

WARBURTON MOUNTAIN BIKE TRAIL DESTINATION

CONSTRUCTION ENVIRONMENT MANAGEMENT PLAN

DECEMBER 2019



WORLD**TRAIL**

DOCUMENT CONTROL

Table 1. Amendment Record

Date	Description	Prepared by	Reviewed by	Approved by
8/9/19	Draft	Daniel Snelgrove	Gerard McHugh	Dylan Jeffries
18/10/19	Draft Version 7	Gerard McHugh	Gerard McHugh	Dylan Jeffries
11/12/19	Draft Version 8	Gerard McHugh	Gerard McHugh	Dylan Jeffries

Table 2. Distribution Record

Copy	Issued to	Controlled Copy		PCBU Signature	Recipient Signature	Issue Date
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Disclaimer:

This document, *Warburton Mountain Bike Trail Destination – CEMP*, has been prepared by World Trail Pty Ltd. This document is the work of World Trail and does not necessarily reflect the final views or opinions of all of stakeholders.

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GLOSSARY

- ANU – Australian National University
- CEMP – Construction Environmental Management Plan
- DELWP – Department of Environment, Land, Water and Planning
- DBH – Diameter at Breast Height
- FFDI – Forest Fire Danger Index
- GIS – Geographic Information System
- IMBA – International Mountain Bicycling Association
- MW – Melbourne Water
- MTB – Mountain Bike
- MTBA – Mountain Bike Australia
- MVO – Management Vehicle Only
- PC – *Phytophthora cinnamomi*
- PC – Practical Completion
- PE – Practical Ecology
- PCBU – Person Conducting a Business or Undertaking
- PSTR – Pre Start Trail Review
- PV – Parks Victoria
- VNPA – Victorian National Parks Association
- WT – World Trail
- WMTBD – Warburton Mountain Bike Destination
- YRC – Yarra Ranges Council

1 PROJECT DETAILS

This Construction Environmental Management Plan (CEMP) has been prepared by World Trail (WT), to guide construction activities associated with the Warburton Mountain Bike Trail Destination (WMTBD) project to minimise impacts to the environment and ensure compliance with all permits, approvals and legislative requirements.

Table 3. Project Details

Project Name	Warburton Mountain Bike Trail Destination
Project Location	The proposed trail network area is located in Warburton, approximately 65 kilometres from Melbourne. 186km of proposed mountain bike (MTB) trails have been ground-truthed, occupying an area of approximately 5,200 hectares of land ¹ . These trails can be described as being located on the southern face of Mt Donna Buang, all aspects of Mt Little Joe and the north and west faces of Mt Tugwell.
Scope of Works	<p>Yarra Ranges Council (YRC) has engaged WT to design and construct 110km of MTB trails associated with the WMTBD.</p> <p>Construction of the trail network will include works to develop new trails and undertake improvements to existing trails.</p> <p>Specific tasks / treatments to be undertaken include:</p> <ul style="list-style-type: none"> • Machine cut trail; • Hand cut trail; • Rock armouring; • Rock retaining walls; • Trail drainage; • Low level bridge and boardwalk installations; • Raised trail profile. <p>The scope of works for this CEMP is limited to the construction of the trails. It does not include the construction of trailheads, car parks, roads or other infrastructure associated with the broader WMTBD project.</p>

This document is the work of WT and is intended for use by WT employees and any sub-contractors. All WT personnel working on the WMTBD project are expected to comply with all requirements outlined in this document. Familiarisation with this document will form a key component of the Project Induction, which all employees and contractors shall be required to attend.

The CEMP shall be kept on-site in the Site Office or Site Container. It shall be available at all times for all employees to review.

All trail alignments and all known site-specific environmental issues discussed in this CEMP have been incorporated into the WT GIS platform. The WT GIS platform is accessible to key staff members, at all times via the Collector app on their smartphones. This will ensure that all staff have access to the locations of all known site-specific environmental issues at all times.

¹ Measured as an approximate polygon encircling the entire proposed trail network and ignoring land tenures.

This CEMP contains various environmental management practices and actions related to works at the site related to:

- Legislation, Standards and Guidelines;
- Erosion and Sediment Control;
- Water Quality;
- Cultural Heritage;
- Noise and Vibration;
- Air Quality;
- Contaminated Sites;
- Fauna;
- Vegetation;
- Weed and Pest Management;
- Waste Management;
- Chemicals and Fuel Management;
- Bushfire.

■ However, the content of this CEMP does not over-ride or negate any local, state or federal legislative requirements at the site, and any works at the site must comply with the relevant legislative requirements which apply to works at the site.

2 WORLD TRAIL ENVIRONMENTAL POLICY

Environmental Policy



1 PURPOSE

World Trail is committed to conducting all its operations in an environmentally responsible manner and to minimising risks associated with our activities which may impact on the environment.

2 SCOPE

Environmental management means conducting our operations with a continuing awareness of the potential for environmental impact, and acting to control and minimise this impact.

3 POLICY

It is our policy to plan, manage and continually improve our activities so as to minimise disturbance or other adverse effects on the natural, cultural or community environments in which we operate. To fulfil the aims of this policy and support its full implementation, we will conduct our activities to ensure:

- i. Compliance with all environmental standards and regulations applicable to our operations.
- ii. Ensure operations minimise hazards to the health, well-being of the community, personnel, and native flora and fauna.
- iii. Avoid pollution or unnecessary disturbance of the natural environment including land, air and water.
- iv. Avoid disturbance to known sites of archaeological, cultural, natural or scientific significance.
- v. Manage our operations so as not to prejudice the interests of other legitimate land users.
- vi. Ensure that all employees and sub-contractors are aware of their environmental responsibilities through inductions and other information and training.
- vii. Monitoring of compliance with this policy and all environmental codes of practice.
- viii. Set and monitor annual targets and objectives for environmental performance improvements.

4 MANAGEMENT OF POLICY

Whilst it is the responsibility of management to ensure that members of their team/s adhere to the Environmental Policy, the success of this policy relies heavily on the cooperation and commitment of all personnel. All personnel have a duty to act responsibly and to do everything they can to prevent damage to the environment.

Dylan Jeffries
Director

Date: 15th November 2017
Review Date: 15.01.19

Glenn Jacobs
Director

Date: 15th November 2017
Review Date: 15.01.19

3 PROJECT ROLES AND RESPONSIBILITIES

This section defines the roles and responsibilities for the management of the project. The parties responsible for the environmental management of the site are defined below.

Unless otherwise stipulated throughout this document, WT's Site Supervisor (unless otherwise advised by the contractor) is responsible for the overall implementation of the environmental measures outlined in this document and its appendices.

Table 4. Project Contact Details

Organization	Role	Name	Phone No.	Email Address	Responsibilities
World Trail (Principle Contractor)	Director – Quality Control	Glen Jacobs	0407 674 943	glen@world-trail.com	Oversight of construction quality.
World Trail (Principle Contractor)	Director – Contract Administration	Dylan Jeffries	0408 007 494	Dylan@world-trail.com	Contract administration.
World Trail (Principle Contractor)	Project Manager	Gerard McHugh	0439 564 765	gerard@world-trail.com	Project management, stakeholder communications, CEMP reporting.
World Trail (Principle Contractor)	Site Supervisor	Ryan De La Rue	0400 801 006	ryan@world-trail.com	On-site supervision of construction activities. Monitoring implementation of CEMP requirements in the field.
Yarra Ranges Council (Principle)	Client Project Manager	Matt Harrington	0419 875 263	M.Harrington@yarra.ranges.vic.gov.au	Nominated project representative for YRC
Parks Victoria	Land Manager – Yarra Ranges National Park	Victoria Purdue	0419 115 636	Victoria.purdue@parks.vic.gov.au	Nominated project representative for PV
Department of Land, Water and Planning	Land Manager – Yarra Ranges State Forest	Nigel Brennan	0429 625 805	Nigel.brennan@delwp.vic.gov.au	Nominated project representative for DELWP

4 PERMITS AND APPROVALS

Table 5 below lists permits and approvals that may be relevant to this project.

Table 5. Project Approvals and Permits

Name of Permit	Licence/ Approval Type	Issuing Authority Name	Permit or Approval Required?	Status
<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>	<p>An EPBC referral may be required if the proposed Warburton Mountain Bike Hub project is likely to significantly impact on any Matters of National Environmental Significance (MNES). These may include:</p> <ul style="list-style-type: none"> National heritage places; Migratory species protected under international agreements and wetlands of international importance (listed under the Ramsar Convention); Listed threatened species and ecological communities; The environment, where actions proposed are on, or will affect Commonwealth land and the environment; The environment, where Commonwealth agencies are proposing to take an action. 	Department of Environment and Energy	Yes	In Progress
<i>Aboriginal Heritage Act 2006 and Aboriginal Heritage Amendment Act 2016 (Inc. Aboriginal Heritage Regulations 2007)</i>	<p>The project has the potential to cause 'significant ground disturbance' and is located within an identified area of cultural sensitivity. A Cultural Heritage Management Plan (CHMP) will be required.</p> <p>The Registered Aboriginal Party (RAP) is the Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation.</p> <p>Because the trail runs through the National Park which is identified as an area of cultural sensitivity the project would need to comply with the Aboriginal Heritage Act 2006 and the Aboriginal Regulations 2018.</p> <p>Regulations prescribe the standards and set out requirements for a Cultural Heritage Management Plan which Parks Victoria would require to be endorsed by the Wurundjeri as an approval requirement.</p> <p>There is also likely to be additional requirements under the <i>Aboriginal Heritage Act</i>.</p>	Aboriginal Victoria / WLCCHCAC	Yes	In Progress
<i>Catchment and Land Protection Act 1994</i>	<p>The project works would need to comply with the <i>Catchment and Land Protection Act 1994</i>, particularly causing or contributing to land degradation, including taking all reasonable steps to conserve soil, protect water resources, eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds and where possible, eradicate established pest animals, as declared under the <i>Catchment and Land Protection Act 1994</i>.</p>	DELWP / DJPR / Melbourne Water	No	Works to comply
<i>Crown Land (Reserves) Act 1978</i>	<p>The Crown Land (Reserves) Act 1978 designates Crown land for specific uses. Consent of the designated Crown land manager may be required to develop or widen new and existing trails on public land. Management must be in accordance with the purpose of reservation.</p> <p>Some land reserved under the <i>Crown Land (Reserves) Act 1978</i> is managed as State wildlife reserve, pursuant to the <i>Wildlife Act 1975</i>.</p> <p>Section 4 sets out the public purposes for which Crown land may be reserved.</p> <p>Section 13 enables regulations to be written for the care, protection and management of Crown Land.</p>	DELWP	Not known	N/A

	Further discussions with the Crown Land manager are required to confirm necessary approvals and consents under this Act.			
<i>Conservation, Forests and Lands Act 1987</i>	<p>Section 31 of the Conservation, Forests and Lands Act 1987 allows the Minister to make Codes of Practice, which specify standards and procedures for the carrying out works.</p> <p>The Code of Practice for VicForests (2014) applies to timber harvesting operations on State forest and private land in Victoria.</p> <p>The Code applies to the planning and conducting of all commercial timber production and timber harvesting operations on both public and private land in Victoria.</p> <p>In consideration of the project activities, no approvals or licenses are required under the Conservation, Forests and Lands Act 1987.</p>	DELWP/VicForest	No	Works to comply
<i>Environment Effects Act 1978</i>	<p>An EES referral may be required if there is a likelihood of regionally or State significant adverse effects on the environment. This includes the potential clearing of 10 ha or more of native vegetation or the potential long term loss of a significant proportion of known remaining habitat or population of a threatened species within Victoria.</p> <p>An EES referral may also be required if the proposed project results in potential extensive or major effects on Aboriginal cultural heritage, or potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the <i>Heritage Act 1995</i>.</p> <p>An EES self-assessment will be undertaken for the Warburton Mountain Bike Hub.</p>	DELWP	Yes	In Progress
<i>Environment Protection Act 1970 (Inc. Environment Protection Amendment Act 2018)</i>	<p>The <i>Environment Protection Act 1970</i> (EP Act 1970) requires that a works approval from the Environment Protection Authority (EPA) must be obtained before certain activities that have the potential to have an impact on the environment can be undertaken.</p> <p><i>The Environment Protection (Scheduled Premises and Exemptions) Regulations 2007</i> specifies the types of activities that require works approval and licensing in Victoria. A Works Approval will not be required.</p> <p>State environment protection policies (SEPPs) are established under the EP Act 1970 and provide statutory guidance on managing impacts of construction activities that may apply to the trails.</p> <p>The SEPPs which are relevant to the project assessment include:</p> <ul style="list-style-type: none"> • State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1. • State Environment Protection Policy (Waters). • State Environment Protection Policy (Ambient Air Quality). • State Environment Protection Policy (Air Quality Management). 	EPA Victoria	Not known	N/A

<i>Flora and Fauna Guarantee Act 1988</i>	<p>A permit from DELWP is required to 'take' (to kill, injure, disturb or collect) listed flora species from public land, which are likely to be present.</p> <p>A permit is not required under the FFG Act for private land, unless listed species are present and the land is declared 'critical habitat' for the species.</p> <p>A permit will be required under the FFG Act for removal of species that are listed under the FFG Act.</p> <p>This will require an application to DELWP after any planning permits are approved.</p> <p>Demonstration of avoided impacts on threatened species and communities will be required.</p> <p>A form will be provided by DELWP Port Phillip Region after any planning permits are issued.</p>	DELWP	Yes	In Progress
<i>Forests Act 1958 Forests (Recreation) Regulations 2010</i>	<p>Works will require consent of the public land manager under the <i>Forest Act 1958</i>.</p> <p>This would apply to all listed State Forests intersecting the project area.</p> <p>Set asides may relate to specific tracks or larger areas of the forest reserve or park:</p> <ul style="list-style-type: none"> Section 20 allows for areas in State forest and forest reserves to be set aside for recreation; Section 21(eb) allows access to roads, tracks and tramways to be restricted; Section 50 allows for areas of State forest to be set aside as a reserve and for regulations to be made in respect of that reserve. <p>Further discussions with DELWP is required to confirm approval requirements under this Act.</p> <p>Public Land Manager consent from DELWP is required where the project is in State Forest, under Clause 36.03 of planning scheme (Public Conservation and Resource Zone) for the applicant to apply for a planning permit. This consent must be sought prior to applying for a planning permit by sending a letter to Port Phillip Region Planning and Approvals Team. Contact ppr.planning@delwp.vic.gov.au to confirm requirements. This letter should include a detailed description of the project, land ownership details, planning requirements and a copy of any environmental assessments completed. The process of considering this application will include a consistency check with the District Action Plan. We anticipate that public land manager consent will be able to be assessed quickly.</p>	DELWP	Yes	In Progress
<i>Heritage Act 2017</i>	<p>The <i>Heritage Act 2017</i> establishes the Victorian Heritage Register and the Victorian Heritage Inventory, for which consents or permits must be obtained before any historic site is disturbed.</p> <p>The project may intersect with Heritage Overlays HO214 (Lilydale – Warburton Railway) and HO41 (Coonara' Don Road, Malleson's Glen). The project may also intersect with Maroondah Water Supply System (Upper & Central) (VHR H2381), O'Shannassy Aquaduct Sawmill Site (VHI H8022-0111). An application has been submitted for H0342 Yarra Hydraulic Gold Sluicing Company to the Victorian Heritage Register.</p> <p>If there is an impact to the registered place, an application for permit to carry out works to a heritage place or object under the <i>Heritage Act 2017</i> is required.</p>	DELWP / Heritage Victoria	Yes	In Progress
<i>Heritage Rivers Act 1992 and Heritage Rivers (Further Protection) Act</i>	<p>The purpose of the Heritage Rivers Act 1992 is to make provision for Victorian heritage rivers by providing for the protection of public land in particular parts of rivers</p>	Melbourne Water	No	Works to comply

2006	<p>and river catchment areas in Victoria which have significant nature conservation, recreation, scenic or cultural heritage attributes.</p> <p>The proposed works are in the vicinity of the Yarra River. Areas along the Yarra River are defined as a heritage river area under Schedule 1. Part 14 confirms the Yarra River Heritage Area comprises “all those pieces of land along the Yarra River shown bordered in blue on the plan lodged in the Central Plan Office and numbered LEGL/91–16”. This comprises the area downstream of Warburton.</p> <p>Further investigation is required to understand the implications of this Act on the project.</p>			
<i>Land and Compensation Act 1986</i>	<p>The Land Acquisition and Compensation Act 1986 (LA&C Act) outlines the process for compulsory acquisition of freehold land by State Government for a public purpose, which can be either compulsory or by negotiation. The Act also provides procedures for the determination of compensation.</p> <p>The preliminary project design intersects private property as well as various crown and park land. It is understood that YRSC will seek to negotiate terms over private land rather than acquire private property.</p> <p>Section 5 of the Act states that an authority cannot commence to acquire the land ‘unless the land has been first reserved by or under a planning instrument for a public purpose’. Therefore, if acquisition of private land cannot be avoided it will be necessary to apply a public acquisition overlay (PAO) to the land and this can only be undertaken through an amendment to the YRPS. Should acquisition be required it is assumed YRSC would be the acquiring authority.</p> <p>Any impacts associated with the acquisition of land will be managed through the compensation procedure outlined under the LA&C Act.</p>	Not known	No	N/A
<i>Land Conservation (Vehicle Control) Act 1972 and Land Conservation (Vehicle Control) Regulations 2013</i>	<p><i>The Land Conservation (Vehicle Control) Act 1972</i> applies to motor-vehicles (i.e. cars, 4WD vehicles, trucks, buses etc.) and other classes of vehicles (including mountain bikes).</p> <p>Two key features of the regulations are:</p> <ul style="list-style-type: none"> • Ability to include off-road access areas; • Ability to restrict or prohibit vehicles or classes of vehicles from areas of public land (e.g. it is possible to prohibit mountain bikes from areas where they are causing unacceptable damage). <p>Further investigation is required to understand the implications of this Act on the project.</p>	Not known	Not known	N/A
<i>Native Title Act 1993</i>	<p>The Native Title Act 1993 (Native Title Act) recognises and protects native title, and establishes a mechanism for determining claims to native title. Consideration of Native Title should be undertaken to ensure Native Title Rights and agreements are not adversely affected and to ensure any actions undertaken in the development of the project do not affect native title law.</p> <p>A review of the National Native Title Register confirms YRSC is affected by a Native Title (Gunaikurnai Land & Waters Aboriginal Corporation), however, this Native Title is not within the project area.</p>	Not known	No	N/A
<i>National Parks Act 1975 National Parks (Park) Regulations 2003</i>	<p>The proposed works fall within various State parks and reserves (Yarra Ranges National Park). Consent from the Minister for Environment may be required.</p> <p>Sections 17(2)(a)(i),(ii) and (v) and (c) and 18(2)(a)(ii) and (iii) and (c) may be relevant regarding management of parks under the National Parks Act 1975.</p>	DELWP / Parks Victoria	Yes	In progress

	<p>Regulation 13 prohibits the cutting, felling, picking, removing, taking, destroying or damage to any flora or other vegetation, whether alive or dead.</p> <p>Regulation 15 prohibits interfering with archaeological or historical remains.</p> <p>Regulation 16 prohibits interfering with rocks or similar natural objects.</p> <p>Regulation 30 prohibits the erection or construction of a structure in a park.</p> <p>Part of the project is located within the YRNP and is controlled by PV under Section 7 of the National Parks Act 1975.</p> <p>The Minister's approval is required under section 23 of the <i>National Parks Act</i> to carry out permanent works in a park. The process for a section 23 approval under the National Parks Act is initiated by a project plan or proposal from the Yarra Ranges Council to Parks Victoria who develop the section 23 for ministerial approval.</p> <p>A planning assessment is also required that is specific to the National Parks Act.</p>			
<i>Parks Victoria Act 2018</i>	<p>Consent from Parks Victoria may be required to develop a trail on public land and to undertake trail – based events on public land.</p> <p>The nature and process for this consent needs to be confirmed with PV.</p>	Parks Victoria	Not known	N/A
<i>Planning and Environment Act 1987 (Inc. Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017))</i>	<p>Use and development of the land for the Warburton Mountain Bike Hub trail requires planning approval in accordance with the Yarra Ranges Planning Scheme.</p> <p>Planning permits will be referred to various relevant referral authorities. A planning permit is required under the following triggers:</p> <ul style="list-style-type: none"> • Zones: PUZ1, PUZ5 (Clause 36.01), CZ1 (Clause 34.01) and depending on the extent of earthworks GW4 (Clause 35.04) and RCZ3 (Clause 35.06). • Overlays: ESO1Z19, ESO1Z31, ESO1Z18, ESO1Z38, ESO1B44, ESO1B45, ESO1B46 (Clause 42.01), SLO3 (Clause 42.03), HO335, HO140, HO342 (Clause 43.01) and EMO (Clause 44.01), BMO (Clause 44.06). • Provisions: Upper Yarra Valley and Dandenong Ranges Strategy Plan (Clause 51.03), Native vegetation (Clause 52.17) and Post Boxes and Dry Stone Walls (Clause 52.33). <p>A planning permit will be required for removal of native vegetation under Clause 52.17 (Native Vegetation) and Clause 42.01 (Environmental Significance Overlay Schedule 1), among other clauses.</p> <p>The application will be referred to DELWP for comment as the vegetation removal will fall within the Detailed assessment pathway in accordance with the <i>Guidelines for the removal, destruction or lopping of native vegetation</i> (2017), which is an incorporated document in the planning scheme.</p> <p>Best practice environmental management on public land and removal of native vegetation requires avoidance, minimisation and offsetting of native vegetation in accordance with the Guidelines. Refer to the guidelines for a comprehensive list of application requirements: https://www.environment.vic.gov.au/native-vegetation/native-vegetation</p> <p>At the appropriate time, DELWP can assist with counter-</p>	DELWP / Yarra Ranges Shire Council	Yes	In Progress

	balancing requirements for crown land under the guidelines, which are relatively new. Finalisation of the native vegetation requirements can only be assessed once there is a specific proposal to assess, however DELWP can assist in setting up a counter-balancing framework in the meantime.			
Power Authority/Supplier consents/agreements	Further engagement and consultation with relevant power authorities should be conducted as soon as possible to get their views on the proposal.	Various	Not known	N/A
Road Management Act 2004	<p>The Road Management Act 2004 (RM Act) sets out the regulations and requirements for working within the road reserve and specifies the relevant road manager for arterial and local roads in Victoria.</p> <p>Code of practices are set out under the Act to provide guidance for road authorities. Any works within a public road or adjacent to a public road will require a permit under the RM Act.</p> <p>The project includes trails that will intersect public roads and include trails adjacent to public roads. A permit will therefore be triggered under the RM Act.</p>	Vic Roads	Yes	In progress
Safety on Public Land Act 2004	<p>Under the Safety on Public Land Act 2004, public safety zones may need be declared (under Section 4) in State forests for public recreation activities, protection of water, soil, natural, cultural, historical values and flora and fauna, and the maintenance of public safety.</p> <p>The process to declare these public safety zones needs to be confirmed with the relevant public land manager. Further investigation is required to understand the implications of this Act on the project.</p>	DELWP	Not known	N/A
Water Act 1989 By-law No.1 Water Supply Protection and By-law No. 2: Waterways, Land and Works Protection and Management	<p>Under Section 67 of the <i>Water Act 1989</i> (Water Act) a licence is required to construct, alter, operate, remove or decommission any works on a waterway. Under the Water Act, the designated waterways, regional drainage and floodplain management authority is Melbourne Water Corporation (Melbourne Water).</p> <p>The Law No.1 Water Supply Protection by-law controls access to water supply areas by prohibiting access to catchment areas and water supply infrastructure, unless authorised by Melbourne Water.</p>	DELWP / Melbourne Water	Yes – Works on Waterways permit	In Progress
Water corporation consents/agreements	Further engagement and consultation with relevant water authorities should be conducted as soon as possible to get their views on the proposal.	Melbourne Water	No	N/A
Wildlife Act 1975	Under the <i>Wildlife Act 1975</i> , a permit must be obtained from DELWP for removal of habitat prior to the commencement of construction. Any persons involved in fauna removal, salvage capture or relocation of fauna during mitigation measures must hold a current Management Authorisation under the Wildlife Act.	DELWP	Yes	In Progress
Yarra River Protection (Wilip-gin Birrarung murrn) Act 2017	<p>The <i>Yarra River Protection (Wilip-gin Birrarung murrn) Act 2017</i> (Yarra River Protection Act) provides for the:</p> <ul style="list-style-type: none"> • Declaration of the Yarra River and specific areas of public land in its vicinity, for the purpose of protecting it as one living and integrated natural entity; • Declaration of the Greater Yarra Urban Parklands; • Development and implementation of the Yarra Strategic Plan (YSP) as a policy and planning framework; • Establishment of the Birrarung Council and give it the function of advising the Minister on matters relating to the Yarra Strategic Plan (YSP) and generally in relation to the protection of the Yarra River land. <p>MW is leading the preparation of the YSP which seeks to guide future use and development and identify areas</p>	Melbourne Water	No	Works to comply

	<p>for protection within the Yarra River corridor. The YSP must set out a decision-making framework against which individual projects and proposals in the Yarra River corridor may be assessed or evaluated.</p> <p>The proposed works fall within the upper rural reach of the Yarra as defined within the Yarra River Action Plan (February 2017). The interim planning controls do not apply to this area of the Yarra River. Further discussions with key stakeholders will be required to understand the approval requirements under the Yarra River Protection Act.</p>			
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DRAFT

5 PROJECT CONSTRUCTION ACTIVITIES

5.1 OVERVIEW OF ACTIVITIES

The main construction activity to be undertaken in this project and covered by this CEMP, is the construction of a network of MTB trails. This includes construction of new MTB trails, improvements to existing MTB trails and the construction of minor structures such as low level elevated boardwalks / bridges to cross waterways.

The scope of works for this CEMP is limited to the construction of the trails. It does not include the construction of trailheads, car parks, roads or other infrastructure associated with the broader WMTBD project.

A network of proposed MTB trails has been designed comprising of 44 individual trails, totalling 186.6km of trails. Not all of these 44 trails will be constructed. The total number and distance of trails to be constructed will depend on funding and other constraints, but is anticipated to be in excess of 110km².

Table 6 below summarises the proposed trail network, providing indicative lengths, proposed trail difficulty ratings and the type of trail experience. Table 7 following provides a breakdown of the different difficulty levels, with percentages, and Table 8 provides a breakdown of the trail styles.

Table 6. Trail Network Summary

No.	Length (m)	Notes	Trail Style	Proposed Trail Difficulty Rating
1	27939	Droppa K - Descends from top of MDB to golf course.	XC / Wilderness	Intermediate
2	5730	Undulating trail running parallel to O'Shannassy Aqueduct linking to Dee Rd car park and then to Droppa K.	XC	Intermediate
3	3257	Loop trail located between trail 1 and 2.	XC	Intermediate
4	116	Short link between trail 1 and 2.	XC	Intermediate
5	7076	Gravity trail from MDB Rd down to O'Shannassy Aqueduct.	Gravity	Intermediate/Difficult
6	5946	Gravity trail from MDB Rd down to O'Shannassy Aqueduct.	Gravity	Difficult
7	5068	Loop trail, starting and finishing on O'Shannassy Aqueduct.	XC	Easy/ Intermediate
8	6189	Easy descending trail from MDB Rd down to O'Shannassy Aqueduct.	XC / Gravity	Easy
9	2488	Loop trail located on private property (Eco Lodge) above golf course.	XC / Gravity	Easy
10	5122	Golf course loop. Concept only.	XC / Gravity	Easy
11	7321	First loop on Mt Little Joe.	XC	Easy
12	3585	Second loop on Mt Little Joe.	XC	Easy
13	5694	Third loop on Mt Little Joe.	XC	Easy
14	5973	Loop to summit of Mt Little Joe.	XC	Easy/ Intermediate
15	2432	Descending trail on the north/east face of Mt Little Joe.	Gravity	Intermediate
16	1962	Descending trail on the east face of Mt Little Joe.	Gravity	Difficult
17	3299	Climbing link from old Warburton Chalet into trail network.	XC	Easy
18	1021	Descending trail through Backstairs corridor.	XC / Gravity	Difficult
19	1009	Descending trail through Backstairs corridor.	XC / Gravity	Intermediate

² WT has been contracted to design and construct 110km of MTB trails. However, the final length of trails to be constructed will depend on the available budget and other variables, and may be greater than 110km.

20	1810	Descending trail through Backstairs corridor.	XC / Gravity	Intermediate
21	638	Access linkage between Backstairs trail junction and vehicle track.	XC	Easy
22	3533	Climbing linkage from Old Warburton Rd crossing up to Edwardstown Rd.	XC	Intermediate
23	1651	Descending trail from Edwardstown Rd to Old Warburton Rd crossing.	Gravity	Intermediate
24	3352	Descending trail from Edwardstown Rd to Old Warburton Rd crossing.	Gravity	Easy
25	2945	Linkage from Old Warburton Rd to Hey Hey My My.	XC	Intermediate
26	6522	Existing MTB trail - Hey Hey My My	XC	Intermediate
27	9759	Main climbing trail to summit of Mt Tugwell.	XC	Intermediate
28	5875	XC style descending trail from summit of Mt Tugwell.	XC / Gravity	Intermediate
29	2638	A-line style jump track using top portion of Cemetery Track.	Gravity	Difficult
30	3823	Gravity descent from summit of Mt Tugwell using mix of new and existing MTB trails (Top Track).	Gravity	Difficult
31	736	Alternate end section on 30.	Gravity	Difficult
32	2110	Gravity descent from summit of Mt Tugwell using mix of new and existing MTB trails.	Gravity	Difficult
33	4136	Gravity descent from summit of Mt Tugwell using mix of new and existing MTB trails (Matt's Track).	Gravity	Intermediate
34	816	Linkage trail between 30 and 32.	Gravity	Difficult
35	2163	Linkage from Edwardstown Rd into Mineshaft Hill area.	XC	Intermediate
36	189	Linkage between trails 28 and 35.	XC / Gravity	Intermediate
37	528	Linkage between trails 27 and 35.	XC	Intermediate
38	1767	Linkage between summit of Mt Tugwell and Tugwell trailhead.	XC	Intermediate
39	6676	Long climbing trail, from Edwardstown Rd to Mt Tugwell trailhead, parallel below Mt Bride Rd.	XC	Easy/ Intermediate
40	1404	Link trail between 40 and 42.	XC	Easy
41	7405	Descending trail below Mt Bride Rd.	XC / Gravity	Easy
42	8491	Long descending trail from Tugwell trailhead wrapping around onto Mt Bride.	XC / Gravity	Intermediate/Difficult
43	3138	Gentle descending trail into Wesburn Rec Reserve. Uses portion of old tramway.	XC	Easy
44	3285	Climbing trail out of Wesburn Rec Reserve.	XC	Easy
TOTAL	186615			

Table 7. Trail Network Breakdown by Difficulty

Proposed Trail Difficulty Rating	Length (m)	%
Easy	52,919	28.4%
Easy/ Intermediate	17,717	9.5%
Intermediate	81,361	43.6%
Intermediate/Difficult	15,567	8.3%
Difficult	19,051	10.2%
TOTAL	186,615	

Table 8. Trail Network Breakdown by Trail Style³

Trail Type	Length	%
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³ Some trails fall into both XC and Gravity categories, hence the distance of 226km.

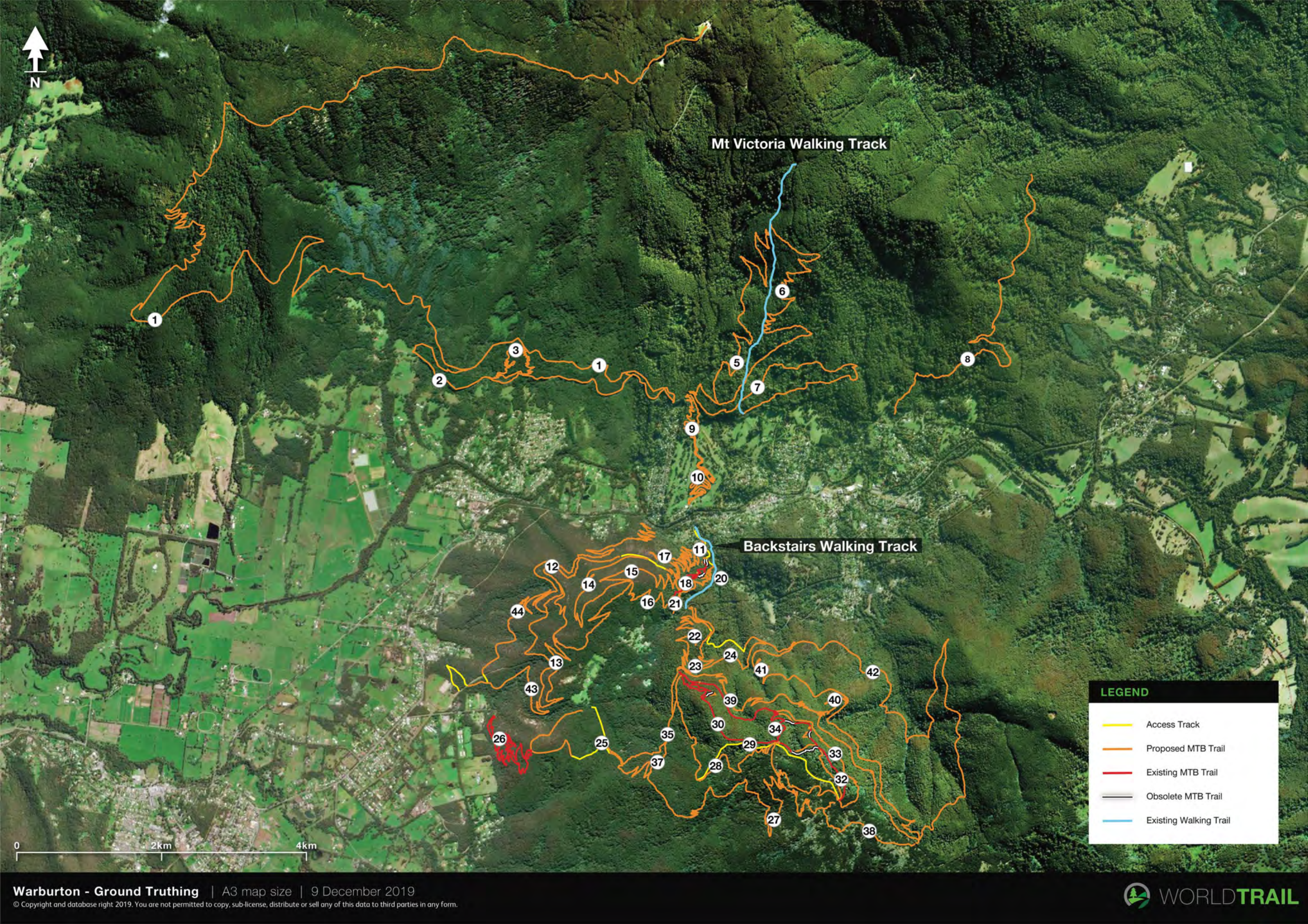
XC	149938	66%
Gravity	76275	34%
	226213	

The maps on the following pages show the proposed network of trails. The WMTBD Master Plan prepared by Cox Architecture⁴ (Appendix 1) contains more details around the design of the trails and the overall intent of the project.

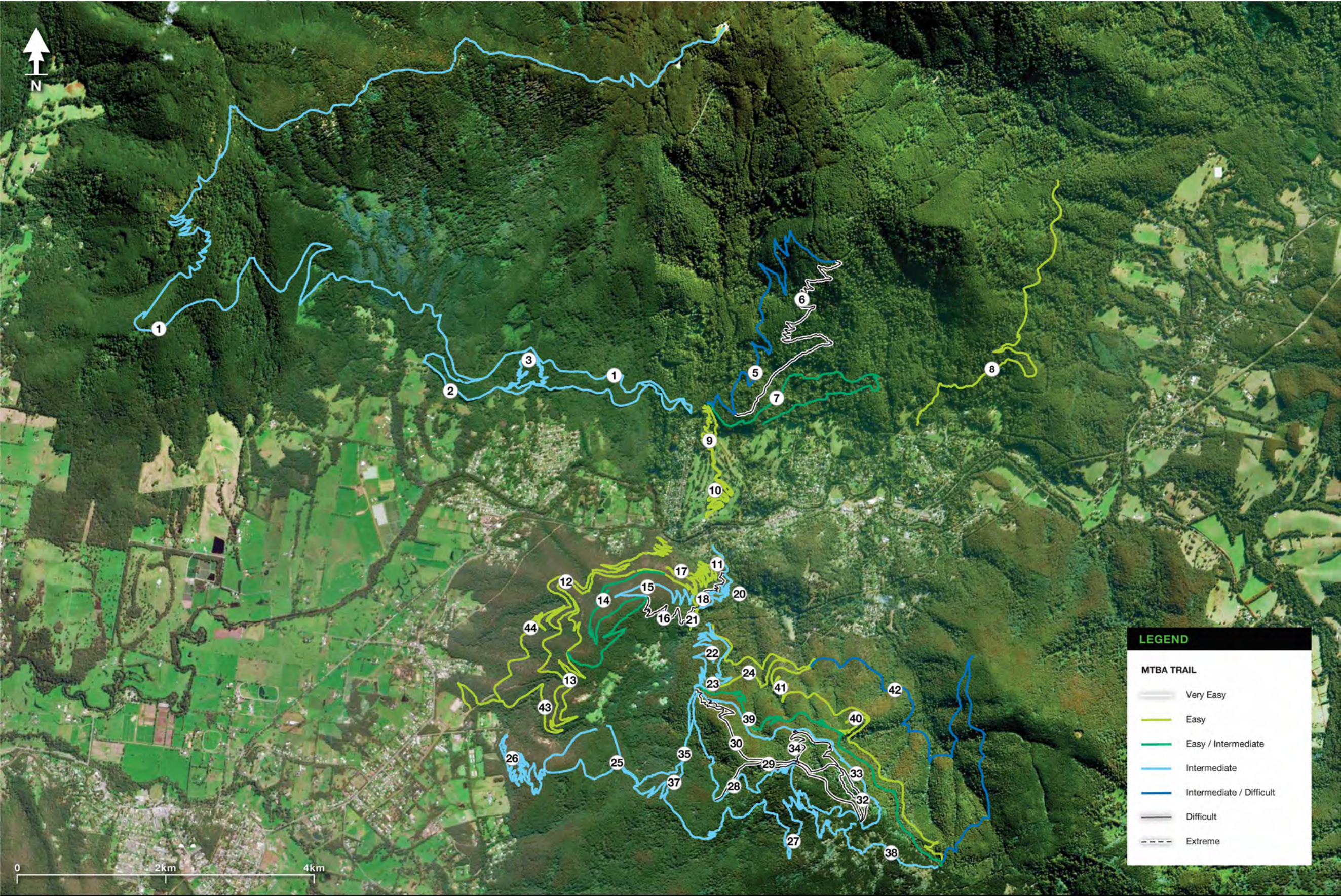
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⁴ Not yet complete.

Map 1. Ground-truthed Trail Network



Map 2. Proposed Trail Difficulty Ratings



Map 3. Water Crossing Treatments



5.2 PROJECT SCHEDULE

Trail construction is generally undertaken in teams of 3-4 people. Each team has all the equipment, vehicles and machinery required to operate independently.

The conditions at Warburton are reasonably good for trail construction:

- Vegetation density is moderate to dense;
- Soils are deep and loamy with good clay content;
- Rock availability is limited;
- Topography ranges from gentle to steep side slopes, but are generally moderate;
- There are numerous roads and four-wheel drive tracks, providing reasonably good construction access;
- Climate is moderate. Summers are mild to hot, while winter can be cold and wet with infrequent snow falls at higher altitudes. Some stand-down days should be expected in summer due to Total Fire Ban or Code Red fire conditions, while in winter wet weather is likely to require standing down from time to time.

With good conditions for trail construction, WT estimates that an experienced team of professional trail builders would achieve around 60m of completed trail per day. This is a realistic productivity target, taking into account potential wet weather delays, the moderately dense vegetation in places and the high number of descending trails likely to be completed, which require higher labour to construct based on the number of features (such as bermed corners, rock armouring, etc.).

Table 9 below shows the expected number of days and weeks required for construction of a total of 110km of trail, based on the number of teams deployed.

Table 9. Anticipated Construction Duration

No. of Teams	Anticipated Productivity Rate (m / day)	Duration (days)	Duration (weeks) ⁵
1	60	1833	366
2	120	916	183
3	180	611	122
4	240	458	92
5	300	366	73

The trail works should be carefully considered and prioritised to allow for the staged opening of trails, with trails closer to trailheads and shuttle drop-offs prioritised before others, although other considerations such as weather, market profile and the inclusion of existing trails should also be considered.

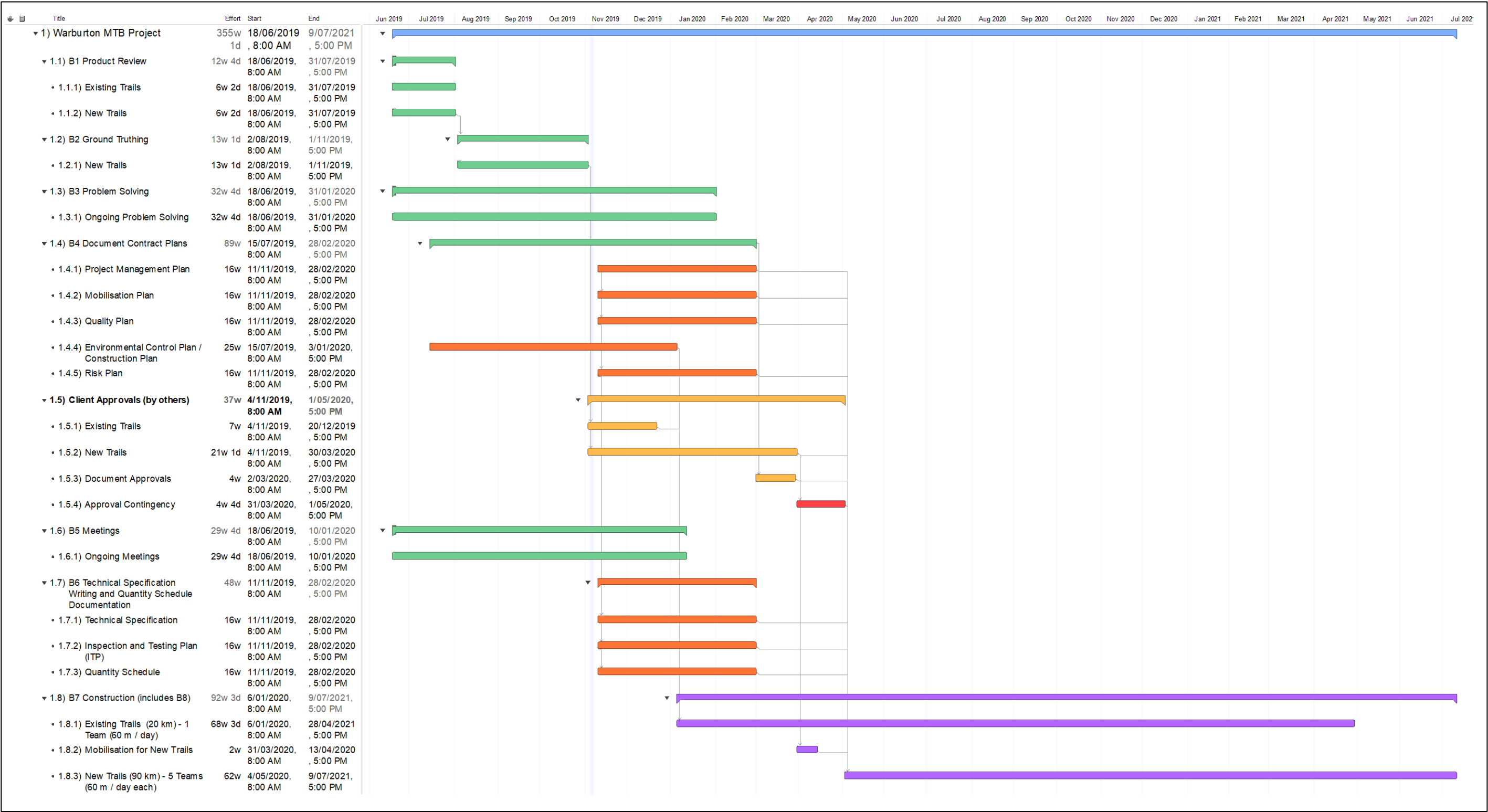
While weather conditions at Warburton are usually mild enough to allow construction works to occur year round, it would probably be more efficient to avoid the middle of winter, when works can be disrupted by wet weather.

Figure 1 on the next page provides a provisional project schedule, which will be revised as project commencement nears. Some assumptions were made in preparing this schedule:

1. It assumes a total of 110km of trails to be constructed, comprising of 20km of upgrades to existing trails and 90km of new trails;
2. It assumes a productivity rate of 60m of finished trail per team per day;
3. It includes a total of six teams. One team starts in January 2020, working on existing trails only. Five teams commence in May 2020, working on new trails.

⁵ Based on a standard 5 day working week.

Figure 1. Provisional Project Schedule



5.3 TRAIL DESIGN METHODOLOGY

The process for designing MTB trails includes two broad stages – conceptual design and detailed design (also called ground-truthing).

In the conceptual stage, trails are planned and mapped out based on a sound understanding of the on-ground conditions, knowledge of access points into the trail and the aspirations of the project with regard to user experience, difficulty, trail sustainability etc.

In the detailed design stage, each conceptual trail alignment is carefully investigated in the field, with the exact final alignment (to within a 10-20m corridor) walked, mapped with GPS and flagged with coloured flagging tape. In this stage, the trail alignment can change from the original conceptual alignment. Changes occur in response to the on-ground conditions. Sometime the terrain offers unexpected opportunities, which force the trail to be modified to maximise the experience for the users. Other times the terrain offers unexpected challenges, which force the trail to be modified for sustainability, safety, budgeting or other reasons.

During ground-truthing works, the following design considerations were followed:

- Where practicable, align trails on old benches/old roads/water races or other disturbance corridors, which are reasonably common in areas that have a history of mining or logging;
- Minimise the use of switchback corners as much as possible by drawing out traversing sections as far as possible and using the available space and terrain as much as possible. Switchback corners are difficult to build and maintain, and generally have a broader construction footprint;
- Where switchback corners can't be avoided, avoid stacking numerous switchback corners on top of each other. This can be done by drawing out the traversing sections between switchbacks as far as possible and deliberately offsetting the switchbacks. Stacked switchbacks create a broad area of disturbance and also create increasingly difficult drainage problems as they constantly discharge water flow onto the trail/switchback located directly below;
- Where practicable, connect the proposed trails to or follow short sections of existing MVO tracks. MVO tracks are useful to break up long sections of singletrack, provide rests and overtaking opportunities for riders and provide construction and emergency access;
- Each trail must be designed according to the proposed Trail Difficulty Rating, especially with regard to the maximum allowable trail gradient:
 - Easy – maximum 15%, average 7% or less;
 - More Difficult – maximum 20% or greater, average 10% or less;
 - Very Difficult – maximum 20% or greater, average 20% or less;
 - Extremely Difficult – maximum 40% or greater, average 20% or greater;
- Use a clinometer to measure gradient;
- Avoid excessively steep and excessively flat areas where possible. Ideal side slopes range from 10 – 50%;
- Design the trail to maximise exposure to changing aspects and vegetation communities. This helps to keep the trail interesting and appealing;
- Design the trail to be constantly changing – no straight lines, no constant unrelenting climbs or descents. On climbs, include some flat and downhill sections, applying the Climb-Rest-Climb protocol. On descents, vary the gradient and include occasional short flat or uphill sections;
- Use the terrain to its maximum. The final shape and feel of the trail is dictated by the terrain, so any interesting shapes or features that are present in the landscape (including both natural and man-made) should be capitalised on where possible;
- Flagging tape protocols:
 - Use flagging tape tied to trees/vegetation to mark the approximate centreline of the trail;
 - Each piece of flagging tape should be visible from the adjacent piece. In dense vegetation use more flagging tape. In sparse vegetation, use less;
 - Three pieces of tape attached to the same tree/branch indicates a sharp corner (either a switchback or a bermed corner);
 - The original Cox alignments are flagged with pink flagging tape;

- New trails ground-truthed by World Trail in 2019 are flagged with blue flagging tape;
- GPS protocols:
 - A high accuracy GPS was used to record the approximate centreline of all new trail alignments;
 - Waypoints shall be captured at appropriate locations, including:
 - Waterway crossings, designating the type of treatment to be used;
 - Views or possible lookouts;
 - Intersections with MVO tracks;
 - Switchback corners;
 - Rock features;
 - Other;
- Private property:
 - Where possible maintain a buffer from any boundaries shared with private properties. In remote areas where there are no dwellings or developments, a small buffer of 20-50m may be appropriate. In built-up areas, ideally the buffer should be dictated by visual distance – that is, no private dwellings or associated infrastructure should be clearly visible from the trail, maintaining a buffer of vegetation between the dwelling and the trail.

5.3.1 Ground-truthing Protocols

The Warburton Mountain Bike Destination: Environmental Protocols (the Protocols) outline the environmental standards to be met in designing the alignment of trails.

The protocols are intended to guide the design of alignments that result in minimal environmental disturbance and ensuring that any disturbance to environmental values can be appropriately mitigated where they cannot be avoided. These protocols relate to the alignment of the trail, but include some measures relating to the construction and operation of the trail where there is a reasonable expectation that these will impact the alignment itself.

These protocols were developed in conjunction with recognised subject experts for Cool Temperate Rainforest, Leadbeaters Possum and Mt Donna Buang Wingless Stonefly and are the combined work of the following organisations:

- Yarra Ranges Council;
- Department of Environment, Land, Water and Planning (DELWP);
- Parks Victoria;
- Practical Ecology;
- World Trail.

Refer to Appendix 2 for the complete Ground-truthing Protocols.

5.4 TRAIL CONSTRUCTION METHODOLOGY

5.4.1 Prestart Trail Review

Before commencing construction of a new trail a Pre Start Trail Review (PSTR) will be undertaken.

The purpose of the PSTR is to review and inspect the trail alignment prior to construction commencing, to confirm the exact alignment within the ground-truthed corridor⁶, identify any specific environmental values to be protected and to discuss and agree on specific construction treatments.

The following personnel must attend the PSTR:

- YRC Project Manager;
- WT Project Manager/Project Supervisor;
- WT Machine Operator (i.e. the person who will be building the trail).

A representative of the land manager (PV or DELWP generally) should be invited to attend the PSTR.

Other personnel may also be required – for example, if the trail is in close proximity to waterways, MW should also be invited; if the trail is in close proximity to areas of high environmental values, qualified environmental specialists such as botanists/zoologists/ecologists should be present to provide assistance in micro-siting the trail to avoid impacts to these values.

Where a trail is very long, shorter agreed construction segments may be used, or the PSTR may be staged over multiple days.

During the PSTR, the intention is to follow the ground-truthed corridor of the trail in the field. The proposed trail alignment should already be flagged in the field (from previous ground-truthing works), however, as flagging tape can be removed by people/wind/animals and can fade/degrade, a high-accuracy GPS must also be carried with the relevant GPS track data. The presence of the machine operator is critical, as they are responsible for determining the exact final alignment to be taken (staying within the ground-truthed corridor), re-flagging the proposed alignment and deciding on any specific construction treatments that may be required.

A pro-forma has been developed to record the outcomes of the PSTR – see Appendix 3. Upon completion, the completed pro-forma is to be signed off by representatives of WT and YRC, with a copy provided to YRC.

The PSTR has two components:

1. A preliminary desktop component, which requires the input of known information such as length, proposed difficulty rating, likely construction treatments, known water-crossings and any environmental issues that have been identified during ground-truthing and associated investigations;
2. A field component, whereby any changes to the alignment, proposed construction treatments or other issues that are identified are documented accordingly along with maps, GPS coordinates, photos and sketches as required.

Where there is a known environmental or cultural heritage issue (as identified in ecological investigations, Cultural Heritage Management Plan or other reports) specific to that trail, the following protocol would apply:

⁶ The ground-truthed corridor is defined as the flagged centre line, plus the agreed buffer to either side, usually 5 or 10m on either side (i.e. a total corridor width of 10-20m). Where flagging tape is missing or sporadic, the GPS alignment can be used, but the flagged alignment should always take priority over the GPS alignment.

- The relevant expert should be contacted prior to the field inspection and invited to attend the PSTR (for example, micro-siting to avoid threatened flora sites);
- During the PSTR, the scope of the environmental issue is visually identified and marked as an exclusion zone (using different coloured flagging tape or bunting). The exact alignment of the trail is flagged, ensuring an adequate buffer from the exclusion zone;
- Detailed documentation is gathered, including photographs showing the pre-existing conditions on site before any works are undertaken. This allows for post-construction photos to be taken, which will enable before/after comparison.

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5.4.2 MTB Trail Construction Techniques

The following external references provide guidance on construction of sustainable MTB trails:

- Australian Mountain Bike Trail Guidelines, Mountain Bike Australia, 2019
- Bike Parks: IMBA's Guide to New School Trails, International Mountain Bicycling Association, 2014
- Managing Mountain Biking: IMBA's Guide to Providing Great Riding, International Mountain Bicycling Association, 2007
- Trail Solutions: IMBA's Guide to Building Sweet Singletrack, International Mountain Bicycling Association, 2004

World Trail has produced its own in-house trail manual. This manual is provided in Appendix 4 – Trail Design Knowledge User Manual.

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5.4.2.1 Trail Excavation

Broadly speaking, the process of constructing a standard MTB trail is as follows:

1. Each day prior to commencing work, review the ground-truthed corridor up to 100-200m ahead of excavator, both visually on the ground and also using the WT in-house ArcGIS platform, which all WT machine operators have access to and which includes all the approved trail alignments, known construction treatments and known environmental issues;
2. Clear the construction corridor of vegetation. The construction corridor is defined as the horizontal corridor from the top of the upslope batter to the toe of the downslope batter and the vertical corridor to about 2m high (sufficient to allow passage of the excavator). Clearing of the construction corridor is usually undertaken manually using motorized tools such as brush cutters, chainsaws and hedge trimmers and hand tools like loppers, hand saws and secateurs. Large trees do not need to be removed, as the trail can be routed to avoid them, however, it is likely that small boughs and limbs may need to be removed. All vegetation that is removed is cut into small pieces and dispersed throughout the surrounding area – no large windrows or stockpiles should be present. At this stage, all vegetation is removed except for ground covers, herbs and grasses (which are left in place for later removal by the excavator);
3. Cut the bench using cut and fill technique. The topsoil and mineral earth removed from the inner side of the bench are used to build up the outer edge of the bench. The excavator works forwards, cutting the bench ahead of it and then moving forward onto the bench. The bench must be wide enough and stable enough for the excavator to operate safely on. Using a rubber-tracked mini-excavator with a minimum track width of about 900mm, the bench is generally constructed at 1m width. Note that the cut material (i.e. the spoil) may be moved locally forward or backwards along the trail to areas where fill material is required. Overall, cut and fill is always balanced, with no fill material removed off-site. On steeper slopes, the outer edge of the bench may need to be retained. In MTB trail construction this is generally done using dry stone rock walls, built from rock sourced during the construction of the bench;
4. Define the ride line by placing rocks, logs and other obstacles as necessary. Large obstacles work best and should be manoeuvred into place by the excavator. The ideal ride line is generally on the inner side of the bench, at the toe of the upslope batter, where the soil is firm and compacted. Obstacles are manually and deliberately placed to control rider speed and position riders towards the inside of the bench, away from the soft outer edge;
5. Clean up the trail tread, removing loose rocks and roots, compacting the tread, back sloping the batter and managing drainage (for example, ensuring the trail is outsloped where practical). This step is undertaken manually by trail labourers working behind the excavator.

The trail is now complete. The trail should be *rested* for as long as possible before allowing riders to use it. This allows the trail tread to settle and harden before being subjected to use.

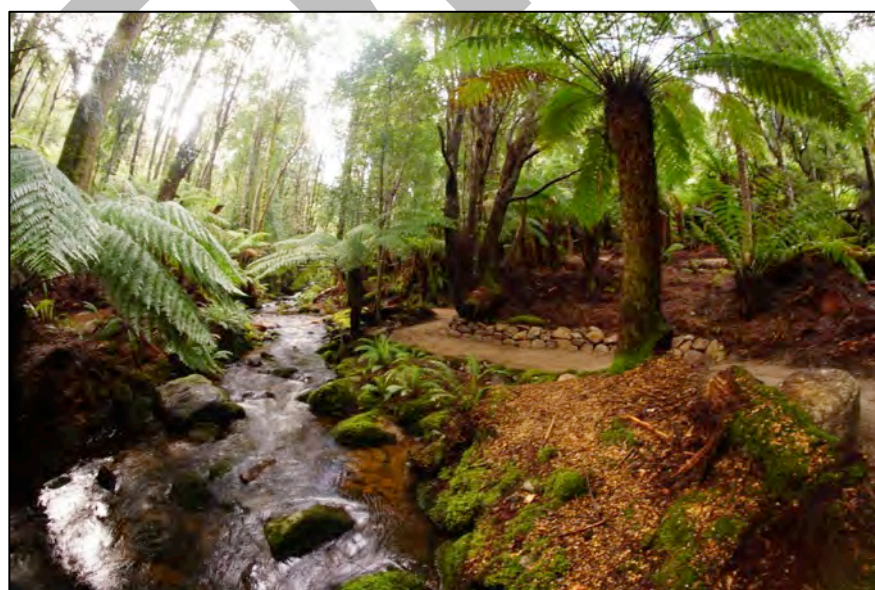
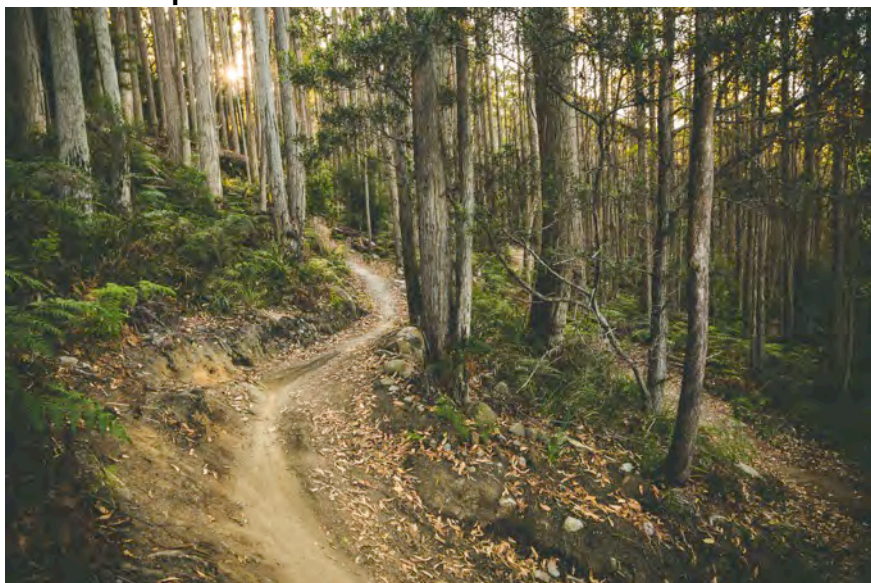
This process above describes the typical methodology for 80-90% of MTB trails.

In some instances where it is not safe, possible or desirable to use an excavator, the trail can be cut by hand. The process remains the same as described above, but the bench is cut by hand instead of by excavator. One of the key benefits of hand-constructed trails is a narrower construction footprint as the bench doesn't need to be cut wide enough to allow the passage of the excavator.

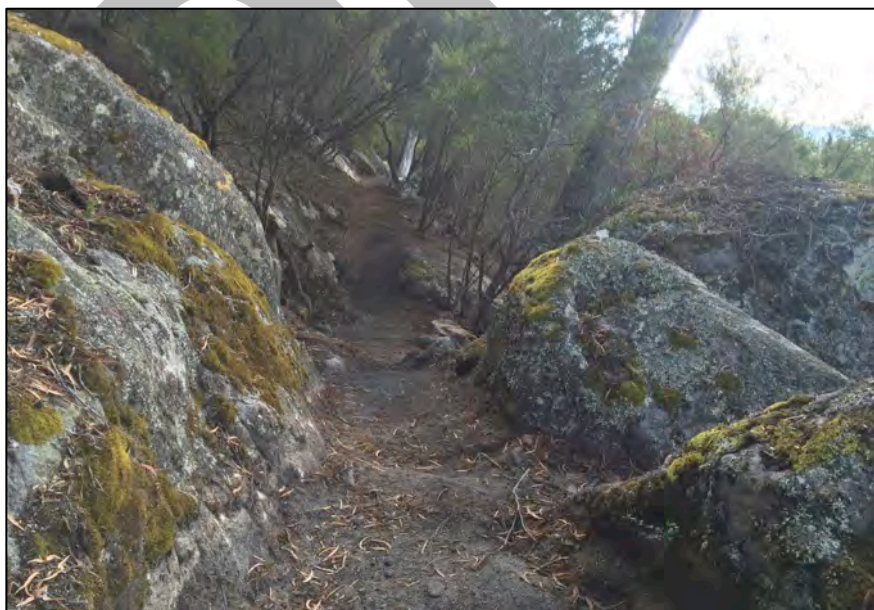
See:

- **WT Standard Drawing WTMSTD-033-YV**
- **WT Standard Drawing WTSTD-040-YV**
- **WT Standard Drawing WTSTD-041-YV**
- **WT Standard Drawing WTSTD-042-YV**

Photo examples of trail excavation:







5.4.2.2 Rock Armouring

Rock armouring is a technique used to harden the trail surface. It is often used on steep gradients, where the soil would likely be displaced by water or trail users, leading to erosion. It can also be used on high traffic areas or areas where soils are unstable.

Rock armouring is usually carried out as follows:

1. Mark out the area to be rock armoured;
2. Collect suitable rocks. Ideally, these are uncovered and placed off to the side during standard trail construction, for usage later on. Rocks should be as large as is practical – WT generally recommends that all rocks be 'microwave' sized as a minimum. Rocks should ideally be 'plate' shaped, with flat upper and lower surfaces, but this is not always possible;
3. Excavate soil from the area to be rock armoured, to the approximate depth of the rocks to be used. Dispose of spoil appropriately, keeping some in reserve for packing in around rocks;
4. Beginning from the bottom and working uphill, place rocks into the excavated trench, locking them together and packing each one in place before moving onto the next. The goal is to ensure that the upper surface of the rock-armoured section is as flat and uniform as possible, (although sometimes it may be desirable to make it uneven or rough). Rocks should not be placed in uniform rows, as this causes the gaps/joins to line up, creating potential traps for water and wheels;
5. Once all rock armouring is complete, use any left over soil/rocks to pack in around the edges of the rock armouring.

If rock armouring is performed correctly, it will resist erosion and last for many years.

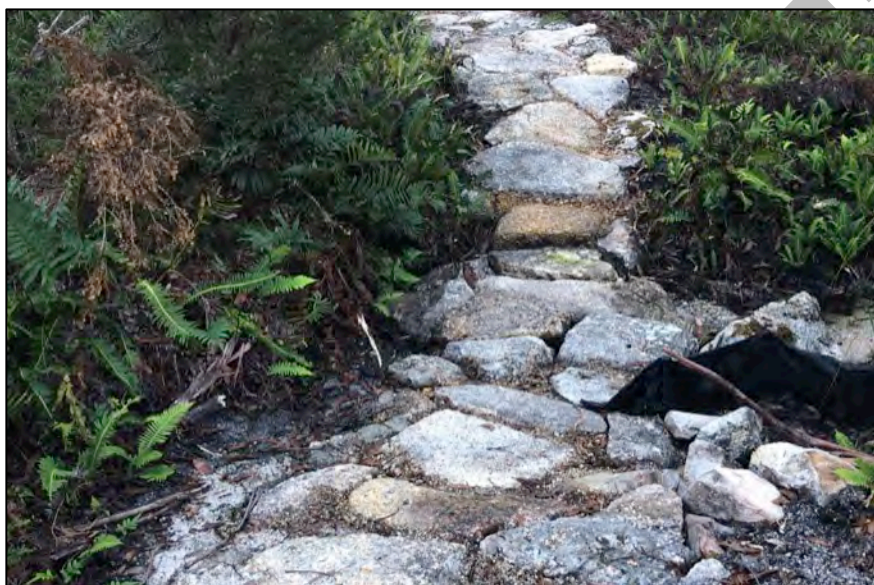
If insitu/locally sourced rocks are not readily available, an alternative option is to use Adjustable Rock Matting (ARM). ARM is a WT proprietary product made from precast concrete and held together using 4mm Nylon. ARM comes in sheets of differing sizes, including 600mm and 1000mm widths, can be transported easily into most locations and replicates normal rock armouring in it's installation, aesthetics and durability. It is approximately 150mm high and is embedded into the ground to provide a continuous level tread surface with the adjacent tread of the trail.

See Appendix 5 – ARM Brochure.

See:

- **WT Standard Drawing WTMSTD-007-YV**
- **WT Standard Drawing WTMSTD-011-YV**

Photo examples of rock armouring:



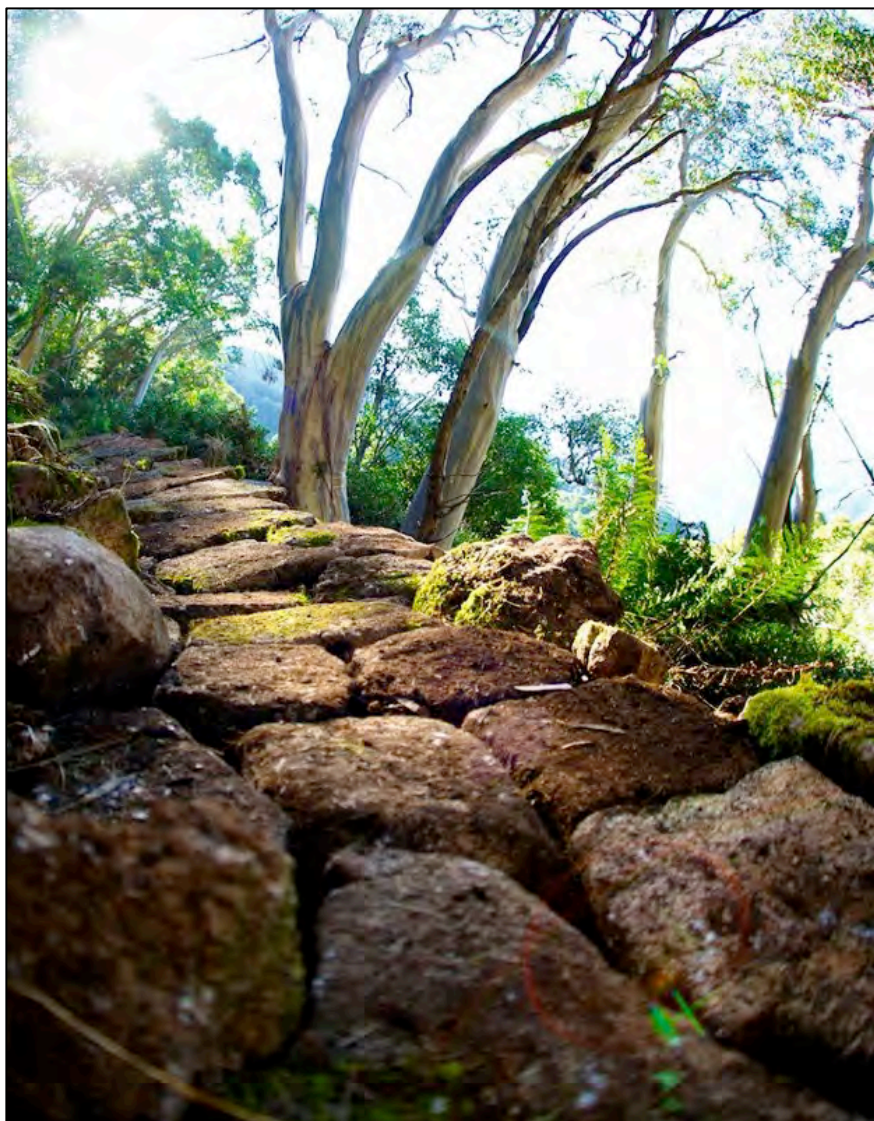
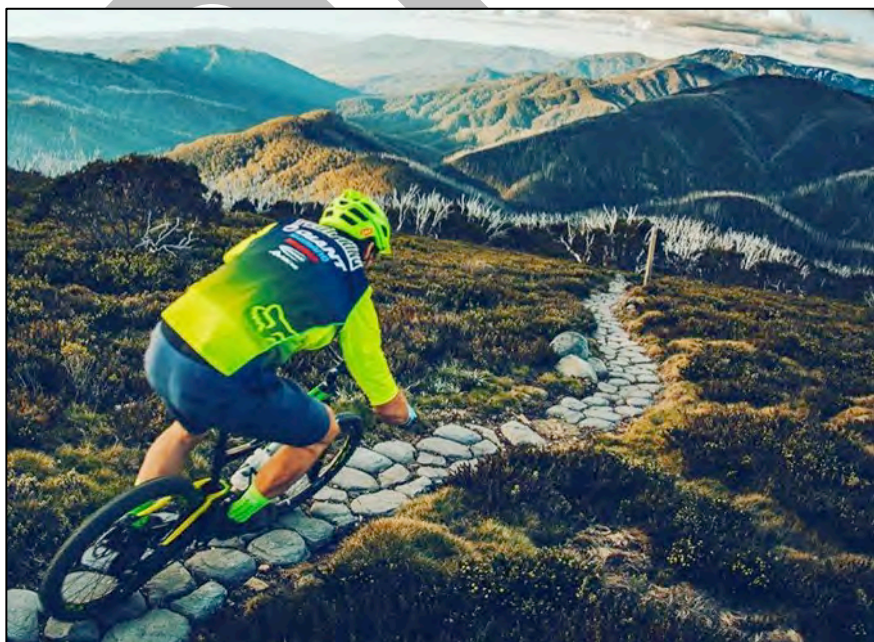


Photo examples of Adjustable Rock Matting (ARM):





5.4.2.3 Raised Embankment

Raised embankments may be necessary in trail sections that are often wet and boggy, or to improve rideability through changing the vertical alignment.

Essentially this technique uses extra 'fill' material to build the trail tread up higher. The fill material is usually sourced from another area where there is an excess of material and moved along the trail to where it is required. In some instances, fill material can be imported to the location from an external source, but this is often impractical in trail construction due to the limited access points and the long linear distances of importing along the trail.

Raised embankments are generally used where the ground surface is not suitable for typical cut and fill benching techniques. Examples include:

- Areas with soft, boggy ground;
- Areas where tree roots run along the tree surface;
- Areas that are very flat with no/little cross-slope to effect drainage.

Raised Embankments should be constructed so that they do not impede the flow of stormwater or they should have suitable drainage structures (e.g. pipes/culverts) placed at the bottom of the fill material.

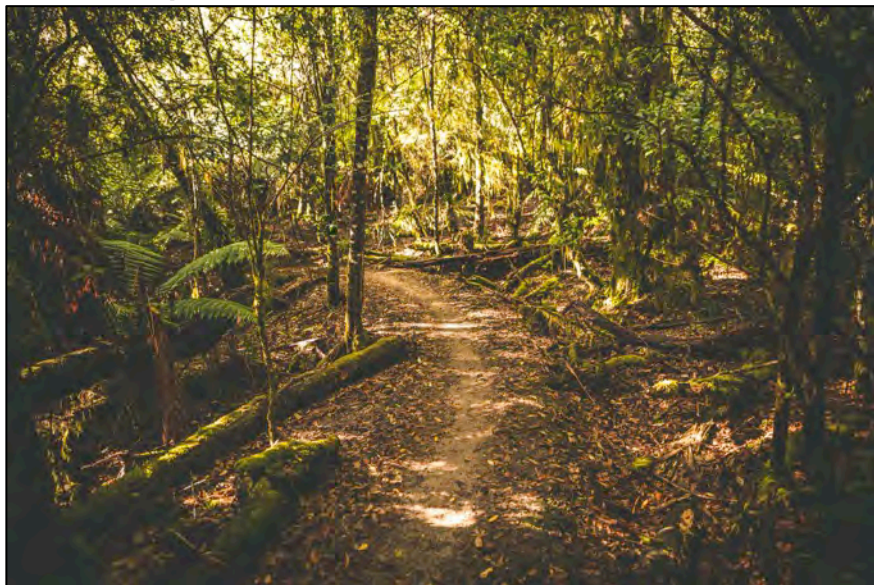
Rocks can be placed at the toe of the embankment to stabilise the batters and protect the bottom section of the embankment from erosion.

Where there is sufficient room, rocks can also be placed at the top of the embankment to direct riders into a preferred 'ride line'.

See:

- **WT Standard Drawing WTMSTD-029-YV**

Photo examples of raised embankment:



5.4.2.4 Tree Root Protection

Considerable efforts have been made during the ground-truthing protocols to ensure suitable offsets away from vegetation communities or species of high sensitivity or environmental significance. However, given the highly treed nature of the study site, it is impossible to avoid constructing trails within the root zone of trees.

Tree Root Protection is to be used in locations where the trail alignment cannot be redirected to avoid tree roots.

The tree root is to be encased in a 'cut to suit' section of PVC pipe that has an internal diameter that provides a 25mm minimum clearance from the tree root.

Other measures to ensure the protection of tree roots include the construction of low level bridges or boardwalks, hand construction and raised embankments.

See:

- **WT Standard Drawing WTMSTD-031-YV**

5.4.2.5 Rock Walling

Rock walling is used from time to time to retain the upper or lower batters, usually in areas with excessively steep side slopes.

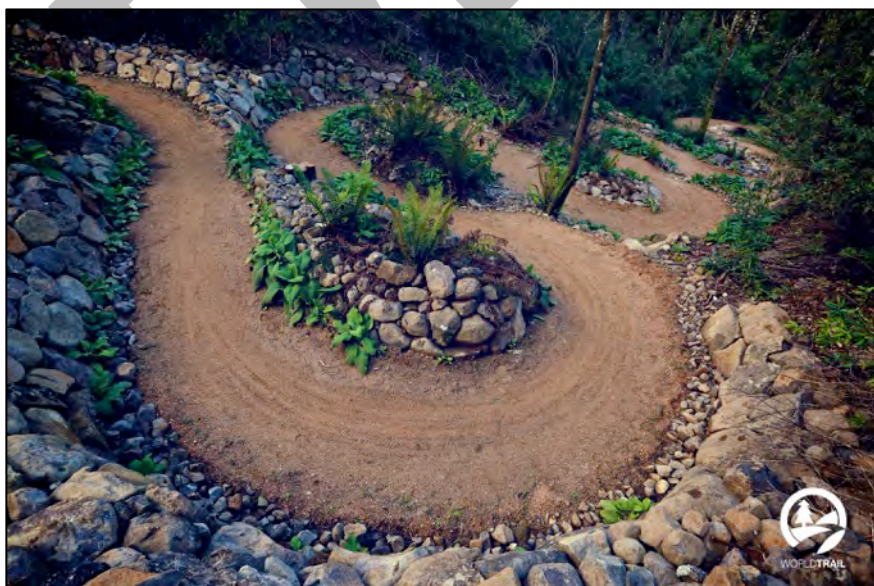
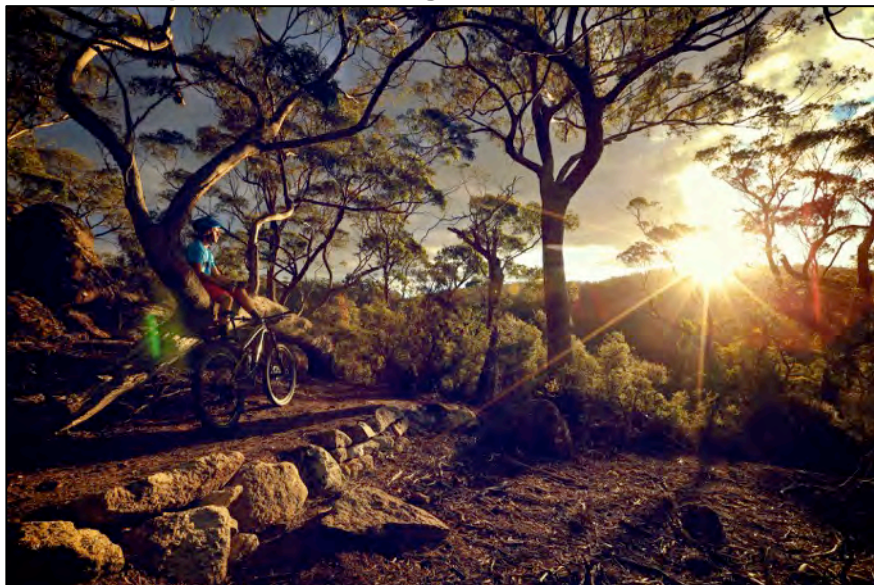
Rock walling used in standard trail construction is less than 500mm high and is constructed using boulders/rocks sourced during standard trail construction. These rock walls are constructed with the assistance of an excavator, as the trail is being constructed. The excavator cuts a trench/pad for the boulders to sit in and can also be used to move/manipulate the heavier rocks into position. These retaining walls don't use concrete or other imported materials as a general rule, and being less than 1m high don't require any specific engineering requirements.

See:

- **WT Standard Drawing WTMSTD-034-YV**

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Photo examples of rock walling:



5.4.2.6 Retaining Walls

Retaining walls over 1m are much less common on MTB trails. They are more commonly used on wider trails, for example, high volume walking tracks or shared-use trails. Retaining walls greater than 1m require the use of imported materials, such as concrete, rock, geofabric and aggregate and require certification by a qualified engineer.

See:

- **WT Standard Drawing WTSTD-004-YV**

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Photo examples of retaining walls:



5.4.2.7 Low Level Bridges

Low level bridges (sometimes called boardwalks) are typically used where the trail crosses over a waterway or area of soft or boggy ground.

A variety of different decking materials can be used. The most commonly used materials are timber, Fibre Reinforced Plastic (FRP) mesh or steel mesh. The use of mesh decking allows light and water to penetrate through the bridge, thus minimizing the impact on the vegetation below.

Typically, low level bridges should be less than 1m above the ground⁷ to avoid the requirement for handrails. Handrails can be a crush hazard for MTB riders' fingers. Sometimes a handrail can be avoided by slightly adjusting the location of a bridge and thus reducing the height of the drop off.

WT Standard Drawing WTMSTD-036-YV and WT Standard Drawing WTMSTD-037-YV provide indicative designs for timber and FRP low level bridges. This design was commissioned by World Trail for usage specifically in environmentally sensitive areas, where it is desirable to avoid excessive excavation (such as typically occurs for normal bridge/boardwalk construction techniques using post and concrete footings). Key design parameters are:

- Footings are hydraulically driven to refusal, requiring minimal impact/excavation;
- Maximum span lengths of 3m should allow the bridges to span the majority of the small streams encountered, without the need for any footings within the defined waterway channel;
- Efficient use of materials. Given the remote locations of the bridges, all materials will likely need to be carried in by hand along the trail, so need to prioritise strength over weight.

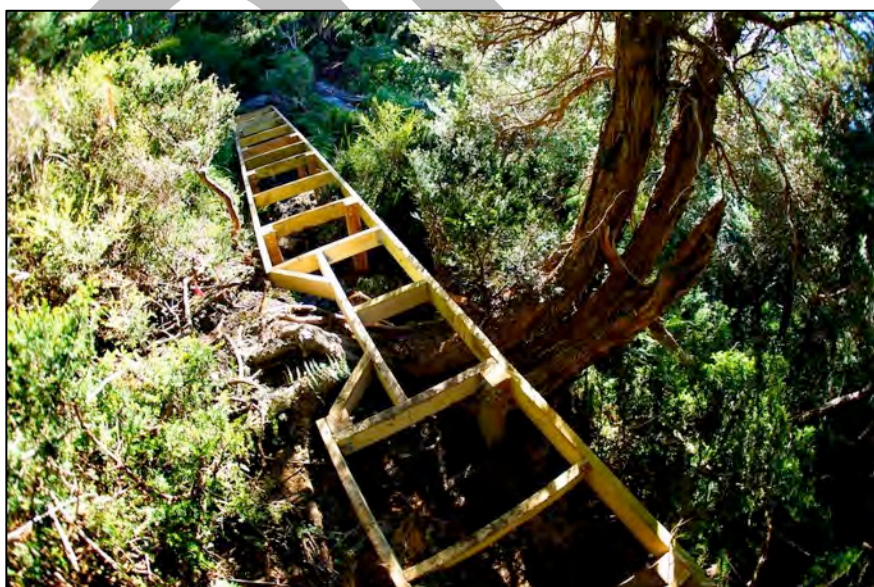
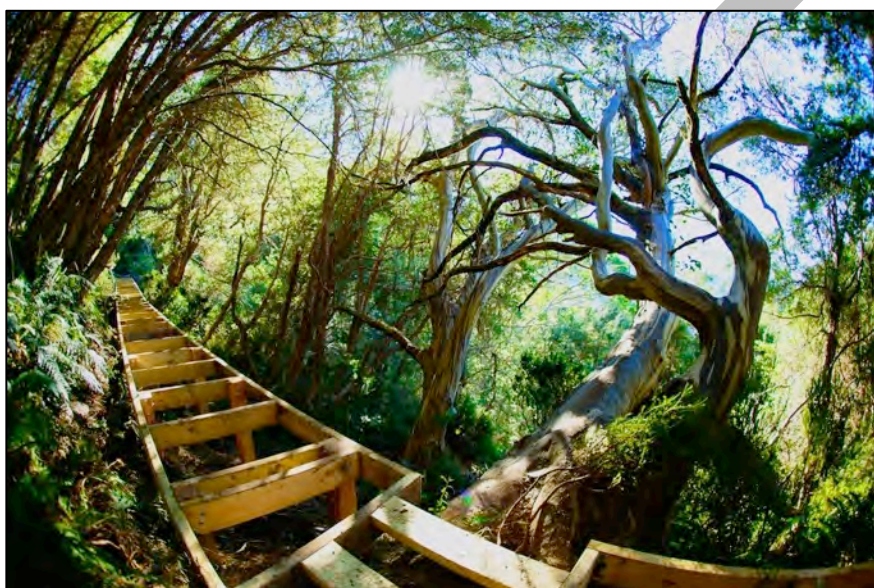
Low level bridges on MTB trails should be designed and placed so as to be as short, straight and level as possible. The entry and exit should ideally be straight and in-line with the bridge. The trail design should naturally slow riders on their approach to the bridge, ensuring that they don't enter at high speeds. Rock armouring (either natural or ARM) for 3-5m at the entry and exit of the bridge is generally recommended – it helps manage any abrasion that may result from heavy braking and can also help to shed mud/dirt off tyres before crossing the bridge.

See:

- **WT Standard Drawing WTMSTD-036-YV**
- **WT Standard Drawing WTMSTD-037-YV**

⁷ Measured from the top of the decking surface down to the ground.

Photo examples of low level bridges:





5.4.3 WT Standard Drawings

The drawings on the following pages depict the standard trail construction techniques used to build MTB trails. Table 10 below lists the standard drawings relevant to this project.

Table 10. Drawing Register

No.	Title	Description	Revision
WTMSTD-033-YV	Mountain Bike Trail Sections, Typical Vegetation Impact Zones, World Trail – Standard Drawing	Mountain bike trail construction benching detail including vegetation clearing zone, bench width, ride line, area of cut, area of fill and construction notes.	A
WTSTD-040-YV	Sediment Control - Fibre Rolls, Placement and Dimensions, World Trail – Standard Drawing	Mountain bike trail construction erosion control technique detail used to control water runoff from disturbed areas. Includes dimensions and construction notes.	A
WTSTD – 041 - YV	Sediment Control - Silt Fence, Placement and Dimensions, World Trail – Standard Drawing	Mountain bike trail construction erosion control technique detail used to control water runoff from disturbed areas. Includes dimensions and construction notes.	A
WTSTD-042-YV	Sediment Control - Silt Fence Notes, Placement and Dimensions, World Trail – Standard Drawing	Mountain bike trail construction erosion control technique detail used to control water runoff from disturbed areas. Includes dimensions and construction notes.	A
WTMSTD-007-YV	Rock Armouring MTB, Placement and Dimensions, World Trail – Standard Drawing	Mountain bike trail construction rock armouring detail used for wet areas or drainage areas. Includes dimensions and construction notes.	B
WTMSTD-011-YV	Adjustable Rock Matting	Mountain bike trail construction artificial modular rock armouring detail used for wet areas where natural rock armour cannot be sourced. Includes dimensions and construction notes.	A
WTMSTD-029-YV	Raised Embankment – MTB, Placement and Dimensions, World Trail – Standard Drawing	Mountain bike trail construction raised embankment detail used for wet areas where natural rock armour cannot be sourced or with high environmental values where machine works need to be limited. Includes dimensions and construction notes.	A
WTMSTD-031-YV	Trail – Tree Root Protection, Placement and Dimensions, World Trail – Standard Drawing	Mountain bike trail construction tree root protection detail used in areas off high environmental value or for significant trees where root disturbance must be minimised. Includes dimensions and construction notes.	A
WTMSTD-034-YV	Rock Walling- Up to 500mm – MTB, Placement and Dimensions, World Trail – Standard Drawing	Mountain bike trail construction dry stacked rock retaining wall detail used for steep side slopes or to build up over significant tree roots. Includes dimensions and construction notes.	A
WTSTD-004-YV	Rock Retaining Wall Up to 1000mm, Placement and Dimensions, World Trail – Standard Drawing	Mountain bike trail construction rock retaining wall technique used to build retaining walls between 500mm and 1000mm. Includes dimensions and construction notes.	A
WTMSTD-036-YV	1200 FRP Bridge Details – MTB, Placement and Dimensions, World Trail – Standard Drawing	Mountain bike trail construction detail for 1200mm wide low-level bridge constructed with fibre reinforced plastic. Used for small creek crossings or areas with high environmental values that machine works need to be limited. Includes dimensions and construction notes.	A
WTMSTD-037-YV	1200 Timber Bridge Details – MTB, Placement and Dimensions, World Trail – Standard Drawing	Mountain bike trail construction detail for 1200mm wide low-level bridge constructed with timber. Used for small creek crossings or areas with high environmental values that machine works need to be limited. Includes dimensions and construction notes.	A

DRAFT

NOTES:

INSTALLATION:

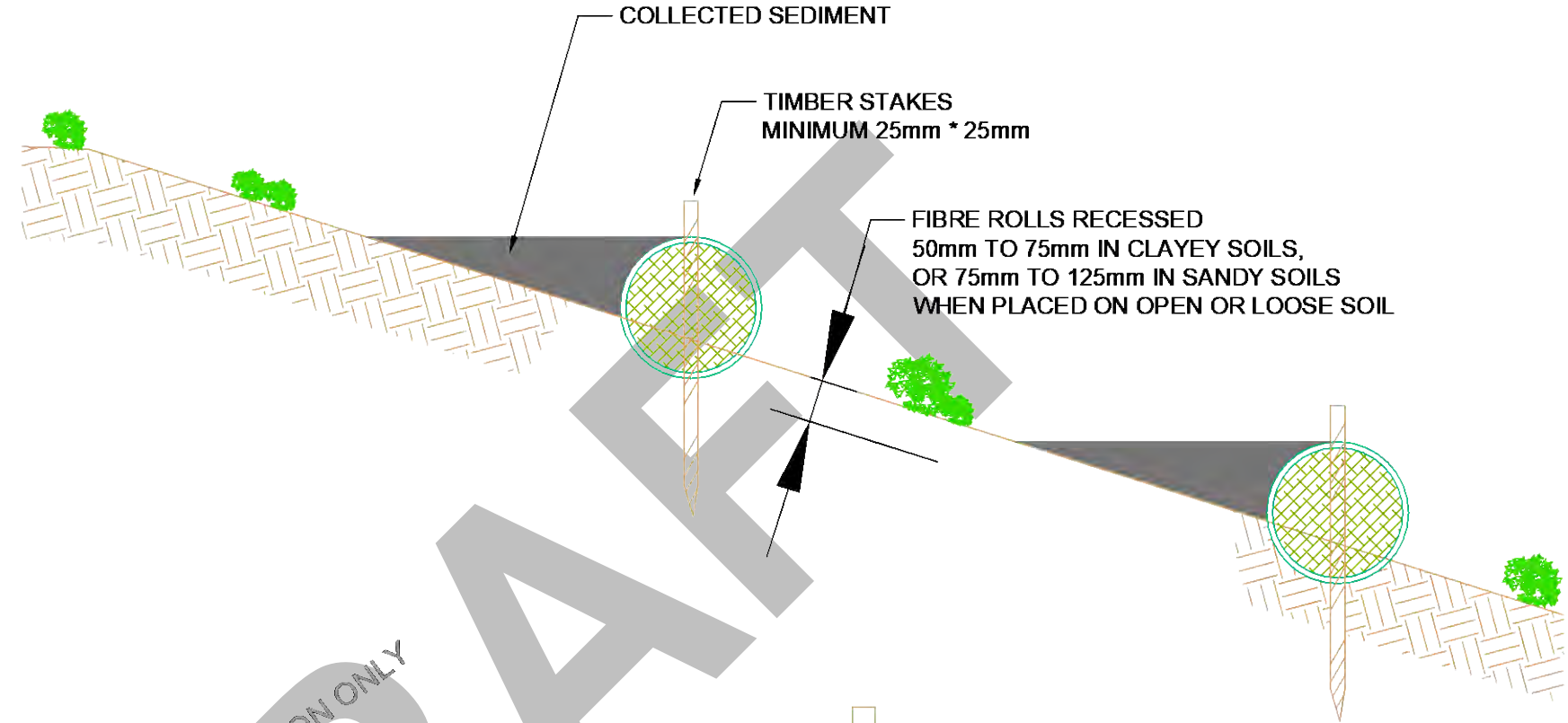
- Fibre Rolls are typically 200mm to 250mm Jute, Coir or Straw roll tied with synthetic biodegradable mesh.
- Fibre Rolls are to be installed as described in any project specific, approved plans. Any queries or alterations need to be provided by or approved by the clients engineer or on site representative.
- The rolls must be placed along the contour when placed across bare or newly seeded slopes.
- Ensure the outermost ends of a line of Fibre Rolls are turned up the slope to ensure ponding and minimise bypassing.
- When placed across the invert of minor drains ensure the rolls are spaced such that the crest of a downstream roll is level with or above the invert at the immediately upstream roll.
- When placed across the invert of minor drains ensure that each roll extends far enough up the banks on each side such that the crest of the roll in the center is lower than the ground height at the ends of the roll.
- Ensure the anchoring stakes are driven through the end of each roll and at a minimum spacing along the roll of the lesser of 1.2m spacings or 6 times the roll diameter.
- Stakes must be driven at a minimum spacing of 300mm when the rolls are being used to form a check dam.
- Adjoining rolls must be overlapped at least 450mm.

MAINTENANCE:

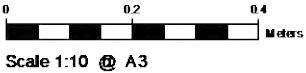
- All Fibre Rolls must be inspected at a minimum of once per week, always prior to a forecast rainfall event and at daily intervals during extended periods of rainfall.
- Any damaged or displaced Fibre Rolls must be replaced, relocated or repaired to ensure compliance with installation requirements.
- Collected sediment should be removed and disposed of in a suitable manner that will not cause erosion or detriment to water quality.

REMOVAL:

- Fibre Rolls are to be removed from site once they are no longer needed to provide their drainage or sediment control function.
- All excessive sediment must be removed from behind the rolls and disposed of as above, if it is likely to be washed away.
- Any biodegradable components of the Fibre Rolls may be suitable to remain on site as mulch.
- All materials that are not readily biodegradable must be removed from the site.



SECTION VIEW - TYPICAL INSTALLATION OF FIBRE ROLLS



NOTE: Sections of this plan have been derived from the Catchments and Creeks Standard Drawing - Plan FR-01

GENERAL
ARRANGEMENT
SCALE 1:25

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SIGNED _____	DATE _____

FOR INFORMATION

Project No.	WT2019-107
Scale	1:10
Sheet Size	A3
Drawing No.	WTSTD-040-YV
Rev.	A

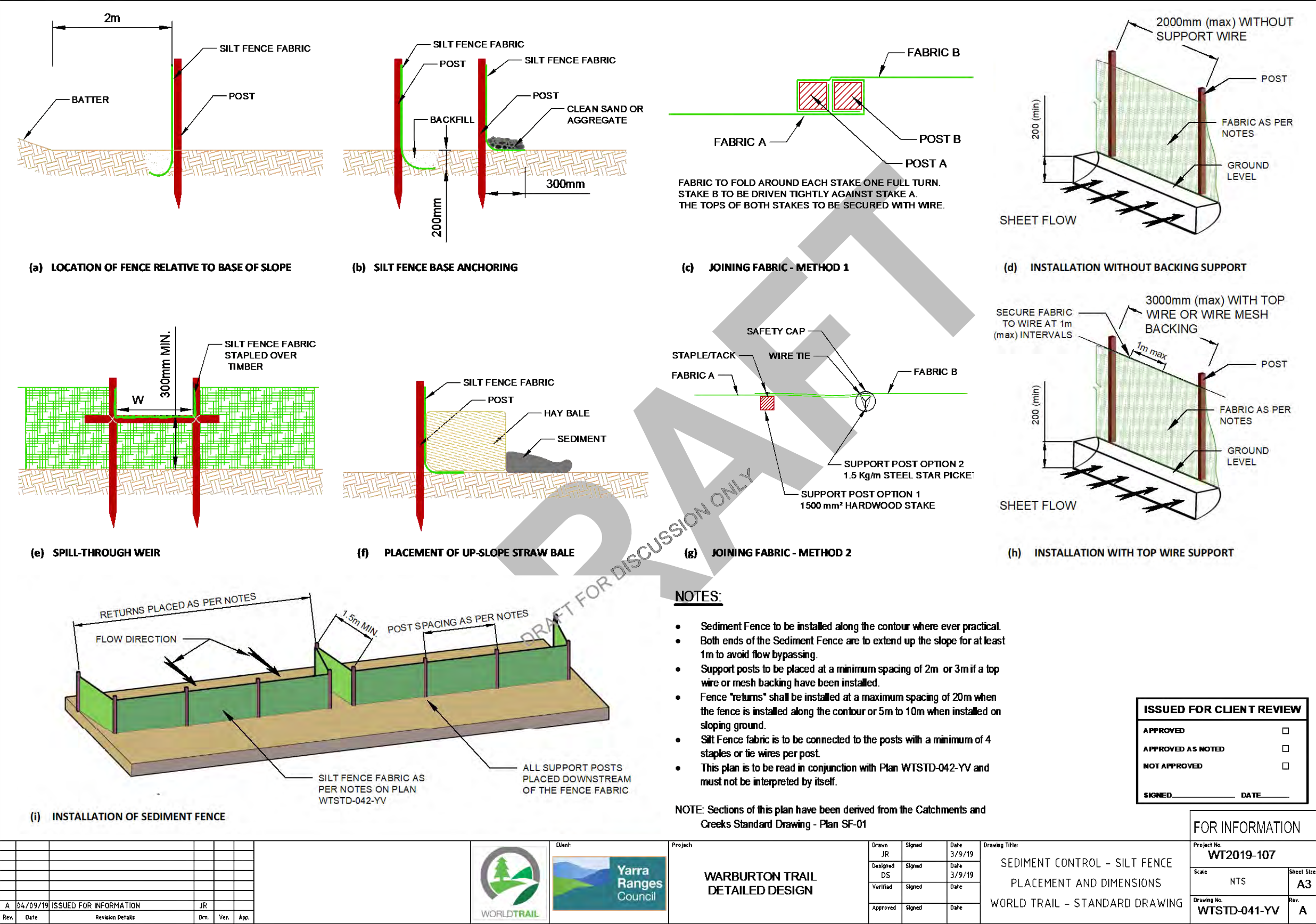
Rev.	Date	Revision Details	Des.	Ver.	App.
A	03/09/19	ISSUED FOR INFORMATION	JR		



WARBURTON TRAIL
DETAILED DESIGN

Drawn	JR	Signed		Date	3/9/19
Designed	DS	Signed		Date	3/9/19
Verified		Signed		Date	
Approved		Signed		Date	

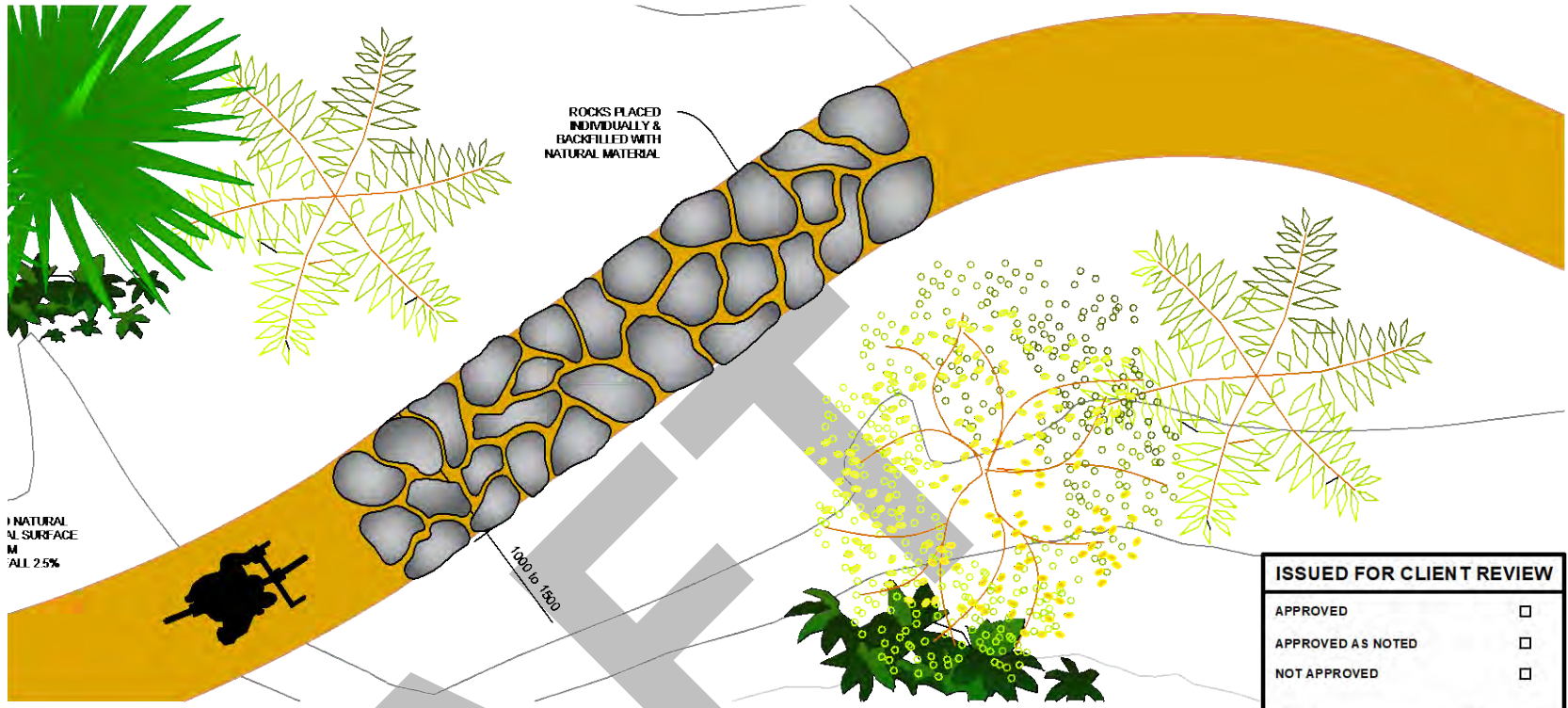
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SEDIMENT CONTROL - FIBRE ROLLS
PLACEMENT AND DIMENSIONS
WORLD TRAIL - STANDARD DRAWING



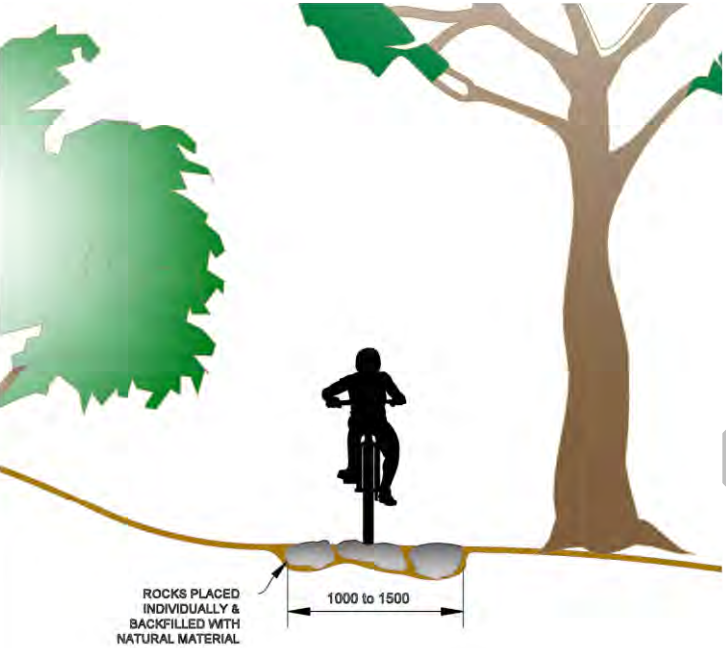
Drawing Title:	SEDIMENT CONTROL - SILT FENCE NOTES PLACEMENT AND DIMENSIONS WORLD TRAIL - STANDARD DRAWING
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NOTES:

- Rock Armouring (RA) is to be used in trail sections that are often wet and boggy or to reduce erosion and increase traction on steeper trail sections.
- RA consists of natural or imported rock depending on availability with a minimum size of 400mm and up to 800mm.
- Typical dimensions for rock armoured areas would be 1200mm (minimum) wide and often 5000mm long
- RA sections may be straight or curved depending on the local topography and the track alignment at that location.
- Rocks are to be placed into the wet foundation material and backfilled with dry graded local material that is of a similar consistency to the general track surface.
- Each rock should be bedded into graded foundation material in such a way that it will remain stable with no rocking or misplacement.
- Rocks used for armouring should be of an appropriate shape, texture and colour to match the native rock and must provide a natural appearance relative to its location.
- Rocks should be placed so that the top surface provides reasonable traction for cycle and foot traffic. Distance between rocks will depend on the degree of "bogginess" and the ability of the foundation material to hold up the backfill material between the individual rocks.
- The texture of the top surface of the rocks should allow for reasonable traction for cycle and foot traffic with minimal slippage.
- Once the rocks have been placed, natural topsoil should be raked or swept into the gaps between the rocks and compacted to minimise future slumping or rock instability.

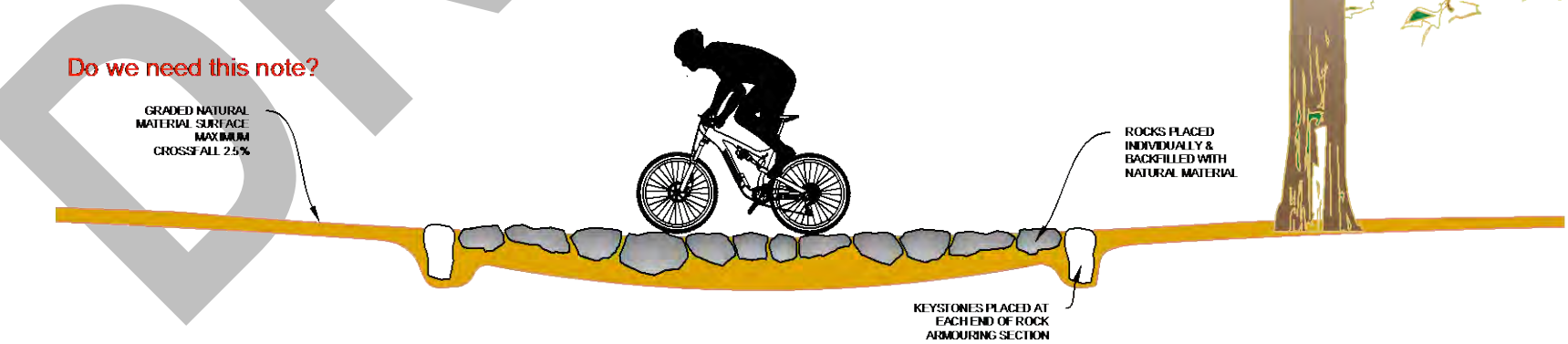


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Do we need this note?

GRADED NATURAL MATERIAL SURFACE
MAXIMUM CROSSFALL 2.5%



0 1.5 3 Meters Scale 1:50 @ A3

GENERAL ARRANGEMENT
SCALE 1:50

FOR INFORMATION

Project No.	WT2019-107
Scale	1:50
Sheet Size	A3
Drawing No.	WTMSTD-007-YV
Rev.	B

Rev.	Date	Revision Details	Dm.	Ver.	App.
B	20/08/19	CHANGE OF DRAWING NAME	JR		
A	25/10/18	ISSUED FOR INFORMATION	JR		



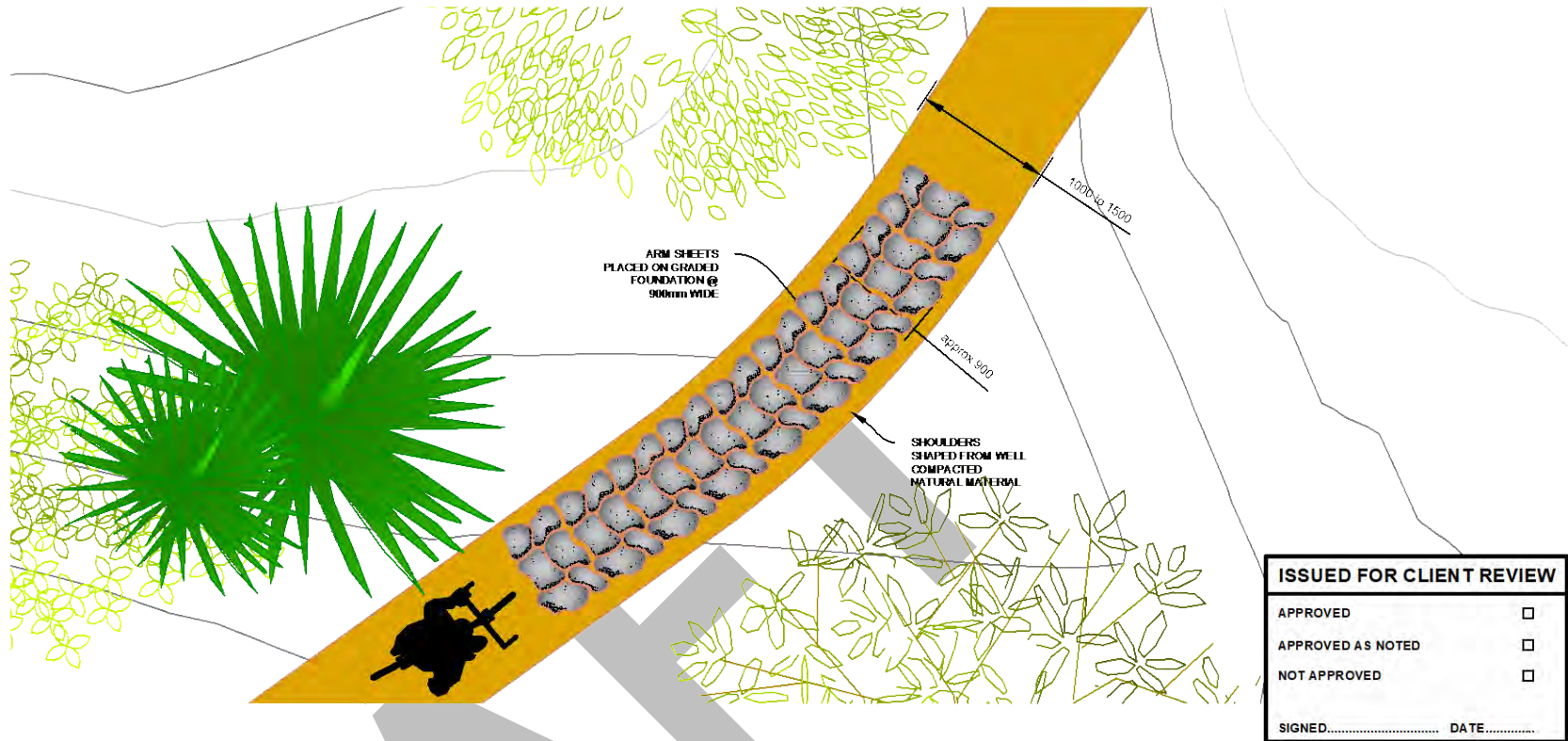
WARBURTON TRAIL
DETAILED DESIGN

Drawn	JR	Signed		Date	
Designed		Signed		Date	
Verified		Signed		Date	
Approved		Signed		Date	

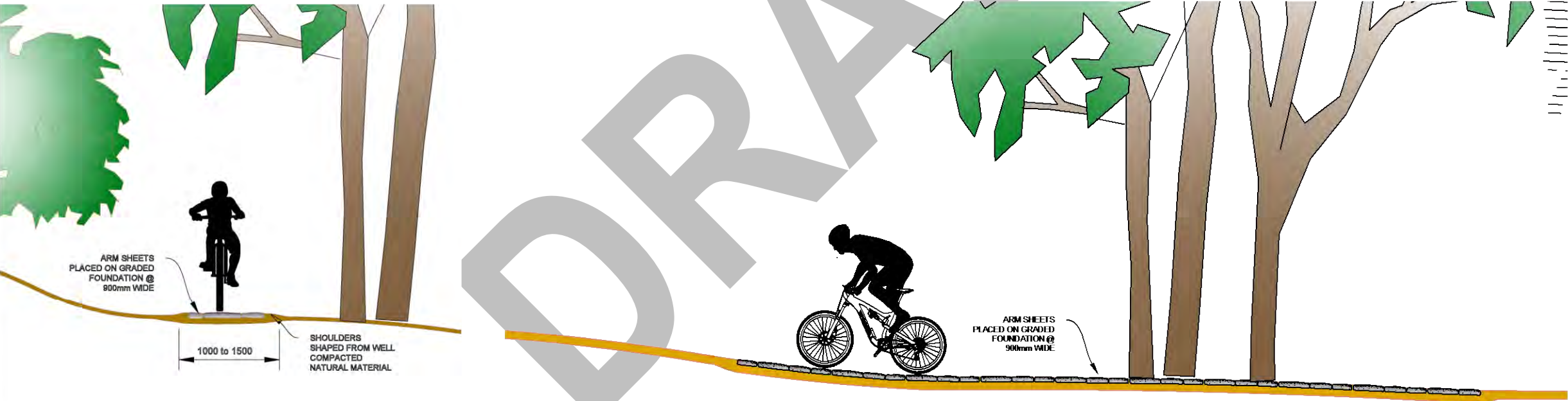
Drawing Title:
ROCK ARMOURING - MTB
PLACEMENT AND DIMENSIONS
WORLD TRAIL - STANDARD DRAWING

NOTES:

- Adjustable Rock Matting (ARM) is to be used in trail sections that are often wet and boggy or to provide a safe braking surface on unavoidable declines.
- ARM is manufactured in 600mm by 900mm sheets that have the capacity to be bent either vertically or horizontally to suit the required topography and trail alignment.
- Refer to World Trail's "ARM Fact Sheet - Installation Process" for more detailed information on design and installation of ARM trail sections.
- The trail section providing a foundation for ARM should be leveled and treated to be free of protruding rocks or roots prior to installation.
- A base layer of imported material may be required to provide a suitable foundation for the ARM if the natural material is found to be unsuitable.
- Any excess loose material should be stockpiled nearby to be used as a coating surface after the ARM has been installed.
- ARM sheets should be installed from the lowest point and working uphill, checking the alignment as installation proceeds.
- Sheets can be cut to allow removal of sections to facilitate alignment around large unmoving objects or to allow tighter curves in difficult trail alignment sections.
- Each sheet should be checked to ensure it is sitting evenly and solidly on the ground without rocking or movement under pressure.
- The ARM sheets should be joined with cable ties and any excess matting trimmed.
- Secure the ARM sheets to the ground with pegs placed through the matting..
- Finish by raking or sweeping the stockpiled topsoil over the ARM sheets, filling and compacting soil into the gaps between the rocks.
- Ensure the ARM placement and soil topping provides a trafficable surface.



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NOT APPROVED	<input type="checkbox"/>
SIGNED.....	DATE.....



GENERAL ARRANGEMENT
SCALE 1:50

FOR INFORMATION	
Project No.	WT2019-107
Scale	1:50
Sheet Size	A3
Drawing No.	WTMSTD-011-YV
Rev.	A

Rev.	Date	Revision Details	Des.	Ver.	App.
A	25/08/19	ISSUED FOR INFORMATION	JR		



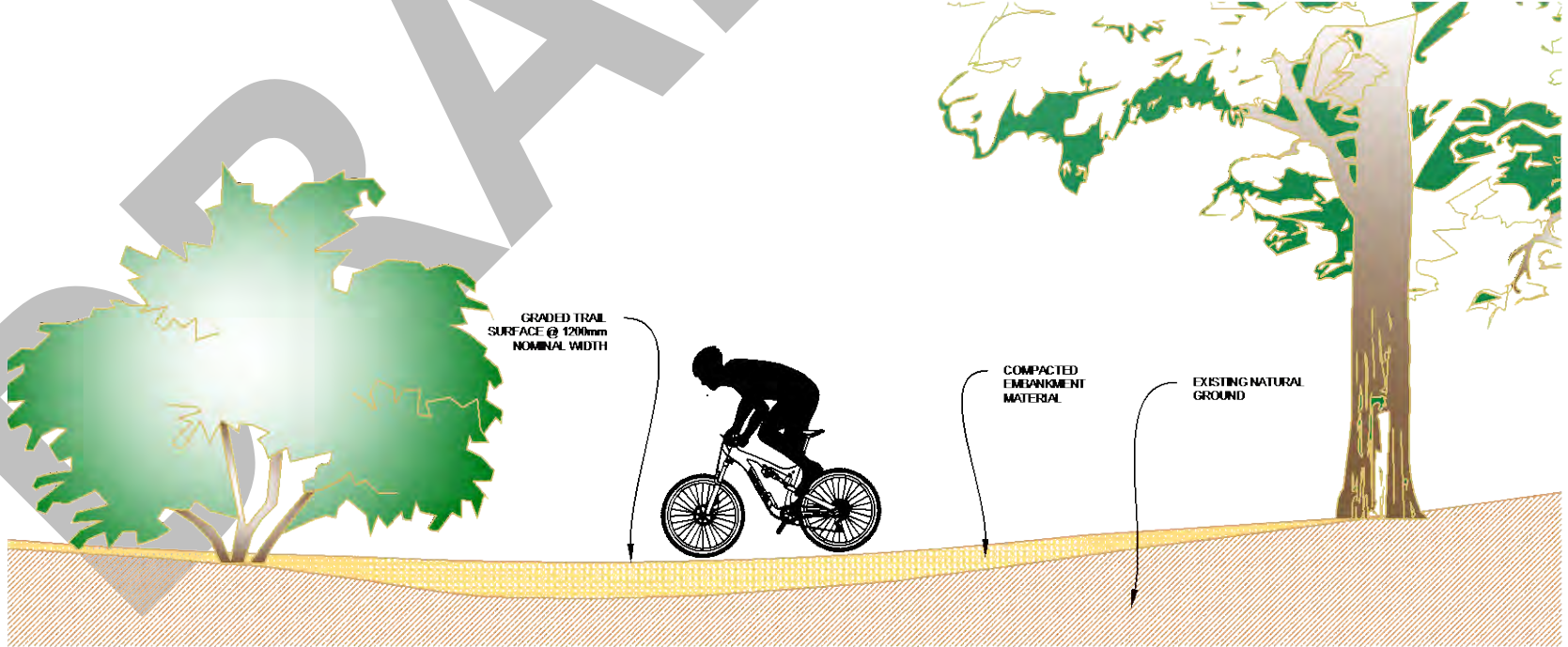
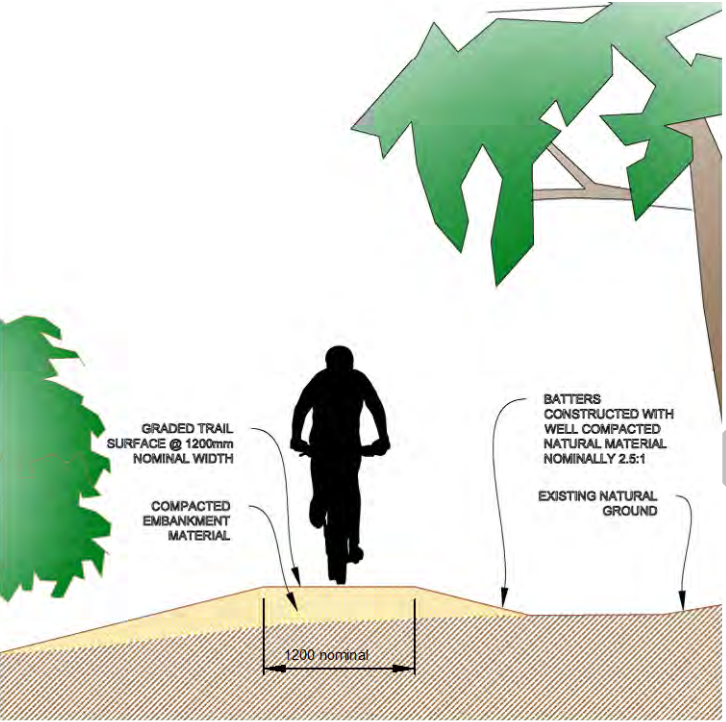
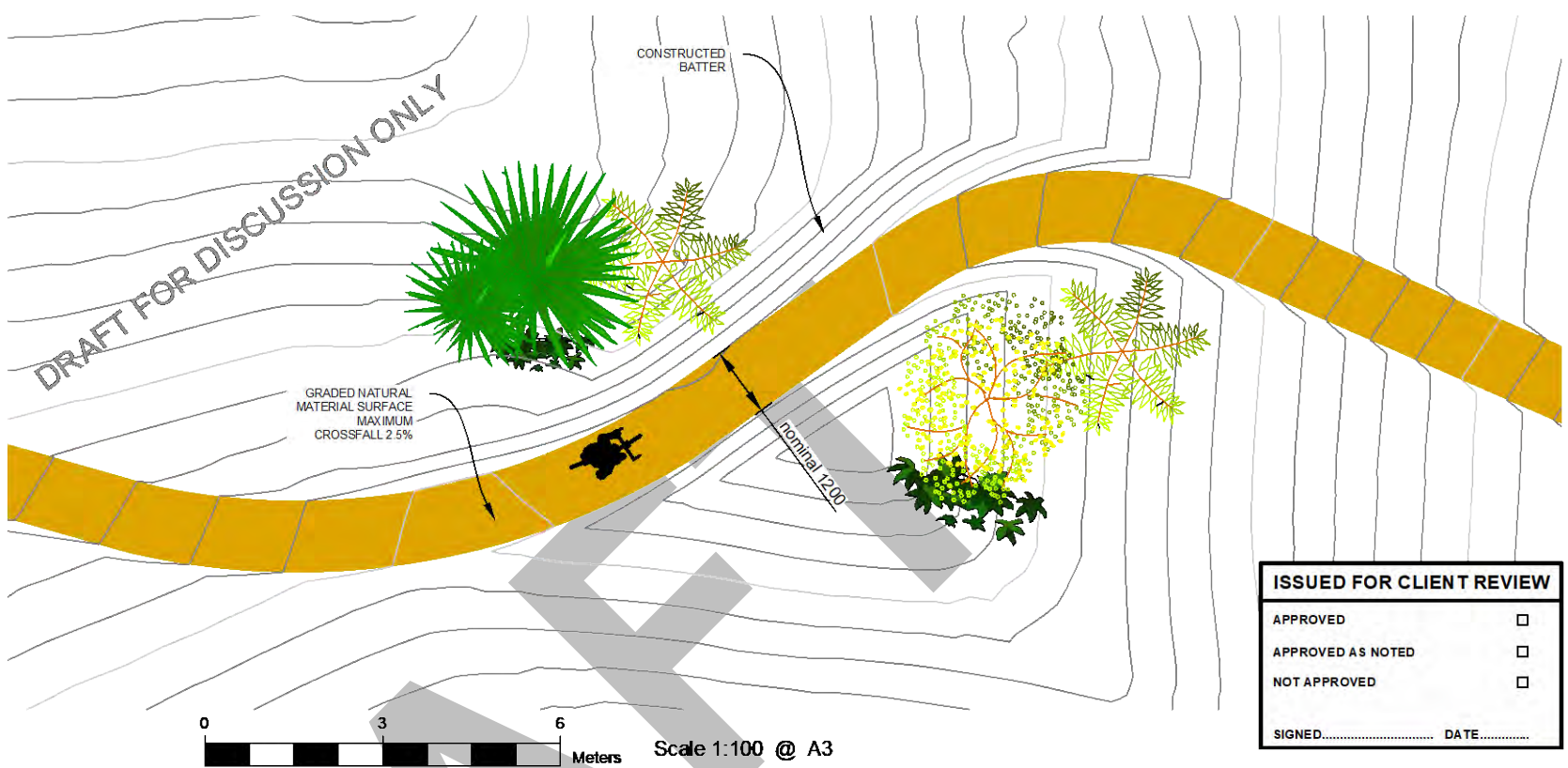
WARBURTON TRAIL
DETAILED DESIGN

Drawn	JR	Signed		Date	
Designed	JR	Signed		Date	
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Approved		Signed		Date	

Drawing Title:
ADJUSTABLE ROCK MATTING 900mm
PLACEMENT AND DIMENSIONS
WORLD TRAIL - STANDARD DRAWING

NOTES:

- Raised Embankments may be necessary in trail sections that are often wet and boggy or to improve rideability through changing the vertical alignment.
- Raised Embankments will only be appropriate in areas where spare embankment material is available and can be utilised economically.
- The height and length of the raised embankment will vary considerably depending on the location where it is required. It will vary from a slight elevation of a few hundred millimeters to around a meter as depicted on this plan.
- Embankment material should be free of large rocks and should not contain large amounts of vegetation matter.
- Embankments are to be compacted in layers of less than 200mm and to 90% of maximum dry density.
- Batter slopes should be nominally 2.5:1 but may vary considerably depending on the type and availability of fill material and the local topography of the trail location.
- Raised Embankments should be constructed so that they do not impede the flow of stormwater or they should have suitable drainage structures (eg pipes) placed at the bottom of the fill material.
- Rocks can be placed at the toe of the embankment to stabilise the batters and protect the bottom section of the embankment from erosion.
- Where there is sufficient room, rocks can also be placed at the top of the embankment to direct riders into a preferred "ride line".



GENERAL
ARRANGEMENT
VARIES

FOR INFORMATION

Project No.	WT2019-107
Scale	as shown
Sheet Size	A3
Drawing No.	WTMSTD-029-YV
Rev.	A

Rev.	Date	Revision Details	Dm.	Ver.	App.
A	05/09/19	ISSUED FOR INFORMATION	JR		



WARBURTON TRAIL
DETAILED DESIGN

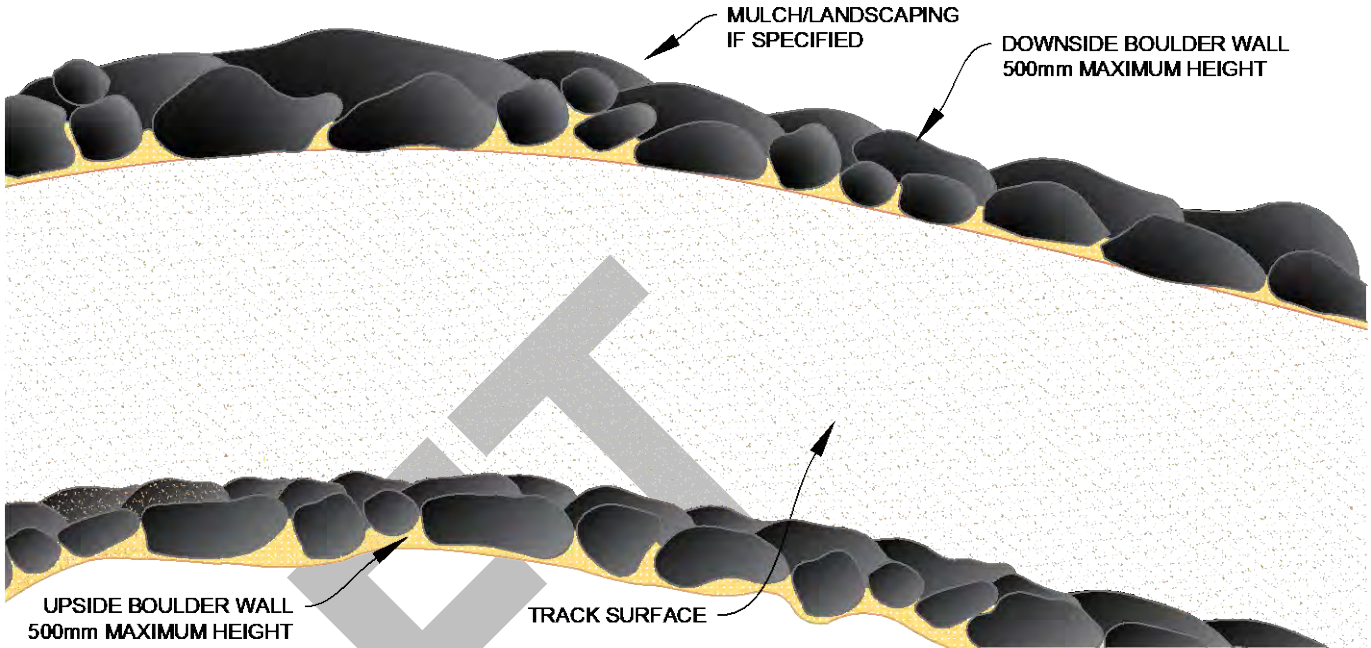
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Designed	DS	Signed		Date	
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Drawing Title:
RAISED EMBANKMENT - MTB
PLACEMENT AND DIMENSIONS
WORLD TRAIL - STANDARD DRAWING

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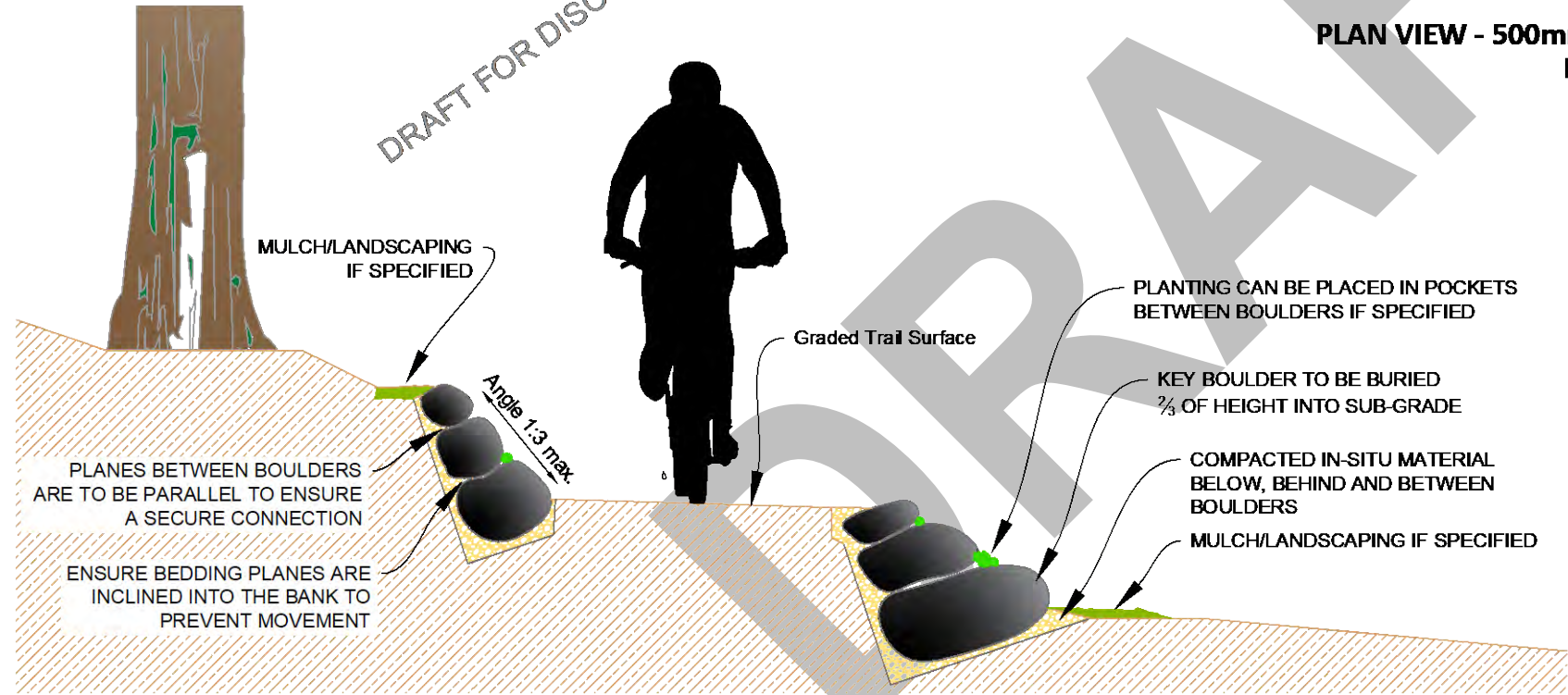
NOTES:

- GENERAL:
- Boulders used for the retention wall to be a minimum size of 300mm * 300mm * 300mm.
 - The approved boulder type used to form the wall shall be of one consistent type. Typically Granite, Sandstone, Volcanic Red Rock, Phophyry or other Natural BushRock Boulders unless specified otherwise.
 - Boulders as specified with the best and most natural surfaces exposed.
 - Sharp / Angled edges are not acceptable.
 - Boulder wall to be constructed by an experienced contractor and must not exceed 500mm in height.
 - Refer to Standard Drawing WTSTD-004-YV for locations where the rock wall needs to be over 500mm.
 - Fill used under, behind and between boulders to be in-situ material or equivalent approved material.
 - In-situ material is to be compacted to 90% Modified Maximum Dry Density to AS1289.5.4.1.
 - This plan depicts boulder walls on both the upside and downside of the track. In many locations only the upside or the downside walls will be required. This plan is meant to be used for the construction of one or the other or both types of retention depending on the local topography.



PLAN VIEW - 500mm BOULDER RETAINING WALL BOTH SIDES

Scale 1:25 @ A3



TYPICAL SECTION - 500mm BOULDER RETAINING WALL BOTH SIDES

0 0.5 1 Meters

Scale 1:25 @ A3

LEGEND:

- GRADED TRAIL SURFACE
- IN-SITU MATERIAL
- NATURAL GROUND

ISSUED FOR CLIENT REVIEW	
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FOR INFORMATION

Project No.	WT2019-107
Scale	1:25
Sheet Size	A3
Drawing No.	WTMSTD-034-YV
Rev.	A

Rev.	Date	Revision Details	Dm.	Ver.	App.
A	02/09/19	ISSUED FOR INFORMATION	JR		



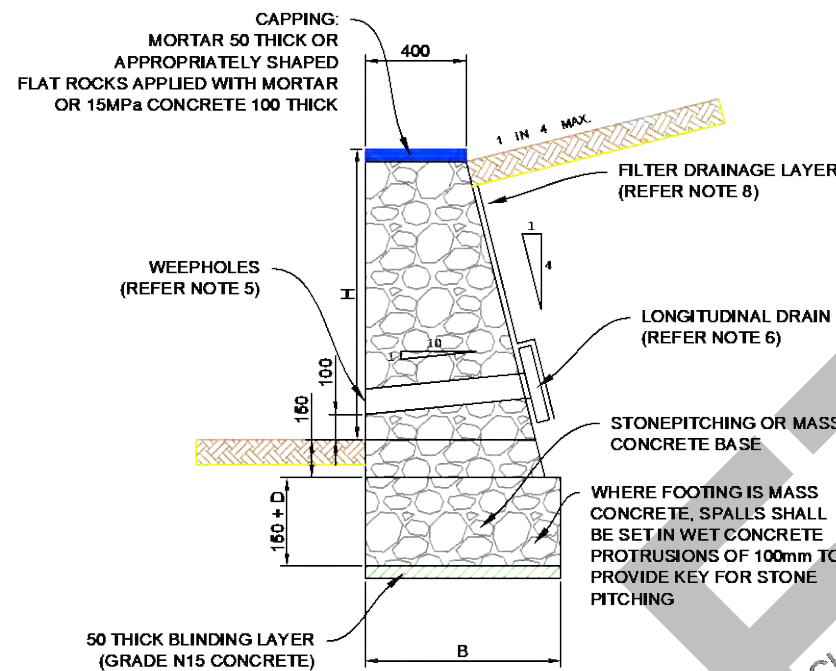
WARBURTON TRAIL
DETAILED DESIGN

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Designed	DS	Signed		Date	16/6/19
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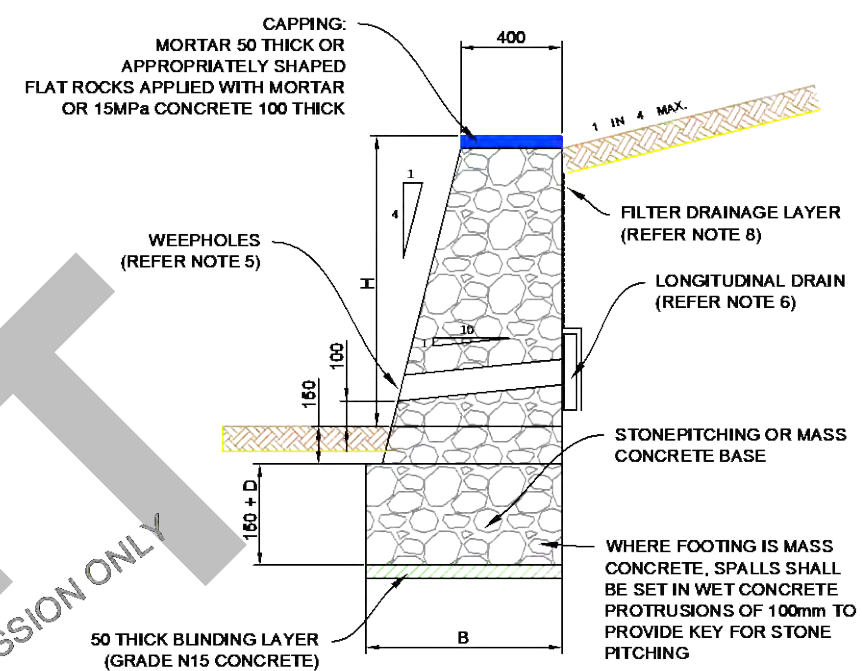
Drawing Title:
ROCK WALLING - UP TO 500mm - MTB
PLACEMENT AND DIMENSIONS
WORLD TRAIL - STANDARD DRAWING

- The wall dimensions shown assume a minimum allowable bearing capacity of 100 KPa is available on site.
- Mortar to be 1 part cement to 3 parts sand (by volume). Face joints to be 25mm nominal width.
- Rocks to be selected spalls set in cement mortar beds in horizontal layers. Unless specified otherwise open faced stonepitching to be used where the concrete is recessed 50mm behind the stone facing. If closed face stonepitching is specified, concrete to be flush with stone facing. Select spalls to avoid sharp edges.
- The standard building regulation 1993 requires that a building application be lodged for earth retaining structures >1000mm high. A geotechnical assessment by a suitably qualified engineer is required for all walls founded in poor materials eg. bearing capacity <100 KPa.
- Install weepholes in addition to the longitudinal drain for maintenance and overflow purposes. Weepholes to be 100mm dia upvc at 1000mm max centres, positioned at approx 100mm constant height above ultimate ground level and connected to the longitudinal drain using standard manufacturers fittings.
- Longitudinal drain shall be 300mm * 50mm megaflo or 100mm dia corrugated perforated polyethylene pipe, encased with geofabric (BIDIM A29 or equivalent). The invert of the longitudinal drain and the weephole inlet shall be aligned to allow direct discharge via the weephole.
- All connection, including the joining of lengths of megaflo or corrugated perforated polyethylene pipe, shall be made using standard manufacturers fittings.
- Filter drainage layer for full height and length of wall to be Cordrain or equivalent with Geofabric (BIDIM A29 or equivalent) adhered to both sides. Alternately, a 300mm thick, free draining filter sand/gravel layer separated from insitu material by a type 2 geofabric layer.
- Backfill shall be freedraining, non plastic predominantly granular material with minimum friction angles of 38° and 27° where founding materials are sand or other materials respectively. Do not place backfill behind the wall until at least 10 days after wall construction.
- The 50mm blinding layer can be replaced with a 200 micron IR2 polyethylene sheet when the bottom off the footing excavation is in stable sound material.
- Drawings are not to scale.
- Dimensions in millimetres unless otherwise noted.

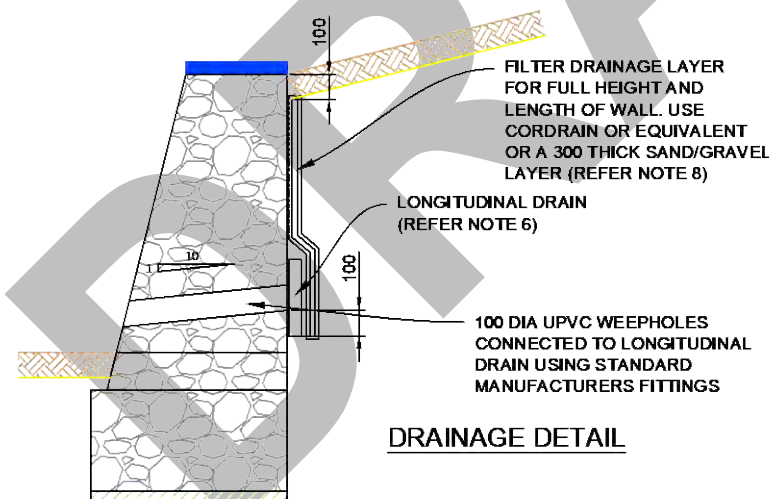
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SIGNED _____	DATE _____



STONEPITCHED RETAINING WALL
VERTICAL FACE
UNSTABLE INSITU MATERIAL RETAINED



STONEPITCHED RETAINING WALL
4 IN 1 FACE SLOPE
UNSTABLE INSITU MATERIAL RETAINED

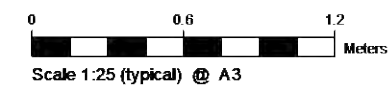


DRAINAGE DETAIL

GENERAL
ARRANGEMENT
SCALE 1/25

WALL DIMENSIONS

SLOPING BACKFILL - 1 IN 4 (MAX) OR LEVEL WITH 5 kPa SURCHARGE		
H	B	D
0 - 400	600	0
401 - 750	660	0
751 - 1000	775	200



FOR INFORMATION	
Project No. WT2019-107	
Scale 1:25	Sheet Size A3
Drawing No. WTSTD-004-YV	Rev. A

A	02/09/19	ISSUED FOR INFORMATION	JR			
Rev.	Date	Revision Details	Dm.	Ver.	App.	

WARBURTON TRAIL
DETAILED DESIGN

Drawn JR	Signed	Date
Designed	Signed	Date
Verified	Signed	Date
Approved	Signed	Date

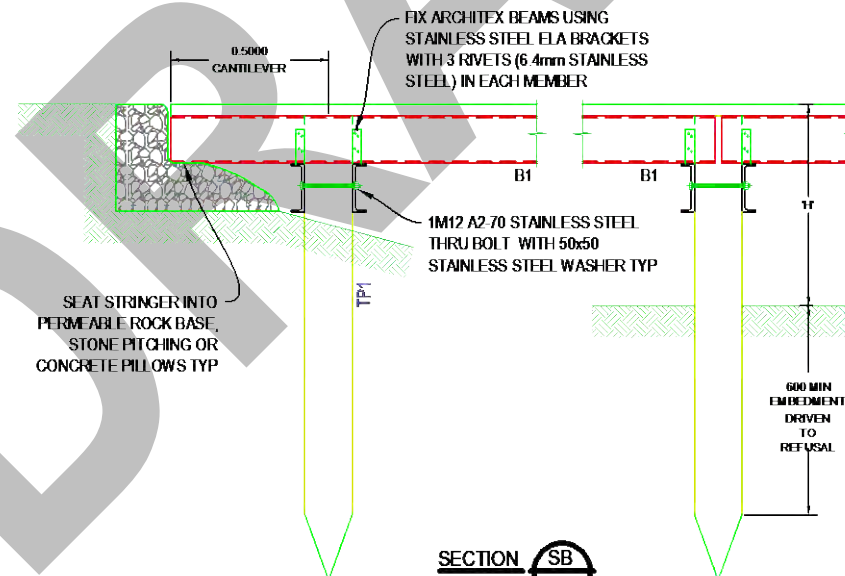
Drawing Title:	ROCK RETAINING WALL UP TO 1000mm PLACEMENT AND DIMENSIONS WORLD TRAIL - STANDARD DRAWING
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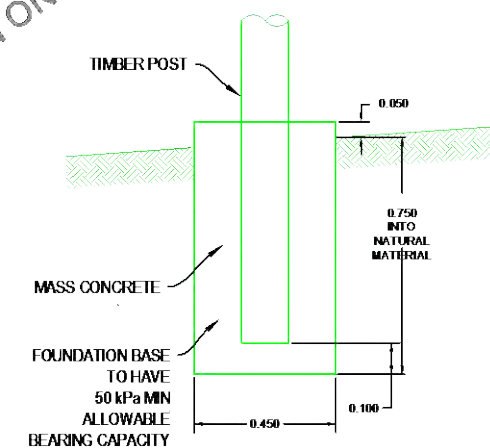
1200 WIDE FRP CYCLE TRAIL FRAMING PLAN
SCALE: 1"=50'

- This plan is a depiction of World Trail Standard Drawing S010 produced for WT by Bligh Tanner and presented for construction on the 8/8/2019. This plan is for information only and the original Plan S010 must be used for construction.
- All works, final and temporary, are the responsibility of the builder until final completion. the builder is responsible to ensure all materials and construction methodologies comply with those specified and their integrity is maintained until final completion.
- All treated pine posts to be hazard H5 to as 1604.1, F7 standard or better. all other treated pine members to be hazard H4 to as 1604.1, F7 standard or better.

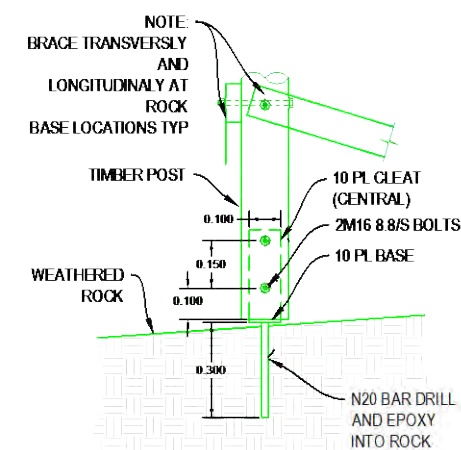
- All timber posts must be driven to refusal with a minimum 600mm embedment.
- All bolts, nuts and washers to be GR 304 stainless steel. Provide 40 sq washers under all bolt heads and nuts bearing against treated pine.
- Fibreglass grating to be colour black and have anti-skid surface.
- Refer to Architex structural product specification for handling and installation.
- Ensure FRP colour has been specified correctly by the client.
- All holes for anchoring to rock must be rotary hammer drilled and cleaned using a suitable brass brush and pressurised air prior to application of epoxy grout.
- Epoxy used for rock anchoring must be "Chemset 502" or Hilti "HIT-RE500 V2" and must be compliant with AS3600.
- Plan S010 must be referred to for further details and specification descriptions.



SECTION SB
SCALE 1:20 S010

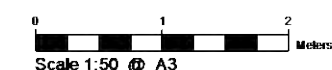
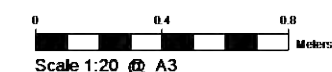


ALTERNATE TIMBER POST BASE DETAIL - CONCRETE PIER
SCALE 1:20



NOTE:
TIMBER POST STEEL BRACKET AND FIXINGS TO BE HOT DIPPED GALVANISED TYP UNO.
IF IN OR CLOSE TO SALT WATER ENVIRONMENT TIMBER POST STEEL BRACKET AND
FIXINGS TO BE 316 STAINLESS STEEL.

ALTERNATE TIMBER POST BASE DETAIL - ROCK BRACKET
SCALE 1:20



FOR INFORMATION	
Project No. WT2019-107	
Scale 1:25	Sheet Size A3
Drawing No. WTMSTD-036-YV	Rev. A

A	25/08/19	ISSUED FOR INFORMATION	JR		
Rev.	Date	Revision Details	Dm.	Ver.	App.

WARBURTON TRAIL
DETAILED DESIGN

Drawn JR	Signed	Date 16/6/1
Designed DS	Signed	Date 16/6/1
Verified	Signed	Date
Approved	Signed	Date

9	<p>Drawing Title:</p> <p>1200 FRP BRIDGE DETAILS - MTB</p> <p>PLACEMENT AND DIMENSIONS</p> <p>WORLD TRAIL - STANDARD DRAWING</p>
9	



6 ENVIRONMENTAL RISK MANAGEMENT CONTROLS

6.1 LEGISLATION STANDARDS AND GUIDELINES

A list of the relevant legislation, standards and guidelines as they apply to the project is provided below.

Legislation

- Planning and Environment Act 1987
- Environment Protection and Biodiversity Conservation Act 1999
- Plant Biosecurity Regulations 2016
- Environment Protection Act 2017
- State Environment Protection Policy (Waters)
- National Environment Protection Council (Victoria) Act 1995
- State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade)
- Wildlife Act 1975
- Aboriginal Heritage Act 2006
- Aboriginal Heritage Regulations 2007
- The Flora and Fauna Guarantee Act (FFG Act) 1988
- The Environment Protection and Biodiversity Conservation Act (EPBC Act) 1988
- The Catchment and Land Protection Act (CaLP Act) 1994
- The National Parks Act 1975

Standards & Guidelines

- Australian Mountain Bike Trail Guidelines 2019
- IMBA (2004) Trail Solutions: IMBA's Guide to Building Sweet Singletrack
- AS1940: The storage and handling of flammable and combustible liquids
- International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control

Yarra Ranges Council Planning Scheme

- Information pertaining to relevant environmental overlays (e.g. ESO and SLO)
- Yarra Ranges Local Vegetation Policy

6.2 AIR QUALITY

The nature of the works means that the main hazard to air quality is likely to be:

- Dust emissions during excavation works;
- Odour issues related to chemical use;
- Exhaust emissions from project plant. [L] [SEP]

Sensitive receptors related to air quality are likely to include: [L] [SEP]

- Park visitors (including walkers and cyclists); [L] [SEP]
- Residents in close proximity to site works; [L] [SEP]
- Wildlife inhabiting the park. [L] [SEP]

Site works that may contribute air quality that impacts on these receptors includes: [L] [SEP]

- The use of chainsaws; [L] [SEP]
- The use of excavation equipment; [L] [SEP]
- The use of compacting equipment; [L] [SEP]
- The use of power carriers; [L] [SEP]
- Vehicular use (4WD and ATV's);
- Motor Bike use to access trails.

Air quality issues should be relatively minimal and localised to the area of works. [L] [SEP]

Table 11. Air Quality

Aspect	Action	
Background	The proposed works have the potential to impact on sensitive receptors as a result of dust generation during disturbance of soils and the movement of machinery. There is also the [L] [SEP] potential for particulates to become a nuisance to sensitive receptors from exhaust fumes as a [L] [SEP] result of construction machinery operating on site. Air quality sensitive receptors in the vicinity of the project area include: [L] [SEP] Construction activities and equipment with the potential to generate dust or diminish air quality and impact on sensitive receptors include.	
Applicability to Project	Air quality issues related to dust and exhaust emissions are the main air quality issues likely to be encountered during the project	
Objective	To minimise the impacts on ambient air quality and avoid or mitigate and manage the potential adverse environmental impacts due to construction activities.	
Actions	Requirements	Timing
1. Dust and Particulate Matter	a. Pre-emptive measures to limit dust generation on site will be implemented. Information pertaining to inspections, monitoring and pre-emptive measures will be recorded within daily inspection reports and checklists.	During Construction
	b. Limit works on windy days.	During Construction
	c. No burning of material is to be undertaken at any time.	During Construction
	d. Finished trails remain shut until enough rain has fallen on them to allow for compaction due to bike traffic to minimise dust.	During Construction
	e. Ensure trucks transporting fine materials are covered and fitted with tight tailgates.	During Construction
	f. Restrict vehicle movements to designated access paths.	During Construction
2. Machinery Emissions	a. Ensure machinery is appropriately maintained and in good working order.	During Construction
	b. Manage vehicle diesel emissions by avoiding or minimising queuing in streets approaching the worksites or adjacent to	During Construction

	other sensitive activities.	
	c. Minimise queuing of construction vehicles and idling for excessive periods (e.g. More than five (5) minutes).	During Construction
	d. Emissions from stationary plant, construction vehicles and equipment powered by diesel motors to be minimised through fitting emission control devices and regular maintenance to manufacturers' specifications.	During Construction
	e. Shut down construction plant and equipment idling for excessive periods (i.e. Longer than five (5) minutes) where possible	During Construction
3. Performance Indicators	a. No visible dust emissions during works. b. No complaints received by members of the public. c. No show cause notices, infringements notices or stop work order.	
4. Monitoring	a. For all trails under active construction, undertake visual observations and monitoring on a daily basis for: <ul style="list-style-type: none"> I. Dust and emission plumes on site associated with the construction works and vehicles; II. Transporting materials and associated visibility observations. 	
5. Reporting	a. Any non-conformances are to be documented and reported to YRC and rectified immediately.	
6. Corrective Actions	a. If complaints about dust or air quality are received, the offending construction activity should immediately cease until the issue is resolved satisfactorily. b. Corrective actions may include ceasing works temporarily during high wind conditions, watering, mechanical sweeping, establishing additional temporary ground covers or other ESC measures.	
7. Responsibilities	a. Air quality management is the responsibility of the site supervisor.	

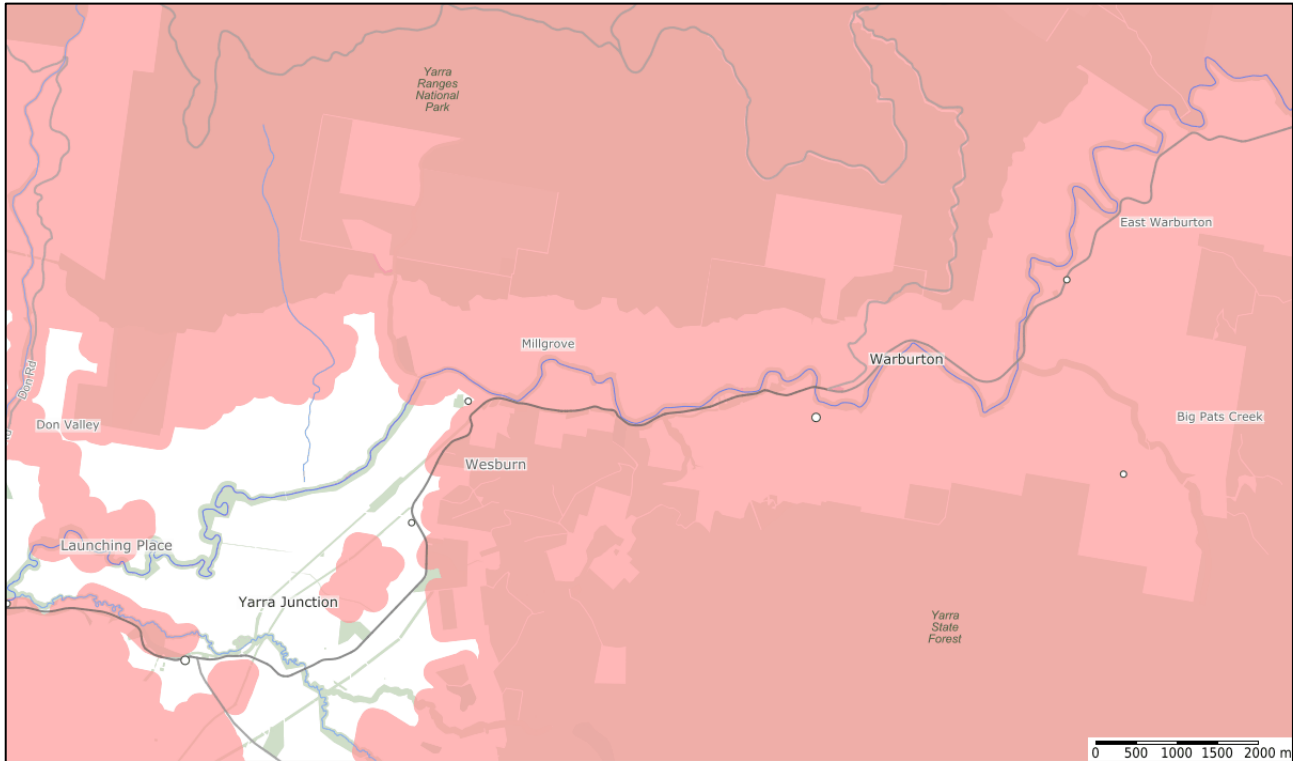
References:

- www.epa.vic.gov.au/about-us/legislation/air-legislation
- Appendix 6 – Air Quality Impact Assessment

6.3 BUSHFIRE

Local Government mapping for the site indicates that works carried out as part of this project will be in areas with a high bushfire risk.

Figure 2. Bushfire Management Overlay



Bushfires pose a significant risk to human safety, for both the construction personnel working on the trails but also other local residents and workers. The main hazards related to bushfire are the risk of works on-site being an ignition source for a bushfire and the risk of a bushfire in the region impacting on site works.

With this in mind, the following practices have been identified to reduce the likelihood of site works contributing to a bushfire, as well as measures to control a fire should site works result in a fire being ignited.

Table 12. Bushfire

Aspect	Action	
Background	The site is located in bushland that is classified as having a high bushfire risk.	
Applicability to Project	Bushfire management actions apply to all aspects of project, with the entire Warburton Mountain Bike Trail Destination located in a high bushfire hazard zone.	
Objective	Site works shall be conducted so that bushfire risk is not increased, and that any bushfire that may occur does not impact on project works.	
Actions	Requirements	Timing
1. General Bushfire Prevention	a. Fire extinguishers to be kept in all vehicles, as well as the project site office.	Prior to commencement of construction
	b. Fuel shall be stored in appropriate storage containers.	During Construction
	c. Site supervisor should be supplied with the contact number for the local CFA unit.	During Construction
	d. All chemical storage and handling will be in accordance with material SDS, with appropriate firefighting equipment (e.g. specific fire extinguisher types) identified in the SDS to be maintained on-site.	During Construction
	e. Adequate fire suppression equipment should be on site as per the requirements of Regulation 111 of the Country Fire Authority Regulations 2014.	During Construction

	f. No burning of any substances, including wooden debris or products, will be undertaken as part of this project.	During Construction
2. Working During the Fire Season	a. Ensure that each team has at least one team member who has been trained in basic bushfire awareness with the appropriate skills to undertake fire weather monitoring and calculation of the Forest Fire Danger Index (FFDI).	During Construction
	b. At the start of each working week (or some other agreed schedule) provide reports to relevant land managers (i.e. DELWP or PV, depending on work locations) stating the trails being worked on, their location and the number of personnel working on each. Report to provide contact details for key personnel including Project Manager and Team Leaders.	During Construction
	c. At the start of each working week, check the weather forecast and note any potential high-risk days (i.e. high-risk days are those with high temperatures and high winds. They generally only occur during the hot summer months or during periods of drought);	During Construction
	d. On the day before any anticipated high-risk days, check to see if a Total Fire Ban (TFB) has been called for the area. Local fire bans will be checked to see if they are in place (phone 1800 020 440), with any project works that pose a high fire risk not performed during this time (e.g. on-site refuelling, etc.).	During Construction
	e. If a TFB day has been called, contact client immediately to discuss whether it is safe/appropriate to work.	During Construction
	f. During the fire season, each team must have the following equipment on hand at all times: <ul style="list-style-type: none"> i. Viable, functioning, two-way communications – e.g. mobile phone, UHF radio or satellite phone. Each team needs to be able to contact each other team and external contacts and each team needs to be contactable; ii. One filled and operational knapsack pump or charged air-water extinguisher (not less than 9L capacity); iii. Two rake hoes; iv. Weather instruments capable of measuring temperature, wind speed and humidity; v. Fire Weather Log Book. 	During Construction
	g. During the fire season, the following weather monitoring protocols apply: <ul style="list-style-type: none"> i. At arrival to site in the morning, check weather observations and calculate FFDI and record in Fire Weather Log Book; ii. Before returning to work after lunch, check weather observations and calculate FFDI and record in Fire Weather Log Book; iii. If the FFDI is equal or greater than 12 (High), consider implementing protocols below as per TFB day. 	During Construction
	h. Chainsaw work to be scheduled to take place early in the morning, when fire danger risk is lowest.	During Construction
	i. Prior to starting chainsaw work: <ul style="list-style-type: none"> i. Ensure that the immediate area has been manually cleared of twigs, leaves, scrub and other flammable material; ii. Have another staff member act as spotter. Spotter to standby at all times while chainsaw is being used; iii. Ensure that the knapsack is on hand, filled and ready for use. 	During Construction
3. Working on Total Fire Ban Days	a. If the client approves work to go ahead, then the following rules must be applied: <ul style="list-style-type: none"> i. Only work in areas with good communication including mobile phone reception; ii. Only work in areas with quick/easy access where vehicles can be parked close by; iii. No operating excavators, chainsaws, brushcutters, or any other machinery/equipment that could conceivably emit sparks during operation; iv. Generally, all work should be conducted with hand tools only; v. Ensure all workers have adequate sun protection; vi. Ensure all workers work to the conditions and drink plenty of water; 	During Construction

	b. On TFB days, the following weather monitoring protocols apply: <ul style="list-style-type: none"> i. At arrival to site in the morning, check weather observations and calculate FFDI and record in Fire weather log book; ii. Before returning to work after morning smoko, check weather observations and calculate FFDI and record in Fire weather log book; iii. Before returning to work after lunch, check weather observations and calculate FFDI and record in Fire weather log book; iv. Before returning to work after afternoon smoko, check weather observations and calculate FFDI and record in Fire weather log book; v. If the FFDI is equal or greater than 20 (High), consider suspending operations and leaving site. 	
4. Performance Indicators	a. Bushfire risk is not increased due to project works. b. Works at the site are not impacted by bushfire risk or fire management.	
5. Monitoring	a. Monitoring of fire bans. b. Monitoring of planned burns.	
6. Reporting	a. Any non-conformances are to be documented and reported to YRC and rectified immediately.	
7. Corrective Actions	a. Replacement of firefighting equipment. b. Staff re- trained in the use of firefighting equipment. c. Staff re- trained to minimise exposure to hazardous materials.	
8. Responsibilities	a. Bushfire management at the site is the responsibility of the Site Supervisor. b. All staff who are required to perform tasks that may impact or be impacted by bushfire during their work are responsible for implementing appropriate bushfire control measures.	

6.4 CHEMICALS AND FUEL MANAGEMENT

Chemicals and fuel used on-site for project works will largely be related to the equipment used to complete works and the chemicals used in the construction.

Equipment used for on-site works on the Track will include:

- Mini Excavators;
- Bobcats;
- Honda Power Carriers;
- Chainsaws;
- Compactors;
- Generators;
- General construction tools and equipment (drills, saws, sanders, etc.).

Some of this equipment will require petrol to be stored on-site. Equipment will be refuelled using petrol storage containers on-site.

All chemicals will be stored in a designated bunded chemical storage compound located at the project site office. Chemicals will be stored according to the storage and handling requirements listed in the relevant safety data sheet and comply with AS 1940 and AS 3833, including minor storages in accordance with Section 2 of the Standards, with incompatible chemicals not stored together. A list of chemicals to be used on-site during the project is provided in the Appendix 7 – Hazardous Chemicals and Dangerous Goods Register.

Spill kits and chemical containment measures will be maintained at the project site compound, as well as in the site vehicles when required.

Table 13. Chemicals and Fuel Management

Aspect	Action	
Background	The works are likely to require the storage/handling of some hazardous substances on site. There is the potential to release hazardous and regulated waste into the waterway/channel during the construction. Hazardous substances and quantities of same likely to be stored on site are listed in Appendix 7 – Hazardous Chemicals and Dangerous Goods Register.	
Applicability to Project	All sections below are applicable to the project.	
Objective	To correctly store and manage all hazardous materials on site to minimise environmental harm in the event of a spill.	
Actions	Requirements	Timing
1. General Chemical and Fuel Management	a. <i>Australian Standard AS 1940- Storage and handling of flammable and combustible liquids</i> to be adhered to.	Prior to commencement of construction
	b. All storage and transport of chemicals will be undertaken in accordance with the relevant Australian standards.	During Construction
	c. Current safety data sheets (SDS) will be kept on site wherever hazardous materials are being stored.	During Construction
	d. A register of all chemicals and SDS for these chemicals will be held on site.	During Construction
	e. Spill kits will be present on site during these works.	During Construction
	f. All personnel will be trained in spill response procedures and in the use of spill kits.	During Construction
	g. If a spill occurs works will stop immediately and emergency procedures enacted if required.	During Construction
	h. All regulated and hazardous waste will be stored in a bunded area as far as practical from the waterways.	During Construction
	i. The quantity of materials being stored on site will be minimised.	During Construction
	j. Machinery will be used and serviced as per manufacturer's instructions.	During Construction
	k. Vehicles will not to be washed down on-site.	During Construction

	l. Plant shall not undergo maintenance or cleaning where contaminants could be released to any waters.	During Construction
	m. Machinery will be refuelled at locations where the risk of environmental harm in the event of a spill is minimised, as specified in the refuelling protocol.	During Construction
	n. Refuelling of machinery shall conform with the following: <ul style="list-style-type: none"> i. Occur away from waterways unless for tracked machinery and contingency plan management measures are available in the immediate area; ii. Fuelling activity to be supervised at all times; and iii. Hoses to be fitted with a stop valve at the nozzle end. 	During Construction
	o. Machinery shall be maintained to minimise the leakage of oil, fuel, hydraulic and other fluids. During the servicing of machinery, the Contractor shall use management measures to capture and contain oils, fuels, hydraulic and other fluids so as to minimise contamination of the servicing area.	During Construction
	p. Surface coating treatments will be undertaken in a manner that avoids or minimises release of chemical to the environment and contact with the public. Unless otherwise stated in the contract, no pre-coating of aggregates shall be conducted on Site.	During Construction
	q. Toilet facilities utilised will be the existing park facilities. An additional port-a-loo facility will be maintained and used on-site, with the amenity maintained, transported and used on-site in accordance with manufacturers' and suppliers' specifications.	During Construction
	r. All waste material will be removed from the site before removing any erosion and sediment control measures.	Site decommissioning
	s. All hazardous materials will be removed from site and disposed of appropriately.	Site decommissioning
2. Performance Indicators	<ul style="list-style-type: none"> a. No visual evidence of any contaminants entering the waterways. b. All spill related environmental incidents are closed out in a timely manner. 	
3. Monitoring	<ul style="list-style-type: none"> a. Daily visual inspection of plant and equipment storage areas to ensure the efficacy of the bunds. b. Daily visual monitoring for leakage or exposure of hazardous materials. 	
4. Reporting	<ul style="list-style-type: none"> a. Any non-conformances are to be documented and reported to YRC and rectified immediately. 	
5. Corrective Actions	<ul style="list-style-type: none"> a. Replacement of depleted spill kits. b. Staff re- trained in the use of spill kits. c. Staff re- trained in the correct handling of materials. d. Staff re- trained to minimise exposure to hazardous materials. 	
6. Responsibilities	<ul style="list-style-type: none"> a. All staff who are required to use machinery and hazardous chemicals during their work. 	

References:

- Appendix 7 – Hazardous Chemicals and Dangerous Goods Register

6.5 CULTURAL HERITAGE

A voluntary Cultural Heritage Management Plan (CHMP) under Section 45 of the *Aboriginal Heritage Act 2006* was developed by Biosis in February 2018. The CHMP defines the ‘Activity Area’ as the WMTBD development area consisting of approximately 5,930 hectares of land. The CHMP is provided in Appendix 8 – Cultural Heritage Management Plan.

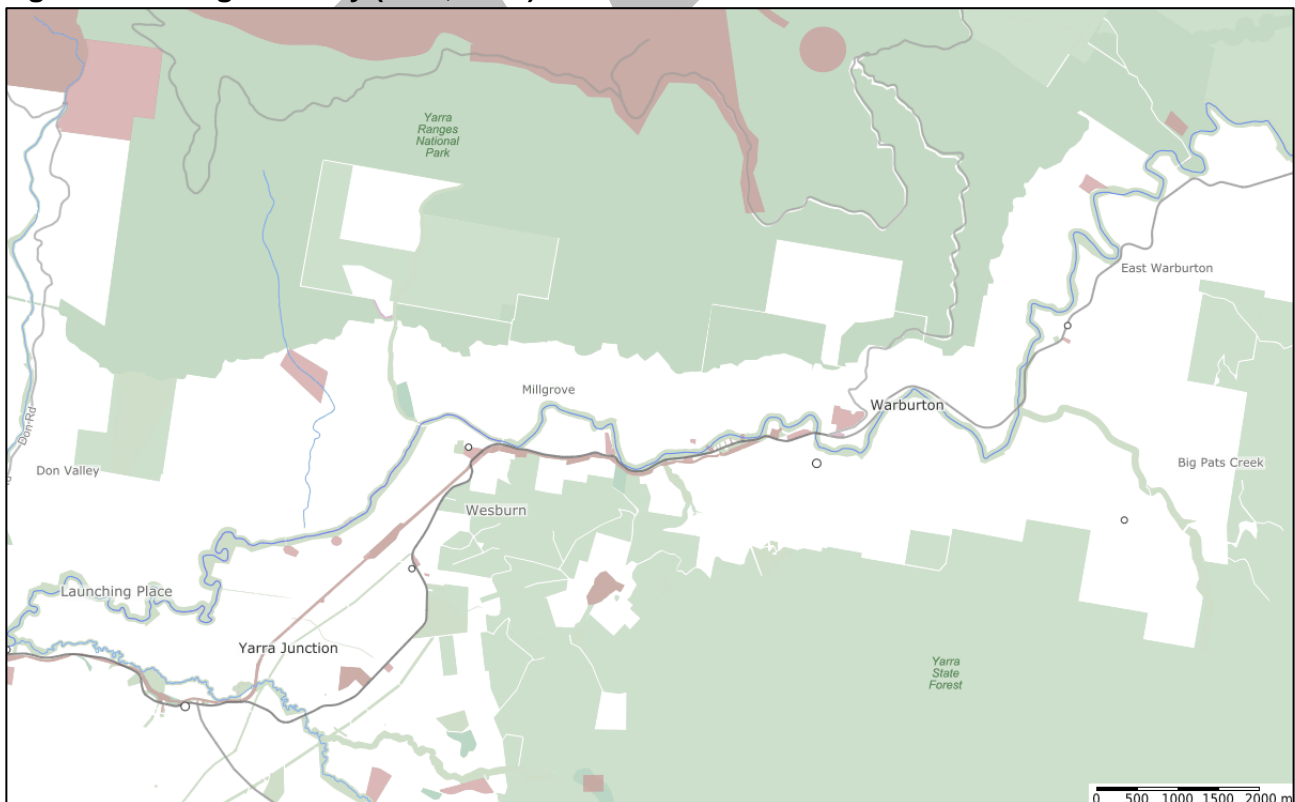
A three-phase assessment approach was undertaken to provide background information on the activity and its impacts, other archaeological studies, previously recorded Aboriginal places, the environment and to develop a prediction model for the Activity Area. The three phases of assessment consisted of the following:

1. Desktop Assessment – review of all background information;
2. Standard Assessment – ground surface visibility, previous disturbance to the proposed development area and identify areas of archaeological potential;
3. Complex Assessment – was undertaken to test the prediction model and areas of archaeological potential within the proposed development area.

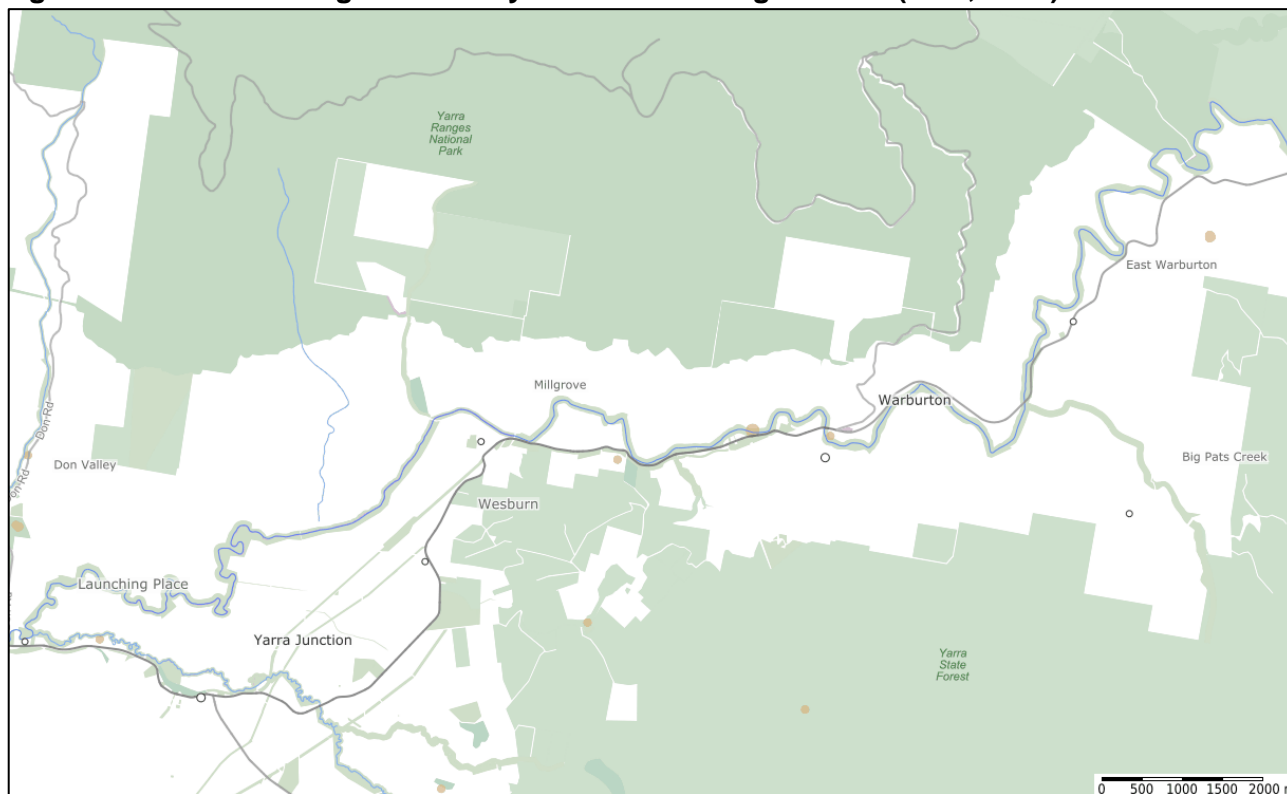
In addition to the CHMP, the European cultural heritage values of the study area have been investigated by Biosis in Warburton Mountain Bike Trails: Historic Survey Report, June 2019. It found that the study area is within forested areas around the Warburton, which historically have been subject to gold mining, timber harvesting and processing and some farming. There have been substantial settlements in the bushland for short periods, especially during the gold rush. Elements of these historical land uses can still be found and are intended to be protected during the development and operation of the Mountain Bike Trails.

Figure 3 below identifies the Heritage Overlay, which identifies areas with heritage characteristics including the Mount Donna Buang-Bridle Tracks & Road towards the North. There are limitations to the demolishing of buildings and to any removal of trees in these areas.

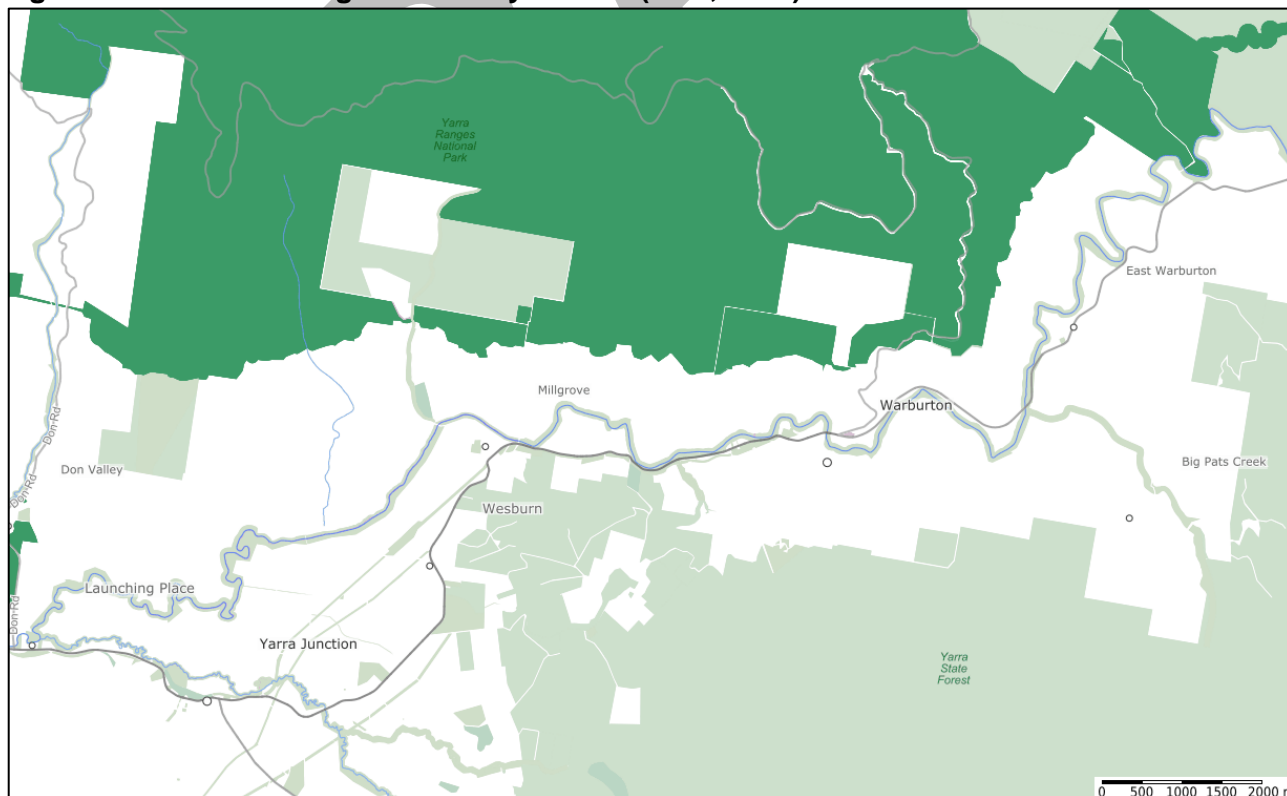
Figure 3. Heritage Overlay (YRC, 2017)



The cultural heritage places identified in Figure 4 must be protected during construction.

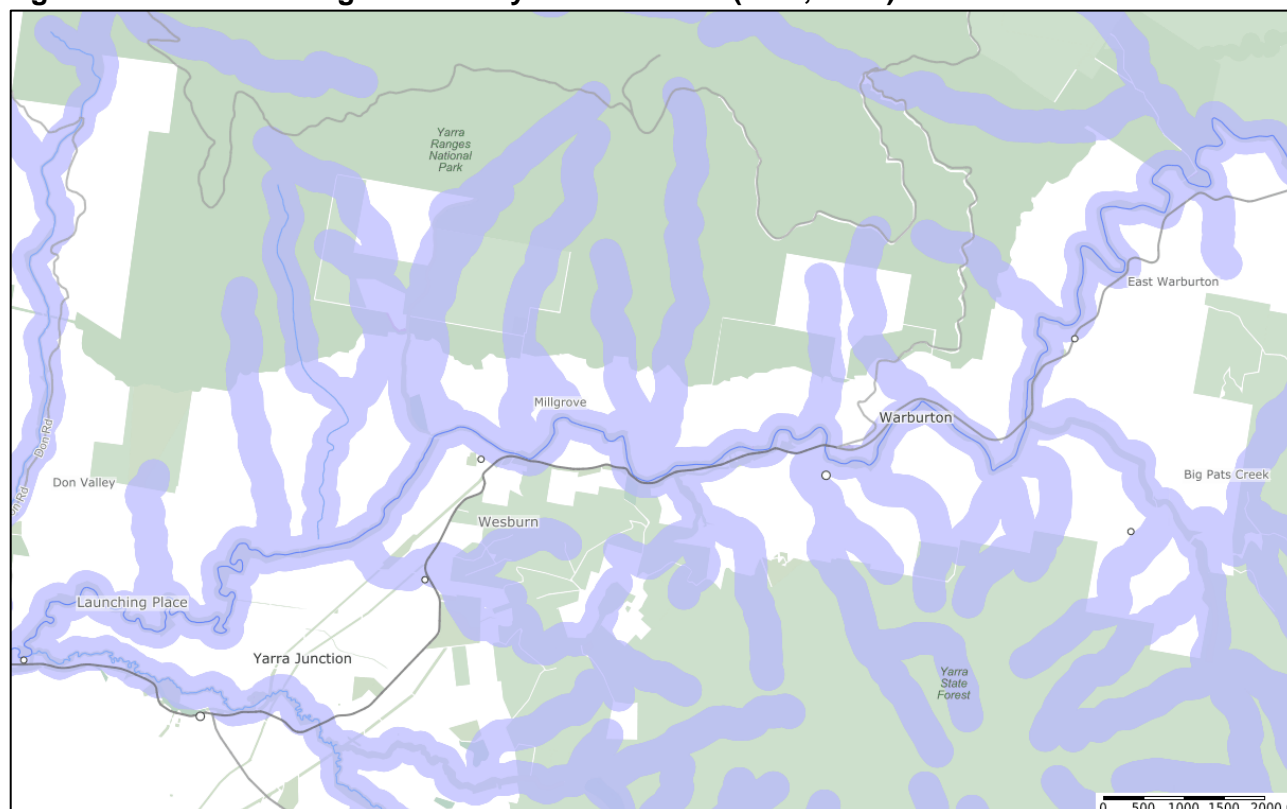
Figure 4. Cultural Heritage Sensitivity - Cultural Heritage Places (YRC, 2017)

National Parks form an important component of the region's identity. With a significant portion of the works occurring within the Yarra Ranges National Park, it will be critical to implement the precautions stipulated in the following table to help maintain the cultural value of the national park.

Figure 5. Cultural Heritage Sensitivity - Parks (YRC, 2017)

Waterways are historically known to be where human populations gather, thus waterways are generally considered to be culturally sensitive. The measures already presented will ensure that the cultural values of the waterways within and downstream of the works are preserved. As shown in Figure 6, the trails will intersect with waterways in many locations. It is likely artefacts may be found in this area thus the management recommendations of the CHMP should be followed.

Figure 6. Cultural Heritage Sensitivity - Water Areas (YRC, 2017)



The outcomes of the above assessments as defined by the CHMP are provided below in Table 15.

Table 14. Cultural Heritage

Aspect	Action	
Background	All significant Aboriginal cultural heritage in Victoria is protected under the <i>Aboriginal Heritage Act 2006</i> , and penalty provisions apply for any unauthorised harm. Under the legislation a person carrying out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal cultural heritage.	
Applicability to Project	<p>The proposed activity is a high impact activity under Regulation 44 (1)(b), a bicycle track with a length exceeding 100 metres as well as Regulation 43 (1)(b)(iii), a car park as defined in the <i>Aboriginal Heritage Regulations 2007</i>. The Activity Area is in an area of cultural heritage sensitivity under Regulation 23 (1), a waterway, or land within 200 metres of a waterway is an area of cultural heritage sensitivity as well as Regulation 29, a park is an area of cultural heritage sensitivity as defined in the <i>Aboriginal Heritage Regulations 2007</i>.</p> <p>The Desktop Assessment has confirmed that the Activity Area does not contain any registered Aboriginal places.</p> <p>No Aboriginal cultural heritage was located during the ground survey as part of the Standard Assessment.</p> <p>No Aboriginal cultural heritage material was found during the Complex Assessment. Based on the review of the geographic region, including its environment, recorded Aboriginal places, previous archaeological assessments and information on the activities of Aboriginal people, a place prediction model has been developed. The place prediction model identifies key points for consideration.</p> <p>Therefore, the following Aboriginal place types likely to be found within the study area are:</p> <ul style="list-style-type: none"> • Artefact distributions consisting of one or more stone artefacts are associated with tool production, domestic activities and resource procurement; • Scarred trees represent cultural modifications of trees to obtain the bark for use as shelters, canoes and shields. Widespread removal of native forest has resulted in little remnant vegetation; scarred trees may occur where mature remnant vegetation exists. 	
Objective	To prevent harm to items of Aboriginal Cultural Heritage value.	
Actions	Requirements	Timing
1. CHMP	a. The Sponsor and Site Supervisor and any relevant personnel involved with supervision of works for the Activity must read the approved CHMP (Biosis 2018) and be aware of the legal conditions and contingency plans concerning Aboriginal cultural heritage within the Activity Area. The Sponsor and Site Supervisor or other relevant personnel must be responsible for implementing any conditions contained within the CHMP (Biosis 2018).	Prior to commencement of construction
	b. A cultural heritage induction must be conducted with all site workers/contractors by representatives of the Wurundjeri (WLCCHCAC) immediately prior to the commencement of ground disturbance activities. A Heritage Advisor/archaeologist must also attend this training session. The requirements of the induction are stipulated in the CHMP (Biosis 2018).	Prior to commencement of construction
	a. Works will comply with the Aboriginal Heritage Regulations 2007, the Aboriginal Heritage Act 2006 during works and the CHMP (Biosis 2018).	During Construction
	b. A copy of the approved CHMP (Biosis 2018) must be held onsite at all times.	During Construction
	c. If items/artefacts/places of indigenous cultural heritage significance are encountered, works must cease immediately and the (State Government) Aboriginal Cultural Heritage Unit must be contacted on <u>1800 762 003</u> . Council must be notified of all finds immediately.	During Construction
	d. With the exception of publicly available information, there shall be no communication or public release of	During Construction

	information concerning Aboriginal cultural heritage without the written permission of the Registered Aboriginal Party. No onsite photographs or information concerning Aboriginal cultural heritage is to be circulated to the media or via social media without the written permission of the Registered Aboriginal Party.	
2. Historic Heritage	a. Identified historic archaeological and heritage places, and areas of historical and archaeological sensitivity shown in the Biosis report (Figure 2 and Figure 3) should be avoided during construction.	
	b. If construction is proposed near areas of historical and archaeological sensitivity works should be designed to minimise impacts and assist in managing the place. For example, tracks may lead to areas of hydraulic sluicing and gold workings, in order to provide interpretation opportunities, but the tracks should not cut across the sluiced faces and banks. Similarly, if level areas from former timber tramways are to be used, approaches should avoid causing erosion or other damage to the features.	
	c. A protocol should be implemented to inform contractors of the need to avoid historical and archaeological features, how to recognise them, and who to contact should unexpected historical and archaeological features or objects should be discovered during works. In order that contractors are able to fulfil this recommendation an induction should be presented by a suitably qualified heritage professional on site, which covers information needed.	
	d. During construction, a program of inspection and archaeological monitoring should be carried out in areas of historical and archaeological sensitivity (as stipulated in the Biosis report).	
	e. A suitably qualified Historical archaeologist with an understanding of the type of historic and archaeological sites found within the study area should undertake the inspection. This inspection should occur when works are underway, once access has been arranged. If during the inspection potentially significant historical archaeological features are identified, options should be examined for realigning the trail to avoid impacts. If impacts cannot be avoided, and the site is deemed to be an archaeological site under the Heritage Act 2017, then recording and consent provisions should be enacted according to Recommendations 4 and 5.	
	f. If any historic archaeological sites are identified during trail construction works and inspection, an assessment should be made as to whether they fulfil the criteria for inclusion on the Victorian Heritage Inventory as historical archaeological sites. Such places are generally more than 75 years old and have a component that includes archaeological deposits. Consultation with Heritage Victoria should be undertaken to confirm whether criteria and thresholds for the VHI are met, and if so, a VHI site record card should be completed by a qualified archaeologist and submitted to Heritage Victoria. Any place recorded in the VHI, will then be subject to Recommendation 5 if it is likely to be impacted by works.	
	g. Where works are to be conducted within the boundaries of places listed on the Victorian Heritage Register, a Permit should first be obtained from Heritage Victoria.	
	h. If works are to be conducted within a place listed on the Victorian Heritage Inventory, Consent to Damage should first be obtained from Heritage Victoria.	
	i. If works are to be carried out within any area included on the Yarra Ranges Heritage Overlay, a planning permit or exemption should be sought from the Shire of Yarra Ranges.	
	j. The following protocols should be enacted to ensure that works minimise any impacts to potential archaeological and heritage places, and if any historic or archaeological features are encountered during works, these can be appropriately managed. <ul style="list-style-type: none"> i. Design works to minimise impacts; ii. Avoid cutting across tramway formations, water races or sluice banks; iii. Induction for contractors in how to recognise and manage historic features, when to stop works, who to contact; iv. Heritage advisor inspection during works in sensitive areas; v. Realign to avoid features if possible; vi. If not possible to avoid, record and obtain heritage approval; vii. Implement a regular process of inspection in case use of the trails reveals historical or archaeological remains which should then be managed appropriately. 	

a. Performance Indicators	a. Adherence to all conditions in the CHMP; b. Adherence to all conditions in the Historic Survey Report.
b. Monitoring	a. Excavation areas will be inspected for potential archaeological artefacts. b. Compliance inspections to be undertaken by Wurundjeri representatives during the constructions works in order to audit the works and ensure that they comply with the conditions and contingency plan contained within the CHMP (Biosis 2018). The requirements of the inspection are stipulated in the CHMP (Biosis 2018).
c. Reporting	a. Any non-conformances are to be documented and reported to YRC and rectified immediately. b. Any items of cultural heritage encountered during the works must be reported to the Aboriginal Party and/or appropriate State government agencies. Also the discovery of cultural heritage artefacts or archaeological artefacts must be reported/notified to Council through a formalised reporting process.
d. Corrective Actions	a. When an unanticipated discovery is made, personnel will immediately stop work in the vicinity of the discovery. b. Notify the Council's Superintendent/ environmental representative. c. For Aboriginal heritage items, the Superintendent/Environmental representative will notify the Aboriginal Parties. d. The significance of Aboriginal Cultural Heritage will be emphasised to staff during toolbox meetings or daily prestart meetings.
e. Responsibilities	a. All staff have a duty of care to protect cultural heritage.

References:

- Appendix 8 – Cultural Heritage Management Plan;
- Appendix 20 – Warburton Mountain Bike Trails: Historic Survey Report

6.6 EROSION SEDIMENT AND WATER MANAGEMENT

Erosion, sediment and water management measures will be a key aspect of environmental management for the WMTBD project. The *Preliminary Surface Water & Geotechnical Assessment* (GHD, 2019 – see Appendix 9 – Preliminary Surface Water & Geotechnical Assessment) provides site-specific recommendations pertaining to the surface and geotechnical considerations during construction and operation of the trail.

The site works require the excavation of material for the construction of MTB trails and will require targeted erosion and sediment control measures to ensure erosive processes and waterway deposition are avoided. The *Environment Protection Act 1970 State Environment Protection Policy (Waters)* stipulates that a person responsible for the construction activity must minimise risk to protect water quality and meet all state and local water quality objectives.

The erosion, sediment and water management plan for the project is provided by the management prescription and onsite controls detailed in Table 15. The construction of trails and batter slopes and careful management of soil will be required under the intended scope of works. The strategies will need to be implemented on a case-by-case basis and continuously monitored to ensure their effectiveness. WT will work with YRC (or their representatives) to ensure that the impacts of the construction phase are limited and contained.

Monitoring the water quality of the receiving waterways is critical in monitoring the impact of construction activities and assess the effectiveness of the control measures. It is also a requirement of the *Environment Protection Act 1970 State Environment Protection Policy (Waters)*. WT will not be responsible for monitoring water quality, but will work with YRC to ensure an appropriate and effective monitoring regime.

The site could include areas impacted by the erosion management overlay, as seen in Figure 7 on the next page. YRC recognises these areas as having heightened landslip risk. As a result, the removal of vegetation must be limited to what is required to facilitate a permitted use if there is no practical alternative. The strategy of aligning the trail based on limiting the vegetation removal required is appropriate to address this concern.

Construction work in flood-prone areas poses a higher risk of pollutant transport in the event of a flood. Additional management considerations are required to ensure that erosion and sediment loss is minimised during a flood event. The site may be affected by flood inundation in the 1-in-100 year flood event as seen in Figure 8.

In those affected areas it is critical that earthworks, structures and management measure do not impede on the area's flood conveyance and storage capacity. It is also critical that polluted construction runoff will not leave the site. This can be addressed through the drainage controls given in Table 15 below and by ceasing works during heavy rainfall. If the onset of a flood is imminent, the site should be prepared to limit any damages to erosion sediment control measures and other equipment.

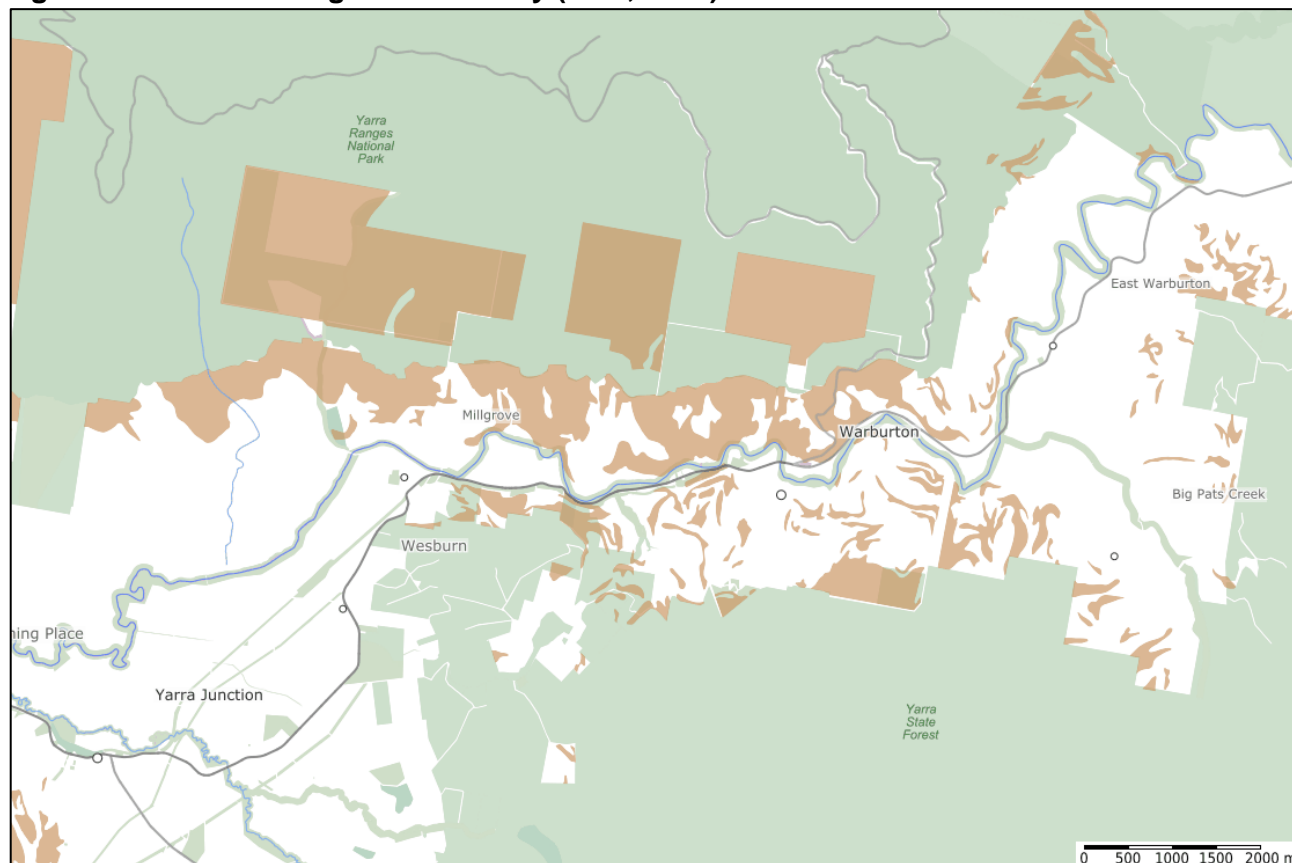
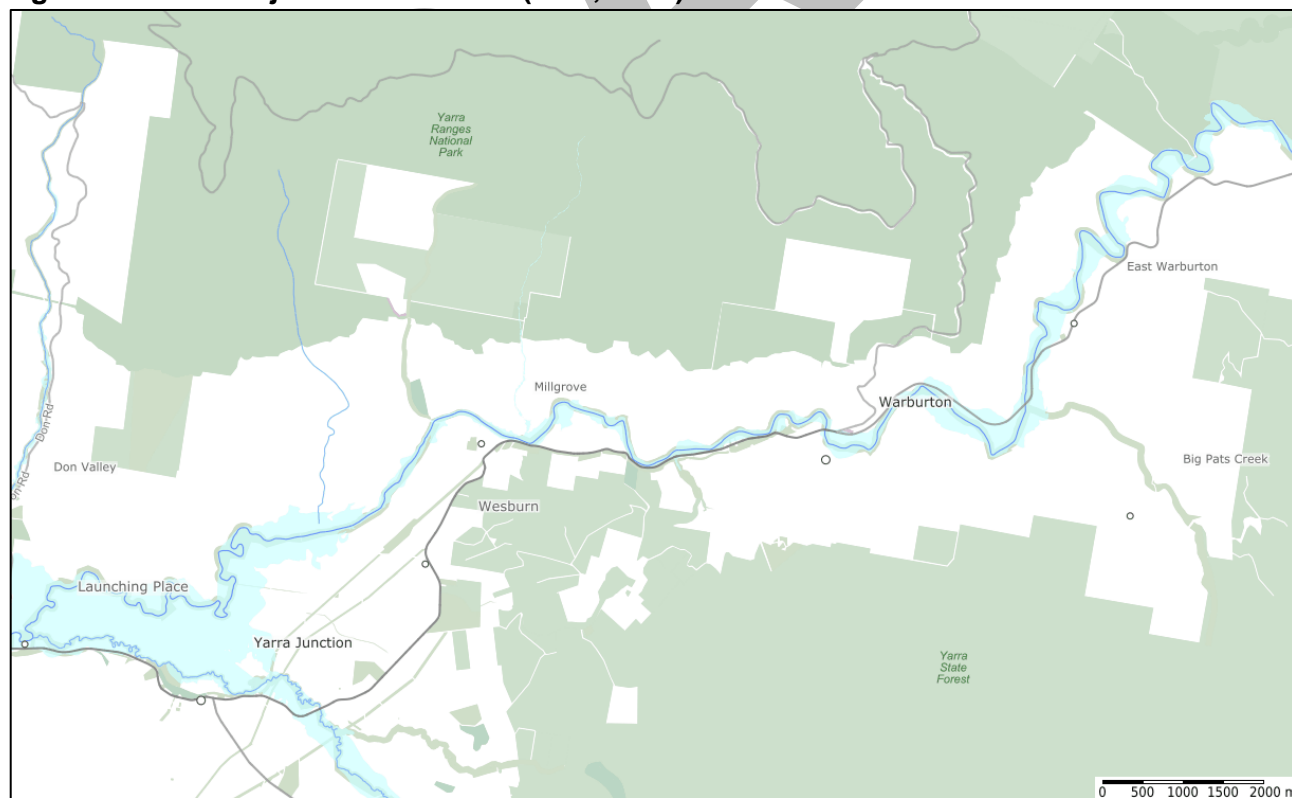
Figure 7. Erosion Management Overlay (YRC, 2017)**Figure 8. Land Subject to Inundation (YRC, 2017)**

Table 15. Erosion Sediment and Water Management

Aspect	Action	
Background	All soils are erodible and have a significant potential for environmental harm if they are not managed. There is a risk of mobilising sediment into waterways should suitable erosion and sediment controls not be installed onsite during construction. The proposed works will be undertaken within proximity to waterways and waterway corridors. If adequate drainage and erosion and sediment control devices are not installed and maintained during the project, there is a risk for the discharge of pollutants from site.	
Applicability to Project	Erosion and sediment control measures will ensure water quality is not adversely impacted by site works.	
Objective	To outline the control measures and management practices that must be employed during the project to minimise the potential for erosion and sediment release during construction works.	
Actions	Requirements	Timing
1. Soil and Sediment Management	a. Identify suitable locations for material stockpiles (if required) prior to construction and ensure appropriate sediment controls are in place prior to stockpiling.	Prior to commencement of construction
	b. Plan construction works to provide for the progressive and timely stabilisation and rehabilitation of disturbed areas as required	Prior to commencement of construction
	c. Balanced cut and fill construction is to be used. No spoil is to be removed off-site or spread down slope, minimising damage to adjacent vegetation below the trail.	During construction
	d. Where the trail runs alongside a waterway, excavated spoil material should not be placed such that it enters the waterway or impedes natural drainage.	During construction
	e. No borrow pits to be established within 50m of a waterway or any areas of significant vegetation.	During construction
	f. Rock armouring shall be used on the entry and exit to any low level bridges or boardwalks and on some steep sections of trails chutes and may be used on sections of boggy ground.	During construction
	g. Topsoil must be retained on any cleared areas not required for construction of the trail tread or batter slopes.	During construction
	h. In areas of high erodibility soils cut batters must be near vertical, and where possible retained by logs or rock facing. Site by site assessment on the requirement for retaining walls will be required. Batters will be stabilised appropriately to reduce potential slippage and erosion. Appropriate silt control mechanisms will be applied where necessary to control and minimize scour and silt movement.	During construction
	i. Cut batters to be less than 2m in vertical height.	During construction
	j. Upon achieving practical completion of a trail, the trail is to remain closed for a period of 4-12 weeks (depending on weather, time of year and other variables) to allow for 'curing' of the trail surface. All sediment control measures (i.e. silt fences) to remain in place during this curing period.	During construction
	k. Silt fences to be installed on all grade reversal outlets within 50m of a waterway where access allows.	During construction
	l. All trails to comply with IMBA trail construction guidelines, especially: <ul style="list-style-type: none"> i. The Half Rule; ii. 10% Average Guideline; iii. Maximum Sustainable Trail Grades; iv. Grade Reversals; v. 5% outslope as appropriate. 	During construction
	m. Maintain all erosion and sediment controls in effective working order as required throughout the construction period.	During Construction

	n. Vehicle entry and exists will be via designated areas only.	During Construction										
	o. Identify all designated 'no go zones' on the plans.	During Construction										
	p. Construction activities creating any soil disturbance to cease during extreme rainfall events.	During Construction										
	q. Materials stockpiled on site will be stored in a designated storage location with silt fencing on down slope areas.	During Construction										
	r. Coir logs or silt fences will be maintained on slopes below bare soil areas at drainage flow path outlets.	During Construction										
	s. Ensure all temporary erosion and sediment controls are removed and relevant notifications undertaken at the completion of works or when sufficient ground cover for stabilisation is achieved.	Site Decommissioning										
2. Drainage	a. Preferred method of drainage from the trail is grade reversal, but culverts and water bars may be used from time to time.	During construction										
	b. Unless the trail tread is out sloped (i.e. it drains to the lower side of the track) and no table drain is required on the upper side, cross drains/water bars/grade reversals must be installed at no greater distance apart than shown below. <table border="1"><thead><tr><th>Trail Gradient</th><th>Maximum Drain Spacing</th></tr></thead><tbody><tr><td>1-5%</td><td>70m</td></tr><tr><td>6-10%</td><td>40m</td></tr><tr><td>11-20%</td><td>30m</td></tr><tr><td>>20%</td><td>20m</td></tr></tbody></table>	Trail Gradient	Maximum Drain Spacing	1-5%	70m	6-10%	40m	11-20%	30m	>20%	20m	During construction
Trail Gradient	Maximum Drain Spacing											
1-5%	70m											
6-10%	40m											
11-20%	30m											
>20%	20m											
	c. If areas of high erodible soils are found in trail surface, the area must be armoured with rock, gravel or low erodibility soils.	During construction										
	d. Drainage must be installed on approaches to waterway crossings so that where possible a 30m buffer of vegetation is achieved to act as a filter strip.	During construction										
	e. All drainage must direct water onto vegetation and not exposed fill material.	During construction										
	f. Trail design and construction is to minimise any changes to surface water flows.	During construction										
3. Waterway Crossings	a. Apply Water Act definition to determine presence and extent of waterways – i.e. natural channel where water regularly flows whether or not the flow is continuous, or lake, lagoon, swamp or marsh. (Vegetation class can be a good indicator of presence and extent of water on site and thus whether waterway exists or not.)	During construction										
	b. Where waterway crossing is required, identify the narrowest practicable location.	During construction										
	c. Span bridges are to be used in preference to culverts wherever practical.	During construction										
	d. All waterway crossings are to be elevated (no rock armouring, no wheels crossing through the flow path).	During construction										
	e. Low level bridges must be designed to cope with peak flows for the catchment they are located in and must not impede flow in any way.	During construction										
	f. Low level bridges must be BCA compliant.	During construction										

	g. Approaches to waterway crossings should as much as possible be at right angles to the waterway and minimise the length of track within the immediate riparian zone.	During construction
	h. Waterway crossings should minimise disturbance to drainage lines, wet soaks and stream banks and provide a solid carriageway.	During construction
	i. Rock armouring shall be used for 2-3m on either side of bridge/boardwalks to prevent soil be carried onto the bridge/boardwalk.	During construction
	j. Works near waterways should be scheduled appropriately. For example, works should be timed to coincide with periods of low flow and completed quickly. Works should be stopped if conditions are not suitable, such as during and after heavy rain.	During construction
	k. Existing crossings should be used to move equipment across waterways. If there is no crossing and the waterway must be crossed with machinery, any disturbance should be minimized and the machinery should be carefully 'walked' across the waterway, using planks or ramps or other materials to ensure that the machinery doesn't impact on the waterway stream bed or banks.	During construction
	l. Any removal of fallen timber within the waterway must be to the minimum extent necessary and any material removed must be retained on site.	During construction
	m. Take special care at waterway crossings (and even minor drainage depression features) to reduce the chance of sediment input, and to minimise damage/disturbance to waterway bed and banks.	During construction
4. Performance Indicators	a. No evidence of erosion on site or sediment/sediment laden runoff entering the downslope waterways. b. No uncontrolled release into any adjacent waterways. c. No complaints received regarding erosion and sediment control. d. No non-conformances raised at site audits regarding erosion and sediment control. e. Personnel responsible for the selection, design, review and monitoring of temporary and permanent erosion and sediment control measures will be adequately trained so that best practice erosion sediment control measures are adopted during construction.	
5. Monitoring	a. For all trails under active construction: <ul style="list-style-type: none"> a. Undertake daily visual inspections of works site and all erosion and sediment control devices; b. Inspect all erosion and sediment control devices following significant rainfall events. 	
6. Reporting	a. Any non-conformances are to be documented and reported to YRC and rectified immediately.	
7. Corrective Actions	a. Seek advice on corrective measures from a suitably qualified person. b. Repair/maintain existing drainage, erosion and sediment control devices. c. Clean up or rehabilitate any impacts/exposed areas. d. Install additional erosion and sediment control devices where issues have been identified. e. Consider the deployment of alternative erosion and sediment control devices where issues have been identified with the existing devices. f. Ensure all personnel involved in the deployment and maintenance of erosion and sediment control measures are appropriately trained in their use and deployment. g. Communicate changes with all relevant staff.	
8. Responsibilities	a. Management and maintenance of erosion and sediment control devices is the responsibility of the Site Supervisor. b. All staff and sub-contractors are responsible for reporting environmental incidents and complaints to their supervisor including the nature and circumstances in which the incident happened (including an immediate verbal/email notification and completion of relevant incident notification forms).	

References:

- Appendix 9 – Preliminary Surface Water & Geotechnical Assessment
- Appendix 10 - Erosion and Sediment Control – A Field Guide for Construction Site Managers

- Appendix 11 – Environmental Guidelines for Major Construction Sites (EPA Publication 480)
- Appendix 12 – Construction Techniques for Sediment Pollution Control (EPA Publication 275)
- Appendix 13 – Constructing Waterway Crossings: A Guide on Building Road (Bridge/Culvert) Crossings Across Melbourne Water's Waterways and Drains
- Appendix 14 – Hydrogeological Assessment (Groundwater Quality) Guidelines (EPA Publication 668)
- Appendix 15 – Groundwater Sampling Guidelines (EPA Publication 669)
- The International Erosion Control Associations' (IECA) Best Practice Erosion and Sediment Control Manual 2008

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6.7 FAUNA

There is a potential for fauna species to be impacted by works at the site, with the entirety of the track located in bushland within the proposed Warburton Mountain Bike Trail Area. A pre-works Biodiversity Impact Assessment Report has been conducted for the site by Practical Ecology Pty Ltd (as per Appendix 16 – Biodiversity Impact Assessment for the Proposed Warburton Mountain Bike Trail – October 2019). Table 16 below outlines the results of this assessment and specifies actions to ensure that impacts to fauna and fauna habitat onsite are minimised.

Assessment protocols and principles for this project were established by the project working group with input from the Land managers including the Department of Environment, Land, Water and Planning (DELWP), Parks Victoria (PV) and Melbourne Water (MW).

Table 16. Fauna

Aspect	Action
Background	<p>Disturbance or injury to fauna or fauna habitat during construction activities can adversely impact upon the viability and health of local populations.</p> <p>A Fauna Habitat Assessment has been undertaken of the proposed works area (refer to Appendix 16 – Biodiversity Impact Assessment for the Proposed Warburton Mountain Bike Trail – October 2019).</p> <p>It found that the habitat observed within the site included:</p> <ul style="list-style-type: none"> • Tree canopies, and trees with small and large hollows, including dead stags; • Dense understorey vegetation including shrubs and grasses; • Vegetation (foliage, fruit and grasses) that provide food resources; • Leaf litter and rocks; • Moist depressions and wet areas along gully lines; • Large fallen logs that are hollow or concave. <p>Vegetation throughout the assessment area provides high-quality fauna habitat for hollow dependent fauna due to the abundance of medium and large old trees and or dead stags including trees with a range of hollow sizes suitable for a diverse array of dependent fauna species. There is high habitat connectivity across the landscape for foraging.</p> <p>No fauna of state or national significance was recorded during the site inspection. However, the regionally-significant Koala <i>Phascolarctos cinereus</i> was recorded at Mount Tugwell in the vicinity of 'Little Joe Climb'.</p> <p>Habitat modelling produced by DELWP includes eleven significant fauna species that potentially occur in the assessment area. Of the eleven species included in DELWP habitat modelling, the following have a high likelihood of occurring in the study area:</p> <ul style="list-style-type: none"> • Leadbeater's Possum <i>Gymnobelideus leadbeateri</i> • Lace Monitor <i>Varanus varius</i> • Eastern Horseshoe Bat <i>Rhinolophus megaphyllus megaphyllus</i> • Powerful Owl <i>Ninox strenua</i> • Grey Goshawk <i>Accipiter novaehollandiae novaehollandiae</i> • Masked Owl <i>Tyto novaehollandiae</i> • Square-tailed Kite <i>Lophoictinia isura</i> • Sooty Owl <i>Tyto tenebricosa tenebricosa</i> <p>The local area supports numerous habitat trees suitable as nesting or roosting habitat for Leadbeater's Possum, owls and raptors, and microbats. The forested area present in the study area provides extensive foraging habitat for all these species.</p> <p>Two of the remaining species (Australian Grayling <i>Prototroctes maraena</i> and Chestnut-rumped Heathwren <i>Calamanthus pyrrhopygius</i>) are considered to have a low likelihood of occurrence within or near to the assessment area based on a combination of factors including lack of suitable habitat and lack of local records. Suitable habitat is present for the Smoky Mouse <i>Pseudomys fumeus</i> and has a moderate likelihood of occurrence, although the species has a patchy distribution in Victoria and there are no local records.</p> <p>An additional 26 species state or national significance (Scheduled in DSE 2013) were</p>

	<p>assessed as to their likelihood of occurrence because of sightings made within 5 km of the subject site, or EPBC-listed species that were predicted to occur based on the results of the Protected Matters Search Tool. The EPBC-listed Grey-headed Flying Fox <i>Pteropus poliocephalus</i> and Swift Parrot <i>Lathamus discolor</i> have a medium likelihood of occurrence, although both species are likely to only be transient individuals foraging through the area during long-distance dispersal. There is a high likelihood of the EPBC listed Southern Brown Bandicoot <i>Isodon obesulus obesulus</i> occurring on the subject site. Other FFG-listed species with a high likelihood of occurrence including Common Bent-wing Bat <i>Miniopterus schreibersii</i>, Brush-tailed Phascogale <i>Phascogale tapoatafa</i> and Barking Owl <i>Ninox connivens connivens</i>.</p> <p>Several populations of the Mount Donna Buang Wingless Stonefly occur in proximity to the trail alignment; however, the alignment does avoid the designated buffer zones. The Mount Donna Buang Wingless Stonefly has been listed as a threatened species under the Flora and Fauna Guarantee Act 1988. The Mount Donna Buang Wingless Stonefly appears closely dependent upon montane rivulets (or their substrates) and adjacent vegetation. It is likely to be sensitive to reductions in water quality (such as from siltation, turbidity, and chemical pollution), possibly even if very minor, or short-term, in effect.</p>	
Applicability to Project	The proposed trail construction works will involve the removal of vegetation, disturbance to leaf litter, rocks and fallen trees that are potentially providing habitat opportunities for significant fauna species. The trail construction works also cross tributaries and minor creeks that may also provide habitat opportunities for significant fauna species. Works therefore have the potential to impact on significant fauna species and their habitats.	
Objective	To manage construction activities to ensure there are no negative impacts on fauna.	
Actions	Requirements	Timing
1. General	a. Staff to be informed of the fauna species that occur within and adjacent to the project area and the appropriate management strategies for their protection as a result of the tree removals. Project induction to include specific information about significant fauna species and any species specific management prescriptions.	Prior to commencement of construction
	b. If during site works any fauna species are identified and require relocation, an accredited Wildlife spotter/catcher will manage these fauna relocations.	During Construction
	c. Any fauna that is injured or killed during construction will be promptly reported to Council as an environmental incident.	During Construction
	d. Native fauna will not be fed by employees. No food scraps to be left onsite.	During Construction
	e. If any FFG Act listed fauna species are found during construction, cease work and inform DELWP and Council.	During Construction
	f. In the event that a koala is encountered within works areas, works will cease to allow the koala to move on of its own accord.	During Construction
	g. When micro-siting the final alignment of a trail, apply the following protocols if possible: <ul style="list-style-type: none"> i. Apply a 50m buffer to owl nesting sites; ii. Apply a 20m buffer to lyrebird display mounds; iii. Apply a 5m buffer to rocky outcrops with cracks and crevices; iv. Apply an appropriate buffer/visual buffer to all tree hollows. 	During Construction
2. Leadbeaters Possum	a. During ground-truthing, where possible, avoid >65% habitat probability (Summit through to Platts Creek Area) for Leadbeaters Possum Habitat (LBP). If it cannot be avoided, detailed ground-truthing with a suitably qualified ecologist (with LBP expertise) will be required to ensure the alignment does not impact on LBP habitat.	Prior to commencement of construction
	b. During ground truthing, any potential LBP nest trees outside of the 200m radius timber harvesting exclusion zones should be identified and avoided. A 10m buffer should apply around any potential LBP hollow bearing nest tree. Trees to be avoided (i.e. suitable nest trees for	Prior to commencement of construction

	<p>Leadbeater's Possum) include:</p> <ul style="list-style-type: none"> i. Any pre-1900 tree (e.g. Eucalypts that were spared during any subsequent logging operations). Trees in this category are assumed to be greater than 120cm DBH; ii. Any dead tree that appears to provide suitable nesting hollows; iii. Any sub-canopy trees; iv. Any trees with nest boxes. 	
	<p>c. During construction, any potential LBP nest trees must be avoided by a 10m buffer zone. Trees to be avoided (i.e. suitable nest trees for Leadbeater's Possum) include:</p> <ul style="list-style-type: none"> i. Any pre-1900 tree (e.g. Eucalypts that were spared during any subsequent logging operations). Trees in this category are assumed to be greater than 120cm DBH; ii. Any dead tree that appears to provide suitable nesting hollows; iii. Any sub-canopy trees; iv. Any trees with nest boxes. 	During Construction
	<p>d. No removal of dense stands of Callistemon or Tea Tree species within potential/suitable sites for Leadbeaters possums. Any such stands of Callistemon or Tea Tree within potential/suitable sites for Leadbeaters possums would be identified during the PSTR, recorded with GIS and photographs, and marked on site with suitable caution/warning tape to indicate a 'no-go' zone.</p>	During Construction
	<p>e. Where removal of vegetation cannot be avoided, the alignment should utilise existing cleared areas.</p>	During Construction
	<p>f. The alignment of the trail should not result in increased visibility to existing nest boxes or occupied tree hollows.</p>	During Construction
3. Mt Donna Buang Wingless Stonefly	<p>a. Any work within the potential range of the species must minimise habitat disturbance and sedimentation by elevating the trail to cross waterways, bogs, damp areas or seasonal drainage lines within the mapped suitable habitat zone.</p>	During Construction
	<p>b. Any elevated structures must be constructed to minimise ground disturbance and maintain natural light levels.</p>	During Construction
	<p>c. Where the trail crosses any waterways, bogs, damp areas or seasonal drainage lines within the mapped suitable habitat zone, construction to be undertaken between December and February.</p>	During Construction
4. Aquatic Fauna	<p>a. Minimise the movement of soil, gravel and water between catchments. In this case, there will be only on-site localised shifting of soil and vegetation, without the need to import potentially contaminated materials.</p>	During Construction
	<p>b. Ensure all water quality and erosion and sedimentation protocols are met.</p>	During Construction
	<p>c. Any works to waterways (bridges or boardwalks) must not impede or alter stream flow or create barriers to fish migration.</p>	During Construction
5. Performance Indicators	<ul style="list-style-type: none"> a. No reports of injury or death to any fauna. b. Area of disturbance of vegetation minimised and existing ecosystems adjacent to works protected. c. Disturbed areas stabilised or revegetated. 	
6. Monitoring	<ul style="list-style-type: none"> a. Visual inspections to be carried out prior to works commencing for the day to ensure fauna are not present within the work area. b. Visual monitoring of injured or dead fauna within the project area. 	
7. Reporting	<ul style="list-style-type: none"> a. Any non-conformances are to be documented and reported to YRC and rectified immediately. b. All incidents (including any exceedances/non-conformances) will be reported in accordance with Council's Incident reporting and Investigation procedure. c. Any complaints received are to be reported to Council. 	
8. Corrective Actions	<ul style="list-style-type: none"> a. Communicate fauna protocols to all staff. b. If an incident occurs or a complaint is registered, the following procedure should be followed: <ul style="list-style-type: none"> i. Cease works and report any breaches of the CEMP or other environmental 	

	<p>issues to Council.</p> <p>II. Undertake an investigation of any non-compliance and determine appropriate course of action to remedy impacts.</p> <p>c. Transport injured fauna to an appropriate veterinarian or carer as soon as possible.</p>
9. Responsibilities	<p>a. Management of fauna is the responsibility of the responsibility of the World Trail site supervisor.</p>

References:

- Appendix 16 – Biodiversity Impact Assessment for the Proposed Warburton Mountain Bike Trail – March 2018

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6.8 FLORA

YRC identifies areas within the site to have environmental significance and applies restrictions in the removal of remnant vegetation.

The significant landscape overlay affects part of the site and requires that development is respectful to the established character of the neighbourhood. It also requires that permission is granted before the removal of vegetation.

An Environmental Significance Overlay and a Significant Landscape Overlay both apply to much of the site. See Figure 9 and Figure 10 on the next page.

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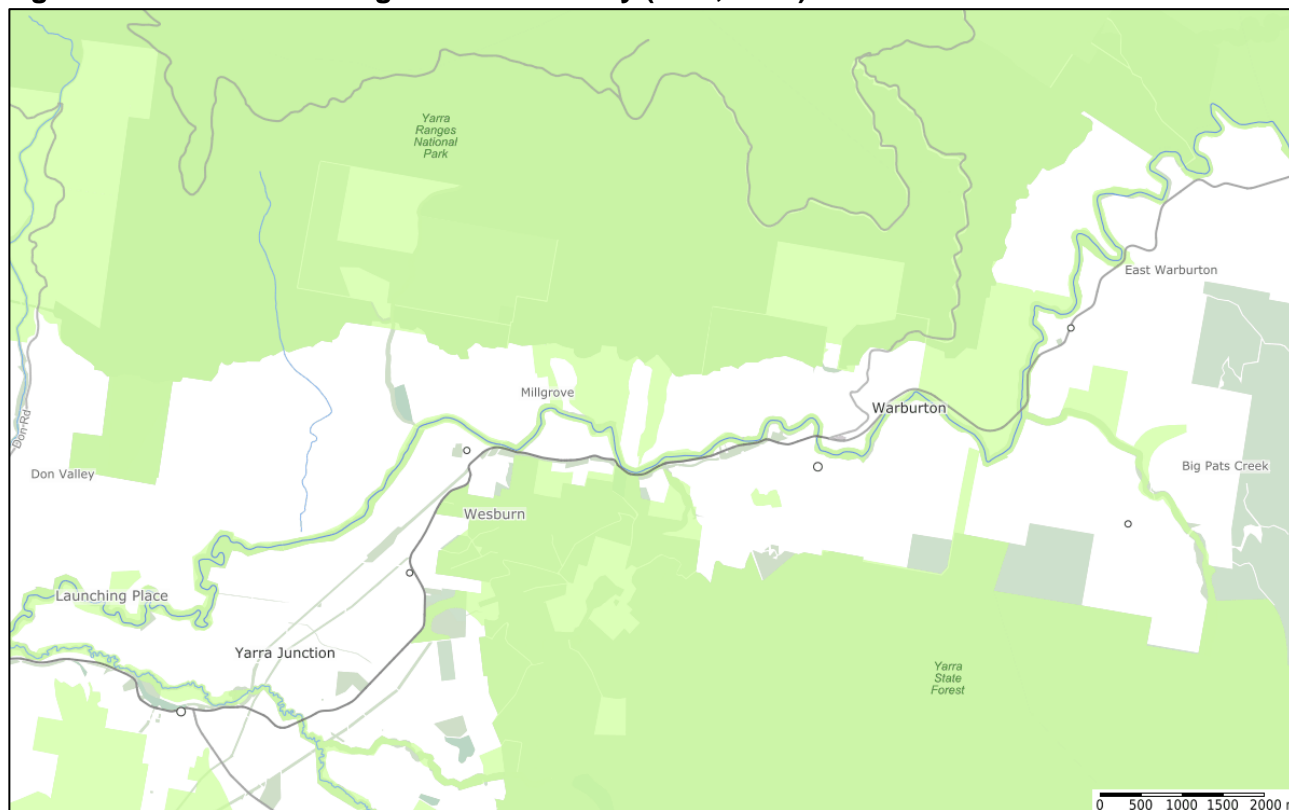
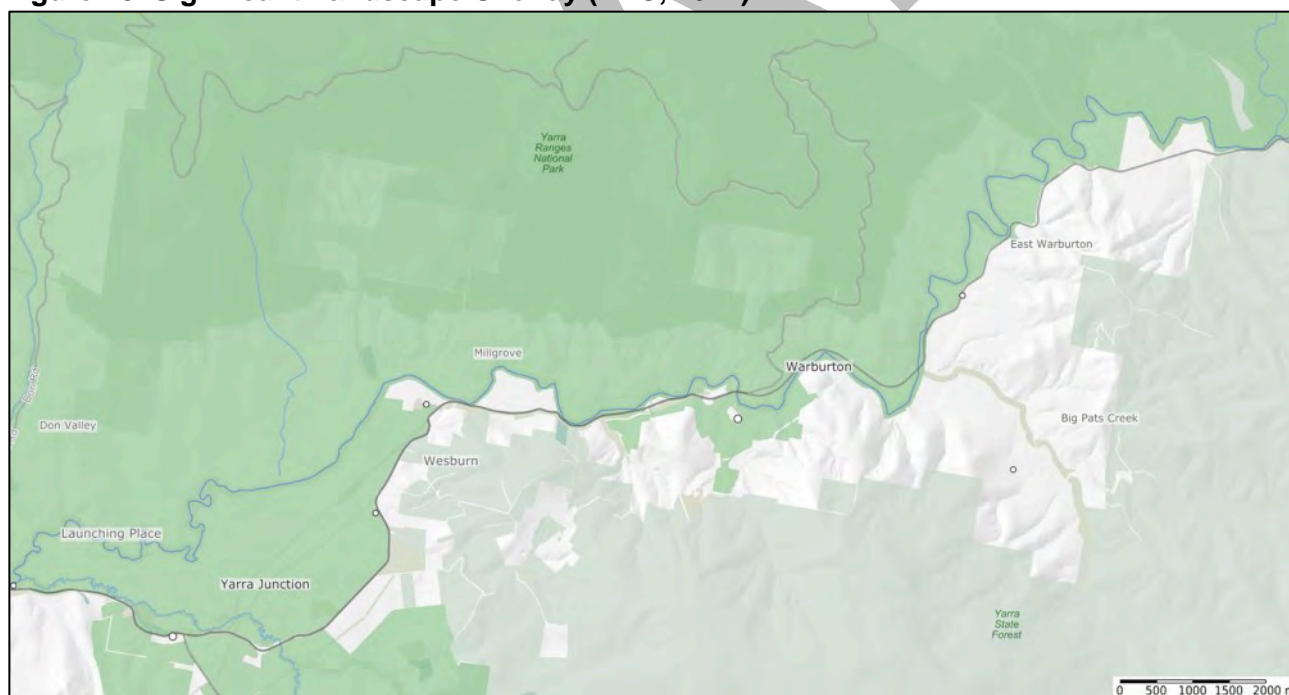
Figure 9. Environmental Significance Overlay (YRC, 2017)**Figure 10. Significant Landscape Overlay (YRC, 2017)**

Table 17. Flora

Aspect	Action	
Background	<p>The area in which the proposed trails are to be constructed is heavily forested, being mostly State Forest or National Park.</p> <p>The proposed works will require the clearance of significant quantities of native vegetation, mostly ground covers, shrubs and small trees. During ground-truthing, the proposed trails were aligned to avoid as much as practicable, areas of significant ecological values. Cleared or disturbed areas were prioritised over undisturbed areas, where practicable.</p> <p>The proposed works also pose the risk of introducing new weeds and plant pathogens into the study area. Machinery and equipment hygiene will need to be managed carefully to ensure that no weeds or pathogens are introduced or spread by the trail construction works.</p> <p>The removal of native vegetation can have secondary impacts on many other ecological values and processes.</p> <p>The Biodiversity Impact Assessment (Biodiversity Impact Assessment for the Proposed Warburton Mountain Bike Trail – October 2019) prepared by Practical Ecology found the following:</p> <ul style="list-style-type: none"> • A total of 190 plant species were recorded in the study area during the survey including 171 that are indigenous and 19 are introduced or naturalised outside their natural range. • Two rare Victorian threatened flora species was confirmed in the study area - Tree Geebung <i>Persoonia arborea</i> and Long Pink Bells <i>Tetradlea stenocarpa</i>. No specimens of Tree Geebung were found to occur directly within the trail alignment or assessment corridor. A small population of Long Pink Bells was identified, but it appears likely that direct impact to this species can be avoided. • It is also possible that numerous populations of Powelltown Correa <i>Correa reflexa</i> var. <i>lobata</i> persists within the Mount Tugwell area where sites have recently experienced wildfire and prescribed burns. These plants were mostly immature (regrowth from bushfire) and no flowering parts were found. Without flowering parts, Powelltown Correa is difficult to distinguish from its common counter-part <i>Correa reflexa</i> var. <i>reflexa</i>. While these species are rare to Victoria, they do not have any legislated protection under the FFG or EPBC Act. • Habitat modelling produced by DELWP (DEPI 2013b) includes 21 additional significant flora species that potentially occur in the assessment corridor. Location records were obtained from the Victorian Biodiversity Atlas (VBA) for the relevant species within a 5-kilometre radius of the subject site. • Although only 2 or possibly 3 threatened flora species were identified during assessments undertaken for this study, this does not mean other locations of threatened species do not occur within the indicative trail alignment as identification of some species has seasonal limitations (e.g. Naked Beard-orchid <i>Calochilus imberbis</i> and Fairy Lanterns <i>Thismia rodwayi</i>). At this stage however, it appears that the assessment corridor does not support any nationally threatened flora species listed under the EPBC Act. 	
Applicability to Project	The removal of native vegetation is one of the most significant environmental impacts of this project and applies to all of the trails to be constructed.	
Objective	To minimise the impacts on flora and avoid or mitigate and manage the potential adverse environmental impacts due to construction activities.	
Actions	Requirements	Timing
1. General	a. Align the trail to minimise the removal of vegetation, including mid-story and ground cover.	Prior to commencement of construction
	b. During ground-truthing, the trail alignment is to be determined based on minimising the removal of vegetation, including mid-story and ground cover. This means deliberately aligning the trail through areas with sparse vegetation.	Prior to commencement of construction
	c. Rest stops and viewing areas along the trail are to use existing cleared areas and breaks in vegetation to minimise vegetation removal.	Prior to commencement of construction
	d. Align trails on the high side of significant trees, especially on steeper side slopes. Tree roots are usually closer to the surface on the downhill side of the tree, so by routing the trail on the uphill side of the tree, there is less chance of impact on	During Construction

	tree roots.	
	e. Where the structural root zones (defined by AS) of trees cannot be avoided, then a design solution will need to be implemented to reduce the impact on tree root zones. Design solutions include: <ul style="list-style-type: none"> • Raised embankment; • Tree root protection sleeve; • Low level bridge / boardwalk. 	During Construction
	f. Any tree roots that are damaged to be treated with fungicide immediately.	During Construction
	g. Minimise disturbance to old-growth trees, especially ones with obvious hollows (noting there is no specified intent to fell any large trees).	During Construction
	h. Large specimen eucalypt trees – Where practical, route the track to maximise the viewing opportunity for such trees, without substantially altering the understorey around their bases.	During Construction
	i. Localised patches of <i>Sphagnum</i> – Minimise disturbance to such patches by minor re-routing, where practical (but recognising that the patches are likely to be resilient to small-scale disturbance).	During Construction
	j. Lichen, moss and filmy fern sites – Manage rock outcrops that support this flora as carefully as possible to minimise the risk of stripping such flora during works.	During Construction
2. Vegetation Clearing	a. Clearing width to be minimized as much as possible and constrained to the construction corridor width. No vegetation to be cut, removed or damaged outside of the trail construction corridor.	During Construction
	b. Vegetation removed is to be distributed into surrounding area, noting that in areas in close proximity to threatened and significant vegetation, care must be taken to avoid disturbance of existing vegetation.	During Construction
	c. In National Park, no trees (including mid-storey trees) of more than 10cm DBH are to be removed.	During Construction
	d. In State Forest, no trees (including mid-storey trees) of more than 20cm DBH are to be removed. Non-Eucalypt tree species like Blackwood, Myrtle etc. between 10 – 20cm DBH should be avoided.	During Construction
	e. Avoid removal of mid-storey vegetation within 10m of known nesting sites of native fauna within National Park.	During Construction
	f. Avoid removal of mid-storey vegetation within 10m of known nesting sites of listed (within VBA) fauna species within State Forest.	During Construction
	g. Where logs are cross-cut and a section removed, where possible place the cut section back against the original log to maintain continuity of the local habitat.	During Construction
	h. Care will be taken when constructing trails so that the roots and trunks of large trees are not damaged by machinery or earthworks.	During Construction
	i. No burning of residues will be undertaken.	During Construction
3. Cool Temperate Rainforest and Cool Temperate Mixed Forest	a. Trail construction is to be undertaken using hand tools only within Cool Temperate Rainforest and Cool Temperate Mixed Forest.	During Construction
	b. Where areas containing Myrtle Beech cannot be avoided, minimise disturbance within the drip line of all Myrtle Beech trees using a design/engineered solution – e.g. low level bridge or boardwalk.	During Construction
	c. In the event that any damage to Myrtle Beech occurs, fungicide must be immediately applied to prevent the spread of Myrtle Wilt.	During Construction
	d. Where soils are damp and boggy within Cool Temperate Rainforest and Cool Temperate Mixed Forest, trail must be elevated using boardwalk or another appropriate engineered/design solution.	During Construction
4. Weed and Pathogen	a. While importation of construction materials is expected to be minimal, all reasonable efforts must be made to ensure that	During Construction

Management	any construction materials (e.g. gravel, ballast rock, soil etc.) being brought into the construction area must be certified clean and weed free and be of a similar pH to natural soils.	
	b. While importation of construction materials is expected to be minimal, all reasonable efforts must be made to ensure that any construction materials (e.g. gravel, ballast rock, soil etc.) being brought into the construction area are free of any pathogens that may negatively impact on the environment.	During Construction
	c. Weed identification to be included in the Site Induction training.	Prior to commencement of construction
	d. Any significant weed populations identified during construction are to be marked on site and the location recorded for reporting to YRC.	During Construction
	e. All machinery and vehicle hygiene protocols to be followed at all times to prevent the introduction of weeds and pathogens.	During Construction
5. <i>Phytophthora cinnamomi</i> (PC) Management	a. High risk PC to be identified prior to construction. High risk PC sites are defined as: <ul style="list-style-type: none"> i. Sites where PC infestation has been identified (suspected or confirmed); ii. Sites where plant species known to be susceptible to PC have been identified. 	Prior to commencement of construction
	b. High risk PC sites will be identified and recorded on the World Trail GIS platform.	During Construction
	c. High risk PC site management prescriptions include: <ul style="list-style-type: none"> iii. All excavators or other plant/machinery to be washed down 100m prior to entry; i. All excavators or other plant/machinery to be washed down at exit of site; ii. Boots to be washed down at exit of site <u>everyday</u> on finishing; iii. Mountain bikes, E-mountain bikes and motorbikes used for transportation to construction sites should be left outside the high risk PC site; iv. No work to be undertaken in very wet conditions; v. No machinery/equipment in contact with soil to be moved outside of site without washdown. 	During Construction
	d. In any areas showing symptoms of PC, where practicable re-route the trail to avoid area, by traversing upslope/above the area (i.e. avoiding the infected site and potentially infected soil downslope);	During Construction
	e. In any areas with species of known susceptibility to PC (e.g. grasstrees), where practicable re-route the trail to avoid area, by traversing downslope/below the area.	During Construction
	f. All machinery and vehicle hygiene protocols to be followed at all times to prevent the introduction of plant pathogens.	During Construction
6. Machinery and Equipment Hygiene	a. At start of project, excavators and other plant/machinery to be washed down at commercial washdown facility or washdown facility at YRC works depot.	Prior to commencement of construction
	b. Any excavators or other plant/machinery brought on-site partway through the project to be washed down at commercial washdown facility or washdown facility at YRC works depot.	During Construction
	c. At the end of the project, or upon departure from the project, excavators and other plant/machinery to be washed down at commercial washdown facility or washdown facility at YRC works depot.	Project Completion
	d. Where possible, the use of commercial washdown facility or washdown facility at YRC works depot is preferred. However from time to time, (e.g. when entering a high risk PC area) a field washdown site will need to be set-up and used.	During Construction
	a) Washdown protocols are described in Appendix 17 – Keeping It Clean. For information on: <ul style="list-style-type: none"> i. Washing down boots and other personal items, see pages 16-19 – Hygiene Protocols For Simple Field Activities; ii. Washing down vehicles and heavy machinery, including selecting a field washdown site, see pages 	During Construction

	20-25 – Hygiene Protocols For Vehicles And Heavy Machinery; iii. How to prepare, apply and dispose of disinfectants, see pages 42-45 – How to Disinfect – Prepare, Apply and Dispose of Disinfectants and Cleaning Waste.	
	e. Boots, clothing and other personal items belonging to workers to be maintained in a clean and generally soil/mud free condition. Workers to be encouraged to clean boots daily, following the Hygiene Protocols For Simple Field Activities. Important that Step 2 (Clean) involving the removal of mud, soil or debris is performed at the field site.	During Construction
	f. Mountain bikes, E-mountain bikes and motorbikes used for transportation to construction sites to be maintained in a clean and generally soil/mud free condition.	During Construction
	g. All excavators and other plant/machinery washdowns to be documented using checklist (see Appendix 18 – Washdown Checklist).	During Construction
	h. Ensure that specific section on hygiene procedures is included in regular reporting to Council, including machinery movements and washdowns.	During Construction
Aspect	Action	
7. Performance Indicators	a. No impact on native vegetation outside of the immediate construction corridor.	
8. Monitoring	a. All excavator and other plant/machinery washdown checklists to be recorded and provided to YRC as required.	
9. Reporting	a. Any non-conformances are to be documented and reported to YRC and rectified immediately.	
10. Corrective Actions		
11. Responsibilities	a. Native vegetation management is the responsibility of the site supervisor.	

References:

- Appendix 16 – Biodiversity Impact Assessment for the Proposed Warburton Mountain Bike Trail – March 2018
- Appendix 17 – Keeping It Clean
- Appendix 18 – Washdown Checklist

6.9 NOISE AND VIBRATION

Due to the proximity of the trails to population centres, the number of noise-sensitive receptors that may be impacted by site works is limited as identified by the following:

- Park visitors (including walkers and cyclists);
- Residents in close proximity to site works (noting this is limited); [L] [SEP]
- Wildlife inhabiting the park.

Site works that may contribute to noise that impacts on these receptors include: [L] [SEP]

- The use of chainsaws; [L] [SEP]
- The use of excavation equipment; [L] [SEP]
- The use of compacting equipment; [L] [SEP]
- The use of power carriers; [L] [SEP]
- Vehicular use (4WD, ATV);
- Motorbike use to access trails.

Vehicle use will involve the carting of materials and equipment to and from the works sites. The nature of the site and the location of works in bushland means that the main noise-sensitive receptors that will be impacted by site works are park visitors and wildlife inhabiting the park. As such, management actions have been designed to reduce the impact of noise on these receptors. Hazards related to vibration works will be associated with track compaction works. However, the risk from vibration work should be minimal and localised.

The main noise-sensitive receptors that will likely be impacted by site works are users of the national park and the local fauna. As such, management actions have been designed to reduce the impact of noise on these receptors.

Table 18. Noise and Vibration

Aspect	Action	
Background	<p>The default noise standards as defined in the <i>Environmental Protection Act 2017</i> for commercial and industrial works are 6:30am to 6:30pm, Monday to Saturday. [L] [SEP]</p> <p>WT's nominated work hours for the WMTBD project will be 7:00am to 5:30pm Monday to Friday, with minimal works on Saturdays and no works occurring on Sundays.</p> <p>Noise and vibration sensitive receptors in the vicinity of the project area, as well as construction activities and equipment with the potential to generate noise and vibration and impact on the sensitive receptors, are outlined above.</p>	
Applicability to Project	<p>The use of mechanical equipment will be the main noise contributor during site works. Vibration hazards should be relatively minimal.</p>	
Objective	<p>To minimise any disturbance to surrounding land users resulting from noise or vibration associated with the works.</p>	
Actions	Requirements	Timing
10. Notifications and Work Planning	a. Ensure notification to nearby residents (where necessary) has been undertaken at least two (2) weeks prior to the commencement of works. The property owners will be notified of the works including the scale, extent and duration of the works.	Prior to commencement of construction
	b. No works will occur on Sundays or public holidays.	During Construction
	c. Signage and notification will be installed so that park patrons are aware of the site activities.	During Construction
	d. Where works outside standard contract hours and/or those specified in [L] [SEP] the EP Act are required, permission will be sought from Council to undertake these works. The following information will be provided to Council to allow a risk assessment to be undertaken:	During Construction

	<p>I. Proposed activities and equipment;</p> <p>II. Reasoning for out of hours works; [SEP]</p> <p>III. Proposed mitigation measures. [SEP]</p>	
11. Machinery	a. Plant and equipment used on site will be used only during appropriate operating hours.	During Construction
	b. Plant and equipment used on site will be properly maintained and inspected for defects on a daily basis.	During Construction
	c. Where material haulage is required, an assessment of likely haulage routes will be undertaken and haulage routes will be selected which minimise noise impacts on residents.	During Construction
	d. Regulated devices will only be used between 7am and 8pm Monday to Sunday (EPA Victoria, 2018) unless the noise is not audible by a sensitive receptor.	During Construction
	<p>e. Mitigation measures which will be implemented as a minimum include:</p> <p>I. Check to ensure machinery is working properly and noise mitigation devices are fitted and installed correctly; [SEP]</p> <p>II. Fit construction equipment with mufflers/silencing equipment [SEP] where possible; [SEP]</p> <p>III. Ensure equipment is well maintained and is in correct working [SEP] order; [SEP]</p> <p>IV. Where possible use smaller equipment that may create less [SEP] noise; [SEP]</p> <p>V. Switch off any equipment during construction work when not in [SEP] use for extended periods of time; [SEP]</p> <p>VI. Provide acoustic screening/enclosures for plant and equipment; [SEP]</p> <p>VII. Establish temporary noise barriers between construction [SEP] worksites and sensitive activities where applicable;</p> <p>VIII. Minimise the use of horn signals and maintaining the horn at a [SEP] low volume. [SEP]</p>	During Construction
12. Performance Indicators	<p>a. No validated complaints received regarding noise and vibration.</p> <p>b. Works are not being undertaken outside the above listed timeframes.</p> <p>c. Plant is operating correctly and not generating a level of noise greater than that specified by the manufacturer.</p>	
13. Monitoring	<p>a. Works are being conducted within specified timeframes.</p> <p>b. Monitoring of plant to ensure it is well maintained and in correct working order.</p> <p>c. Noise monitoring will only be undertaken in the event of a request from the regulatory agency (Council's Compliance and Regulatory Services).</p>	
14. Reporting	<p>d. Any non-conformances are to be documented and reported to YRC and rectified immediately.</p> <p>e. All incidents (including any exceedances/non-conformances) will be reported in accordance with Council's Incident reporting and Investigation procedure.</p> <p>f. Any complaints received are to be recorded on the site project office complaints register, and reported to Council's representative.</p>	
15. Corrective Actions	<p>a. Ensure the above actions are being implemented. [SEP]</p> <p>b. Use at source shielding where possible [SEP]</p> <p>c. Repair or replace defective plant. [SEP]</p> <p>d. Undertake a noise risk assessment, if required. [SEP]</p> <p>e. Undertake noise monitoring and implement control measures where noise levels exceed the relevant criteria. [SEP]</p>	
16. Responsibilities	a. Management of noise and vibration resulting from the works is the responsibility of the site supervisor.	

References:

- www.epa.vic.gov.au/your-environment/noise/environment-protection-residential-noise-regulations-2018 [SEP]
- www.epa.vic.gov.au/your-environment/noise/construction-noise

- Appendix 19 – Noise Impact Assessment

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6.10 WASTE MANAGEMENT

World Trail is committed to undertaking the project sustainability, and to minimise waste production during the project.

While the production of waste during construction is expected to be minimal, waste will be disposed of according to the waste and resource management hierarchy:

1. AVOID unnecessary resource consumption;
2. REDUCE waste generation and disposal;
3. RE-USE waste resources without further manufacturing;
4. RECYCLE waste resources to make the same or different products;
5. RECOVER waste resources, including the recovery of energy;
6. TREAT waste before disposal, including reducing the hazardous nature of waste;
7. DISPOSE of waste only if there is no viable alternative.

An indication of the types and an estimate of the volume of waste produced during the project is provided below:

- Waste soil material – no soil to be removed from site;
- Miscellaneous waste – worker's personal waste, to be removed and disposed daily.

The following waste management controls are proposed to meet the requirements of the Environment Protection (Industrial Waste Resource) Regulations 2009.

Table 19. Waste Management

Aspect	Action	
Background	The proposed works have the potential to generate minimal waste during construction. Low volumes of general waste is likely to be generated by workers and will be removed on a daily basis.	
Applicability to Project	All sections below are applicable to the project.	
Objective	To minimise the production of waste and to adequately store and dispose of all waste generated on site and maximise reuse and recycling of waste produced during construction, including recycling of all oil, grease, solvents or other such materials.	
Actions	Requirements	Timing
1. General Waste Management	a. All opportunities to reduce resource consumption will be taken following the waste hierarchy of control: avoid, reduce, reuse, recycle, recover and dispose waste material.	Prior to commencement of construction
	b. An assessment of opportunities for reduction of waste at the source, reuse and recycling as well as recovery of materials or conversion of waste into useable material will be undertaken.	Prior to commencement of construction
	c. Materials and products with recycled content will be proposed for the works wherever these are cost and performance competitive and they are environmentally preferable to the non- recycled alternative.	Prior to commencement of construction
	d. The correct quantities of material for the works will be procured to limit waste and excess materials.	During Construction
	e. Appropriate waste receptacles will be provided at the site compound, including recycling bin/s. All waste containers must be fitted with secure lids at all times to ensure native fauna and/or pest species are not attracted to the site.	During Construction
	f. The site will be kept in a clean and tidy state throughout the works and the site will be left in a clean and tidy condition.	During Construction
	g. Cigarette butts will be disposed of appropriately, to prevent pollution and the occurrence of fire.	During Construction
	h. Waste oil will be sent to approved recyclers.	During Construction
	i. Waste and containers not able to be recycled will be disposed of at a licensed landfill site.	During Construction
	j. There will be no removal of soil as part of this project.	During Construction
	k. The works site will be left in a clean and tidy state following the completion of works.	Site decommissioning
	l. All waste will be removed from site at the completion of works and disposed of appropriately.	Site decommissioning

2. Performance Indicators	a. Waste is being separated and disposed of into the appropriate receptacle. b. No contamination of soil, water or air as a result of inappropriate waste management. c. The site is maintained in a clean and tidy state throughout the project activities. d. Continuous improvement of waste avoidance, reduction and recycling throughout the project. e. No validated complaints in relation to waste management practices.
3. Monitoring	a. Daily visual inspection of waste collection areas and general site housekeeping. b. Daily visual inspection to ensure that waste is being recycled and disposed of in a manner consistent with the actions above.
4. Reporting	a. Any non-conformances are to be documented and reported to YRC and rectified immediately.
5. Corrective Actions	a. Provide additional waste receptacles if required. b. Investigate any incidents of inappropriate waste disposal and rectify as required.
6. Responsibilities	a. Waste management on site is the responsibility of the Site Supervisor.

References:

- www.epa.vic.gov.au/your-environment/waste/construction-and-demolition-waste

7 INDUCTION AND TRAINING

At the start of this project, all staff members will be required to attend a Project Induction.

Key items within the Project Induction will be:

- Project location – review the location of the trails to be constructed;
- Project scope of works – review the scope of works, including schedules, resources, equipment, container/compound locations, days/hours of work, productivity targets, reporting milestones etc.;
- Construction Environmental Management Plan – possibly including (but not limited to) discussion of key environmental issues, photographic examples of key flora and fauna species, field identification of key flora species and the mechanisms to avoid impacts on key species.
- WHS Management Plan (including key project contacts, evacuation plan, SWMS etc.).

Ideally, representatives from YRC, PV and DELWP will be present at the induction and may choose to include organization-specific induction material.

At the completion of the Project Induction training, all staff members will be required to sign an attendance form.

This training is one of the key mechanisms by which we will ensure that the environmental issues and ameliorative measures identified in the CEMP are clearly understood by all WT staff members.

Any new staff members arriving throughout the duration of the project will be required to undertake a shortened Project Induction with the Project Supervisor or Project Manager.

8 PROCEDURE FOR ALIGNMENT CHANGES

From time to time during trail construction, changes need to be made to the proposed trail alignment. These changes can occur in response to issues that become apparent once construction commences (for example, unstable ground caused by a former industrial use), or in response to new opportunities that are identified to improve the trail experience.

To be completed once the formal planning approval process is known.

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9 EMERGENCY INCIDENT PLANNING AND RESPONSE

Emergency and incident responses will vary depending on the nature of the incident.

Council's representative will be verbally notified of an incident within 2 hours of the responsible person becoming aware of the incident, and in writing within 24 hours. All notifications to authorities (e.g. Department of Environment, Land, Water and Planning) will be undertaken by Council.

When reporting environmental incidents to YRC, the following information is to be provided:

- The name and contact details of the reporting person;
- The date and time the environmental incident occurred;
- The activity that was being undertaken when the incident occurred;
- How the incident occurred;
- Any containment measures put in place to reduce or contain environmental harm;
- An assessment of the amount of environmental harm that occurred;
- If any other stakeholders are aware of the incident.

Environmental incidents and emergencies have been identified within the individual environmental risk management plans above. However, pro-active environmental risk management measures should be undertaken wherever possible, if events such as extreme rainfall or flooding are forecast.

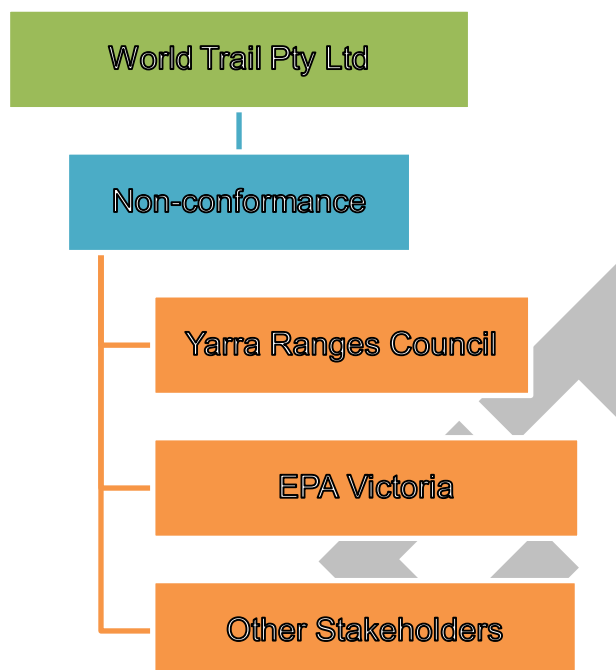
Some examples of environmental risk responses are provided below.

Table 20. Example environmental incidents and mitigation and reporting requirements

Incident	Mitigation measure	Reporting
Failure of erosion and sediment control devices following rainfall event or flooding	Re-instatement of ESC devices	Report to YRC
Contamination of waterway with suspended solids or chemicals	Deploy spill-kit/containment measures (e.g. silt boom, rock check dam, etc.)	Report to YRC
Non-compliance detected during monitoring program (e.g. water quality)	Cease operations and perform root-cause analysis	Report to YRC
Identification of cultural heritage aspects during excavation	Cease operations and follow cultural heritage reporting procedure	Report to YRC
Noise or air quality complaints	Record complaint in on-site complaints register and inform Council	Report to YRC
Injury to fauna during site works	Follow notification procedure in risk management plan	Report to YRC
Damage to vegetation	Cease operations in vicinity of impacted vegetation. Attempt to stabilise damage, engage project arborist	Report to YRC
Bushfire	Evacuate site, and if adequate time secure site (including removal of petrol products if possible)	Report to YRC

The incident reporting process for all incidents is provided below.

Figure 11. Warburton Mountain Bike Trail Destination non-conformance reporting diagram



10 REFERENCES

EPA Victoria. (1996.) Environmental Guidelines for Major Construction Sites.

EPA Victoria. (2019). Business, industry and planning guidance. Retrieved from <https://www.epa.vic.gov.au/business-and-industry/guidelines>.

EPA Victoria. (2019). How to manage your environmental impact. Retrieved from <https://www.epa.vic.gov.au/business-and-industry/how-to-manage-your-environmental-impact>.

EPA Victoria. (2019). Legislation. Retrieved from <https://www.epa.vic.gov.au/about-us/legislation>.

EPA Victoria. (2019). Preventing erosion and sedimentation impacts: A guide for business. Retrieved from <https://www.epa.vic.gov.au/business-and-industry/guidelines/erosion-and-sedimentation-impacts-guidance>.

EPA Victoria. (2019). Priority Sites Register. Retrieved from <https://www.epa.vic.gov.au/your-environment/land-and-groundwater/priority-sites-register>

EPA Victoria. (2019). Waste management policies. Retrieved from <https://www.epa.vic.gov.au/about-us/legislation/waste-legislation/waste-management-policies>.
https://www.epa.vic.gov.au/~/_media/Publications/480.pdf.

Yarra Ranges Council. (2018). Schedule to The Erosion Management Overlay. Retrieved from http://planning-schemes.delwp.vic.gov.au/schemes/yarraranges/ordinance/44_01s_yran.pdf

Yarra Ranges Council. (2019). Environmental Significance Overlay (ESO2 - Little Stringybark Creek) on my property. Retrieved from <https://www.yarraranges.vic.gov.au/Build/Planning/Planning-FAQs/What-if-I-have-an-Environmental-Significance-Overlay-ESO2-on-my-property>.

Yarra Ranges Council. (2019). Warburton MTB Destination. Retrieved from <https://www.rideyarraranges.com.au/warburton-mtb-destination/>

Yarra Ranges Council. (2019). What if I have an Erosion Management Overlay on my property. Retrieved from <https://www.yarraranges.vic.gov.au/Development/Planning/Planning-FAQs/What-if-I-have-an-Erosion-Management-Overlay-on-my-property>.

11 APPENDICES

- Appendix 1 – Cox Master Plan
- Appendix 2 – Ground-Truthing Protocols
- Appendix 3 – Pre Start Trail Review Record Sheet
- Appendix 4 – Trail Design Knowledge User Manual
- Appendix 5 – Arm Brochure
- Appendix 6 – Air Quality Impact Assessment
- Appendix 7 – Hazardous Chemical And Dangerous Goods Register
- Appendix 8 – Cultural Heritage Management Plan
- Appendix 9 – Preliminary Surface Water And Geotech Assessment
- Appendix 10 – Erosion And Sediment Control
- Appendix 11 – Environmental Guidelines For Major Construction Sites (Epa Publication 480)
- Appendix 12 – Construction Techniques For Sediment Pollution Control (Epa Publication 275)
- Appendix 13 – Constructing Waterway Crossing Guidelines
- Appendix 14 – Hydrogeological Assessment (Groundwater Quality) Guidelines (Epa Publication 668)
- Appendix 15 – Groundwater Sampling Guidelines (Epa Publication 669)
- Appendix 16 – Biodiversity Impact Assessment
- Appendix 18 – Washdown Checklist
- Appendix 19 – Noise Impact Assessment
- Appendix 20 - Warburton Mountain Bike Trails: Historic Survey Report



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