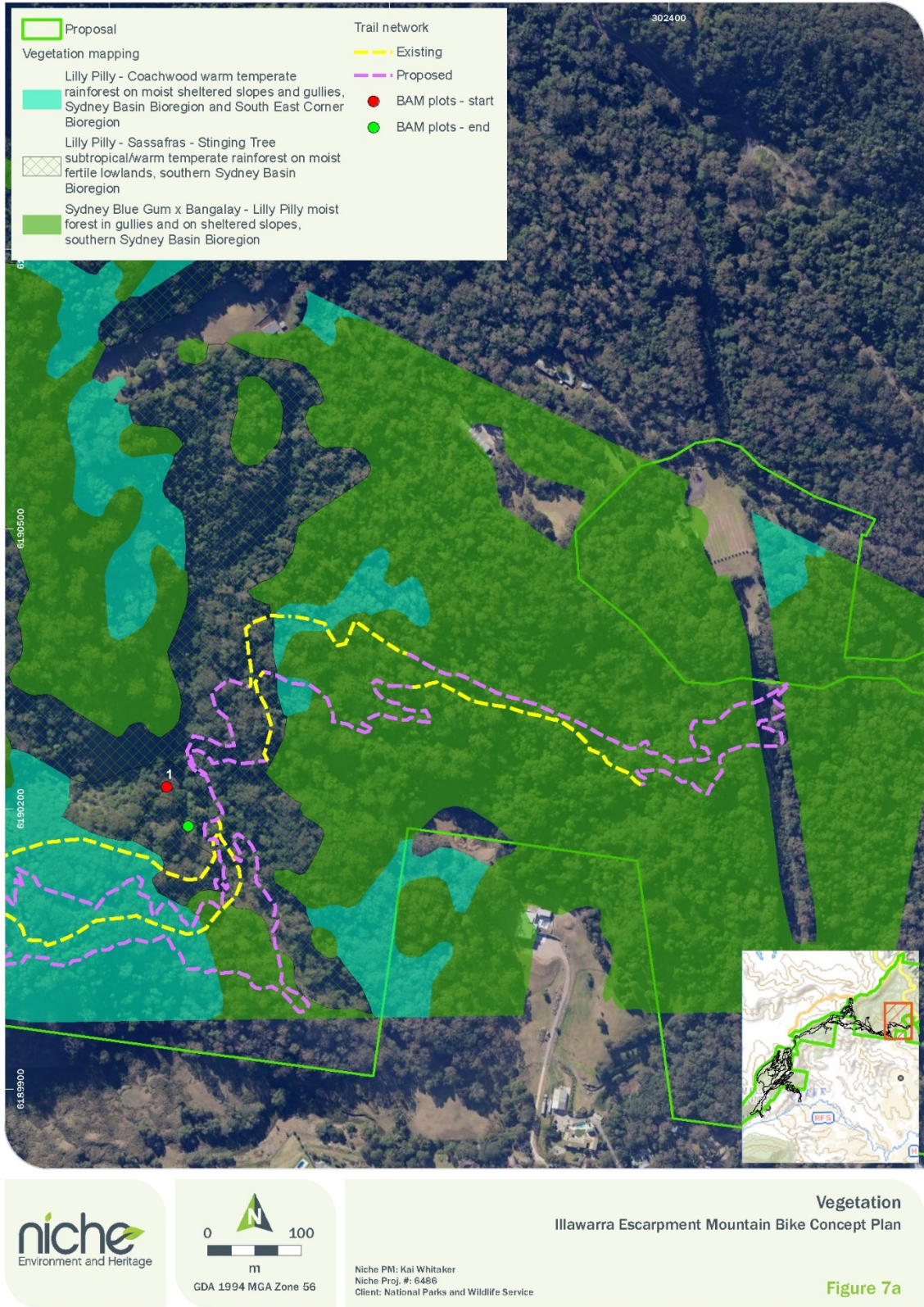
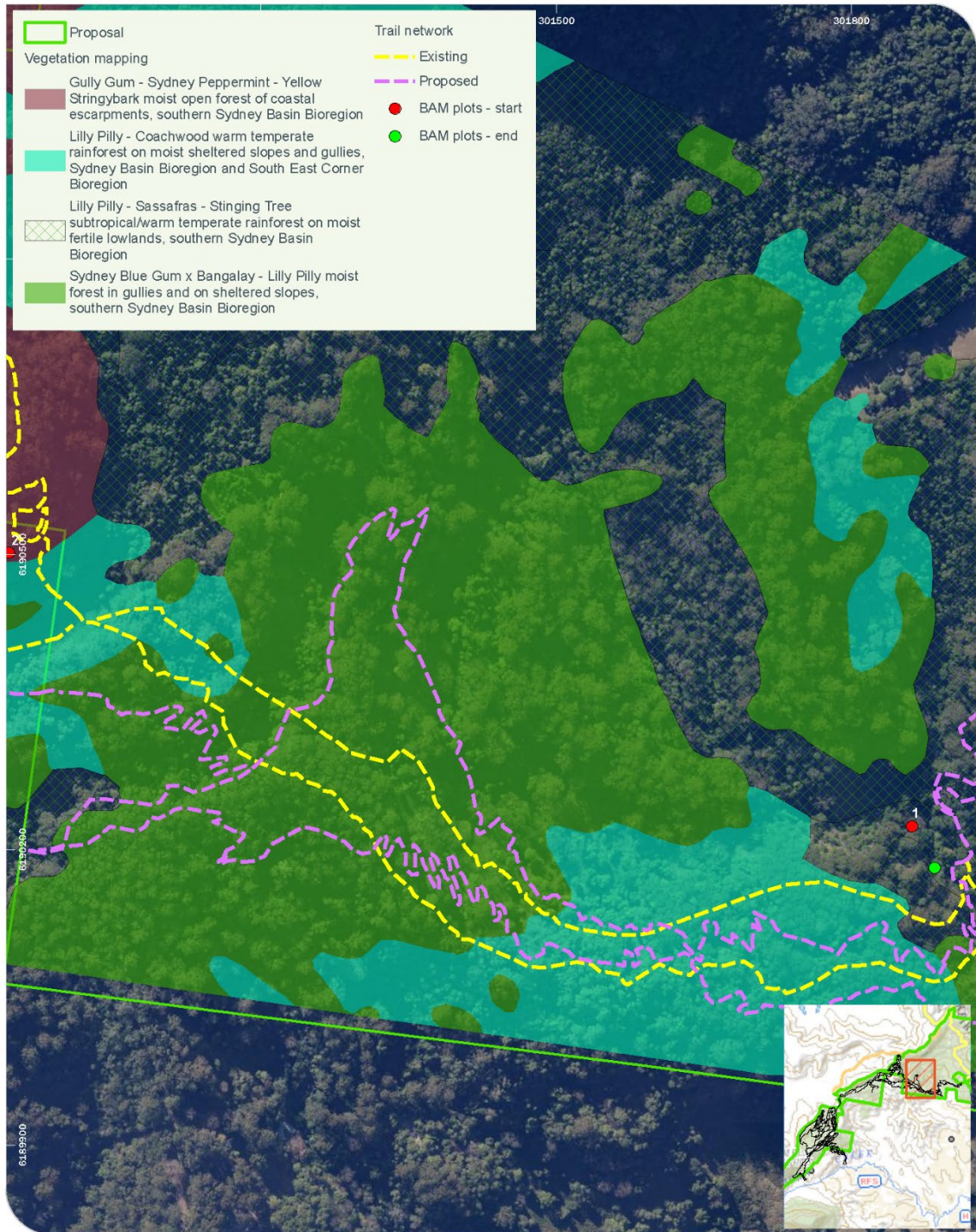


Figure 9 Vegetation (plant community types) in the proposal area



niche
Environment and Heritage

0 100
m
GDA 1994 MGA Zone 56

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Niche Proj. #: 6486
Client: National Parks and Wildlife Service

Vegetation
Illawarra Escarpment Mountain Bike Concept Plan

Figure 7b

pubb01NSW_Bass_Map, © Department of Customer Service 2020/pub01NSW_Imagery, © Department of Customer Service 2020

Figure 10 Vegetation (plant community types) in the proposal area

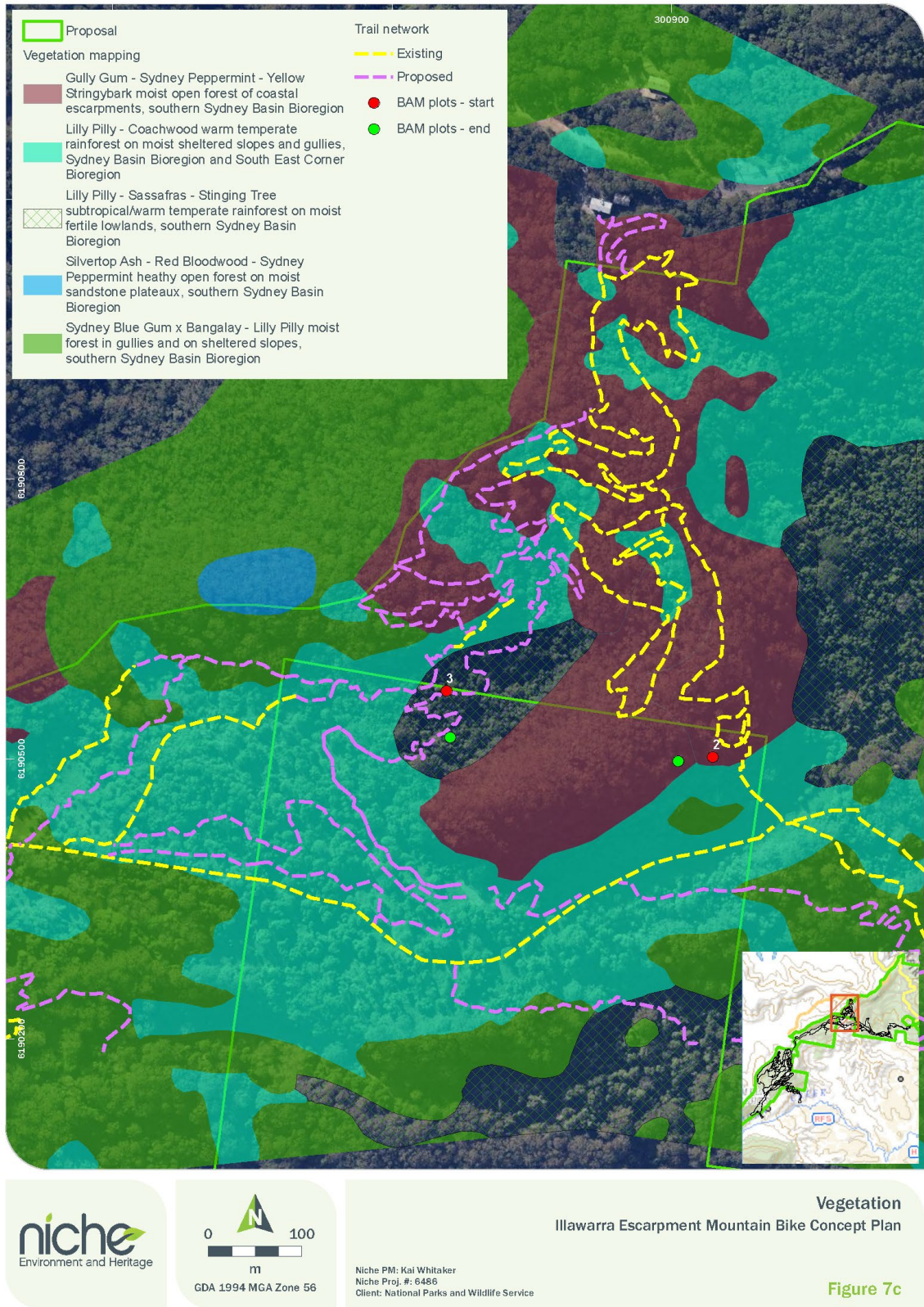


Figure 11 Vegetation (plant community types) in the proposal area

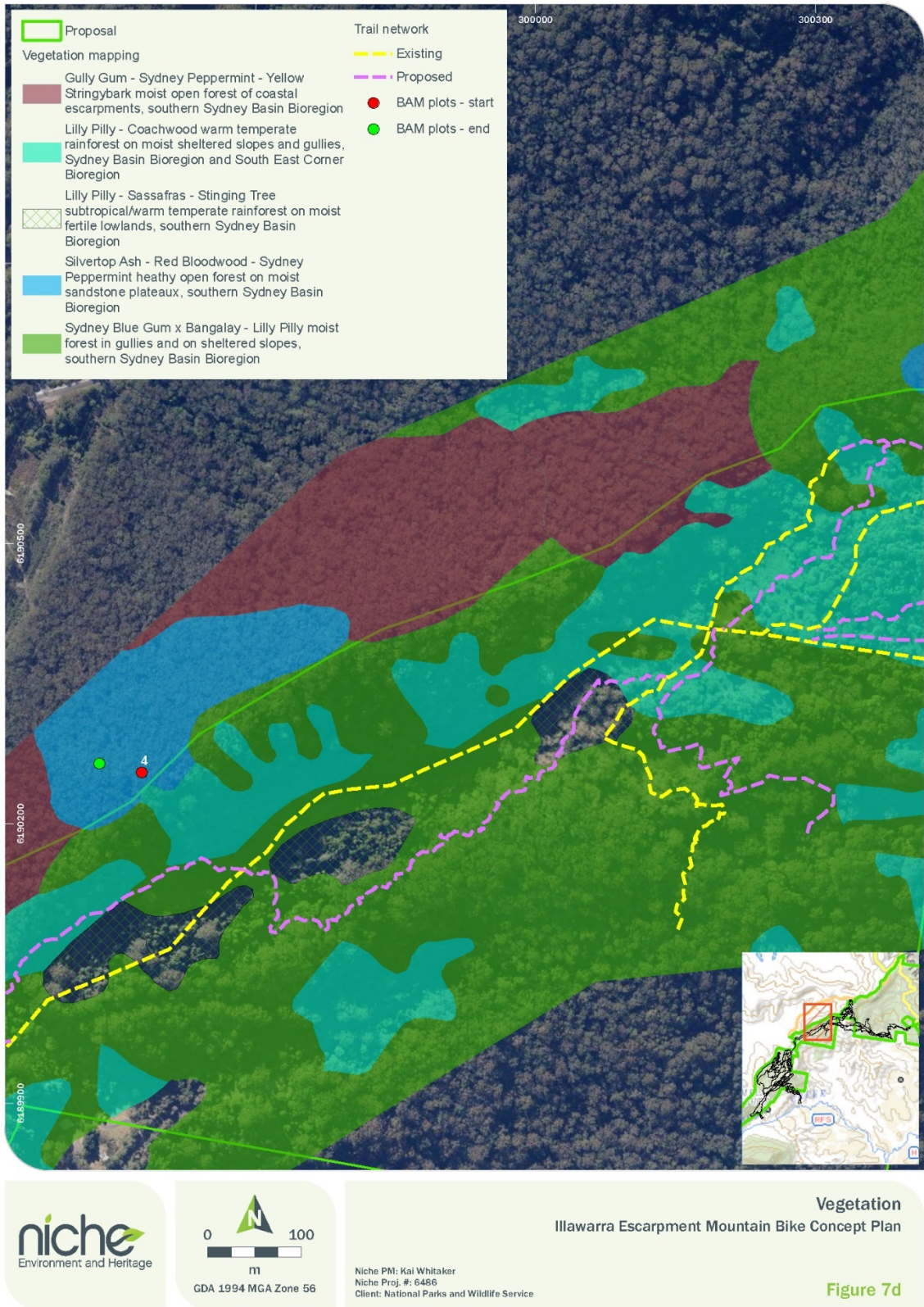
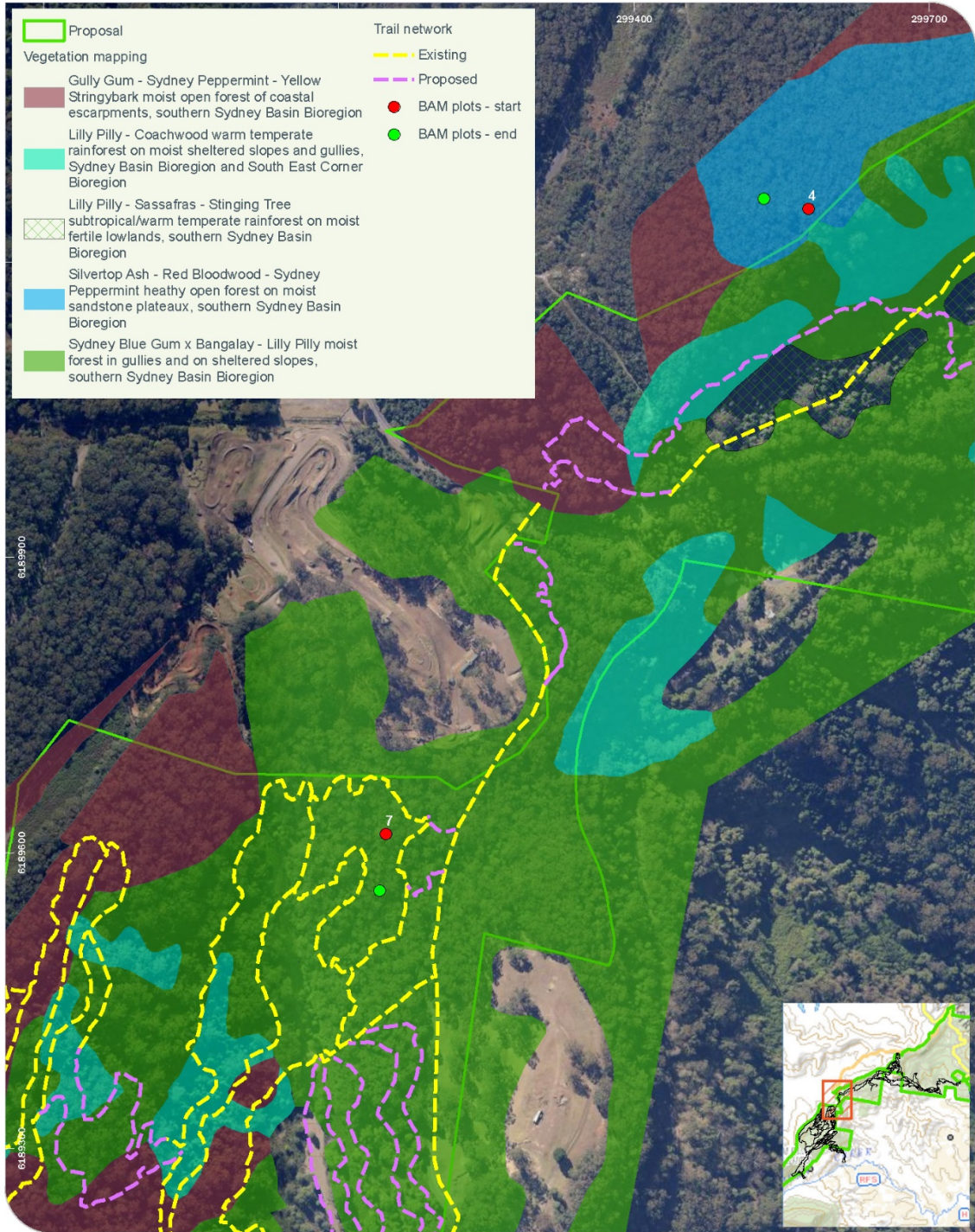


Figure 12 Vegetation (plant community types) in the proposal area



niche
Environment and Heritage

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m
GDA 1994 MGA Zone 56

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Niche Proj. #: 6486
Client: National Parks and Wildlife Service

Figure 7e

publicNSW_Base_Map © Department of Customer Service 2020/publicNSW_Imagery © Department of Customer Service 2020

Figure 13 Vegetation (plant community types) in the proposal area

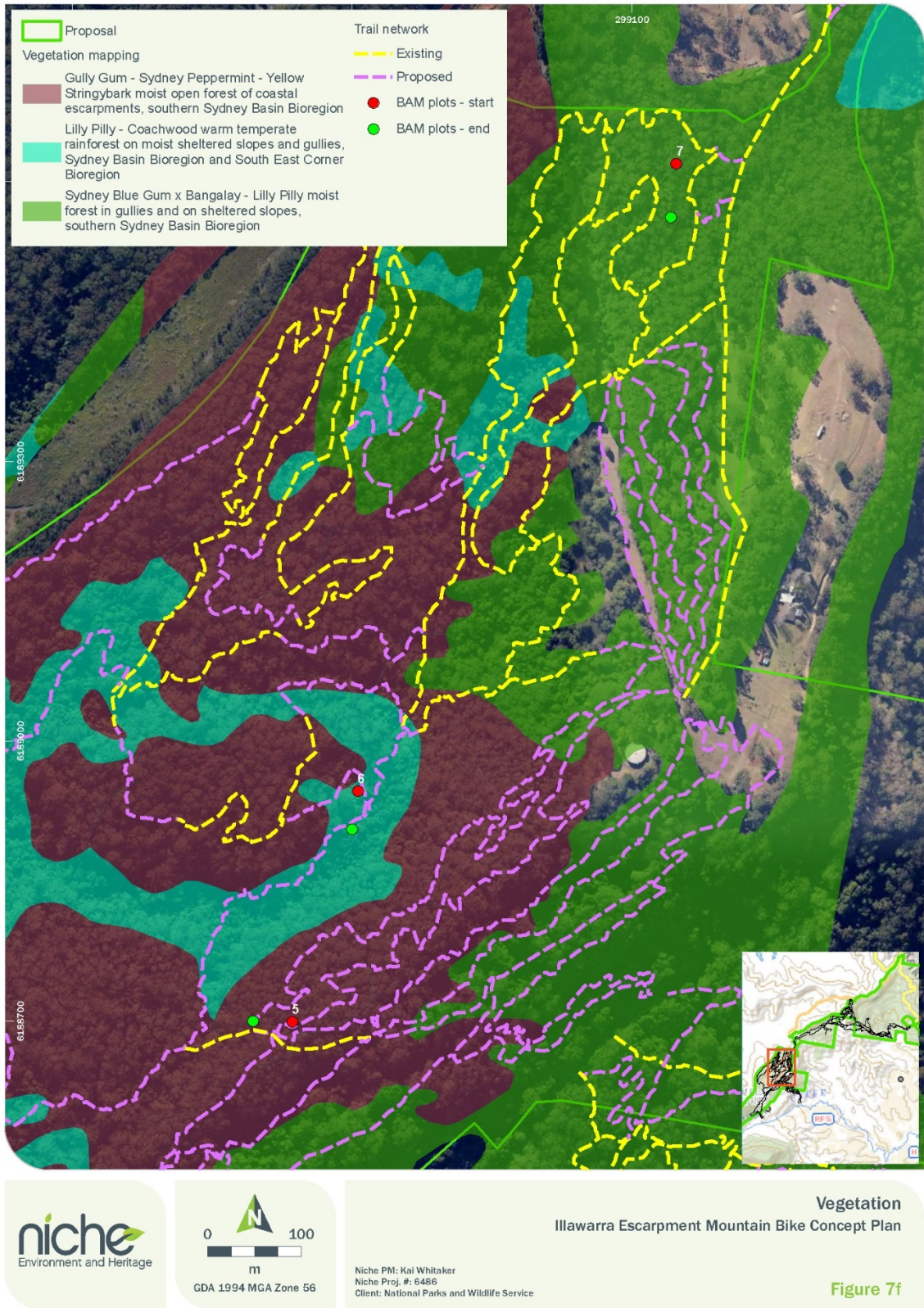


Figure 14 Vegetation (plant community types) in the proposal area

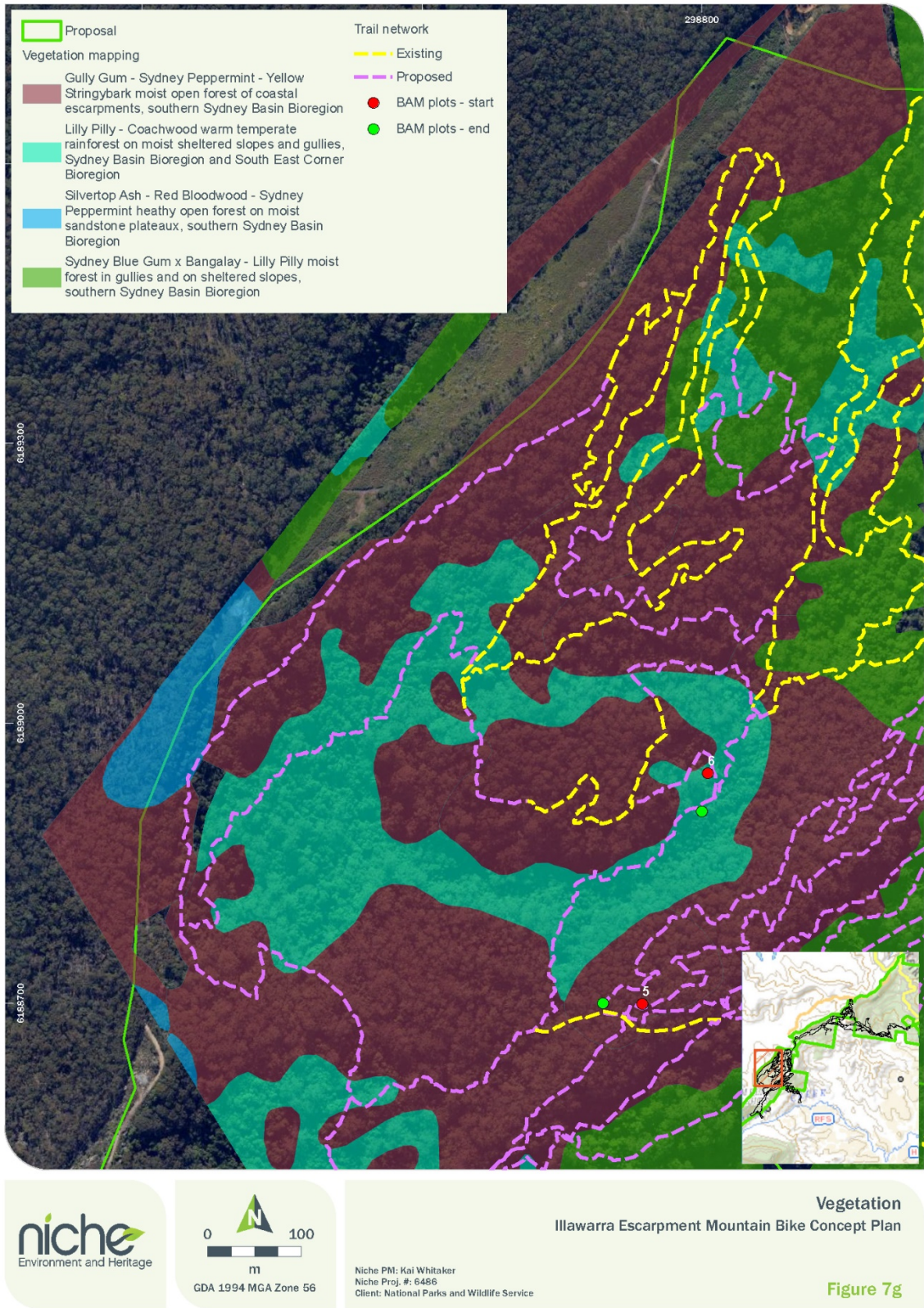
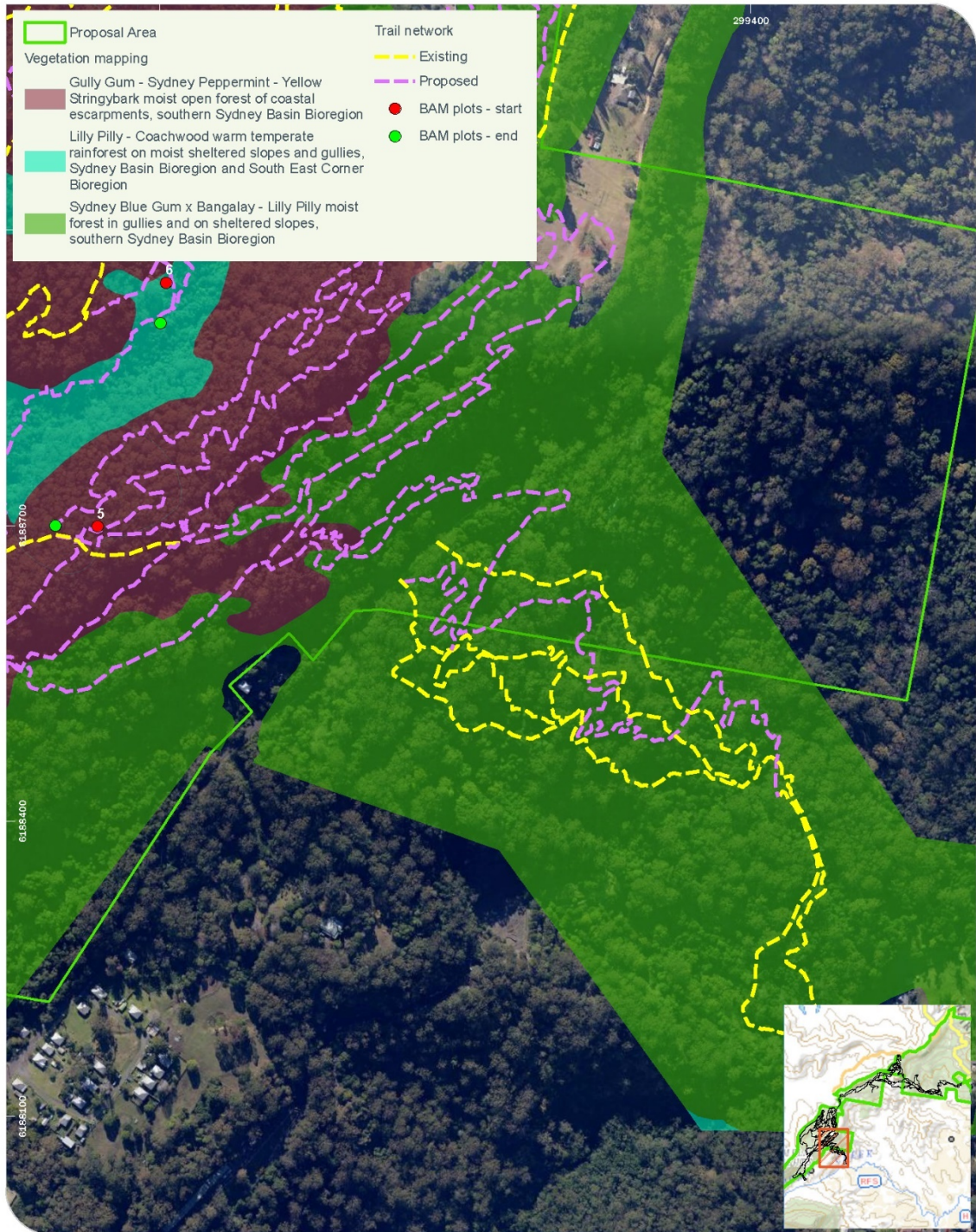


Figure 15 Vegetation (plant community types) in the proposal area

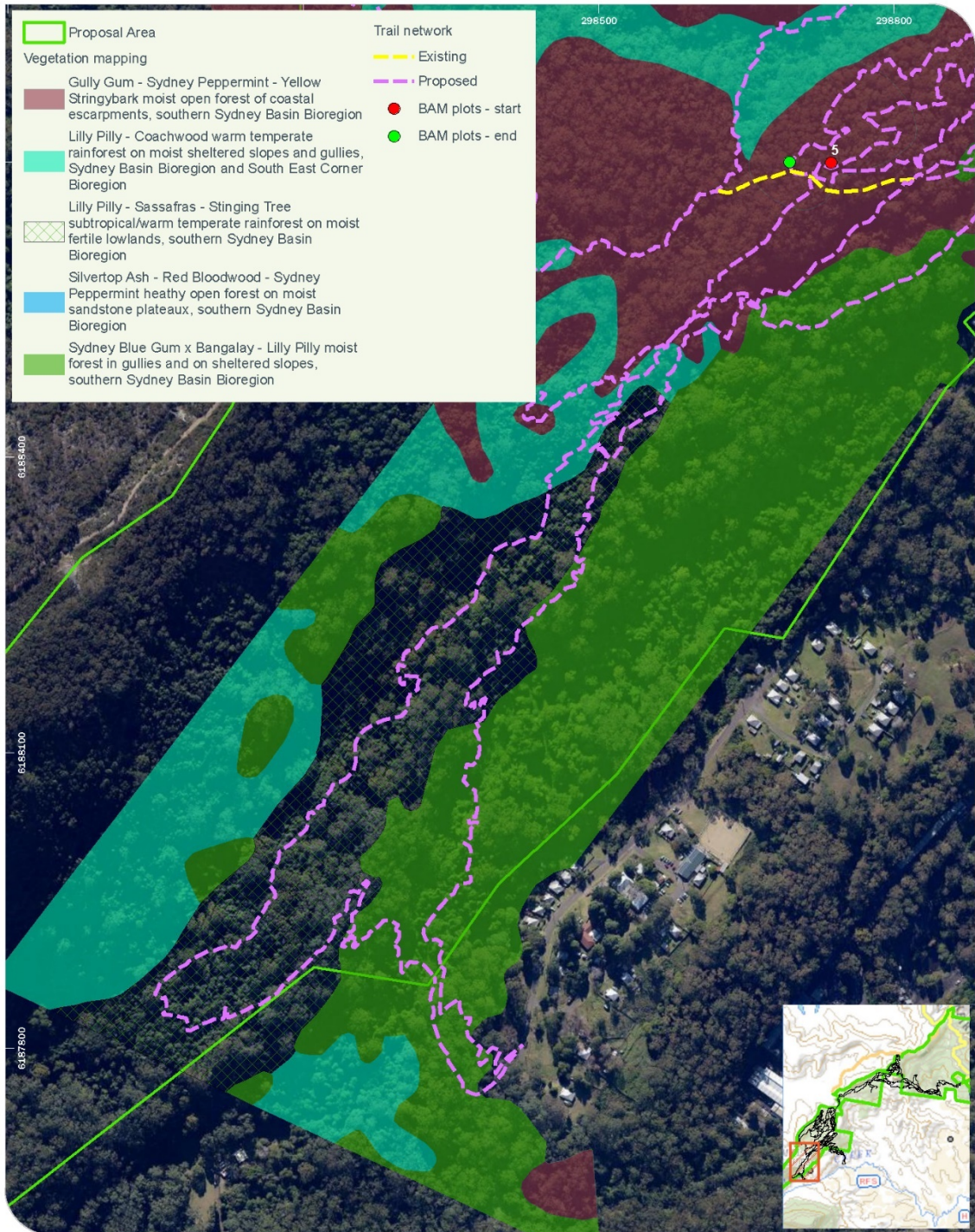


Vegetation
Illawarra Escarpment Mountain Bike Concept Plan

Figure 7h

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Figure 16 Vegetation (plant community types) in the proposal area



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0 100
m
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Vegetation
Illawarra Escarpment Mountain Bike Concept Plan

Figure 7i

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Figure 17 Vegetation (plant community types) in the proposal area



GDA 1994 MGA Zone 56

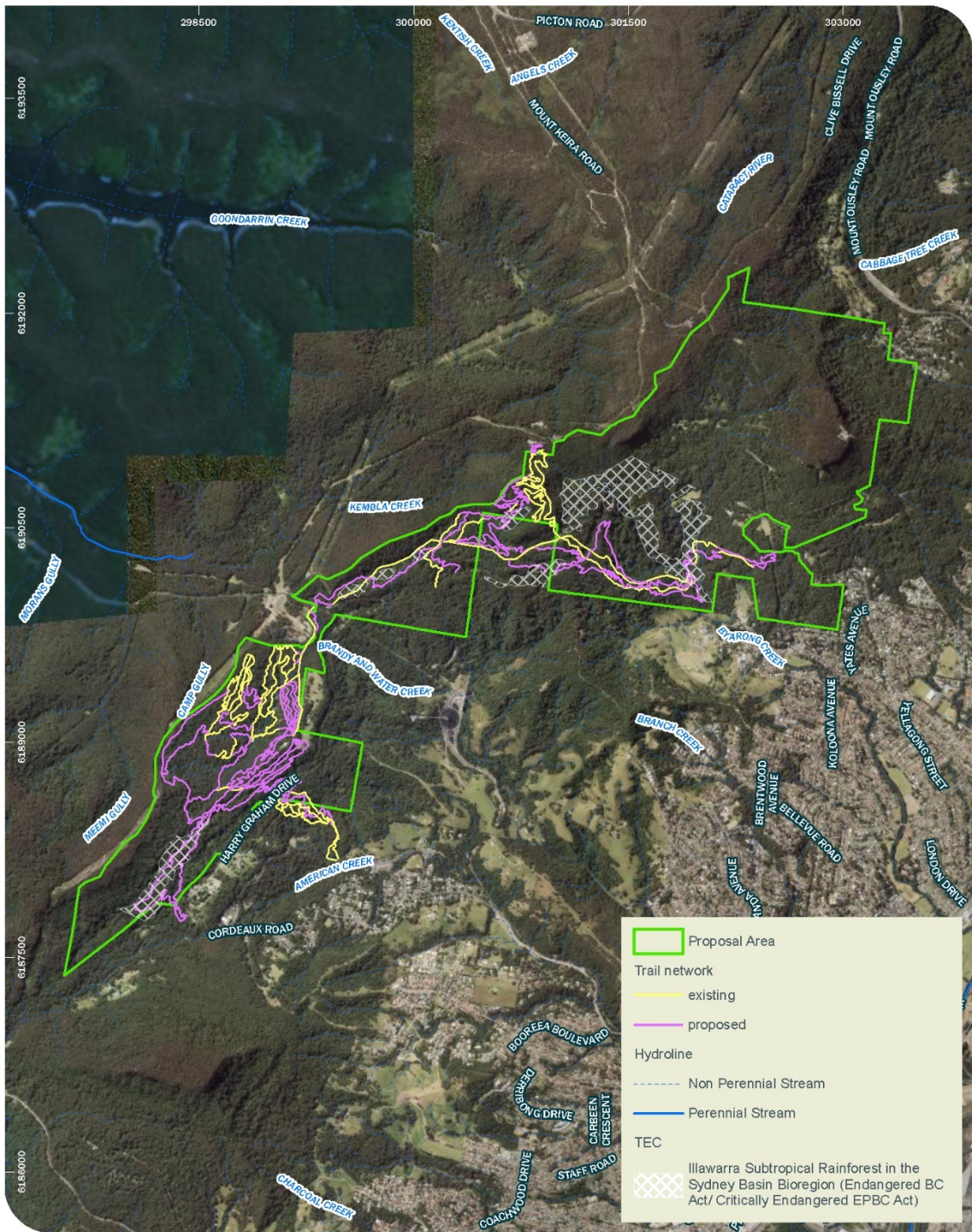
Vegetation
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Figure 7j

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Figure 18 Vegetation (plant community types) in the proposal area



Threatened Ecological Communities (TECs)
 Illawarra Escarpment Mountain Bike Concept Plan

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 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Figure 8

Figure 19 Threatened ecological communities in the proposal area

8.3.7 Plants and animals

Threatened flora

A total of 35 subject threatened flora, as listed under the BC Act and/or EPBC Act, were considered in this assessment (refer to Appendix 1 in the ecological assessment at Attachment C). This list was derived from the database searches outlined in Section 2.1 of Attachment C. There were 3 threatened flora that were considered to have a high or moderate likelihood of occurrence in the proposal area:

- white-flowered wax plant (*Cynanchum elegans*)
- Illawarra socketwood (*Daphnandra johnsonii*)
- scrub turpentine (*Rhodamnia rubescens*).

During the field surveys no threatened flora were recorded in the proposal area. Affected threatened flora and their habitats are assessed in Section 4.3 of Attachment C.

Threatened fauna

A total of 89 subject threatened fauna have previously been recorded (BioNet Atlas of NSW Wildlife) or are predicted to have habitat (EPBC Act / *Biodiversity Assessment Method* calculator PCT habitats) within the locality (see Appendix 1 of the ecological assessment at Attachment C). There were 15 threatened fauna that were considered to have a high or moderate likelihood of occurrence in the proposal area:

- giant burrowing frog (*Heleioporus australiacus*)
- red-crowned toadlet (*Pseudophryne australis*)
- Rosenberg's goanna (*Varanus rosenbergi*)
- olive whistler (*Coracina lineata*)
- pink robin (*Petroica rodinogaster*)
- powerful owl (*Ninox strenua*)
- large-eared pied bat (*Chalinolobus dwyeri*)
- spotted-tailed quoll (*Dasyurus maculatus*)
- eastern false pipistrelle (*Falsistrellus tasmaniensis*)
- eastern freetail-bat (*Micronomus norfolkensis*)
- little bentwing-bat (*Miniopterus australis*)
- eastern bentwing-bat (*Miniopterus orianae oceanensis*)
- southern myotis (*Myotis macropus*)
- grey-headed flying-fox (*Pteropus poliocephalus*)
- greater broad-nosed bat (*Scoteanax rueppellii*).

During the field survey there were 2 threatened fauna species recorded: grey-headed flying-fox and powerful owl. Multiple (> 10) grey-headed flying-foxes were recorded within the proposal area, roosting in the trees in the vicinity of American Creek (at the beginning of the Memorial Pathway in Kembla Grange). One individual was also recorded roosting at the edge of the transmission line easement near Mount Keira Road. Grey-headed flying-foxes are listed as vulnerable under both the BC Act and EPBC Act. One powerful owl was also heard whilst doing amphibian surveys at American Creek, calling from a significant distance to the north-west.

There were also 3 other threatened fauna recorded at a nearby previous Niche Environment and Heritage project along Harry Graham Drive and in the proposal area (see Appendix 4 in Attachment C).

Affected threatened fauna and their habitats are assessed in Section 4.4 of Attachment C.

Reference material

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

8.4 Cultural values

8.4.1 Aboriginal cultural heritage

The project is located specifically within the Djembla Djeera Cultural Landscape, the core elements of which are Djembla (Mount Kembla), Djeera (Mount Keira), and the Dreaming Track that connects the two. The Djembla Djeera Cultural Landscape is located primarily within the Illawarra Escarpment SCA. The Djembla Djeera Cultural Landscape can be understood as a sacred landscape that embodies Dreaming Stories, Dreaming Tracks and Ceremony Places and is an important Teaching Place. The Djembla Djeera Cultural Landscape is of very high significance for its social and spiritual value to past, present and future generations (Waters 2022 at Appendix 4 of Attachment A). It is also noted that there is a pending proposal for Mount Keira area to be declared an Aboriginal place under the NPW Act. This is addressed further in the Aboriginal cultural heritage assessment (Attachment A).

Due to the low number of surveys and archaeological studies completed primarily within the proposal area, an extensive search of the NPWS Aboriginal Heritage Information Management System (AHIMS) identified a total of one Aboriginal cultural heritage site located within 250 m of the proposal area. This does not necessarily reflect the distribution of Aboriginal cultural heritage sites within the area, but is instead a result of the lack of archaeological surveys conducted within the Illawarra Escarpment landscape due to the difficulty of the steep terrain and/or lack of previous development within the area necessitating development-driven Aboriginal heritage assessments.

The character of the escarpment landscape within the proposal area (which experiences frequent landslips and extreme soil erosion), combined with the character of the land use within the proposal area (namely its long association with coalmining, cedar-getting, pastoral and agricultural practices, and unsanctioned mountain biking tracks) has likely impacted the integrity of the soil profile and consequently the likelihood of finding in situ artefacts and/or stratified deposits. There is also potential for displaced artefacts to have been washed/eroded from the upper lip of the escarpment downslope, especially from sites such as Mount Kembla; O'Brien's Gap (AHIMS ID#52-2-0859). Thus, while the likelihood of finding Aboriginal objects in the proposal area is considered moderate, the integrity of such objects is likely to be low depending on the level of past disturbance associated with certain areas within the proposal area.

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. It is anticipated that the proposed development of the mountain bike tracks through the proposal area (including future usage of the tracks) may result in the harm of several Aboriginal cultural heritage sites (refer to Section 8.3 of the Aboriginal cultural heritage assessment at Attachment A).

During the consultation process the NPWS and Niche Environment and Heritage provided the opportunity for the registered Aboriginal parties to provide cultural information, including a statement of the value of identified sites and other matters. The input points were listed within the survey methodology that has been included in Appendix 2 of the Aboriginal cultural heritage assessment (Attachment A), and information will be accepted at any point during the project prior to the finalisation of the Aboriginal cultural heritage assessment.

Registered Aboriginal parties were made aware that the proponent, Waters Consultancy and Niche Environment and Heritage staff would seek cultural information and supporting evidence in regard to matters of cultural value.

In the event that a stakeholder had sensitive or restricted public access information it was proposed that the proponent and Niche Environment and Heritage would manage this information (if provided by the Aboriginal community) in accordance with a sensitive cultural information management protocol. It is anticipated that the protocol will include making note of and managing the material in accordance with key limitations as advised by Aboriginal community members at the time of the information being provided (see Section 3.2 of the Aboriginal cultural heritage assessment at Attachment A).

No sensitive or restrictive material provided by the registered Aboriginal parties to Niche Environment and Heritage during the site inspection is to be included within the Aboriginal cultural heritage assessment or archaeological report.

The Aboriginal cultural heritage assessment presents the detailed results of an Aboriginal cultural heritage site inspection completed by Niche Environment and Heritage and representatives of the registered Aboriginal parties in compliance with the requirements of the *Code of practice for archaeological investigation of Aboriginal objects in New South Wales* (DECCW 2010b). A total of 5 Aboriginal cultural heritage sites were recorded during the field survey (refer to Attachment A for details).

Recommendations as a result of consultation completed during the Aboriginal cultural heritage assessment and the cultural values assessment are presented in Section 10 of Attachment A. A key recommendation from the 2 cultural assessments is that an Aboriginal heritage impact permit will be required for the proposal to proceed as described in Section 6.

Note that access to the cultural values assessment and Aboriginal cultural heritage assessment (Attachment A) is restricted to registered Aboriginal parties and nominated Knowledge Holders.

Reference material

- Aboriginal cultural heritage assessment (Niche Environment and Heritage 2022a at Attachment A)
- Cultural values assessment (Waters Consultancy 2022 at Appendix 4 of Attachment A)

8.4.2 National/state/local historic heritage values

The proposal area has a long post-European settlement history dating to early settlement of NSW and early industrialisation of the region, with the longest period of industrial activity being from the coalmining phase.

Much of the proposal area is undeveloped, however, it does form a significant part of NSW and Australia's historical development. This is due to the wider historical cultural landscape of industrial coal processes and timber-getting industry, which forms part of the historical development of much of the greater area as well as the site of Australia's worst industrial disaster, the Mount Kembla mine disaster of 1902.

Although the historical development can be said to be constrained to 2 phases, the proposal area also has heritage values due to its scenic, social (including tourist and recreational), visual, and natural history. The proposal area was likely explored in the early 19th century by European settlers and its natural and scenic values were described as exceptional. Tourists and visitors continue to visit the area for similar values.

The historic heritage assessment (Attachment D) determined that there is a low to moderate chance of archaeological resources across the proposal area. The area comprising additional site items to the south-west of the timber yard and mine outbuildings have been assessed as having a moderate to high archaeological potential (refer to Section 6 of the historic heritage assessment at Attachment D).

Four heritage items were identified that were either within or in the near vicinity to the proposal area that were listed on the Wollongong LEP 2009, 3 sites were listed in the s 170 asset register of Heritage Act and 2 sites were unlisted but identified as having heritage values (Table 17). These sites were assessed using the criteria outlined in *Assessing heritage significance* (Heritage Office 2000).

Table 17 Summary of historic heritage items within or adjacent to the proposal area

Item #	Item name	Statutory listing	Location	Level of significance
6480	Illawarra Escarpment Landscape Conservation Area	Wollongong LEP 2009	Macquarie Pass, NSW 2577	Local
6409	Kembla Heights Mining Village Heritage Conservation Area	Wollongong LEP 2009	Kembla Heights, NSW 2526	Local
7105	Mount Kembla Colliery including site of mine workings, portal, mine air shaft and pit pony stables	Wollongong LEP 2009	Harry Graham Drive Kembla Heights, NSW 2526	Local (Endorsed. State assessed) SHR nomination pending
11950	House remains	s 170	56 299142 E 618875 N	Local
2147	Remnants Of Original O'Brien's Road	Potential s 170	56 300124 E 619007 N	Local

On the basis of the statement of heritage impact (Attachment E), the proposed works will likely have no or little impacts on the heritage items.

Mitigation measures, detailed in Section 8 of the statement of heritage impact (Attachment E), should be taken to ensure the significance of these sites is protected.

Reference material

- Historic heritage assessment (Niche Environment and Heritage 2022c at Attachment D)
- Statement of heritage impact (Niche Environment and Heritage 2022d at Attachment E)

8.5 Social values

8.5.1 Recreation values

The Illawarra Escarpment SCA is located adjacent to a large population in the Wollongong area and the coastal communities to the north and south, as well as being easily accessed from Sydney and elsewhere via main roads and public transport. It forms part of a system of protected lands and open space that cater for a wide spectrum of outdoor recreation in the Illawarra.

The Illawarra Escarpment SCA provides a strong contrast to the urban attractions of Wollongong and other coastal communities, and its facilities complement those on adjacent or nearby lands. Attractions include the escarpment's spectacular scenery and rainforests, the plateau's diversity of wildflowers and native birds, the variety of cultural and historic heritage, a network of walking tracks, tracks for cycling, picnic facilities, scenic views and lookouts. These attractions provide local recreational opportunities and have the potential to be important for ecotourism in the Illawarra.

Mountain biking has grown in popularity in the Illawarra and across NSW 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.

Over 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 illegal, unsanctioned tracks throughout the proposal area.

The Illawarra Escarpment SCA is subject to heavy recreational pressure owing to the large neighbouring population, but is fragile because of 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 educational values. Hazards, such as cliffs, instability and disused mines, also limit the types and extent of recreational opportunities that can be provided. 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 F).

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. The Mount Kembla Lookout is located beneath a major overhead powerline that limits the aesthetic values of the site. The former Woodward Lookout (on the Woodward Track) has been closed owing to concerns about the stability of the site.

8.5.3 Education and scientific values

The wide range of natural and cultural attributes, and close 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 would improve conservation and sustainable use.

8.5.4 Interests of external stakeholders

The proposal would be located adjacent to the Metropolitan Special Area drinking water catchment. It is noted that the intended and projected increase in recreational use as part of the proposal poses a risk to the Metropolitan Special Area. This REF is supported by a neutral or beneficial effects assessment (Attachment G).

The exhibition of the draft REF revealed high level of public interest in the protection of the Illawarra Escarpment's biodiversity, landscape and cultural values; and interest in retaining some areas for low-key and passive recreational pursuits.

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 threatened species and ecological communities, and migratory species.

8.6.1 Species and communities

The species and communities listed in Table 18 have been recorded or are considered to have a moderate or high likelihood of occurring within the proposal area:

Table 18 Matters of national environmental significance known from or considered to have a moderate or high likelihood of occurrence in the proposal area

Common name	Scientific name	EPBC Act status	Likelihood of occurrence within the proposal area
Giant burrowing frog	<i>Heleioporus australiacus</i>	Vulnerable	Moderate
Large-eared pied bat	<i>Chalinolobus dwyeri</i>	Vulnerable	Moderate
Spotted-tailed quoll	<i>Dasyurus maculatus maculatus</i>	Endangered	Moderate
Grey-headed flying-fox	<i>Pteropus poliocephalus</i>	Vulnerable	Present
White-flowered wax plant	<i>Cynanchum elegans</i>	Endangered	High
Illawarra socketwood	<i>Daphnandra johnsonii</i>	Endangered	Moderate
Illawarra Subtropical Rainforest in the Sydney Basin Bioregion threatened ecological community		Critically endangered	Present

Reference material

- Matters of national environmental significance assessment (DAWE 2021 at Attachment I)
- Ecological assessment (Niche Environment and Heritage 2022b at Attachment C)

9. Impact assessment

9.1 Physical and chemical impacts during construction and operation

Is the proposed activity likely to...	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
1. Impact on soil quality or land stability?	☒	Low; negative	<p>The construction phase of the proposed activity will result in minor and temporary disturbance to the soil structure/land stability with: 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 1, Mount Kembla (the track network) would provide adequate mitigation of any potential soil erosion impacts from track usage. A maintenance regime would aid in identifying any dysfunctional drainage features requiring repair, especially following major rainfall events. Considering these factors, it is likely that where existing unsanctioned tracks would be upgraded, soil quality and land stability would be improved. This would be a positive impact.</p> <p>Furthermore, the geotechnical assessment (Attachment F) has indicated that 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>Construction phase</p> <p>Sediment control measures are to be in place prior to any vegetation clearing and track works and shall be maintained until run-off 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 would largely be carried out by hand, using handheld tools and plant (e.g. chainsaws and brush cutters). A mini-excavator would also be used, however, this would 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 and 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 if any spillage occurs 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</p>

Is the proposed activity likely to...	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
			<p>It is likely that some of the tracks traverse slow moving landslides exhibiting creep behaviour, however, these features are unlikely to 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 F).</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>proposed works period and works will cease, and open areas stabilised, if heavy rainfall is forecast.</p> <p>Erosion and sediment control measures are to be implemented and maintained to:</p> <ul style="list-style-type: none"> • prevent sediment moving off-site and sediment-laden water entering any watercourse, drainage lines or drain inlets • reduce water velocity and capture sediment on site • minimise the amount of material transported from site to surrounding pavement surfaces • if required, divert clean water around the site, in accordance with the blue book (Landcom 2004). <p>A construction environmental management plan (CEMP) will be prepared by the construction contractor and to the satisfaction of NPWS. The CEMP will detail all safeguards and mitigation measures related to the construction phase of the proposal.</p> <p>Operational phase</p> <p>Drainage features, rock armouring and other track features have been integrated into the design of the track network (see Attachment H for details and Appendix 1 for indicative locations) to minimise the potential for erosion and sedimentation.</p> <p>Entries and exits of drainage features will be rock-armoured to minimise potential soil erosion and run-off. 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>

Is the proposed activity likely to...	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
2. Affect a waterbody, watercourse, wetland or natural drainage system – either physically or chemically (e.g. due to run-off or pollution)?	☒	Low; negative	<p>The proposed track network is designed to follow the landscape contours. Drainage line crossings have been minimised, with only three 3rd order (or higher) crossings proposed. All other drainage line crossings are 1st or 2nd order ephemeral watercourses, requiring either raised track or rock-armoured crossings. These types of crossings would involve minimal physical alteration of the drainage line and are not likely to alter flow characteristics.</p> <p>Taking the above reasons into account and the proposed safeguards and mitigation measures, it is unlikely that the project would have more than a negligible impact on waterbodies, watercourses, wetlands or natural drainage systems as a result of the proposed activity.</p>	<p>Long-term maintenance schedules are to take into account the life cycle of materials that may harm the environment (e.g. fibre-reinforced plastic).</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 H 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 H for details) to minimise the potential for erosion and sedimentation. These features would have rock-armoured entries and exits to minimise potential sediment run-off.</p> <p>Bridges and raised track would be installed in sections of track that cross drainage features or where pooling occurs (see Attachment H for details).</p> <p>Track mats or similar will be utilised for machinery access over sensitive areas; machinery to cross perpendicular to drainage lines if required.</p>
3. Change flood or tidal regimes, or be affected by flooding?	☒	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 run-off 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 run-off velocity and concentration.</p>

Is the proposed activity likely to...	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
4. Affect coastal processes and coastal hazards, including those under climate change projections (e.g. sea level rise)?	<input type="checkbox"/>	NA	Coastal processes are not relevant to the proposal, including climate change or sea level rise projections.	
5. Involve the use, storage or transport of hazardous substances, or use or generate chemicals which may build up residues in the environment?	<input checked="" type="checkbox"/>	Negligible	<p>The proposed activity would involve the use or transport of hazardous substances or 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 would largely be carried out by hand, using handheld tools and plant (e.g. chainsaws and brush cutters). A mini-excavator would also be used, however, this would 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 3rd order streams.</p> <p>Contractors are to have, and be competent in the use of, petrochemical spill kits for use if any spillage occurs 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>
6. Involve the generation or disposal of gaseous, liquid or solid wastes or emissions?	<input checked="" type="checkbox"/>	Negligible	<p>The proposal is likely to involve the generation of gaseous, solid wastes and emissions. Gaseous emissions would be generated during construction and maintenance from the use of the machinery and equipment, although this is expected to be minor.</p> <p>During the operational phase, human waste would be generated. Toilet facilities will be provided outside of the</p>	<p>As above.</p> <p>During the construction phase, human faecal waste will be completely containerised in portable toilets, subject to regular servicing to empty and prevent overflow, and disposed of off-site as per legislative requirements.</p>

Is the proposed activity likely to...	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
7. Involve the emission of dust, odours, noise, vibration or radiation?	<input checked="" type="checkbox"/>	Negligible	<p>proposal area so will be assessed in a separate Part 5 assessment.</p> <p>The proposal would generate vegetation and excavated fill waste. This type of waste will be minimised through re-use 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, dispersed over a large area, it is likely that dust generation would be negligible.</p> <p>Helicopter activity during the construction phase would involve the generation of noise. However, helicopter operations would 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 amount 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 methodology would largely be by hand and small excavator, reducing noise.</p> <p>Helicopter delivery of material would 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

Is the proposed activity likely to...	Applicable?*	Likely 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
1. Affect any declared area of outstanding biodiversity value (under the BC Act) or critical habitat (under the FM Act)?	<input type="checkbox"/>	NA	NA	
2. Result in the 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', whilst the existing tracks incorporated into the network have been assessed as 'secondary clearing'. The proposal would result in unavoidable and direct impacts on native vegetation (see Table 11), namely the removal of approximately 3.80 ha of native vegetation for primary clearing, 1.96 ha of native vegetation for secondary clearing, and 0.13 ha of temporary impacts to native vegetation at material laydown areas. An additional 0.11 ha of cleared or exotic land would be subject to primary clearing.</p> <p>All areas disturbed temporarily will be regenerated post-works.</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>A test of significance (BC Act) (see Appendix 2 in Attachment C) and assessment of significance (EPBC Act) (see Appendix 3 in Attachment C) for the Illawarra Subtropical Rainforest TEC were conducted and are presented in Attachment C. 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</p>	<p>Only ground cover and understory vegetation will be modified or removed for the proposed activity.</p> <p>No mature or hollow-bearing trees will be removed.</p> <p>Prior to the clearing works, each track will be clearly marked out. Such marking may comprise star pickets with bunting or flagging to clearly demarcate the limit.</p>

Is the proposed activity likely to...	Applicable?*	Likely 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
3. Endanger, displace or disturb terrestrial or aquatic fauna, including fauna of conservation significance, or create a barrier to their movement?	☒	Low; negative	<p>the Illawarra Subtropical Rainforest TEC at risk of extinction.</p> <p>All 15 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. Furthermore, the proposal would not remove any hollow-bearing trees, stags, mature trees or termite mounds by utilising existing tracks or avoiding 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>On the basis of having a high likelihood to occur within the proposal area and also the proximity of the proposed works to ephemeral drainages or potential impacts due to construction works, a test of significance (BC Act) was conducted for both the red-crowned toadlet and giant burrowing frog (see Appendix 2 in Attachment C). An assessment of significance (EPBC Act) was also conducted for giant burrowing frog, which is listed under the EPBC Act (see Appendix 3 in Attachment C). 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>	<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, allowing for many of the direct impacts such as loss of shade and shelter or breeding opportunities to be avoided.</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>
4. Have a significant effect on protected flora, including conservation significance?	☒	Negligible	<p>Three/Four threatened subject flora are considered to have potential habitat (or known presence) within the proposal area:</p> <ul style="list-style-type: none"> white-flowered wax plant (<i>Cynanchum elegans</i>) 	<p>Prior to construction, the track alignment will be sited to avoid mature trees (including the threatened subject flora).</p> <p>A suitably qualified ecologist or NPWS personnel will be present during the track alignment siting to ensure that protected flora species are avoided.</p>

Is the proposed activity likely to...	Applicable?*	Likely 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
			<ul style="list-style-type: none"> • Illawarra socketwood (<i>Daphnandra johnsonii</i>) • scrub turpentine (<i>Rhodamnia rubescens</i>). <p>Given that they can be detected at any time of year (and they 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. It is considered unlikely that the threatened subject flora would be impacted by the proposal.</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>6. Contribute to a key threatening process to biodiversity or ecological integrity as listed under the BC Act or FM Act?</p>	<input checked="" type="checkbox"/>	<p>Low; negative</p>	<p>The 39 key threatening processes (KTPs) that are listed on the BC Act and/or EPBC Act as of June 2021 and are applicable to terrestrial environments, are shown in Table 18 of Attachment C.</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 would 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 would stay at site until the proposed works are completed.</p> <p>The only KTP that would occur as a result of the proposal is the removal of 3.80 ha of native vegetation for primary clearing and 1.96 ha of native vegetation for secondary clearing.</p> <p>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 would potentially reduce the creation of illegal mountain bike tracks along the Illawarra Escarpment and allow NPWS to rehabilitate unsanctioned tracks.</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 (e.g. wonga vine [<i>Pandorea pandorana</i>] and scrambling lilly [<i>Geitonoplesium cymosum</i>]) would 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>

Is the proposed activity likely to...	Applicable?*	Likely 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
7. Introduce 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 would increase the potential for the introduction of weeds 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>
9. Affect any 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

Is the proposed activity likely to...	Applicable?*	Likely 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
1. Affect community services or infrastructure?	☒	Medium; positive	<p>The proposed track network would provide high-quality mountain biking infrastructure for visitors to the proposal area.</p> <p>The implementation of the track network would ultimately result in unsanctioned tracks (those not being incorporated into the network) being closed and rehabilitated, including those at Mount Keira.</p> <p>Considering that the proposal would provide additional recreational infrastructure, it is likely that the proposal would, overall, improve community services and infrastructure.</p> <p>A detailed assessment of social impacts is provided in the social impact comment (Attachment B).</p>	Mitigations measures from Section 5 of the social impact comment (Attachment B) should be implemented.
2. Affect sites of importance to local or the broader community for their recreational or other values or access to these sites?	☒	Medium; positive	<p>The proposed track network would affect the Illawarra Escarpment SCA, which is an important site to the local and broader community. The track network would provide enhanced recreational access and opportunities to the area for all levels of mountain biking. It is understood that the Illawarra Escarpment SCA is a valued site for bushwalking. The track network is designed to keep riders on the network, and minimising rider and walker interaction.</p> <p>The project is not designed or 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>The track network is expected to result in an increase of visitors to the Illawarra Escarpment SCA.</p>	<p>Track network designed to be single-use (i.e. 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>

Is the proposed activity likely to...	Applicable?*	Likely 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
3. Affect economic factors, including employment, industry and property value?	<input checked="" type="checkbox"/>	Low; positive	<p>Taking the above reasons into account there may be an overall medium positive impact to the broader community in relation to recreational and other values as a result of the proposed activity.</p> <p>The track project is likely to have a significant positive impact on the Wollongong economy (PPM Economics 2021 at Appendix G of Attachment B). The benefits will likely accrue from users in the form of additional recreation opportunities. Benefits are also likely to accrue from the broader economy and society through increased spending by mountain bike riders, increased health, increased productivity, increased human capital, and better criminal and social justice outcomes. The project is also likely to result in benefits from increased tourism.</p> <p>The initial social impact comment is based on an estimate of 175,000 visitors utilising the network per year. NPWS is currently undertaking data collection and modelling to qualify projected numbers to inform the final social impact assessment and Wollongong City Council's infrastructure assessments. The updated data will be incorporated into the final REF and assessments updated where appropriate.</p>	None required.
4. Have an 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 track network will be constructed to IMBA standards to maximise the safety of riders.</p> <p>The closure and rehabilitation of unsanctioned tracks has the potential to improve safety outcomes, as the majority of riders can use formalised tracks with known access points and routes for emergency and first aid response.</p> <p>Further improvements to community safety would be achieved by creating a formal network designed to be single-use (for mountain biking), reducing potential for interaction.</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 inform users of hazards along the track.</p>

Is the proposed activity likely to...	Applicable?*	Likely 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
5. Cause a bushfire risk?	<input checked="" type="checkbox"/>	Negligible	<p>The proposed activity is likely to result in an increase in visitors 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 construction phases of the project would pose a bushfire risk. However, these risks would be mitigated by following NPWS construction procedures regarding bushfire risk. These procedures will be incorporated into the CEMP.</p>	<p>Regular track inspections and maintenance schedule will ensure track features are functioning correctly.</p> <p>The 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 the NPWS safety procedures.</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 (e.g. long grass).</p> <p>Interpretive material will include information about bushfire risk.</p>
6. Affect the visual or scenic landscape?	<input checked="" type="checkbox"/>	Low; negative	<p>During the construction phase, there would be a temporary visual impact from the activity of work crews, helicopter material drops and storage of materials.</p> <p>Temporary signage would 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 each track predominately under 1 m.</p> <p>The track network includes at least 211 signs throughout the network (Appendix 2j). However, this signage would not obstruct any views and would be designed to have a</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>

Is the proposed activity likely to...	Applicable?*	Likely 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
7. Cause noise, pollution, visual impact, loss of privacy, glare or overshadowing to members of the community, particularly adjoining landowners?	<input checked="" type="checkbox"/>	Negligible	<p>low visual impact. The tracks are not likely to be visible in views of the escarpment.</p> <p>Therefore, it is unlikely that the project would have more than a low negative visual or scenic impact.</p> <p>Through an anticipated increased visitation to the proposal area, the project is likely to cause increased noise and visual impact to landowners at Kembla Heights Village and Mount Kembla. There may also be a loss of privacy to the immediate neighbours of the track network. However, there is ample evidence from NPWS (reports) to indicate that the Illawarra Escarpment SCA is already a popular site for visitors, including mountain bike riders using existing unsanctioned tracks.</p> <p>By creating a formal track network, the project is likely to create more certainty to the local community about where mountain biking is permitted and can be expected.</p> <p>The signage used throughout the network would be designed to reduce glare for non-intended viewers.</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 would be undertaken between 7 am to 5:30 pm on weekdays, and 7 am to 12:00 pm on Saturdays. No work will be undertaken on Sundays or public holidays.</p>

9.4 Natural resource impacts during construction and operation

Is the proposed activity likely to...	Applicable?*	Likely 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
1. Result in the degradation of the park or any other area reserved for conservation purposes?	<input checked="" type="checkbox"/>	Low; negative	<p>The track network has been designed to have minimal impact on the natural resources of the proposal area. 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 would be micro-sited to avoid mature and hollow-bearing trees.</p> <p>The proposal would involve the removal of approximately 3.80 ha of native vegetation for primary clearing, and 1.96 ha of native vegetation for secondary clearing.</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 would be developed by NPWS for the construction phase. The weed management plan would be incorporated into the CEMP.</p>
2. Affect the use of, or the community's ability to use, natural resources?	<input checked="" type="checkbox"/>	Medium; positive	<p>The project would 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 proposal would be partially located adjacent to the Metropolitan Special Area (see Figure 1). As per requests</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>

Is the proposed activity likely to...	Applicable?*	Likely 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>from WaterNSW, a neutral or beneficial effects assessment has been prepared in support of this REF (Attachment G). The project is likely to have a neutral effect on water quality within the Kembla Creek catchment, considering the design standards of the track network, which are designed to reduce erosion potential and soil degradation.</p>	
<p>3. Involve the use, wastage, destruction or depletion of natural resources including water, fuels, timber or extractive materials?</p>	<input checked="" type="checkbox"/>	<p>Negligible</p>	<p>The proposal would involve the removal of approximately 3.80 ha of native vegetation for primary clearing, 1.96 ha of native vegetation for secondary clearing. The track network has been designed to incorporate existing unsanctioned tracks where suitable.</p> <p>Where NPWS approves, rock would 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 to be used 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 would 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 would be sourced from a certified supplier and would be consistent with the geology of the proposal area.</p>
<p>4. Provide for the sustainable and efficient use of water and energy?²</p>	<input checked="" type="checkbox"/>	<p>Negligible</p>	<p>The project would require the use of machinery during the construction phase.</p> <p>During the operational phase, energy use would be limited to the maintenance of the track network.</p>	<p>All machinery will be in good working condition.</p>

9.5 Aboriginal cultural heritage impacts during construction and operation

Is the proposed activity likely to...	Applicable?*	Likely 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
1. Disturb the ground surface or any culturally modified trees?	☒	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. It is anticipated that the proposed development of the mountain bike tracks through the proposal area (including future usage of the tracks) may result in the harm of the following Aboriginal cultural heritage sites:</p> <ul style="list-style-type: none"> • Mount Kembla; O'Briens Gap (AHIMS ID# 52-2-0859) • MK 1 (AHIMS ID# 52-2-4860) • MK 2 (AHIMS ID# 52-2-4861) • MK 3 (AHIMS ID# 52-2-4862) • MK 7 (AHIMS ID# 52-2-4740). <p>Where harm cannot be avoided, management measures are warranted to mitigate the loss of values to Aboriginal sites, objects and values that would result from the proposed activity. 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 the Aboriginal cultural heritage assessment (see Table 34 of 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 would be removed or trimmed as part of the proposal.</p> <p>Implement the recommendations in the Aboriginal cultural heritage assessment and cultural values assessment (Attachment A).</p> <p>Recommendations in the Aboriginal heritage assessment include the avoidance of Aboriginal sites through minor adjustments to the alignment where practicable.</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>

Is the proposed activity likely to...	Applicable?*	Likely 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
2. Affect or occur in close proximity to known Aboriginal objects or Aboriginal places?	<input checked="" type="checkbox"/>	Low; negative	<p>The proposal would increase visitation to the proposal area for activities that are discordant with the cultural values of the Djembla Djeera Cultural Landscape.</p> <p>The proposed track alignments have been sited to avoid Mount Keira and the Mount Kembla summit. The development of the proposal would allow NPWS to close unsanctioned tracks on Mount Keira.</p> <p>Should the Aboriginal place nomination of Djeera Mount Keira and Five Islands be gazetted by Heritage NSW, then the works for the Illawarra Escarpment Mountain Bike Track Network 1, Mount Kembla project that fall within the boundaries of the Aboriginal place will require an AHIP in accordance with the NPW Act.</p>	Implement the mitigation measures and recommendations in the Aboriginal cultural heritage assessment and cultural values assessment (Attachment A).
3. Affect areas: <ul style="list-style-type: none"> - within 200 m of waters - within a sand dune system - on a ridge top, ridge line or headland - within 200m below or above a cliff face - within 20m of or in a cave, rock shelter or a cave mouth? If so, can impacts be avoided? How?	<input checked="" type="checkbox"/>	Low; negative	<p>The proposal would 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 above reasons into account and 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).
4. Affect wild resources which are used or valued by the Aboriginal community or affect access to these resources?	<input checked="" type="checkbox"/>	Low; negative	The proposal would increase visitation to the proposal area for activities that are discordant with the cultural values of the Djembla Djeera Cultural Landscape. This could negatively impact the access to wild resources valued by the Aboriginal community.	Implement the mitigation measures and recommendations in the Aboriginal cultural heritage assessment and cultural values assessment (Attachment A).

Is the proposed activity likely to...	Applicable?*	Likely 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
5. Affect access to culturally sensitive locations?	<input checked="" type="checkbox"/>	Low; negative	<p>As the proposed tracks are single-use riding tracks, this may negatively impact access to sites within the Djembla Djeera Cultural Landscape.</p> <p>The proposal would increase visitation to the proposal area for activities that are discordant with the cultural values of the Djembla Djeera Cultural Landscape.</p> <p>As the proposed tracks are single-use riding tracks, this may negatively impact access to sites within the Djembla Djeera Cultural Landscape.</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

Is the proposed activity likely to...	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
1. Impact on places, buildings, landscapes or moveable heritage items?	<input checked="" type="checkbox"/>	Low; negative	On the basis of the statement of heritage impact (Attachment E), the proposal works will likely have no or little impacts on the heritage items.	<p>Any approvals required under the Heritage Act will be obtained.</p> <p>Implement the mitigation measures and recommendations in the statement of heritage impact (Attachment E).</p> <p>If any historic heritage items or places are observed during the construction phase of the proposed activity, then work is to cease immediately and the NPWS is to be notified and appropriate measures are to be implemented.</p>
2. Impact on vegetation of cultural landscape value (e.g. gardens and settings, introduced exotic species,	<input type="checkbox"/>	NA	NA	

Is the proposed activity likely to...	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
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or evidence of broader remnant land uses)?

9.7 Matters of national environmental significance under the EPBC Act

Is the proposal likely to impact 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
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1. Listed threatened species or ecological communities)?



Low; negative

There is one TEC (Illawarra Subtropical Rainforest) and one threatened fauna species (giant burrowing frog) listed under EPBC Act with the potential to be impacted by the proposal.

The proposal would not result in an increase in the level of fragmentation for the existing remnant Illawarra Subtropical Rainforest patch. The increased fragmentation within the midstory and understory layers of the vegetation via the introduction of narrow mountain bike tracks (generally 0.9 m) is unlikely to reduce seed dispersal and animal dispersal for some species that are currently able to move between patches of the TEC.

The EPBC Act assessment concludes that the Illawarra Subtropical Rainforest habitat to be impacted is classed as habitat critical to the survival of the TEC (Attachment C). There will be a small impact in the extent of Illawarra Subtropical Rainforest TEC from the proposal (0.56 ha) (<0.01% in the locality) through primary and secondary clearing and the use of one helicopter drop zone. All other areas of the TEC have been avoided, therefore based on EPBC Act guidelines, the proposal is not likely

The canopy layer and any large shrubs will be left intact. A weed management plan will be developed and implemented for the construction phase of the proposal. Track network has been designed to incorporate existing tracks where feasible. Following the construction phase, material drop zones and laydown areas will be regenerated to prevent potential weed invasion and unauthorised access.

Is the proposal likely to impact 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
			<p>to have a significant impact on the Illawarra Subtropical Rainforest TEC.</p> <p>The proposal would remove up to 5.76 ha of native vegetation through both primary and secondary clearing, some of which may provide habitat for the giant burrowing frog. However, given that impacts are relatively minor, the proposal area is likely to continue to provide habitat for the species. The proposal is considered unlikely to have a significant impact on the giant burrowing frog.</p>	
2. Listed migratory species?	<input type="checkbox"/>	NA	NA	
3. The ecology of Ramsar wetlands?	<input type="checkbox"/>	NA	NA	
4. Commonwealth marine environment?	<input type="checkbox"/>	NA	NA	
5. World Heritage values of world heritage properties?	<input type="checkbox"/>	NA	NA	
6. The national heritage values of national heritage places?	<input type="checkbox"/>	NA	NA	

9.8 Cumulative impacts

That part of the Illawarra Escarpment Mountain Bike Track Network 1, Mount Kembla proposed for NPWS-managed lands is not happening in isolation. As identified elsewhere in this REF, the network will extend onto other lands which are subject to a separate development assessment and approval pathway under the EP&A Act.

In addition, there are several other projects currently happening or planned for Illawarra Escarpment SCA and neighbouring lands. These include the Great Southern Walk and the associated proposed development of a campground at Balgownie. 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.

9.8.1 Native vegetation clearing

This section details the vegetation disturbance associated with the entire proposed track network in Network 1 – Mount Kembla (including NPWS and non-NPWS land). Sections of track located on non-NPWS land will be assessed in a separate Part 4 assessment. The *Ecological assessment Illawarra Escarpment Mountain bike concept plan planning and assessment services* (Niche Environment and Heritage 2022b at Attachment C) has assessed the proposal holistically, inclusive of all tenures, including formal tests of significance under the BC Act and EPBC Act. These supporting assessments have enabled to cumulative impacts to be taken into consideration in this REF.

These cumulative assessments have concluded that threatened ecological communities (TECs) and threatened fauna species listed under the BC Act and EPBC Act are unlikely to be significantly affected by the proposal.

It is noted that at this stage of the proposal, ancillary features such as parking and amenities would not require vegetation clearing and therefore have not been considered as a cumulative impact. These ancillary features would be subject to assessment under Part 4 of the EP&A Act, or as exempt development under Part 5 where located on Wollongong City Council land.

A summary of native vegetation clearing, and disturbance associated with the entire Network 1 inclusive of all land tenures is presented in Table 19. Refer to Table 11 for a summary of native vegetation clearing and disturbance associated with the proposal area (predominantly NPWS land).

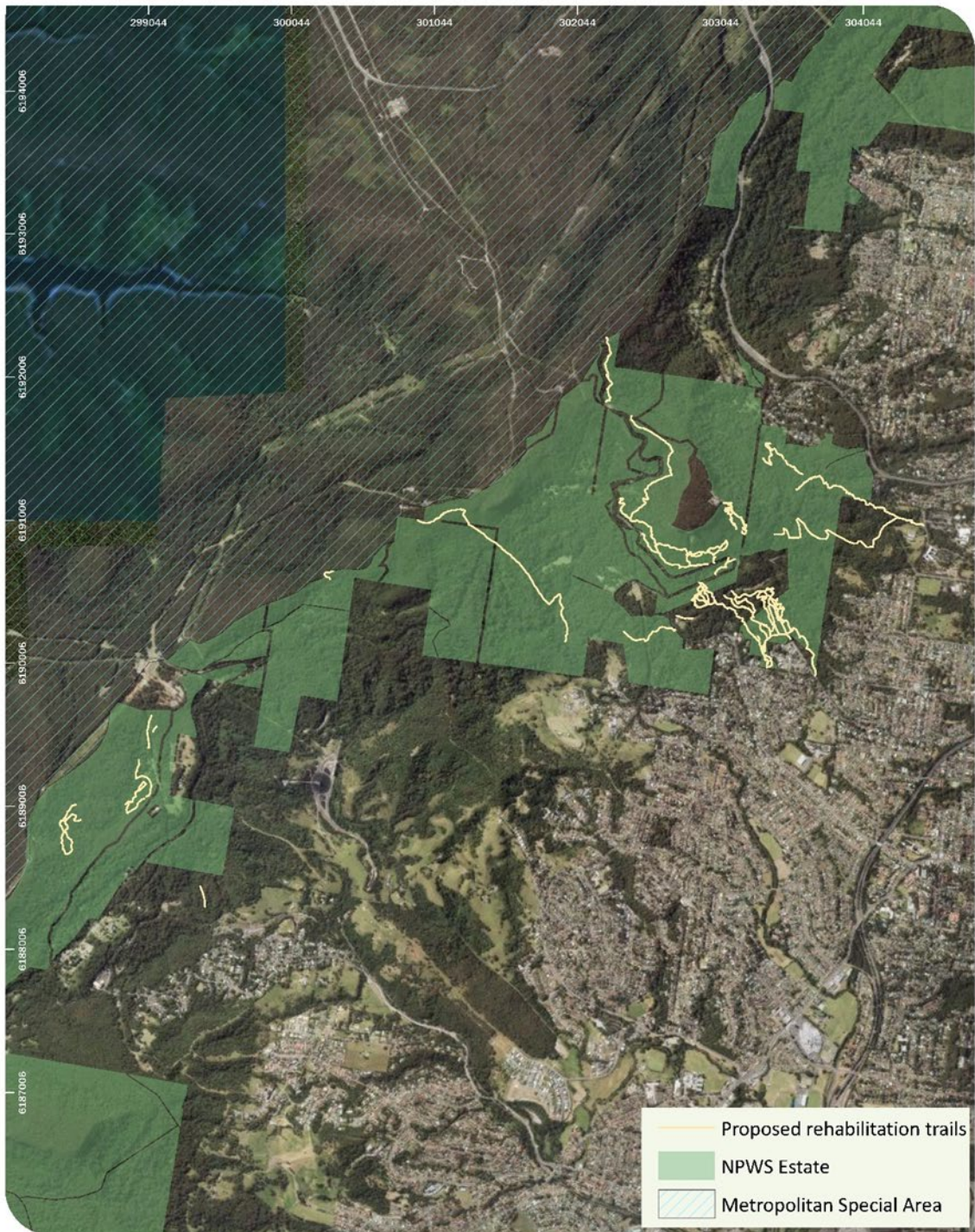
Table 19 Summary of construction impacts to each plant community type (PCT) in Network 1 – Mount Kembla (inclusive of all land tenures)

Plant community type	Primary clearing (new tracks) for construction (ha)	Secondary clearing (existing tracks) for construction (ha)	Temporary disturbance from material laydown areas (ha) (number of zones)	Total impact area (ha)
878 Gully Gum – Sydney Peppermint – Yellow Stringybark moist open forest of coastal escarpments, southern Sydney Basin Bioregion	1.03	0.78	0.02 (8 zones)	1.82

Plant community type	Primary clearing (new tracks) for construction (ha)	Secondary clearing (existing tracks) for construction (ha)	Temporary disturbance from material laydown areas (ha) (number of zones)	Total impact area (ha)
905 Lilly Pilly – Coachwood warm temperate rainforest on moist sheltered slopes and gullies, Sydney Basin Bioregion and South East Corner Bioregion	0.97	0.49	0.05 (18 zones)	1.51
906 Lilly Pilly – Sassafras – Stinging Tree subtropical/warm temperate rainforest on moist fertile lowlands, southern Sydney Basin Bioregion	0.40	0.05	0.02 (6 zones)	0.47
1156 Silvertop Ash – Red Bloodwood – Sydney Peppermint heathy open forest on moist sandstone plateaux, southern Sydney Basin Bioregion	0.01	Nil	Nil	0.01
1245 Sydney Blue Gum x Bangalay – Lilly Pilly moist forest in gullies and on sheltered slopes, southern Sydney Basin Bioregion	1.89	0.91	0.08 (32 zones)	2.88
Native Vegetation Subtotal	4.30	2.24	0.16 (64 zones)	6.69
Blank Unmapped PCT area inundated with invasive flora species (mapped as cleared NPWS 2002b)	0.13	Nil	Nil	0.13
Total	4.43	2.24	0.16 (64 zones)	6.82

Numbers have been rounded to 2 decimal points.

9.8.2 Rehabilitation of unsanctioned tracks



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Client: NPWS

Proposed rehabilitation of unsanctioned trails
Illawarra Escarpment Mountain Bike Concept Plan

Figure 9

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Figure 20 As noted in Section 7, NPWS has committed to close and rehabilitate unsanctioned tracks (that are not incorporated into the proposal) within the Illawarra Escarpment SCA, particularly those on Mount Keira. NPWS has identified 20.05 km of track to be targeted for rehabilitation.

The rehabilitation of unsanctioned tracks is not within the scope of this REF and will be subject to further assessment by NPWS. However, the positive cumulative impact from the rehabilitation on native vegetation is considered below (Table 20).

The lengths of unsanctioned tracks proposed for rehabilitation (20.05 km) is of similar magnitude to the lengths of unsanctioned tracks proposed to be formalised within the track network (19.43 km) (Table 4). It is worthwhile noting that 1 km of track traversing the Illawarra Subtropical Rainforest TEC (comprised of PCTs 906 and 1300) would be rehabilitated (Table 20), which would constitute a positive impact.

The rehabilitation would be conducted in accordance with a vegetation rehabilitation management plan, which will include:

- mapping of the extents 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 rehabilitation of unsanctioned tracks, particularly on Mount Keira, would likely constitute a positive impact given that it has been stated as an important site within the highly significant Djembla Djeera Cultural Landscape.

Table 20 Summary of the extent of tracks identified for rehabilitation by NPWS with corresponding PCTs

Plant community type	Length of tracks identified for rehabilitation (km)	Approximate rehabilitation area *(ha)
694 Illawarra Escarpment Blackbutt forest	0.68	0.07
878 Gully Gum – Sydney Peppermint – Yellow Stringybark moist open forest of coastal escarpments, southern Sydney Basin Bioregion	1.10	0.11
905 Lilly Pilly – Coachwood warm temperate rainforest on moist sheltered slopes and gullies, Sydney Basin Bioregion and South East Corner Bioregion	4.81	0.48
*906 Lilly Pilly – Sassafras – Stinging Tree subtropical/warm temperate rainforest on moist fertile lowlands, southern Sydney Basin Bioregion	0.50	0.05
1156 Silvertop Ash – Red Bloodwood – Sydney Peppermint heathy open forest on moist sandstone plateaux, southern Sydney Basin Bioregion	0.24	0.02
1245 Sydney Blue Gum x Bangalay – Lilly Pilly moist forest in gullies and on sheltered slopes, southern Sydney Basin Bioregion	7.39	0.74

Plant community type	Length of tracks identified for rehabilitation (km)	Approximate rehabilitation area *(ha)
*1300 Whalebone Tree - Native Quince dry subtropical rainforest on dry fertile slopes, southern Sydney Basin Bioregion	0.50	0.05
Blank Unmapped PCT area inundated with invasive flora species (blank or mapped as cleared NPWS 2002b)	4.83	0.48
Total	20.05	2.00

Numbers have been rounded to 2 decimal points.

A nominal width of 1 m has been assumed in order to estimate the rehabilitation area.

*PCTs 906 and 1300 correspond to the Illawarra Subtropical Rainforest in the Sydney Basin Bioregion TEC.

Table 21 Summary of proposed tracks and rehabilitation

	Unsanctioned Tracks to be upgraded and included in network (kms)	New tracks (kms)	Unsanctioned tracks to be rehabilitated (kms)	Cumulative impact (new tracks less rehab tracks)
NPWS Land	16.28	27.61	15.56	28.33
All land (NPWS, South 32, Sydney Water)	3.07	4.00	4.49	2.58
Total	19.34	31.61	20.05	30.90

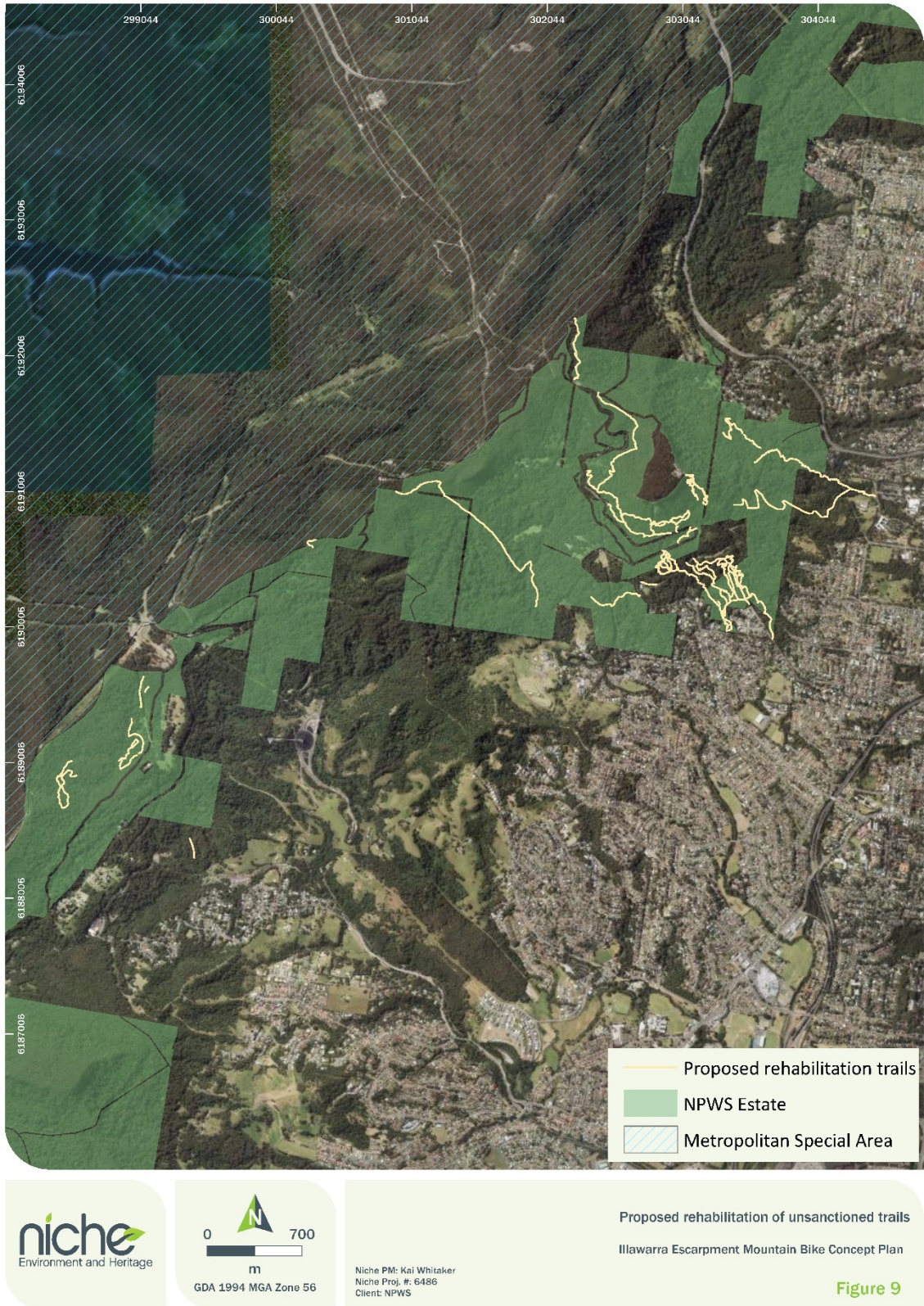


Figure 21 Location of unsanctioned tracks proposed for rehabilitation

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 22 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

Category of impact	Significance of impacts		Environmentally sensitive features
	Extent of impact	Nature of impact	
	Low; negative	Increased visitation and ground disturbance	Djembla Djeera Cultural landscape of high significance
	Low; negative	Affect access to wild resources which are used or valued by the Aboriginal community	
	Low; negative	Affect access to culturally sensitive locations	

In conclusion and based on the summary of impacts in Table 22 there is not likely to be a significant effect on the environment and an environmental impact statement is not required. This REF has considered each of the factors listed in s 171 of the EP&A 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 C) 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 C). 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 and nominated Knowledge Holders.

Attachment	Document title	Author	Date
A	Aboriginal cultural heritage assessment	Niche Environment and Heritage	December 2022a
B	Social impact comment	Element Environment	June 2022
C	Ecological assessment	Niche Environment and Heritage	November 2022b
D	Historic heritage assessment	Niche Environment and Heritage	June 2022c
E	Statement of heritage impact	Niche Environment and Heritage	June 2022d
F	Geotechnical assessment and landslide risk assessment	GHD	March 2022
G	Neutral or beneficial effects (NorBE) assessment	Niche Environment and Heritage	October 2021
H	Track network built features guide	Bennett Murada Architects	August 2021
I	Matters of national environmental significance search report	Department of Agriculture Water and the Environment	June 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

3 November 2022

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):

4. 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', Dirt Art.
- DPI (Department of Primary Industries NSW) (2013) 'Policy and guidelines for fish habitat conservation and management' (update 2013), NSW DPI.
- DPIE (Department of Planning, Industry and Environment NSW) (2016) *Bionet Vegetation Classification, Illawarra Plant Community Type Vegetation Map, 2016*. VIS_ID 4678.
- DPIE (Department of Planning, Industry and Environment NSW) (2021) Illawarra-Shoalhaven regional plan 2041
- EPA (Environment Protection Authority NSW) (2020) 'Draft construction noise guideline [PDF 646KB], EPA, Parramatta.
- Evju M, Hagen D, Jokerud M, Olsen SL, Kjendlie Selvaag S and Vistad OI (2021) 'Effects of mountain biking versus hiking on tracks under different environmental conditions', *Journal of Environmental Management*, 278(2): 111554, ISSN 0301-4797.
- Hazelton P, Tillie P (2010) 'The Wollongong – Port Hacking 1:100,000 Soil Landscape Series Sheet' 9029-9129 (Edition 1). NSW Department of Environment, Climate Change and Water.
- Heritage Office NSW (2000) 'Assessing heritage significance [PDF 767KB], NSW Heritage Manual update, Heritage Office, Sydney.
- Landcom (2004) 'Managing urban stormwater: soils and construction (4th Edition)', National Landcom, NSW Government.
- NPWS (National Parks and Wildlife Service) (2016) *Parks facilities manual* [unpublished report], NPWS, Sydney.
- NPWS and WCC (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.
- NPWS (2002a) 'Bioregional Assessment Study (Part I): Native vegetation of the Illawarra Escarpment and Coastal Plain: a project arising from the Commission of Inquiry into the long-term planning and management of the Illawarra Escarpment, Wollongong Local Government Area [PDF 7.1MB], NSW National Parks and Wildlife Service, Sydney.
- NPWS (2020b) '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 track 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, 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.

Wollongong City Council (2020), Wollongong local strategic planning statement 2020

More information

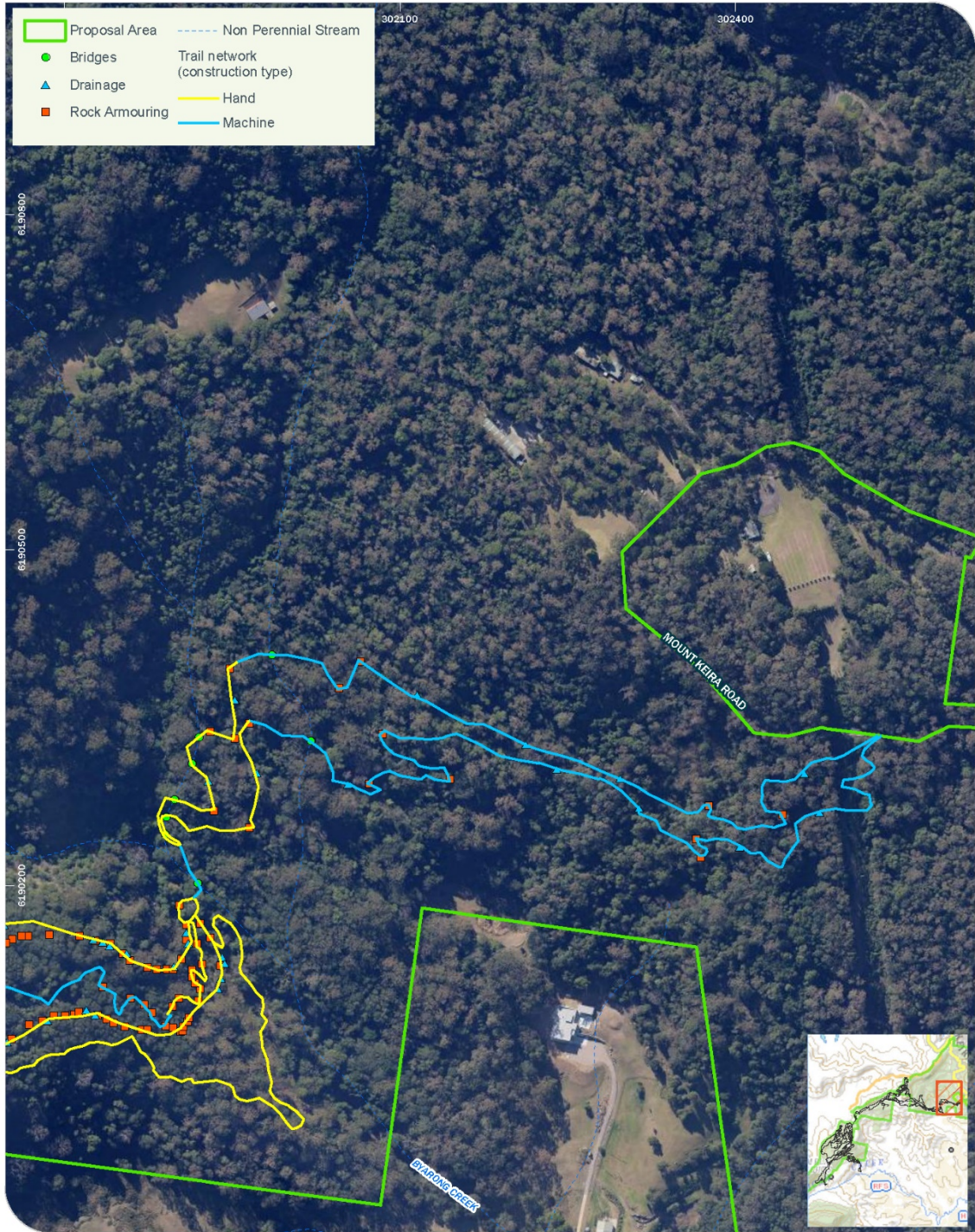
- Indigenous land use agreements
- NPWS policies and procedures:
 - Cycling policy
 - Landslides and rockfalls policy
 - Visitor safety policy
- Acts, regulations and environmental planning instruments:
 - Biodiversity Conservation Act 2016
 - Biosecurity Act 2015
 - Environmental Planning and Assessment 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 (Planning Systems) 2021
 - 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
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

Appendix 1 – Locations of bridges, drainage features and rock armouring within the track network

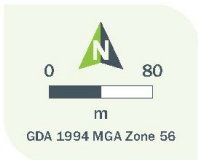
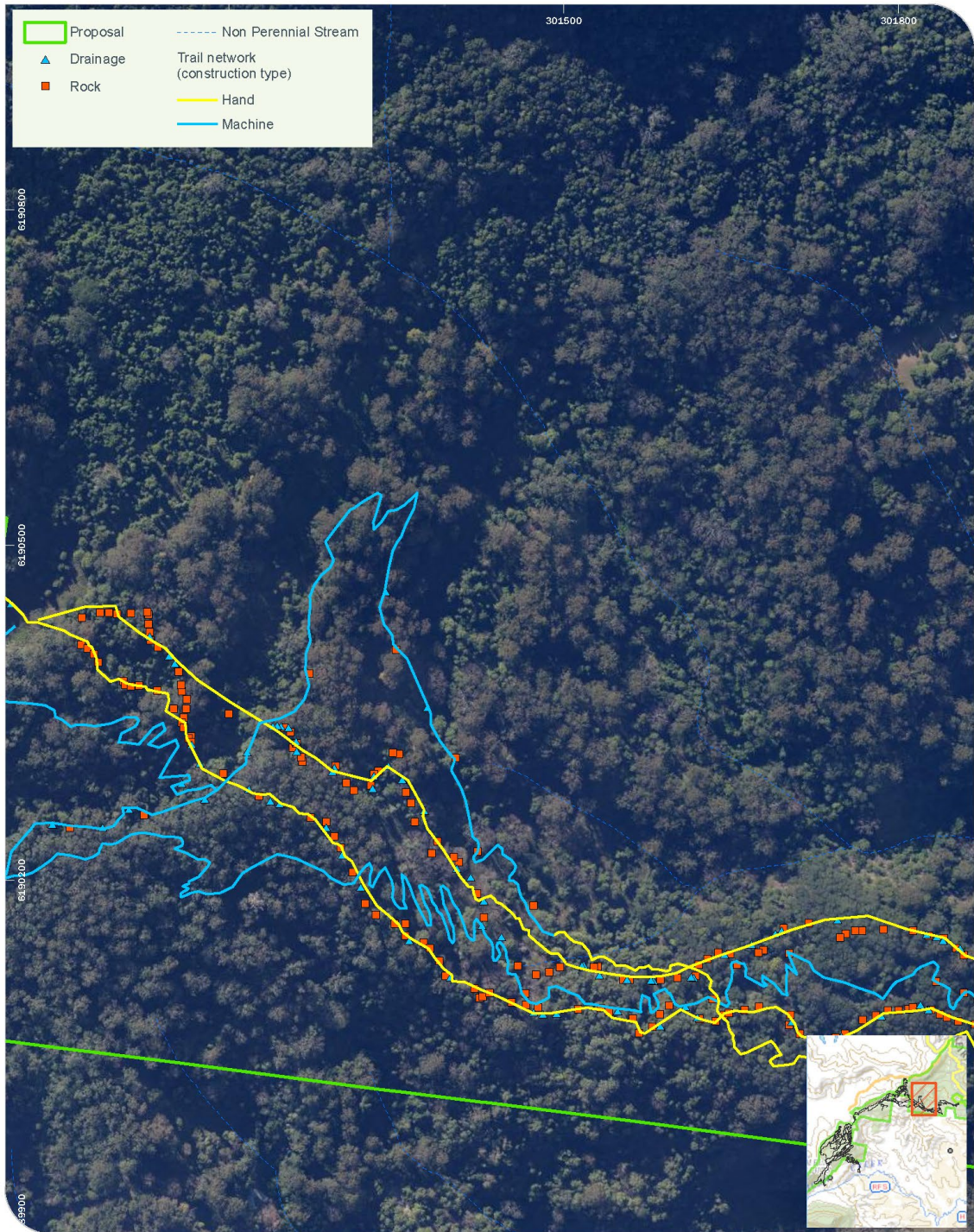


Bridges, Drainage and Rock Armouring
 Illawarra Escarpment Mountain Bike Concept Plan

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 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Appendix 1a

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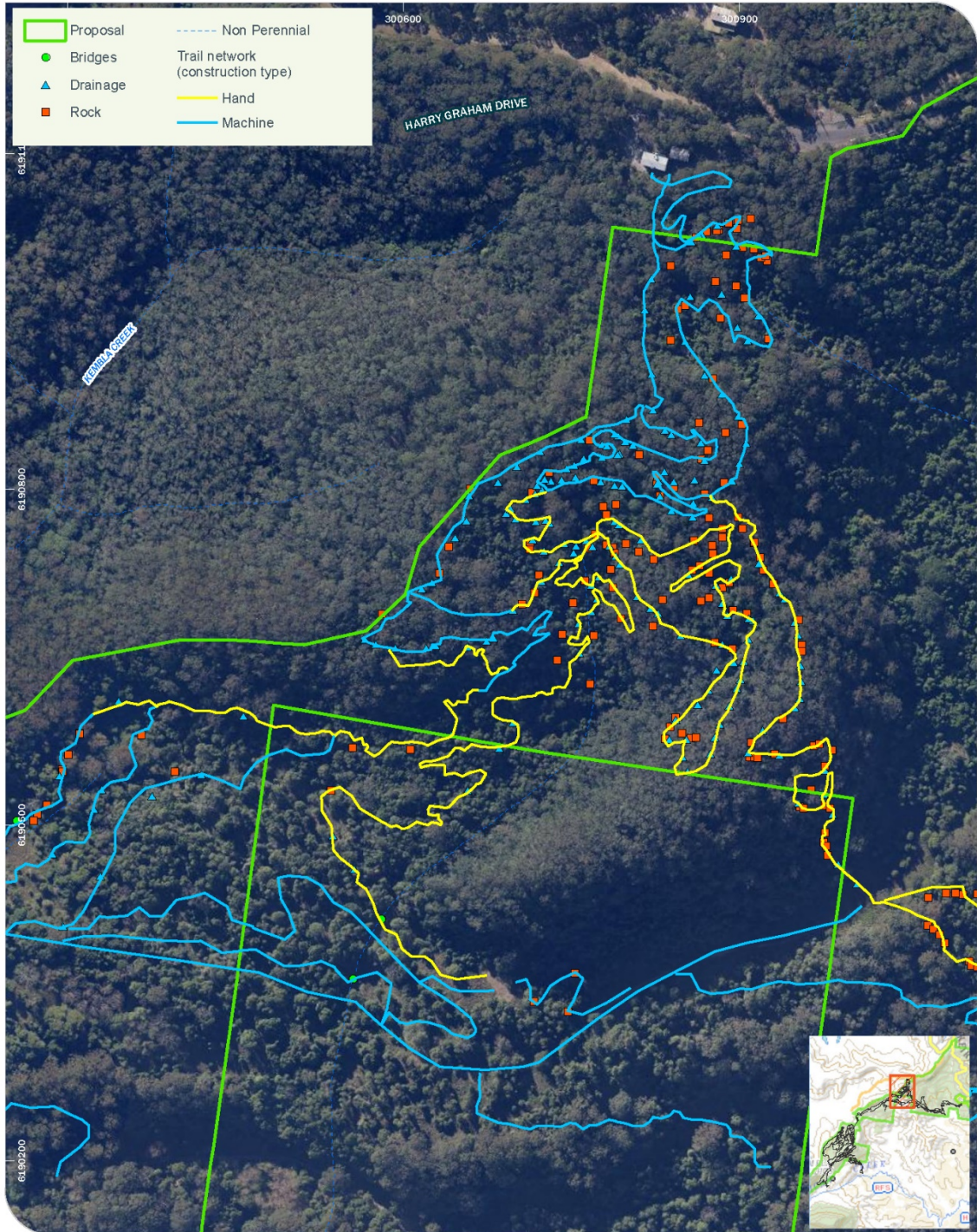


Bridges, Drainage and Rock Armoring
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Appendix 1b

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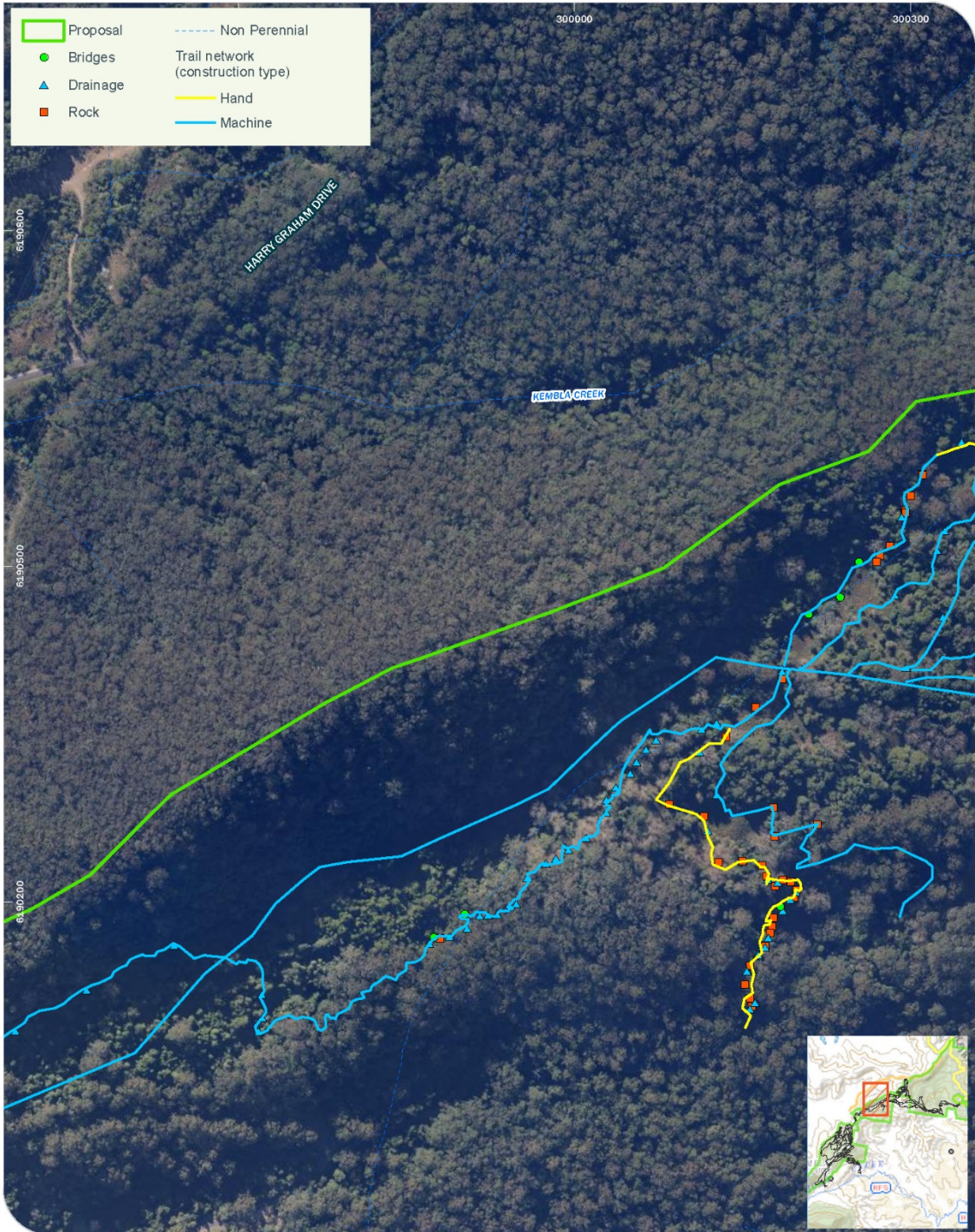


Bridges, Drainage and Rock Armoring
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Appendix 1c

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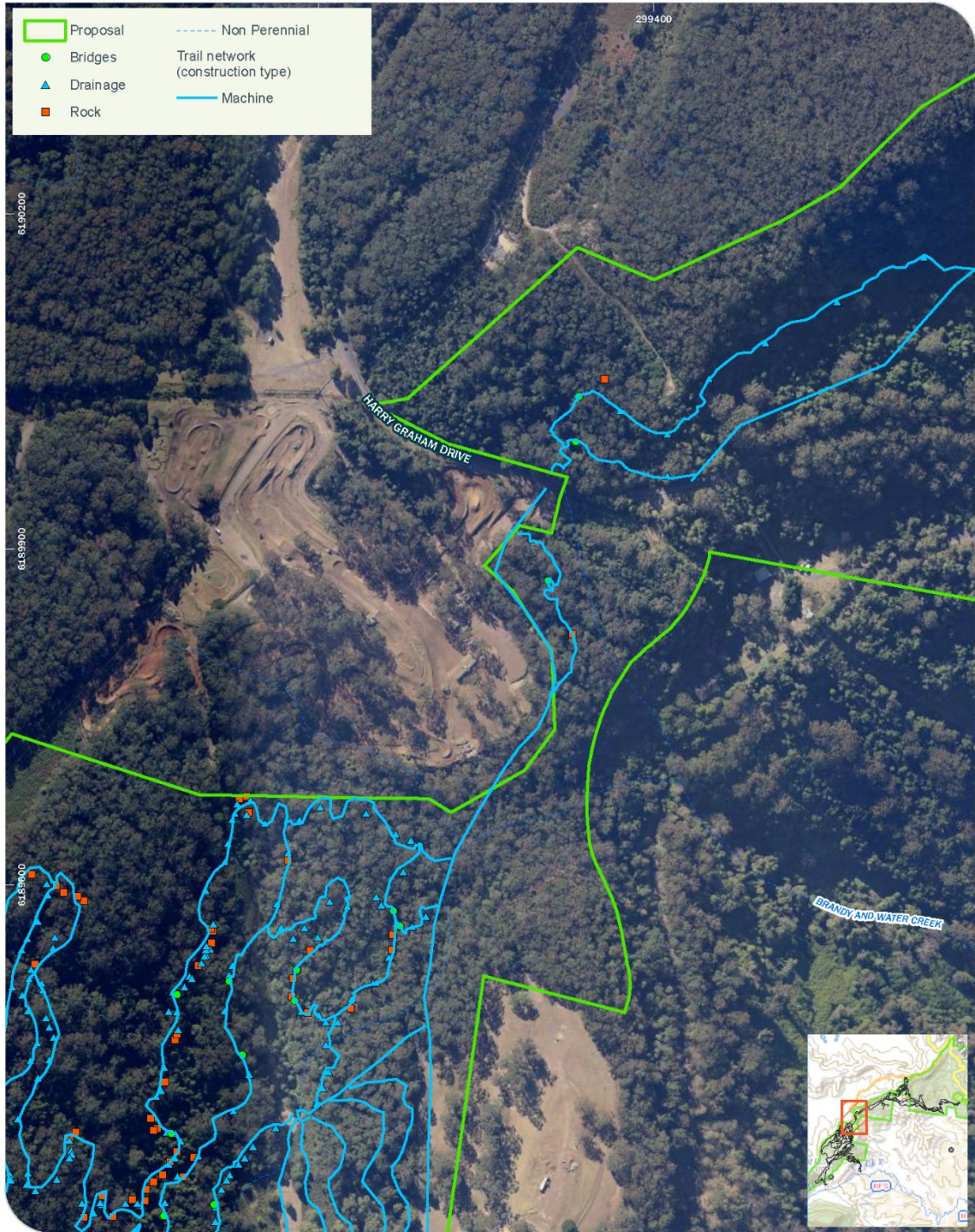


Bridges, Drainage and Rock Armoring
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Appendix 1d

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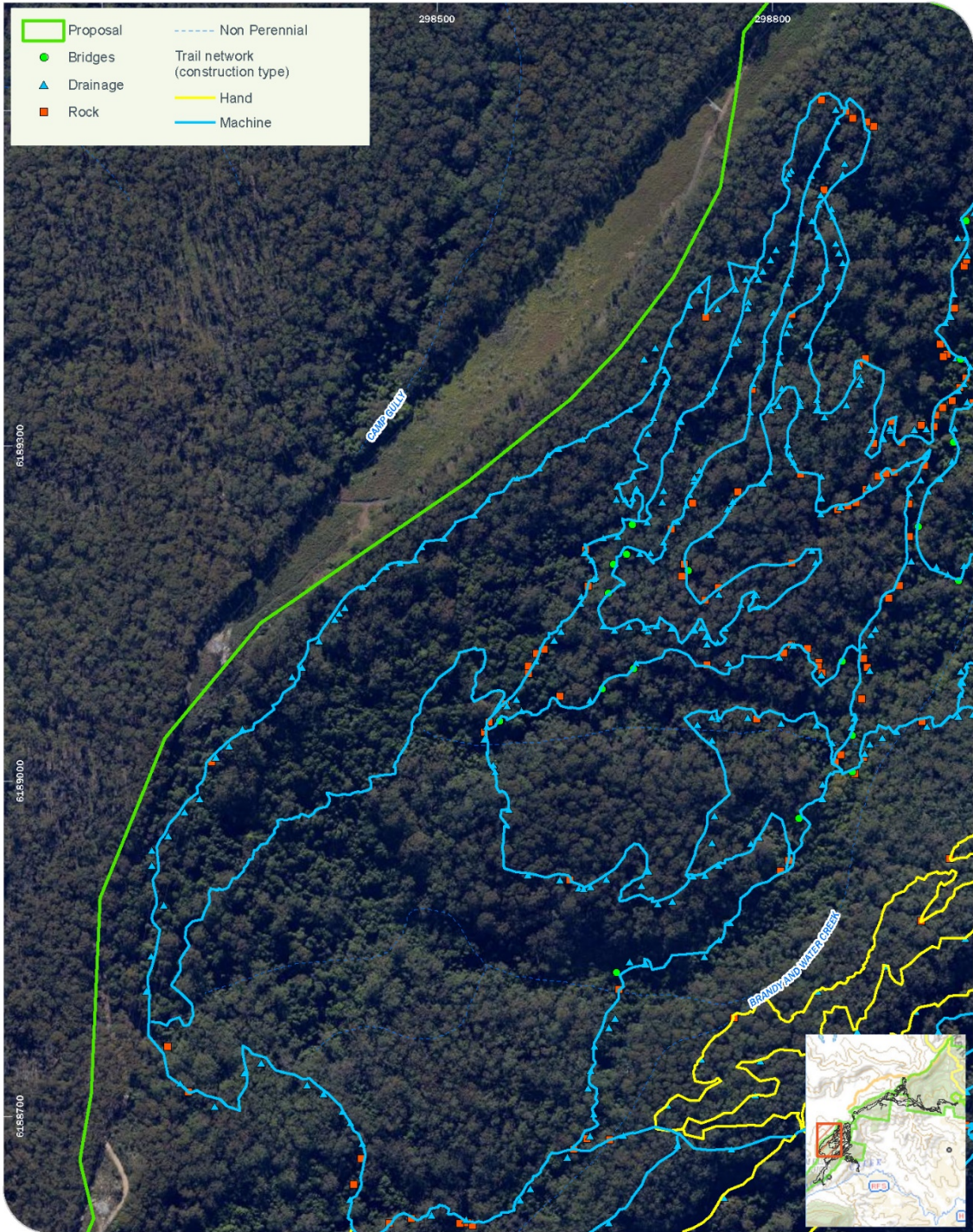


Bridges, Drainage and Rock Armouring
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Appendix 1e

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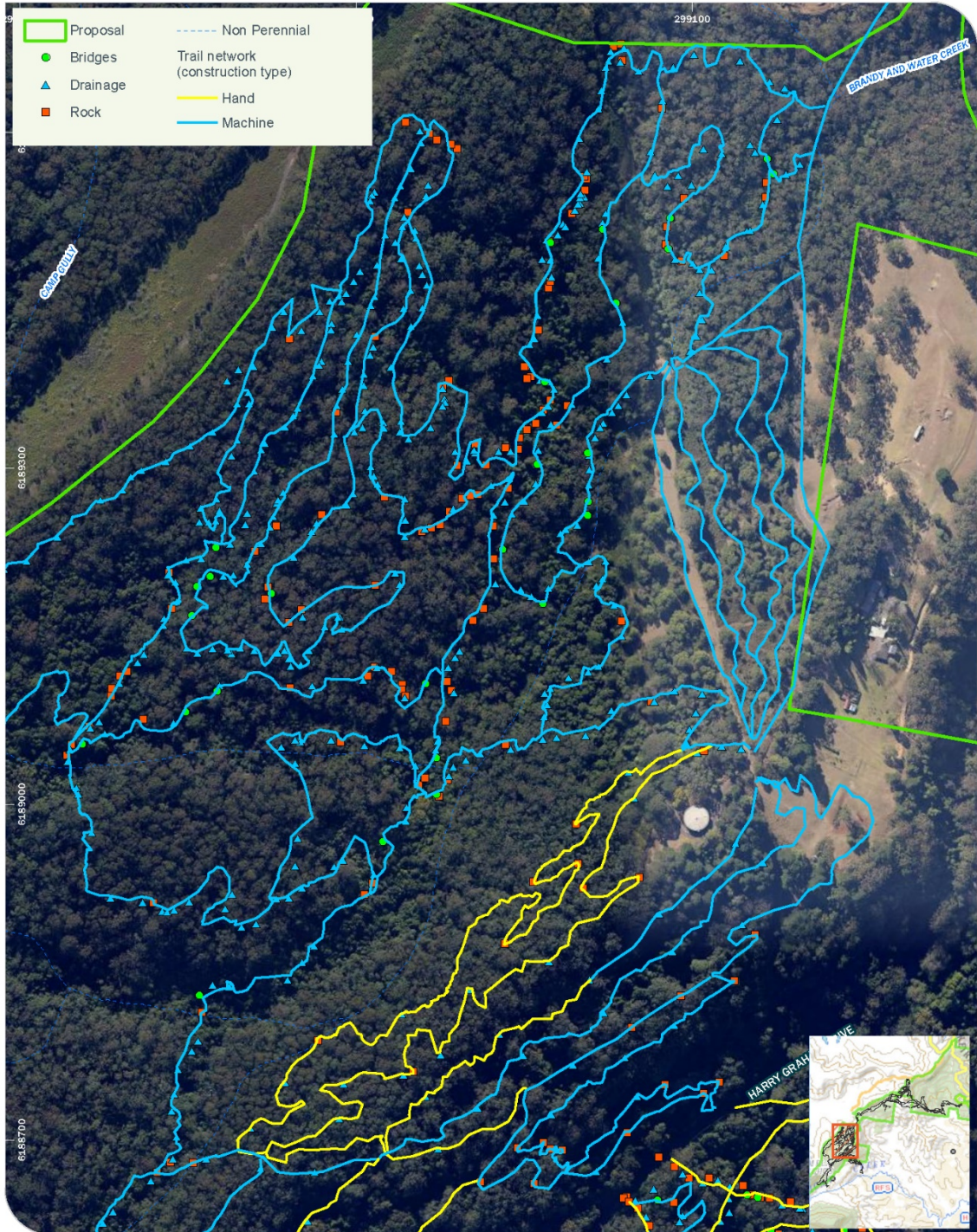


Bridges, Drainage and Rock Armoring
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Appendix 1g

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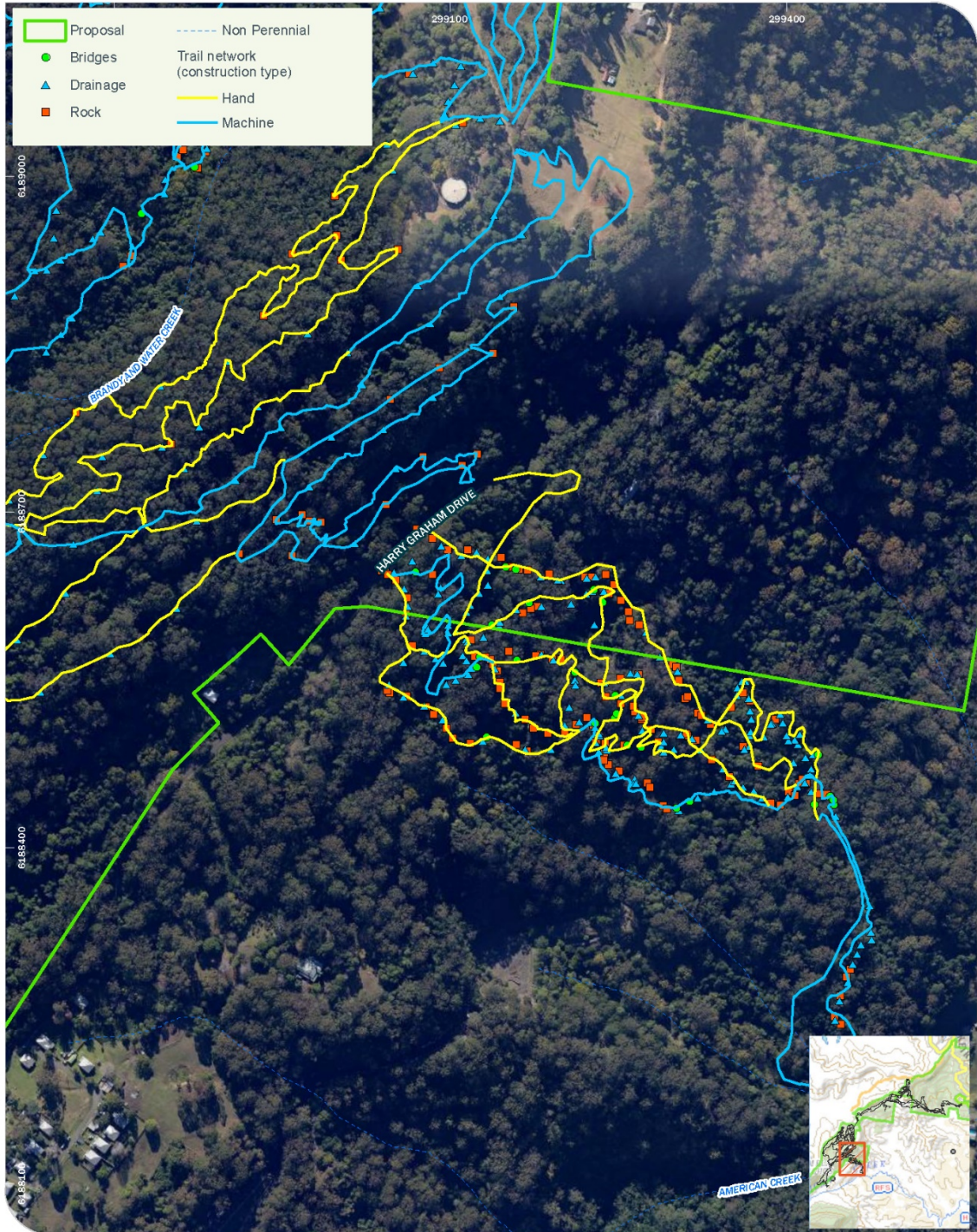


Bridges, Drainage and Rock Armoring
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 Client: National Parks and Wildlife Service

Appendix 1f

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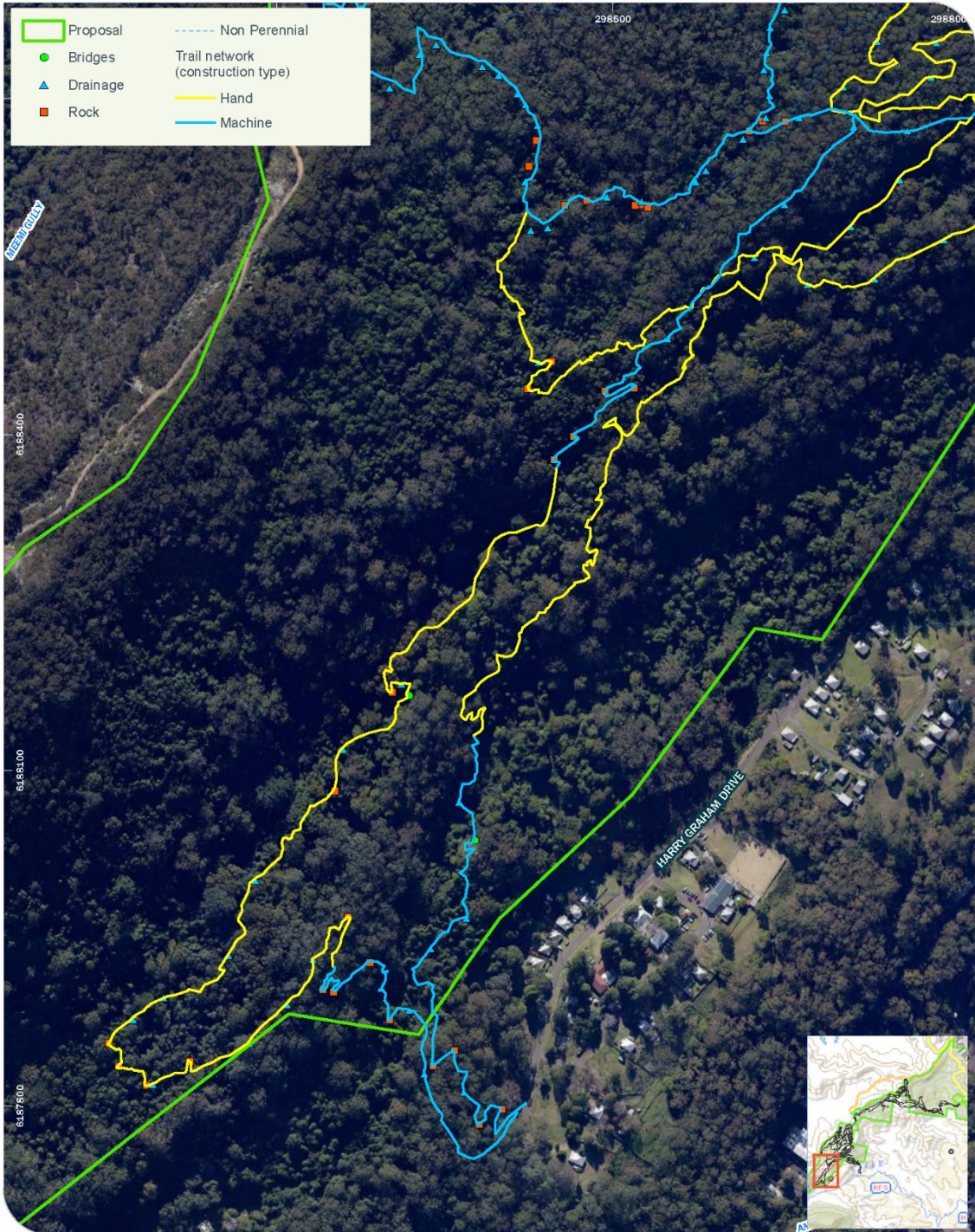


Bridges, Drainage and Rock Armoring
Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
Niche Proj. #: 6486
Client: National Parks and Wildlife Service

Appendix 1h

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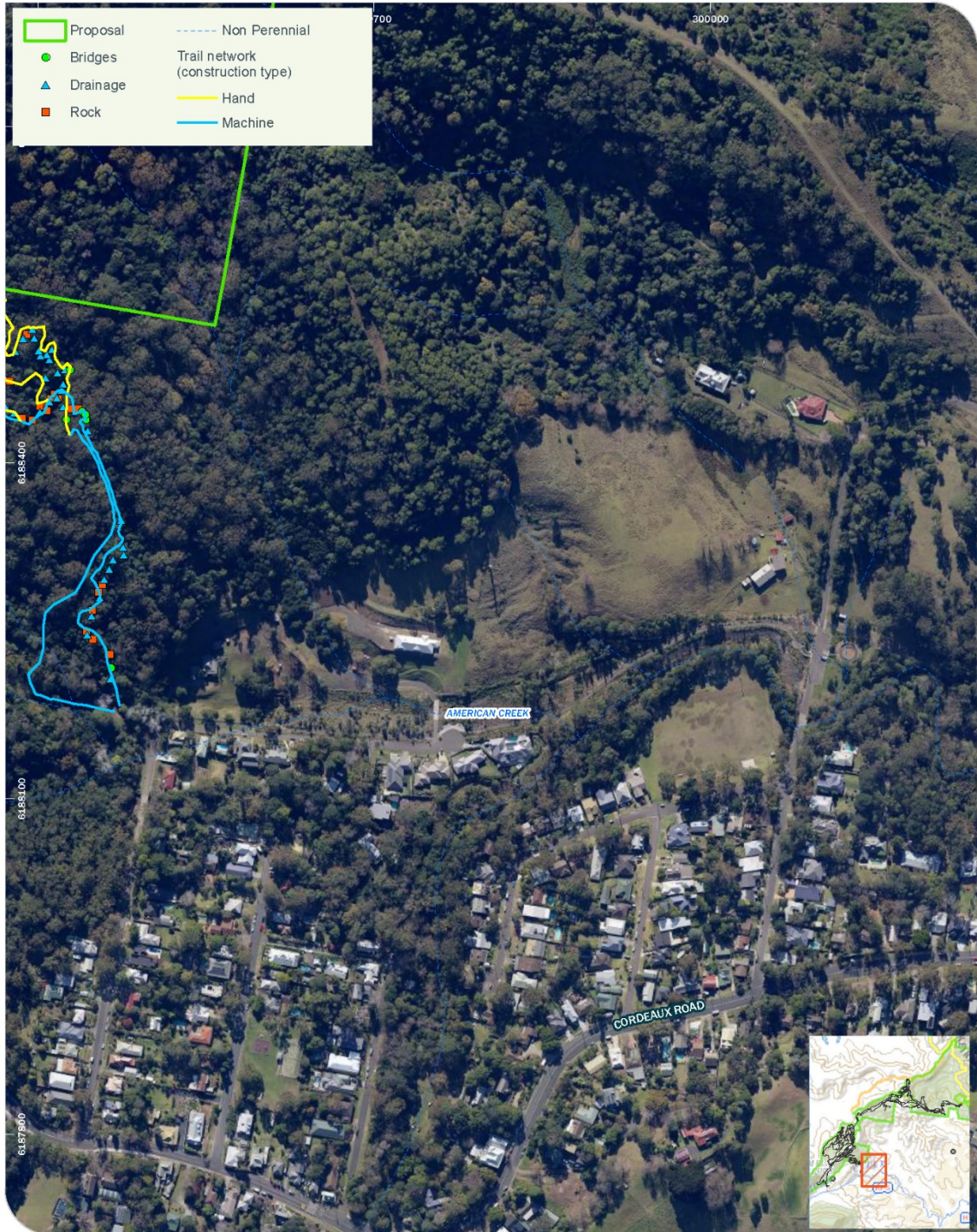


Bridges, Drainage and Rock Armoring
 Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Appendix 1i

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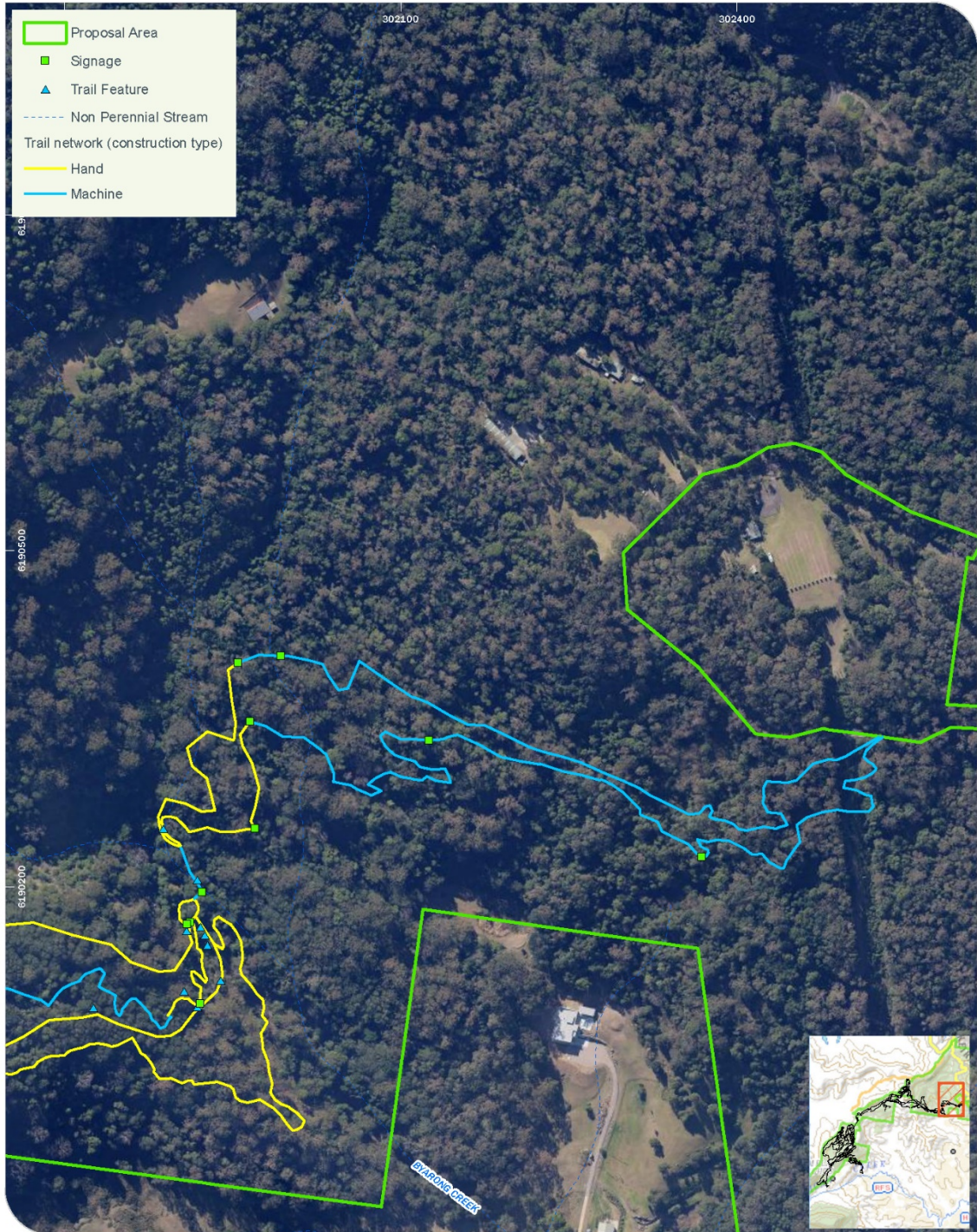
Bridges, Drainage and Rock Armoring
 Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Appendix 1j

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Appendix 2 – Track features and signage



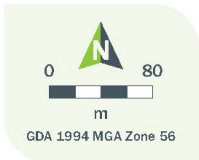
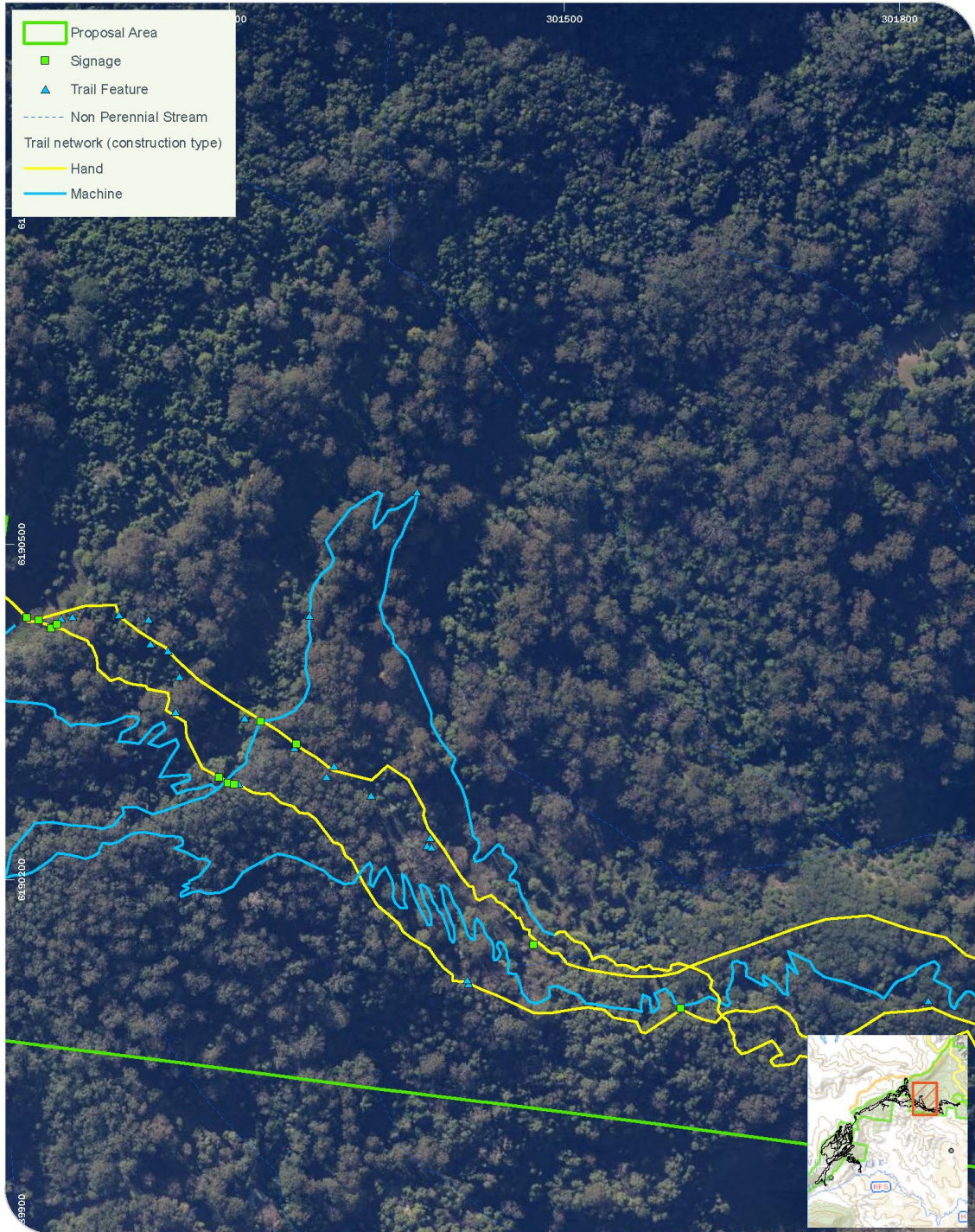
Other Trail Features and Signage
 Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Appendix 2a

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Illawarra Escarpment Mountain Bike Network 1, Mount Kembla – Review of environmental factors

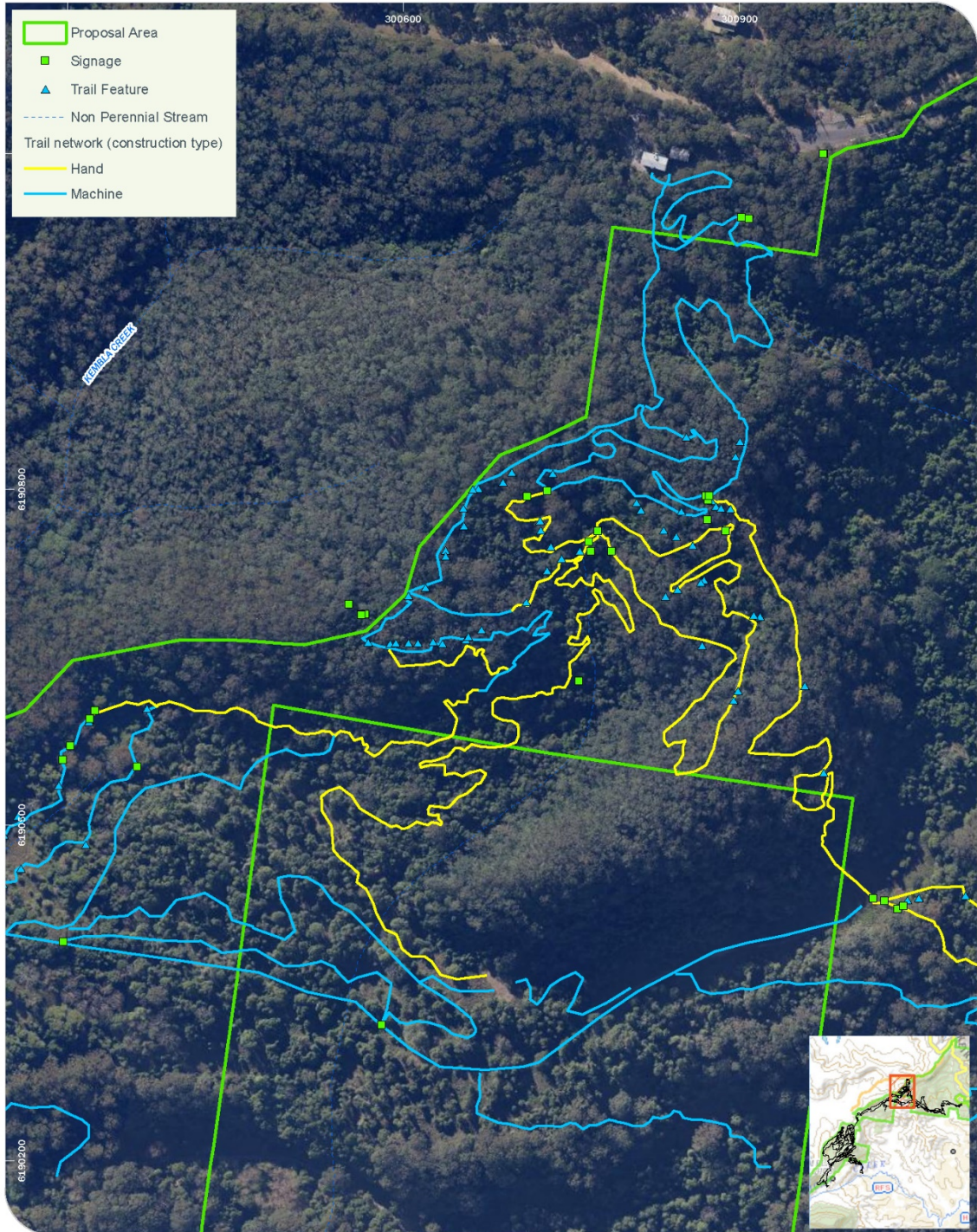


Other Trail Features and Signage
 Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Appendix 2b

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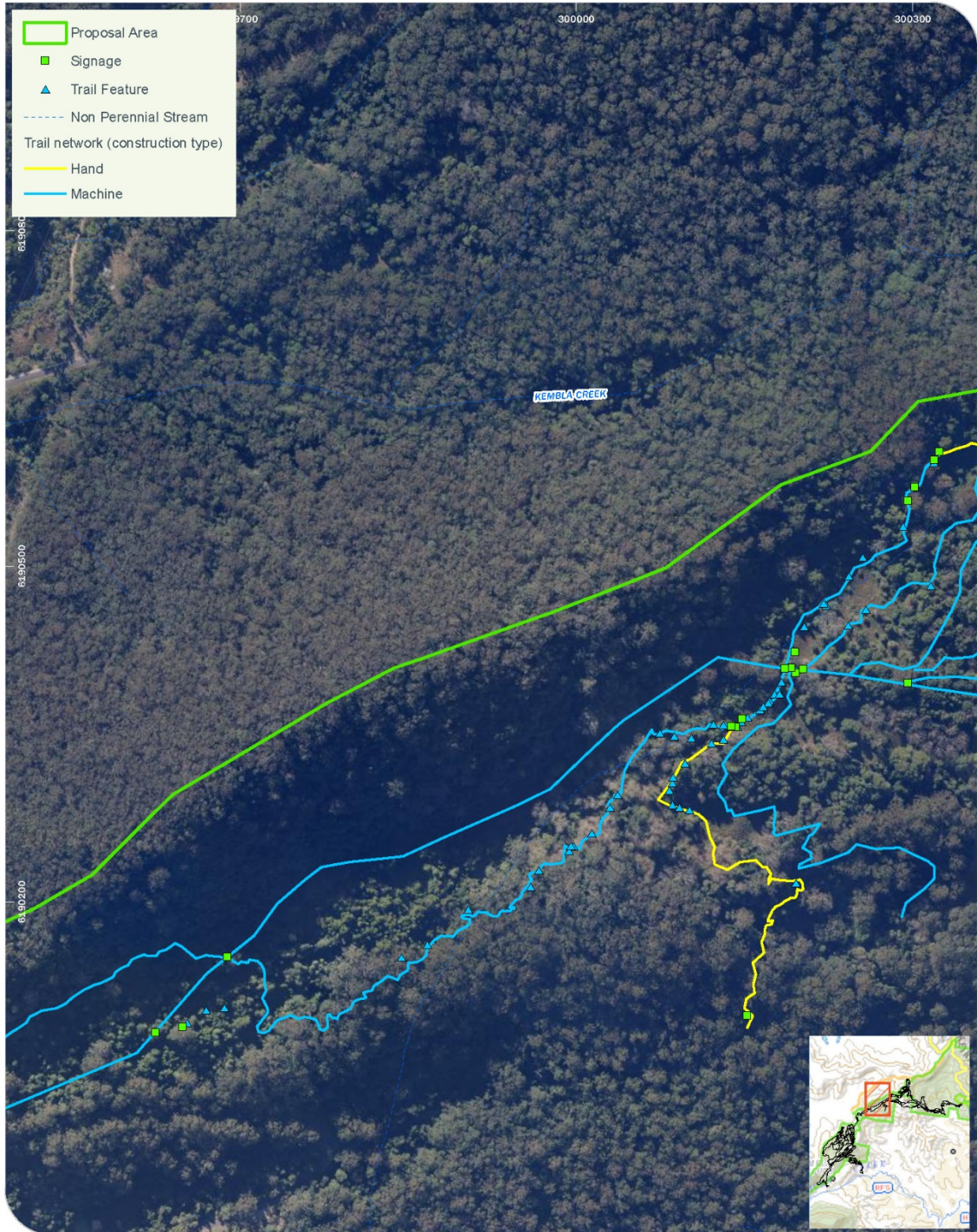


Other Trail Features and Signage
 Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Appendix 2c

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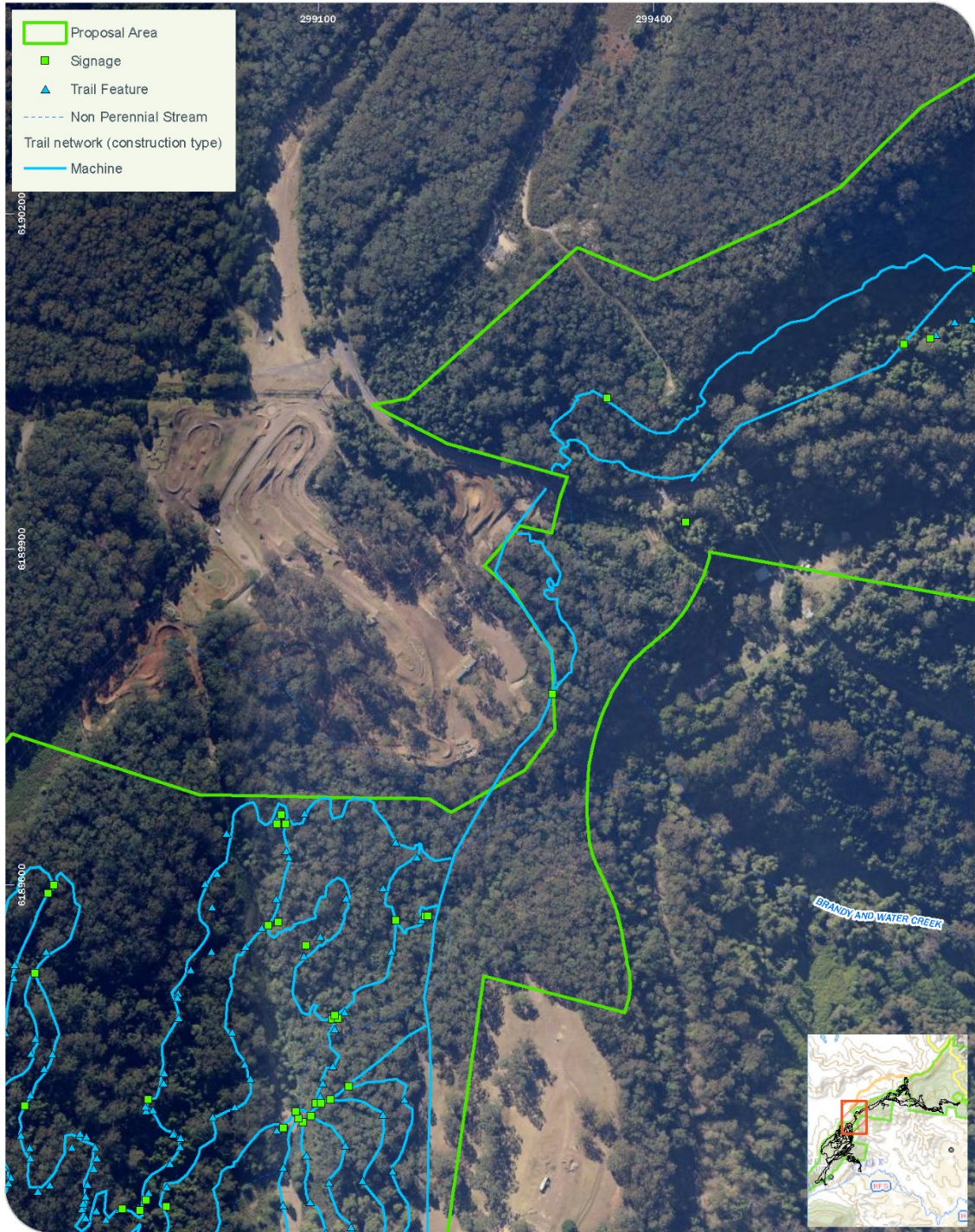


Other Trail Features and Signage
 Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Appendix 2d

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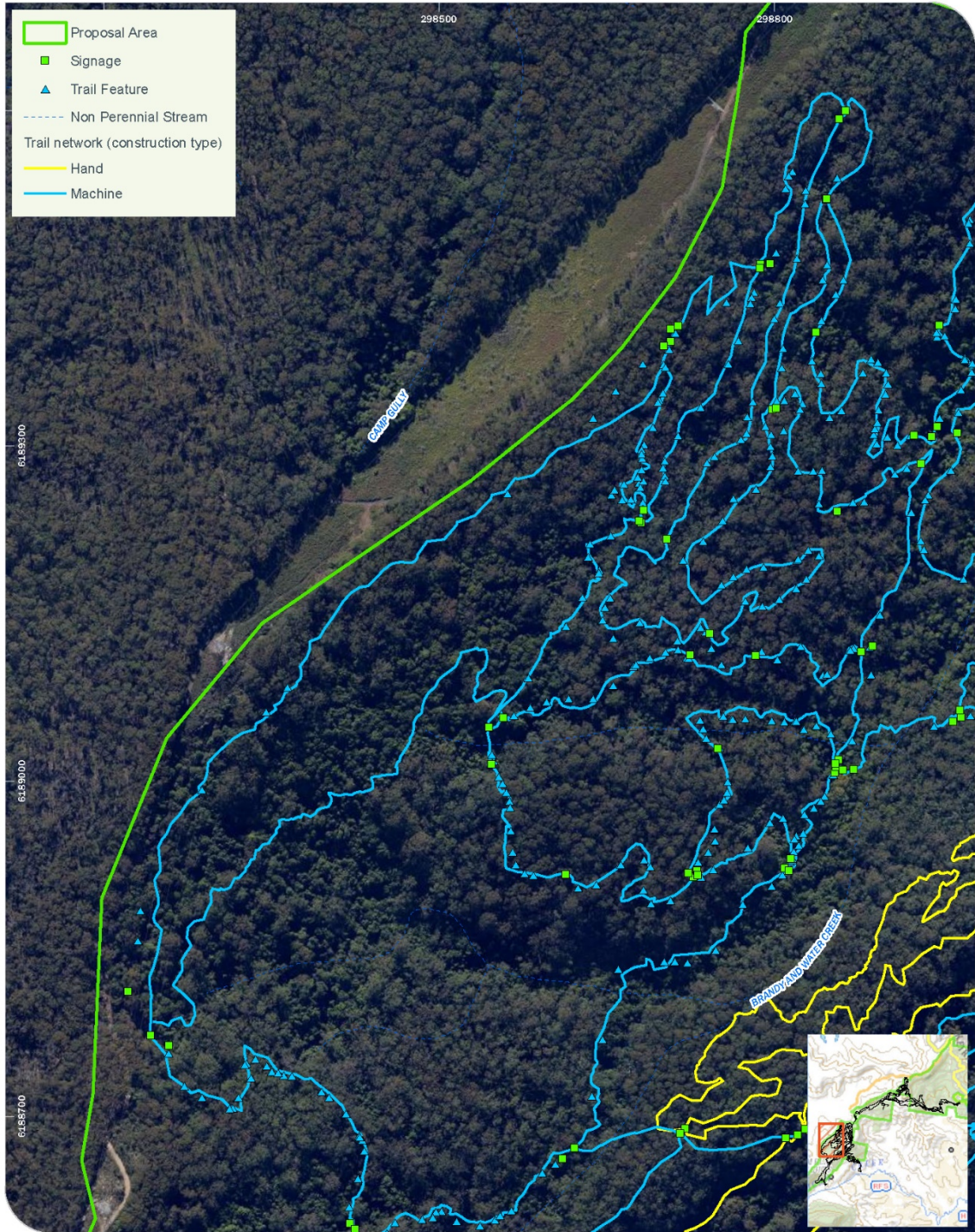


Other Trail Features and Signage
 Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Appendix 2e

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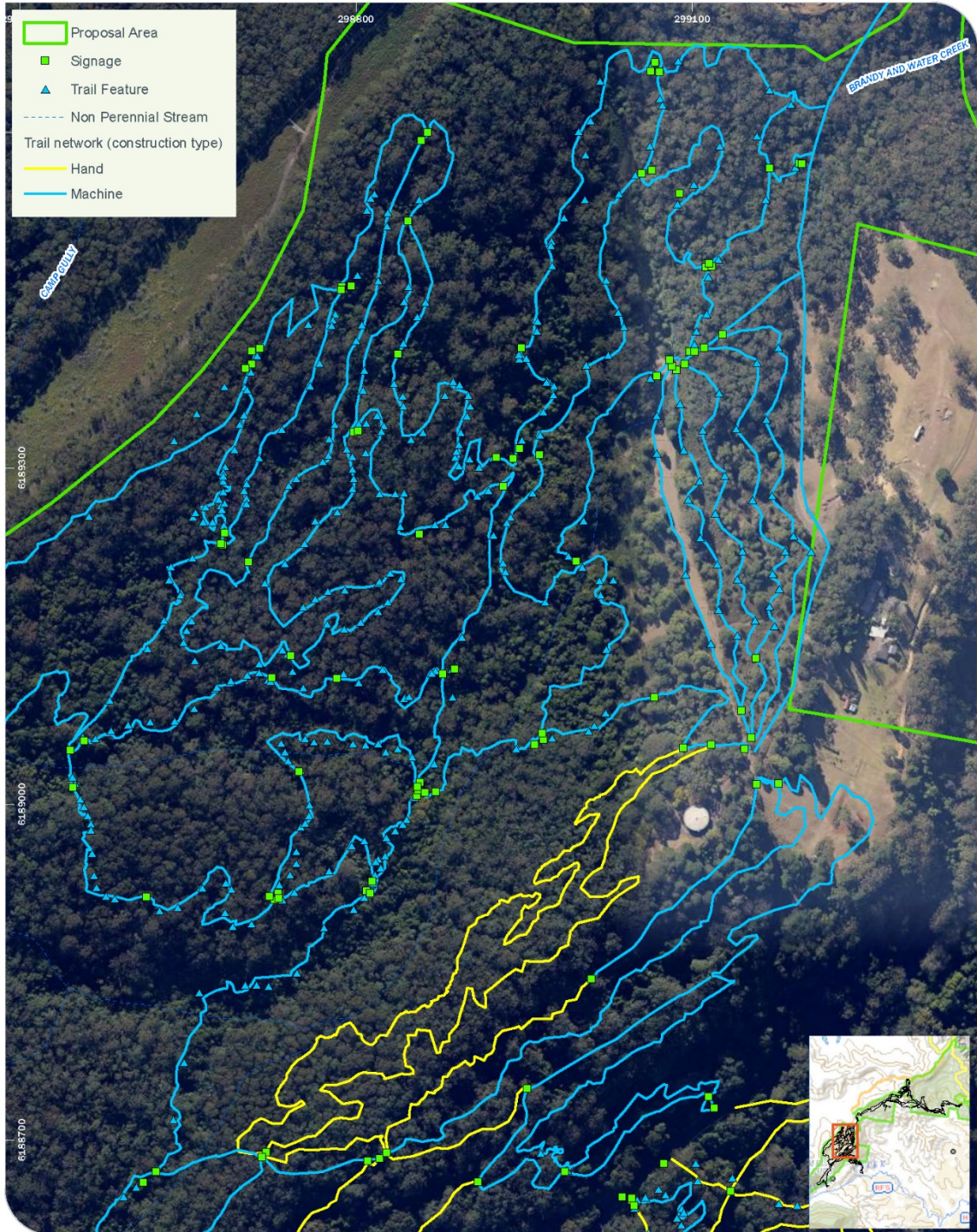


Other Trail Features and Signage
 Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Appendix 2g

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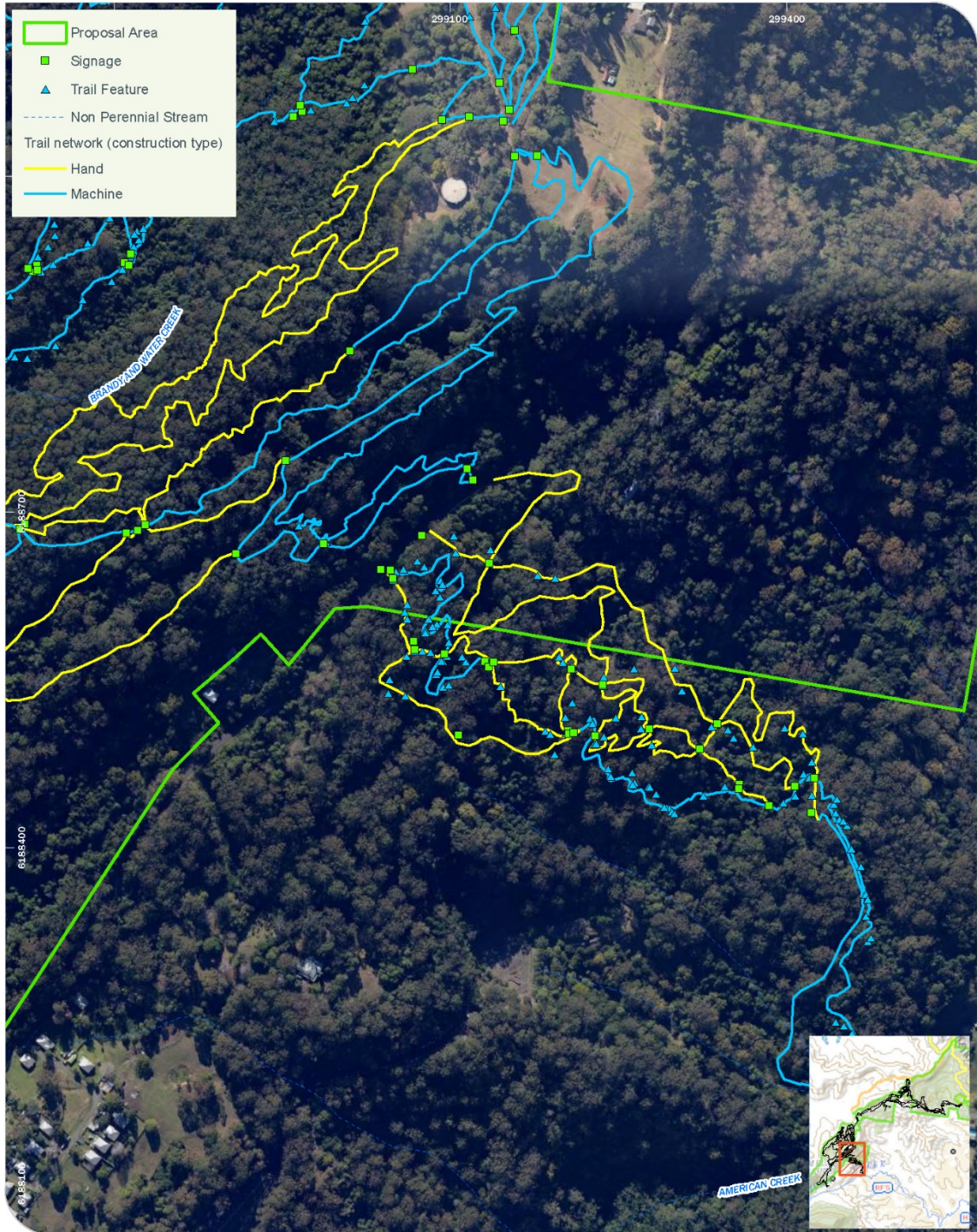


Other Trail Features and Signage
 Illawarra Escarpment Mountain Bike Concept Plan

Niche PM: Kai Whitaker
 Niche Proj. #: 6486
 Client: National Parks and Wildlife Service

Appendix 2f

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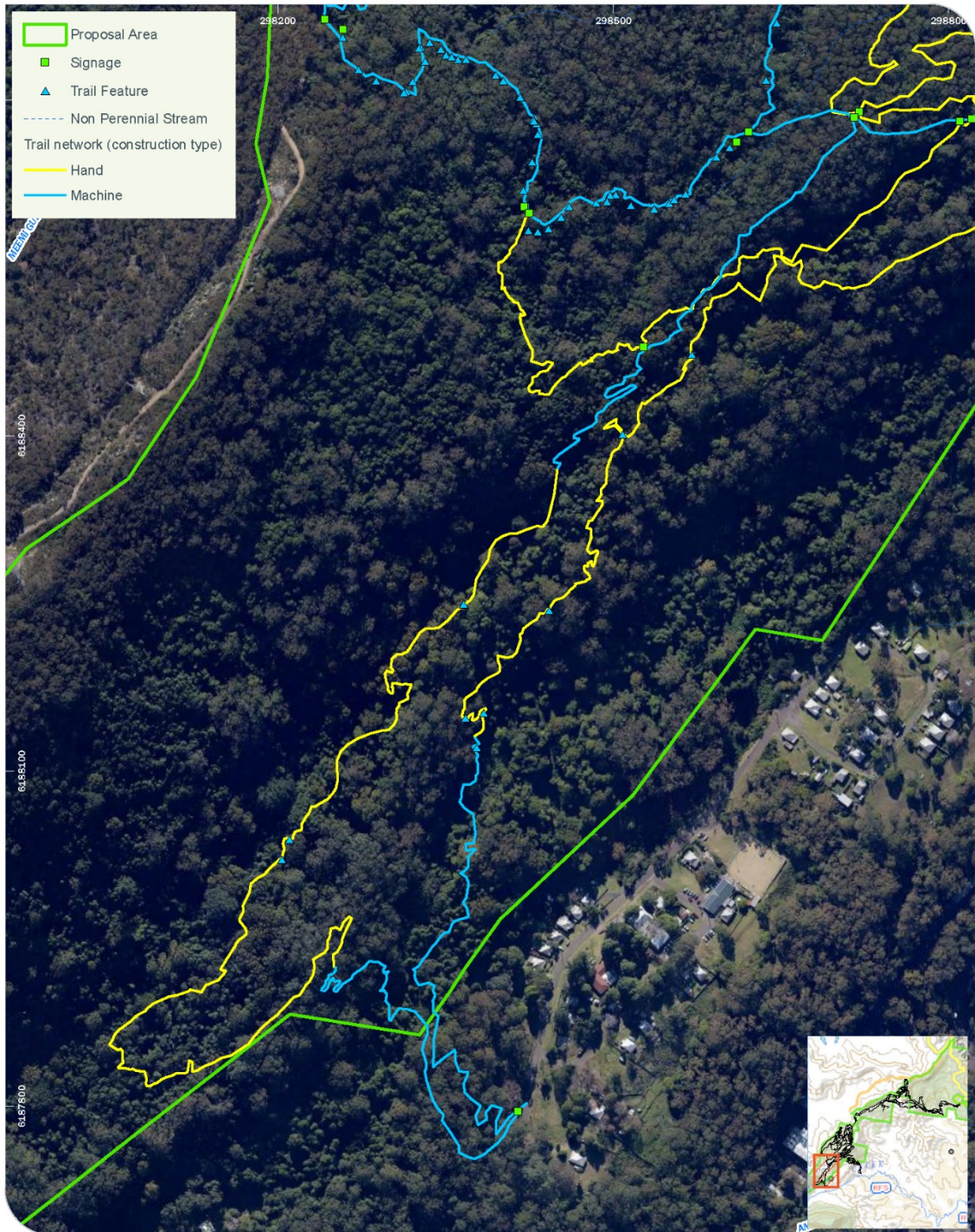


Other Trail Features and Signage
Illawarra Escarpment Mountain Bike Concept Plan

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Niche Proj. #: 6486
Client: National Parks and Wildlife Service

Appendix 2h

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Other Trail Features and Signage
 Illawarra Escarpment Mountain Bike Concept Plan

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Appendix 2i

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