PROPOSED TE ARA MANGAWHERO

PHASE 1 TRAILS

ASSESSMENT OF ENVIRONMENTAL EFFECTS

Disclaimer:

This document has been prepared using information and data that is sourced from external documents and information from third parties. Where possible, we have attempted to verify the accuracy of this material but accept no responsibility or liability for any inaccuracies or omissions from that material that may affect the accuracy of the assessment or recommendations made in this report. It should not be construed that we have conducted an audit of any of the information used in this report or any of the individuals, companies or organisations consulted during the course of preparing the document.

We reserve the right, but are under no obligation, to revise or amend our report if any additional information (particularly as regards the assumptions we have relied upon) which exists on the date of our report but was not drawn to our attention during its preparation, subsequently comes to light.

Initial draft to client issued: 23 May 2022

Final report issued to client: 24 July 2022

Report prepared by: Rowan Sapsford

Director

Roam Consulting Limited

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1 Project Introduction

1.1 Assessment Development

Ehara taku toa i te toa takitahi, engari kē he toa takitini

This assessment has been developed collectively with Ngāti Rangi and key technical experts. Key cultural, ecological and engineering information has been provided to ROAM to enable a comprehensive assessment of the development to support decision makers to fully understand its effects (both positive and negative) on the environment.

For the sake of this report, the proposed trail and its effects have been broken down into its component parts to fit the legislative requirements of the statute it will be considered against. This is not indicative of the approach taken to design the trail; the design approach has considered the trail as a whole within the important cultural, physical and social elements of Ruapehu Maunga. This integrated and holistic approach is vital to ensure that the Te Ara Mangawhero can proceed in a manner that truly respects and reflects the importance of the maunga whose slopes it climbs, the ngahere where it will find a home and the awa whose ihi it passes on to those who use the trail.

1.2 Purpose of this Assessment

The purpose of this document is to provide an assessment of the potential environmental effects associated with Phase 1 of the proposed Te Ara Mangawhero Trail to be developed on the lower slopes of Mount Ruapehu, above Ohakune. The proposed 8.8km of trails described in this report are Phase 1 of a proposed extension to the Mountains to Sea (M2C) trail that will connect Ruapehu Maunga to National Park village and the existing sections of the Mountains to Sea trail. The proposed Phase 1 trails are shown on Figure 1.

This assessment has been prepared for Ngāti Rangi iwi (the Applicants).

An assessment of effects on the environment is required to accompany any application for resource consent from Horizons Regional Council under the provisions of Section 88 of the Resource Management Act (the RMA) and is prepared in accordance with the Fourth Schedule of the RMA.

This assessment also meets the requirements of Section 17S of the Conservation Act 1987 to accompany a concession application to the Department of Conservation.

It is considered that this assessment also includes the details required to progress a Works Approval for the development of the proposed trail within Tongariro National Park as per Section 4.1.16.3 of the Tongariro National Park Management Plan (TNPMP).

This application sets out:

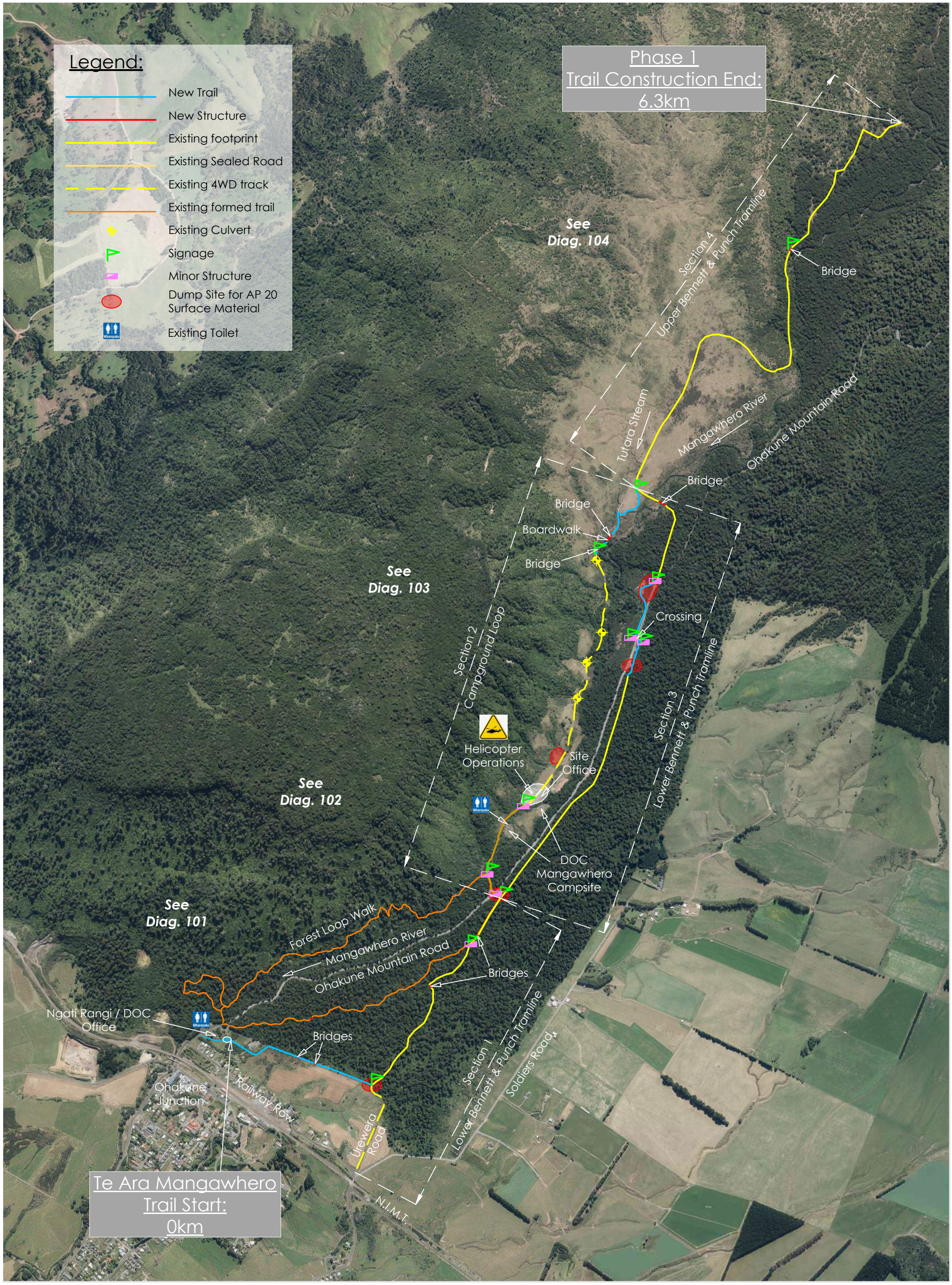
i. The background to the development – the need for the project, and other relevant background considerations

ii. A description of the proposal including its location and context within the surrounding environment

iii. Statutory Context – an overview of the Resource Management Act, and Conservation Act requirements and relevant statutory plan provisions

iv. Assessment of Effects – the assessment of the effects, including any mitigation measures

v. Consultation – a description of the consultation and engagement undertaken



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Rev	Date	Amendment	By	Chk	App
G	06/07/2022	Trail Start	CJO	DS	DS
F	01/07/2022	Trail Start	CJO	DS	DS

Project Title
Ruapehu WorX Limited:
Te Ara Mangawhero Trail

Drawing Title
Phase One Construction
Trail Sections Overview

Surveyed	J.Brown & P.Carr	Aug-Sept 2021	JB
Designed	C.J.Olmi	14/09/21	CJO
Drawn	C.J.Olmi	14/09/21	CJO
Checked	D.Sherrit	14/09/21	DS
Approved	D.Sherrit	29/10/21	DS

Status **INFORMATION**

Scale A3 1:15000 | A3

Drawing Number 210700-100 | Rev G

2 Applicant Details

2.1 Full name of registered company or individual

Ngā Waihua o Paerangi Trust

2.2 Address of Registered Office

1 Mountain Road

PO BOX 195

Ohakune 4625

3 Proposal Details

3.1 Concession Timeframe

The Applicant is seeking a concession for a period of 20 years to develop Phase 1 of the proposed trail and associated structures as described.

Trail development will be undertaken by Ngati Rangi (via Ruapehu WorX) and managed by Ruapehu District Council (RDC). Operation and management of the trail will be undertaken by Ngāti Rangi. On completion of the trail development, operation and management of the trail will be assumed by Ngāti Rangi.

3.2 General Description

The application is for the development of Phase 1 of the proposed extensions to the Mountains to Sea (M2C) Great Ride.

The extensions to the M2C Great Ride have been proposed by Ruapehu District Council (RDC), in conjunction with key partners including Ngāti Rangi, Uenuku and Ohakune 2000.

RDC and partners have been working with central government to enable the development of these extensions to the M2C trail. To date, this work has resulted in a partial amendment to the TNPMP enabling the consideration of the development of the trail within TNP. The parties have also secured $6.5 million from the Government (Provincial Growth Fund and New Zealand Cycle Trail Extension and Enhancement Fund) for the development of the trail. This funding has been granted based on the economic, social and health benefits associated with the proposed trail extensions.

Ngāti Rangi is taking this trail project to the next stage to enable the development of Phase 1 of the Te Ara Mangawhero Trail.

For the purposes of trail planning, the M2C extensions have been broken into three discrete sections as follows:

1. Te Ara Mangawhero is a shared use 21.3km trail located on the flanks of Mt Ruapehu, connecting Tūroa to Ohakune. The proposed grade 2–3 trail will traverse alpine, sub alpine and forested areas within the vicinity of the Tūroa Mountain Road. It will connect to the existing M2C section - 'The Old Coach Road'. This trail consists of the following sub sections:
    a. Section 1: Bennet and Punch (lower and upper)
    b. Section 2: Campground Loop
    c. Section 4: Blyth to Mangawhero
    d. Section 5: Chainshed to Old Blyth
    e. Section 7: Tūroa to Chainshed
2. Horopito Trail (Section 3)
3. Missing Link (Section 6)

These sections are shown on Figure 2.

Sections 1 - 7 of the Te Ara Mangawhero section will extend the existing M2C trail to meet the key objective of developing a single contiguous and engaging journey from Mount Ruapehu to Whanganui and the Tasman Sea. This objective will promote the Great Ride as an epic and linked journey from the upper slopes of Mount Ruapehu (located in Tongariro National Park, a dual World Heritage area) to the Whanganui River (adjoining the Whanganui National Park) and on to the Tasman Sea. It is anticipated that the development of these trails will resolve current trail legibility issues, improve trail access and differentiate it from other regional attractions through the delivery of a linked and coherent multiday ride located in iconic landscapes.

Funding for the trail also includes a storytelling project which will facilitate local iwi to tell their stories of the important values and histories associated with the area.

The proposed M2C extensions will:

- improve the user experience by making the wider trail easier to understand through the linking of trail gaps
- reinforce the brand by having a true trail start on Mt Ruapehu
- provide for greater marketing and economic development opportunities through the development of a more visible product close to existing communities and destinations (i.e. Tūroa, Ohakune, Horopito and National Park).

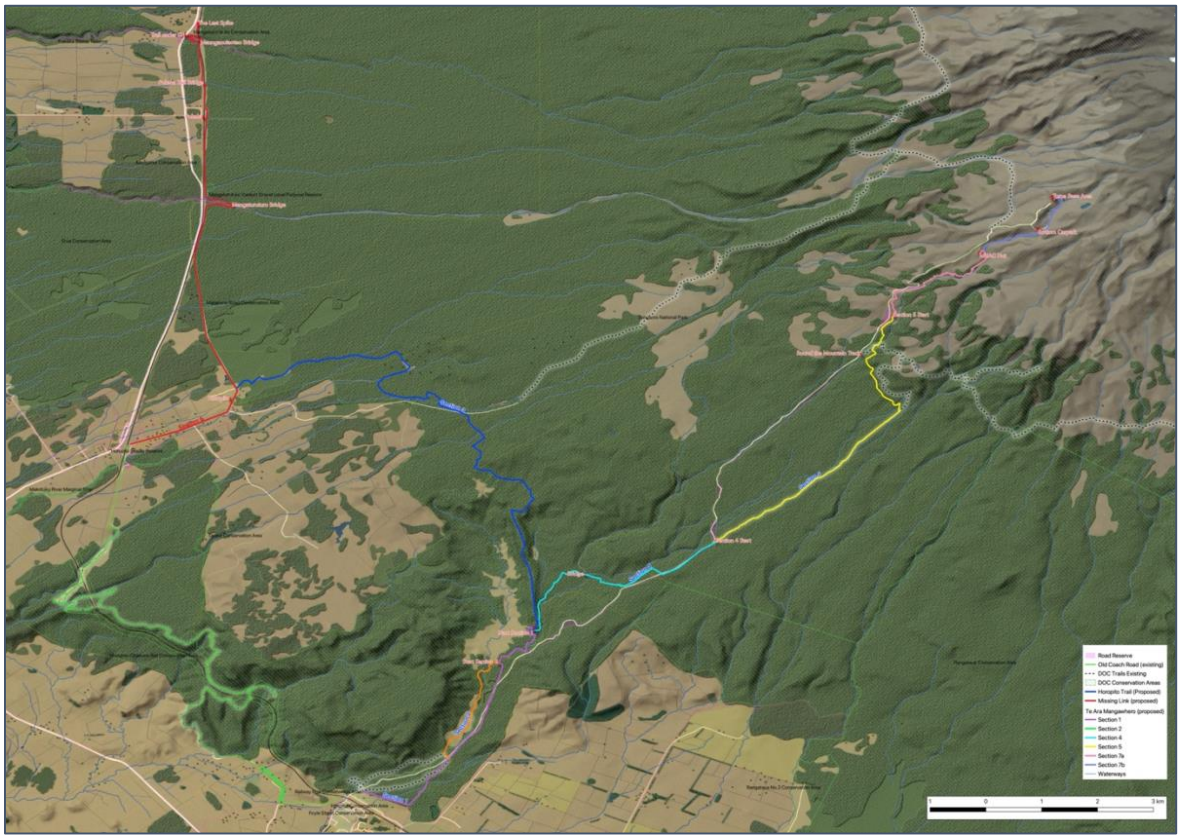


FIGURE 2 FULL MOUNTAINS TO SEA EXTENSIONS

A feasibility assessment undertaken to support the 2020 PGF funding application for the M2C extensions (Appendix 2) has identified measurable benefits, including the economic benefits of out-of-region visitors using the trail, health benefits and consumer surplus benefits from local and domestic users.

The case demonstrated that the proposed extensions will benefit the Ruapehu District's economy.

Ten years after the full trail extension is completed, it is forecast to attract 58,007 users per annum. Of this, 47,461 will be from outside the region including 6,548 internationals[1].

A summary of the key business case findings is shown in Figure 3.

[1] Trail user numbers were forecast prior to the Covid-19 pandemic.

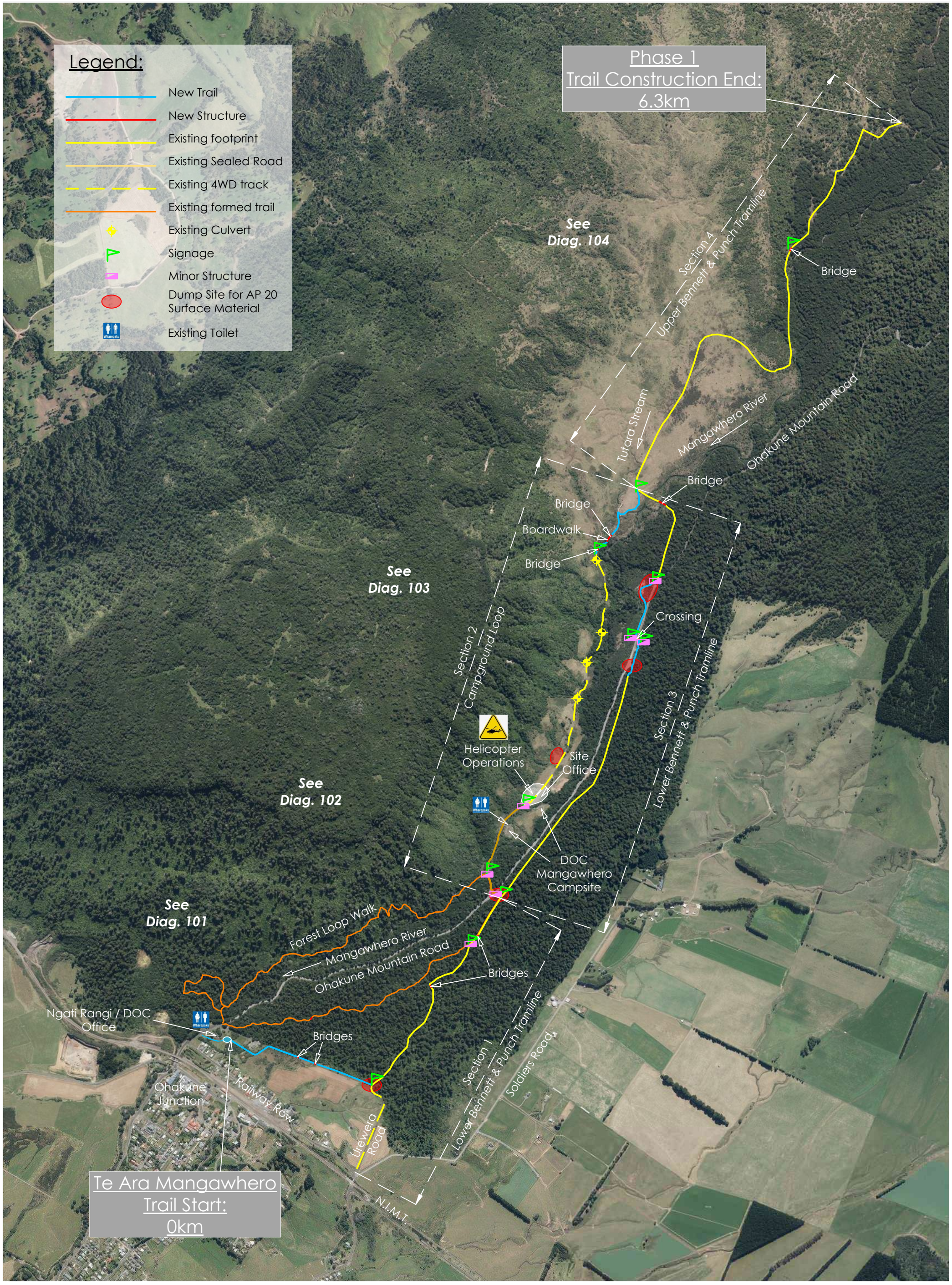
Outcome	Regional benefits	National benefits
Users	About 7,818 locals are expected to use the trail in the year after it is completed, increasing to 10,546 by year 10. By year 5, about 35,065 New Zealanders from outside the region are expected to ride the trail, increasing to 40,913 by year 10. About 4,133 international visitors are expected to ride the trail once it is completed, increasing to 6,548 in year 10.	
Visitor expenditure	The trails are expected to generate about $2.75 million per annum in additional visitor expenditure regionally by year 10.	The proposed trails are expected to generate about $342,000 per annum in additional visitor expenditure nationally by year 10.
Construction and operational jobs	The trail is expected to generate up to 31 full time jobs over the four-year construction phase and sustain an average of 65 full time jobs each year over 10 years.	
CBA	The trail will have a net present value of $7.85 million, a benefit: cost ratio of 2.6, and an internal rate of return of 24 percent.	The trail will have a net present value of ($1.2 million), a benefit: cost ratio of 0.9, and an internal rate of return of 4 percent.
Visitor benefits	The present value of visitor spend is estimated at $12.6 million per annum.	The present value of visitor spend is estimated at $1.6 million per annum.
Health benefits	The trail is expected to contribute $0.16 million in health benefits per annum.	The trail is expected to contribute $2.2 million in health benefits per annum.
Consumer surplus	The trail is expected to contribute about $0.1 million in consumer surplus per annum.	The trail is expected to contribute about $3.7 million in consumer surplus per annum.

FIGURE 3 BUSINESS CASE SUMMARY

Construction of the trail will occur in a phased approach. This is to ensure that development occurs in a manner consistent with the TNPMP and, more importantly, to ensure a precautionary approach is taken in developing the trail in more sensitive areas further up Ruapehu Maunga. These stages are:

1. **Phase 1:** Trail sections Lower Bennett and Punch, Upper Bennet and Punch (Part) and Campground (Section 1 (part) and Section 2)
2. **Phase 2:** Trail sections Upper Bennett and Punch (part), Horopito, Blyth to Mangawhero and the alpine sections.
3. **Phase 3:** The Missing Link

<u>This application is for the development and management of Phase 1 trails only as shown on Figure 4.</u>



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Approved	D.Sherrit	29/10/21	DS

Status **INFORMATION**

Scale A3 1:15000 | A3

Drawing Number 210700-100 | Rev G

Appendix 1 shows more detailed plans of the proposed 8.8 km trail route, including breaking the trail down into the following sections, that make up **Phase 1**.

Section ID	Description	Distance (m)
Section 1	Ohakune to Ohakune Mountain Road (Lower Bennett and Punch Tramline)	2,068
Section 2	Ohakune Mountain Road to water intake (Campground Loop)	2,113
Section 3	Ohakune Mountain Road to Mangawhero River and start of Upper Bennett and Punch Tramline	2,143
Section 4	Upper Bennett and Punch Tramline	2,522
		8,846

TABLE 1 PHASE 1 TRAIL SECTIONS

For the purposes of considering the proposed Phase 1 trails against Map 10 of the Tongariro National Park Management Plan, the Phase 1 trails all form part of the trail shown in red and identified as the Waitonga Falls – Blyth Track. Note that correspondence with DOC staff in preparing this application identified that Map 10 may be incorrect and that these sections are actually part of the Old Coach Road Loop Track, and that the Campground Loop (Section 2) is included in this. Either way, the proposed tracks have been identified in the TNPMP.

3.3 Subject Site and Tenure

The proposed trail route will be located predominantly on historic tramlines or the existing Ohakune water supply pipeline. The historic Bennett and Punch tramlines are approximately three metres wide and slightly raised with a benched surface along most of the length. There are a few places where the tramline is within cuttings in the surrounding hillsides (and reduces in width to *c.*2.5 metres) or has settled to below the natural ground surface level (e.g. Section 4). Most of the tramline has seen no human-induced disturbance or development of new infrastructure since 1957.

The proposed trail will predominantly be located within areas of mature indigenous vegetation, with the exception of Section 2 which is largely 4WD trail and Section 4 which is through exotic grassland with patches of early successional shrubs.

The proposed trails traverse a range of land tenure which is set out in Table 2.

Property	Status	Ownership/Management	Phase 1 Trail Sections
A Tongariro National Park	National Park	Crown/ Department of Conservation	Sections 1 - 4
B Formed Ohakune Mountain Road	Legal road	Ruapehu District Council	Sections 1, 2 and 3
C Unformed Urewera Road	Road Reserve	Ruapehu District Council	Section 1

TABLE 2 Affected Tenure

3.4 Permissions Required

Given the range of tenure and associated statutory management mechanisms in place, the proposal requires several statutory permissions from local and central government before it can proceed. The required permissions are as follows:

Permission and Authority	Statutory documents	Phase 1 Trail Sections	Activities	Description
Concession from the Department of Conservation	National Parks Act 1980 Conservation Act Tongariro National Park Management Plan Taupō Tongariro Conservation Management Strategy	Sections 1 - 4	Trail development will be undertaken by Ngati Rangi (via Ruapehu WorX) and managed by Ruapehu District Council (RDC). Operation and management of the trail will be undertaken by Ngāti Rangi. On completion of the trail development, operation and management of the trail will be assumed by Ngāti Rangi.	A concession is required for third parties to develop and manage facilities on public conservation land and for use of aircraft in the development of the trail.
Department of Conservation Major Works Approval	Department of Conservation Tongariro National Park Management Plan	Sections 1 - 4	To undertake the construction works to build the proposed trail within TNP.	A works approval is required for any physical works carried out within TNP. The nature of the works means that the application will be processed as a 'Major Works Approval' which will require public notification.
Horizons Regional Council Resource Consent – land use	Resource Management Act Horizons One Plan	Sections 1 - 4	The clearance of indigenous vegetation, undertake works around rivers and bridge construction.	Resource consent is required for the development of bridges over the Mangawhero awa and associated tributaries, clearance of indigenous vegetation and earthworks adjacent to waterways.

TABLE 3 Statutory Permissions Required

This assessment has been developed to support the Resource Consent, Concession and Works Approval applications.

3.5 Details of Development

The proposal is for the development of 8.8 km of shared use trail within Tongariro National Park. The location of the trail is shown in Figure 4 with more detail in the Construction Management Plan (Appendix 11).

Section	Segment	Name	Length (m)	Description
1	1.1	New Trail	111	Trail Start Section 1 - Bush section
	1.2	New Trail	59	
	1.3	New Trail	69	
	1.4.B	Bridge	6	New
	1.5	New Trail	76	
	1.6.B	Bridge	6	New
	1.7	New Trail	261	Urewera Road intersection
	1.8	Urewera Road	432	Existing metalled road
	1.9	Existing footprint	531	Lower Bennett and Punch Tramline
	1.10.B	Bridge	8	Existing water supply pipes adjacent
	1.11	Existing footprint	263	Lower Bennett and Punch Tramline
	1.12	Existing formed trail	51	Part of existing Forest Loop
	1.13.B	Bridge	6	New bridge to replace existing
	1.14	Existing formed trail	189	Section 1 END
2	2.1	Existing formed trail	33	Existing Forest Loop to Mtn Road
	2.2	Existing sealed road	448	To DOC Campground
	2.3	Existing 4WD track	1,226	4 No. existing culverts
	2.4	New Trail	18	
	2.5.B	Bridge	6	New
	2.6	New Trail	56	
	2.7.W	Boardwalk	17	New
	2.8.B	Bridge	17	New bridge over Tutara Stream
	2.9	New Trail	292	
3	3.1	Existing footprint	1,141	Lower Bennett and Punch Tramline
	3.2	New Trail	178	Parallel to Road
	3.3	Crossing	10	New
	3.4	New Trail	312	Parallel to Road
	3.5	Existing footprint	358	Lower Bennett and Punch Tramline
	3.6.B	Bridge	30	Old Bridge to rebuild
	3.7	Existing footprint	114	Upper Bennett and Punch Tramline
4	4.1	Existing footprint	1,378	Upper Bennett and Punch Tramline
	4.2	Existing footprint	298	Upper Bennett and Punch Tramline
	4.3.B	Bridge	17	New
	4.4	Existing footprint	829	Upper Bennett and Punch Tramline
			8,846	

TABLE 4 PHASE 1 TRAIL DETAILS

For the purposes of this application and subsequent construction the proposed trail has been broken down into four sections as set out in Table 4. The proposal will also include the development of nine bridges and one boardwalk of note. Trail structures (gates etc) and signage will also be installed as part of the development.

3.6 Trail Development

Appendix 11 is the Construction Management Plan that sets out the general conditions and monitoring requirements for all works associated with the construction of the first phase of the proposed Te Ara Mangawhero trail.

The proposed trail will be an easy, family friendly Grade 2 trail that enables a high level of access by users of a wide range of ages and abilities. As the trail is a shared use trail, its design considers dual use and dual flow of users. The design has incorporated a range of tools to facilitate safe use by people on foot and on bike.

The trail will be built 1.5m wide with an all-weather surface placed on existing ballast foundations of the Bennett and Punch tramline, and where the terrain permits the trail will extend to 1.8m wide to allow easy passing and shared use.

The Bennett and Punch 3m wide tramline allows for curvature and ability to soften the existing straight lines of the tramline. The intention is for the trail to meander through the regenerating forest that is growing along the tramline.

The proposed trail development will traverse and showcase a wide range of ecologically and culturally significant forest and river margin habitats on the lower slopes of Ruapehu. The proposed route has been designed to maximise the use of previously disturbed sites/areas, and to avoid and minimise the potential for adverse effects on intact indigenous ecosystems.

Design of the trail and associated outdoor structures and ongoing maintenance is to be in accordance with SNZ HB 8630:2004 New Zealand Handbook Tracks and Outdoor Visitor Structures, and the New Zealand cycle trail design guide https://www.mbie.govt.nz/assets/new-zealand-cycle-trail-design- guide.pdf.

This is a specification for the Department and other agencies responsible for the management of tracks and outdoor visitor structures. It provides guidance on 'track service standards' relative to visitor (user) characteristics and the type of recreational opportunity being provided, and guidance for the engineering design of structures. Many other standards relate to design and construction of various elements of outdoor structures, and these are referred to in SNZ HB 8630.

The trail will comply with the standards for a Day Visitor – Walking Track for Cyclists/Mountain-Bikers and Pedestrians.

3.6.1 Ruapehu WorX Limited Partnership

Construction of the Phase 1 trails will be undertaken by Ruapehu WorX led by Paul Carr.

Ruapehu WorX is a trail building company that aims to find the balance and wellbeing of the ngahere, taiao, communities and the people. Enabling recreational access will create connection and enable greater environmental and conservation outcomes. Healthy parks, healthy people.

Ruapehu WorX is a Ngāti Rangi owned sustainable commercial company with its purpose being to enhance the taiao, communities, people, place and mana whenua of Koro Ruapehu, Hapaitia te ora – uplift the place and the people.

Ruapehu WorX is guided by Ngāti Rangi and the support of the taiao management team and wider collective of kaimahi who have been leading taiao management within Ruapehu since 1992.

Ruapehu WorX is led by Paul Carr. Paul has 32 years' experience in trail building, project management and construction of numerous iconic remote destinations throughout Aotearoa.

3.6.2 Use of Helicopters

Helicopters will be used in the development of the trail. These will be used to fly in structures, such as bridges and gravel to key areas. The use of helicopters in this instance is to reduce the overall disturbance to the environment by reducing unnecessary disturbance at bridge sites.

Helicopter operations will be managed by Ruapehu WorkX.

Helicopters and pilots will be used from the following companies:

- Midwest Helicopters NZ (https://www.midwesthelicopters.co.nz) using Airbus As350 B@ and Airbus AS350 B3 helicopters
- Beck Helicopters (http://www.heli.co.nz) using a Bell UH1 Iroquis

Further information on the location and use of Helicopters can be found in the CMP in Appendix 11.

3.7 Trail Management

Trail development will be undertaken by Ngāti Rangi (via Ruapehu WorX) and managed by Ruapehu District Council (RDC). Trail development will be undertaken by Ngāti Rangi (via Ruapehu WorX) and managed by Ruapehu District Council (RDC). Operation and management of the trail will be undertaken by Ngāti Rangi. On completion of the trail development, operation and management of the trail will be assumed by Ngāti Rangi.

The proposed sections of trail are on easy topography, are easily accessible, are close to an existing population centre and the majority of the trail is under canopy cover. These factors mean the trail will be relatively straightforward and cost effective to maintain.

Management and maintenance of the trail will be undertaken by Ngāti Rangi utilising their trail management team. They have recently developed the capability and capacity for trail development and management, primarily through Ruapehu WorX. Funding for trail management will come, amongst other sources, from the Ruapehu District Council Long Term Plan.

The Level of Service (LOS) for the management of the trail will be to ensure the trail meets the DOC and New Zealand Cycle Trail standards for a Grade 2 Trail. As noted above, this management will be funded through Ruapehu District rates and wider funding associated with the Mountains to Sea Trail.

Ngāti Rangi will work with RDC and the wider Mountains to Sea trail managers and owners to ensure the trail is managed and marketed to a standard that meets the New Zealand Cycle Trails and the Department's requirements.

A proactive approach to sustainable trail management will be taken. This starts with the design and build of the trail and structures. The trail will be built to be robust and resistant to key impacts that are likely to affect the trail surface and overall trail integrity. This will primarily be water management. It is important to note that the sections of trail proposed to be developed are in a relatively easy topography, meaning that water flow along the length of the trail is not anticipated to be a significant issue.

The majority of the trail is on reasonably flat country where the trail surface is to be crowned with surface slope to each side about 4%. This avoids a trenched/dished trail surface developing with use within a short timeframe. Rolling grade dips will be constructed at suitable locations to divert water off the trail and into the surrounding vegetation. Gully crossings are to be armed with local rock where water may flow due to localised heavy rainfall events.

Where the trail is to be developed across slopes, it will be sloped outwards at 4% to encourage any runoff to flow across the trail. An outward sloping trail is preferred to a crowned or inward sloping surface which could require an inside drain and use of culverts. Where run off is likely to occur, shallow swales will be placed across the trail at regular intervals to let the water cross the trail. These gully swales will be armed with local rock and will be used over culverts where possible to reduce maintenance. The finished slopes will be at an angle similar to the existing natural slopes which will result in minimal runoff.

The majority of the trail is under canopy cover which will reduce the impact of direct rainfall. The native canopy cover will also significantly reduce the amount of weed growth around the trail to a negligible level. In open areas, vegetation and weed control will be undertaken on a seasonal basis.

Ongoing maintenance requirements for the bridges will include two-yearly checks by suitably trained inspectors and six-yearly checks by an appropriately qualified bridge engineer.

All structures are required to have an engineering design and approval to Department of Conservation standards. This includes all bridges, handrails and board walks.

Ngāti Rangi have their offices at the base of the maunga and are well placed to respond quickly and efficiently to any trail issues that may arise. This will include inspecting the trail after wind and/or rain events to check for any windfall or slumping. Bridges and other structures will be checked after any peak flow events too.

As the trail will form part of the Nga Haerenga Great Rides, there will be monthly feedback from the trail survey. This feedback will be assessed on a monthly basis and used to inform any maintenance works. Likewise, NZCT has quality assurance tools such as the Trail Warrant of Fitness that assesses a range of trail factors including trail surface quality. These assessments will be done regularly by a NZCT assessor and will provide additional feedback on trail management. As a Great Ride, the trail will have access to a range of additional funds. The annual Trail Manager fund provides operational costs of $45,000 (to be used across the wider M2C trail), and the Extreme Events fund provides support when sections of trail have been damaged by extreme events such as storm damage, fire, flooding or single event vandalism.

As a Great Ride, the trail will be insured under the New Zealand Cycle Trails Great Ride Insurance scheme which can be viewed HERE.

Additional information about these funds can be found HERE.

Additional information about trail development and maintenance can be found in the Construction Management Plan in Appendix 11.

3.8 Ecological Enhancement

The trail development and management by Ngāti Rangi will enable the iwi to better fulfil their role as kaitiaki This will include their pest trapping and weed control. Enabling access to this area means there is greater opportunity for active conservation initiatives by the Applicant and the wider community. A specific focus of these initiatives will be around waterways to ensure that whio have more protection from predators.

Further detail about this enhancement work is set out in the Construction Management Plan in Appendix 11.

4 History of proposal and other sites considered

Investigations and planning of the proposed trail started in 2014 by the local community. At the time the local community group, Ohakune 2000, led investigations into the development of the proposed Ohakune Mountain Road trail. This has included consultation with iwi, former Ohakune Mountain Road builders, adjoining property owners and hunters. They undertook a comprehensive desktop study using underlying cadastral data, historical maps and reports. They also completed a detailed field investigation and identified a potential trail route that has been plotted using GPS.

This proposed route was reviewed by Evan Freshwater and Jonathan Kennett from New Zealand Cycle Trail Inc. in March 2016. They noted that the trail is likely to be enormously popular with bikers and has the potential to be a unique and significant attraction for Ohakune. However, due to the status of the area as a national park and a dual World Heritage Area, they recommended that further investigation should be undertaken by a 'master trail builder' to confirm that a sustainable route and trail can be developed. This was done in May 2016 by two NZCT accredited Master Trail Builders who reviewed the proposed route and provided feedback to the project team. The proposed route at the time was subsequently amended to take on board the feedback provided.

A feasibility assessment was prepared in 2016 by Perception Planning Limited for the Department of Conservation (the Department) to inform a proposed amendment to the Tongariro National Park Management Plan (TNPMP). A copy of this assessment can be viewed HERE.

While a strong focus of the report was an assessment of the proposed trail against the Department's statutory instruments, it also included an assessment of the proposed route, environmental and cultural impacts and a market and economic assessment. Page 10 of the 2016 feasibility noted the following drivers for the trail:

- A series of safety audits undertaken on the Ohakune Mountain Road by the Ruapehu District Council (RDC) and the New Zealand Transport Authority (NZTA)[2], demonstrated that the road does not meet the required safety standards for the user groups of the road (vehicles, bicycles, pedestrians). Road design criteria were drawn up in 2012 for the realignment of the road that met minimum design criteria standards, but that excluded other users (walkers and bikers) from the carriageway. This was done to minimise the environmental impact on the vegetation adjacent to the road by further widening the road. However, this meant that a separate walking and biking trail was needed. This option was supported by the Department, local iwi (Ngāti Rangi and Ngāti Uenuku) and the local community[3].
- The Manawatu-Whanganui Regional Growth Study published jointly by The Ministry of Business, Innovation and Employment (MBIE) and The Ministry of Primary Industries in 2015[4], prioritised eight opportunities for economic and social growth in the region. The first of these opportunities was the development of tourism and visitor services – with the initial emphasis on the development of mountain bike trails by introducing an additional trail on the Turoa side of Mt Ruapehu. The report went on to estimate that if this initiative and two others suggested in the region increased visitor spend by 10%, the regional GDP would be boosted by $63m a year and add 71 jobs directly and indirectly.
- The Round the Mountain track maintained by the Department requires walkers to walk 3.5km along the Ohakune Mountain Road between Whanganui Corner and the Waitonga Falls carpark. Although no negative comments have been made on the Department's website about this, negative comments have

[2] Pers Com: Warren Furner, Ruapehu District Council Roading and Economic Development Manager

[3] The roading upgrade work has subsequently occurred

[4] The Manawatu-Whanganui Regional Growth Strategy http://www.mbie.govt.nz/about/whats-happening/news/2015/manawatu-whanganui-growth-study-published/?searchterm=manawatu-whanganui-growth-study%2A

been seen in the hut books. There is an opportunity to enrich the visitor's experience and increase safety on the road by taking the walkers off this section of road and directing them towards the proposed new trail.

- The Mountains to Sea Cycleway (part of the New Zealand Cycle Trail) starts at the Turoa skifield carpark and ends in Whanganui. The Ohakune Mountain Road is thus part of this cycleway. There is an opportunity to take bikers off the road to enrich their visitor experience and increase safety on the road by offering an off-road trail.
- The numbers walking the Tongariro Alpine Crossing have increased on an annual basis, putting pressure on the track surface and the services offered to walkers. There is no alternative day walk in the immediate area in the event of bad weather or in the event of an eruption (and the track closure that has followed an eruption in the past).

In 2016, a partial review of the TNPMP was initiated which involved a public consultation process under Sections 46 and 47 of the National Parks Act 1980. This review included a submission process which was advertised nationwide with public hearings held in Ohakune in 2017. The review enabled the development of Te Ara Mangawhero, the Horopito Trail and those sections of the Missing Link that fall within the national park. The partial review was approved by the New Zealand Conservation Authority on 23 April 2018.

This process represented an acceptance of the appropriateness of these trails by the Department, provided that they are developed and managed in accordance with the revised TNPMP.

The key alternative route considered for the trail at the outset was an extension of the Ohakune Mountain Road carriageway to include a wider shoulder for use by walkers and cyclists. This option was not supported by iwi and others due to the environmental impact associated with the road widening. Further discussion on this can be found in Section 2.2 of the 2016 feasibility assessment.

Further feasibility and business case work was undertaken for the proposed trail to secure additional central government funding. These assessments considered the trail within the context of the amended management plan and additional on ground assessments undertaken on the Missing Link section of the trail. A copy of this most recent feasibility assessment can be found in Appendix 2.

5 Statutory Assessment

The following statutory assessment considers both the Resource Management Act 1991 and the Conservation Act 1987 which are relevant to this proposal and the permissions sought.

The following statutory documents are considered directly relevant to the concession application:

- National Parks Act 1980 (the Act);
- Conservation Act 1987
- Tongariro National Park Bylaws 1981;
- General Policy for National Parks 2005;
- Tongariro / Taupo Conservation Management Strategy 2002-2012 (CMS);
- Tongariro National Parks Management Plan 2006-2016 (Plan);
- Tongariro National Park Amendment 2018 (Amendment).

The following statutory documents are considered directly relevant to the resource consent applications that will be lodged with Horizons Regional Council:

- The Resource Management Act 1991
- National Policy for Freshwater Management 2020
- The Horizons One Plan

The following statutory document is considered relevant to both applications:

- Ngāti Rangi Claims Settlement Act 2019

5.1 National Parks Act 1980 and General Policy for National Parks 2005

The purposes of national parks, as set out at Section 4 of the Act, are the preservation in perpetuity for their intrinsic worth and for the benefit, use and enjoyment of the public areas of New Zealand that contain scenery of such distinctive quality, ecological system, or natural features so beautiful, unique or scientifically important that their preservation is in the national interest[5].

The principles for national park management are set out in Sections 4, 5 and 5A of the Act and Section 6 of the Conservation Act 1987. There is a clear hierarchy of considerations for decision makers, with the primary focus of the legislation being preservation and protection of natural and historic values in their natural state: while providing for, or fostering, recreation and public access for the benefit of users, from their interaction with the underlying natural resources.

The 2017/18 partial review of the Plan was guided by the National Parks Act and the General Policy for National Parks. The proposed amendment was considered consistent with the higher order statutory framework on the basis the activity of mountain biking is considered part of the valid recreation opportunity spectrum within the national park, and the infrastructure development associated with it maintains or enhances park values. The policy approach taken ensures a precautionary, staged approach to track development, disciplined monitoring and review of development and use, and formalised reporting and feedback to the governance entity for

[5] Derived from Section 4(1) National Parks Act 1980

Tongariro National Park. The cultural values of Tongariro National Park will be sustained through the involvement in the trail by Ngāti Rangi.

On this basis, the principle of establishing a shared use trail along the alignment set out in Map 10 of the Amendment has been confirmed against national level statutory documents. This application therefore considers the detail of the proposed trail route and its construction and associated effects against the relevant provisions of the Plan and the CMS.

5.2 Tongariro National Park Management Plan

Tongariro National Park is a nationally significant area with Dual World Heritage status for cultural and geological reasons. The Park is a major tourist attraction and has sites such as the Tongariro Crossing which have high international use for outdoor recreation. The Park is nationally important for skiing with three ski areas, two of them of international standard. Other recreation opportunities include ski mountaineering, climbing, snow caving, nature study, photography, hunting and tramping.

The objective of the Tongariro National Park Management Plan in respect to recreation management is to facilitate public benefit, use and enjoyment of the Park by providing for a variety of low-impact recreational activities, where this is consistent with the primary objective of protecting the natural character of the Park.

The Plan (Section 3.1) identifies eleven principles that reflect the core values of the Park as follows:

- *To protect Tongariro National Park in its natural state in perpetuity;*
- *To manage Tongariro National Park consistent with conservation legislation and General Policy;*
- *To protect the taonga – the peaks of Tongariro National Park;*
- *To ensure World Heritage obligations are met and given effect to;*
- *To give effects to the principles of the Treaty of Waitangi;*
- *To provide for co-operative conservation management;*
- *To provide for public enjoyment of natural and cultural heritage;*
- *To protect the ancestral, historical, archaeological and cultural heritage landscape of Tongariro National Park;*
- *To reflect the values of the park partners in management;*
- *To minimise infrastructure to that <u>essential</u> to provide for visitors' benefit, use and enjoyment of the park [emphasis added]; and*
- *To honour existing legal agreements.*

The key management policies and philosophies highlighted within the Plan are hierarchical in nature. They give effect to the requirements of the National Parks Act 1980. The protection ethic inherent in the Plan principles cannot be derogated from in decision making. While both documents highlight fostering recreation and essential infrastructure for visitor use and enjoyment, these things occur in the context of the overarching protection requirement.

The Plan was amended in 2018 to specifically provide for the development of a shared use trail along the route identified in Map 10 of the amendment. That route is the same as set out in this application and Phase 1 includes the trail referred to as the 'Old Coach Road Loop Track' and the lower part of the 'Waitonga Falls-Blyth Track'. The amendment established specific direction in the Plan on the nature of the trail, its development, use and management. On this basis the development and management of the proposed trail has been predicated by the partial amendment of the Plan and as such the following assumptions are made:

- The concept of the trail being developed and managed by a third party is accepted, albeit in a manner in line with relevant plan policies relating to how this is to be done.
- Provisions in Section 4.1.1 of the TNPMP relating to limiting concessionaire infrastructure to amenities areas etc and whether activities could be conducted outside of the Park have been addressed through the partial amendment and do not need to be 'argued' through the trail concession.
- The concept of locating a shared use trail in the Park and people being able to ride bikes (including E-bikes) on it is has been agreed in principle.

These points do not mean that the trail is to be developed on a permitted basis, as the plan sets out the expectations around the development and management of the trail including ensuring that it does not adversely affect the important values of the Park.

A detailed assessment of the proposed trail development and its management against the relevant provisions of the Plan is set out in Appendix 5. This assessment is undertaken in a manner cognisant of the three assumptions set out above.

The following assessment is of those parts of the Plan that are considered to be particularly relevant to the proposed development.

5.2.1 Plan Section 4.3.2.4 Tracks

The amendment resulted in a number of changes to Section 4.3.2.4 of the Plan. Foremost of these changes was the addition of the new objective C as follows:

To enable family-friendly mountain bike recreation opportunities where they cannot be more appropriately located outside of the national park and where they are compatible with the protection of the cultural and natural values of the park and the enjoyment of it by other recreation users.

The proposed trail is to be developed as a shared trail at a grade generally consistent with the Department's standard for Grade 2 cycle trails. This is an easy, family friendly grade that enables a high level of access by users of a wide range of ages and abilities. The detailed trail planning and design has been informed by ecological and cultural assessments to ensure the trail will be compatible with the natural values of the Park. As a shared use trail, the design of the trail has been carried out to manage use of the trail by walkers and bikers and ensure their safe and enjoyable use.

Policy 4.3.2.4.4 was added into the Plan through the Amendment and requires the following:

Allow for the development and operation of shared-use of the Waitonga Falls- Blyth Track, Old Coach Road Loop Track, and Maungaturuturu Link Track, where:

> *a) the protection of visitor safety and enjoyment is provided for;*
>
> *b) departmental standards for Grade 2 (easy) cycle trails or equivalents are met; and*
>
> *c) the Department has sought advice from the Tongariro/Taupo Conservation Board with respect to route selection, track development and environmental impact assessment.*

Policy 4.3.2.4.6 requires that a and b should be complied with when developing the trail.

As noted above, the proposed trail will be an easy, family friendly grade that enables a high level of access by users of a wide range of ages and abilities. As the trail is a shared use trail, its design considers dual use and also dual flow of users. The design has incorporated a range of tools to facilitate safe use by people on foot and on bike. These include:

1. The trail will be built 1.8m wide where the terrain permits to allow easy passing and shared use.
2. Boardwalk sections should be built to a minimum 1.2m wide.
3. Grade reversals will be used often to manage rider speed on longer straight sections of trail.
4. Long straight sections will be minimised to reduce rider speed.
5. Corners will be, where possible, open with good sightlines to ensure that all users have maximum visibility of the trail and other users.
6. There will be signage at trail heads and along the trail reminding users that it is a shared use trail and to share with care.
7. The Grade 2 trail means that it does not passively promote high speed use by riders.

The proposed trail is designed to meet Departmental Grade 2 Standards.

A presentation was provided to the Conservation Board on the proposed Phase 1 trails on November 18, 2021.

Policy 4.3.2.4.10 considers opportunities for parties other than the Department to develop the tracks and for them to be constructed, maintained and managed under a concession or management agreement. Accordingly, the tracks are proposed to be developed and managed by Ngāti Rangi under a concession from the Department. As per Policy 4.3.2.4.11, independent mountain biking and e-biking will be allowed free of charge on the proposed trails.

Policy 4.3.2.4.12 sets out a number of priorities for the trail as follows:

> a) ensure the protection of visitor safety and enjoyment;
>
> b) promote awareness of park values including values of significance to tangata whenua and how to avoid adverse effects on these;
>
> c) promote awareness of desired behaviours when using a shared-use track to protect the experiences of, and avoid creating hazards for, others;
>
> d) meet departmental standards for Grade2 (easy) cycle trails or equivalents; and
>
> e) address the transfer of infrastructure assets, restoration of developed sites to original state, or reassignment of management functions upon expiry of the concession or management agreement.

Matters a, c and d are discussed above.

The trail development project has also included planning for storytelling and interpretation around the important values associated with the Park. The storytelling component will be developed as part of future phases of the trail development process. Involvement by Ngāti Rangi in the development and management of the trail means that consideration of these values will be an intrinsic part of the trail development and management process.

In respect to the transfer of infrastructure and assets, the trail infrastructure and associated assets will be transferred from RDC to Ngāti Rangi once the development is complete. While the concession application is for a period of 20 years, it is not anticipated that this will be the life of the trail and associated assets. Like existing trails in the Park, the proposed trail will have a greater lifetime than the initial term sought via the concession. On that basis restoration is not anticipated but, given the nature of the development, the trail could be restored naturally if use and maintenance of the trail is stopped. Structures, such as bridges, boardwalks and signage, are

discrete items that can be deconstructed and removed from the environment without creating wider effects. It is also important to note that as tāngata whenua, Ngāti Rangi have a permanent relationship with the land.

Policy 4.3.2.4.13 sets out the following matters which the Department should do on receipt of a concession application for the trail development:

a) require consideration of the policies in *Section 4.4.1 Concessions General*;
b) seek advice from the Tongariro/Taupo Conservation Board;
c) require a project plan that demonstrates the sustainable operation of the proposed mountain bike tracks over the long term; and
d) require a full environmental impact assessment undertaken by appropriately qualified specialists.

Section 4.4 of the TNPMP contains a comprehensive set of objectives and policies relating to concessions within the Tongariro National Park. Section 4.4 asks several key questions that each concession application will need to respond to. These questions are discussed in more detail in Appendix 5. In summary, the concession application meets the requirements in Section 4.4.

A presentation was provided to the Conservation Board on the proposed Phase 1 trails on November 18, 2021.

Discussion on the management of the proposed trail by Ngāti Rangi is contained in Section 3.7 of this report.

As part of the trail planning process, an ecological and cultural assessment was undertaken for the trail. These assessments can be found in Appendix 7 and Appendix 8 of this report. These reports have formed an integral part of the wider environmental impact assessment.

Policy 4.3.2.4.14 directs that the development of tracks should be undertaken on a staged basis as follows: (1) Old Coach Road Loop Track, (2) Maungaturuturu Link Track, (3) Waitonga Falls-Blyth Track and (4) Turoa-Waitonga Falls Track.

The trails that are proposed to be developed through this application are the Old Coach Road Loop Track and the lower sections of the Waitonga Falls-Blyth Track. The latter has been identified in the Plan as being developed at a later stage. The phase 1 tracks identified in Policy 14 are the lower sections of the wider trail. These trails are of an easier grade and it stands to reason that Sections 1 and 2 should be included in the first tranche of trails to be developed to allow the development of easy grade trails on areas that have been previously disturbed.

5.2.2 Plan Section 4.1.2 He Kaupapa Rangatira

He Kaupapa Rangatira is the principal means by which the Treaty principles and objectives will be implemented and achieved in the Park. It is a practical and pragmatic expression of the relationship between Ngāti Tūwharetoa, Ngāti Rangi and the Department. This section is relevant to this application as the Applicant is Ngāti Rangi. Of specific relevance are the following Objectives in 4.1.2:

1. 4.1.2.2.a To recognise and actively promote the exercise by iwi of tino rangatiratanga over their land and resources, and taonga of significance to them.
2. 4.1.2.2.b To identify with iwi opportunities for them to exercise an effective degree of control over traditional resources and taonga that are administered by the department, where this is not inconsistent with legislation. Note: “An effective degree of control” may vary from full authority at one end of the spectrum to a right to be consulted at the other end.
3. 4.1.2.5.a To recognise and actively promote the exercise of kaitiakitanga by iwi in respect of their land, including resources and taonga of significance to them and under the control of the department.

4. 4.1.2.5.b To facilitate the exercise of kaitiakitanga by iwi in respect of traditional resources and taonga of significance to them where these are administered by the department.
5. 4.1.2.6.a To identify with iwi the means to provide opportunities for partnership and participation in conservation management, particularly in respect of traditional land, resources, and taonga administered by the department.
6. 4.1.2.6.b To develop an active relationship of co-operation, utmost good faith, and mutual respect between the department and iwi and to reflect the importance and quality of that relationship in the culture of the department and all of its operations.

If granted, the concession will be the first concession in TNP held by iwi for the development and management of a physical asset in the Park. Currently there are skifields, motels etc owned and operated by clubs and companies, however nothing owned by iwi. With Ngāti Rangi managing the trail on the slopes of Ruapehu Maunga, a significant opportunity would be provided for the iwi to exercise Kaitiakitanga and an effective degree of control of a key asset within the Park. This opportunity 'provided' to iwi by the Department would be a practical and pragmatic expression of the important relationship between iwi and the Maunga.

5.2.3 4.1.16 Works Approvals

All works undertaken within the Park, beyond basic maintenance, require approval by the Department as land administrator (a 'works approval'). The intention of that approval is to allow the Department to consider works at a broad strategic level, to consider their cumulative effects over time, and to consider the specific effects of the proposal in relation to the values of the Park.

This AEE supports applications by Ngāti Rangi to build and manage the trails proposed. This allows the Department to consider the effects of the development of the trail and its ongoing management by Ngāti Rangi. As the proposed physical works result in permanent infrastructure over 100m2 and are outside of the amenities area then the approval needs to be considered as a 'major' application as per policy 4.1.16.3. As the application is of a scale that necessitates the development of an EIA, it will have to be notified.

Dual notification of the concession and works approval is requested in this instance to provide for a more efficient process for the Applicant, the Department and those third parties who may wish to submit on the application.

5.2.4 4.3.2.12 Mountain Biking

Section 4.3.2.12 of the Plan was amended through the partial review process. These amendments focused on enabling the use of the proposed trails by people on bikes, and concession activities relating to guided mountain biking on specified trails within the Park.

It is important to note that the concession and works approval is for the development of a trail that will be used by people on bikes. This has informed the detailed design and route of the trails as lodged.

5.3 Tongariro-Taupō Conservation Management Strategy

The proposed trails are located within the Tongariro–Taupō CMS area. The 2002–2012 Tongariro-Taupō Conservation Management Strategy (CMS) covers the Tongariro National Park and surrounding area. Section 2.1.2 of the CMS contains six key principles as follows:

- *Protection and enhancement of the natural environment;*
- *Protection of historic resources managed by the Department;*
- *Development of an effective conservation partnership with tāngata whenua;*

- *Fostering recreation use of public conservation land [emphasis added];*
- *Limiting non-recreation commercial use of public conservation land; and*
- *Enhancing advocacy outcomes and community relations.*

Those CMS provisions which are directly relevant to the proposed development are assessed in Appendix 6.

5.4 Statutory Assessment Conservation Summary

The key management policies and philosophies highlighted within the CMS and Plan are hierarchical in nature. They give effect to the requirements of the Conservation and National Parks Acts. The protection ethic inherent in the CMS and Plan principles cannot be derogated from in decision making. While both documents highlight fostering recreation and essential infrastructure for visitor use and enjoyment, these things occur in the context of the overarching protection requirement.

The application has been assessed against the relevant provisions of both of these plans. This assessment is set out in Appendix 5 and Appendix 6.

The project proposal is considered consistent with this framework on the basis the activity of mountain biking is considered part of the valid recreation opportunity spectrum within the national park, and the infrastructure development associated with it maintains or enhances park values. This has been confirmed through the amendment to the plan that specifically enabled these activities to occur in the location proposed through this application. The proposed development is consistent with the policy approach set out in the Plan and CMS and ensures a precautionary, staged approach to track development.

The cultural values of Tongariro National Park have been considered through the cultural assessment in Appendix 7. Ngāti Rangi have identified that as they will be responsible for construction and kaitiakitanga of ongoing management and maintenance of the trail they are satisfied that cultural impacts have either been mitigated or can be managed.

5.5 Resource Management Act 1991

The following sections consider the proposed development against relevant sections of the Resource Management Act 1991 (RMA). This assessment is relevant to the resource consents required for the trail development.

5.5.1 Part II Purpose and Principles

The purpose and principles of the Resource Management Act 1991 are set out in Part II of the Act. Part II is a relevant consideration in assessing the application.

5.5.1.1 Section 5

Section 5 sets out that the purpose of the RMA is to promote the sustainable management of natural and physical resources. In the RMA, 'sustainable management' means:

> *managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –*
>
> *(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
>
> *(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The proposed development is considered consistent with Section 5 of the RMA in that its effects on the natural and physical resources of the site will be less than minor.

5.5.1.2 Section 6

Section 6 of the RMA outlines matters of national importance that need to be recognised and provided for by the consent authority (Horizons Regional Council) in exercising functions and powers under the RMA. The following matters are of national importance:

(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development;

(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development;

(c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna;

(d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers;

(e) the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga;

(f) the protection of historic heritage from inappropriate subdivision, use, and development;

(g) the protection of protected customary rights.

The proposal will provide for the preservation of the natural character of the river and its margins with sensitive trail and bridge design. An ecological assessment demonstrates the effects on the significant indigenous vegetation and habitat of the site. The proposal will enhance public access to the Mangawhero Awa. The proposed trail has been designed in a manner conscious of the relationship of Māori with the ancestral lands, water, sites, wāhi tapu, other taonga and customary rights. The proposed trail is also conscious of the heritage values of the location by bringing to life an old bush tramway. The proposal is consistent with Section 6 of the RMA.

5.5.1.3 Section 7

Section 7 outlines other matters to which particular regard should be given by the consent authority, which are:

(a) kaitiakitanga;

(aa) the ethic of stewardship;

(b) the efficient use and development of natural and physical resources;

(ba) the efficiency of the end use of energy;

(c) the maintenance and enhancement of amenity values;

(d) intrinsic values of ecosystems;

(e) [Repealed]

(f) maintenance and enhancement of the quality of the environment;

(g) any finite characteristics of natural and physical resources;

(h) the protection of the habitat of trout and salmon;

(i) the effects of climate change;

(j) the benefits to be derived from the use and development of renewable energy

The proposed ecological restoration work is anticipated to result in an enhancement of the intrinsic values of local ecosystems and their associated amenity values. The Applicant's approach to improve the environment through their proposed development is consistent with the ethic of stewardship. Its location in an area valued for recreation and in close association with other recreation activities is an efficient use of the resources of the site.

5.5.1.4 Section 8

Section 8 requires the principles of Te Tiriti o Waitangi (the Treaty of Waitangi) to be taken into account when considering an application for resource consent.

The proposal will enable Ngāti Rangi to be active kaitiaki in that part of the maunga and their role as Applicant will ensure that the important cultural values of the site are safeguarded.

5.5.1.5 Part II Summary

Overall, it is considered that the proposed development is an efficient use of a natural and physical resource in a manner that provides for the protection and enhancement of nationally important landscape and natural value areas. It will enable the use of an area by locals and visitors in a manner that respects the important cultural, environmental and historical values of the site. The proposal will enable Ngāti Rangi to better fulfil their role as active kaitiaki of the Maunga.

The proposal is considered consistent with Part II of the Resource Management Act (the RMA), and the RMA would be better served with approval rather than declining of the proposal.

5.5.2 Section 88 – Making an Application

Section 88 sets out the requirements for making a resource consent application under the Resource Management Act. Section 88(2)(b) requires applicants to include the information relating to the activity, including an assessment of the activity's effects on the environment. It is considered that the application meets all the requirements of Section 88. The assessment of effects is proportionate to the scale of potential effects that may be attributed to the proposal in accordance with Section 88(2)(b).

5.5.3 Section 104 Consideration of Resource Consent Applications

Section 104 of the RMA requires (subject to Part II of the Act) a consent authority to have regard to the matters in Section 104 when considering resource consent applications. Section 104 states:

1. When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to-
   a. Any actual and potential effects on the environment of allowing the activity; and
   b. Any relevant provisions of

      (i) national environmental standard:

      (ii) other regulations:

      (iii) a national policy statement:

      (iv) a New Zealand coastal policy statement:

      (v) a regional policy statement or proposed regional policy statement:

(vi) a plan or proposed plan; and

c. any other matter the consent authority considers relevant and reasonably necessary to determine the application.

2. When forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if the plan permits an activity with that effect.

The actual and potential effects of the project are assessed in Section 7 of this document. The planning documents relevant to this project are outlined in Section 5.

5.5.4 Section 104D: Particular restrictions for non-complying activities

This application is considered to be a non-complying activity under rule 13.9 of the Regional Plan.

Section 104D states that a consent authority may grant a resource consent for a non-complying activity only if it is satisfied that either:

(a) the adverse effects of the activity will be minor, or

(b) the application is for an activity which is not contrary to the objectives and policies of the relevant plan.

For the reasons set out in this report, it is considered that the application meets both of these tests and the Council can approve the application.

5.6 National Policy Statement for Freshwater Management 2020

The proposed development will involve bridge development over and land disturbance adjacent to Te Mangawhero Awa and its tributaries.

Ngāti Rangi is the Applicant on the basis that they wish to ensure they have oversight of the development and management of the trail in an area that is very important to them. The Mangawhero Awa is of fundamental importance to Ngāti Rangi, as is the need to protect the mana and mouri of the awa and the wellbeing of the surrounding environment.

The approach taken by Ngāti Rangi in the trail design and its development is rooted in tikanga and kawa that is consistent with the principles of Te Mana o te Wai, as articulated in Section 1.3 of the NPSFM, specifically:

- *Mana whakahaere:* being the power, authority and obligations of Ngāti Rangi to make decisions that maintain, protect, and sustain the health and well-being of, and their relationship with, the Mangawhero awa.
- *Kaitiakitanga*: the obligation of Ngāti Rangi to preserve, restore, enhance, and sustainably use the Mangawhero awa for the benefit of present and future generations.
- *Manaakitanga*: the role of Ngāti Rangi as mana whenua to show respect, generosity, and care for the Mangawhero awa and for others.
- *Governance*: the importance of enabling Ngāti Rangi to take greater responsibility and exercise their authority to make decisions about the Mangawhero awa in a way that prioritises the health and well-being of freshwater now and into the future.

An assessment of the relevant objectives and policies contained in the NPSFM can be found in Appendix 3 of this report.

The proposed development meets the requirements of the NPSFM.

5.7 Horizons One Plan

Notified in 2007, the One Plan is the 'one stop shop' resource management planning document for the Horizons Region. It combines the Regional Policy Statement, Regional Plan and Coastal Plan. The One Plan defines how the natural and physical resources of the region, including freshwater, air, productive land and natural ecosystems, will be cared for and managed by the Regional Council in partnership with Territorial Authorities and the community.

The One Plan is separated into two parts as follows:

- Part I is the Regional Policy Statement. It sets out regionally significant resource management issues, and outlines objectives, policies and methods that will address them.
- Part II is the Regional Plan, which includes the rules for natural and physical resource use in the region.

5.7.1 Horizons One Plan Part One

Appendix 3 contains an assessment of the proposed activity against the relevant objectives and policies in Part 1 of the One Plan.

The proposed activity is consistent with these statutory provisions on the basis that the effects on the environment will be minor.

5.7.2 Horizons One Plan Part Two

The proposed activity has been assessed against the provisions of the Horizons One Plan. The trail development process will involve the following activities which are regulated through the One Plan. The proposed activities and relevant One Plan rules are set out below in Table 5.

Activity	Description	Relevant One Plan Rules	Activity Status
Vegetation Clearance	Trail development will involve the removal of indigenous vegetation within areas identified as Threatened or At Risk Habitats.	Rule 13-9 activities in Threatened habitats	Non-Complying Activity
Earthworks	Land disturbance adjacent to waterways.	13-7 vegetation clearance and land disturbance that does not comply with rules 13-1 to 13-6	Discretionary Activity
Bridges and Structures over waterways	Nine bridges will be developed over the Mangawhero Awa and its tributaries.	Rule 17-3 Structures^ and disturbances involving a reach of river^ or its bed^ with Schedule B Values of Natural State, Sites of Significance - Aquatic and Sites of Significance – Cultural Within a reach of river^ or its bed^ with a Schedule B Value of Natural State: The erection, placement or extension of any structure^ in, on, under or over the bed^	Discretionary Activity

		except for lines, cables and ropeways that are suspended above the water^ and do not require a support structure^ in, on, over or under the bed^ of the river^	

TABLE 5 PROPOSED ACTIVITIES AND ASSOCIATED ONE PLAN RULES

5.7.3 Indigenous Vegetation Clearance

As the trail will traverse at risk and threatened habitats, policy 13-4 needs be applied.

13-4 b states that consent must generally not be granted for resource use activities in a *rare habitat**, *threatened habitat** or *at-risk habitat** assessed to be an area of significant indigenous vegetation or a significant habitat of indigenous fauna under Policy 13-5, unless:

i. any more than minor *adverse effects^* on that habitat's representativeness, rarity and distinctiveness, or ecological context assessed under Policy 13-5 are avoided.

ii. where any more than minor *adverse effects^* cannot reasonably be avoided, they are remedied or mitigated at the point where the adverse *effect^* occurs.

iii. where any more than minor *adverse effects^* cannot reasonably be avoided, remedied or mitigated in accordance with (b)(i) and (ii), they are offset to result in a net indigenous *biological diversity^* gain.

Appendix 8 of this report contains an ecological assessment of the proposed trail development. This report has been developed by suitably qualified ecologists who have walked the entire route. The report was also developed with Ngāti Rangi to ensure the matauranga māori lens was applied to the assessment. This report concludes that the effects of the proposed trail development on the habitat's representativeness, rarity and distinctiveness, or ecological context will be less than minor. This is due to the nature of the proposed development, the construction techniques to be used and that the trail is to be developed on previously disturbed areas.

On this basis it is considered that consent can be granted for the disturbance of indigenous vegetation as it will not result in effects that are more than minor, and it is not contrary to the objectives and policies in the Plan.

5.7.4 Earthworks

Rule 13-7 relates to vegetation clearance and land disturbance that does not comply with rules 13-1 to 13-6. 13-7 is specifically triggered due to the proposed earthworks associated with the construction of the proposed bridges, being within 5m of a bed of a permanently flowing river.

Information on the nature of these earthworks and the associated Erosion Control and Sediment Plan is set out in the attached Construction Management Plan (Appendix 11).

5.7.5 Bridges

The proposed trail will involve the development of nine bridges and one boardwalk of note, along the route of the trail. They are described below in Table 6. with their locations shown in Appendix 1. Those bridges marked with an * are to be built in a location where there has previously been a bridge or there are existing structures such as a fence or pipes.

Awa	Name of Bridge	Design	Length	Section of Trail
Mangawhero Tributary	1.2.B	Wooden Sleeper Bridge	6	Section 1

Mangawhero Tributary	Bridge 1.4.B*	Wooden Sleeper Bridge	6	1
Mangawhero Tributary	Bridge 1.6.B*	Wooden Sleeper Bridge	6	1
Wairimu Stream	Wairimu Stream bridge (1.10.B)*	Wooden Sleeper Bridge	8	1
Mangawhero Tributary	New bridge 1.13.B to replace existing bridge*	Wooden Sleeper Bridge	6	1
Mangawhero Awa	Bennett and Punch tramline bridge (3.6.B)*	Old bridge to rebuild	34	3
Mangawhero Tributary	Small Bridge (2.5.B)	Wooden Sleeper Bridge	6	2
-	Boardwalk (2.7.W)	Wooden Boardwalk	17	2
Tutara Stream	Tutara (Serpentine) Stream (2.8.B)	Timber deck bridge	17	2
Mangawhero Tributary	Section 4 bridge (4.3.B)*	Timber deck bridge	19	4

TABLE 6 TE ARA MANGAWHERO BRIDGES

As can be noted from Table 6, most bridges are to be developed at sites that are subject to existing development or are the site of previous bridges. This was done purposefully to minimise disturbance to more pristine areas. This is especially relevant for bridges 3.6.B and 4.3.B which are likely to have the greatest visual impact.

The detailed bridge designs and construction methods are set out in Appendix 11. The bridge designs are typical of walking and cycling bridges used in other parts of the conservation estate throughout Aotearoa. A geotechnical assessment has also been undertaken at key bridge locations to ensure the proposed sites are physically suitable for the construction and ongoing presence of the proposed bridges. This Geotechnical Assessment is attached to this report in Appendix 10.

All bridges will be bank to bank with no disturbance of river beds.

All bridges will be inspected every six years by qualified engineers to ensure they meet appropriate DOC and Building Act standards.

5.8 Resource Consent Activity Status

As noted above, due to the non-compliance with rule 13-9, a **non-complying** resource consent is required. By applying the bundling rule, the consent must be considered under the statutory provisions (notably those set out in Section 5.5.4 of this report) that apply to non-complying activities.

5.9 Ngāti Rangi Claims Settlement Act 2019 – Te Waiū-o-Te-ika

A full assessment of the proposal against the Ngāti Rangi Claims Settlement Act can be found in Appendix 9. This assessment concludes that the establishment of the proposed trail will result in renewed and enhanced

connection and kaitiakitanga which benefits health and wellbeing – physically, spiritually, culturally, and economically. Placing the taiao at the forefront of decision-making minimises the degradation of mouri of the waterways and enables improvements in the ecology and mouri of the surrounding areas. The combined effect is raised individual and community inspiration, sustenance, prosperity, and growth now and for future generations. Holistically speaking, as the mouri of the taiao and mana of individuals and communities will be enhanced, the mana of Te Waiū-o-Te-Ika will be uplifted.

The outcomes of the development of the proposed areas of Te Ara Mangawhero entwine as an integrated management approach to uphold the intrinsic values that represent the essence of Te Waiū-o-Te-Ika, therefore giving effect to Te Mana Tupua and Ngā Toka Tupua.

6 Consideration of Other Relevant Matters

The following are relevant to the determination of the appropriateness of the proposed development.

6.1 Ngāti Rangi Taiao Management Plan, 2014

An assessment of this proposal against the Ngāti Rangi Taiao plan can be found in **Error! Reference source not found.**. This assessment notes the following:

The Te Ara Mangawhero route has been designed to maximise the use of previously disturbed sites/areas and to avoid and minimise the potential for adverse effects on intact indigenous ecosystems. To respect the sensitive nature of the natural landscape the trail construction methodology is based on the wellbeing of the taiao. New opportunities for the control of pest plants and pest animals to complement existing conservation management in the local area will result from the establishment of the trail. There are also opportunities to enhance the recovery of indigenous vegetation within previously disturbed areas. The aim is to build a sustainable trail that blends with the environment, has minimal impact, resists erosion through proper design, and enhances the mouri of the area.

The trail will traverse and showcase a wide range of ecologically and culturally significant forest and river margin habitats on the lower slopes of Ruapehu. Positioning of interpretation is crucial not only to add to the trail experience but also in providing an opportunity for important natural, cultural and historical korero associated with the land and the trail to be told. Enabling recreational access will create connection, health and wellbeing benefits, and enable greater environmental and conservation outcomes.

6.2 Other Strategic Documents

The proposed trail has been recognised through the Accelerate 25 Growth Prosperous Manawatu and Whanganui document and also the 2017 Ruapehu Regional Visitor Development Plan. In both instances the proposed trails have been identified as important initiatives for the region.

The Manawatū Whanganui Economic Action Plan (2016) identified tourism as the critical Ruapehu growth opportunity. Ruapehu is a destination with the natural 'greater outdoors' and nature-based resources, landscapes and assets sought by visitors. The location has good proximity to over three million New Zealanders and is favoured by many New Zealanders as a holiday location of choice, especially for those who are interested in outdoor activities. Ruapehu is also close to the international gateways of Auckland and Wellington Airports.

The proposed trails have been identified in the Ruapehu Regional Visitor Development Plan as one of the five iconic destination-growing and experience investments of immediate importance. These projects are considered by the Ruapehu 400 organisation as capable of delivering substantial regional economic development benefits to Ruapehu and the surrounding areas. The Plan identifies that the proposed trails are likely to result in increased jobs (through trail construction and direct and indirect servicing of users), social inclusion through effective training (as there will be a key focus on developing a local workforce) and enabling Māori to realise their full potential through significant participation in the trail development, operation and servicing.

7 Assessment of Environmental Effects

The matters that must be addressed pursuant to Clauses 6 and 7 of Schedule 4 of the Resource Management Act 1991 are detailed below.

The proposed development is considered to raise the following actual or potential effects on the environment:

- Positive Effects;
- Effects on Landscape and Visual Character;
- Effects on Ecology and Indigenous Vegetation;
- Effects on Recreation and Use

In assessing the actual or potential effects on the environment from the categories listed above, reliance has been placed on the various supporting reports and assessments as outlined throughout the application.

7.1 Positive Effects

The proposal is considered to result in positive effects as set out below:

7.1.1 Recreation Opportunities

There are significant recreation opportunities associated with the development of the trail through trail use. The 2020 Feasibility Assessment for the trail identified that about 7,818 locals are expected to use the full trail in the year after it is completed, increasing to 10,546 by year 10. By year 5, about 35,065 New Zealanders from outside the region are expected to ride the trail, increasing to 40,913 by year 10. Note that these figures are for the full completed trail. The presence of the completed trail will enable approximately 41,000 people to use the trail for outdoor recreational purposes by foot and on bike.

7.1.2 Tourism and Economic Development

The Ruapehu District is at the tail end of the regional development stakes in New Zealand. GDP per capita is 23% below the national average. Nominal GDP dropped from a 2011 peak of $540m to $506m in 2016. The average annual employment growth between 2001 and 2016 was around minus 2%.

Ruapehu's resident 2016 population sits at just over 11,700 persons. This population dropped by more than 17% between 2001 and 2016 and, under a low growth scenario, will decline to under 7000 persons by 2035.

The Manawatū Whanganui Economic Action Plan (2016) identified tourism as the critical Ruapehu growth opportunity. Ruapehu is a destination with the natural 'greater outdoors' and nature-based resources, landscapes and assets sought by visitors. The location has good proximity to over three million New Zealanders and is close to international gateways located at the Auckland and Wellington Airports.

The proposed trails have been identified in the Ruapehu Regional Visitor Development Plan as one of the five iconic destination-growing and experience investments of immediate importance. These projects are considered by the Ruapehu 400 organisation as capable of delivering substantial regional economic development benefits to Ruapehu and the surrounding areas. The Plan identifies that the proposed trails are likely to result in increased jobs (through trail construction and direct and indirect servicing of users), social inclusion through effective training (as there will be a key focus on developing a local workforce) and they will enable Māori to realise their full potential through significant participation in the trail development, operation and servicing.

7.1.3 Ecological

An ecological assessment of the proposed trail has been undertaken by Wildlands Consultants. This is attached as Appendix 7 to this report.

The proposed trail will provide new opportunities for the control of pest plants and pest animals to complement existing conservation management in the local area. Pest animal control stations near the Mangawhero River could provide greater protection for whio. In specific locations, there are also opportunities to enhance the recovery of indigenous vegetation within previously-disturbed areas. The relative ease of access provided by the

trail could improve opportunities for Ngāti Rangi and the local community to engage with conservation activities associated with the trail on the lower slopes of Ruapehu.

7.1.4 Cultural

A cultural assessment undertaken by Ngāti Rangi has been attached to this report in Appendix 7. This report concludes with the following statements in respect to positive effects:

New opportunities for the control of pest plants and pest animals to complement existing conservation management in the local area will result from the establishment of the trail. There are also opportunities to enhance the recovery of indigenous vegetation within previously disturbed areas. The aim is to build a sustainable trail that blends with the environment, has minimal impact, resists erosion through proper design, and enhances the mouri of the area.

The trail will traverse and showcase a wide range of ecologically and culturally significant forest and river margin habitats on the lower slopes of Ruapehu. Positioning of interpretation is crucial not only to add to the trail experience but also in providing an opportunity for important natural, cultural and historical korero associated with the land and the trail to be told. Enabling recreational access will create connection, health and wellbeing benefits, and enable greater environmental and conservation outcomes.

7.2 Ecological and Conservation Effects

This first stage of the Te Ara Mangawhero Trail will require construction of a trail over approximately eight kilometres of previously disturbed ground (tramline, roads, and waterline), including c.300 metres along the margin of Ohakune Mountain Road. An ecological assessment of the proposed trail has been undertaken by Wildlands Consultants. This assessment has been attached as Appendix 7 to this report.

For the purposes of the ecological assessment, the proposed trail has been broken down into five specific sections as follows:

- Section 1a: National Park margin to Mountain Road tramline, *c.*2.3 kilometres
- Section 1b: Mountain Road margin to Mangawhero River, *c.*1.0 kilometre
- Section 2: Campsite to Tutara Stream, *c.*1.8 kilometres
- Section 3: Historic milling clearing, *c.*1.8 kilometres
- Section 4: Tramline to trail end, *c.*1.2 kilometres

These sections are shown on Figure 5.

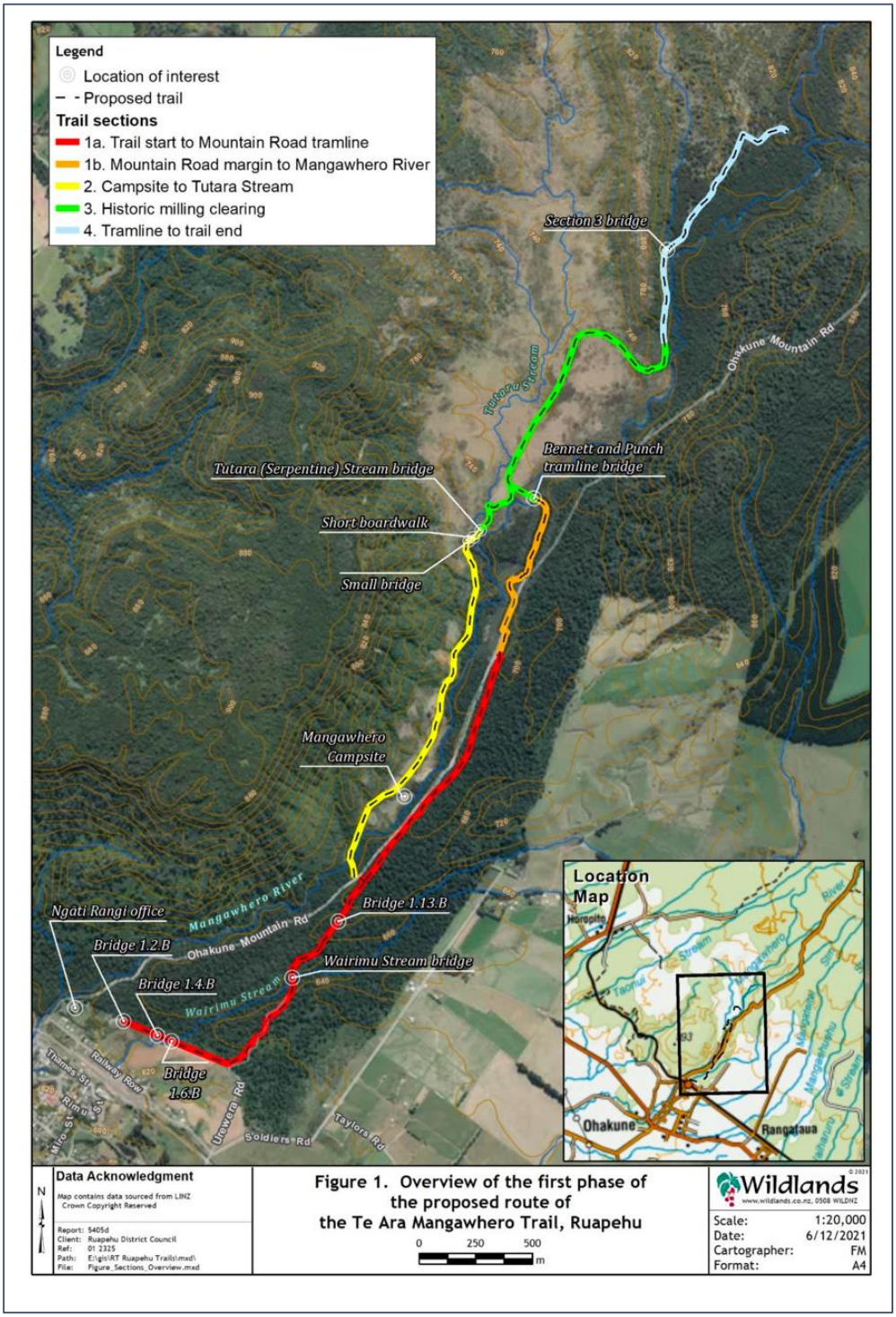


FIGURE 5 ECOLOGICAL ASSESSMENT MAP OF THE PROPOSED ROUTE

The ecological values of habitats within the project area range from very high to low.

Vegetation and Habitat Type	Ecological Value
Section 1a	
A. Rimu-mataī-miro forest B. Existing Mangawhero Forest Walk C. Rimu-mataī-miro/kāmahi forest	Very high
D. Forest margin	Low
Section 1b	
A. Mānuka-horoeka scrub and black beech forest margin B. Mānuka scrub C. Black beech-silver beech forest	Low Low High
Section 2	
A. Sealed Road B. Gravel Road C. Indigenous broadleaved species shrubland D. Black beech forest	Low Low Low Moderate
Section 3	
A. Mānuka shrubland B. Exotic grassland with patches of early successional shrubs C. Indigenous broadleaves species shrubland D. Indigenous broadleaves species scrub	Low Low Low Moderate
Section 4	
A. Black beech-kāmahi-indigenous broadleaved species forest B. Black beech forest with scattered clearings	Moderate

TABLE 7 ECOLOGICAL VALUES OF HABITATS ALONG THE PROPOSED TE ARA MANGAWHERO TRAIL ROUTE

The following vegetation and habitats within the proposed trail route meet the criteria for Threatened or At Risk habitats as defined in Schedule F of the Horizons One Plan[6]:

- Podocarp forest – Threatened (Vegetation and Habitat Type A in Section 1a).
- Podocarp/black beech/mountain beech forest – Threatened (Vegetation and Habitat Type C in Section 1b and Vegetation and Habitat Type B in Section 4).
- Podocarp/kāmahi forest – At Risk (Vegetation and Habitat Type C in Section 1a).
- Riparian margin – At Risk (at proposed bridge locations).

Potential ecological effects of constructing the first stage of the proposed Te Ara Mangawhero Trail on these areas could include the following:

- Vegetation clearance
- Construction effects on indigenous fauna
- Damage to adjacent vegetation
- Construction disturbance
- Erosion, sedimentation, and changes in hydrology
- Creation of a corridor for the movement of pest plants and animals

[6] Horizons One Plan, Schedule F: Indigenous Biodiversity.

The report outlines opportunities to avoid or minimise these potentially adverse ecological effects in Section 11 of the report. Those matters set out in Section 11 have been included in the CMP (attached in Appendix 11) to ensure that those potential effects are appropriately avoided or mitigated to an appropriate level.

Section 12 of the ecological report notes that potential ecological effects of the construction and subsequent use of this stage of the Te Ara Mangawhero Trail can be less than minor, subject to the use of good techniques to avoid and minimise potential adverse effects. Formation of the trail will nevertheless require the clearance of a corridor of vegetation within Tongariro National Park and some disturbance of indigenous fauna. Ecological effects of the development and ongoing use of the trail can be mitigated by undertaking activities that will enhance the ecological integrity of the high-quality, diverse indigenous ecosystems that are present. Section 12 includes a set of recommendations to further mitigate the potential effects, including implementing a pest plant management plan, implementing pest animal control and restoration planting. The Applicant will be undertaking these actions as part of managing the trail, but also in their role as kaitiaki of the area where the proposed trail is to be developed.

The ecological report concludes that the proposed trail route will primarily utilise previously-disturbed areas/sites, associated with the Bennett and Punch logging tramlines, existing roads and tracks, and the Ohakune Water Supply pipeline, to minimise the potential for adverse ecological effects on adjacent intact indigenous ecosystems. This will ensure that the clearance of larger indigenous trees can be avoided. Within the trail corridor, clearance of indigenous vegetation will be limited to the understorey species and smaller trees that have established following disturbance in the last 80 years or so. Retention of larger trees will enable potential effects on indigenous fauna to be avoided or minimised. Appropriate sensitive construction techniques and sediment management will be important, in particular to avoid adverse effects on aquatic fauna and whio at each of the nine bridge locations. With appropriate management, all of the potential ecological effects of this stage of the proposed Te Ara Mangawhero Trail can be avoided or reduced to less than minor.

The report also states that the proposed trail will provide new opportunities for the control of pest plants and pest animals to complement existing conservation management in the local area. Pest animal control stations near the Mangawhero River could provide greater protection for whio. In specific locations there are also opportunities to enhance the recovery of indigenous vegetation within previously-disturbed areas. The relative ease of access provided by the trail could improve opportunities for Ngāti Rangi and the local community to engage with conservation activities associated with the trail on the lower slopes of Ruapehu.

7.3 Cultural Effects

A cultural assessment undertaken by Ngāti Rangi has been attached to this report in Appendix 7**Error! Reference source not found.**. This report concludes with the following statements:

Ngāti Rangi has been proactively involved with Te Ara Managwhero since its inception. Given we will be responsible for construction and kaitiakitanga of ongoing management and maintenance we are satisfied cultural impacts have either been mitigated or can be managed.

We won't speak on other tribes' behalf, yet we acknowledge the interests of our whānaunga. Given the location for the development of Te Ara Mangawhero, Ngāti Rangi deems it appropriate for Ngā Waihua o Paerangi Trust to apply for approvals to build, manage and maintain the trail.

On this basis it is considered that the proposed trail is appropriate to be developed in respect to the important cultural values of the site.

7.4 Recreation Effects

The recreation effects associated with the development of the trail were considered during the partial amendment of the TNPMP which identified the trail in the Plan. That assessment informed the decision to amend the TNPMP and provide for the development of a shared use trail.

The effects on existing recreation users in the Park have been considered in the design of the trail. As noted above, overall the recreation effects are expected to be positive, however there are potential conflict issues that could arise. This conflict could be between users of the proposed trail and users of existing walking trails where they overlap.

These conflicts can be addressed through a combination of trail design and signage. The alignment of the trail with the historic tramway, with existing roads and tracks and with existing pipelines will mean there are generally good sightlines along the trail. Trail users will have good visibility of other users who may be travelling along the trail in the same or opposite direction. The grade 2 trail standards also mean there will be a low gradient and a generally wide trail which will enable passing and facilitate multidirectional use. This is an important factor as it means users are expecting to encounter others, generally altering their behaviour so they are using the trail in a more cautionary manner.

The nature of the trail and the surrounding environment is also conducive to positive use. As an easy grade trail with high scenic qualities, the trail provides for a more relaxed rider approach rather than a faster experience that may be found on purpose-built mountain bike trails. This is similar to other parts of the M2C trail and also a similar experience to that found on the Timber Trail.

It will be important for signage to be placed at key parts of the trail, including junctions, to reinforce the status of the trail as shared use, and reminding all users to share with care. Signage will be couched in positive terms to facilitate positive use.

At intersections with walking trails, there will be signage and structures to direct people on bikes off those trails. Those sections of trail that are shared with the existing walking trails are straight with good sightlines and will be widened to facilitate shared use.

Toilets are already provided at key points along the route of the trail. There are toilets on the OMR at the entrance to the Park and Trail as well as located at the campground. These toilets are considered adequate to cater to users of the Phase 1 trails. Additional toilets will be developed at key locations along the trail in the further phases of the trail development process. These toilets and potential future amenity development at the trail entrance will reduce the loading on those existing toilets.

It is anticipated that while some trail users will start their journey at the proposed start of Phase 1 of the trail, others will ride (or walk) from or to locations within Ohakune itself.

Additional development is proposed by Ngāti Rangi at the start of the trail which will provide a more formal gateway and associated parking and transport etc facilities at the start of the proposed trail. This project is being progressed in parallel to the proposed trail and is being planned in a collaborative fashion with the Department. That project will be progressed via separate permissions as they fall outside of TNP.

The start of the proposed trail has been designed to not interfere with existing DOC operations and connects to the existing Old Coach Road section of the M2C trail as well as Ohakune itself.

7.5 Visual effects

A landscape assessment was undertaken by Richard Hart in 2017 to inform the TNPMP amendment process. This assessment is attached as Appendix 13. Mr Hart's assessment was for the wider trail. In 2020 Mr Hart provided additional advice to support the permissions process that focused on the alpine sections of the trail (which do not form part of this application) "…because it is considered to be the most sensitive in terms of natural character and landscape".[7] The 2020 report did however contain broad guidance on trail development with respect to landscape and visual effects. This guidance has been used to inform the final route of the trail and the CMP.

Generally speaking, the lower sections of the trail will not have a wide viewing catchment. This is due to the amount of vegetation present and also the easy terrain. Within the forested sections, the trail will not be visible from the wider landscape. The trail is to be designed to utilise existing features such as tramlines, and will have a natural finish. The trail will not be traversing steep terrain meaning no unnecessary cuts or excavations are required for its construction. In most cases the viewing audience for the trail will be trail users themselves. The trail will be visible from the Ohakune Mountain Road and existing walking trails where intersected by the trail.

Section 4 of the trail will be traversing an open area. This area is an old farmed area where trail development is "…likely to have few if any adverse landscape effects"[8]. In this location, the trail will follow the old Bennett and Punch tramline with no high structures elevating its appearance above the vegetation. There is scattered shrubland within this area that will break up the trail when viewed from the elevated plateau at the northern end of that section of the trail.

Nine bridges will need to be developed as described in Section 3.5 this report. These structures are likely to have the greatest visual impact of the proposed development given their size and location over waterways. As noted, only two of the bridge locations will be located where there has not been a bridge or structure previously. The two largest bridges over the Mangawhero awa will be located where there have previously been bridges. In the case of Bridge 3.6.B the concrete piers of the original bridge is planned to be used. Bridge locations have been chosen to avoid disturbances in areas that are considered to be pristine. Previously disturbed areas have been prioritised to reduce any unnecessary ecological, visual or cultural effects. The bridges themselves will be wooden and similar in style to other bridges used within the Tongariro National Park. The visual effects of these bridges will be limited to the surrounding area and will only be visible to trail users. Construction from wood (as opposed to concrete or steel) will mean the visual prominence of the structure will soften over time as the timber weathers.

Pages 25 to 27 of Mr Hart's 2017 report consider the visual effects of the Phase 1 trails. Mr Hart notes the following on page 27:

"In practice landscape effects of this proposed trail are likely to be minor as this section of the park is relatively inaccessible and not within general public view. Potential effects of vegetation clearance and track construction are likely to be localised. Any adverse effects will be predominantly on natural character.

Further investigation of the landscape effects of this track may be warranted prior to construction, and as part of the developed and detailed design. Triggers for an assessment would be the need for significant earthworks or structures, or adverse effects on the vegetation or ecology. Effects on natural character will be better informed

[7] Landscape protocols for the Turoa alpine section of the Ruapehu trails, R Hart. 2020

[8] Tongariro National Park Management Plan Review – Landscape opinion, R Hart 2017

by the ecological assessment. This is not yet available. I expect this trail to open parts of the park not currently available for general use, education and enjoyment, so there may be benefits in terms of public access to the natural environment."

There are no significant earthworks that would change the topography of the area proposed as part of the development. The key structures will be bridges. These are predominantly located at sites of prior development. As noted in section 10.7 of the ecological assessment (Appendix 8), an increased number of people using the trail corridor following completion of the trail could create some further increased noise within the landscape. Noise and physical disturbance may have some effects on resident indigenous birds, however, based on similar trails, the overall effects of increased human activity and the effects of the development on the environment along the proposed trail route are anticipated to be less than minor.

7.6 Historic Effects

The proposed trail has been assessed by Paul Mahoney who is a Senior Heritage Advisor with the Department of Conservation. This assessment included a field inspection on 17 November 2021. This field inspection confirmed his views stated in his initial 2015 assessment (Appendix 12) in relation to the Bennett and Punch Tramway, which was that it is a fairly typical bush tram route that will be brought to life if it is developed as a cycleway. This is provided that the suggested heritage protection rules are followed. Conversely, it was noted that if the route is not developed it is likely that the tramway route will be totally lost due to regrowth and slips.

The relevant heritage protection rules set out in Appendix 12 are:

I. The initial clearance of the tram route is minimal to provide access for a heritage inspection
II. Heritage inspection is done by an experienced person to create a map, a GPS record and to understand heritage features
III. During restoration work, maintain the character of the tramline; stick to the route; don't widen the cuttings
IV. Drainage culverts may be installed
V. The remaining wooden sleepers and bridge beams are not practical to preserve
VI. Any objects discovered should be photographed and left where they are while the image is sent for identification
VII. Any major artefacts like log bogies and rails should be saved for possible restoration (note none found in route survey November 2021)
VIII. In particular the train wreck should be stabilised as a key point of interest

These rules have been incorporated into the CMP.

7.7 Water Quality and effects on the awa

The ecological assessment (Appendix 8) identifies potential effects on waterways and aquatic habitat of the proposed development as follows:

"Erosion and sedimentation could have major ecological effects but, with appropriate construction techniques and management, these effects can be reduced to no more than minor."

The ecological assessment recommends a number of opportunities to avoid or minimise potential adverse ecological effects in section 11. These include minimising erosion and sediment run-off and effects on aquatic fauna. These 'opportunities' have been included into the CMP to ensure that there are no effects on the awa.

Bridge 2.8.B is located on the Tutara stream downstream of the water take for Ohakune. There are no bridges above the intake structure so there will be no effects on the Ohakune drinking water.

7.8 World Heritage

Tongariro National Park is one of only 29 sites in the world with dual World Heritage status. In 1990 it received World Heritage status for its natural landscape values and in 1993, under a criteria change, the special significance of the Park's mountains and cultural landscape to the Tūwharetoa and Whanganui people was recognised.

Normally, proposals within World Heritage sites are assessed against the 'statement of universal values' for the site, however the statement for this site is still being developed. In these circumstances, the proposal will need to be assessed against the values as described at the time of nomination and the natural and cultural criteria under which these sites have gained status. These are contained in the following two nomination documents:

Nomination of Tongariro National Park New Zealand for inclusion in the WORLD HERITAGE LIST, prepared for the World Heritage Committee by the Department of Lands and Survey, New Zealand, December 1986.

- Nomination of Tongariro National Park by the Government of New Zealand for inclusion in the WORLD HERITAGE CULTURAL LIST, May 1993
- Where proposals have the potential to impact on the values of World Heritage sites, the proposal needs to be referred to the World Heritage Centre.

On review of the World Heritage nomination documents, the values the Park was nominated for are the volcanic landscapes in the Park and the significant cultural associations and importance of the mountains to Māori. Assessments would be undertaken of the cultural, landscape and ecological values of the Park to understand the potential impact of the proposal on these values that make the Park globally important.

The development of the trail is likely to have a very localised visual effect and would not impact on the macro landscape features of the Park. Given the scale of the work proposed, the development will not have a large visual impact greater than any other trail in the Park.

The Applicant does not anticipate that the trail will adversely impact on the important iwi values and associations. This is primarily due to the involvement of local iwi throughout the process, including in route selection.

The trail will still need to be developed in a manner that respects iwi values, so a cultural impact assessment is recommended as part of the works approval process. The storytelling component of the trail provides an opportunity for local iwi to tell their stories first hand, allowing users of the area to have a better understanding of the important cultural values that are recognised by the Park's World Heritage status.

It is important to note that UNESCO advocates for buffers to World Heritage sites to ensure that adjacent development does not impact on the values that make these locations important[9]. The decision not to widen the carriageway of the Ohakune Mountain Road to accommodate walkers and bikers has meant that environmental damage to an area surrounded by the World Heritage area has been avoided.

[9] World Heritage Papers 25. World Heritage and Buffer Zones: International Expert meeting on World Heritage and Buffer Zones. Davos, Switzerland March 2008.

7.9 Use of Helicopters

The use of helicopters is not likely to have any associated adverse effect on the values of the Park or on other park users. The Helicopters will be working in areas which are not generally accessible to public.

7.10 Effects Summary

Overall, the adverse effects of the proposal are expected to be minor. The activity has the potential to result in positive effects on ecological values, to enhance the recreational offerings, and to enable social and economic effects to ensue.

8 Consultation and Engagement

There has been significant engagement by the Applicant with key stakeholders throughout the planning and design of this development. The following section sets out the nature of this engagement.

Letters of support from stakeholders can be found in Appendix 14.

8.1 Iwi

The following iwi have associations to this area and have been engaged with throughout the planning for the trail and the development of the permissions applications.

8.1.1 Ngāti Rangi

Ngāti Rangi as Applicant supports the development of the trail.

8.1.2 Ngāti Uenuku

Ngāti Uenuku have been engaged with throughout the process and are not opposed to the project. They will provide feedback directly to the relevant statutory authority.

8.1.3 Ngāti Haua

Ngāti Haua have been engaged with and are not opposed to the project. They will provide feedback directly to the relevant statutory authority.

8.2 Department of Conservation

Ngāti Rangi has worked with the Department of Conservation throughout the development of these applications. This has included weekly hui with local DOC staff to update them on the progress of the project and planning.

A formal view on the project from the Department will come through their decision on the works approval and concession applications.

8.3 Other Parties

The following parties have also been engaged with in the planning and design of the project. All have provided written support for the project. These letters of support can be found in Appendix 14

- Visit Ruapehu
- Ohakune Inc.
- New Zealand Cycle Trails Inc
- Ruapehu Mountain Bike Club
- National Park Business Association
- Mountains to Sea Trust
- Ngā Haerenga New Zealand Cycle Trails
- Ruapehu District Council

The project team has also kept representatives from UNESCO World Heritage, Forest and Bird New Zealand and Federated Mountain Clubs up to date on the project, including providing them a copy of the Wildlands Ecological Assessment. Initial comments from these parties highlighted the need to ensure that the important ecological values of the area are protected.

9 Notification

As noted in Sections 4 and 5 of this report, the concept of a shared use trail in this location was publicly discussed through the partial review of the Tongariro National Park Management Plan. That process included a public submission process and public hearings. That process essentially agreed the concept of the trail while this notification looks at the detail of the trail development and management and associated effects.

9.1 Concession Notification

The Conservation Act 1987 section 17SC specifies that the Minister must publicly notify every application for—

1. (a) A lease; or
2. (b) A licence for a term (including renewals) of more than 10 years.

As the application is for a period of greater than 10 years it must be publicly notified by the Department.

9.2 Works Approval Notification

As the proposed physical works result in permanent infrastructure over 100m2 and are outside of the amenities area then the approval needs to be considered as a 'major' application as per policy 4.1.16.3. As the application is of a scale which necessitates the development of an EIA then it will have to be notified as per policy 4.1.16.9.

9.3 Resource Consent Public Notification

Under Section 95A of the RMA the resource consent application is not precluded from public notification.

Section 95A specifies that a consent application must be publicly notified if it is required to be publicly notified by the District/Regional Plan or a rule in a NES, or the Council decides that the activity will have or is likely to have adverse effects on the environment that are more than minor (in accordance with Section 95D), or the Applicant requests public notification. The Applicant is not requesting public notification and public notification is not required by the Regional Plan or a NES rule.

Section 95D(a) requires Council to disregard any effect on persons who own or occupy land on which the activity will occur or any land adjacent to the subject site. Also Section 95D(b) allows Council to disregard the effects related to the permitted baseline.

As discussed in Section 7 of this report, it is considered that the effects of the proposal are less than minor. There are no special circumstances that necessitate public notification and public notification will be undertaken by the Department of Conservation for the concession application.

9.4 Resource Consent Limited Notification

Section 95B specifies the criteria for limited notification of resource consent applications. The proposal is not precluded from limited notification by the Regional Plan or a NES rule.

Under Section 95E Council must determine whether any persons are affected, including protected customary rights groups or persons who have a statutory acknowledgment over the area of the proposal. In this instance the Applicant is Ngāti Rangi and the project is to be carried out within an area of importance to Ngāti Uenuku and Ngāti Haua (see section 8.1) who are aware of the proposed development.

Under Section 95E(1) of the RMA a person is considered affected in relation to an activity if the activity's adverse effects on the person are minor or more than minor (but are not less than minor). The proposed

development is within Crown land managed by the Department of Conservation and Ruapehu District Council. The interests in these lands and the people who use them is represented by these parties. RDC have provided written support for the project which is attached in Appendix 14 of this report. The view of the Department of Conservation will be through their statutory processes under the Conservation and National Park Acts. As noted above, this will involve a notified process whereby members of the public will be able to provide comment on the appropriateness of the proposed development. The Department's process will be considering the effects of development on ecological (terrestrial and aquatic), historic, cultural and recreational values of the site. Notification of the resource consent application will be duplicating this process and in this case, notification of the application is not considered necessary.

10 Conclusion

A concession, works approval and resource consent are sought by Ngāti Rangi for the establishment of a shared use trail and associated structures within Tongariro National Park.

This trail will be an extension of the Mountains to Sea Great Ride.

The proposed development has been considered against a number of statutory documents relevant to the permissions sought. This assessment has shown that the proposed development will be generally consistent with the requirements set out in those documents.

A number of technical assessments have also been undertaken and summarised in this report. These assessments note that the effects of the proposed development on the environment and values of the site are anticipated to be less than minor.

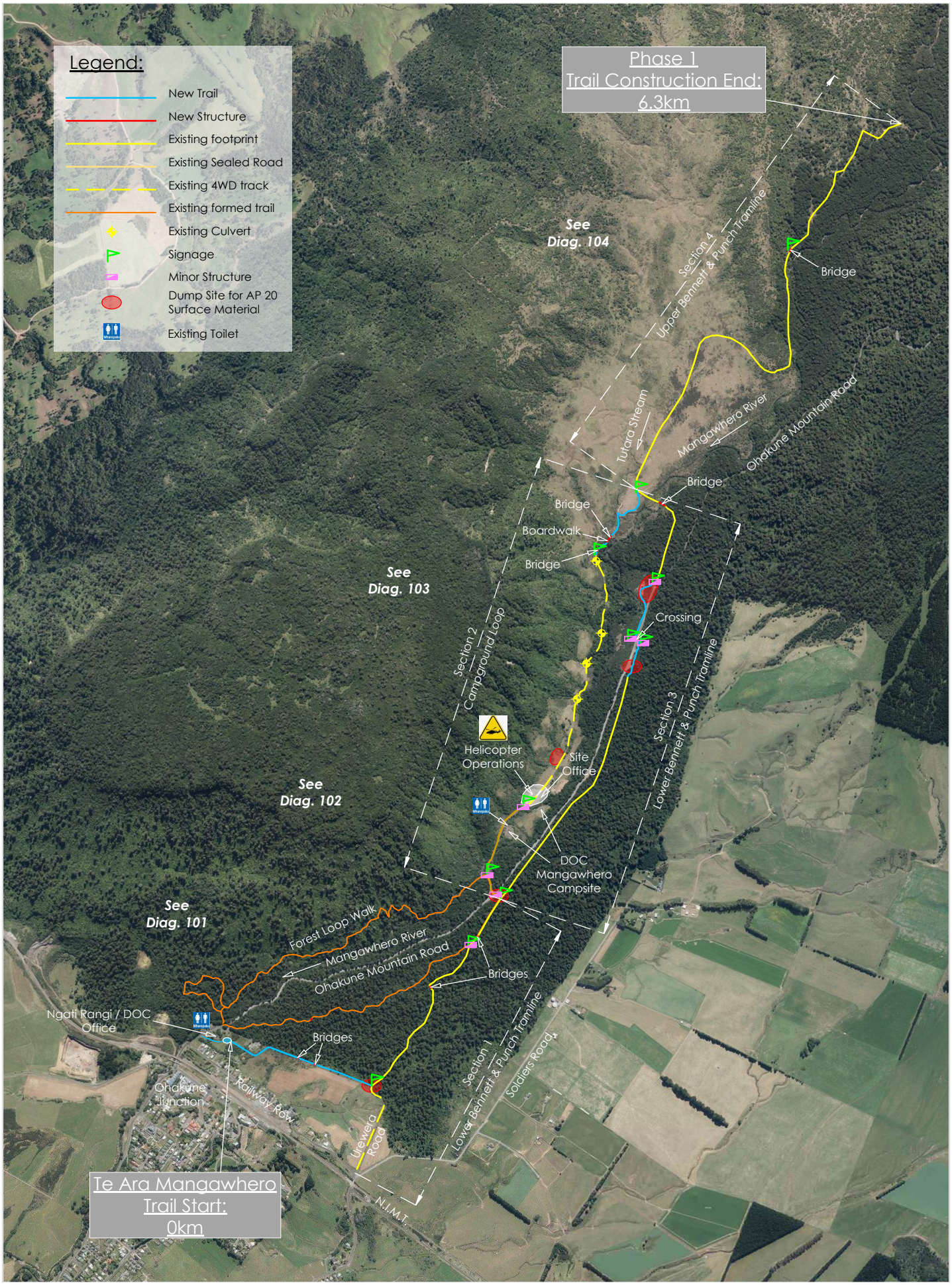
We certify that the information contained herein is in accordance with the requirements of the Resource Management Act 1991 and that the Applicant has a legal obligation to comply with any Conditions imposed should the Application be approved and given effect to.

Rowan Sapsford

Roam Consulting Limited

Saturday, 23 July 2022

Appendix 1. Route of Proposed Trail (Phase 1 Sections)



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Rev	Date	Amendment	By	Chk	App
G	06/07/2022	Trail Start	CJO	DS	DS
F	01/07/2022	Trail Start	CJO	DS	DS

Project Title
Ruapehu WorX Limited:
Te Ara Mangawhero Trail

Drawing Title
Phase One Construction
Trail Sections Overview

Surveyed	J.Brown & P.Carr	Aug-Sept 2021	JB
Designed	C.J.Olmi	14/09/21	CJO
Drawn	C.J.Olmi	14/09/21	CJO
Checked	D.Sherrit	14/09/21	DS
Approved	D.Sherrit	29/10/21	DS

Status: INFORMATION

Scale A3: 1:15000 | A3

Drawing Number: 210700-100 | Rev: G

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Rev	Date	Amendment	By	Chk	App
G	06/07/2022	Trail Start	CJO	DS	DS
F	01/07/22	Trail Start	CJO	DS	DS

Project Title
Ruapehu WorX Limited:
Te Ara Mangawhero Trail

Drawing Title
Phase One Construction
Trail Section Detail

Surveyed	J.Brown & P.Carr	Aug-Sept 2021	JB
Designed	C.J.Olmi	14/09/21	CJO
Drawn	C.J.Olmi	14/09/21	CJO
Checked	D.Sherrit	14/09/21	DS
Approved	D.Sherrit	29/10/21	DS

Status INFORMATION

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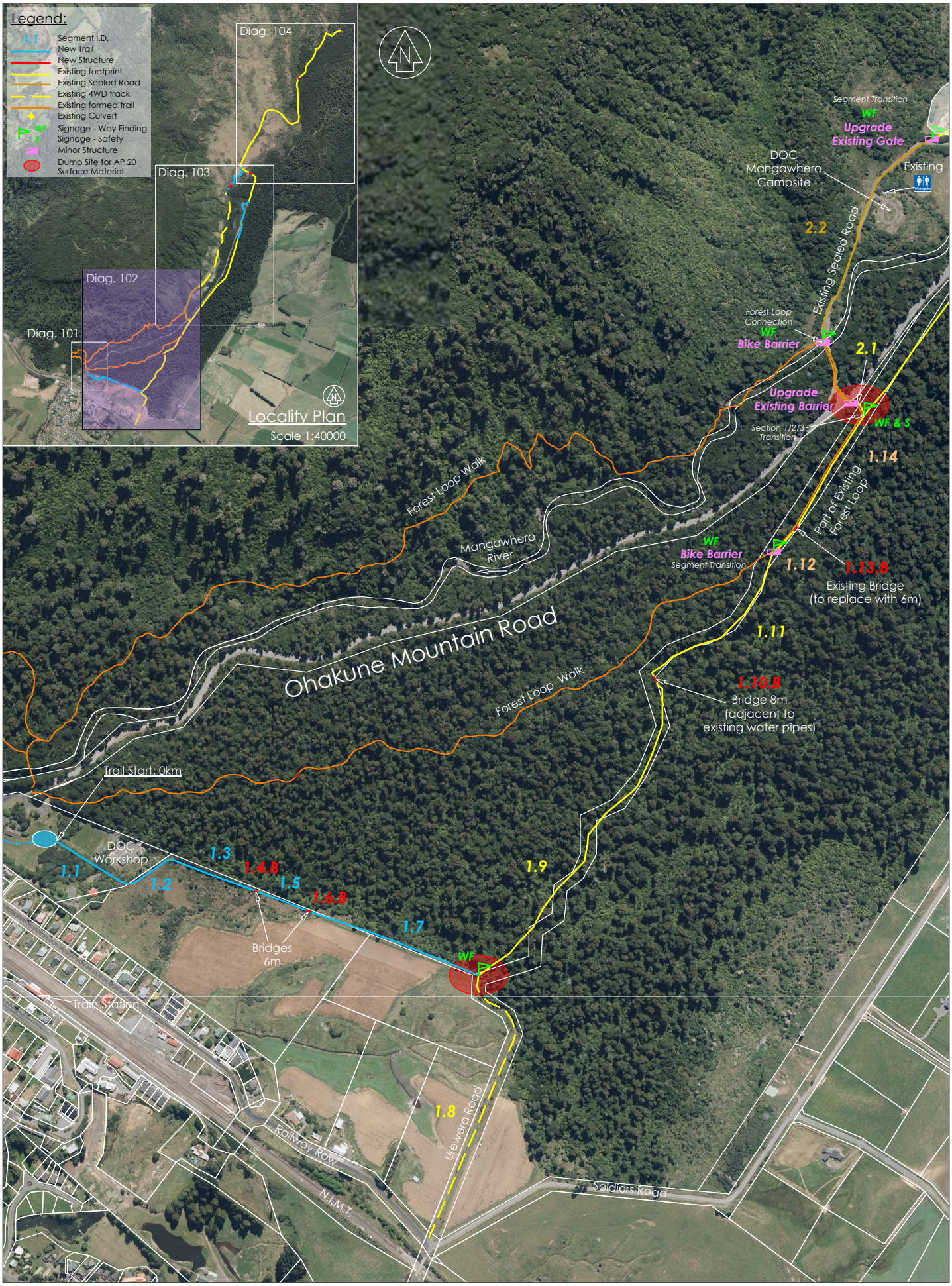
Drawing Number 210700-101 | Rev G



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Rev	Date	Amendment	By	Chk	App
G	06/07/2022	Trail Start	CJO	DS	DS
F	01/07/2022	Trail Start	CJO	DS	DS

Project Title
Ruapehu WorX Limited:
Te Ara Mangawhero Trail

Drawing Title
Phase One Construction
Trail Section Detail

Surveyed	J.Brown & P.Carr	Aug-Sept 2021	JB
Designed	C.J.Olmi	14/09/21	CJO
Drawn	C.J.Olmi	14/09/21	CJO
Checked	D.Sherrit	14/09/21	DS
Approved	D.Sherrit	29/10/21	DS

Status INFORMATION

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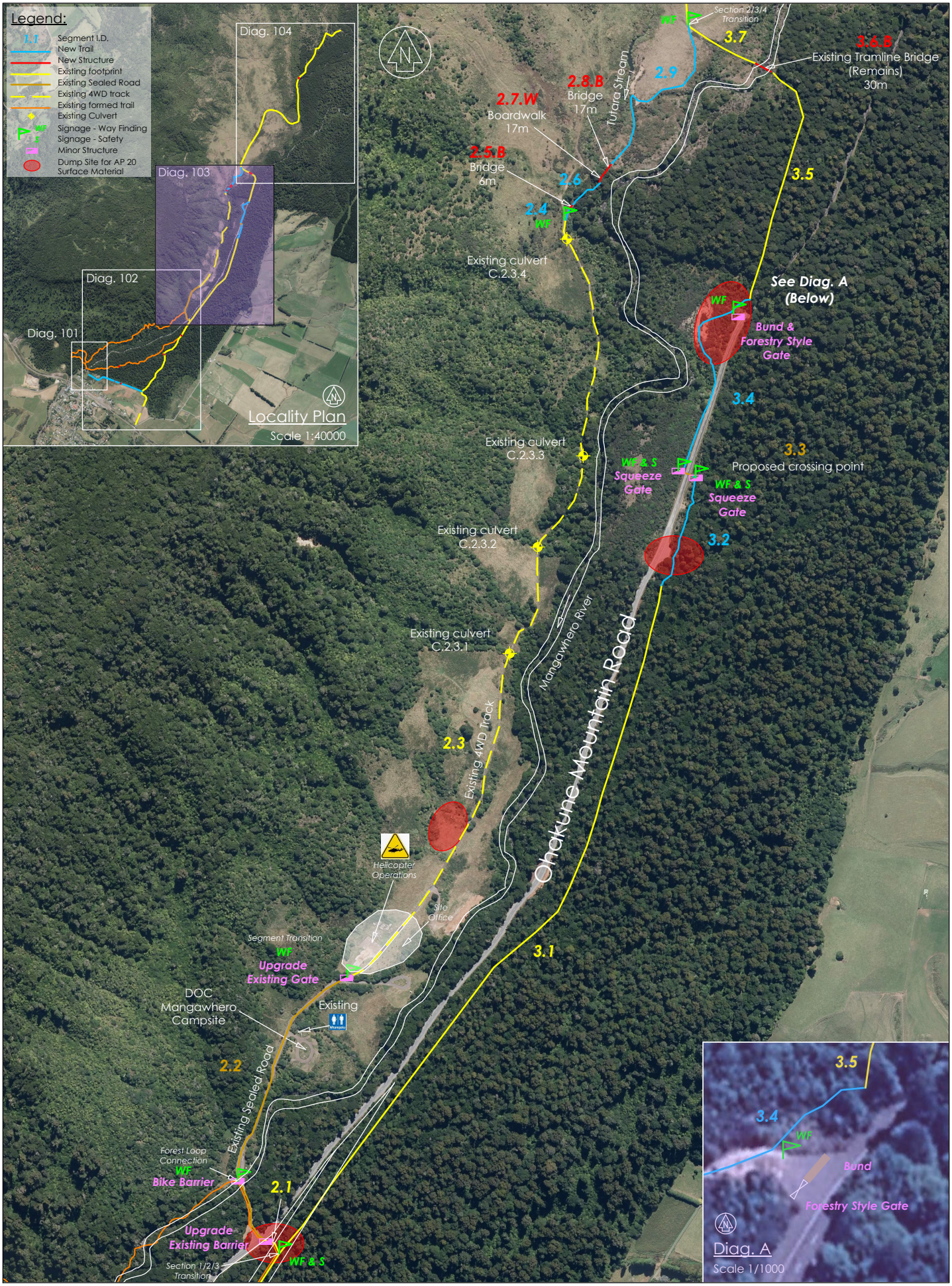
Drawing Number 210700-102 | Rev G



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Rev	Date	Amendment	By	Chk	App
E	11/04/22	WC Revision	CJO	DS	DS
D	09/03/22	Start & Dump sites	CJO	DS	DS
C	26/11/21	Signage & Minor Structure	CJO	DS	DS
B	18/11/21	Phase One Construction	CJO	DS	DS
A	29/10/21	Information	CJO	DS	DS

Project Title
Ruapehu WorX Limited:
Te Ara Mangawhero Trail

Drawing Title
Phase One Construction
Trail Section Detail

Surveyed	J.Brown & P.Carr	Aug-Sept 2021	JB
Designed	C.J.Olmi	14/09/21	CJO
Drawn	C.J.Olmi	14/09/21	CJO
Checked	D.Sherriff	14/09/21	DS
Approved	D.Sherriff	29/10/21	DS

Status **INFORMATION**

Scale A3 1:5000 | A3

Drawing Number 210700-103 | Rev E

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Rev	Date	Amendment	By	Chk	App
C	11/04/22	WC Revision	CJO	DS	DS
B	18/11/21	Phase One Construction	CJO	DS	DS
A	29/10/21	Information	CJO	DS	DS

Project Title
Ruapehu WorX Limited:
Te Ara Mangawhero Trail

Drawing Title
Phase One Construction
Trail Section Detail

Surveyed	J.Brown & P.Carr	Aug-Sept 2021	JB
Designed	C.J.Olmi	14/09/21	CJO
Drawn	C.J.Olmi	14/09/21	CJO
Checked	D.Sherriff	14/09/21	DS
Approved	D.Sherriff	29/10/21	DS

Status INFORMATION

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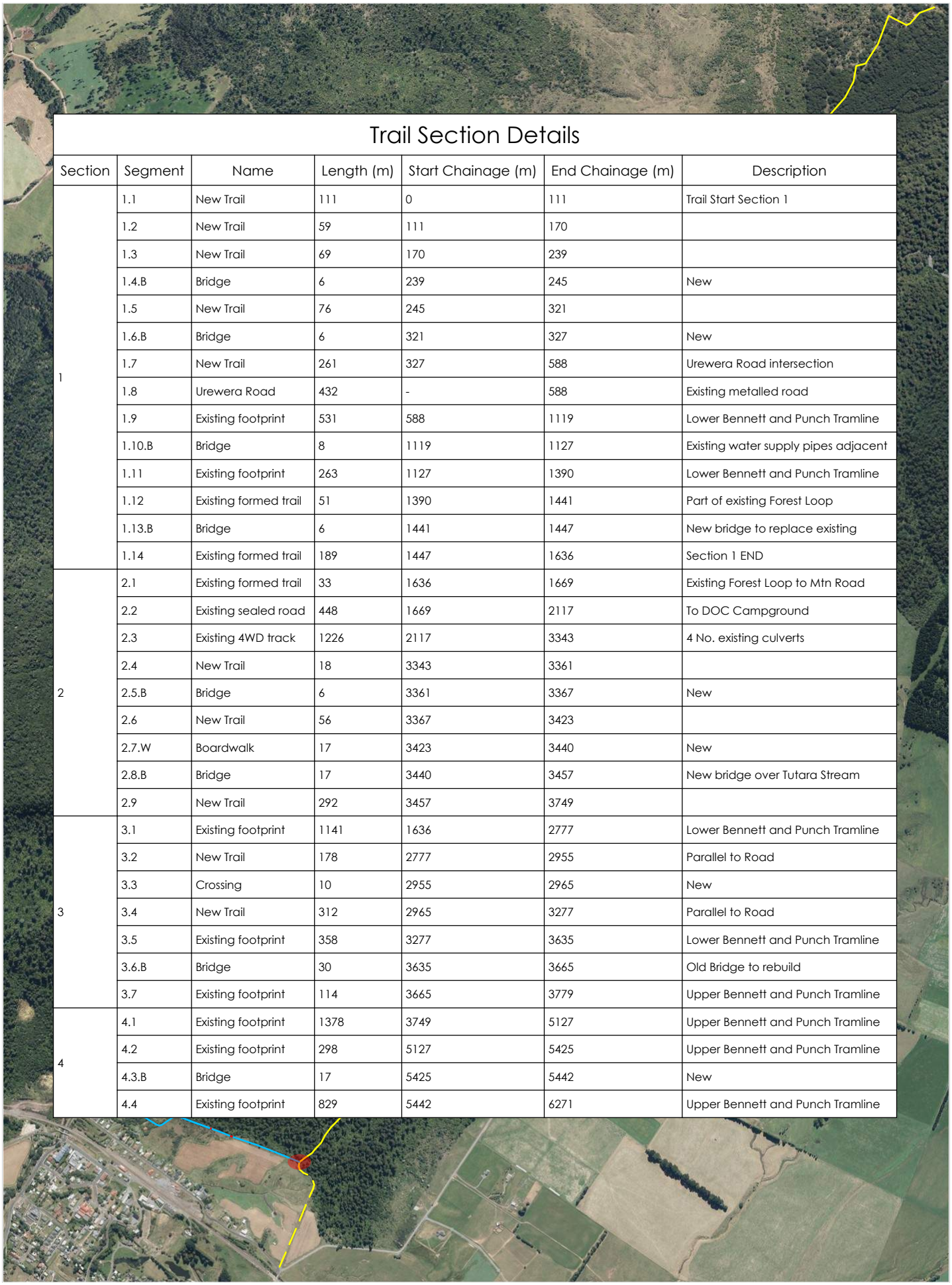

Trail Section Details

Section	Segment	Name	Length (m)	Start Chainage (m)	End Chainage (m)	Description
1	1.1	New Trail	111	0	111	Trail Start Section 1
	1.2	New Trail	59	111	170	
	1.3	New Trail	69	170	239	
	1.4.B	Bridge	6	239	245	New
	1.5	New Trail	76	245	321	
	1.6.B	Bridge	6	321	327	New
	1.7	New Trail	261	327	588	Urewera Road intersection
	1.8	Urewera Road	432	-	588	Existing metalled road
	1.9	Existing footprint	531	588	1119	Lower Bennett and Punch Tramline
	1.10.B	Bridge	8	1119	1127	Existing water supply pipes adjacent
	1.11	Existing footprint	263	1127	1390	Lower Bennett and Punch Tramline
	1.12	Existing formed trail	51	1390	1441	Part of existing Forest Loop
	1.13.B	Bridge	6	1441	1447	New bridge to replace existing
	1.14	Existing formed trail	189	1447	1636	Section 1 END
2	2.1	Existing formed trail	33	1636	1669	Existing Forest Loop to Mtn Road
	2.2	Existing sealed road	448	1669	2117	To DOC Campground
	2.3	Existing 4WD track	1226	2117	3343	4 No. existing culverts
	2.4	New Trail	18	3343	3361	
	2.5.B	Bridge	6	3361	3367	New
	2.6	New Trail	56	3367	3423	
	2.7.W	Boardwalk	17	3423	3440	New
	2.8.B	Bridge	17	3440	3457	New bridge over Tutara Stream
	2.9	New Trail	292	3457	3749	
3	3.1	Existing footprint	1141	1636	2777	Lower Bennett and Punch Tramline
	3.2	New Trail	178	2777	2955	Parallel to Road
	3.3	Crossing	10	2955	2965	New
	3.4	New Trail	312	2965	3277	Parallel to Road
	3.5	Existing footprint	358	3277	3635	Lower Bennett and Punch Tramline
	3.6.B	Bridge	30	3635	3665	Old Bridge to rebuild
	3.7	Existing footprint	114	3665	3779	Upper Bennett and Punch Tramline
4	4.1	Existing footprint	1378	3749	5127	Upper Bennett and Punch Tramline
	4.2	Existing footprint	298	5127	5425	Upper Bennett and Punch Tramline
	4.3.B	Bridge	17	5425	5442	New
	4.4	Existing footprint	829	5442	6271	Upper Bennett and Punch Tramline

Appendix 2. 2020 Feasibility Assessment

Proposed Ruapehu Trails Feasibility Assessment

Prepared by Roam Consulting for:
Ruapehu District Council

ROAM

Issued 31 March 2020

Disclaimer:

This document has been prepared using information and data that is sourced from external documents and information from third parties. Where possible, we have attempted to verify the accuracy of this material but accept no responsibility or liability for any inaccuracies or omissions from that material that may affect the accuracy of the assessment or recommendations made in this report. It should not be construed that we have conducted an audit of any of the information used in this report or any of the individuals, companies or organisations consulted during the course of preparing the document.

We reserve the right, but are under no obligation, to revise or amend our report if any additional information (particularly as regards the assumptions we have relied upon) which exists on the date of our report but was not drawn to our attention during its preparation, subsequently comes to light.

Final Report issued to Client: 31 March 2020

Report prepared by: Rowan Sapsford (BREP, Dip Rural)

Director – Roam Consulting Limited

Acknowledgements

I would like to acknowledge the contributions of the following people for their assistance and input into the development of this report.

Peter Masters, Peter MacFarlane, Chad Hooten, Murray Wilson, Dave Bamford, Jonathan Kennett, Warren Furner, Don Cameron, Gerry Dance, Mark Walter, Fil Ranga, Tim Borren, John Hutchings, Libby O'Brien, Connie Norgate, Dean Sherritt, Ross Copland, Deirdre Ewart, Marion Ross, Julian Tovey, Jonno Maxwell, Bhrent Guy

Ehara taku toa i te toa takitahi engari, he toa takitini

Executive Summary

Extensions to the Mountains to Sea Great Ride have been proposed by Ruapehu District Council, in conjunction with key partners including the Department of Conservation, Ngāti Rangi, Uenuku and the emerging Ruapehu Trails Trust.

Funding is to be sought from central government to develop two new sections of the Mountains to Sea Great Ride, being the Te Ara Mangawhero trail and the Missing Link trail. These trails will add an additional 43 km of trail and work towards providing an unbroken linked trail from the mountains to the sea.

	Te Ara Mangawhero	Missing Link Trail – Horopito to The Last Spike
Description	Situated on the flanks of Mt Ruapehu within the Tongariro National Park dual World Heritage area, it is an easy grade mountain bike trail from Turoa to Ohakune and Horopito. Includes alpine, sub alpine and forested areas. Connects to Old Coach Road and proposed Missing Link.	An easy grade mountain bike trail that skirts the base of Mt Ruapehu from Horopito to the Last Spike Memorial. It traverses native bush areas, wetlands and forested valleys. It will include two remarkable bridges that reflect the histories of the area.
Distance	32km	11km
Grade	Grade 2-3	Grade 1-2
Build Cost	$4,993,300	$2,650,888
Annual Maintenance Cost	$48,450	$13,500
	$100,000 for trust administration and management	
Projected use (Y5)	59,919	
Projected Use (Y10)	60,247	

The opportunity for the Mountains to Sea is to extend the existing trail to meet the key objective of developing a contiguous and engaging journey from Mount Ruapehu to Whanganui and the Tasman Sea. This objective will promote the Great Ride as an epic and linked journey from the upper slopes of Mount Ruapehu (located in Tongariro National Park, a dual World Heritage area) to the Whanganui River (located in the Whanganui National Park) and on to the Tasman Sea. It is anticipated that the development of these trails will resolve current trail legibility issues, improve trail access and differentiate it from other regional attractions through the delivery of a linked and coherent multiday ride located in iconic landscapes.

The proposed extensions will:

- improve the user experience by making the wider trail easier to understand through the linking of trail gaps
- reinforce the brand by having a true trail start on Mt Ruapehu
- provide for greater marketing and economic development opportunities through the development of a more visible product close to existing communities and destinations (i.e. Tūroa, Ohakune, Horopito and National Park).

Measurable benefits include the economic benefits of out-of-region visitors using the trail, health benefits and consumer surplus benefits from local and domestic users.

The Economic Case clearly demonstrates that the proposed trails will significantly benefit the Ruapehu District's economy.

The benefits from the proposed trails are realised through its users. These users are made up of local riders and out-of-region recreational users. Out-of-region users can also be split into domestic and international visitors who could use the trail for a part of the day (single-day) or for several days (multi-day).

Once fully completed, the proposed trails are forecast to attract an additional 27,100 recreational users from outside the region. International visitors will account for 3,605 (11%) of those users.

Economic benefits are presented using a social cost benefit analysis and have been prepared at a regional and national level.

Outcome	Regional benefit	National benefits
Users	About 7,818 locals are expected to use the trail in the year after it is completed, increasing to 10,546 by year 10. By year 5, about 35,065 New Zealanders from outside the region are expected to ride the trail, increasing to 40,913 by year 10. About 4,133 international visitors are expected to ride the trail once it is completed, increasing to 6,548 in year 10.	
Visitor expenditure	The trails are expected to generate about $2.75 million in additional visitor expenditure regionally by year 10.	The proposed trails are expected to generate about $0.342 million in additional visitor expenditure nationally by year 10.
Construction and operational jobs	The trail is expected to generate up to 31 full time jobs over the four-year construction phase and sustain an average of 65 full time jobs each year over 10 years.	
CBA	The trail will have a net present value of $7.85 million, a benefit: cost ratio of 2.6, and an internal rate of return of 24 percent.	The trail will have a net present value of ($1.2 million), a benefit: cost ratio of 0.9, and an internal rate of return of 4 percent[1].
Visitor benefits	The present value of visitor spend is estimated at $12.6 million.	The present value of visitor spend is estimated at $1.6 million.
Health benefits	The trail is expected to contribute $0.16 million in health benefits.	The trail is expected to contribute $2.2 million in health benefits.
Consumer surplus	The trail is expected to contribute about $0.1 million in consumer surplus.	The trail is expected to contribute about $3.7 million in consumer surplus.

For the trail to be developed as planned there will be resource consents a concession and a works approval required. Initial discussions with councils and the Department of Conservation have indicated the process for these and what will be required for a positive outcome.

A new governance entity is being developed to oversee the construction and maintenance of the new sections of trail. The focus of the Ruapehu Trails Trust will be on the sections of the Mountains to Sea from Tūroa to National Park and will include representation from the Department of Conservation, local iwi, Ruapehu District Council and the local community. This trust has yet to be established, however the key parties are currently in discussion to finalise its formation. The trust will be supported by the Department and Ruapehu District Council.

[1] This reflects the 100% government funding contribution.

Funding to construct the trails is being sought from central government through New Zealand Cycle Trails and Provincial Growth funds. There will also be a contribution from Ruapehu District Council. Ongoing operational funding will be sourced locally from the community.

There has been comprehensive engagement with iwi regarding the proposed trails. Iwi support is crucial to their development and their support has been in evidence through the progression of the Ohakune Mountain Road upgrades and the change to the Tongariro National Park Management Plan. Without iwi support in those preceding processes the trail planning would not have been able to progress through to this stage. Iwi will also play a vital role in the subsequent permissions process and in trail governance.

The proposed trails align well with local relevant statutory and non-statutory plans and strategies and they have been identified as key economic development opportunities for the Ruapehu area. This is due to their anticipated popularity with domestic and international riders and walkers.

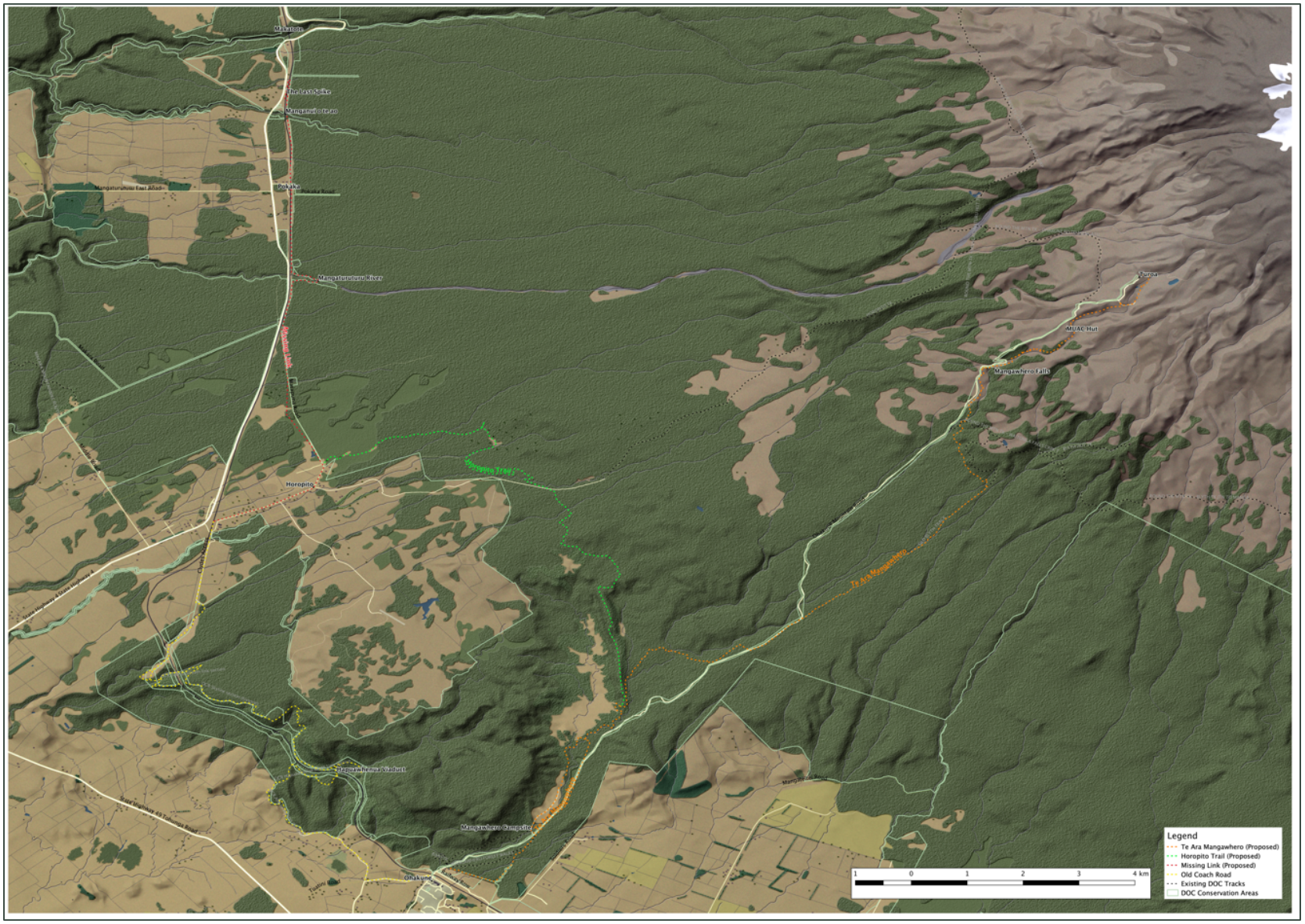

Figure 1 Location and route of proposed trails

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1 Introduction and Context

1.1 Background

The following feasibility assessment has been developed specifically to support an application by Ruapehu District Council (RDC) to the New Zealand Cycleways Trust Enhancement and Extension Fund and the Provincial Growth Fund.

The assessment relates to the proposed development of the Te Ara Mangawhero trails (including the Horopito return trail) and the Missing Link trail.

Prior to the development of this report there were earlier feasibility assessments undertaken for both sets of trails.

- In 2015 a feasibility assessment was undertaken by Ruapehu District Council and TRC Tourism for the Missing Link trail.
- In 2016 a feasibility assessment was undertaken by Perception Planning Limited for the Te Ara Mangawhero trails.

This feasibility assessment does not intend to replicate those assessments and they should be read alongside this report as key reference documents. While, in some cases, it has been necessary to revise some of the recommendations or findings in these previous assessments where there has been additional research or circumstances have changed over time, the recommendations in those previous reports are still considered to be sound and relevant.

1.2 The Mountains to Sea Great Ride

The Mountains to Sea cycle trail was one of seven New Zealand Cycle Trail Quick Start projects announced by the government in 2009 and the subsequently developed Mountains to Sea trail is well established and exceeded market expectation.

The trail is 217km or 209km long dependent on whether the user starts at Ohakune or National Park. It consists of single-track riding through indigenous vegetation (including two national parks), historic coach and rail routes, gravel road, a jetboat passage down the Whanganui awa and sealed sections into Whanganui city.

Most people don't complete the whole trail but instead complete individual sections depending on their itinerary and/or accommodation base. Popular accommodation bases are National Park village, Ohakune and Raetihi, but day rides from Taumarunui, Taupō and Turangi are also evident.

The trail is governed under the Mountains to Sea Trail Partnership, a group representative of all major stakeholders (DOC, Ruapehu District Council, Whanganui District Council and iwi). Construction work

funded as Stage One was completed in 2012 and audited by NZCT representatives. Operations and maintenance of the constructed sections of the trail are managed under a Memorandum of Agreement between the partners.

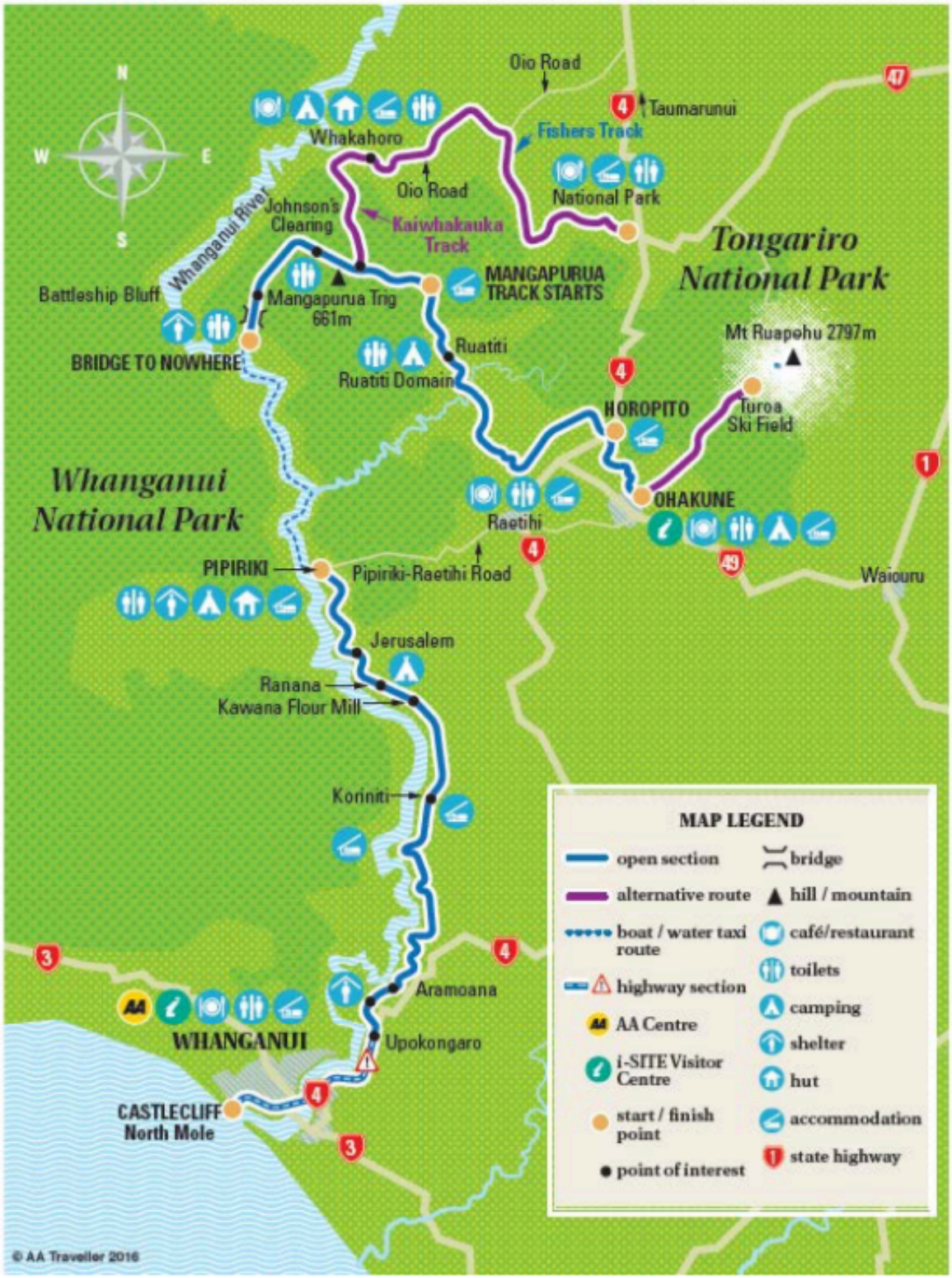


Figure 2 New Zealand Cycle Trails trail map

The Mountains to Sea cycle trail has been in full operation since 2012. Early data counts revealed a significant immediate response from a mainly domestic market, where riders visited to experience one of the early quick start cycle trail projects. Since 2012, cyclist numbers on all sections of the trail have exceeded realistic expectations forecast in the 2010 TRC Tourism Feasibility Study.

Over time, visitor trends researched and reported in the New Zealand Cycle Trail Evaluation Report written by Angus and Associates and TRC Tourism 2013 revealed a mainly domestic market driving multiple visits to the Ruapehu district to complete sections of the ride, as opposed to undertaking linear multi-day rides as part of packaged itineraries. These riders are referred to as hub and spoke riders and they are a valuable domestic market segment.

1.2.1 Concept Plan

A concept plan was developed for the trail in 2016 and was revised in November 2017. It identified the following vision for the trail:

"The Mountains to Sea Nga Ara Tuhono is one of New Zealand's must do visits for recreational mountain biking. It is truly a Great Ride that contributes positively to the wellbeing of the Ruapehu and Whanganui Districts, and to New Zealand. The trail is to be completed by connecting The Old Coach Road section of trail from Horopito to National Park Village via the 'Missing Link', extended to include a new section of trail 'Nga Ara Mangawhero' from the Turoa Ski Area on Mt Ruapehu to The Junction in Ohakune, the latter being the current formal gateway to the beginning of the trail, and completing the proposed section of trail beside SH 4 Upokongaru to the Whanganui City ride (currently approved and funded by MGR fund). The Mountains to Sea is currently part of the wider network, including the existing Heartland Rides linking Pureora Timber Trail to Mountains to Sea via Taumarunui and on to Taranaki via Whangamomona and Bell Block. There is future potential to link Ohakune to Taihape, and Whanganui to Hunterville. Investigations and feasibility work are also recommended to link Ohakune to Raetihi via the old railway branch line, and connecting Raetihi to The Mountains To Sea trail via Ameku Road to Shorts Hill."

This vision is a summary of discussions held at various community consultations, both formal and informal, undertaken by the Ruapehu District Council and MBIE as part of the Regional Growth Study Accelerate 25. Those trail sections in Whanganui and within national parks are subject to further consultation as projects develop or maintenance and enhancement are undertaken. The Regional Economic Development Plan 2016 being delivered by Accelerate25 and MBIE will also consider future recreation and tourism assets within its proposed Destination Management Product Development and Marketing Plan 2017.

To meet the vision, the concept plan identified that there were a series of problems and challenges that it would need to address. The main problems or challenges the Mountains to Sea trail needs to address to reach its full potential, and to provide what customers are looking for, include:

- being responsive to major safety challenges created by natural events such as land movement in steep backcountry environments
- maintaining the grade of the trail through volatile and changing surface conditions
- adding a heartland ride on a State Highway with little shoulder from Upokongaru to Whanganui City
- reaching agreement with local landowners for some sections of proposed trail
- working with the local business community to extend service offerings to customers
- enhancing the marketing plan and working with neighbouring trails/businesses to create packages appealing to the intended target market
- maintaining governance support and ongoing funding certainty

The concept plan included an action plan to address these challenges as follows:

- Phase 1 M2C Trails General: which had a focus on completing the section of the trail into Whanganui City and resurfacing the Mangapurua and Kaiwhakauka trail sections.
- Phase 1 MGR Mangapurua / Kaiwhakauka Maintaining Great Rides – work on fixing trail issues on the Mangaparua and Kaiwhakauka sections of the trail
- Phase 2 MGR Mangaparua Maintaining Great Rides – bluff and bridge widening
- Phase 2a Mangawhero (Ohakune Mountain Road) – route investigation, design and construction
- Phase 2b Missing Link Horopito to National Park - route investigation, design and construction
- Phase 3 Ohakune/Raetihi/ Mountains to Sea Option Link – investigating new links
- Phase 3 MGR – Kaiwhakauka – bluff widening

Phase 1 projects have either been completed or are underway. Work by the Department of Conservation on the Mangapurua and Kaiwhakauka sections is in the planning stage with physical work anticipated to start in 2020.

The proposed new trails deliver on Phase 2 and 2A of the concept plan.

2 The Proposed Trails

This feasibility report considers a 32km extension of the Mountains to Sea Great Ride. The proposed trail is considered to be a single extension to the Mountains to Sea but for the purposes of this assessment has been broken down into two discrete sections being:

- Te Ara Mangawhero Trail from Tūroa to Ohakune and Horopito
- The Missing Link from Horopito to The Last Spike

2.1 Te Ara Mangawhero

The proposed Te Ara Mangawhero (Figure 3) is a 32km shared use trail on the southern slopes of Mount Ruapehu that connects Tūroa to Ohakune and Horopito. The trail will involve the development of 15km of new trail and the upgrading, and in some cases rerouting, of 18km of trail.

The Te Ara Mangawhero trail is the latest initiative of the local community who have a rich history of developing positive community infrastructure for the benefit of locals and visitors alike.

2.1.1 The Ohakune Mountain Road

In the early 1950s the Ohakune Mountain Road Association was formed to promote the construction of an access road from Ohakune to Tongariro National Park. The purpose of the road was to give access to the snow and ski slopes from Ohakune, and also to provide a scenic drive through the native forest. After eleven years of fundraising and much voluntary labour, 12km of the road was opened (approximately to Mangawhero Falls) in 1963. It was extended by the Ministry of Works to its current 17km length a short time later.

In 1976 the Ohakune Mountain Road (OMR) was declared legal road. It is currently managed by the Ruapehu District Council as a 'Special Purpose Road' and is used to access Tūroa Ski Area and the Round the Mountain track. Cyclists riding the Mountains to Sea cycle trail use the road. Trampers using the Round the Mountain track at Tūroa need to walk on 3.5 km of Ohakune Mountain Road. The Ruapehu District Council has identified safety issues associated with the increasing number of trampers and cyclists on the road.

The Ruapehu District Council and NZTA have completed improvements to the Ohakune Mountain Road. Rather than widen the road to provide safe access for walkers and cyclists, they have opted instead to contribute $320,000 over four years towards scoping, design and construction of a walking and cycling track adjacent to the road. This contribution has received widespread support from iwi, the community and stakeholders.

2.1.2 Ohakune 2000 and the Old Coach Road

Ohakune 2000 is an incorporated society formed in 1997 to develop and promote projects for the betterment of Ohakune and surrounds. Since its formation, Ohakune 2000 has facilitated many initiatives towards the revitalisation and rejuvenation of Ohakune including the Mainstreet town centre upgrade, the Ohakune Junction redevelopment (JAAZ Project), the Mangawhero River walking and cycling track, the i-SITE redevelopment, the Ohakune skate park and the Te Pepe Pump & Jump bike

park. Ohakune 2000 is currently working on the Rochfort (Carrot) Park redevelopment in conjunction with RDC and Ohakune Growers.

In 2006, Ohakune 2000 partnered with DOC to restore the Ohakune Old Coach Road as a walking and cycling track. Ohakune 2000 contributed $750,000.00 to the project, providing access to the historic Hapuawhenua and Taonui rail viaducts. Subsequently, the Ohakune Old Coach Road became part of the Mountains to the Sea Cycle Trail in 2010.

2.1.3 Route Identification and Initial Feasibility Assessment

Ohakune 2000 has been leading investigations into the development of the proposed Ohakune Mountain Road trail. This has included consultation with iwi, former Ohakune Mountain Road builders, adjoining property owners and hunters. They have undertaken a comprehensive desktop study using underlying cadastral data, historical maps and reports. They also completed a detailed field investigation and identified a potential trail route that has been plotted using GPS.

The proposed trail will start at Tūroa base area and, using a combination of new (35%) and existing (65%) trails, will work its way down Mount Ruapehu to Ohakune. The proposed route is 32km long and includes an 11km connection from the Ohakune Mountain Road to Horopito.

This proposed route was reviewed by Evan Freshwater and Jonathan Kennett from New Zealand Cycle Trail Inc. in March 2016. They noted that the trail is likely to be enormously popular with bikers and has the potential to be a unique and significant attraction for Ohakune. However, due to the status of the area as a national park and a dual World Heritage Area, they recommended that further investigation should be undertaken by a 'master track builder' to confirm that a sustainable trail and route can be developed.

In May 2016, DOC asked Peter Masters, Peter MacFarlane and Chad Hooton of Bike Taupō to inspect the proposed route and provide feedback on the overall trail concept as well as identify any potential construction issues. This assessment process resulted in the identification of the following set of parameters to ensure a sustainable trail with a wide user base is developed:

1. The trail should be designed and constructed in a manner that respects the World Heritage values of the site and also the Tongariro National Park values.
2. The trail should be designed and constructed as a shared use trail for both walkers and bikers.
3. The trail should be designed and constructed for safe two-way use by both walkers and bikers.
4. The trail should be constructed to technical specifications that allow ease of riding by Grade 2 to 3 riders to maximise the appeal to the widest possible audience.

5. The trail should be built to a high standard throughout and provide a high-quality walking and biking experience, i.e. the impact of the trail should not detract from the surrounding environment.
6. The trail should be constructed to require minimal maintenance, i.e. with a maximum gradient of 8% to allow effective water management.
7. The track should be built to the 'Walking Track' standards (Tracks and Outdoor Visitor Structures SNZ HB 8630:2004), but with a maximum 8% grade and no steps.
8. Safer and less invasive trail options will be prioritised.
9. The trails should be built 1.8m wide where the terrain permits to allow easy passing and shared use.
10. Boardwalk sections should be built to a minimum 1.2m wide.
11. Existing trails will be used where possible, except where these fall outside the sustainable trail construction parameters identified in 4 and 6 above.
12. The track should follow the 'line of desire' to reduce the risk of walkers[2] shortcutting off the trail.
13. Culturally and ecologically important sites, where known, will be avoided.

As a result of the May 2016 assessment, sections 1 - 3 of the trail were realigned to keep the grades generally between 3% (1.62°) and 4% (2.24°) with the steepest sections at 8% (4.3°) in places. Mr Masters noted that the route would allow a very good sustainable track to be built that would require much less maintenance than many of the present tracks in the area (which have slopes of 15%-20% in some places). He also commented that the proposed track has very good access points from the Ohakune Mountain Road that will reduce construction and long-term maintenance costs.

The proposed route and associated costings were reviewed in March 2020 by Pete Masters and Chad Hooton for the purposes of this feasibility study.

2.1.4 The Proposed Route

The route shown on Figure 3 is considered to meet the trail selection parameters identified in section 2.1.3 above.

The proposed trail starts at Tūroa at 1600m ASL. The trail will descend 1000m over 19km, ending in Ohakune. An 11km trail which will connect to Horopito, transforming the Old Coach Road trail into a loop trail, will also be developed. The proposed trail descends from an alpine environment to podocarp forests,

[2] Note: given the nature of the terrain surrounding the trail (especially the upper sections which are steep and rocky), walkers have been identified as being more likely to shortcut the track than bikers.

and in some parts traverses historic logging tramways. The trail uses a lot of existing trails and is located with good access by the Ohakune Mountain Road.

2.1.5 Initial Trail Feasibility

On confirmation of the route, a feasibility assessment was undertaken in order to inform the Department of Conservation's view on proceeding with a change to the Tongariro National Park Management Plan (TNPMP).

The feasibility assessment was prepared in 2016 by Perception Planning Limited for the Department of Conservation (the Department) to inform a proposed amendment to the Tongariro National Park Management Plan (TNPMP). While a strong focus of the report was an assessment of the proposed trail against the Department's statutory instruments, it also included an assessment of the proposed route, environmental and cultural impacts and a market and economic assessment. The key outcomes of this assessment are summarised as follows:

- A partial review to the TNPMP would be required to develop the trail (this work was subsequently undertaken by the Department)
- The trail would cost approximately $5,000,000 to develop and between $20,000 - $25,000 per annum to maintain.
- The proposed trail will go from Tūroa Ski Area to Ohakune and out to Horopito via the already established and highly popular 'Old Coach Road'. It will be 32km long and be a Grade 2 trail suitable for a wide range of recreational riders. 35% of the trail will be new and the remaining 65% will be the upgrading of existing trail, including historical tram track routes.
- The trail will need to be developed to a high standard to ensure that it is sensitive to the high ecological, cultural, landscape and historic values in the area. Constructing the trail to the recommended standard will also ensure that ongoing trail maintenance costs are kept to a minimum.
- The proposed trail has the support of Ngāti Rangi and Uenuku Charitable Trust who are the iwi of the area. Iwi will be involved in the development of the trail, including the set-out process, management and storytelling components.
- Market and economic assessments identified that the trail is anticipated to have a wide and popular appeal with 17,000 riders in year 1, increasing to 34,250 by year five[3]. The predicted daily spend for users is anticipated to be $169 per day resulting in an estimated

[3] Low estimates

associated spend of $2,873,000 in the first year of completion and $5,788250 after year five.

- The Department has been working with iwi and the local community on the proposal since 2014 and both are generally supportive. Any concerns raised have been addressed through trail design and predevelopment assessments[4], and through the requirement for further works to include the details that will be assessed as part of a DOC works approvals process.
- The trail is to be managed by a local community group with the purpose of trail management and maintenance. This will allow a more efficient and cost-effective trail management process.
- The proposed trail will need to be consistent with the TNPMP and require works approval from the Department. Resource consent will be required from the Regional Council for some earthworks and bridging, however these consents are not anticipated to be difficult to acquire.
- The trail will improve safety on the Ohakune Mountain Road by providing the option for cyclists and walkers to be well separated from other road users.
- The trail will provide for much higher use of established accommodation and visitor services which have traditionally been underutilised over summer in comparison to use during the winter ski season.

As part of this application process, the feasibility assessment has been reviewed to reflect the process since its publication, and it has been incorporated into this report to ensure that it is still an accurate account of the feasibility of the proposed trail. A copy of this initial feasibility report can be viewed here. This review has identified that there has been additional growth in visitation in the area since the report was published, including growth in the use of the ski areas and surrounding trails. This growth is likely to result in a slight increase in the user numbers proposed. As noted further in this application, a partial review was undertaken of the Tongariro National Park Management Plan (TNPMP) allowing the trail to proceed, but in a sensitive manner. Recognition of the Department's trail development requirements has meant that there will need to be additional rigour in initial planning and permissions required. A trail monitoring (use and development) process will also need to be developed to give the Department the confidence to allow the development of the upper sections of the trail. This also has implications for the order of trail construction with the lower sections of trail developed first.

[4] Note that this was prior to the subsequent public submission process for the partial review of the TNPMP to enable trail development.

As a result of the feasibility work and wider community support, the trail was identified in the Manawatu Whanganui Regional Growth document, Accelerate 25[5], as an 'immediate priority'. This led to the government setting aside $2 million for the trail in 2016, subject to a NZ Cycle Trail Enhancement and Extension fund application requirements being met.

2.1.6 Tongariro National Park Management Plan Review

The Department has been engaging with the community on the proposed trail since December 2014, starting with a presentation to the Taupō Tongariro Conservation Board.

[5] Discussed further in Section 7.7 of this report.

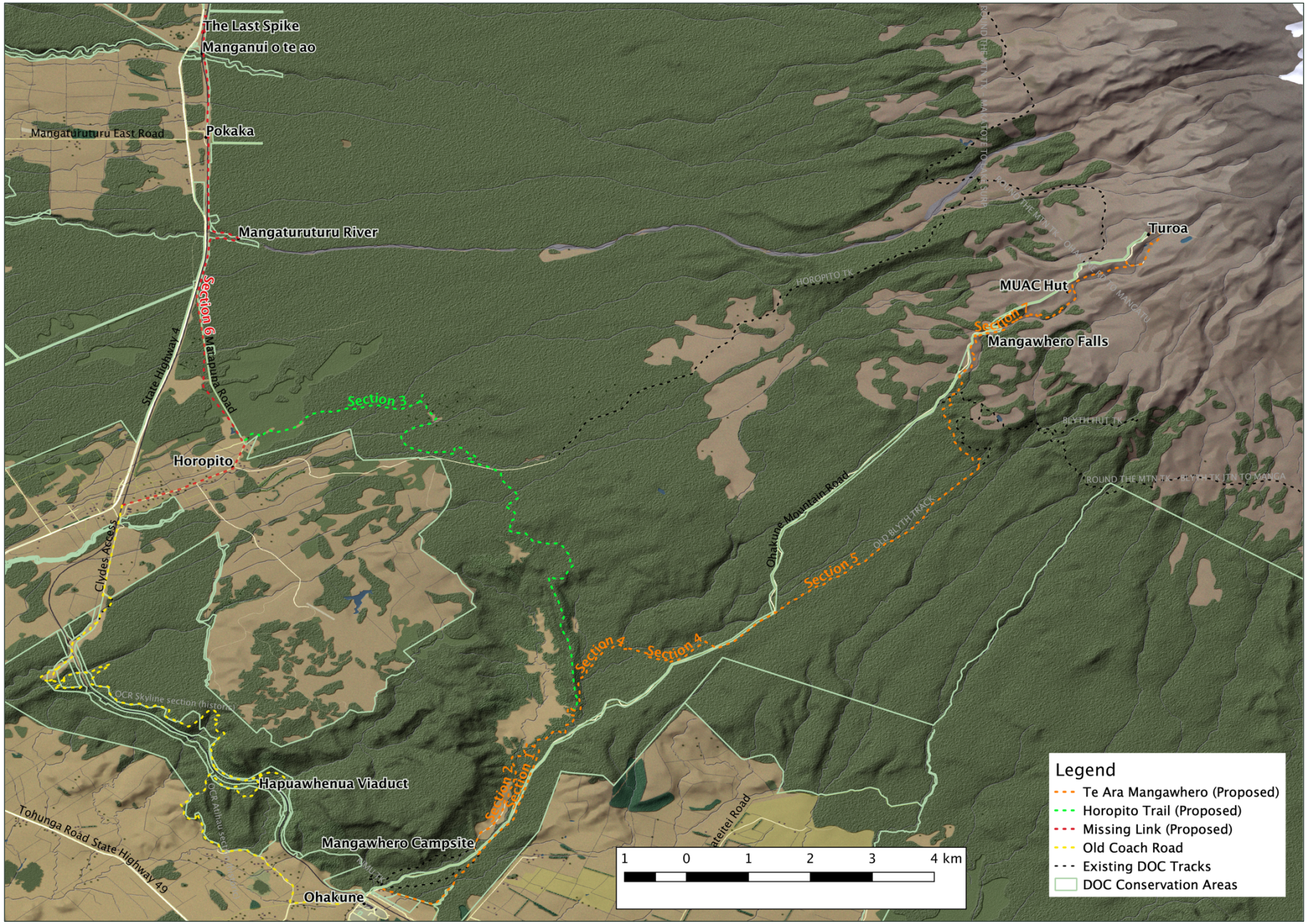


Figure 3 Proposed Trail Extensions

In 2016, the partial review of the TNPMP was initiated which involved a public consultation process under Section 46 and 47 of the National Parks Act 1980. This process included a submission process which was advertised nationwide with public hearings held in Ohakune in 2017. The review enabled the development of Te Ara Mangawhero, the Horopito Trail and those sections of the Missing Link which fall within the national park. The partial review was approved by the New Zealand Conservation Authority on 23 April 2018.

This process represents an acceptance of the appropriateness of these trails by the Department provided that they are developed and managed in accordance with the revised TNPMP.

2.2 The Missing Link

The Missing Link will be a 25km trail between Horopito and National Park. It will be an easy grade trail, the majority being Grade 1 - 2 with some short sections of Grade 3. The route will follow the existing main trunk line around the base of Mount Ruapehu to the Makatote Viaduct where it crosses wetland terrain before connecting to the historic Marton Sash and Door tramline and linking to National Park village.

The entire route from National Park village to Horopito incorporates the scenery of the North Island's sub-alpine forest. Amidst the forest windows are views over Tongariro National Park to all four mountains within the Park. Beyond the plateau is the Makatote Viaduct and pristine rivers emerging from Mt Ruapehu.

The route of the Missing Link traverses a number of areas of public conservation lands including the Tongariro National Park, the Erua Conservation Area and the Makatote Scenic Reserve. A review of this route by the Department of Conservation against the Taupō-Tongariro Conservation Management Strategy (CMS) indicated that the proposed trail may be inconsistent with the CMS document and they would not support its development until the CMS was amended to specifically allow for the trail to be developed and used by bikes.

While it is still anticipated that the full Missing Link trail will be developed in time, it is proposed that the trail should be developed from Horopito to The Last Spike initially. This section of trail avoids those sections of public conservation lands which are not specifically provided for by the review to the TNPMP.

The proposed 10km route will largely be a Grade 1 trail and include the development of a number of bridges over the Mangaturuturu and the Manganuioteao Rivers.

The features of this trail section are the built rail heritage structures and the stories of railway communities working and living along the route. Interpretation of this story will be valued by bikers and walkers and provide for the rail heritage story seeker.

The proposed cycle trail route will use a mixture of bush trails, maintained low volume rural roads, historic road and rail routes and new trail adjacent to Tongariro National Park. The trail will traverse mature beech forests, bush margins and cross deep forested gorges.

This section has a strong rail heritage story that runs its length as it travels adjacent to the main trunk line, next to viaducts and rail bridges. Its terminus at The Last Spike is a key part of that story. The Last Spike is the site at which the then Prime Minister Sir Joseph Ward ceremonially opened the North Island main trunk railway line by driving home a final polished silver spike at Manganuioteao in 1908.

These stories of New Zealand's rail and pioneer heritage not only provide a contiguous link to the wider Mountains to Sea but also provide a compelling story that makes for a more memorable and unique ride experience.

2.2.1 2015 Feasibility Process

A trail set out process was initiated by RDC and the local community in 2014. A route was identified and an initial feasibility study for the Missing Link was developed by RDC and TRC Tourism and published in February 2015. This feasibility study identified that the cost of developing the trail would be $1,719,400.00 with $553,000 of that already spent by the local community in developing the Marton Sash and Door Tramline. The feasibility study estimated 3,500 users in year 1 and 8,600 in year 5. The estimated return on investment in Year 1 was over $600,000 and by year 5 was over $1.5 million per year.

This feasibility process was used to inform the TNPMP review process discussed in Section. 2.1.6 and also to have the trail identified in the Accelerate 25 document. A copy of this initial feasibility work can be viewed here.

2.2.2 2018 – 2019 Review

As part of the development of this feasibility assessment the 2014 route and market impact assessment were reviewed. The proposed trail route was initially reviewed through a desk-based assessment and discussions with Murray Wilson (National Park), LINZ, NZTA and KiwiRail. An onsite assessment was undertaken with experienced trail builders from Bike Taupō. Through this process the proposed route was confirmed, and costings undertaken. This route is largely the same as the 2015 route, with a key difference being that the Makatote crossing is now at the site of the White Elephant Bridge, 1km downstream of the Makatote Viaduct.

The initial part of this route to the Last Spike is to be used for this process.

3 Technical Assessment

3.1 Route Identification

Initial route investigations were undertaken by local riders and members of Ohakune 2000 and the National Park Village Association. The proposed routes were also assessed by local DOC staff and in some cases NZCT representatives. Once initial trail corridors were identified, the trail was walked by experienced trail planners Peter Masters, Peter Macfarlane and Chad Hooton. They were accompanied by local riders and members of Ohakune 2000 and National Park Village Association.

The proposed route met the desired trail parameters and were adopted by the Department as part of their partial review of the TNPMP CMS.

3.2 Proposed Route of Trail

The proposed trail is broken into five sections with clear start and end destinations. Some sections include pre-existing sections of trail and others will be complete new builds or new routes.

Section	Distance	Trail Description	Tenure
Section 1 Lower Bennett and Punch Trail	4.9 kilometre Grade 2-3 trail (0.6 kilometres new and 4.3 kilometres existing)	This section utilises well-preserved existing tramlines, and links back to the Ohakune DOC field centre/Ngāti Rangi office. It also connects to the Old Coach Road	Public Conservation Land Ruapehu District Council Road Reserve
Section 2 Campground Loop	2 kilometre Grade 2-3 trail (0.3 kilometres new and 1.7 kilometres existing)	Follows existing seal and gravel track to water intake, crosses Serpentine downstream of water intake.	Public Conservation Land NZTA Road Reserve
Section 3 Horopito Link Trail	11 kilometre Grade 2 trail (2 kilometres new and 9 kilometres existing)	This track connects to Horopito and utilises sections of the existing Cowern's tram line and the Punch and Bennett tram line. This section will also use part of the formed and gravelled Matapuna Road.	Public Conservation Land

		This section also forms a loop with the Ohakune Old Coach Road.	
Section 4 Blyth to Mangawhero and Upper Bennet and Punch	3.9 kilometre Grade 3 trail (2.3 kilometres new and 1.6 kilometres existing)	This is a new section of track that follows close to the Ohakune Mountain Road, crossing the road in an identified safe area with good visibility uphill/downhill. This section also includes a potential mid trail access point and may necessitate a layby/pull off area and signage. Includes the Upper Bennett and Punch Tramway to Mangawhero River Terrace.	Public Conservation Land NZTA Road Reserve
Section 5 Chainshed to Old Blyth and Blyth	5.8 kilometre Grade 3 trail (2.3 kilometres new and 3.5 kilometres existing)	This section is set within a sub alpine beech environment and will cross the Mangawhero River approximately 500m above the Waitonga Falls, connecting to the top of the Old Blyth Track. The trail will also follow the route of the existing Blyth Track (to be upgraded and rerouted) and the Round the Mountain Trail.	Public Conservation Land NZTA Road Reserve
Section 6 Horopito to The Last Spike	10.6 kilometre Grade1-2 trail (9 kilometres new and 3 kilometres existing)	This trail follows the margins of the Tongariro National Park from Horopito to The Last Spike using sections of existing trail, the rail corridor and historic roads. It will include a number of suspension bridges over the Manganuioteau and Mangatururu Rivers.	Public Conservation Land NZTA Road Reserve Kiwi Rail Corridor Ruapehu District Council Road Reserve
Section 7 Tūroa to Chainshed	4.7 kilometre Grade 3 trail (4.6 kilometres new and 0.1	Includes the Tūroa Ski Area lease area and is an alpine environment requiring sensitive construction using boardwalks. This section will	Public Conservation Land NZTA Road Reserve

	kilometres existing)	provide users of the 'Round the Mountain' track an alternative to walking on the road. It will pass the Mangawhero Falls and provide a unique alpine experience.	

Table 1 Summary of Proposed Trail Sections

3.3 Trail Development Costing

A cost estimate to build the trail has been developed including trail development, bridges and supporting infrastructure.

The costing was undertaken by ROAM with Peter Masters and Peter Macfarlane and is considered to reflect a practical and realistic build cost for the trail. These costings include trail construction, bridging, water management, board walking and miscellaneous works.

Overhead items such as design and surveying, project management and consenting (building consents) are also estimated and costed out.

A 15% or 20% contingency has also been applied to these costs. This contingency is considered to be appropriate based on the level of investigation that has been undertaken by expert trail builders who have a good working knowledge of trail building in the area.

A key factor with this trail is that it is very accessible from local roads and settlements. This will have a significant impact on transport costs as well as day to day staff/contractor travel time and costs.

The cost of developing the trails is estimated to be $6,665,933. A summary is provided below in Table 2 with more detailed estimates found in Appendix 2

Section	Cost
Permissions	$77,000.00
Storytelling Project	$200,000.00
Project Management	$213,333.33
Lower Bennett and Punch Trail	$533,600.00
Campground Loop	$172,500.00
Horopito Link Trail	$743,475.00
Blyth to Mangawhero and Upper Bennet and Punch	$511,750.00
Chainshed to Old Blyth and Blyth	$839,400.00
Missing Link	$1,507,075.00

Tūroa to Chainshed	$1,867,800.00
Total	**$6,665,933.33**

Table 2.Trail Development Costs

3.3.1 Bridges

Bridge costs have been estimated on a lineal metre basis using standard bridge designs used on surrounding trails. The bridge over the Maunganuioteau River is anticipated to be a more technical build and a higher cost has been used. This cost was determined based on the cost and effort required to develop similar scale bridges on the Timber Trail. A key difference for the Maunganuioteau bridge, and also those in the wider trail, is that they are very accessible, being close to roads and settlements. This will significantly reduce transport costs and build efficiency.

3.3.2 Supporting Facilities

As well as the key structural components of the proposed trail, supporting facilities such as toilets, counters, signage and shelters will be required. These are important facilities that make the trail work and facilitate a positive rider experience. Such facilities are generally positioned at key nodal points along the trail where users are likely to take a break or enter or exit the trail.

In some places, these facilities will already be in place (i.e. existing toilets and carparks). However, the ability of existing facilities to cope with the estimated increase in use will need to be considered.

It is estimated that the cost of developing these facilities along the length of the trail has been factored into the sectional build cost.

3.3.3 Project Management

In addition to direct development costs, a project manager will need to operate full time to ensure that the project build progresses in an effective manner. It is anticipated that the project manager will work with a master trail builder (cost factored into sectional costs) in ensuring that the design and development practices associated with the trail are achieving a high quality and resilient trail outcome.

Project management and operations costs associated with the development of the trail are anticipated to cost $80,000 per annum.

3.3.4 Interpretation and Storytelling

An interpretation or storytelling plan will be required to guide the development of information signage and installation along the route of the proposed trails. Interpretation is an important element of the proposed trail as it will not only add to the trail experience but it will also provide an opportunity for important natural, cultural and historical stories associated with the land and the trail to be told.

The important cultural stories associated with Ruapehu Maunga can be told and this will give local iwi the opportunity to tell the important stories of their lands and sites in a meaningful and sensitive manner. Interpretation and storytelling are not limited to signage, but could also include pou, sculptures and other installations which reflect the values and stories at place.

3.4 Maintenance Costs

Once completed, the trail will cost approximately $61,950 per annum to maintain. This cost has been calculated using an average cost of $1,500 per kilometre. This is a precautionary high estimate and does not include reference to the easy access to the trail, the amount of board walking and the significant opportunities for local communities and businesses to be associated with looking after the trail.

3.5 Construction Methodology and Timeframes

Both the Te Ara Mangawhero and the Missing Link are considered as one trail development project to be undertaken by the Ruapehu MTB Trails Trust. The estimated process and timeframes to develop these trails is shown below in Figure 4 and Figure 5.

This work plan takes into consideration the resources and expertise currently available and focuses on growing local capacity and skill to ensure quality and sustainable trails are developed. They also take into account the importance of the seasonality for this build with all of the upper, and potentially snow affected, tracks proposed to be developed during the warmer months.

Trail development timeframes are also guided by the TNPMP as the revision to the TNPMP sets out an order for the development of the trail (*TNPMP Policy 4.3.2.4.14)* and requires the lower sections of the Te Ara Mangawhero to be developed first. This is so that the Department is able to monitor the trail development and management prior to the upper sections of trail being developed.

	Task	Time (months)	Start	Finish
1	Funding Confirmed (milestone)	-	1/06/20	
2	Consenting and permissions	5	29/06/20	13/11/20
3	Procurement and project establishment	2	19/10/20	11/12/20
4	Lower Bennett and Punch	5	14/12/20	30/04/21
5	Campground Loop	5	8/02/21	25/06/21
6	Horopito Link Trail	5	3/05/21	17/09/21
7	Blyth to Mangawhero and Bennett and Punch	7	28/06/21	7/01/22
8	Chainshed to Old Blyth	4	20/09/21	7/01/22
9	Horopito to Last Spike	7	10/01/22	22/07/22
10	Turoa to Chainshed	7	10/01/22	22/07/22
11	Storytelling	11	8/11/21	16/09/22
12	Trail Opening (milestone)	-	22/11/22	

Figure 4 Trail Development Schedule

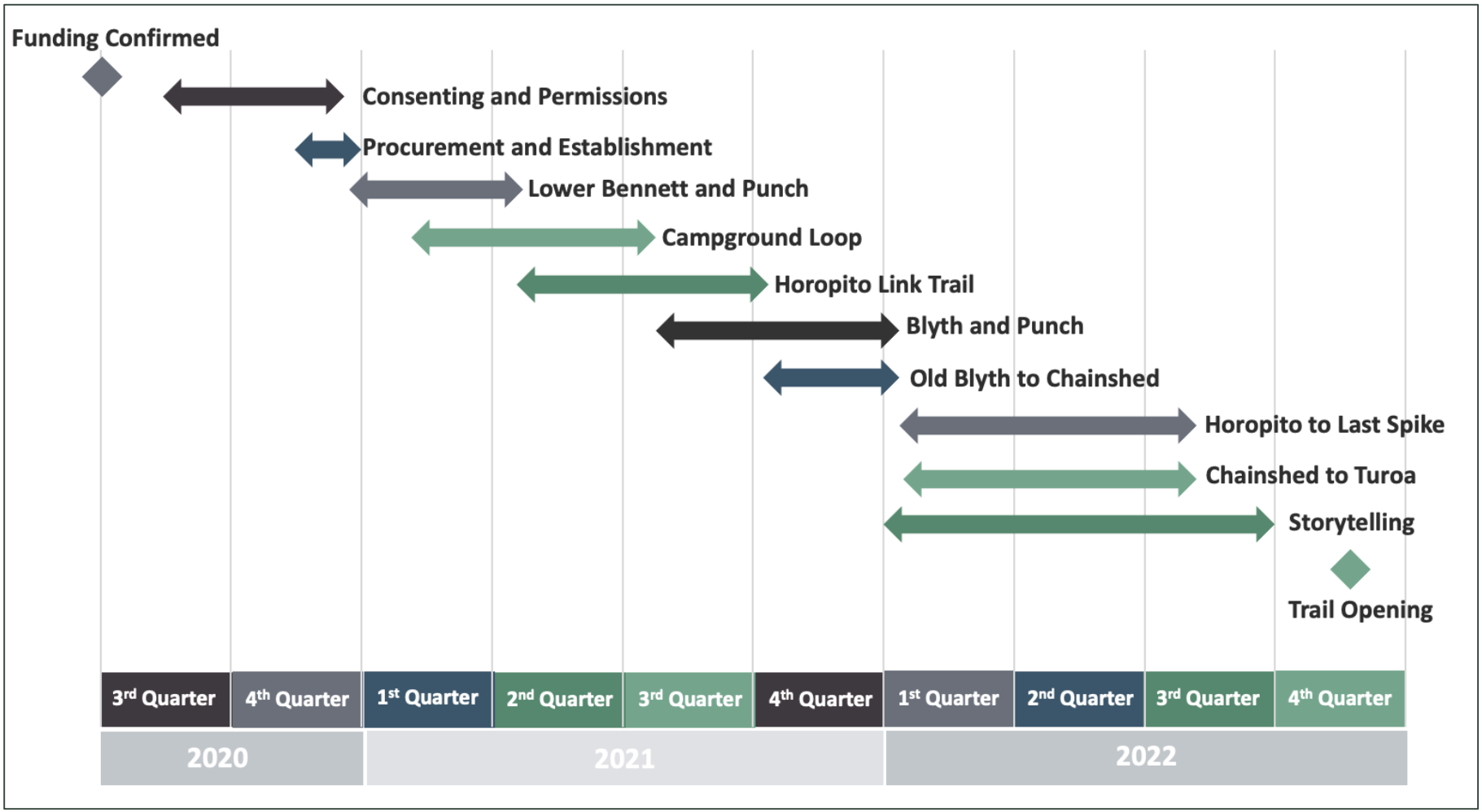


Figure 5 Trail Development Schedule

4 The Mountains to Sea Experience

The Mountains to Sea Cycle Trail is a journey from the volcanic centre of the North Island down to the Whanganui on the west coast via the Whanganui River. The NZCT website says the trail is '...suitable for all abilities of cyclists, the trail includes a mixture of off and on-road trail, which can be enjoyed in sections or in its entirety'. It recommends that trail users start from Ohakune and undertake the 217km journey (Ohakune - Horopito – Mangapurua – Pipiriki – Whanganui) as a grade 2-3 ride, or alternatively start at National Park to do the 209km journey (National Park – Whakahoro - Mangapurua – Pipiriki – Whanganui) which includes a Grade 4 section (Kaiwhakauka).

The official trail map on the NZCT website (Figure 2) identifies the starting point at Ohakune but with alternative starting points at Tūroa and National Park.

The complexity in accessing the trail was identified in the 2017 Mountains to Sea Cycle Trail Marketing Review and Action Plan report undertaken by Destination Planning Limited (the DPL report). The DPL report identified these multiple starting points to the trail as being a key factor in marketing issues and overall trail legibility;

"There are multiple truths in the marketplace. The Mountains to Sea proposition is complex and confusing with the two possible start branches and strong identities of trail sub sections creating clutter."

"The trail descriptions across different channels and maps all vary. Each description breaks the trail into different sections and uses different grading and trail distances. Some start at Turoa, others Ohakune, while some exclude the northern National Park option completely."

This is an honest and accurate summary of how the trail is perceived by users and operators, with its multiple start points and also varying trail grades. This has been exacerbated by the fact that the Mangapurua and Kaiwhakauka sections of the trail are frequently impassable after heavy rain and through winter. This is an ongoing issue with those sections of the trail that has created the impression the trail is overly technical, and in some cases unrideable, as noted in the recent Trail WOF assessment:

"The trail condition is in poor condition in many places and a test for Grade 4 riders.

This track is included in the loop based from Whakahoro and is therefore ridden as part of the Great Ride to the Bridge to Nowhere, often for riders uncomfortable with Grade 4 (anecdotal). Because of the poor track condition, the expectation that it can be ridden as part of the easier Mangapurua, has resulted in disappointment (anecdotal) and is contrary to good customer engagement."

These issues of trail legibility and quality are important and need to be taken into account when considering additions to the wider trail. Trail legibility and quality have also been identified as an issue by

New Zealand Cycle Trails Inc. who have a focus on ensuring the quality of the current rides is at a suitable level before they are extended.

4.1 Trail Legibility Issues

Ultimately the proposed trails will form an unbroken off-road route between Tūroa and National Park. They will add an additional 55km of trail to the Mountains to Sea journey and provide a start on the upper slopes of Mount Ruapehu. Current confusion about riding the trail is in part due to the multiple start points of Ohakune and National Park. The proposed trails will go a long way towards creating this single rideable route especially once the final stages of the Missing Link Section from The Last Spike to National Park are able to be developed. The Te Ara Mangawhero trail will also provide a compelling and definitive starting point for the trail at Tūroa. The development of the Missing Link (Stages 1 and 2) will be important in enabling a connected journey that forms a single compelling and rideable route from Tūroa to Castlecliff in Whanganui.

The development of the proposed trails will not stop users 'cherry picking' sections of the Mountains to Sea to ride independently of others (this occurs on most of the Great Rides where there are access points along the trail), but it will provide a greater sense of the journey which the separate sections of the Mountains to Sea are part of. This sense of the journey will also be facilitated by a more cohesive marketing effort (see Section 6.8), consistent trail interpretation and branding.

This journey will not be able to be completed at this time due to the CMS restrictions on Stage 2 of the Missing Link. The development of Stage 1 of the Missing Link to The Last Spike will enable key trails in this journey to be initiated. Advice received from the Department is that they are currently investigating the possibility of initiating a technical amendment to the CMS. This will mean that the entire Missing Link may be able to be completed in the near future.

5 Market Assessment

This market assessment process has been undertaken using the information developed for the previous feasibility assessments as a base. Both the 2015 Missing Link and the 2016 Te Ara Mangawhero feasibility assessments included assessments of the potential markets for the trails, user projections and estimates of associated spend. In both cases, these earlier assessments have been reviewed by Dave Bamford with consideration of contemporary user data and trends to ensure they are still accurate. The assessments have also been 're-cast' to identify those user groups required to fit the Martin Jenkins CBA model used by MBIE when identifying the potential costs and benefits associated with New Zealand Cycle Trails. For

the Missing Link trail, the proposed route change incorporating the White Elephant Bridge has seen the original estimates revised up.

These previous assessments also did not include consideration of the Horopito connection trail and those figures have now been added and are set out below.

5.1 Te Ara Mangawhero

It is considered that the Te Ara Mangawhero trail is likely to be very popular with walkers and bikers. According to a market-based assessment undertaken by Dave Bamford in 2016, the trail could be used by between 17,000 and 29,250 users in the first year (after full completion) and between 34,250 and 48,750 after five years. Mr Bamford's assessment was prepared with a working knowledge of the market, discussions with key people and groups and consideration of the nature of the proposed trail route and its landscape/environmental context.

This assessment was based on the following approach:

- Product definition
- Consideration of current key data
- Trend indicators and assessment
- Evaluation of comparative products
- Identification of possible markets
- Market based user estimate

This assessment made estimates based on an understanding of the product, trends and potential users. In this case, the nature of the product (the proposed trail) has a very strong bearing on the estimates. The proposed trail has a number of unique characteristics that are not found on other trails elsewhere in New Zealand, i.e. the landscape/environment context of the trail has compelling qualities that will appeal to a very wide domestic and international market.

Conservative estimates and high and low scenarios were used for the same time period as the Demand Analysis:

Market	Year 1 Low
Spring Tūroa Skiers	3,000
Winter Skiers	1,500
Round the Mountain Track	1,000
Walking Market	5,500

Market	Year 1 Low
Summer Cyclists Ohakune Holiday	3,000
Summer Cyclists Regional	2,000
Summer Cyclists North Island	1,500
Summer Cyclists International	500
Tongariro Crossing People	500
Mountains to Sea (2 Day)	1,000
Mountains to Sea (4 Day)	500
Events	500
Locals	250
Educational	250
Total	**21,000**

Table 3 Te Ara Mangawhero market assessment estimates

The feasibility of the trail should therefore be considered with the expectation that the trail will attract at least 21,000 users within the first year of it being fully completed, and 34,250 per year from the fifth year.

5.2 Horopito

As noted above, the Horopito trail was assessed separately from the Te Ara Mangawhero trail. On review, it was considered that the trail is likely to be used by those wanting to do a loop ride incorporating the Old Coach Road and as a more direct connector to Horopito and the Missing Link Trail and the wider Mountains To Sea journey. This link could be considered as a competitor to the existing Old Coach Road section as a means to connect to Horopito. The easy nature of the terrain and historic elements will appeal to some riders, however it is anticipated that the Old Coach Road will be the preferred route to Horopito. Its function as a return trail from Horopito and the Old Coach Road will make it of interest to events in the area such as the Ruapehu Express.

Market	Year 1
Spring Tūroa Skiers	150

Winter Skiers	150
Walking Market	300
Summer Cyclists Ohakune Holiday	1,000
Summer Cyclists Regional	750
Summer Cyclists North Island	250
Summer Cyclists International	250
Mountains to Sea (2 Day)	1,000
Mountains to Sea (4 Day)	500
Events	500
Locals	250
Educational	250
Total	5,350

Table 4 Horopito Link market assessment estimates

The feasibility of the trail should therefore be considered with the expectation that the trail will attract at least 5,350 users within the first year of it being fully completed. Given its role as a connection trail, its use will grow with that of the surrounding trails but at a lower rate of 3% per annum.

5.3 Missing Link

The 2015 feasibility assessment sets out the product and the associated market demand for the Missing Link trail. It identifies that it will be important as a day ride (from National Park to Horopito/Ohakune) as well as being an integral part of the wider Mountains to Sea Journey. Consideration of some of the newly proposed trail elements, notably the proposed bridges, the rail heritage sites and the unique landscape features such as the river valleys, resulted in an increase in the estimated use from the 2015 projections.

These projections have had to be revised to reflect the revised route of the Missing Link from Horopito to The Last Spike. The Missing Link to Last Spike journey has been considered as an important 10/20km Grade 1-2 trail experience that links two local destinations. The grade and distance of the trail means that it is likely to appeal to families, less experienced and also older riders on E bikes. The development of the

trail will also strengthen Horopito as a key trail 'hub' servicing the Old Coach Road, the Horopito Trail and the Missing Link.

Figure 6 Mangatururu River Bridge Site

The following matters were considered when reviewing user projections for the Missing Link:

- The dramatic nature of the proposed Mangatururu (Figure 6) and Manganuioteao (Figure 7) bridges and their marketing value.
- Proximity to the State Highway providing good vehicle access to Horopito and the Last Spike.
- The rail heritage story which can be capitalised on at key points along the trail including Horopito, Pokaka, Maunganuioteao and the Last Spike.
- The growing levels of subdivision and development at Horopito including recent investment at Smash Palace and a proposed cafe and visitor hub.
- There is a transport operator based in National Park village who is able to shuttle trail users to trail heads and signals that the same will occur at Horopito as well.
- The trail will remove some of the cycle tourers / bike packers using this trail rather than the road when travelling between Taumarunui and Ohakune.

Figure 7 Manganuioteao River Bridge Site

Three tribes take on biodiversity

Three Ruapehu tribes and conservation experts have shared with the Minister of Conservation new developments in plans for a major eco-sanctuary project.

Uenuku Charitable Trust (UCT), which represents the people of Uenuku, Tamakana and Tamahaki, is developing ideas for an "inland island" biodiversity restoration sanctuary on ancestral lands in the Erua area near National Park township. The working name for the proposal is Pokaka EcoSanctuary.

The three tribes are seeking to address growing concern about urgent conservation and ecological issues in their ancestral estate, resulting from the decimation of biodiversity following the milling of the Waimarino sub-alpine native forests at the turn of the century and, more recently, poor pest management, continued loss of species, the effects of encroaching farmlands on ecology, and the increasing footprint of tourism.

Uenuku chair Aiden Gilbert said the proposed ecological restoration project would be the first iwi-driven ecosanctuary in Aotearoa, and would be founded upon traditional kaitiakitanga (conservation

Turn to Page 2

Conservation Minister Eugene Sage, at centre, looks at possible sites for a Pokaka eco-sanctuary.

more technical trails.

- The increased investment in this area (i.e. Ruapehu Sky Waka) is likely to increase rates of summer visitation especially around target markets.
- The Last Spike is adjacent to the proposed Pokaka Eco Sanctuary being developed by local iwi.
- The trail will include a range of forest types including beech forests, mountain cabbage tree groves and native forest margin areas.
- It is an easy grade which will generally be flat to undulating with an average grade of approximately 1.5%. This grade will ensure that the trail will have high appeal to larger and more diverse markets than steeper or

There is an identified risk that, because the trail will initially finish at the Last Spike, some riders wanting to ride the full Mountains to Sea journey may choose to ride the 6km on the State Highway to Erua. This risk can be mitigated by 'promoting and packaging' the trail as an easy grade 10/20km experience and by facilitating shuttles from Ohakune, Horopito and National Park. Until the next section of the trail is developed it will not be promoted as part of the wider journey but more one of the local trails to be experienced. It is anticipated that once the wider trail is developed, this marketing will still be relevant and improved with the addition of the White Elephant bridge and Makatote overbridge etc. It is also hoped that the duration of such a risk will be short if the Department is able to progress their technical amendments to the CMS.

In addition, it is anticipated that the development of this new section of trail will remove current cycle tourers off the State Highway.

The following table shows the proposed markets that are anticipated to be using the Last Spike section of the Missing link in the first year of operation. For the sake of comparison, the projections for the full Missing Link are also included.

Market	Missing Link Full	Missing Link Stage 1 Horopito to the Last Spike	
Mountains to Sea (2 Day)	700	350	Some multiday riders will shuttle to connect to the other parts of the trail at National Park, Kaiwhakauka or Mangapurua. Others will cherry pick sections of the wider trail journey which appeals to them.
Mountains to Sea (4 Day)	250	75	
Educational	1,700	1,700	The length, grade and locations of interest along the trail are likely to appeal to school groups who visit the area – this includes use of the trail by Hillary Outdoors.
Family Groups	1,800	2,000	The length of this trail, its grade and associated marketing are likely to mean that it will be very popular with family groups.
Dedicated NZ MTBrs	1,000	500	This user group will generally prefer longer rides but its association with the other nearby trails plus the bridges etc will appeal to all riders.

Dedicated International MTBrs	200	50	Similar to the above, however they are generally after longer full day rides.
Displaced TAC Walkers	400	200	This short experience will be an option to those TAC users who are staying in the vicinity (i.e. National Park, Ohakune etc)
Locals	250	200	Likely to be a go to trail for some Horopito locals and also used regularly by those in Ohakune and National Park. Lack of contiguous connection to National Park will impact some local use.
Skiers	300	200	Likely to be a popular alternative to skiing when the mountain is closed. Will be especially popular with families etc staying locally.
Cycle Tourers	500	500	Existing cycle tourers using the SH will be deviated onto the trail.
Walking Market	1,100	1,000	As a short / day walk the 10km hike will be in reasonable demand. Travel logistics (i.e. groups with two cars) are fairly straightforward if walked in one direction only.
Total	8,200	6,500	

Table 5 Missing Link market assessment estimates

In addition to the above there is likely to be other users who may visit the last spike and then walk to the Maunganuioteau bridge (2km return) and part way down the trail etc as a short walk. Similarly, users from Horopito are likely to walk to the Mangatuturu River area and back (9km return).

The feasibility of the trail should therefore be considered with the expectation that the trail will attract at least 6,500 users within the first year of it being fully completed. Given the trail elements and experiences that it offers it is anticipated that this use will grow at a rate of 4% per annum.

6 Trail Governance and Management

6.1 Mountains to Sea Trail Governance

The overall Mountains to Sea trail is currently governed by Ruapehu and Whanganui District Councils and the Department of Conservation. These three entities meet on an irregular basis to discuss the wider Mountains to Sea journey. Recently the governance focus has been on those sections of trail above Pipirkiki with the Department and Ruapehu District Council working closely together to address key trail issues such as the Kaiwhakauka and Mangapurua sections and also trail marketing matters. Ruapehu District Council has essentially taken a lead role in trail governance due to the amount of trail in the district and the recognised benefits the trail has for their communities.

At a sectional level, trail governance is currently led by those entities who are in governance / management roles at place and include representation by local iwi and in some cases community-based stakeholders. This provides more focus to their operations and management of the sections of trail which are most relevant to them.

The development of this business case process and also an initial response from MBIE to a previous business case has prompted discussion locally on what the most effective trail management and governance model looks like for the trail. During these discussions, it was acknowledged that the current model can be improved to ensure there is greater consistency in trail management, marketing and maintenance. As a result of those discussions a new governance model for the trail has been identified and is currently being considered by the Trail Partners. This new model is shown in Figure 8**Error! Reference source not found.** below, and has been developed in consideration of the following:

- The current trail is managed by the Department, RDC and Whanganui District Council, with each of those entities managing specific sections of the trail.
- Some parts of the trail are public road (Oio, Whanganui River Road etc) and should continue to be managed by the relevant roading authority.
- The Ruapehu Trails Trust is to be established with a governance role over those sections of trail within Tongariro National Park. This is required by the Tongariro National Park Management Plan.
- The existing trail is currently viewed as a set of individual trails for management purposes but it is anticipated that this will transition to a whole of trail view in the future.

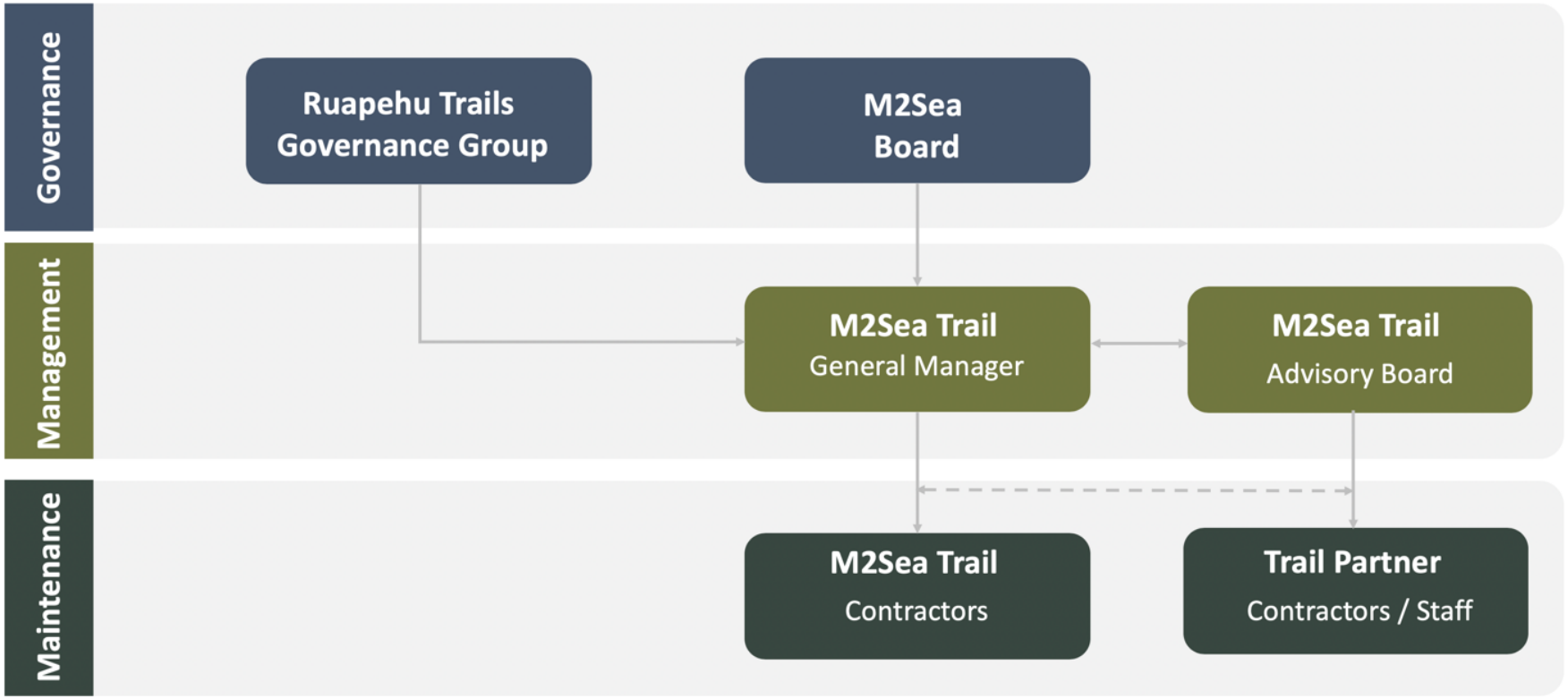


Figure 8 Proposed M2Sea Trails Trust Model

It is proposed to establish the Mountains to Sea Trail Trust to govern and manage the Mountains to Sea trail.

6.2 Mountains to Sea Trail Trust Board of Directors

The Trust will be led by a Board of Directors that will be made up of members appointed by Trail Partners as follows:

1. 1 Member appointed by Whanganui District Council
2. 1 Member appointed by Ruapehu District Council
3. 1 Member appointed by the Department of Conservation
4. 3 Members appointed by Iwi

The Board will have oversight and governance of the entire Mountains to Sea Trail and will be established by a MOU signed by the trail partners. The Board will appoint the trail General Manager and will hold mandate for decision making on budgets, levels of service etc. The Board will, facilitated by the trail GM, also hold key relationships with NZCT and other key stakeholders and partners.

6.3 Mountains to Sea Trail Trust General Manager

The General Manager (GM) will be appointed by Board and be the public face of the trail, similar to the Hauraki Rail Trail GM. The GM will have oversight over the entire trail and will be responsible for trail management and maintenance. They will also be responsible for partnerships, funding and maintaining relationships with the wider trail community. They will report to the Board and will work closely with the marketing coordinator for the trail. The GM will manage the contractors for the trail and be involved in quality management and trail planning. They will work with, and be supported by, the Trail Advisory Group which will consist of operational / management staff from RDC, WDC and DOC who provide technical and relationship support to the GM and the trail.

This position is to be funded by the District Councils and the Department initially, however it is anticipated that some of those costs will be reduced through the development of partnerships and additional funding streams in the long term.

6.4 Contractors and Procurement

Over time it is anticipated that trail contractors / crew will be managed by the GM. There will be a three-year transition period from the current contract model to the Trust managed model. These contractors will be locally based and will be trained through the proposed trail development processes for the Te Ara Mangawhero and Missing Link trails.

6.5 Ruapehu Trails Governance Group

As noted above, the proposed Trust will need to work with the yet to be established Ruapehu Trails Governance Group. The need for this group was identified during the partial review of the Tongariro National Park Management Plan. Figure 8 identifies how the proposed Trust is to work with the Ruapehu Trails Governance Group. The proposed Trust will provide direction to the Trail GM for those trails within the Park and the GM will manage contractors for those trails and report back to the Group.

6.6 Funding the Mountains To Sea Trail Trust

Funding for the establishment and running of the Trust will come from the District Councils and the Department of Conservation. Currently, Ruapehu District Council has a dedicated $50k allocation to unsubsidised maintenance, plus its investment in walking and cycling within its transport portfolio on 'on road and Heartland Ride' sections of the NZ Cycle Trail. This is estimated to be in the order of $50k per annum from its Land Transport account.

Trail maintenance in the Whanganui district is managed as part of its infrastructure network, however there are no committed funds for the establishment of the Trust.

The estimated annual maintenance costs for the proposed trails (including operational overheads) are $161,950 per annum. This is in addition to the maintenance costs for the existing sections of the Mountains to Sea trail. The maintenance costs for the trail during its establishment will be negligible and, realistically, the full maintenance costs will not be required until the proposed sections are fully developed.

There will also be costs associated with the running of the Trust and contractors. Some of this will be covered by the aforementioned maintenance costs but the role of the GM is likely to be on top of that figure. Dependent on the size of the GM role, that position could cost approximately $100,000 per year including expenses.

Both Ruapehu and Whanganui District Councils have made commitments to support this new governance model, including financial support. Letters of support can be found in Appendix 4.

6.7 Trail Management and Marketing

The proposed trails are to be managed and maintained by the Ruapehu Trails Trust. The Trust will be closely aligned (and is anticipated to merge with) the Ruapehu Mountain Bike Club that was established earlier in 2018 to manage the growing number of trails in the area. The club currently manage the Uenuku Pines Mountain Bike Park and their members undertake trail maintenance and development work on the Old Coach Road and the Marton Sash & Door Tramway track. They are supported by Ohakune 2000 (see Section 2.1.2) and have good relationships with local businesses, central government agencies (DOC

and LINZ) and local iwi. Members of the Trust also assisted in undertaking initial route assessments and setting out parts of the proposed trail.

While the exact details of how the Trust will operate is still being finalised, it will be similar to that of the Mokihinui-Lyell Backcountry and Bike Taupō Trusts, both of which are successful community-based trail managers.

The Trust will be managing the project build and will be made up of individuals selected by Ruapehu District Council to ensure that they have the skills and expertise to manage such a project.

The Trails Trust will be supported by Ruapehu District Council and provide guidance on project management and reporting. The project management and reporting will utilise the NZCT based systems, including the monthly reporting templates and risk assessment processes.

A 'Master Trail Builder' will be engaged to provide additional advice to the project manager but also technical advice and on job training to the trail crew which will include young members of the community. The role of the Master Trail Builder is seen as vital in ensuring a quality trail is developed using proper technique. This is very important considering the sensitive nature of the environment in which the trail will be built. This role will also build local capacity by training local trail crews so that they are able to build trails themselves and also maintain them into the future.

The Trust will also be supported by representatives from Bike Taupō Inc who will provide technical expertise and guidance to the Trust in all aspects of developing the trail. Bike Taupō has extensive experience in developing and managing shared use trails to a high standard and is nationally recognised for this.

This Trust will also maintain the trails. Trail maintenance for the proposed trails is anticipated to cost approximately $161,950 per annum. This includes operational costs for the trail governance entity as described above. Funding for these operational costs is anticipated to be sourced locally with contributions from the governance agencies, community grants, partnerships schemes, concessions and support from local businesses.

6.8 Trail Marketing

Marketing of the Mountains to Sea trail was identified as an issue in a 2017 marketing assessment by Destination Planning Ltd (DPL). The DPL report identifies that trail marketing was designated to the two Regional Tourism Organisations but despite some work on drafting a business plan, marketing action report and new website in 2015, there has been no formal adoption of these plans. Other than a map brochure and basic website, marketing has been operator led and reactionary since 2017. This has resulted in key operators promoting the sections of the trail they work on, leading to confusion around what the

Mountains to Sea trail is, with many users thinking it is limited to the 'Bridge to Nowhere' ride. The Old Coach Road section is also promoted separately as a short ½ or 1-day ride from Ohakune.

A similar view was expressed in the 2017 WOF process undertaken by Roger Coles. This process also identified that:

"The OCR is well promoted as a stand-alone ride. The fact that it is part of the Mountains to Sea seems incidental at times."

And for the Mangapurua trail:

"The mere name of this trail will draw in visitors wanting to experience the adventure of 'riding to the Bridge to Nowhere'! It may be the North Island's most recognised trail."

In both instances the trails are known as discrete rides. While a lot of trails have favoured sections, they are generally known within the context of the wider trail or journey that they are part of. The strength of these individual brands means that this wider context often goes unnoticed, to the detriment of the wider great ride.

The DPL report includes a series of recommendations to address marketing issues, as follows:

1. Establish a 0.5 Full Time Equivalent role dedicated to Mountains to Sea marketing coordination.
2. Consider combining this with the Timber Trail role to create a full-time position, given the significant duplication of functions and activities.
3. The role would best be housed in an RTO to simplify reporting lines and leverage complementary marketing resources.
4. Basing the person in the Ruapehu district would give them the most central access to trail operators and stakeholders.

A marketing role for the Mountains to Sea and Timber Trail has already been established and filled. That position is currently funded by Whanganui, Ruapehu and Waitomo District Councils for an average of 20 hours per week. Whanganui and Ruapehu District Councils have committed $30,000.00 per annum each for the trail marketing for the current LTP period.

It is anticipated that the trail marketing person will work closely with the Trail GM position.

This role has already adressed some of the key marketing issues associated with the current Mountains to Sea trail and provide a strong marketing platform for the proposed new sections. With a greater focus on marketing all sections of the trail as part of the wider journey, the Mountains to Sea will be better appreciated and understood by its users. This coordinated marketing effort will also address the current confusion about how to ride the trail, as discussed in Section 4.

7 Due Dilligence

7.1 Cultural Values

Mount Ruapehu and the wider Tongariro National Park hold immense cultural significance to local Māori. Recognising and protecting these important cultural values is critical to any new development within the Park. The Park is also subject to an unresolved Treaty of Waitangi claim[6].

Ngāti Rangi and Uenuku hold mana whenua over the part of the Park where the proposed trail would be built. Ngāti Tuwharetoa has also been approached regarding the proposed trail. Ngāti Tuwharetoa has indicated that, as per their tikanga, Ngāti Hikairo will leave the discussions on those matters with the Department and the affected iwi/hapu. In regard to the Tuwharetoa representative(s) on the Tongariro Taupō Conservation Board, it is expected that the Board members will support the stance of the affected iwi and/or hapu in all matters pertaining to any activity within the iwi/hapu rohe.

Both Ngāti Rangi and Uenuku have been involved in the trail advisory group to date and have indicated that they support the development of the trail in principle, specifically as it is a solution to the current safety issue of walkers and bikers using the Ohakune Mountain Road. Their key concerns are related to the cultural and environmental impacts of the trail.

A Cultural Impact Assessment must be undertaken prior to trail construction so the cultural values associated with the tupuna maunga are not compromised. This assessment should be undertaken by Ngāti Rangi as part of the works approvals process prior to any construction. To date, Ngāti Rangi has been involved in the trail planning process as an active member of the trail development working party. They have provided input into the proposed route to ensure it does not disturb important sites on the slopes of Ruapehu and acknowledge that the proposed route does avoid significant cultural sites.

Ngāti Rangi considers it important that they are involved in decision making on the future governance and management of the trail, regardless of who supervises the work. They see real opportunities for iwi and community employment resulting from the trail development that range from storytelling involvement to considering guiding and transportation initiatives on the maunga.

There is currently no formal Ngāti Rangi storytelling in the Park and they welcome the opportunity to be involved with any interpretation associated with the trail. Ngāti Rangi requires that they have control over developing and telling their stories. This could include placing Waharoa and Pou along the length of the trail.

[6] Wai 1130: Te Kahui Maunga

Monitoring and auditing the use and impact of the trail is also a key Ngāti Rangi concern. It is anticipated that the Environmental and Cultural Impact Assessments will identify which matters need to be monitored to avoid unanticipated environmental and/or cultural impacts.

Iwi can also play an important role in naming the trail to reflect its location and the importance of that location.

7.2 Ecological Values

The Department conducted a preliminary ecological impact assessment. They concluded that the impact of the new trail on the surrounding environment would be minimal because most of the trail already exists either as a walking track or historic tramline.

Their assessment included specific strategies to minimise impacts of the proposed track:

- Avoid the alpine flush area at Tūroa Ski Area (which has been achieved through the revised route).
- Investigate the alpine pond just below the Massey University Hut and avoid if possible (which has been achieved through the revised route).
- Minimise vegetation clearance where possible by restricting the width of the track to the minimum allowed.
- Avoid any trees larger than 30cm in diameter if possible as these could potentially be communal trees for bats (although they would be on the smaller end). The visual impact of the track will be minimised if large trees are kept. If this is not logistically possible, a bat ecologist should assess the likelihood of a tree being an active roost tree prior to felling.
- Undertake a survey for long-tailed bats and if they are present, any tree 15cm (diameter at breast height) or more identified as a potential roost tree by a bat ecologist needs to be assessed for long-tailed bat activity the night before it's felled.
- Undertake a full botanical assessment along the proposed track route to ensure mistletoe host species are not impacted by the development, and to identify any threatened species that have not been found to date (e.g. Dactylanthus) so the track can avoid those areas.
- If any lizard species are disturbed during construction (which is unlikely), a record should be taken and the lizard moved to a safe spot near where it was found.

The authors of the report noted this does not constitute a full ecological impact assessment as the exact route has not yet been determined. They recommended that an ecologist walk the final route to identify and mark any trees and other vegetation that should be avoided.

It is important to consider the impacts of the alternative to the trail being developed. The proposed trail is an alternative to widening the carriageway of the Ohakune Mountain Road to accommodate walkers and

cyclists. While this road corridor is not within the Tongariro National Park, it is part of landscape and ecosystems that overlap with the TNP. It is anticipated that road widening would create more than minor effects on the indigenous vegetation and habitat in that area. There would be little to no choice on the route as the road is already in place, and similarly limited opportunities to avoid sensitive areas or vegetation. This is especially pertinent for some of the larger trees that grow next to the OMR.

Any ecological assessment will also need to extend to the Missing Link. The development of that trail is over less sensitive areas, however care still needs to be undertaken. There are areas of established indigenous vegetation and wetlands where sensitive trail building will be required. In such instances an ecological based trail protocol should be adhered to.

7.3 Landscape Values

The potential effects of the proposed trails on the landscape were considered through the TNPMP review process. The Department sought advice from landscape experts, especially for those sections of trail in alpine areas on the upper slopes of Mount Ruapehu. A more detailed landscape assessment of the proposed route will have to be carried out through the resource consent and works approvals stage.

7.4 Historical Values

The new tracks between Tūroa Ski Area, Ohakune and Horopito will utilise the Bennett and Punch Tramway and the William Cowern Bush Tramway. Heritage Impact Assessments were prepared by Department staff on the potential impact of the new track on these currently unused tramways. They concluded that, if these tramways are restored as part of the proposed trail, work would need to be carried out that includes regrowth and slips cleared, drains and culverts reactivated, regular maintenance scheduled, storytelling developed, and key features restored. The following heritage character protection guidelines and recommendations will need to be followed to ensure that the values of the tramlines are not affected:

- The initial clearance of the tram route is minimal to provide access for a heritage inspection
- Heritage inspection is done by an experienced person to create a map, a GPS record and to understand heritage features
- During restoration work, maintain the character of the tramline; stick to the route; don't widen the cuttings
- Drainage culverts may be installed
- The remaining wooden sleepers and bridge beams are not practical to preserve
- Any objects discovered should be photographed and left where they are while the image is sent for identification

- Any major artefacts like log bogies and rails should be saved for possible restoration
- In particular the train wreck on the Bennett and Punch Railway should be stabilised as a key point of interest[7].
- Conversely, they noted that if the route is not developed then it is likely that the tramway route will be totally lost due to regrowth and slips.

While it has not been the subject of a historical assessment, it is noted that Blyth Track has been identified in section 4.1.9 of the TNPMP as a protected and identified historic resource, being the main bridle track to Blyth Hut prior to the construction of the OMR. Through initial route investigations it was noted that Blyth Track is severely eroded in places by water. This is due to the grade of the trail which exceeds 15% in places. The proposed trail would involve restoring the bottom section of this trail, and in some cases realigning it to a more sustainable gradient. Storytelling can also be put in place to convey the story of this trail.

Figure 9 The Last Spike Memorial

[7] The train wreck will be stabilised and has a separate work plan associated with it.

The Missing Link trail will provide an opportunity to showcase some important rail and pioneering stories to users. The proposed terminus of the Missing Link is at the Last Spike which is an important rail history site already marked with a memorial, seating, parking etc. It is proposed to further upgrade this site with toilets and additional signage and interpretation as part of the trail development. This, combined with the proposed bridge over the Maunganuioteau River adjacent to the rail viaduct, will be a strong experience element of the trail.

7.5 World Heritage Values

Tongariro National Park is one of only 29 sites in the world with dual World Heritage status. In 1990 it received World Heritage Site status for its natural landscape values and in 1993, under a criteria change, the special significance of the Park's mountains and cultural landscape to the Tuwharetoa and Whanganui people was recognised.

Normally, proposals within World Heritage sites are assessed against the 'statement of universal values' for the site, however the statement for this site is still being developed. In these circumstances the proposal will need to be assessed against the values as described at the time of nomination and the natural and cultural criteria under which these sites have gained status. These are contained in the following two nomination documents:

Nomination of Tongariro National Park New Zealand for inclusion in the WORLD HERITAGE LIST, prepared for the World Heritage Committee by the Department of Lands and Survey, New Zealand, December 1986.

- Nomination of Tongariro National Park by the Government of New Zealand for inclusion in the WORLD HERITAGE CULTURAL LIST, May 1993
- Where proposals have the potential to impact on the values of World Heritage sites, the proposal needs to be referred to the World Heritage Centre.

On review of the World Heritage nomination documents, the values the Park was nominated for are the volcanic landscapes in the Park and the significant cultural associations and importance of the mountains to Māori. Assessments would be undertaken of the cultural, landscape and ecological values of the Park to understand the potential impact of the proposal on these values which that make the Park globally important.

The development of the trail is likely to have a very localised visual effect and would not impact on the macro landscape features of the Park. Given the scale of the work proposed, the development will not have a large visual impact greater than any other trail in the Park. The proposed route has been chosen to minimise any visual effects above the treeline and uses existing tracks where possible. To ensure the trail is

developed with sensitivity towards the landscape values of the immediate area, a visual assessment is recommended as part of the works approval process.

The cultural impact discussed in Section 7.1 does not anticipate that the trail will adversely impact on the important iwi values and associations. This is primarily down to the involvement of local iwi throughout the process, including in route selection. Tuwharetoa will, however, need to be engaged with prior to the proposal advancing further.

The trail will still need to be developed in a manner that respects their values, so a cultural impact assessment is recommended as part of the works approval process. The storytelling component of the trail provides an opportunity for local iwi to tell their stories firsthand, allowing users of the area to have a better understanding of the important cultural values which are recognised by the Park's World Heritage status.

It is important to note that UNESCO advocates for buffers to World Heritage sites to ensure that adjacent development does not impact on the values that make these locations important[8]. The decision not to widen the carriageway of the Ohakune Mountain Road to accommodate walkers and bikes has meant that environmental damage to an area surrounded by the World Heritage area has been avoided.

7.6 Statutory Assessment

7.6.1 Department of Conservation

The appropriateness of developing a trail within the National Park has been discussed extensively through the Tongariro National Park Management Plan (TNPMP) review process. As noted above, the outcome of that process was an amendment to that plan which identifies the appropriateness of the trail being developed in a sensitive manner.

The Department has indicated that a concession and works approval will be required by the Ruapehu District Council (which can be transferred to the Trails Trust) prior to the development of the trail. As these applications will be for the development and management of a new asset on PCL then the processes will need to be considered through a notified process under the Conservation Act. Such processes can take quite a while and timeframes are dependent on the Departments resourcing and priorities. Conversations with the Department locally have been initiated and there is an awareness of the importance of this project and the need to ensure that the permission process occurs in a timely manner. A strong working relationship with the Department has been developed on this project and this will facilitate the development of a comprehensive assessment of effects that can be used to inform the

[8] World Heritage Papers 25. World Heritage and Buffer Zones: International Expert meeting on World Heritage and Buffer Zones. Davos, Switzerland March 2008.

concession, works approval and also resource consent processes. This working relationship will also facilitate a timely consideration process by the Department.

As noted above, the proposed trails have already gone through a management plan change. This process involved considerable public consultation and analysis of the trail and its potential impacts. Based on that process and initial due diligence undertaken it is considered that the concession and works approval will be secured, provided that trail planning and development are consistent with the provisions in the TNPMP.

7.6.2 Resource Management Act

Trail development is to occur on a range of tenures within the Manawatu Whanganui Region and the Ruapehu District. As such, the Manawatu Wanganui Regional Plan (One Plan) and the Ruapehu District Plan need to be considered.

Section 4 of the Resource Management Act excludes activity within public conservation land that is consistent with the associated management plan (National Park Management Plan, conservation management strategy etc) from requiring resource consents from District Councils. Section 4 of the Resource Management Act does not, however, exclude such activities from Regional Plan requirements.

7.6.2.1 Regional Plan Requirements

The Manawatu Wanganui Regional Council One Plan is the 'one stop shop' resource management planning document for the Horizons Region. It combines the Regional Policy Statement, Regional Plan and Coastal Plan and contains rules on matters such as earthworks, biodiversity and landscape protection. As the plan is a regional plan, works undertaken in the Park will require a resource consent[9].

It is possible that the earthworks required to construct the new sections of trail will trigger Discretionary Activity Rule 13-7 of the One Plan. This is due to the area of earthworks (more than 2,500m^2) and their location on steeper slopes and, in places, within 5m of some waterways. While the focus will be on those parts of the development that do not meet the permitted threshold, the wider effects of the activity will need to be assessed through the consent process.

Proposed bridges over the Mangawhero, Manganuioteao and Mangaturuturu Rivers will also trigger Discretionary Activity Rule 17-3 as they have a 'Natural State' value under Schedule B of the One Plan.

While vegetation clearance is also regulated in the One Plan, its definition excludes that which is undertaken within public conservation land and is consistent with a conservation management strategy, conservation management plan, or management plan established under the Conservation Act 1987 or any

[9] Section 4 of the Resource Management Act exempts activities undertaken on the public conservation lands which is consistent with a management plan or CMS from requiring land use consents from district council.

other Act specified in Schedule 1 to that Act. While there will be parts of the Missing Link developed on land outside of conservation land, it will not have the same vegetation values and will not trigger the need for any additional consents.

As the land disturbance and bridging activities are components of the same overall project, the two matters should be bundled together into the same application.

While the consent application preparation will add to the cost, it is considered that consent will be granted provided the trail building techniques described in section 2.1.3 of this report are used. Appropriate trail and bridge building techniques will not result in slope destabilisation and sedimentation of rivers and streams. Any consent lodgement will require a comprehensive Assessment of Environmental Effects, clearly noting the potential effects associated with the trail development and how these effects will be avoided, remedied or mitigated. As noted earlier, a Works Approval will be required prior to trail development. The AEE that accompanies the works approval application will be largely similar to that accompanying the resource consent application.

7.6.2.2 District Council Consents

As elements of the proposed trails will be outside of public conservation land, the Ruapehu District Plan will need to be considered. As there will be bridges and trail development occurring on such land which will not meet the set out in Section RU3 (Rural Zone) of the plan, a restricted discretionary activity consent could be required. The assessment undertaken as part of the regional consent process should more than satisfy the requirements of these rules.

7.7 Strategic Assessment

The feasibility assessment sets out the alignment of the proposals with regional strategies and plans. In addition to these, the trails have been recognised through the Accelerate 25 Growth Prosperous Manawatu and Whanganui document and also the 2017 Ruapehu Regional Visitor Development Plan. In both instances the proposed trails have been identified as important initiatives for the region.

The Manawatū-Whanganui Economic Action Plan (2016) identified tourism as the critical Ruapehu growth opportunity. Ruapehu is a destination with the natural 'greater outdoors' and nature-based resources, landscapes and assets sought by visitors. The location has good proximity to over three million New Zealanders and is favoured by many New Zealanders as a holiday location of choice, especially for those who are interested in outdoor activities. Ruapehu is also close to the international gateways of Auckland and Wellington Airports.

The proposed trails have been identified in the Ruapehu Regional Visitor Development Plan as one of the five iconic destination growing and experience investments of immediate importance. These projects are

considered by the Ruapehu 400 organisations as capable of delivering substantial regional economic development benefits to Ruapehu and the surrounding areas. The Plan identifies that the proposed trails are likely to result in increased jobs (through trail construction and direct and indirect servicing of users), social inclusion through effective training (as there will be a key focus on developing a local workforce) and enabling Māori to realise their full potential through significant participation in the trail development, operation and servicing.

7.8 Tenure

The proposed routes for the trails are in mixed tenure. The vast majority of the trails are within public conservation land administered by the Department of Conservation. There are also sections of government land managed by LINZ, KiwRail, Ruapehu District Council and NZTA. In addition, there are three affected private landowners.

7.8.1 Department of Conservation

The Te Ara Mangawhero and Horopito trails are to be developed on public conservation land within the Tongariro National Park. As set out in Section 7.6.1 of this report there are still permissions to be granted for the trail development, but the Department is supportive of the trails in principle. A management agreement or concession will be required between the trail development / management entity and the Department.

A letter of support from the Department can be found in Appendix 4.

7.8.2 New Zealand Transport Authority

The New Zealand Transport Authority (NZTA) have been engaged with in developing the feasibility assessment. NZTA has indicated that they are supportive of the proposed trails as they provide an alternative for walkers and bikers using the state highway network.

7.8.3 KiwiRail

Initial discussions with KiwiRail have identified the process for gaining permissions for the development of those sections of the Missing Link that are to use the rail corridor. Guidance provided by KiwiRail (see Appendix 3) has informed the proposed trail route to ensure that there is good separation between the trail and the rail lines. A rail crossing that was initially proposed has also been removed with the trail now crossing under the rail lines at an existing bridge site north of the Last Spike. It is anticipated that the key requirements for walking/cycleways developed on the rail corridor are able to be met by the route and design of the proposed trail.

Once the project is initiated it is recommended that the in-principle agreement stage is initiated by the trail developer.

7.8.4 Ruapehu District Council

There will be a number of locations where the trail will use road corridor owned by RDC. RDC are part of the Trust and are a key supporter of the trail. RDC has indicated that the trail can be developed on their land.

7.9 Communities of Interest

7.9.1 The Department of Conservation

The project is supported by the Department of Conservation through the recent partial change to the TNPMP. The department initiated the plan change process and associated feasibility work to ensure that the trail could proceed in a manner consistent with their statutory processes. This plan change process demonstrated that the proposal aligns with the Department's statutory and also strategic positions. Local staff have been proactive in working with RDC and also the Trails Trust to facilitate their establishment. The Department is currently working with the Trails Trust, local iwi and others to establish the governance framework for the trail.

7.9.2 Iwi

Ngāti Rangi, Ngāti Hauā and Uenuku Charitable Trust are the iwi of the area where the trails are proposed to be built. All iwi have been heavily involved in the planning for this project and will be formally involved in the project governance and management. Iwi see that there will be benefits to their people through employment in the trail development, ongoing management and in providing services such as transport and guiding. They also recognise the important economic benefits the proposed trails will have for the wider community they are part of. The incorporation of the storytelling / interpretation element of the project also offers an opportunity for iwi to tell their stories and to have their connections to the area appropriately recognised. Not only is this of great significance to iwi, but it will create a more engaging and memorable experience for riders by giving them a better understanding of the immense cultural values associated with the Ruapehu area.

There has been comprehensive engagement with iwi regarding the proposed trails. Iwi support is crucial to the development of these trails and their support has been in evidence through the progression of the Mountain Road upgrades and the change to the Tongariro National Park Management Plan. Without iwi support in those preceding processes the trail planning would not have been able to be progressed through to this stage. Iwi will also play a vital role in the subsequent permissions process and in trail governance.

7.9.3 Regional Council

The Manawatu Whanganui Regional Council has also indicated that they support the project in principle, noting that the trail is a key iconic project supporting the further development of tourism opportunities in the district and wider region. As such, it is a strategic priority for the region. In addition, the Accelerate25

governance team has previously endorsed and supported the project. An email confirming that support has been attached to this application in Appendix 3.

7.9.4 Local Communities

In addition to the groups listed above, the local Ruapehu communities (including Ohakune, Horopito and National Park) have been involved in the planning for these trails for a number of years. Community groups involved include Ohakune 2000, the Ruapehu Mountain Bike Club and the National Park Business Association. Individuals and communities were also active in submitting in support of the proposed trail through the TNPMP review process.

7.10 Funding sources

7.10.1 Capital Costs

Given the level of investment required, it is not possible to fully source funding locally or from other non-government funders. As set out in Section 8, there are significant regional benefits associated with the proposed trails, and national level funding which has a goal of lifting the productivity potential of a region is considered to be the most appropriate and viable funding source. The estimated costs of developing the trail do, however, reflect a level of community support, especially by businesses with goods and services donated or provided at a reduced cost.

Funding for the trail development is sought mainly from central government with some funding support locally. This local support is in addition to funding for the preliminary work from RDC, NZTA and the Department. The local community is not in a space where they are able to commit any further funding for the development of the trail. In 2016 the previous government committed $2,000,000 from the NCT Extension and Enhancement Fund. RDC is applying for the balance of $4565,933 to be funded by the Provincial Growth Fund. Initial discussions with MBIE regarding both funds has been positive.

Source of funding	Amount sought (Excluding GST)	Status
Provincial Growth Fund	$4,565,933	Application lodged April 2020
Ruapehu District Council	$100,000	Available 2020/2021
New Zealand Cycle Trails Extension and Enhancement Fund	$2,000,000	Application lodged April 2020
Total	**$6,665,933.00**	

7.10.2 Operational Costs

As set out in section 6, it is anticipated that there will be support and funding from the local community for the maintenance and management of the trails. The annual maintenance and operational costs of the proposed trails are estimated to be approximately $161,950 per annum. It is anticipated that this will be funded via the local community, through the Trust and with local government support. Having the Trust manage and maintain the trail will mean that maintenance costs are lower than if the government was doing so, and they can also access a wider range of funding streams. Again, this places significant onus on the establishment and running of the Trust in an effective and certain manner.

8 Economic Case

The user projections estimated spend and construction and maintenance costs were provided to Martin Jenkins to be put into the Great Rides Cost Benefit Analysis model. This model was reviewed by the NZCT team and the final model and outputs sent back to the project team for review and inclusion in the feasibility assessment and business case. In running the CBA model, half of the total capital costs were applied at a regional level. This makes the CBA results comparable to those of other trails which, predominantly, have 50% local funding. That information has been used to inform the following economic case.

8.1 Regional Benefits

The Ruapehu District is at the tail end of the regional development stakes in New Zealand. GDP per capita is 23% below the national average. Nominal GDP dropped from a 2011 peak of $540m to $506m in 2016. The average annual employment growth between 2001 and 2016 was around minus 2%.

Ruapehu's resident 2016 population sits at just over 11,700 persons. This population dropped by more than 17% between 2001 and 2016 and, under a low growth scenario, will decline to under 7000 persons by 2035.

The Manawatū-Whanganui Economic Action Plan (2016) identified tourism as the critical Ruapehu growth opportunity. Ruapehu is a destination with the natural 'greater outdoors' and nature-based resources, landscapes and assets sought by visitors. The location has good proximity to over three million New Zealanders and is close to international gateways located at the Auckland and Wellington Airports.

The proposed trails have been identified in the Ruapehu Regional Visitor Development Plan as one of the five iconic destination growing and experience investments of immediate importance. These projects are considered by the Ruapehu 400 organisations as capable of delivering substantial regional economic development benefits to Ruapehu and the surrounding areas. The Plan identifies that the proposed trails

are likely to result in increased jobs (through trail construction and direct and indirect servicing of users), social inclusion through effective training (as there will be a key focus on developing a local workforce) and they will enable Māori to realise their full potential through significant participation in the trail development, operation and servicing.

Outcome	Regional benefit	National benefits
Users	About 7,818 locals are expected to use the trail in the year after it is completed, increasing to 10,546 by year 10. By year 5, about 35,065 New Zealanders from outside the region are expected to ride the trail, increasing to 40,913 by year 10. About 4,133 international visitors are expected to ride the trail once it is completed, increasing to 6,548 in year 10.	
Visitor expenditure	The trails are expected to generate about $2.75 million in additional visitor expenditure regionally by year 10.	The proposed trails are expected to generate about $0.342 million in additional visitor expenditure nationally by year 10.
Construction and operational jobs	The trail is expected to generate up to 31 full time jobs over the four-year construction phase and sustain an average of 65 full time jobs each year over 10 years.	
CBA	The trail will have a net present value of $7.85 million, a benefit: cost ratio of 2.6, and an internal rate of return of 24 percent.	The trail will have a net present value of ($1.2 million), a benefit: cost ratio of 0.9, and an internal rate of return of 4 percent[10].
Visitor benefits	The present value of visitor spend is estimated at $12.6 million.	The present value of visitor spend is estimated at $1.6 million.
Health benefits	The trail is expected to contribute $0.16 million in health benefits.	The trail is expected to contribute $2.2 million in health benefits.
Consumer surplus	The trail is expected to contribute about $0.1 million in consumer surplus.	The trail is expected to contribute about $3.7 million in consumer surplus.

Table 6. Summary of economic and social benefits from the proposed trail

8.2 Outcomes

Outcomes have been calculated for the benefiting region (Ruapehu District) and New Zealand (national).

[10] This reflects the 100% government funding contribution.

Summary metrics	Regional	National
Net Present Value	$7,853,530	($1,217,176)
Benefit:Cost ratio	2.6	0.9
Internal rate of return (IRR)	24%	4%
Net Benefit Summary		
Total benefits (NPV)	$12,862,662	$7,525,823
Total costs (NPV)	$5,009,131	$8,742,999
Benefits Summary		
Visitors (NPV)	$12,577,143	$1,572,679
Health (NPV)	$166,452	$2,191,838
Consumer surplus (NPV)	$106,120	$3,701,082

Table 7.Summary cost benefit metrics

The trails are expected to result in a net economic benefit of $7.85 million to the region. This represents a positive benefit:cost ratio of 2.6 and an internal rate of return of 24 percent.

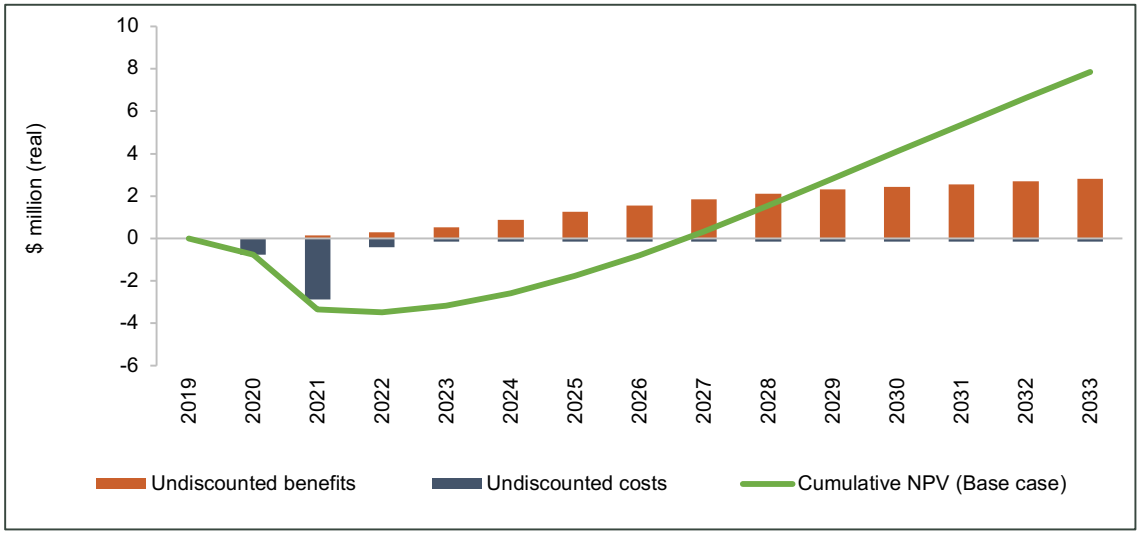


Figure 10.Annual regional costs, benefits and cumulative net present value

As shown in the graph, the largest costs occur during the construction phase and benefits start accruing from the second year when the first new extensions are opened to the public. Benefits are greater than costs from year 2.

8.3 Employment

A key objective of the Provincial Growth Fund and the NZCT Trails is to encourage job growth, particularly in the regions. Jobs are created during the construction phase of the trails and from providing services to users of the trails once they are open.

The estimated construction cost of the trails is $6.6 million incurred over three years. Many jobs will be supported during the construction phase.

The immediate employment benefits from the trails are likely to take place during construction. Jobs will be for machine operators and in bridge and underpass construction. However, more options for cycle trail users will provide business confidence for new investment in cycle hire, cycle transportation and cycle guide businesses. This will enable small to medium enterprises to employ additional full or part- time staff, making a real contribution to the district's economic performance. Improved business confidence and prospects helps to reduce unemployment levels, outward migration and dependency ratios.

There will be indirect benefits to the local (Ruapehu District) businesses, with greater occupancy and use of transport, accommodation, cafés and bike providers. This increased economic activity is likely to encourage increased investment by local businesses and assist new business investment confidence, as well as support improved property values.

The economic benefits of the proposed trail will be driven initially by the construction phase over the first year. Construction could start in the second half of 2018 once consents obtained. It is estimated that there will be up to 31 jobs created during the construction phase of the trails and an additional 96 ongoing jobs created by 2033.

Once the trails are completed, we expect additional visitors, staying longer, will generate significant new visitor expenditure in the region. This increased expenditure will support several businesses and jobs. There will also be maintenance work associated with the trail.

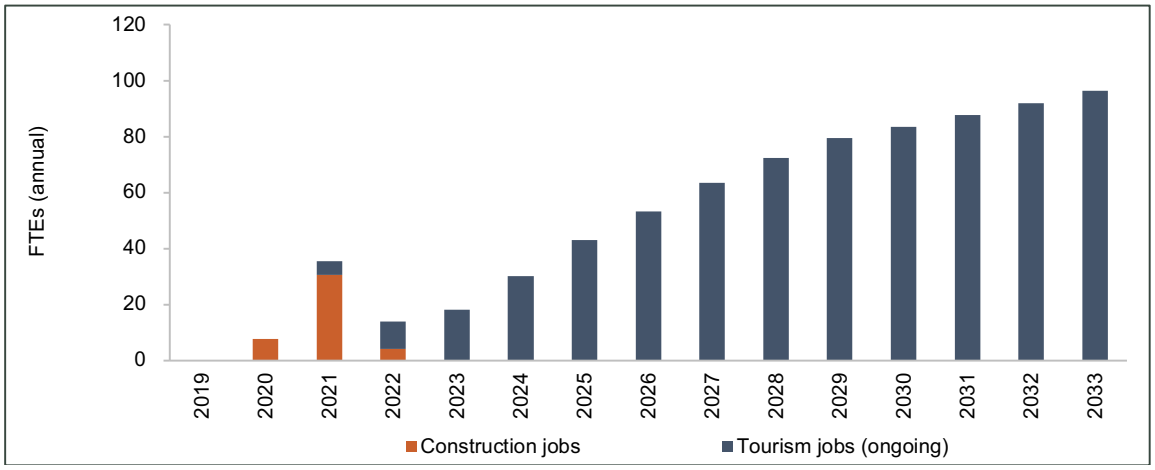


Figure 11.Jobs supported in the Ruapehu District

8.3.1 Additional visitor spend

In addition to the spend associated with the construction of the trails, based on the predicted daily spend associated with bikers who ride the Mountains to Sea Trail ($173 - $224 per day), the proposed trails are estimated to generate a net benefit from visitor expenditure to the region of $2.2 million per annum after year five and $2.8 million after year 10 (Figure 12).

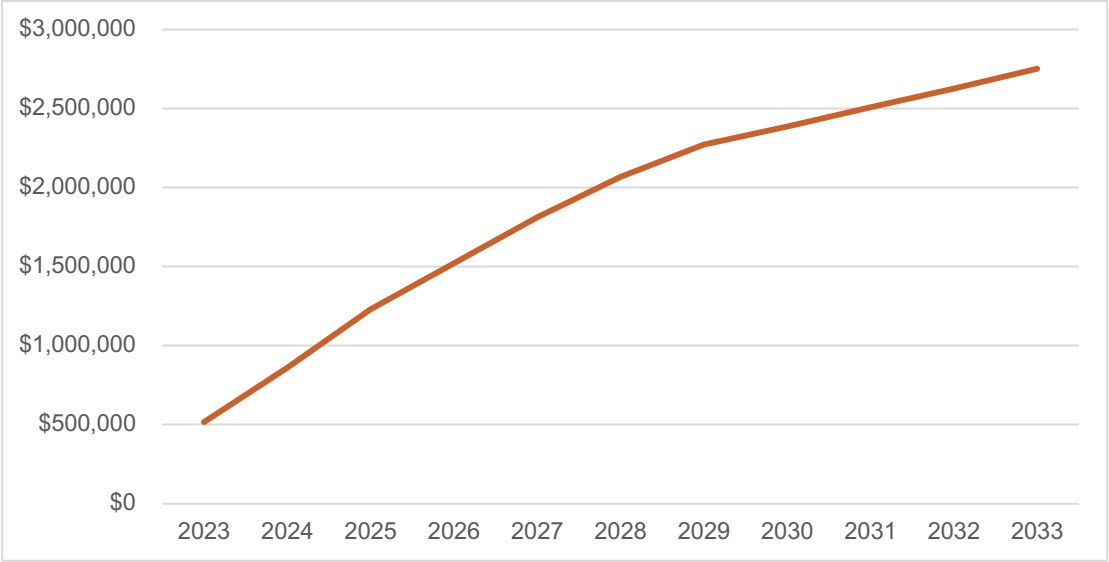


Figure 12 Regional net benefit from additional visitor expenditure

9 Recommendations

Both the Te Ara Mangawhero and the Missing Link trails will be popular rides with wide appeal. Market based projections indicate that their use will benefit the local economy through increased spending and employment opportunities. The trails will be built through unique and significant landscapes in the heart of the central North Island. The volcanic landscapes of the central North Island are not found elsewhere in

the country and currently attract high volumes of domestic and international tourists seeking outdoor experiences. The environment is rich in environmental, cultural and historical values that require a sensitive and collaborative approach to trail planning and development. This approach will need to be undertaken through the permission process required to secure works approvals and resource consents from the Department, Regional Council and District Council. It is anticipated that, assuming the appropriate levels of due diligence are undertaken in the planning phase, such permissions should be able to be obtained.

The new sections of the trail will form valuable links to the wider Mountains to Sea trail and will work to address some of the identified issues with the trail. It is anticipated these new trails will result in long-term growth in use over the wider Great Ride, provided that the proposed and existing trails are maintained, marketed and managed effectively.

To ensure that this happens, issues with trail governance for the wider and proposed trails will need to be resolved. While a governance and management model has been developed and agreed to by key parties, implementing this in an effective manner will be critical to the ongoing success of the trail. There have been issues acknowledged with trail governance and marketing in the past, however RDC, the Department and WDC have been working more actively towards implementing a more effective governance model. It is noted that the Ruapehu Trails Trust, which has been proposed as the management entity for the new trails, has yet to be formed. The formation and formalisation of that Trust should be a priority, otherwise another entity will be required to develop and administer the trails, which could be problematic.

Similarly, the Department has been actively working to resolve trail issues on the Mangapurua and Kaiwhakauka sections of the trail. They are currently undertaking works to bring the trail up to a consistent Grade 3 standard and also facilitate the future maintenance of these sections.

Local government and third party funding for trail development is limited in the District and is reliant on central government support. In 2016 the government committed $2 million to the project (through the NZCT fund) and a further application has been made for $2,577,200 from the Provincial Growth Fund. Subsequent to that application, the route of the Missing Link has been revised and re-costed. The original costs for the Te Ara Mangawhero trail were also reviewed to ensure that they reflected up to date costs. The overall project is now valued at $6,665,933. The funding for the proposed development is expected to come largely from central government, meaning the trail will have a benefit at the national level but a significant positive benefit at the regional level.

Trail maintenance is anticipated to cost approximately $161,950 per annum for the proposed new sections. This figure includes operational costs for the trail management entity. Costs are anticipated to be funded via the local community through the Trust. Having the Trust manage and maintain the trail will

mean that maintenance costs are lower than if the government was doing so, and they can also access a wider range of funding streams. Again, this places significant onus on the establishment and running of the Trust.

As well as providing key links to the Mountains to Sea trail, the proposed trails will also provide stronger links to the settlements along its route. Ohakune, Horopito and National Park will become more relevant to the journey and there will be more opportunities for those communities to provide on-trail services.

Provided that trail governance and funding matters are resolved, it is anticipated that the development of the proposed trails will have positive outcomes for the local community and also for the wider NZCT family of trails.

Appendix 1 Te Ara Mangawhero Market Based Assessment

A Market Based Assessment was undertaken with Dave Bamford which indicates that initial use would be between 17,000 and 29,250 people in the first year and 34,250 and 48,750 in the fifth year. The following is a summary of the process used:

The Product

The following product definition was established prior to the assessment being undertaken (note Section 6 – Horopito connection) and was not factored into the description of the product.

The Te Ara Mangawhero trail is a 20km grade 2-3 trail that is predominantly downhill. It will start at Tūroa which has a café, parking and toilet facilities. Tūroa is located in an alpine environment on the slopes of Mount Ruapehu, and within Tongariro National Park which has dual World Heritage status. Tūroa and the upper part of the trail provide expansive views down the mountain and south and west over the central North Island. The gradient of the trail will allow it to be walked and ridden by a wide range of users with varying ages and experiences. The proposed trail will be built on two established attractions - the Round the Mountain trail and the Mountains to Sea New Zealand Cycle Trail. The trail will descend from an alpine environment through a range of altitudinal-based habitats till it reaches Ohakune. The trail will likely take about 1.5- 2 hours for most cyclists.

Current Key Data and Resources

A consideration of the following key data sets:

- An analysis of current visitor arrivals to NZ and CNI
- An analysis of future visitor arrivals to NZ and Ruapehu
- An analysis of current cycle use in NZ and CNI
- An analysis of cycle use trends in NZ and CNI
- A comparison of TRC's demand analysis of 5 NZ Cycle Trails assessed in 2010-12 and actual numbers delivered. In summary, these demand assessments were on the lower end of the user numbers now occurring (i.e. Great Lake Trails (Taupō) and the Timber Trail)
- Mega trends from other NZ cycle trails – both urban and rural
- An analysis of Ohakune commercial cycle business data - including bike hire
- An analysis of Tūroa winter use
- Tūroa spring use and possible closed ski area days
- Tongariro Taupō Destination Management Plan
- TAC report
- MBIE Manawatu-Whanganui Growth Study

- Missing Link Report
- Pers com by the author and Dave Bamford with – Dave Mazey (RAL), Warren Furner (RDC), Jane Gamble (Mountain Bike Station Ohakune), Evan Freshwater (NZCT), Julian Tovey and Jonno Maxwell (DOC), Mark Gibson (Top Gear Cycles, Taupo), Dean Sherritt (Ohakune 2000) and Peter Masters (Bike Taupō).

Trend Indicators

The following trend indicators were considered:

- New Zealand tourism
- Local tourism
- Cycle use
- Walking for recreation
- Events

Biking:

On review of other biking products in New Zealand it was considered that the proposed trail is unique in the location and ride experience that it could offer. There are, however, other biking trails in the vicinity that do offer similar distances or have some characteristics in common. These include the following trails:

Tongariro National Park and surrounds

- The Old Coach Road (NZCT)*
- Fishers Track
- 42 Traverse
- Tukino Mountain Road
- Tree Trunk Gorge and Pillars of Hercules
- Martin Sash & Door/Erua Tramway cycleways
- Rangataua Forest

Wider Central North Island

- Mangapurua (Bridge to Nowhere)*
- Tongariro River Trail
- Great Lake Trail (NZCT)
- Timber Trail (NZCT)

* Complementary trails in that they are able to be ridden together

Walking

Given the range of walking opportunities in the Park, the proposed trail is less of a unique proposition for walkers. The Tongariro Alpine Crossing and the trails around Whakapapa (including the Tama Lakes and Northern Circuit) already allow for walking experiences within an alpine and volcanic landscape. The proposed trail will form part of the Round the Mountain Track. It is complementary to that trail and will enhance its safety by keeping walkers off the OMR. Given that the trail is serviced from Ohakune and Tūroa and it has an established transport service, it is likely to be the most popular day walk on the southern side of the mountain.

Markets

The following markets have been identified as being relevant to the proposed trail.

Market	Description
Skiers	In 2015 there were 174,439 skier days at Tūroa Ski Area and 159,289 at Whakapapa Ski Area. It is considered that there is a large overlap between ski field users and the bike market and that there will be significant appeal in riding down the mountain at the end of the ski day. In addition, season and life pass holders (especially) generally stay in the area for longer and will not ski all of those days (primarily due to weather), and the opportunity that the new trail presents will be a major attractor. This will be facilitated by direct marketing by RAL. The bike trail may also help increase both winter and summer users of the RAL lift facilities. Spring skiers are more likely to ride the trail due to the longer days, higher snow levels and better weather.
Round the Mountain	Users of the Round the Mountain Track will continue, and it is anticipated that the use in the Tūroa area will grow with the realignment of the track to Tūroa and the potential of new marketing of the trail by RAL during the summer months.
Walking Market	Numbers using the proposed trail as a day walk, either in its entirety or just sections (not Round the Mountain Track users), are anticipated to grow. This anticipated growth is due to the location of the trail, its downhill nature, the potential for storytelling, proximity to urban areas and services such as transport, and its ability to be walked as a whole or by section.
Summer Cyclists Ohakune Holiday	Those who are vacationing in Ohakune and will bring their bikes. It is anticipated that some of these potential users will be those who would have done the Old Coach Road, but it is expected that the unique nature of the trail and associated marketing will increase the numbers of people who holiday in Ohakune and will bring their bikes.
Summer Cyclists Regional	This is based on a two and a half hour drive catchment from Ohakune including the Manawatu, Whanganui, Taupō district, Rotorua and the wider Ruapehu districts (approximate population of 300,000 people).

Market	Description
Summer Cyclists wider New Zealand	Bikers from the wider North Island and South Island.
Summer Cyclists International	Those who travel to New Zealand for the purposes of riding, including Australians flying into Rotorua to ride.
Tongariro Alpine Crossing People	Those who travel to the area to walk the Tongariro Alpine Crossing and either choose to do the proposed trail instead (due to weather or spontaneous choice) or will do it as well given they are in the area (which will be facilitated by transport operators offering packages etc.).
Mountains to Sea (2 Day)	Those who will ride the Mountains to Sea ride in two days (i.e. OMR, OCR and Mangapurua).
Mountains to Sea (4 Day)	Those who will ride the Mountains to Sea trail in four days (i.e. OMR, OCR, Missing Link, Mangapurua and Pipiriki to Whanganui).
Events	Walking and running events, including adding the trail or parts of it to multisport events. The success of the recent Ruapehu Express event provides a good indication of the success of the area for such events. This market is not anticipated to include biking at this stage. This is due to the fact that it is hard to have such a trail (i.e. predominantly downhill) open to the public during such an event given the risk of conflict with other users.
Locals	Those Ohakune locals who will use the trail on a regular basis for exercise and recreation. This also includes RAL staff who may use the trail to commute home at the end of the working day.
Educational	Schools, Hillary Outdoors and army using the trail as part of field trips and exercises. The Park is currently a popular location for both and is seen as an alternative to the TAC.

Predictions

The following predictions have been undertaken based on the markets discussed earlier. In every case, conservative estimates were used. In addition, an exclusive approach was taken for each market, i.e. where there is possible for overlap, the number was reduced or a more conservative estimate was used to ensure there was no double counting. The predictions by market are shown in the table below.

Market	Year 1 Low	Year 1 High	Year 5 Low	Year 5 High
Spring Turoa Skiers	3,000	4,000	5,000	10,000
Winter Skiers	1,500	2,000	2,000	3,000
Round the Mountain Track	1,000	1,500	2,000	2,500
Walking Market	5,500	3,000	3,500	5,000
Summer Cyclists Ohakune Holiday	3,000	4,000	4,500	6,000
Summer Cyclists Regional	2,000	4,000	4,500	5,000
Summer Cyclists North Island	1,500	3,000	3,500	4,000
Summer Cyclists International	500	1,000	1,500	2000
Tongariro Crossing People	500	2,000	2,250	4,000
Mountains to Sea (2 Day)	1,000	2,000	2,250	3,000
Mountains to Sea (4 Day)	500	1,000	1,250	1,500
Events	500	750	750	1,000
Locals	250	500	500	750
Educational	250	500	750	1,000
Total	**21,000**	**29,250**	**34,250**	**48,750**

Appendix 2 Trail Development Costs

Section 1 Lower Bennett and Punch

Section	length / number	Item Cost	Cost
Development of new Trail	600m	$80.00 /m	$48,000.00
Upgrade of existing Trail	4300m	$40.00 /m	$172,000.00
Boardwalks	300m	$350.00 /m	$105,000.00
Bridges	35m	$2,000.00 /m	$70,000.00
Counter	1	$8,000.00 each	$8,000.00
Signage and Wayfinding			$30,000.00
Engineering	80 hours	$200.00 per hour	$16,000.00
Helicopter	6 hours	$2,500.00 per hour	$15,000.00
Trail Length	4,900 m		
	Sub Total		**$464,000.00**
	Contingency	**15%**	**$69,600.00**
	Total		**$533,600.00**
	Per m cost		$108.90

Section 2 Campground Loop

Section	length / number	Item Cost	Cost
Development of new Trail	300	$80.00 per m	$ 24,000.00

Upgrade of existing Trail	1700	$40.00 per m	$ 68,000.00
Boardwalking		$350.00 per m	$ -
Bridges	15m	$2,000.00 per m	$ 30,000.00
Signage and Wayfinding			$ 10,000.00
Engineering	40 hours	$200.00 per hour	$ 8,000.00
Helicopter	4 hours	2,500 per hour	$ 10,000.00
Trail Length	2,000 m		
	Sub Total		$150,000.00
	Contingency	15%	$22,500.00
	Total		$172,500.00
	Per m cost		$86.25

Section 3 Horopito Link Trail

Section	length / number	Item Cost	Cost
Development of new Trail	2,000m	$80.00 per m	$ 160,000.00
Upgrade of existing Trail	9,000m	$40.00 per m	$ 360,000.00
Boardwalking	150m	$350.00 per m	$ 52,500.00
Bridges	15m	$2,000.00 per m	$ 30,000.00
Counter	1	$8,000.00 each	$ 8,000.00
Signage and Wayfinding			$ 10,000.00
Engineering	80 hours	$200.00 per hour	$ 16,000.00
Helicopter	4 hours	$2,500 per hour	$ 10,000.00

Total length	11,000m		
	Sub Total		**$646,500.00**
	Contingency	**15%**	**$96,975.00**
	Total		**$743,475.00**
	Per m cost		**$67.59**

Section 4 Blyth to Mangawhero and Upper Bennett and Punch

Section	length / number	Item Cost	Cost
Development of new Trail	2,300m	$80.00 per m	$ 184,000.00
Upgrade of existing Trail	1,600m	$40.00 per m	$ 64,000.00
Boardwalking	100m	$350.00 per m	$ 35,000.00
Bridges	20m	$ 3,000.00 per m	$ 60,000.00
Toilet	1	$ 40,000.00 each	$ 40,000.00
Counter	1	$ 8,000.00 Each	$ 8,000.00
Signage and Wayfinding			$10,000.00
Engineering	120	$200.00 per hour	$ 24,000.00
Helicopter	8	$2,500 per hour	$ 20,000.00
Trail Length	**3,900 M**		
	Sub Total		**$445,000.00**
	Contingency	**15%**	**$66,750.00**
	Total		**$511,750.00**
	Per m cost		**$131.22**

Section 5 Chainshed to Old Blyth and Old Blyth Track

Section	length / number	Item Cost	Cost
Development of new Trail	2,300m	$80.00 per m	$184,000.00
Upgrade of existing Trail	3,500m	$40.00 per m	$140,000.00
Boardwalking	500m	$350.00 per m	$175,000.00
Bridges	50m	$3,000.00 per m	$150,000.00
Counter	1	$8,000.00 per hour	$8,000.00
Signage and Wayfinding			$10,000.00
Engineering	100 hours	$200.00 per hour	$20,000.00
Helicopter	5hours	2500per hour	$12,500.00
Trail Length	5,800m		
	Sub Total		**$ 699,500.00**
	Contingency	**20%**	**$ 139,900.00**
	Total		**$ 839,400.00**
	Per m cost		**$ 144.72**

Section 6 Horopito to Last Spike

Item	length / number	Item Cost	Cost
Existing Gravel Road	**3,000m**		

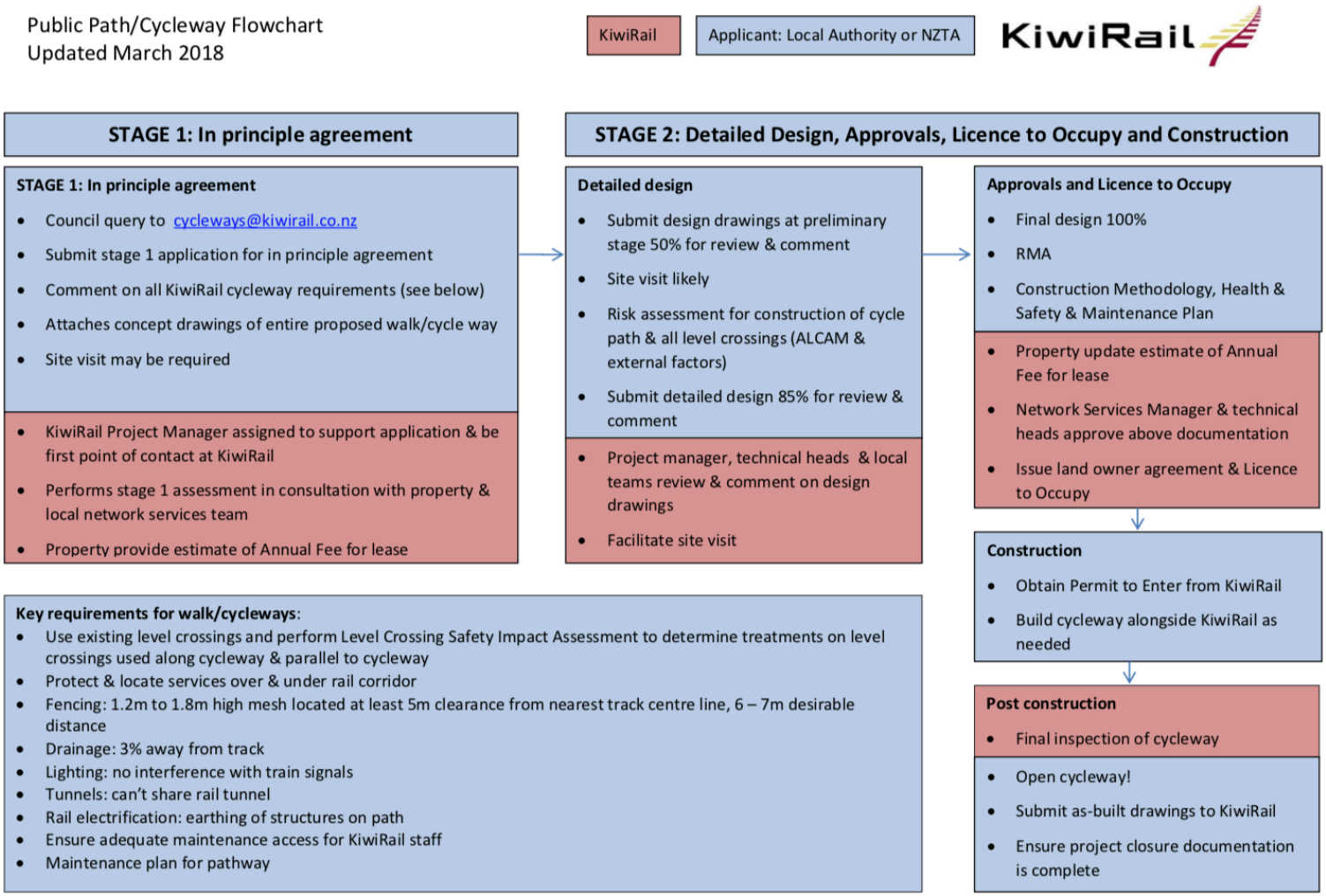
Trail	1,400m	$15.00 per m	$ 21,000.00
Bridge 1	6m	$ 3,000.00 per m	$ 18,000.00
Bridge 2	15m	$ 3,000.00 per m	$ 45,000.00
Bridge 3	5m	$ 3,000.00 per m	$ 15,000.00
small bridges	5	$ 600.00 each	$ 3,000.00
Trail	1000m	$ 40.00 per m	$ 40,000.00
Trail	1000m	$ 50.00 per m	$ 50,000.00
Bridge (Mangaturuturu)	35m	$ 3,000.00 per m	$ 105,000.00
Bridge	15m	$ 3,000.00 per m	$ 45,000.00
Trail	3000m	$ 40.00 per m	$ 120,000.00
small bridges	15m	$ 600.00 each	$ 9,000.00
Bridge	5	$ 3,000.00 per m	$ 15,000.00
Bridge (Maunganuiaoteao)	100m	$ 4,000.00 per m	$ 400,000.00
small bridges	5	$ 600.00 each	$ 3,000.00
Trail	1000m	$ 40.00 per m	$ 40,000.00
Toilets	1	$ 70,000.00 each	$ 70,000.00
Shelter / interp	1	$ 60,000.00 each	$ 60,000.00
Bridge and under trail	15m	$ 3,000.00 per m	$ 45,000.00
Fencing (rail)	1,000m	$ 16.00 per m	$ 16,000.00
Counter	1	$ 8,000.00 each	$ 8,000.00
Signage and Wayfinding			$ 50,000.00
Weed and pest control			$ 30,000.00
Engineering and Design	200 hours	$ 200.00 per hour	$ 40,000.00
Helicopter	25 hours	$2,500 per hour	$ 62,500.00

Trail length (m)	10,601		
	Sub Total		**$1,310,500.00**
	Contingency	**15%**	**$196,575.00**
	Total		**$1,507,075.00**
	Per m cost		**$142.16**

Section 7 Turoa to Chainshed

Section	length / number	Item Cost	Cost
Development of new Trail	1,500m	$110.00 per m	$ 165,000.00
Upgrade of existing Trail	100m	$60.00 per m	$ 6,000.00
Boardwalking	3,100m	$350.00 per m	$ 1,085,000.00
Bridges	60m	$3,000.00 per m	$ 180,000.00
Counter	1	$8,000.00 each	$ 8,000.00
Signage and Wayfinding			$ 10,000.00
Weed and pest control			
Engineering	200	$200.00	$ 40,000.00
Helicopter	25	2500	$ 62,500.00
Track length	4,986m		
	Sub Total		**$ 1,556,500.00**
	Contingency	**20%**	**$ 311,300.00**
	Total		**$ 1,867,800.00**
	Per m cost		**$ 374.61**

Appendix 3 Kiwi Rail Public Path/Cycleway Flowchart



Appendix 3 Support from Manawatu Whanganui Regional Council

From: **Nic Peet** Nic.Peet@horizons.govt.nz
Subject: Re: Te Ara Mangawhero PGF Application
Date: 4 October 2018 at 11:32 AM
To: Rowan Sapsford rowan@perceptionplanning.co.nz
Cc: Warren Furner Warren.Furner@ruapehudc.govt.nz

Tena koe Rowan

Please take this email as confirmation of support from Accelerate 25 for the development of Te Ara Mangawhero. The trail is a key iconic project supporting the further development of tourism opportunities in the district and wider region. As such it is a strategic priority for the region.

The Accelerate25 governance team has previously endorsed and supported the project.

Naku noa, na
Nic

Dr NIC PEET I Group Manager Strategy & Regulation
DDI 06 9522876 I M 021 227 7160 I E Nic.Peet@horizons.govt.nz
Horizons Regional Council 11-15 Victoria Avenue | Palmerston North 4410

On 4/10/2018, at 11:11 AM, Rowan Sapsford <rowan@perceptionplanning.co.nz> wrote:

> Hi Nic, I am currently in the process of submitting an application to the PGF for funding for the Te Ara Mangawhero trail between Turoa and Ohakune as well as the Missing Link to National Park. I understand from talking to Warren Furner that the regional council is supportive of this project. Is it possible to get a short letter or email confirming this support in principle. Unfortunately time frames are very short (are having to submit the application this week) as Minister Jones is keen to make an announcement next month.
>
> If you are able to fire something through that would be great otherwise we can proceed with out it.
>
> Please do not hesitate to give me a call if you require further information.
>
> Nga mihi
>
> _____
> Rowan Sapsford
>
> <PPL email signature logo.jpg>
>
> Level 1, 127 Tongariro Street
> Taupo 3330
> 07 3788 105 | 021 744 957
> perceptionplanning.co.nz
>
> <Spoken email signature logo.jpg>
> spoken.co.nz
>
> <FB logo email signature.tiff>
> We're on Facebook

Appendix 4 Letters of Support

RUAPEHU DISTRICT COUNCIL
Private Bag 1001, Taumarunui 3946, New Zealand
Telephone +64 7 895 8188 • Fax +64 7 895 3256
Email info@ruapehudc.govt.nz
Website www.ruapehudc.govt.nz

Our Ref: 718794
File: E01-0024

11 June 2019

Ministry of Business, Innovation and Employment
15 Stout Street
WELLINGTON

To Whom It May Concern

SUPPORT IN PRINCIPLE FOR PROPOSED MOUNTAINS TO SEA TRAIL GOVERNANCE STRUCTURE

Following on from the Mountains to Sea Cycle Trail Partnership group hui held in Ohakune on 24 May, Ruapehu District Council (RDC) would like to reiterate our support in principle for proposed trail governance model. This in principle support is given with the understanding that there will be further discussion amongst the parties regarding the detail of the governance model and also ensuring that Whanganui river iwi are appropriately represented.

We feel that a governance body established specifically to manage the whole trail is the best structure. It will give necessary focus on the trail its self, enable central government funds to be accessed that council and the Department of Conservation are not eligible for, will be a more effective vehicle for securing local financial support than either DOC or council.

RDC is committed to be a working part of this body to ensure that the Mountains to Sea Trail is managed to be a world class trail experience.

Please do not hesitate to contact me if you would like to discuss this matter further.

Yours sincerely
s9(2)(a)

Don Cameron
MAYOR

dc: nf

The Ruapehu District ... where adventure begins !

WHANGANUI DISTRICT COUNCIL
TE KAUNIHERA A ROHE O WHANGANUI
OFFICE OF THE MAYOR

28 August 2019

Clive Manley
Chief Executive Officer
Ruapehu District Council
TAUMARUNUI 3946

Tena koe Clive

Support in Principle for Proposed Mountains to Sea Trail Governance Structure

Following on from the Mountains to Sea Cycle Trail Partnership governance group Hui held in Ohakune on 24 May, 2019 the Whanganui District Council and Whanganui and Partners would like to reiterate our support in principle for proposed trail governance model.

This support is given in principle with the understanding that there will be further discussion amongst the parties regarding the detail of the governance model and also ensuring that Whanganui river iwi are appropriately represented.

We feel that a governance body established specifically to manage the whole trail is the best structure. It will give necessary focus on the trail itself, enable central government funds to be accessed that council and the Department of Conservation (DOC) are not eligible for and will be a more effective vehicle for securing local financial support than either DOC or Council on its own.

Whanganui District Council and Whanganui & Partners are committed to be a working part of this body to ensure that the Mountains to Sea Cycle Trail is managed to become a world-class cycle trail experience.

Please do not hesitate to contact me if you would like to discuss this matter further.

s9(2)(a)

Mayor Hamish McDouall
Mayor - Koromatua 0 Te Kaunihera o Whanganui

s9(2)(a)

Kym Fell
Chief Executive
Whanganui District Council

101 GUYTON STREET • PO BOX 637 WHANGANUI NEW ZEALAND
PHONE 06 349 0001 • DDI 06 349 3086 • FAX 06 349 0000
EMAIL MAYOR@WHANGANUI.GOVT.NZ • WWW.WHANGANUI.GOVT.NZ

Department of Conservation
Te Papa Atawhai

1st April 2020

Mr Warren Furner

Regional Tourism Development Manager

Ruapehu District Council

Tena koe Warren

Department of Conservation support for Mountains To Sea Great Ride Business Case

Thank you for consulting with the Department of Conservation (DOC) on the application for funding to the Ministry for Business, Innovation and Employment for the construction of the Te Ara Mangawhero section of Nga Ara Tuhono (Mountains to Sea) cycle trail.

DOC supports the development of the remaining sections of the trail and the business case being put forward.

We will want to discuss the details of construction and sustainable future management of the trails further including the governance and management structure to manage the trails into the future. This should be done with the support of treaty partners and community.

Disclaimer For the avoidance of doubt, any support for a financial grant for the proposal by the Minister of Conservation or the Department of Conservation shall not be construed as approval, consent or authorisation of the proposal. If the proposal requires a concession or any other form of authorisation under the Conservation Act 1987 or any of the Acts specified in Schedule 1 to that Act (the conservation legislation) the proposer must apply and obtain such concession or other authorisation before undertaking the proposal. The Minister of Conservation and Director-General of Conservation shall consider any applications for concessions or other authorisations in accordance with the conservation legislation, regardless of any support for the financial grant for the proposal. The Department of Conservation shall continue to exercise its function to advocate for the conservation of natural and historic resources generally (including advocating under the Resource Management Act 1991), regardless of any support for the financial grant for the proposal.

We hope this gives the understanding you require as you progress this exciting project. We look forward to working with you in the months ahead.

Nga mihi

s9(2)(a)

Connie Norgate

Operations Manager, Tongariro

Department of Conservation

UENUKU

28 Queen Street, Raetihi 4632
PO Box 102 | +64 (06) 385 4900
enquiries@uenuku.iwi.nz
www.uenuku.iwi.nz

25 June 2019

To whom it may concern

SUPPORT IN PRINCIPLE FOR PROPOSED MOUNTAINS TO SEA TRAIL GOVERNANCE STRUCTURE

We are writing to support in principle for the proposed mountains to sea trail governance structure. This follows a Mountains to Sea meeting on 24 May 2019 and Uenuku Board of Trustees meeting on 16 June 2019.

This in principle support is given on the basis that there will be further discussion among the parties to confirm the governance model and that Uenuku reserves the right to withdraw its support should Uenuku decision making interest not be appropriately represented.

We note that Uenuku interest in the proposed new trails (Te Ara Mangawhero and the Missing Link) is significant and that its interest should not be diminished in any future governance structure.

Nga mihi

s9(2)(a)

Aiden
Chairman

Appendix 3. National Policy Statement for Freshwater Management 2020

Assessment of the proposed development against the Objectives and Policy in Part 2 of the NPSFM.

NPSFM Objective 2.1

The design of the proposed trail and associated structures prioritises the protection of the Mangawhero awa. The awa is a central component of the trail and its importance to Ngāti Rangi and the wider community is reflected in the name of the trail. The trail planning process has minimised the number of river crossings required, and where crossings are still required they are in locations that have previously been disturbed or have previously been subject to development. Bridge design will mean that there will not be any disturbance of the bed of the awa. The CMP also sets out the bridge and trail development process to ensure that there will be no sedimentation of the awa during the trail development process or ongoing.

As discussed in Section 7, the development of the trail is likely to result in social and economic benefits for the local communities and wider. There will also be benefits to Ngāti Rangi who will be the trail developers and who will be managers of the trail once the development is complete. Ngāti Rangi will be actively managing an important asset on the slopes of Ruapehu Maunga.

NPSFM Policy 2.2

As discussed in Section 5.6, the proposed development and specifically the involvement of Ngāti Rangi embodies many important aspects of Te Mana o te Wai (Policy 1). The project provides an important opportunity for Ngāti Rangi to be more actively involved in the management of the Mangawhero awa (Policy 2). The design of the trail and its structures means there will be no adverse effects on the Mangawhero awa or the wider catchment and associated receiving environments (Policy 3).

All structures will be built and located with consideration of the effects of climate change (Policy 4).

Locations that have been previously disturbed or subjected to development have been identified for bridge development to reduce impacts on the values of the Mangawhero awa (Policy 7 and 8).

It is anticipated (see Section 13 of the ecological assessment in Appendix 7) that the development of the trail and associated trapping opportunities is likely to have a positive effect on whio populations that live on the Mangawhero awa (Policy 9).

As set out in Section 3.7, the trail and associated structures will be regularly monitored and maintained to ensure there are no offsite effects that may impact on the Mangawhero awa (Policy 13).

As discussed in Section 7, the development of the trail is likely to result in social and economic benefits for the local communities and wider. There will also be benefits for Ngāti Rangi, the trail developers and managers who will be actively managing an important asset on the slopes of Ruapehu Maunga (Policy 15).

Appendix 4. Horizons One Plan Assessment

Regional Policy Statement
Whāinga 2-1: Te whakahaere rauemi (resource management) and associated kaupapa (policies)
Objective 2.1 requires that the mauri of natural and physical resources is had regard to, to enable iwi to provide for their social, economic and cultural wellbeing. Kaitiakitanga must also be given particular regard to as well as the relationship of iwi with their ancestral lands and waters, sites and waahi tapu and other taonga. The application has been developed by Ngāti Rangi. The detailed design of the trail has been undertaken in consideration of the tikanga referred to in Objective 2.1. The trail would not be developed if Ngāti Rangi, as mana whenua, were not comfortable that these matters were adequately reflected in the proposed trail. As discussed in Section **4** of this EIA document, the original route of the trail has been amended to ensure that it will not disturb wāhi tapu sites and other areas of cultural importance. The development of the trail will also enable Ngāti Rangi to be more active kaitiaki in an area that has been historically managed by the Crown. The development of Te Ara Mangawhero enables Ngāti Rangi to strengthen their relationship with their ancestral lands, waters (specifically the Mangawhero awa), sites and other taonga. The impacts on the mouri of water has been a significant part of the route planning process. This has included ensuring that bridging locations and design are conscious of the important cultural values of the awa. This has included reducing the potential crossing points and locating the remaining ones at areas that have previously been disturbed. The bridge design and associated sediment management means that there will be no direct physical effect on the awa from the structures, the trail or their development.
Whāinga 5-1: He ūara whakahaere wai (water) and associated kaupapa (policies)
The proposed trail and associated structures will be developed adjacent and over the Mangawhero Awa. The Mangawhero Awa is central to the kaupapa of the trail and its story. The awa is immensely important to Ngāti Rangi . The proposed development will be within the reach of water identified in Schedule B of the RPS as Whau_3d. The values associated with that reach in Schedule B include Life Supporting capacity, aesthetics, contact recreation, mauri, natural state and sites of significance – aquatic. These values reflect the quality of the water in the awa and also the relatively undisturbed state of the surrounding environment. These values, in addition to those of Ngāti Rangi for the awa, have been a guiding factor in the design of the trail and associated structures. The trail will only be developed in riparian areas where it is necessary to cross the awa. In all other cases the trail will be routed out of riparian areas to ensure the awa is not unnecessarily disturbed by the development of the trail or its ongoing use. The bridge design and associated sediment controls mean there will be no direct physical effect on the awa from the structures, the trail or their development. This is a key part of the kaupapa of the trail and its development. The proposed trail and its development is consistent with the management objectives of the respective individual values associated with Whau_3d. There will be no effects on the quality of the water within any awa, and the bed of awa will also not be disturbed.

Regional Policy Statement
Whāinga 6-1: Te kanorau koiora taketake (Indigenous biological diversity) and associated kaupapa (policies)
Objective 6-1 requires that areas of significant indigenous vegetation and significant habitats of indigenous fauna are protected and that indigenous biological diversity is maintained, including enhancement where appropriate. The proposed sections of the trail are to be developed over areas that have been previously disturbed through previous landuse activities. The trail development process will still result in disturbance to indigenous vegetation, however the effects will be less than minor as set out in the ecological assessment undertaken on the effects of the proposed trail. The proposed trail will traverse rare and threatened habitats and there will be an element of indigenous vegetation clearance associated with the trail development. This clearance will be minimal and restricted to vegetation that has a DBH of less than 15cm. Any pest plants encountered along the route of the trail will also be removed. There is a strong focus on ensuring the proposed development has a light touch on the environment and ensuring the important natural and cultural values of the area are protected. Specific measures will also be put in place (see Appendix 11) to ensure that no pest plants will be introduced into the Park at the time of trail development. In addition, regular maintenance will include the removal of any new plant pests that may establish along the route of the trail over time.
Whāinga 6-2: Ngā tohu kōhure, ngā mata whenua motuhake me te āhuatanga māori (outstanding natural features and landscapes, and natural character) and associated kaupapa (policies)
The proposed trail is within the Tongariro National Park which is identified in Schedule G of the One Plan as an Outstanding natural landscape. The characteristics of TNP are identified in Schedule G of the One Plan as: (i) Visual and scenic characteristics, particularly the Park's visual prominence in the region and the contrast of the Rangipo Desert with adjacent landscapes (ii) Geological features including the Rangataua Lava Flow (iii) Recreational values, particularly tramping and snow sports (iv) Scientific value, particularly the volcanic landscape (v) Ecological value, particularly the mountainous ecology and the extensive tussock grasslands and wetlands supporting rare indigenous flora (vi) Importance to tangata whenua The One Plan requires the protection of these values. The proposed development is generally consistent with those values, specifically iii, v and vi. This is due to the development being consistent with other recreational assets in the Park, being generally under canopy and being developed in a manner that respects the ecological value of the location. Those parts of the trail in more open areas are within areas that are more modified (exotic pasture) and follow historic transport routes that currently occupy those landscapes. An initial landscape assessment undertaken as part of the partial review of the TNPMP recommended an additional landscape assessment to be undertaken for the upper sections of the trail, and for the lower sections it noted the following: *The section of the proposed trail below the Waitonga Falls – Blyth track is largely within the forest canopy. Much of this construction is permitted under the Management Plan as maintenance and upgrade of degraded track*

Regional Policy Statement
(4.3.2.4 policy 1). Effects on natural character and landscape are largely hidden and so avoided except to the extent the track access points will likely become more obvious along OMR, and through the possible need for additional works for car parking, signage and safe turning in future. [10] As part of the phase 1 trails there are no carparks proposed, however there will be some wayfinding signage proposed at key intersections. Such signs will be small and discrete and the majority will not be visible from the road. There is one new access point (at the trail entrance and one new road crossing in the Ohakune Mountain Road). These will be similar in nature to existing access points. The proposed trail will result in the reintroduction of physical structures into the landscape, however this is being done in a way that prioritises those areas that have previously been disturbed. From a heritage perspective, the development of the trail will enable the use and appreciation of bush tramways which are an important part of the contemporary histories of the area. The Applicant, Ngāti Rangi, is comfortable that the proposed trail will not detract from the important cultural values associated with the area. The proposed development will include trail development within the vicinity of awa and bridges developed across these awa. In all instances, the trail will cross the awa corridor and will not traverse its margins, in order to reduce impacts on the character of the awa corridor. There are to be nine bridges developed that will cross awa. Of these bridges, four will be in locations where there is an existing bridge or infrastructure. Some of these (bridges 1.10.B, 3.6.B and 4.3.B) are in locations of historical bridges. These bridging sites were chosen specifically for this reason. In all cases, the bridges are to facilitate recreational (walking and biking) activities that are consistent with the management of the Tongariro National Park. The bridges have been designed so that there is no bed disturbance and will be built from natural materials to better fit with the landscape. The proposed trail will facilitate public access, for recreational purposes, to parts of the Mangawhero awa and tributaries.
Whāinga 6-3: Ngā taonga tuku iho o mua (historic heritage) and associated kaupapa (policies)
The proposed trail has been assessed by Paul Mahoney from the Department of Conservation. This assessment included a field inspection on 17 November 2021. This field inspection confirmed his views stated in his initial assessment (Appendix 12), in relation to the Bennett and Punch Tramway, that it is a fairly typical bush tram route that will be brought to life if it is developed as a cycleway.

[10] Richard Hart, 2017 – page 24

Appendix 5. Tongariro National Park Management Plan Assessment

Tongariro National Park Management Plan
4.4.2.6 Aircraft
The Plan has an objective relating to the use of aircraft to generally minimise their use within the Park. Policy allows aircraft to operate in the park with minimal restriction where required for park management and for activities, which would benefit park management, where undertaken by the department or a concessionaire authorised by the department to carry out these activities. Helicopters will be used to facilitate the development of the trail to enhance visitor opportunities. The helicopters will be used in areas which are not currently accessible by the public and as such will not compromise the experience of other users. The use of aircraft for trail development will only be undertaken where it will avoid greater environmental effects than if aircraft were not otherwise used. This will include flying in large structures, such as bridges. Transportation of such structures on ground and emplacing them without the use of helicopters would lead to a greater level of disturbance to the environment, specifically around water ways.
4.1.2 He Kaupapa Rangatira
The relevant objectives and policies are discussed in Section 5.2.2
4.1.3 Landscape
The development of the proposed trails will be predominantly undertaken under canopy, with the majority of the trail to be on areas that have been previously disturbed. On this basis, a landscape assessment has not been considered to be necessary as there is not a wide visual catchment (it is restricted to the trail) associated with the trail project. The trail and associated infrastructure (i.e. bridges etc) will be of a similar design and scale as that already found within the Park and constructed out of natural materials that will, over time, weather and blend into the environment. The key piece of infrastructure is the bridge over Te Mangawhero tributary on Section 3. This bridge is to be sited where there is existing infrastructure (old bridge piers) so as not to introduce structures into a location that is otherwise undisturbed.
4.1.7 Plants
An ecological assessment has been developed to inform the trail development process and is attached as Appendix 8. This assessment includes consideration of rare and endangered species and the potential effects on these species.
4.1.8 Animals
An ecological assessment has been developed to inform the trail development process and is attached as Appendix 7. The proposed development is considered to have less than minor effects on indigenous fauna. There will be no infrastructure developed on the beds or rivers. All bridges will be designed so that they do not disturb the river bed.

Tongariro National Park Management Plan
4.1.9 Historical Resources
Trail planning has included the assessment of the impacts of the trail on the Bennett and Punch tramline. While not identified in the Plan as a historic resource, the tramline does have important heritage values associated with it, namely tramlines and tracks along with abandoned logging infrastructure. The impact of the trail on these features is discussed in Section 7.6 of the report. The assessment undertaken by Department staff noted that the proposed trail is consistent with the original intent of the tramline (i.e. transport) and that the trail could bring to life some of the heritage aspects of the trail. Trail development will be undertaken in a manner consistent with the 'rules' set out in Section 7.6 and the attached CMP.
4.1.10 Local Authorities
Concurrent applications are being lodged with both the Department of Conservation and Horizons Regional Council for resource consent to clear indigenous vegetation, build bridges and undertake earthworks adjacent to waterways.
4.1.11 Community Relations
As discussed in Section 5.2.2 of this report, the proposed trail is to be managed and maintained by Ngāti Rangi utilising their trail management team. This will result in benefits to the iwi including being able to act as more active kaitiaki within the Park. The wider community has also been actively involved in the planning of the trail since the inception of the trail concept in 2014. There is a strong level of interest in the development of the trail from local communities. The establishment of the trail will provide additional opportunities for community conservation initiatives in the Park, specifically through the development of traplines and other pest management activities.
4.1.13 Park Interpretation and Public Information
The long term project will include a strong storytelling element. The objective of this is to share the important values of the place with trail users. This aspect of the trail experience will be developed by Ngāti Rangi at a later stage.
4.1.14.1 Volcanic Hazards
The route of the proposed track is not associated with any known historic lahar paths. As such, the probability of a lahar is low, but the consequences may be high. This risk will be managed in partnership with the Department using the same methodologies applied to the many tracks located elsewhere on the volcanic plateau.
4.1.14.2 Avalanches/Erosion
The trail set out for the stage 1 trails is on relatively easy country which is vegetated. This will mean that the trail will not result in destabilising any slopes. Trail design utilises techniques to direct water off the trail so that erosion of the trail surface does not occur. Regular trail maintenance as set out in Section 3.7 will also address this potential issue. The Geotech assessment contained in Appendix 9 provides additional assessment of the erosion risk.
4.1.16 Works Approvals
The works approvals process is discussed in Section 5.2.3. This application is to be considered as a major works approval and contains all the information required for the Department to make an informed decision on the works proposed.

Tongariro National Park Management Plan
4.1.17 Waste, Discharges, Contaminants and Noise
The activity proposed is consistent with existing activities that already occur within the Park. The development of a trail to be used by people on foot and on bikes will not derogate from the wider visitor experience. The trail will not result in any additional waste generated in the Park with all trail users expected to follow the same rules to 'pack in and pack out' any rubbish they bring with them. No wharepaku are to be developed within the Park associated with this section of trail. Any rubbish associated with the trail development process will be removed from the Park. All proposed works will be carried out in a manner consistent with the conditions of the concession and works approval.
4.1.18 Research and Monitoring
A counter will be installed at key sections of the trail to monitor the number and frequency of trail users. As one of the Great Rides, users will be asked to fill out a survey providing feedback on their trail experience. Ngāti Rangi will work with the Department to undertake any monitoring of the ongoing use or effects of the trail and its users on the wider values of the Park.
4.2 Special Areas and Management Zones
The proposed trail and associated development will not be undertaken within any special areas and management zones.
4.3 Use Objectives and Policies
4.3.2 Recreation
The proposed trail will be freely accessible to people on foot and on bike. The proposed trail will be managed in a manner that ensures it will meet relevant Departmental environmental, safety and Department trail standards. This is set out in Section 3.7. A counter will be installed at key sections of the trail to monitor the number and frequency of trail users. As one of the Great Rides, users will be asked to fill out a survey providing feedback on their experience on the trail. Ngāti Rangi will work with the Department to undertake any monitoring of the ongoing use or effects of the trail and its users on the wider values of the Park. The long term project will include a strong storytelling element. The objective of this is to share the important values of the place with trail users. This aspect of the trail experience will be developed by Ngāti Rangi at a later stage.
4.3.2.3 Buildings, Structures and Utility Services
The trail infrastructure (i.e. bridges, boardwalks etc) will be of a similar design and scale to that already found within the Park. They will be constructed out of natural materials that will weather and blend in with the environment over time. The key piece of infrastructure is the bridge over Te Mangawhero tributary on Section 1. This bridge is to be sited where there is existing infrastructure (old bridge piers) so as not to introduce structures into a location that is otherwise undisturbed.

Tongariro National Park Management Plan
All structures will be developed in accordance with the relevant Departmental guidelines as set out in the construction management plan (Appendix 11).
4.3.2.4 Tracks
An assessment of these provisions is set out in Section 5.2.1 of the report.
4.3.2.6 Access for People with Impaired Mobility
Sections 1 and 2 of the proposed trail will be developed so that they are able to be used by people who are mobility impaired. The gradient and track surface will allow the trails to be traversed by mobility impaired people who have access to off road equipment. Sections 1 and 2 are adjacent to the Ohakune Mountain Road.
4.3.2.8 Day Visitors
The proposed trails will be used by a range of users. Some will continue on with the wider Mountains to Sea trail over a number of days, however the majority will use the trail for a day use experience. The trail will be developed to a standard (i.e. Grade 2-3) to cater for the majority of users and will also be located in close proximity to Ohakune.
4.3.2.9 Tramping
The proposed new trails are shared use and will provide additional opportunities to encourage tramping in the Park.
4.3.2.12 Mountain Biking
An assessment of these provisions is set out in Section 5.2.4 of the report. The proposed trails have been scheduled for mountain bike use in the amendment to the Plan.
4.4 Concessions
Section 4.4 of the TNPMP contains a comprehensive set of objectives and policies relating to concessions within the Tongariro National Park. Section 4.4 asks a number of key questions that are addressed here. **Can the activity be conducted outside the Park?** In this case the activity is the development of a trail which is specifically mandated by the Plan. The question of whether the trail should be in the Park was considered through the Plan amendment process which confirmed its appropriateness. **Can the activity be conducted in an amenities area?** The activity should be undertaken along the route of the trail as set out in Map 10 of the Plan. The proposed route falls outside of the amenities area as identified in the Plan, meaning that the activity could not be conducted within an amenities area. **Whether the activity will benefit the Park, public use and enjoyment or safety, and whether the activity will have national or regional benefits;** The proposed trail will extend the existing Mountains to Sea trail to meet the key objective of developing a contiguous and engaging journey from Mount Ruapehu to Whanganui and the Tasman Sea. This objective will promote the Great Ride as an epic and linked journey from the upper slopes of Mount Ruapehu (located in Tongariro National Park, a dual World Heritage area) to the Whanganui River (located in the Whanganui National Park) and on to the Tasman Sea. It is anticipated that the development of these trails will resolve current trail legibility issues,

improve trail access and differentiate it from other regional attractions through the delivery of a linked and coherent multiday ride located in iconic landscapes.

The proposed extensions will:

- improve the user experience by making the wider trail easier to understand through the linking of trail gaps
- reinforce the Mountains to Sea brand by having a true trail start on Mt Ruapehu
- provide for greater marketing and economic development opportunities through the development of a more visible product close to existing communities and destinations (i.e. Tūroa, Ohakune, Horopito and National Park).

These benefits are set out in the feasibility report and associated funding applications submitted to the government to secure funding to develop the trail. These measurable benefits include the economic benefits of out-of-region visitors using the trail, health benefits and consumer surplus benefits from local and domestic users.

The Economic Case clearly demonstrates that the proposed trails will significantly benefit the Ruapehu District's economy.

The benefits from the proposed trails are realised through its users. These users are made up of local and out-of-region recreational users. Out-of-region users can also be split into domestic and international visitors who could use the trail for a part of the day (single-day) or for several days (multi-day).

Once fully completed, the proposed trails are forecast to attract an additional 27,100 recreational users from outside the region. International visitors will account for 3,605 (11%) of those users.

Importantly, the development and management of the trail will give Ngāti Rangi an opportunity to take a more active role in managing assets on Ruapehu Maunga.

The purpose of the trail was to remove walkers and bikers off the Ohakune Mountain Road. Currently those walking the round the mountain trail have a 3km walk on the Mountain Road. Similarly, those cyclists who choose to start their Mountains to Sea journey from the top of Tūroa have to ride on the Ohakune Mountain Road to get from Tūroa to the start of the Old Coach Road section of the trail. The development of the trail will remove the necessity of these vulnerable users sharing the road with cars etc.

Whether the activity will have an effect on indigenous plants and animals, natural features, scenic values, sites of historical or cultural interest, on soil stability, on water quality, and the natural state of the park, and implications for further development that might result.

Environmental, historical and cultural effects associated with the trail development process are set out in Section 7 of the report. The assessment concludes that the level of effect associated with the activity is appropriate.

Minimal disturbance to the environment and ngahere has been achieved by the collaborative approach of knowledge sharing and professional expertise of all who have contributed to the final design of the Te Ara Mangawhero, because of this principle adopted early, the Ruapehu WorX team managed to find an alignment that:

- 85% of the track development is placed on top of the existing forestry tramline the Bennet and Punch.
- 7% of new track construction is within a heavily modified Ohakune Mountain Road corridor.
- 4% of new track construction follows the access road for the Ohakune Raw Water pipeline.
- 4% of new track construction on Ngāti Rangi privately owned land.

This disturbance and development will align with the route set out in Map 10 of the Park and does not create a precedent for any further trails to be developed off this route. Any further development or works would need to be considered through the concession and works approvals process in any case.

What effect the activity will have on other park users, natural quiet, other activities already taking place in the park, or the ability of staff to manage the park, and is it consistent with the reasonable demands of existing legitimate public usage;

The presence of the trail and its use has been considered by the Department through the amendment process. The trail and its use by people on foot and on bike has been legitimised through the amendment process.

The development of the trail is estimated to result in increased use of the Park by those using the trail on bike and/or foot. This increase in use will be largely focused on the route of the trail but it is anticipated that it will attract more people to the Park and surrounding area generally. Given the location of the Phase 1 trails, this increased use will be focused around the settlement of Ohakune located outside of the Park. It is also reasonable to expect that, along with the additional trail users, there will also be a flow on effect of growth in visitors to the southern part of the Park and recreational assets located in that area.

It is not anticipated that this use will impact on the ability of Department staff to manage the Park, especially given that the trail itself is to be managed by Ngāti Rangi and not the Department.

Whether the Applicant is well-enough equipped – in terms of expertise and finance, for example – to carry through and complete the proposal in a safe and proper manner;

The Applicant will be working with experienced trail developers and trail managers. This will include working with RDC, who already manage parts of two Great Rides, the Timber Trail and parts of the Mountains to Sea. Funding for the full construction of the trail has already been secured through central government.

Ruapehu WorX will be carrying out construction and management of the trail. As outlined in Section 3.6.1 of this report, Ruapehu WorX is guided by Ngāti Rangi and has the support of the taiao management team and wider collective of kaimahi who have been leading taiao management within Ruapehu since 1992.

Ruapehu WorX is led by Paul Carr. Paul has 32 years' experience in trail building, project management and construction of numerous iconic remote destinations throughout Aotearoa.

4.4.3.2 Signs

Wayfinding and interpretation signs will be developed and put in place along the trail to facilitate the use of the trail and also to communicate the important stories and values to trail users. The location of key wayfinding signs is identified in the CMP in Appendix 11 of this report. The signs will be similar to other signs associated with recreation activities found in the Park.

Appendix 6. Taupō Tongariro CMS Objective Assessment

The following table assesses the proposed development against the relevant provisions in the TTCMS.

Taupō Tongariro Conservation Management Strategy
3.1.2 Management of Historic Resources
Trail planning has included the assessment of the impacts of the trail on the Bennett and Punch tramline. The tramline does have important heritage values associated with it, namely tramlines and tracks, along with abandoned logging infrastructure. The impact of the trail on these features is discussed in Section 7.6 of the report. The assessment undertaken by Department staff noted that the proposed trail is consistent with the original intent of the tramline (i.e. transport) and that the trail could bring to life some of the heritage aspects of the trail. Trail development will be undertaken in a manner consistent with the 'rules' set out in Section 7.6. Ngāti Rangi, as the Applicant and tāngata whenua, were involved in all aspects of trail planning, including inspecting the route to consider any impacts on sites of cultural significance.
3.1.6 Restoration / Rehabilitation
In the event that the trail and associated infrastructure is no longer required, it will be decommissioned with structures removed and the trail area allowed to regenerate back to a natural state.
3.1.8 Natural hazards
Bridges will be located a suitable height above rivers so that they will not be affected by high flows during flood events etc. Initial trail planning work has included geotechnical assessments which have not identified any issues for the Phase 1 trails.
3.2.2 Protected Species
The ecological assessment (Appendix 7) identifies that a range of Threatened and At Risk indigenous plants and fauna species (including whio) are known to occur within the vicinity. The assessment concludes that with appropriate management, all of the potential ecological effects of this stage of the proposed Te Ara Mangawhero Trail can be avoided or reduced to less than minor. The suggested conditions in the assessment to achieve this outcome have been included in the attached CMP (Appendix 11) as key requirements in the development and management of the trail.
3.5 Recreation Management
The proposed trail will introduce a new recreation asset into the TNP. This asset is expressly provided for by the TNPMP via the partial amendment process. The proposed trail development will include trail counters to monitor use of the trail by people on foot and bikes.
3.5.2.1 Visitor Access
The proposed trail will be a new recreation asset which will enable an additional opportunity for public to access the conservation estate on foot and by bike. The proposed trail will enhance walking and biking access to the area.

Taupō Tongariro Conservation Management Strategy
Trail planning has included consideration of the effects of this proposal in respect to the important natural and historical values of the site.
3.5.2.2 Aircraft use
Objectives and policy relating to the use of aircraft on PCL are included in section 3.5.2.2 of the CMS. The relevant Objective permit aircraft landings on public conservation land for management and emergency purposes and where this enhances visitor opportunities without compromising the experience of others. Helicopters will be used to facilitate the development of the trail to enhance visitor opportunities. The helicopters will be used in areas which are not currently accessible by the public and as such will not compromise the experience of other users. The use of aircraft for trail development will only be undertaken where it avoids greater environmental effects than if aircraft were not otherwise used. This will include flying in large structures, such as bridges. Transportation of such structures on ground and emplacing them without the use of helicopters would lead to a greater level of disturbance to the environment, specifically around water ways. Hughes 300 helicopters will not be used.
3.5.2.4 Mountain Bikes
The proposed trail will be a new mountain biking opportunity on public conservation land. The assessments included in the wider report consider the impacts of this trail on the wider natural, historic and visitor values of the area. On review, it is considered that these values will not be adversely compromised and that the recreation/visitor values will be enhanced. The trails proposed are specified in the TNPMP as amended through the partial review process. As noted in the wider report, the amendment process authorised the consideration of the trails to be developed and used by people on bikes. Departmental guidance on bike trails will be used to guide the design of the proposed trails. Monitoring is to be undertaken by the Department (as per the TNPMP) in respect to any effects on the physical environment and visitor experience. Given the nature of the trail and its proposed use, it is not anticipated that there will be any ongoing effects of the trail being in place. The location, design and maintenance of the trail will be such that there will be no ongoing physical impacts from the trail. People on bikes are unlikely to stray from the trail into the wider environment. The trails are new so it is not anticipated that there will be effects on the current experience except for those very short sections where the trails intersect with the existing Mangawhero Forest Trails. Signs will be put in place informing people on bikes that these trails that are not shared use are not to be used by people on bikes. The trails themselves are to be designed to be shared use and will include design elements that facilitate safe shared use.
3.6.3 Conservation Awareness
The trail will be promoted through local and national channels by the trail manager and also by New Zealand Cycle Trails as it forms part of a Great Ride. It is anticipated that trail interpretation / storytelling will include messaging about conservation and also the important cultural elements and stories associated with the trail and the wider Ruapehu Maunga.

Taupō Tongariro Conservation Management Strategy
3.7 Kaupapa Maori
The relevant objectives and policies are discussed in Section 5.2.2
3.8.2 Non-Recreation Concessions
3.8.2.4 Easements
It is noted that there are no specific provisions within the CMS document relating to the licence to establish and manage the trail. The provisions relating to Easements are the closest direction in the CMS. The objective of the easement provisions is, 'To grant easements only where they will not significantly compromise natural or historic values or public use and their purposes cannot reasonably be achieved by other means on private land.' As noted above, the right to develop the trail and have it managed by a third party is established through the amendment to the TNPMP. The appropriateness of developing the trail on the proposed route rather than off conservation land was established through that statutory process. The wider assessment contained in this report demonstrates that the proposed trail and its management by Ngāti Rangi will not compromise the natural and historic values of the land or public use. The development of the trail will enhance public use of the land. Associated implementation policies require an EIA which sets out alternatives. This is discussed in Section 5.2 of this EIA document.

Appendix 7. Te Ara Mangawhero Cultural Impact Information

Te Ara Mangawhero cultural impact information

NGĀTI RANGI

Ngāti Rangi is an iwi based on the southern slopes of Matua te Mana or Ruapehu. Our cultural identity is linked to his essence, the lifeblood of our people cascades as waters from his slopes, and his peaks above are our sacred altar. The vision statement for Ngāti Rangi is:

"Kia mura ai te ora o Ngāti Rangi ki tua o te 1,000 tau.

Ngāti Rangi continues to vibrantly exist in 1,000 years".

Our vision statement stands as a testament to our role and responsibility to be active tāngata tiaki for our environment to ensure our descendants, in 1,000 years have clean water, fresh air, and healthy land. Our maunga Ruapehu is the mātāpuna, the source of our waterways from the mountain to sea; their clarity, their uniqueness, their quality, and their voices speak to our wairua, give life to our lands, and are our lifeblood.

Ngāti Rangi Group Structure

Key kaumātua and Ngāti Rangi claimants with the endorsement of the Whanganui River Māori Trust Board established the Ngāti Rangi Trust in 1992. The Trust was established to coordinate and manage iwi affairs and progress the settlement of Treaty grievances.

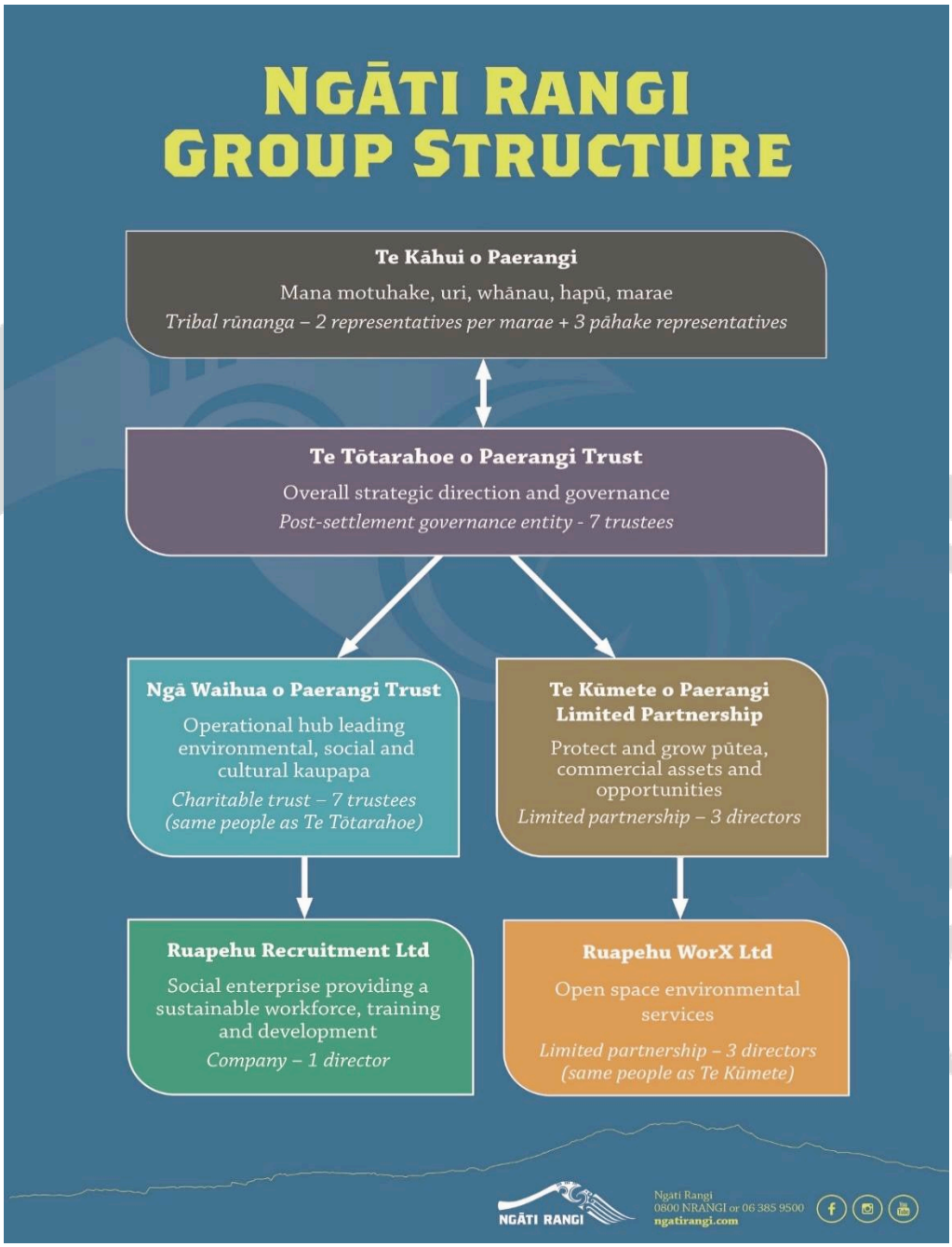
Following an internal review, a restructure was confirmed and launched in 2008. The change included:

a. The establishment of Te Kāhui o Paerangi (the Ngāti Rangi rūnanga): A marae and pahake representative body constituted under Ngāti Rangi kawa and tikanga; and

b. The restructure of the Ngāti Rangi Trust (known as Te Tōtarahoe o Paerangi): A legal authority that represents the interests of the rūnanga and iwi and upholds the tribes' legal responsibilities.

Following mandate, settlement negotiations between the Crown and representatives of Ngāti Rangi about the historical Treaty of Waitangi claims of Ngāti Rangi took place. The deed of settlement, Rukutia te Mana, was signed in March 2018 and became legislated in September 2019. As part of the settlement:

- Te Tōtarahoe o Paerangi was established as the entity to implement the terms of Rukutia te Mana, and receive and manage the settlement redress, on behalf and for the benefit of Ngāti Rangi.
- The name Ngāti Rangi Trust was changed to Ngā Waihua o Paerangi Trust.
- Te Kūmete o Paerangi was established to protect and grow the post-treaty settlement funds as well as its commercial assets and opportunities.
- Ruapehu WorX Ltd was established to enhance our taiao, communities, and mana whenua of Ruapehu and supports our aim to be active guardians of all our whenua under the gaze of Ruapehu. Uplifting our people and our place – Hapaitia te ora.



Te Ara ki te Moungaroa

Te Ara ki te Moungaroa 2035 sets a clear vision and purposeful mission that will enable Ngāti Rangi to develop into a vibrant community for generations to come. The 2020-2025 strategic plan defines a pathway towards achieving our collective aspirations to grow as an iwi and community.

NGĀTI RANGI STRATEGIC PLAN 2020-2025 - SUMMARY

NGĀTI RANGI

TE WAWATA OUR VISION
Kia mura ai te ora o Ngāti Rangi ki tua o te 1,000 tau
Ngāti Rangi continues to vibrantly exist in 1,000 years

TE ARONGA OUR HOW
E kōkiri tahi ana a Ngāti Rangi i ngā kaupapa hei oranga mō te katoa
Together Ngāti Rangi will grow itself and its communities

TE TAKE OUR FIVE-YEAR PLAN
Kākā te whare toka o Paerangi, kākā hoki ko au
Igniting our people to live vibrantly in our majestic landscape

NGĀ TIKANGA OUR SHARED VALUES

Guides our behaviours and decisions

- **Kia MANA ai ngā mahi** – To act with INTEGRITY and HONESTY
- **Kia mau ai ki te MANAAKITANGA** – To CARE WHOLE-HEARTEDLY
- **Kia tika ai tōu TŪRANGAWAEWAE** – To be ACCOUNTABLE
- **Kia ū ai ki ngā TIKANGA** – To be DUTY BOUND
- **Kia rapu ai i te MEA NGARO** – To unleash POTENTIAL

	NGĀTI RANGITANGA	RAU KOTAHI	TE AO TŪROA	TARI
NGĀ WHĀINGA OUR GOALS What does success look like?	• Every marae has, at least, 4 new kaikōrero and 4 kaikaranga who are equipped to uphold Ngāti Rangitanga • 80% of Ngāti Rangi uri engaged in iwi Ngāti Rangitanga programmes access content at least bi-monthly, or attend wānanga to grow Ngāti Rangitanga at least quarterly	• 100 whānau will have completed a tailored Ngāti Rangi programme that helped them build their self-belief, motivation and ability to confidently navigate the world to achieve their personal aspirations • 80% of iwi members currently engaged with Ngāti Rangi programmes will report good or significant progress since commencing the programme	• The oranga of our maunga, specific wai, and whenua over which Ngāti Rangi has control improves between 2020 and 2025 • 90% of iwi members involved in Te Ao Tūroa kaupapa feel more connected to their maunga,wai and whenua than they did in 2020	• Our organisation has the systems, processes and capability to effectively and efficiently execute on our strategic priorities
NGĀ POUPOU RAUTAKI OUR STRATEGIC PRIORITIES What will we focus on to achieve our goals?	• Strengthen the understanding and connection of uri to their Ngāti Rangitanga • Build confidence in identity and enable access to resources and events to support this	• Grow the confidence, motivation and ability of uri to self-determine	• Enhance and protect the oranga of our taiao • Nurture a strong connection between uri and our maunga, wai and whenua • Establishing the mechanisms to maintain connections to maunga, wai and whenua	• Enhance and grow our operational effectiveness and efficiencies • Operate in a sustainable manner for the long term

NGĀTI RANGI
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Our holistic approach to achieving our vision covers four key pillars:

- **Ngāti Rangitanga:** Strengthening cultural identity and whanaungatanga, deepening our knowledge and connection to our history, tikanga and kawa; celebrating our culture and inspiring purpose.
- **Rau Kotahi**: Supporting whānau to achieve their aspirations by equipping them with the necessary skills, knowledge, and experience to reach their potential and navigate life confidently through Ngāti Rangitanga and Te Ao Tūroa.
- **Te Ao Tūroa:** Nurturing the oranga of our taiao and connection to our maunga, wai and whenua; leveraging our understanding of our taiao to transform whānau wellbeing.
- **Tari:** Ensuring we have the right capability and capacity to successfully deliver this strategy.

Te Aronga, our how;

"E kōkiri tahi ana a Ngāti Rangi i ngā kaupapa hei oranga mō te katoa.

Together Ngāti Rangi will grow itself and its communities".

Ngāti Rangi Claims Settlement Act 2019

The Ngāti Rangi Claims Settlement Act came into force in September 2019.

The negotiations were guided by the aspirations of Ngāti Rangi uri. These included the importance of the Crown's long-overdue recognition of our mana motuhake, and of aligning the settlement with our kaupapa, including our vision, aspirations and values.

Ngāti Rangi negotiated our settlement with the Crown based on the following principles:

- Kia mau ki te wairua o te Tiriti o Waitangi
  To uphold the spirit of the Treaty of Waitangi
- Ahakoa haere te Karauna ki whea, ka haere hoki a Ngāti Rangi
  Where the Crown goes, so goes Ngāti Rangi
- Ka whakaae te Karauna ki te mana motuhake o Ngāti Rangi
  Acknowledgement of the mana motuhake o Ngāti Rangi
- Ka whakaora anō tō mātau mana kia toitū a Ngāti Rangi me ngā hapū, ngā whānau me ngā tini uri
  Restoration of a cultural, environmental, economic, family and social base for Ngāti Rangi

The settlement framework is named after Ruapehu, Te Whare Toka o Paerangi. There are six interlinked poupou; two are Treaty settlement specific and the remaining four are aligned to our iwi strategy (outlined above) and our multigenerational goal of 'vibrantly existing in 1,000 years.

Te Hohourongo and Te Matapihi are the Treaty settlement specific pou, they recognise a focused approach to work together in partnership under the Ngāti Rangi Claims Settlement Act with the Crown, crown representative Ministries and organisations.

- **Te Hohourongo:** Reconciliation by way of acknowledgment and apology from the Crown.
- **Te Matapihi:** Partnership and relationship agreements with the Crown.

These pou combined with the pillars of Te Ara ki te Moungaroa interlink as mechanisms towards a sustainable and holistic approach for the betterment of our environment, our culture and the health and wellbeing of our people and our community.

Ngāti Rangi Taiao Management Plan 2014

The Ngāti Rangi Taiao Management Plan 2014 outlines our key requirements regarding environmental and cultural expectations for our rohe.

The framework of our Taiao Management Plan is based on the structure of a whare. The utilisation of the whare to structure the plan is likened to our eponymous ancestor Paerangi-i-te-Whare-Toka and his House of Stone. The plan offers an invitation for people to enter the house of Ngāti Rangi, to view our tikanga and understand our thoughts, viewpoints and responsibilities. The plan is divided into five sections; these emulate the different structural components of a whare:

1. **Te Roro Whare** – The Verandah of the House
   This refers to the outline, purpose, overall vision and the desired outcomes we seek.
2. **Te Tatau** – The Entranceway
   Te Tatau depicts who we are, and the values and guiding principles we hold to.
3. **Ngā Pou o te Whare** – The Pillars of the House
   This section is the central element of the plan and contains our perspectives on issues and the care and management of the taiao within our tribal boundaries.
4. **Ngā Heke Kōrero** – Rafters
   Ngā Heke Kōrero outlines the process of making a submission, as a guide for individual hapū and whānau members of Ngāti Rangi.
5. **Te Pani Kōkōwai** – The Final Touches
   Te Pani Kōkōwai are the final statements of Ngāti Rangi to conclude the document.

To expand on Ngā Pou o te Whare, the pillars of the house are structurally important as the key elements in the stability and support of a sound building. Without these pillars, the whare will crumble. Utilising the atua as our pillars aid in our interaction not only with the atua but also with our kaitiaki and tūpuna. We view ourselves as a reflection of the universe; therefore using this helps us to aspire to the beauty, brilliance and ultimately the purity of the atua. The pillars are ordered in terms of their whakapapa, and are outlined below:

- **Ranginui:** Ranginui governs our skies and is ultimately the backdrop of our vistas. He stands higher than the peaks of Matua te Mana and his presence is seen and felt throughout the universe.
- **Papa-tū-ā-nuku:** Papa-tū-ā-nuku is our ultimate mother, the mother of all things; she is planet earth. Her fertility and life force are a constant gift that sustains us.
- **Tāne-nui-a-rangi:** As overlord of the ngahere, Tāne-nui-a-rangi (or Tāne Mahuta) is a significant ancestor of Ngāti Rangi. He governs the realm of the forest and all the indigenous plants and creatures that dwell within.
- **Tangaroa-i-te-wai-māori:** The waters of Tangaroa-i-te-wai-māori are the bloodlines of Papa-tū-ā-nuku. These waters flow along her slopes and nourish Ngāti Rangi not only with a constant supply of mouri but with kai and freshwater.
- **Rongomātāne:** Rongomātāne governs the realm of cultivated foods, which is a major activity in our region.
- **Rūaumoko:** Rūaumoko is the youngest child of Rangi and Papa; he was clutched to Papa's breast during the separation of Rangi and Papa. Earthquakes and volcanic activity are a result of Rūaumoko and his movements within the earth.
- **Matua te Mana:** Otherwise known as Ruapehu, Matua te Mana is central to the cultural and spiritual identity of Ngāti Rangi. He is the stronghold for Ngāti Rangi, is beloved among his people and is referred to by uri as Koro Ruapehu, the tribal grandfather.

The different pillars used to categorise our issues are interlinked not only because they are our whanaunga, but because impacts that occur in one area also impact other areas of the environment, and ultimately on us as an iwi. The pillars outline our approaches to caring for our environment to ensure it endures for a thousand years and more.

TE ARA MANGAWHERO

As tangata tiaki, the maintenance and improvement in the quality of our air, water, and whenua are a mechanism for the management of a sustainable and holistic environment that we strive for as a people.

Ngāti Rangi recognises that our world is changing and for our vision **"Kia mura ai te ora o Ngāti Rangi ki tua o te 1,000 tau – Ngāti Rangi continues to vibrantly exist in 1,000 years"** to come to fruition, we need to ensure that the health and wellbeing of the environment are at the forefront of all decisions.

It is our responsibility to ensure that the quality of our environment is of a better state, but at the very least, no worse than the conditions that exist currently, for future generations. To fulfil these responsibilities we look for opportunities to be true kaitiaki of our natural world.

Lands within our rohe provide Ngāti Rangi with the perfect environment to achieve positive results and make a difference in the lives of our people and community.

Initially, we saw Te Ara Mangawhero as an opportunity to improve safety for users of the Ohakune Mountain Road (especially pedestrians and cyclists) without the significant environmental impacts of widening the road. We now see the opportunities for ourselves and our communities in taking a lead role in this mahi.

Ngāti Rangi has been involved in the Te Ara Mangawhero kaupapa for over a decade; from initial discussion and active participation in the original working group, contributions to the Tongariro National Park Management Plan change process, and more recently, involvement in planning processes and leading detailed trail design and construction methodology mahi.

Ngā Waihua o Paerangi Trust (Ngāti Rangi's operational hub leading environmental, social and cultural kaupapa) and the former Ngāti Rangi Trust have socialised and discussed the concept of Te Ara Mangawhero with Te Tōtarahoe o Paerangi and Te Kāhui o Paerangi throughout our 10-plus years of involvement with the project.

Referring back to the Ngāti Rangi Group Structure, Te Tōtarahoe o Paerangi is our post-treaty settlement governance entity, its role is to uphold the mana o te iwi and to protect our aspirations by acting on behalf of and in the beneficial interests of Ngāti Rangi.

Keeping us grounded in our tikanga and values is the core kaupapa of Te Kāhui o Paerangi, the Ngāti Rangi rūnanga. This body is the matua or principal body of our iwi and provides constructive guidance for the respective organisations that implement our tribal aspirations. As the representative voice of our marae, its purpose is to:

- Provide strategic and political leadership for Ngāti Rangi iwi;
- Uphold the kawa and tikanga of Ngāti Rangi;
- Advocate for our marae and their respective hapū; and
- Promote sustainable environmental decisions based on the principles that evolve from our kawa and tikanga.

Following Treaty settlement Te Kūmete o Paerangi was established to protect and grow the settlement funds as well as its commercial assets and opportunities. This saw the establishment of Ruapehu WorX Ltd to support our aim to be active guardians of all our whenua under the gaze of Ruapehu by enhancing our taiao, communities, and the mana whenua of Ruapehu.

Ruapehu WorX has led the detailed trail design and construction methodology mahi to enable Ngā Waihua o Paerangi Trust, with the support of Te Tōtarahoe o Paerangi and Te Kāhui o Paerangi, to apply for approvals to build, manage and maintain Te Ara Mangawhero. Gaining these approvals will enable Ngāti Rangi to be true kaitiaki of our natural world in this location.

Referencing Te Ara ki te Moungaroa and our 2020-2025 strategic plan, within the Te Ao Tūroa pillar our strategic priorities are:

- Enhance and protect the oranga of our taiao.
- Nurture a strong connection between uri and our maunga, wai and whenua.
- Establishing the mechanisms to maintain connections to maunga, wai and whenua.

The development of Te Ara Mangawhero will help to directly achieve these strategic priorities. Our broad holistic approach to the development enables the protection and enhancement of the oranga of our taiao in this area. Construction of the trail offers initial opportunities for connection with our maunga, wai and whenua along with longer-term opportunities to maintain these connections through the ongoing operation and maintenance of the trail.

Specific to Te Ao Tūroa Rukutia te Mana focuses on the interdependent relationship between the environment and people and the use of all resources based on our principles. The settlement redress includes:

- An integrated framework for the Whangaehu River catchment called Te Waiū-o-Te-Ika.
- A comprehensive Conservation Partnership Framework, including governance and management arrangements with the Department of Conservation.
- Special arrangements concerning pākohe, pākere, onewa and matā which recognise Ngāti Rangi's connection with these taonga.

The redress ensures that:

- Fundamental change is made to how our awa and whenua are viewed, cared for and managed, putting the health and wellbeing of our awa and whenua at the forefront of decision-making.
- The Crown continues to be actively engaged with and responsible to us for our awa and whenua.
- The decades of struggle Ngāti Rangi has put into advocating for the voice of our awa and whenua are reflected.

Te Waiū-o-Te-Ika is a legal framework for the Whangaehu River catchment. The framework focuses on recognising, promoting, and protecting the health and wellbeing of the awa, and the intrinsic relationship of Ngā Iwi o Te Waiū-o-Te-Ika with the awa and our responsibility to care for, protect and use the awa in accordance with our kawa, tikanga, and ritenga. The area of development for Te Ara Mangawhero lies within Te Waiū-o-Te-Ika. Holistically speaking, as the mouri of the taiao and mana of individuals and communities will be enhanced by the development, the mana of Te Waiū-o-Te-Ika will be uplifted.

As mentioned above, the settlement arrangements include a comprehensive Conservation Partnership Framework with the Department of Conservation. Included in this framework is a partnership agreement, known as Te Mana Paenga. Te Mana Paenga focuses on how the Department and Ngāti Rangi will work together to ensure Ngāti Rangi perspectives, kawa, tikanga and ritenga are integrated into conservation management over conservation lands across the Ngāti Rangi rohe.

Additionally, Tongariro National Park is a dual World Heritage area. This status recognises the Parks important Māori cultural and spiritual associations as well as its outstanding volcanic features. It is our view that the importance of our Māori culture is not held in equal status

and has continued to lag behind volcanic landscape feature values, public recreational use, and tourism for many decades.

For the true intent of the cultural heritage of Tongariro National Park to be fully realised and elevated to equal status with the other values of the park tangata whenua need to provide for our self-development of our cultural resources and to deliver our own cultural experiences. This is truly the only way to put an authentic cultural face and heart to these values. Tangata whenua developed, tangata whenua trained and tangata whenua delivered.

The land for the development of Te Ara Mangawhero lies within Tongariro National Park. While this land isn't included in the partnership agreement of Te Mana Paenga we believe the intent of the agreement to honour the spirit of partnership required under Te Tiriti o Waitangi in a manner that recognises and respects the kawa, tikanga and ritenga of Ngāti Rangi remains important.

Concerning Te Ara Mangawhero, the following pillars from the Ngāti Rangi Taiao Management Plan are of paramount importance:

- **Papa-tū-ā-nuku**
  The health of Papa-tū-ā-nuku, our eternal mother, is central to our health and wellbeing as humanity. She is the ultimate provider; we depend on her fertility and her gifts for survival. Ngāti Rangi is concerned about the unsustainable use and exploitation of Papa-tū-ā-nuku and her gifts, particularly around how the whenua is used and managed and the pollution and waste that accompanies use. As tāngata tiaki, we are duty-bound to ensure care and reciprocity are actioned.

- **Tāne-nui-a-rangi**
  Ngāti Rangi's history has been centred in the realm of Tāne, as we are people of the ngahere. The protection of native flora and fauna is paramount to Ngāti Rangi, but so too is the protection of our customary needs. The balance between this give-and-take relationship needs to be restored to enable the protection of our taonga as well as ensure our cultural practices are not jeopardised. Our concerns vary in nature from the health and wellbeing of the forest as a whole to the customary use of the forest by Ngāti Rangi through to the use of the forest by others.

- **Tangaroa-i-te-wai-māori**
  Tangaroa-i-te-wai-māori is the embodiment of freshwater within our region. He is present in the numerous waterways that run along the back of Papa-tū-ā-nuku; he is the lifeblood of Ngāti Rangi. Water is a fundamental element of all facets of life and is essential to our health and wellbeing. Our waterways provide us with a constant supply of mouri to replenish and revitalise our iwi. We have huge concerns over the state of our freshwater and its mouri, and how this impacts Ngāti Rangi as an iwi.

- **Matua te Mana**
  Matua te Mana is our ancestral maunga. Matua te Mana is more commonly referred to as Ruapehu and is the source of our cultural and spiritual identity. Ruapehu is the anchor for us to our whenua, and he exists as the stronghold of our people. From Te Wai ā-moe and Ruapehu's slopes our waterways spring forth, which carry mouri and mana directly to our landscape, and our people. The main concerns we as Ngāti Rangi have here are based on the use and management of our maunga.

The Ngāti Rangi Taiao Management Plan outlines our approaches to caring for our environment to ensure it endures for a thousand years and more. We advocate for these approaches to be taken into account during the preparation of applications and in decision-making processes such as resource consent and concession applications.

The Te Ara Mangawhero route has been designed to maximise the use of previously disturbed sites/areas and to avoid and minimise the potential for adverse effects on intact indigenous ecosystems. To respect the sensitive nature of the natural landscape the trail construction methodology is based on the wellbeing of the taiao. New opportunities for the control of pest plants and pest animals to complement existing conservation management in the local area will result from the establishment of the trail. There are also opportunities to enhance the recovery of indigenous vegetation within previously disturbed areas. The aim is to build a sustainable trail that blends with the environment, has minimal impact, resists erosion through proper design, and enhances the mouri of the area.

The trail will traverse and showcase a wide range of ecologically and culturally significant forest and river margin habitats on the lower slopes of Ruapehu. Positioning of interpretation is crucial not only to add to the trail experience but also in providing an opportunity for important natural, cultural and historical korero associated with the land and the trail to be told. Enabling recreational access will create connection, health and wellbeing benefits, and enable greater environmental and conservation outcomes.

As tangata tiaki, Ngā Waihua o Paerangi Trust and Ruapehu WorX will establish, manage and maintain Te Ara Mangawhero. This will nurture a strong and maintained connection with our maunga, wai and whenua enabling care and reciprocity for the location while providing employment and growth opportunities for local people.

Leading the detailed trail design and construction methodology mahi has ensured Ngāti Rangi values have been integrated and weaved through the design of Te Ara Mangawhero. The trail design alongside sensitive construction methodologies has ensured approaches from the Ngāti Rangi Taiao Management Plan have been met. Therefore, cultural effects have either been mitigated or can be managed.

SUMMARY

Ngāti Rangi has been proactively involved with Te Ara Managwhero since its inception. Given we will be responsible for construction and kaitiakitanga of ongoing management and maintenance we are satisfied cultural impacts have either been mitigated or can be managed.

We won't speak on other tribes' behalf, yet we acknowledge the interests of our whānaunga. Given the location for the development of Te Ara Mangawhero, Ngāti Rangi deems it appropriate for Ngā Waihua o Paerangi Trust to apply for approvals to build, manage and maintain the trail.

Appendix 8. Assessment of Ecological Effects

ASSESSMENT OF ECOLOGICAL EFFECTS FOR A PROPOSED SHARED USE TRAIL ON THE LOWER SLOPES OF MOUNT RUAPEHU

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ASSESSMENT OF ECOLOGICAL EFFECTS FOR A PROPOSED SHARED USE TRAIL ON THE LOWER SLOPES OF MOUNT RUAPEHU

Historic tramline within rimu-mataī-miro/kāmahi forest, Section 1b. Red arrow indicates the direction towards Ohakune. 16 September 2021.

Contract Report No. 5405d

December 2021

Project Team:
Angela Simpson - Field evaluation and report author
William Shaw - Project management and peer review

Prepared for:
Ruapehu District Council
C/- GHD
Taumarunui

99 SALA STREET, WHAKAREWAREWA, 3010, P.O. BOX 7137, TE NGAE, ROTORUA 3042
Ph 07-343-9017; Fax 07-343-9018, email ecology@wildlands.co.nz, www.wildlands.co.nz

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Reviewed and approved for release by:

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W.B. Shaw
Director/Lead Principal Ecologist
Wildland Consultants Ltd

1. INTRODUCTION

Te Ara Mangawhero Advisory Group in Ohakune has proposed the development of a family-friendly, shared use walking and mountain biking trail within Tongariro National Park, from Turoa Ski Field to Ohakune (*c.*19.3 kilometres). Construction of Te Ara Mangawhero Trail would complete the Mountain to Sea Cycle Trail, which currently ends with the Old Coach Road trail at the lower end of Ohakune Mountain Road.

The first stage of Te Ara Mangawhero Trail that is currently under consideration is from the Ngāti Rangi office in Ohakune (about 620 metres above sea level, a.s.l.), to near the Mangawhero River, at about 800 metres a.s.l. Most of this stage is to be located in previously - disturbed areas associated with the historic Bennett and Punch tramlines and/or the existing Ohakune water supply pipeline. The trail is intended to showcase a wide range of habitats associated with the ngahere (forest), Mangawhero awa (river), and previously cleared areas on the lower slopes of Ruapehu.

Ruapehu District Council commissioned Wildland Consultants to provide an evaluation of the proposed route for the first stage of the trail, and provide an assessment of the potential ecological effects as part of an assessment of effects for the following permissions processes:

- Department of Conservation works approval.
- Department of Conservation concession.
- Horizons Regional Council resource consent.

This report provides an assessment of ecological effects for the proposed works, including options to avoid or minimise potential adverse effects.

2. BACKGROUND

Wildland Consultants has previously provided the following services and reporting for the trail project:

<u>Ecology</u>

- Desktop ecological assessment of the proposed trail alignments (May 2020, Wildland Consultants 2020a).
- Attendance and verbal contributions at a hui with Ngāti Rangi and the Department of Conservation in Ohakune (November 2020).
- Attendance and technical advice on a field evaluation of the section of trail from Turoa Skifield to the Mountain Road (November 2020, Wildland Consultants 2020a).
- Provision of follow-up advice on a 'trail deviation process' (November 2020, Wildland Consultants 2020c).

Landscape

- Protocols for the Turoa alpine section (May 2020).
- Attendance and verbal contributions at a hui with DOC and iwi in Ohakune (November 2020).
- Attendance and technical advice on a field evaluation of the section of trail from Turoa Skifield to the Mountain Road.

Other assessments relating to landscape and ecological impacts of the proposed Te Ara Mangawhero Trail include Carylon (2017), Scrimgeor *et al*. (2017), and Singers and Bayler (2017).

3. CONTEXT

Existing information on the ecological context and ecological values of the project area was compiled and evaluated in Wildland Consultants (2020a).

The proposed trail is within the southern part of Tongariro Ecological District. This Ecological District contains both active and dormant volcanoes at the southern end of the volcanic plateau, including the highest mountain in the North Island, Ruapehu (2,797 metres a.s.l.), and a ring plain formed by extensive lahars. Close to two thirds of the Ecological District retains indigenous vegetation cover (Leathwick *et al*. 1995).

Much of Tongariro Ecological District is within Tongariro National Park, an area of international cultural and natural landscape significance and is recognised as a dual World Heritage Site. Iwi of the volcanic plateau have a special relationship with the maunga/mountains of Tongariro National Park.

The proposed trail is within the Ruapehu District, in Manawatū-Whanganui Region. Relevant statutory documents to the proposed trail include the Tongariro National Park Management Plan, Tongariro Taupō Conservation Management Strategy, and the Horizons (Manawatū-Whanganui) Regional Council One Plan.

4. METHODS

Site visits were undertaken on 16 and 17 September 2021, in the company of Ngāti Rangi representatives and other project team members - including a Ngāti Rangi ecologist, planners and surveyors - to develop a good understanding of the ecological values along the proposed trail route.

High resolution aerial imagery (LINZ Aerial Photographs) of the project area was obtained and printed at a scale suitable for field use (1:2,000).

Vegetation and habitat types present within the project area were identified and described following the vegetation classification methodology of Atkinson (1985). Vegetation and habitat types and key features were mapped using the aerial photographs and digitised with ArcGIS 10.8.

All vascular plant species observed during the site visits were recorded and are listed in Appendix 1. Incidental observations of avifauna were recorded during the site visits and are listed in Appendix 2. Representative photographs were taken of the vegetation and habitat types, proposed trail and bridge locations, and key ecological features (Appendix 3).

Ecological values of the site and potential ecological effects of the proposed trail route were assessed. Options to avoid, minimise, or mitigate any adverse effects were evaluated.

5. OVERVIEW OF THE PROPOSED TRAIL

5.1 Overview

The following sections have been compiled based on information supplied by the client in September-November 2021.

The proposed Te Ara Mangawhero Trail will be an all-season shared cycleway and walkway that will provide a loop track from the Ngāti Rangi office on the northeastern side of Ohakune to the Mangawhero Campsite and a northern extension that could eventually join future stages of the Mountains to Sea Cycle Trail at higher elevations (Figure 1). The proposed trail alignment is located on public conservation land within Tongariro National Park, except for two short sections: between the Ngāti Rangi office and Urewera Road, and within the Ohakune Mountain Road corridor. The proposed trail is about 8.3 kilometres long. The trail is intended to be used by public for walking and mountain biking, and will be able to be used in both directions. It will be suitable for a wide range of ages and abilities.

For the purposes of this report, the first stage of the proposed trail has been divided into the following sections:

- Section 1a: Trail start to Mountain Road tramline, *c.*2.8 kilometres.
- Section 1b: Mountain Road margin to Mangawhero River, *c.*0.8 kilometre.
- Section 2: Campsite to Tutara Stream, *c.*1.8 kilometres.
- Section 3: Historic milling clearing, *c.*1.7 kilometres.
- Section 4: Tramline to trail end, *c.*1.3 kilometres.

Construction is intended to be undertaken by a local company, Ruapehu WorX, to provide local upskilling and employment opportunities, including for members of Ngāti Rangi iwi. Ruapehu WorX started in 2020 and is guided by Ngāti Rangi, and a taiao (environmental) management team with experience in the Ruapehu area since 1992. Ruapehu WorX is led by Paul Carr, who has 32 years of experience in trail building, project management, and construction in iconic remote destinations throughout Aotearoa. A suitably qualified and experienced trail construction manager will train and oversee kaimahi (staff) to ensure that appropriate techniques are used.

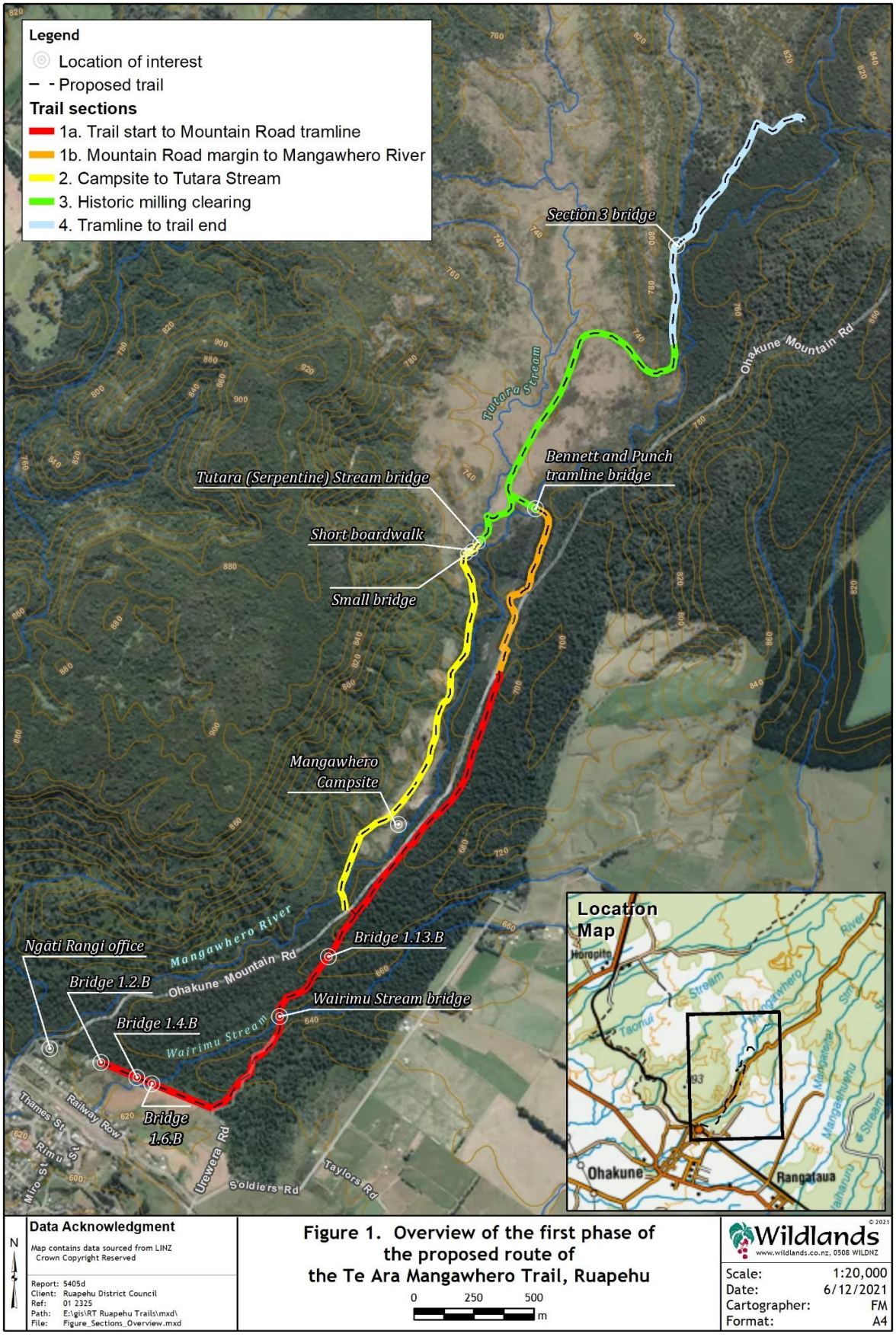


Figure 1. Overview of the first phase of the proposed route of the Te Ara Mangawhero Trail, Ruapehu

5.2 Proposed footprint

The proposed trail route will be located predominantly on historic tramlines and/or the existing Ohakune water supply pipeline. The historic Bennett and Punch tramlines are approximately three metres wide and slightly raised with a benched surface along most of the length. There are a few places where the tramline is within cuttings in the surrounding hillsides (and reduces in width to *c.*2.5 metres) or has settled to below the natural ground surface level (e.g. Section 3). Most of the tramline has seen no human-induced disturbance or development of new infrastructure for about 80 years (Carlyon 2017). The existing Ohakune water supply pipeline is positioned on the section of the tramline below the proposed Tutara (Serpentine) Stream bridge (via Section 1a). The original pipeline is buried, although a 340 metre long section of pipeline that was replaced in 1992 sits on the ground surface (Singers 2020).

The average width of the completed trail will be 1.5 metres, extending to 1.8 metres where terrain permits to allow for easy passing and shared use. The maximum width of the construction alignment, including batters, will be 2.0 metres. The trail will cross waterways via nine bridges. Boardwalks could be used in sections of sensitive terrain, such as within black beech (*Fuscospora solandri*) forest (Section 2). Bridges would be *c.*1.2 metres wide. Locations of proposed bridges are shown in Figure 1 and are summarised in Table 1.

Table 1: Proposed bridges and boardwalks along the alignment of Te Ara Mangawhero trail.

Name of Bridge (as per plans provided by Cheal)	Section of Trail	Length of Bridge (metres)	Style of Bridge
Bridge 1.2.B	1a	6	Sleeper bridge
Bridge 1.4.B	1a	6	Sleeper bridge
Bridge 1.6.B	1a	6	Sleeper bridge
Wairimu Stream bridge (1.10.B)	1a	8	Sleeper bridge
New bridge 1.13.B to replace existing bridge	1a	6	Sleeper bridge
Bennett and Punch tramline bridge (3.6.B)	1b	34	Steel beam timber deck bridge
Small bridge (2.5.B)	2	6	Sleeper bridge
Boardwalk (2.7.W)	2	17.5	Boardwalk
Tutara (Serpentine) Stream bridge (2.8.B)	2	6	Steel beam timber deck bridge
Section 3 bridge (4.3.B)	4	17.5	Steel beam timber deck bridge

5.3 Construction methodology

The over-arching philosophy is that trail construction will be undertaken in a sensitive manner, with a major focus on recognising the cultural and ecological importance of the surrounding indigenous habitats and aquatic environments. A key aim will be to avoid and minimise the potential adverse effects of trail construction and ongoing maintenance on te taiao (the environment). Construction of the trail would be overseen by a suitably qualified and experienced trail construction manager. The construction methodology is still being finalised by the project team (refer to the Trail Construction Protocol for further detail, Ruapehu WorX 2021), but will include the following steps:

- Final "setting out" of the trail route to ensure that appropriate detailed design considerations are addressed. The ecologist from Ngāti Rangi will be involved on-site in deciding the final route of the trail, with kaumātua in attendance where possible. A monitoring officer from the Department of Conservation will inspect each section of the final trail alignment prior to construction beginning on each section.

- The trail would be built to a Grade 2 (Easy) New Zealand Cycle Trail Design Standard (ViaStrada 2019). This means that the trail will generally be wide with gentle climbs and a smooth alignment. Although, there will likely be some steeper or narrower Grade 3 (Intermediate) sections. The design of the trail has incorporated features to enable safe shared use by people on foot and on bike, travelling in both directions. The overall maximum gradient of the trail is intended to be an average of 5%, but no greater than 8%.

- Helicopter-drop locations will be used to deliver supplies to the construction front at set locations along the route. Existing clearings or gaps in the forest canopy can be used for helicopter-drop locations. For locations less than one kilometre from roads or access points, materials will be transported using tracked low-ground-pressure dumpers.

- The Ruapehu WorX ecologist, in conjunction with a suitable representative from the Department of Conservation, will identify any indigenous shrubs and tree species (less than two metres in height) or understorey plants that could be successfully transplanted from the trail footprint. Once approved, the identified plants will be removed for replanting in identified restoration areas before construction is started (refer to Section 9 of Ruapehu WorX 2021).

- Vegetation clearance will be undertaken within the trail footprint using arboriculture tools e.g. chainsaws and hand tools.

- Clearance of the trail footprint using machines such as a small excavator, to a maximum size of 1.8 tonnes[1], 1.4 metres wide. Tracked, low-ground pressure machinery will be used, to minimise compaction.

- The width to be disturbed during construction is likely to be up to two metres in places. This includes the trail width (average 1.5 metres) and construction batters. Based on these widths, it is feasible for the trail to be constrained to the existing disturbed footprints of the tramlines and water pipeline which are about three metres wide. The width of the tramline also allows for curvature of the trail.

- The intention is for the trail to meander through existing indigenous vegetation. No mature indigenous trees will be removed and, where possible, indigenous trees taller than two metres will be left undisturbed and the existing root structures of mature trees will be protected from damage.

- Vegetative material that is cleared will be scattered along the trail margins, where suitable, avoiding the formation of large piles of debris.

[1] A 1.2-1.8 tonne excavator is preferred over a larger excavator because a larger excavator will generally result in more severe ecological effects.

- Where possible, the intention is to use construction methods that involve minimal or no excavation. Any soil or substrate that is removed will be used as fill for other sections of the trail (e.g. boulder mesh nets as bridge struts) or placed in areas of minimal ecological impact (such as recently disturbed areas) and then revegetated. Excess material will not be side-cast or disposed of loosely.

- Careful sediment controls will be implemented at all bridge sites, using coir logs or similar (as per the Erosion Sediment Control Plan, du Plessis 2021).

- Forming the surface of the trail. Along most of the proposed route there is an existing benched surface foundation that will be used, from the historic tramlines, existing waterline, and roads.

- On flat terrain the trail surface will be crowned with the surface sloping towards each side at a gradient of approximately 4%, which will prevent a trenched/dished trail surface developing from use over a short period of time. A small proportion of the length of the trail will traverse slopes. Therefore, to manage water, an outward-sloping trail surface will be used, in preference to a crowned or inward sloping surface which could require an inside drain and use of culverts. This will assist any water to run across the trail and not down the trail, thereby minimising ongoing maintenance needs. Rolling grade dips will be installed at suitable locations, as needed, to divert water off the trail surface.

- A compacted gravel surface will be established. Weed-free gravel (AP 60 scoria base course and AP 20 volcanic top course material) is to be sourced from a local quarry near Ohakune. Aggregate would then be spread using a mini loader.

- Small sections of boardwalks will be used in sections of sensitive terrain, such as within black beech forest (Section 2).

- Six sleeper-style bridges (five at six metre single spans and one eight metre single span) and three steel beam timber deck bridges (two 17.5 metre single spans and one 34 metre three-span) are proposed (see Table 1). Timber handrails will be installed as fall protection for pedestrians and cyclists. All of the steel beams will be coated with approved natural colours to align with the surrounding natural landscape. All of the proposed bridges will span entirely over the existing waterways in such a way that the waterway under the bridge is not reduced and potential effects are avoided or kept to a minimum. Where land disturbance activities are carried out, erosion and sediment control will be provided on-site during construction. Concrete foundations will be precast offsite where possible. The precast components and steel beams will be lifted into place using a helicopter. The proposed three-span 34 metre long bridge that is to be located at the Bennett and Punch tramline crossing of the Mangawhero River will utilise the existing bridge piers and abutments.

- Where possible, all boardwalks and bridges will be constructed offsite and dropped into place by helicopter. Larger bridges will be air-lifted as components and assembled on-site.

6. VEGETATION AND HABITATS

Seventeen broad vegetation and habitat types were identified along the proposed trail. Vegetation and habitats within each section of the trail are mapped in Figures 2-6 and listed in Table 2, with descriptions of the types provided below. Representative photographs of vegetation and habitats are presented in Appendix 3.

Table 2: Vegetation and habitat types along the alignment proposed for Te Ara Mangawhero Trail.

Vegetation and Habitat Type		Length of Proposed Trail (km)
Section 1a		
A.	Rimu-mataī-miro forest	0.8
B.	Existing Mangawhero Forest Walk	0.3
C.	Rimu-mataī-miro/kāmahi forest	1.2
D.	Forest margin	0.5
Total		**2.8**
Section 1b		
A.	Mānuka-horoeka scrub and black beech forest margin	0.1
B.	Mānuka scrub	0.3
C.	Black beech-silver beech forest	0.4
Total		**0.8**
Section 1 Total		**3.6**
Section 2		
A.	Sealed road	0.6
B.	Gravel road	1.1
C.	Indigenous broadleaved species shrubland	0.02
D.	Black beech forest	0.1
Total		**1.8**
Section 3		
A.	Mānuka shrubland	0.1
B.	Exotic grassland with patches of early successional shrubs	1.2
C.	Indigenous broadleaved species shrubland	0.1
D.	Indigenous broadleaved species scrub	0.3
Total		**1.7**
Section 4		
A.	Black beech-kāmahi-indigenous broadleaved species forest	0.4
B.	Black beech forest with scattered clearings	0.9
Total		**1.3**
Grand Total		**8.3**

6.1 Section 1a: Trail start to Mountain Road tramline

A. Rimu-mataī-miro forest

The proposed trail first enters Tongariro National Park via an existing four-wheel drive track, referred to as Urewera Road. This section of the trail is within tall podocarp forest dominated by large emergent podocarps, including many trees of rimu (*Dacrydium cupressinum*), mataī (*Prumnopitys taxifolia*), and miro (*Pectinopitys ferruginea*) that are greater than 25 metres tall (Plates 1-3 in

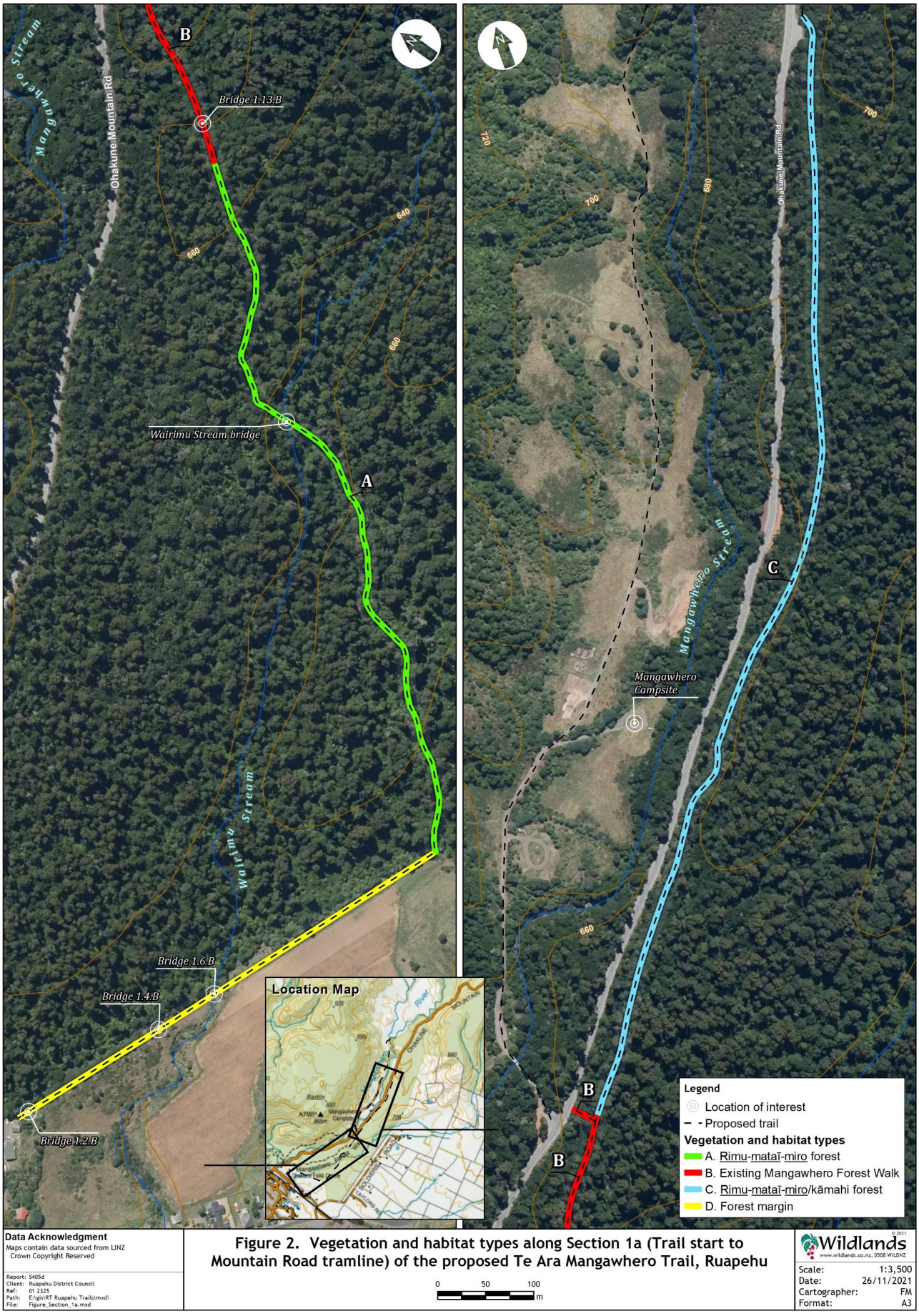


Figure 2. Vegetation and habitat types along Section 1a (Trail start to Mountain Road tramline) of the proposed Te Ara Mangawhero Trail, Ruapehu

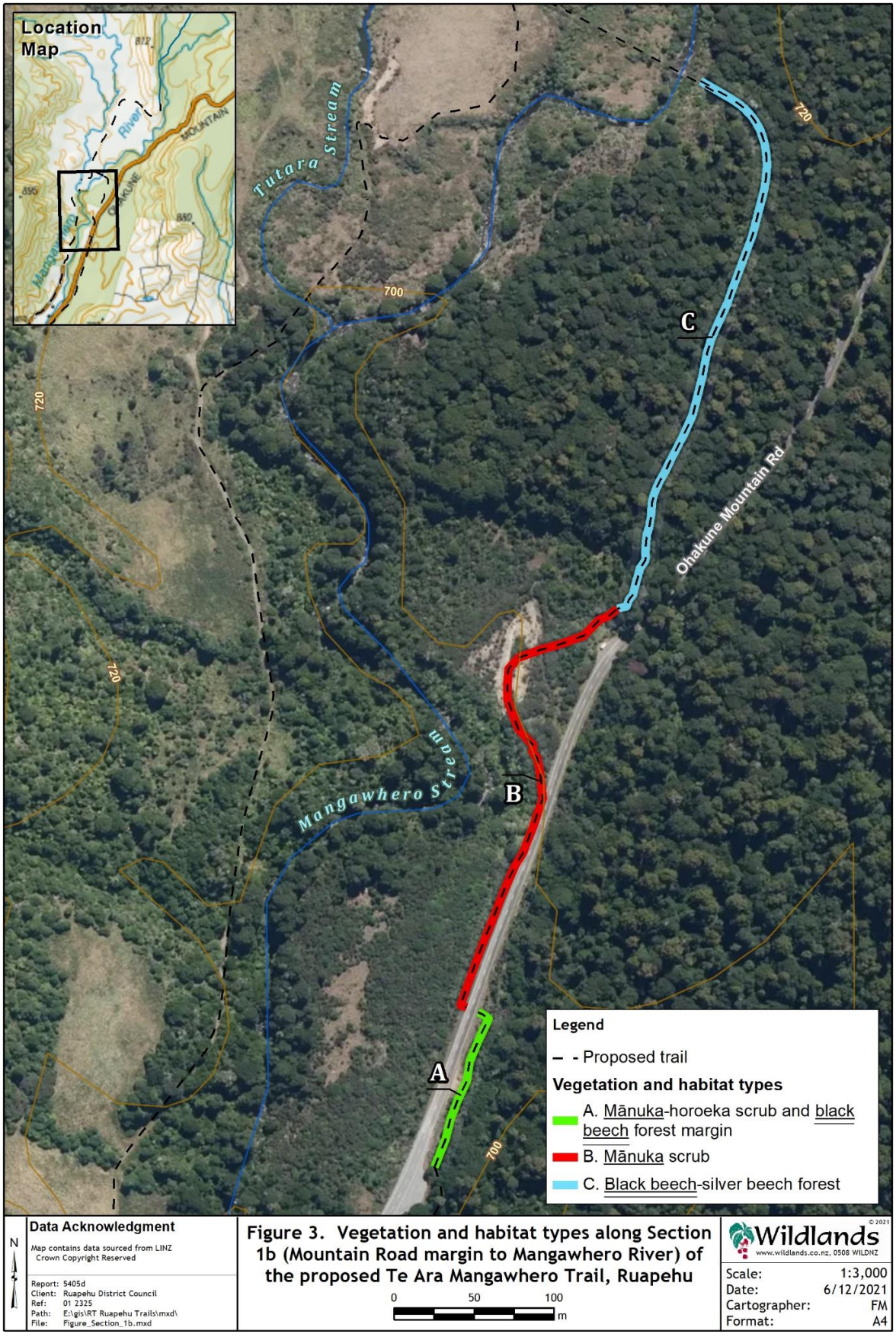
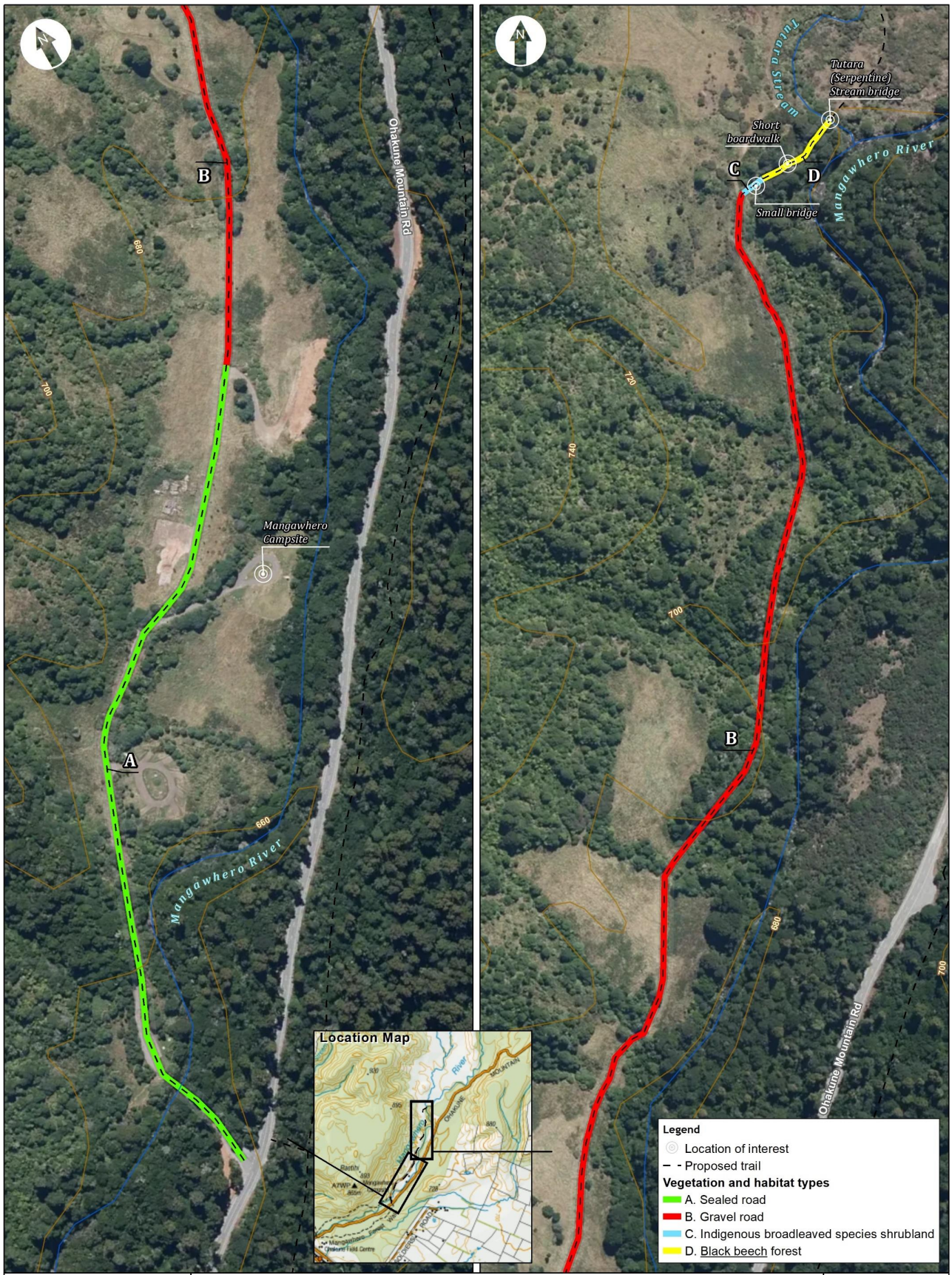


Figure 3. Vegetation and habitat types along Section 1b (Mountain Road margin to Mangawhero River) of the proposed Te Ara Mangawhero Trail, Ruapehu



Data Acknowledgment
Maps contain data sourced from LINZ
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Figure 4. Vegetation comunities along the proposed Section 2 (Campsite to Tutara Stream), Te Ara Mangawhero Trail, Ruapehu

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Scale: 1:2,500
Date: 25/11/2021
Cartographer: FM
Format: A3

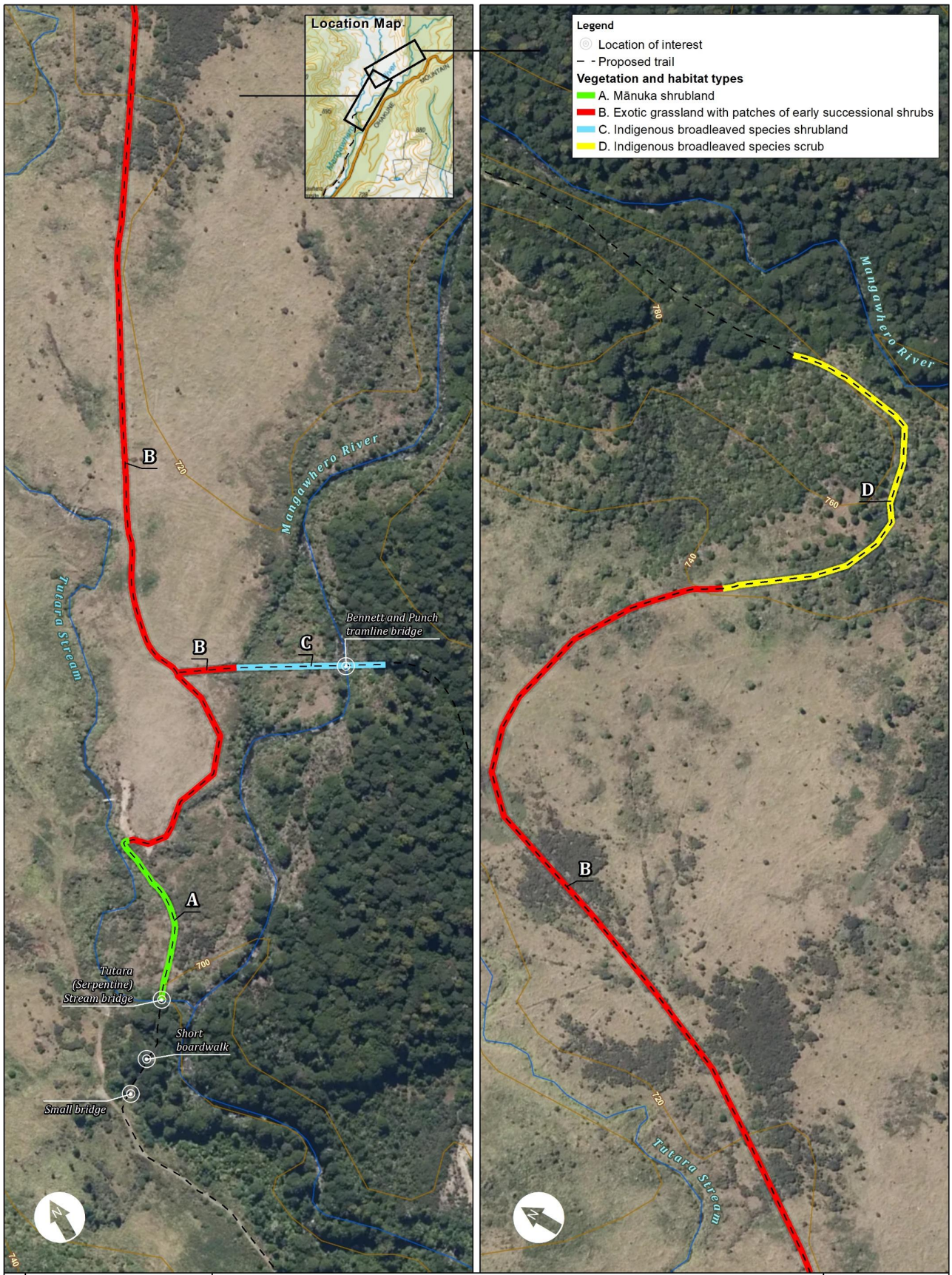

Figure 5. Vegetation and habitat types along Section 3 (historic milling clearing) of the proposed Te Ara Mangawhero Trail, Ruapehu

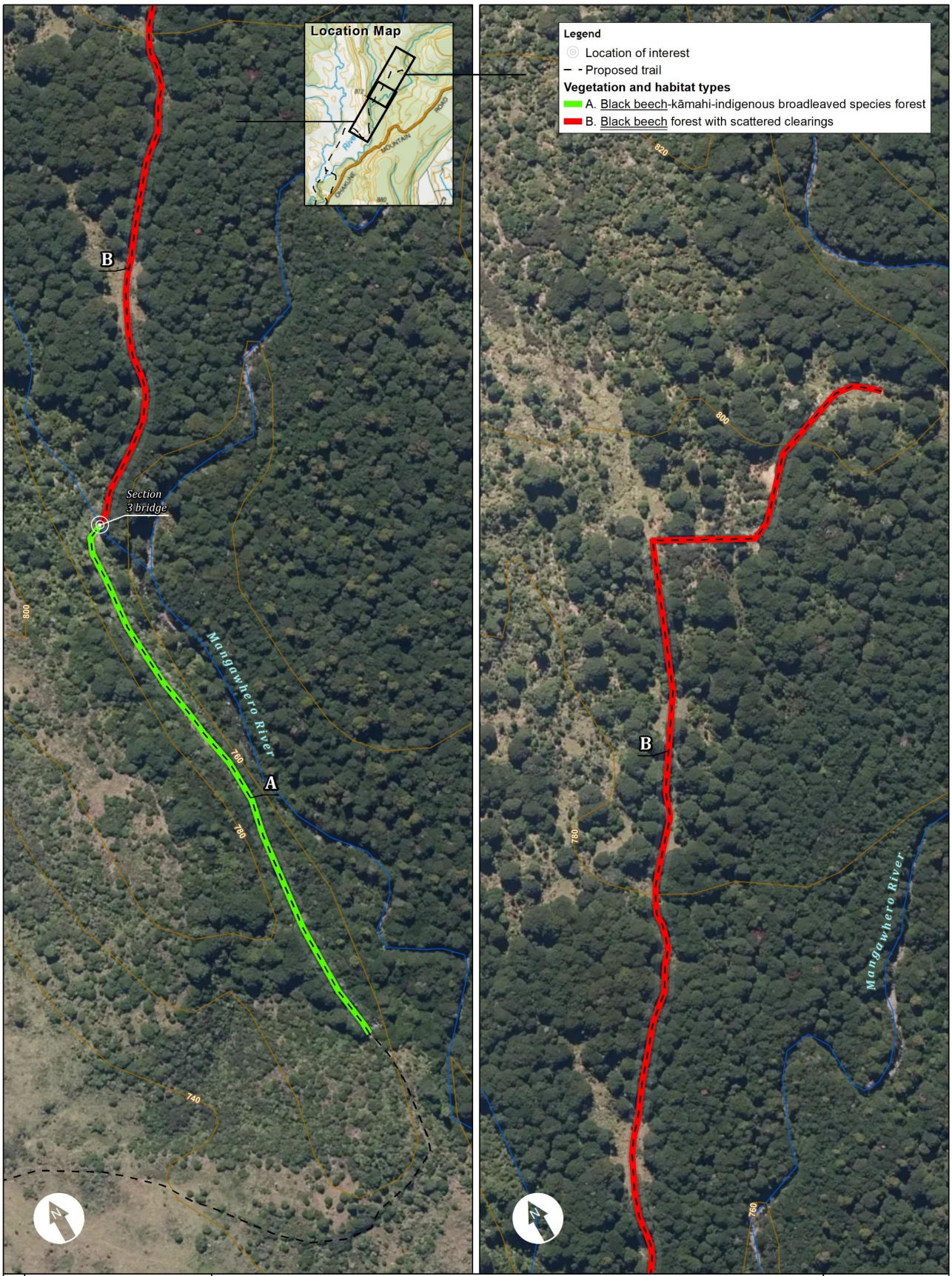

Figure 6. Vegetation and habitat types along Section 4 (tramline to trail end) of the proposed Te Ara Mangawhero Trail, Ruapehu

Appendix 3). The subcanopy tier (*c.*5-10 metres tall) includes a range of indigenous broadleaved trees and tree ferns, including māhoe (*Melicytus ramiflorus* subsp. *ramiflorus*), patē (*Schefflera digitata*), makomako (*Aristotelia serrata*), kātote (*Cyathea smithi*), whekī (*Dicksonia squarrosa*), kōtukutuku (*Fuchsia excorticata*), putaputawētā (*Carpodetus serratus*), and rangiora (*Brachyglottis repanda*). Within the footprint of the tramline, the groundcover is dominated by leaf litter, with scattered piupiu/crown fern (*Blechnum discolor*), *Blechnum fluviatile*, and hook grasses (*Carex* sp.). Saplings of the canopy tree species are present in the shrub tier (*c.*1-2 metres tall) but larger trees are generally only present beyond the margins of the tramline.

B. Existing Mangawhero Forest Walk

Approximately 250 metres of this section of the proposed trail is to include the existing Mangawhero Forest Walk track. This track is currently *c.*1.2 metres wide. It is proposed that the existing track would be increased to *c.*1.5 metres wide to accommodate this part of the trail (see Plate 4 in Appendix 3). The two existing six metre long bridges would also be widened to 1.5 metres (see Plate 5 in Appendix 3).

C. Rimu-mataī-miro/kāmahi forest

This section of the proposed trail passes through forest that comprises scattered emergent podocarps (including trees greater than 25 metres tall) above a canopy dominated by kāmahi (*Weinmannia racemosa*, *c.*10-15 metres tall) (Plates 6-8 in Appendix 3). Podocarps present include moderate-sized rimu, mataī, miro, and Hall's tōtara (*Podocarpus laetus*). Maire rau nui/black maire (*Nestegis cunninghamii*), hīnau (*Elaeocarpus dentatus*), toro (*Myrsine salicina*), māhoe, and putaputawētā are scattered in the canopy. Tree ferns are common (*c.*2-5 metres tall), particularly kātote, and whekī-ponga (*Dicksonia fibrosa*). Piupiu/crown fern forms a dense groundcover throughout, with scattered bush rice grass (*Microlaena avenacea*) and hook grasses. Within the footprint of the tramline, large trees (>15 centimetres diameter at breast height, dbh) are generally absent, although saplings of the canopy species and small leaved shrubs are present in the shrub tier (*c.*1-3 metres tall) including *Coprosma rhamnoides*, rōhutu (*Neomyrtus pedunculata*), and mingimingi (*Leucopogon fasciculatus*).

D. Forest margin

The proposed trail will start from the Ngāti Rangi office on the northeastern side of Ohakune. From here the trail will be situated within exotic grassland along the outer margin of the rimu-mataī-miro forest (Plate 9 in Appendix 3). Three six metre-long bridges will be constructed to cross the Wairimu Stream and associated tributaries or damp areas in the first half of this section of trail. Patches of regenerating mixed indigenous and exotic shrubland are present in the vicinity of the proposed bridges.

6.2 Section 1b: Mountain Road margin to Mangawhero River

A. Mānuka-horoeka scrub and black beech forest margin

The former tramline cannot be used for this section of the proposed trail because it is located under Mountain Road. There is no previously undisturbed footprint within the rimu-mataī-miro/black beech-kāmahi forest that is present alongside this part of Mountain Road. The proposed trail route would therefore be within the regenerating scrub and forest, ranging from the immediate road margin to about 10 metres from the road margin (eastern side of Mountain Road).

This part of the proposed route comprises scrub dominated by mānuka (*Leptospermum scoparium*, *c.*2-3 metres tall) with scattered horoeka/lancewood (*Pseudopanax crassifolius*) (Plate 10 in Appendix 3). *Coprosma dumosa*, mingimingi, rārahu/bracken (*Pteridium esculentum*), and toetoe (*Austroderia fulvida*) are present in the understorey. There are a few small trees of rimu, kāpuka (*Griselinia littoralis*), and putaputawētā scattered throughout. This scrub type is present between the road margin and black beech forest (*c.*10 metres tall).

B. Mānuka scrub

This section of the proposed trail route, near the western margin of Mountain Road, is within scrub dominated mānuka (*c.*2-3 metres tall, Plate 11 in Appendix 3) with occasional horoeka/lancewood and whauwhaupaku (*Pseudopanax arboreus*). Rārahu/bracken is common in the understorey, with patches of moss and sparsely scattered koromiko (*Veronica stricta* var. *stricta*), toetoe, and mingimingi.

C. Black beech-silver beech forest

The section of trail before the Bennett and Punch tramline bridge is within forest dominated by black beech (about 20 metres tall), with occasional tawhai/silver beech (*Lophozonia menziesii*) and rimu.

Within the proposed trail footprint, there are scattered saplings of the canopy tree species (*c.*2-3 metres tall), and occasional small trees and shrubs such as putaputawētā, kanono (*Coprosma grandifolia*), *Coprosma tenuifolia*, and mingimingi (Plates 12-13 in Appendix 3). Tree ferns of kātote and whekī-ponga are also scattered throughout. *Astelia fragrans* and piupiu/crown fern dominate the groundcover, along with scattered bush rice grass and hook grasses. A few large rimu trees occur near the margins of the old tramline.

6.3 Section 2: Campsite to Tutara Stream

A. Sealed road

This section of the proposed trail will utilise the existing sealed road that services the Mangawhero Campsite. The sealed road is about four metres wide and is surrounded by patches of exotic grassland and indigenous broadleaved forest and scrub. Indigenous broadleaved species present are similar to those included in

the description for the gravel road below. It is proposed that the trail will use the margin of this sealed road and the road bridge, and no vegetation clearance will be required for this section.

B. Gravel road

This section of the proposed trail will follow the existing gravel road that services the Ohakune Water Source. The gravel road is about three metres wide (Plates 14-18 in Appendix 3). It is surrounded by exotic grassland and areas in various stages of regeneration from rārahu/bracken fernland to mānuka scrub, indigenous broadleaved scrub, and indigenous broadleaved forest. Indigenous broadleaved species that are common include koromiko, horoeka, whauwhaupaku, kanono, kāpuka, whekī-ponga, and *Coprosma dumosa*. Kāmahi dominates the canopy in the areas of more developed forest, along with occasional pole rimu. The gravel road is rutted and poor quality in places.

C. Indigenous broadleaved species shrubland

Shrubland with a variable cover of a range of indigenous broadleaved trees and shrubs (*c.*2-5 metres tall) intermixed with patches of exotic grassland and rārahu/bracken is present on the margins of a small unnamed tributary stream where a small bridge is proposed (Plate 19 in Appendix 3). Indigenous broadleaved species present include horoeka, rautāwhiri (*Pittosporum colensoi*), koromiko, kāpuka, and mānuka. There are a few whekī-ponga and toi (*Cordyline indivisa*). Pūniu (*Polystichum vestitum*), kiokio (*Blechnum novae-zelandiae*), and whararikі are scattered along the stream margins.

D. Black beech forest

Forest dominated by black beech (*c.*15 metres tall) occurs in this part of the proposed trail (Plates 20-23 in Appendix 3). The understorey is relatively sparse with scattered *Coprosma tenuifolia*, *Coprosma lucida*, *Astelia fragrans*, and mingimingi. There are occasional saplings of Hall's tōtara, miro, and horoeka. A small patch of mānuka scrub (about three metres tall) is present for about a five metre length along the proposed trail route in this section.

6.4 Section 3: Historic milling clearing

A. Mānuka shrubland

Shrubland with a variable cover of mānuka (to about two metres tall) intermixed with patches of exotic grassland occurs on river terraces and within the lower part of this section of the proposed route (Plate 24 in Appendix 3). Other indigenous shrubs and saplings in the shrubland include horoeka, koromiko, and *Coprosma dumosa*.

B. Exotic grassland with patches of early successional shrubs

Grassland dominated by a range of exotic pasture grasses with patches of early successional rārahu/bracken fernland, mānuka scrub (about two metres tall), and

scattered indigenous broadleaved species occurs within this part of the proposed trail route (Plates 25-28 in Appendix 3). The relatively flat topography of this area means that the ground on both sides of the old tramline bench is seasonally damp in places. Standing tree stumps are scattered throughout the area, remnants of logging that was undertaken between 1909 and the 1920s.

Exotic grasses present include red fescue (*Festuca rubra* subsp. *rubra*), tall fescue (*Lolium arundinaceum* subsp. *arundinaceum*), and cocksfoot (*Dactylis glomerata*). Rārahu/bracken is common on the scrub margins and *Blechnum penna-marina* subsp. *alpina* is common in the understorey of the mānuka scrub. There are occasional shrubs of *Coprosma dumosa* and koromiko, and small trees of kāpuka (to about five metres tall) are scattered throughout the scrub and grassland. One patch of *Gleichenia microphylla* and at least two shrubs of *Olearia virgata* are present along the proposed trail route.

C. Indigenous broadleaved species shrubland

Shrubland with a variable cover of a range of indigenous broadleaved trees and shrubs (2-5 metres tall) intermixed with patches of exotic grassland is present on river terraces within this part of the proposed trail. Indigenous broadleaved species present include horoeka, koromiko, mānuka, kāpuka, and orihou/mountain five finger (*Pseudopanax colensoi*). Rārahu/bracken is present on the margins of the patches of shrubs. A bridge will be constructed over the Mangawhero River at the site of the old Bennett and Punch tramline bridge (Plate 29 in Appendix 3).

D. Indigenous broadleaved species scrub

Scrub with a variable cover of indigenous broadleaved species (3-5 metres tall, Plate 30 in Appendix 3) occurs on a hillslope at the end of the proposed third section of trail. Tree species present include kāpuka, putaputawētā, mānuka, and rangiora. Patches of exotic grasses and ground ferns including rārahu/bracken, kōwaowao/hound's tongue fern (*Microsorum pustulatum*), mātātā (*Paesia scaberula*), and kiokio are scattered along the tramline in places. There are a few rimu, and scattered koromiko and toetoe.

6.5 Section 4: Tramline to trail end

A. Black beech-kāmahi-indigenous broadleaved species forest

A variable cover of black beech forest (about 10 metres tall) intermixed with patches of kāmahi occurs alongside the old tramline in this section of the proposed trail route. Indigenous broadleaved species are common in the canopy, particularly on the steeper downhill side of the tramline, including kāpuka, koromiko, putaputawētā, rangiora, *Coprosma lucida*, horoeka, and toetoe. Several mature toi occur immediately alongside the tramline (Plate 31 in Appendix 3). A patch of *Corybas* sp. (likely *C. iridescens*) about three metres wide was present within about 50 metres from the proposed location of the Section 3 bridge.

A bank (*c.*0.5-2.0 metres high) occurs along the uphill side of the tramline for most of this part of the proposed route (Plates 32-33 in Appendix 3). Ground ferns including heruheru (*Leptopteris hymenophylloides*), piupiu/crown fern, rereti (*Blechnum chambersii*), peretao (*Blechnum colensoi*), and kiokio are present on the bank.

At the location of the proposed bridge, the margins of the tributary stream are dominated by kiokio, with emergent toi and scattered toetoe. Patē, orihou/mountain five finger, *Coprosma lucida*, koromiko, and kāmahi saplings are also present (Plates 34-35 in Appendix 3).

B. <u>Black beech</u> forest with scattered clearings

Forest dominated by black beech (10-15 metres tall) occurs in the final part of this stage of the proposed trail (Plates 36-37 in Appendix 3). Podocarps are uncommon and the most of the larger trees have been selectively logged. Occasional miro, silver beech, pōkākā (*Elaeocarpus hookerianus*), maire rau nui/black maire, Hall's tōtara, and rimu are present in the canopy. Piupiu/crown fern and *Astelia fragrans* are common in the understorey, with scattered saplings of the canopy tree species, mountain horopito (*Pseudowintera colorata*), and occasional *Raukaua anomalus*, ngutukākāriki/Prince of Wales feathers (*Leptopteris superba*), and hūpiro (*Coprosma foetidissima*). Epiphytes are common on the larger trees including *Asplenium flaccidum*, *Notogrammitis heterophylla*, and kōwaowao/hound's tongue fern.

Clearings that are scattered along the tramline are in various stages of regeneration (Plate 38 in Appendix 3). In general, exotic grasses, mosses, and toetoe dominate the centre of the clearings. Horoeka, mountain horopito, *Coprosma dumosa*, mingimingi, and putaputawētā are common on the forest margins (to about five metres tall), along with saplings of the canopy tree species.

There is a patch of mānuka scrub (about three metres tall) covering a distance of about 100 metres, about 50 metres before the final clearing at the end of the proposed trail. *Astelia fragrans* and toetoe are common in the understorey. A small stream flows through this area (Plate 39 in Appendix 3), but the tramline formation is generally raised above the areas of wet substrate.

7. FLORA

A total of 131 vascular plant species, including 112 indigenous and 19 exotic plant species, were recorded during the site visits (Appendix 1).

Four indigenous vascular plant species that were recorded as naturally occurring at the site have a national-level threat classification (as per de Lange *et al.* 2018):

- Mānuka; At Risk-Declining.
- Rōhutu; Threatened-Nationally Critical.
- Two species of rātā: *Metrosideros diffusa*; Threatened-Nationally Vulnerable and *Metrosideros perforata*; Threatened-Nationally Vulnerable.

These four species belong to the Myrtaceae plant family, which is at risk of infection by myrtle rust (*Austropuccinia psidii*) which arrived in Aotearoa New Zealand in May 2017. Myrtle rust is a fungal disease which infects plants from the myrtle family (Myrtaceae) and could potentially have devastating effects on indigenous Myrtaceae species. Therefore, the threat statuses of all New Zealand Myrtaceae have been elevated as a precautionary measure based on the potential threat that myrtle rust poses to these species. Mānuka and the two rātā species are otherwise relatively common and widespread within Tongariro Ecological District. Rōhutu has a relatively sparse natural occurrence within this Ecological District.

A further one Threatened and nine At Risk indigenous plant species have previously been recorded within the general area of the proposed trail (for more detail refer to Wildland Consultants 2020a): pua o te reinga/wood rose, a threatened root parasite (*Dactylanthus taylorii*; Threatened-Nationally Vulnerable), three At Risk orchid species, four At Risk mistletoe species, and two shrub species that are typically epiphytic: Kirk's kōhūhū *Pittosporum kirkii* and kohurangi *Brachyglottis kirkii*; both At Risk-Declining as per de Lange *et al*. 2018).

8. FAUNA

8.1 Avifauna

During the site visits, three indigenous and six introduced bird species were recorded (Appendix 2), none of which are classified as Threatened or At Risk (as per Robertson *et al.* 2017). It is likely that the poor weather conditions during the site visits reduced the diversity of bird species that were observed.

One Threatened and eight At Risk indigenous bird species (threat status as per Robertson *et al*. 2017) have been previously recorded in the general vicinity of the proposed trail (for more detail refer to Wildland Consultants 2020a).

Whio (*Hymenolaimus malacorhynchos*, Threatened-Nationally Vulnerable) have been released to the Mangawhero River, upstream of Ohakune, and at least one known pair continues to use this part of the river. Whio tend to nest under logs and in associated vegetation along river margins. High water quality and fast-flowing rivers with sufficient ongoing control of introduced mammalian predators (particularly stoats, *Mustela erminea*) are key factors in the survival and success of whio.

Indigenous birds that are relatively common within the area include toutouwai (North Island robin, *Petroica longipes*), pōpokatea (whitehead, (*Mohoua albicilla*), tītitipounamu (North Island rifleman, *Acanthisitta chloris granti*) (all At Risk-Declining), and tūī (*Prosthemadera novaeseelandiae novaeseelandiae*; Not Threatened). North Island kākā (*Nestor meridionalis*;), kārearea (bush falcon, *Falco novaeseelandiae*; both At Risk-Recovering), and North Island brown kiwi (*Apteryx mantelli*; At Risk-Declining) are also present, although more uncommon.

8.2 Pekapeka/bats

It is highly likely that long-tailed bats (*Chalinolobus tuberculatus*; Threatened-Nationally Critical, as per O'Donnell *et al*. 2018) and central short-tailed bats (*Mystacina tuberculata rhyacobia*; At Risk-Declining) utilise habitats along the proposed trail alignments, at least periodically, based on previous records within the vicinity (for more detail refer to Wildland Consultants 2020a).

8.3 Lizards

The following indigenous lizard species have previously been recorded in the general vicinity of the proposed trail (threat classifications are from Hitchmough *et al.* 2021):

- Northern grass skink (*Oligosoma polychroma*; Not Threatened).
- Barking gecko (*Naultinus punctatus*; At Risk-Declining).
- Forest gecko (*Mokopirirakau granulatus*; At Risk-Declining).

Northern grass skinks are very likely to be present in any open grassy areas or in open shrubland. Barking gecko and forest gecko may be widespread in the forest and shrubland, but are probably in very low population densities. Although unlikely, the presence of an additional five indigenous lizard species (including four At Risk species) cannot be fully ruled out. For more detail refer to Wildland Consultants (2020a).

8.4 Aquatic fauna

Rivers and streams that drain from Mt Ruapehu and the sounding area are of high ecological value. Indigenous freshwater fish species and freshwater invertebrates that are likely to occur in the Mangawhero River and tributary streams include longfin eel (*Anguilla dieffenbachii*;), torrentfish (*Cheimarrichthys fosteri*), kōaro (*Galaxias brevipinnis*) (all At Risk-Declining as per Dunn *et al*. 2018), kākahi (freshwater mussels; *Echyridella menziesi*) (At Risk-Declining as per Grainger *et al.* 2018), and kōura (*Paranephrops planifrons*).

9. SUMMARY OF ECOLOGICAL VALUES

This first stage of the Te Ara Mangawhero Trail will require construction of a trail over approximately eight kilometres of previously disturbed ground, (tramline, roads, and waterline) including *c.*300 metres near the margin of Ohakune Mountain Road. The ecological values of habitats within the project area range from very high to low (Table 3), as described below.

Table 3: Summary of the ecological values of vegetation and habitats along the proposed Te Ara Mangawhero Trail route.

Vegetation and Habitat Type		Ecological Value
Section 1a		
A.	Rimu-mataī-miro forest	Very high
B.	Existing Mangawhero Forest Walk	
C.	Rimu-mataī-miro/kāmahi forest	
D.	Forest margin	Low
Section 1b		
A.	Mānuka-horoeka scrub and black beech forest margin	Low
B.	Mānuka scrub	Low
C.	Black beech-silver beech forest	High
Section 2		
A.	Sealed road	Low
B.	Gravel road	Low
C.	Indigenous broadleaved species shrubland	Low
D.	Black beech forest	Moderate
Section 3		
A.	Mānuka shrubland	Low
B.	Exotic grassland with patches of early successional shrubs	Low
C.	Indigenous broadleaved species shrubland	Low
D.	Indigenous broadleaved species scrub	Moderate
Section 4		
A.	Black beech-kāmahi-indigenous broadleaved species forest	Moderate
B.	Black beech forest with scattered clearings	

The following vegetation and habitats along the proposed trail route meet the criteria for Threatened or At Risk habitats as defined in Schedule F of the Horizons One Plan[1]:

- Podocarp forest – Threatened (Vegetation and Habitat Type A in Section 1a).
- Podocarp/black beech/mountain beech forest – Threatened (Vegetation and Habitat Type C in Section 1b and Vegetation and Habitat Type B in Section 4).
- Podocarp/kāmahi forest – At Risk (Vegetation and Habitat Type C in Section 1a).
- Riparian margin – At Risk (at proposed bridge locations).

Section 1

Podocarp forest and podocarp/kāmahi forest in Section 1a (Vegetation and Habitat Types A-C) is of very high ecological value and is one of the best remaining examples of this forest type in the southern Ruapehu area. There is a high abundance of large rimu, mataī, and miro trees, many of which are likely to be more than 1,000 years old. It is likely that the forests in this section of the proposed Te Ara Mangawhero Trail provide roosting and foraging habitat for pekapeka/bats, and habitat for threatened birds, threatened lizards, and uncommon plants (such as the epiphytes, Kirk's kōhūhū *Pittosporum kirkii* and kohurangi *Brachyglottis kirkii*; both At Risk-Declining as per de Lange *et al*. 2018).

[1] Horizons One Plan, Schedule F: Indigenous Biodiversity. https://www.horizons.govt.nz/CMSPages/GetFile.aspx?guid=3343c27f-3032-4537-bddd-6d0e654c2913 Accessed on 11 October 2021.

The initial section of trail along the forest margin (Vegetation and Habitat Type D) is of low ecological value. The vegetation is exotic grassland with patches of regenerating mixed indigenous and exotic shrubland. This area provides low value habitats for indigenous fauna.

In Section 1b, black beech-silver beech forest (Vegetation and Habitat Type C) is of high ecological value. Although the historic tramline is a previously disturbed area, the surrounding forest is intact. There are occasional large trees of silver beech and rimu that were not harvested during the period of logging. This forest may provide habitat for threatened bats, birds, and lizards, as well as uncommon plants such as red mistletoe (*Peraxilla tetrapetala*) or yellow mistletoe (*Alepis flavida*), both At Risk-Declining as per de Lange *et al*. (2018).

Vegetation and Habitat Types A and B in Section 1b are of relatively low ecological value. Mānuka scrub and the black beech forest on the eastern margin of Ohakune Mountain Road were disturbed during the widening of the road in about 2017. Mānuka scrub on the western road margin represents a relatively young stage of natural regeneration. Although there are a few notable trees present and indigenous cover is regenerating; the values of these roadside habitats for indigenous fauna are likely to be low.

Section 2

The sealed and gravel road (Vegetation and Habitat Types A and B) that are proposed to be used for this section of the trail are modified habitats of low ecological value. The patches of secondary indigenous broadleaved species forest, scrub, and shrubland alongside these roads and at the small stream crossing (Vegetation and Habitat Type C) provide habitat for common species of indigenous fauna and although unlikely, may provide habitat for pua o te reinga/wood rose (Threatened-Nationally Vulnerable). Overall, these early successional vegetation types are otherwise common within Tongariro National Park and the wider central North Island.

The area of black beech forest in Section 2 (Vegetation and Habitat Type D) is of moderate ecological value. It is a very small area compared to other areas of this vegetation type within Tongariro National Park and the wider central North Island. Although it was disturbed during the period of logging and larger trees are now relatively few, this section of the proposed trail may provide habitat for threatened bats, birds, lizards, and uncommon plants (such as mistletoes).

Section 3

Habitats within the historic logging clearing (Section 3) are largely modified and range from low to moderate ecological value depending on the stage of regeneration since the 1920s. The patches of rārahu/bracken fernland, mānuka shrubland, and indigenous broadleaved species scrub and shrubland within the exotic grassland and at either end of this section of trail may provide suitable habitat for common species of indigenous birds, as well as threatened indigenous lizards. These habitats are however, otherwise common within the Tongariro National Park and the wider central North Island.

Section 4

Black beech-dominant forest (Vegetation and Habitat Types A and B) in the upper section of this stage of the proposed trail has been heavily affected by logging activity associated with the Bennett and Punch tramline. Despite this these areas remain of moderate ecological value. It is likely that threatened indigenous bats, birds, and lizards utilise habitats within this area and uncommon plants (such as mistletoes) may be present.

Streams

Mangawhero River and the tributary streams, including Tutara (Serpentine) Stream, are of high ecological value. They provide good quality habitat for indigenous freshwater fish and invertebrates. Whio are known to utilise the fast-flowing sections of the river, and may use some of the tributary streams on occasion. Wairimu Stream may be of slightly lower quality because there are areas of grazed farmland and plantation forest in the upstream sections.

10. POTENTIAL ECOLOGICAL EFFECTS

10.1 Overview

The first stage of the proposed Te Ara Mangawhero Trail will traverse and showcase a wide range of ecologically- and culturally-significant forest and river margin habitats on the lower slopes of Ruapehu. The proposed route has been designed to maximise the use of previously-disturbed sites/areas, to avoid and minimise the potential for adverse effects on intact indigenous ecosystems.

Potential effects of constructing the first stage of the proposed Te Ara Mangawhero Trail could include the following:

- Vegetation clearance.
- Construction effects on indigenous fauna.
- Damage to adjacent vegetation.
- Construction disturbance
- Erosion, sedimentation, and changes in hydrology.
- Creation of a corridor for the movement of pest plants and animals.

These matters are addressed below.

10.2 Vegetation clearance

Development of the trail within the intended footprint will result in the removal of indigenous plants from the trail corridor. For all sections of the trail, this will have relatively minor ecological effects, because the vegetation is present on previously-disturbed sites and is relatively young compared to that in the surrounding area, and clearance of indigenous plants will be limited to understorey species, ground ferns, shrubs, saplings, and smaller trees (<15 centimetres dbh).

Effects of vegetation clearance along existing roads and within exotic grassland in Sections 2 and 3 will also be relatively minor.

Based on the site visits, the proposed trail can be aligned to avoid the clearance of larger indigenous canopy and sub-canopy trees (>15 centimetres dbh), particularly podocarps and beech trees. No individuals of Threatened or At Risk indigenous plant species (including hemiparasites or epiphytes) are likely to be lost during construction of the trail because no such individuals were observed within the footprint of the trail during the site visits.

Removal of indigenous vegetation for construction of the trail will nevertheless result in the localised loss of indigenous vegetation.

10.3 Construction effects on indigenous fauna

Indigenous fauna that are known to occur within the vicinity of the proposed trail and which could be affected by the removal of vegetation, particularly any larger trees, include: short-tailed bats and long-tailed bats, indigenous tree-nesting bird species such as tītitipounamu (North Island rifleman; At Risk-Declining), and pīwakawaka (North Island fantail, *Rhipidura fuliginosa*; Not Threatened), indigenous ground dwelling skinks such as northern grass skink, indigenous geckos (for example barking gecko and forest gecko) within vegetation, and indigenous invertebrates within or on the soil or in vegetation.

However, the removal of larger trees (>15 centimetres dbh) is to be avoided, and effects on indigenous birds, bats, and invertebrates are likely to be less than minor. Most birds and invertebrates that are potentially subject to disturbance are highly mobile and will be able to deal with localised disturbance. Tree-nesting birds such as kākā generally nest in larger trees so loss of nests will be avoided.

Potential effects on whio, could include disturbance of the nests or habitat but will be limited to the location of the bridges, particularly the bridge over the Mangawhero River (i.e. the Bennett and Punch tramline bridge). If construction of the bridges is undertaken using appropriate techniques and within well-defined, small footprints, potential effects on whio can be avoided.

Effects on indigenous skinks and indigenous geckos due to loss of vegetation or disturbance of habitats during trail construction are likely to be less than minor. Populations of any indigenous lizards are very low and are unlikely to be encountered during trail development.

Construction of the proposed bridges could affect freshwater habitats for indigenous fish and freshwater invertebrates. For example, spillage of sediment, or fuel from machinery that is used during construction could lead to sedimentation or contamination of waterways. Construction at the waterways also has the potential to disturb, or cause injury, and/or mortality to indigenous fish and freshwater invertebrates. However, with appropriate construction techniques and management, potential effects will be no more than minor.

10.4 Damage to adjacent vegetation

Vegetation immediately adjacent the proposed alignment is comparatively more intact, and contains more frequent and larger trees than the footprint of the actual trail, particularly in Sections 1, 2, and 4. It is therefore important to ensure that effects on vegetation in the surrounding area are avoided or minimised.

If construction results in damage to any large trees adjacent to the trail (such as podocarps that are scattered alongside the tramline in Section 1, see Singers 2020), decay could begin that will not have a noticeable effect on canopy health or tree stability for several decades. In general, any damage caused to ancient emergent trees will generally be worse than damage caused to shorter-lived canopy and understorey trees, shrubs, and ferns. Some of the larger emergent trees in Section 1a have visible scars from damage that occurred during construction of the original tramline and there are also some dead-standing trees that have likely died, at least in part, as a result of damage inflicted during this period. Further impacts on such large emergent trees will need to be avoided during construction of the trail.

Damage to vegetation and trees adjoining the trail could occur through physical contact with scratching of tree trunks or trampling of understorey vegetation when construction materials are being transported, as well as during construction. Damage to trunks, branches, or roots of trees can result in fungal decay, reduced nutrient and water uptake, loss of structural integrity, and dieback.

Roots of trees within the trail route and adjacent to it will likely be partially lost or damaged during trail construction. This will particularly be the case if shallow excavation is required to form the trail surface or if large lateral roots are severed. The main canopy tree species along the route of the trails achieve stability against strong winds by forming a shallow, wide-spreading network of roots, rather than by rooting deeply.

Construction of the trail could, potentially, result in the loss of feeder roots that lie within the footprint of the path, where the humus layer is removed, or the deeper burial of feeder roots, if trail material is deposited over the top of the humus layer. The effects of this deeper burial or loss can be expected to be proportional to the area of the root system of a tree that is affected.

A track which passes along one side of a tree trunk could, potentially, affect 50% of the root system of a tree, if excavation results in the loss of all roots affected by the trail. This degree of root loss would likely have a deleterious effect on the long-term health of a tree. However, if excavation depth (or lack of excavation or placement of fill) allows for subsurface lateral roots to pass undamaged under the track, the extent of feeder root loss will be limited to those beneath the footprint of the trail. Feeder root loss is unlikely to significantly affect tree health if all large lateral roots are retained, and if the footprint of the trail only covers a small percentage of the root system of a tree.

Because the trail is relatively narrow, the chance that damage to the roots of large trees is likely to lead to increased windthrow of trees alongside the trail is considered to be

very low. The trail is also unlikely to cause adverse edge effects, because large gaps or corridors will not be formed in the existing canopy of vegetation.

Damage to adjoining vegetation and tree roots could have major adverse ecological effects, however with appropriate management, these effects could be avoided or reduced to less than minor.

10.5 Erosion, sedimentation, and changes in hydrology

If not managed well, the removal of indigenous vegetation, earthworks along the trail alignment, and installation of bridges and boardwalks has the potential to result in sediment run-off during heavy rain events and rock falls in areas of steep terrain (for example, the recently recovered slip faces in Section 2 - Vegetation and Habitat Type B and Section 4 - Vegetation and Habitat Type A). Chronic sedimentation of waterways can result in the degradation of freshwater habitats for indigenous fauna (including whio), as well as a general decline of water quality. Over time, following construction of the trail, there is also potential for gravel to be eroded from the surface of the trail. This will particularly be the case if construction of the trail leads to the impediment or redirection of natural waterflows. Section 3 is relatively flat and low-lying so will require appropriate planning to provide sufficient drainage from the trail surface without causing undesirable ponding in the surrounding area.

Movement of any stockpiled soil, or gravel onto the forest floor or into waterways may result in undesirable effects. Spills may create blockages or contamination. If cement, soil, and gravel are managed appropriately, these effects are expected to be less than minor.

Hazardous substances such as oil and diesel/petrol will be required for machinery to be used for construction of the trail. It is important that such spills of these products are avoided.

Erosion and sedimentation could have major ecological effects but, with appropriate construction techniques and management, these effects can be reduced to no more than minor.

10.6 Creation of a corridor for the movement of pest plants and animals

Clearance of indigenous vegetation for construction of this trail could potentially create corridors for the dispersal of pest plants and animals. Seeds of pest plants may be dispersed by humans or other vertebrate species along the trail, resulting in the establishment of new populations of pest plants that already occur elsewhere in the vicinity or populations of pest plants that are new to the local area. Any shade-tolerant pest plant species that establish along the trail margin - for example tradescantia, *Tradescantia fluminensis* - may then colonise adjacent scrub and forest habitats. Elsewhere in Tongariro National Park weeds such as heather (*Calluna vulgaris*) and gorse (*Ulex europaeus*) have spread along track margins over time.

Similarly, pest animals, including small mammals (for example, ship rats; *Rattus rattus* and stoats) and ungulates may use the trails to move between habitats along the trail.

10.7 Increased human activity

The part of Section 1a alongside the Mangawhero Forest Walk and roads within Section 2 are regularly used on a daily basis by members of the local community from Ohakune. Mangawhero Campsite and Forest Walk are popular with visitors from outside of Ruapehu District, particularly during summer. The gravel road to the Ohakune water source is used on a regular basis for maintenance as required. The remaining sections of the proposed trail are currently used infrequently, by relatively low numbers of people, including hunters and Department of Conservation staff servicing pest animal control stations.

An increased number of people using the trail corridor, following completion of the trail could create some further increased noise. Noise and physical disturbance may have some effects on resident indigenous birds. However, based on similar trails, the overall effects of increased human activity along the proposed trail route should be less than minor.

10.8 Overall magnitude of potential effects

While there is some potential for construction and subsequent use of this proposed initial stage of the Te Ara Mangawhero Trail within the previously disturbed footprint to have adverse ecological effects on the surrounding ecosystems, with appropriate management, all of these potential effects could be avoided or reduced to less than minor.

11. OPPORTUNITIES TO AVOID OR MINIMISE POTENTIALLY ADVERSE ECOLOGICAL EFFECTS

11.1 Overview

The major focus for construction and use of the proposed trail should be to avoid or minimise potentially adverse ecological effects. This is because of the intact state of indigenous forest and river margin environments surrounding most of the proposed route in this part of Tongariro National Park, and also because of the strong need to protect the natural features that users of the trail will want to see and experience.

11.2 General project management and biosecurity considerations

Use Existing Trail Building Guidelines

The Department of Conservation's Track Construction and Maintenance Guidelines (DOC 2008), Standards New Zealand Handbook 8630 (SNZ 2004), and the New Zealand Cycle Trail Design Guide (ViaStrada 2019) provide industry best practice guidelines for the planning, construction, and maintenance of cycle trails. These guidelines (plus subsequent amendments) should be used to develop a trail construction protocol for the project.

Plan the Route Carefully

The trail alignment should be carefully planned to avoid and minimise adverse effects on indigenous vegetation. This includes rerouting of the alignment around sensitive habitats, using sections of boardwalks where suitable, placement of fill over root systems where appropriate (rather than excavating through them), avoiding trees >15 centimetres dbh, making the footprint of the trail as small as possible, and ensuring that the margins of the trail are no wider than they need to be. Note that only a relatively small proportion of a tree root system should ever be covered by fill.

To ensure that only the minimum area required for the trails is cleared, the extent of works should be physically marked with stakes and/or flagging tape prior to any vegetation removal and earthworks. No areas beyond this boundary should be used during construction, e.g. for temporary storage areas for equipment or for disposal of fill.

Only existing canopy gaps or disturbed areas near the trail route should be used for helicopter-delivery of supplies.

Use Reputable Contractors and Provide Ongoing Project Oversight

During construction of the trail, the project manager should undertake regular site visits to ensure that the contractors understand and are complying with the guidelines set out in this report. If these are not followed, the project manager should reserve the right to halt operations at the work site until the contractors can demonstrate that they will comply with these measures.

Only suitably qualified and experienced contractors that have (1) a reputable track record in the delivery of high-quality work, and (2) strategies to minimise environmental damage, should be engaged to undertake the construction of the trails.

Establish and Maintain High Biosecurity Standards

All contractors should be made aware of the risks of dispersing propagules or seeds of pest plants, soil-borne pathogens, and invertebrates on trail building equipment that is contaminated with soil or biological materials.

All equipment that is to be used to construct sections of the trail, should be pressure-washed before being brought into the National Park. Particular attention should be paid to the wheel wells of wheeled vehicles, the tracks of excavators and other tracked vehicles, and the under-carriages of all vehicles. Inspections of equipment should be undertaken prior to the first day that contractors work at the sites, to ensure compliance with these measures.

11.3 Avoid damage to large roots, trunks, and large branches of indigenous trees, and avoid damage to other indigenous vegetation

Set out below are measures to avoid damage to the roots, trunks, and branches of indigenous trees, and other indigenous vegetation when constructing the trail:

Avoid Damage to Indigenous Trees Within the Trail Corridor

- Felling of large indigenous trees (>15 centimetres dbh) should be avoided. In particular, large podocarps (including rimu, miro, mataī, Hall's tōtara) and beech trees should should be retained and protected from damage.

- Trimming of large trees, particularly podocarps, should be avoided or kept to the minimum required to form the trail corridor.

- All vegetation clearance should be undertaken by hand. This will ensure that vegetation clearance is minimised, enable felled branches to be placed into the surrounding area, and any fauna such as lizards to move into the vegetation in the surrounding area.

- If required, logs or branches can be chopped into sizeable chunks before scattering along the trail margins, but they should not be mulched.

- Physical contact with trees (large branches, and trunks in particular) should be avoided when construction materials are being transported and during construction. All equipment and machinery used during construction should be moved with care.

- Damage to the roots of indigenous trees should be avoided or kept to a minimum. It is important that large lateral roots, in particular, are not severed during trail construction. The distance within which large surface lateral roots are likely to occur for key canopy species within the project area are presented in Table 4. In general, the trail should be at least 2-4 metres from larger indigenous trees (>30 centimetres dbh).

  Table 4: Notes on trail construction near larger trees of key canopy species, where large surface lateral roots are likely to be common.

Species	Common Name	Distance Within Which Large Surface Laterals are Likely to Be Common	Notes on Trail Construction Near Large Trees
Dacrydium cupressinum	Rimu	3 metres	Highly variable surface root length. Large trees in close proximity to trail should be assessed on a case-by-case basis.
Podocarpus laetus	Hall's tōtara	4-6 metres	Separation distance of four metres should avoid large surface roots of most trees. Some larger trees may have large surface roots out to six metres.
Pectinopitys ferruginea	Miro	4-8 metres	Separation distance of four metres should avoid large surface roots for most trees. Some larger trees may have large surface roots to eight metres.
Prumnopitys taxifolia	Mataī		
Weinmannia racemosa	Kāmahi	2 metres	Trail can probably be as close as 0.5-1 metres from trees less than 20 cm diameter if no large surface laterals are damaged.

- Where trail construction is constrained by an abundance of large surface roots, the trail should be realigned to avoid the roots. In places where it is anticipated that

large lateral roots might extend into the footprint of the trail, a spade should be used to dig holes to assess the diameter of the roots. For roots that are larger than five centimetres , the trail should be realigned, or fill should be placed over the roots (only a small proportion of the root system) or a section of boardwalk should be used.

- If roots greater than five centimetres in diameter must be severed, no tree should have multiple large roots removed. All roots greater than three centimetres in diameter that are cut should be cleanly severed using a handsaw. Roots left with ragged or rough ends are less likely to heal, and are at greater risk from infection and ongoing decay.

- If possible, roots of indigenous trees (including trees and roots outside of the trail footprint) should not be buried under soil or track materials. That is, after any compaction of the fill material has occurred, the roots of the trees should remain at the same depth as they are currently situated. This will ensure that any erosion of the track surface does not result in the exposure, and subsequent damage, of large tree roots.

- Boardwalks should be used in sections of sensitive terrain, such as crossings of intermittent streams (e.g. about 50 metres before the end of Section 4, Plate 39 in Appendix 3). Any boardwalks should be permeable, and of sufficient height above the ground to allow for the natural flow of water and the persistence of a humus layer (preferably with associated ground tier plants). Structural supports for the boardwalk should be sited to avoid large surface lateral roots.

- Where the trail cuts across a slope and requires the installation of drainage, the outflows for these drains should be designed to avoid the erosion and loss of the humus layer.

<u>Avoid Damage to Indigenous Vegetation Beyond the Trail Corridor</u>

- Care should be taken to avoid damage to the trunks and limbs of indigenous trees that are outside the footprint of the trail, i.e. any trees that are not to be removed as part of the works.

- Any larger trees that do need to be removed for construction of the proposed trail should be felled into the corridor of the trail to avoid and/or minimise damage to the surrounding forest.

- Trampling of understorey vegetation beyond the trail footprint should be kept to a minimum. All construction activities should be undertaken with the aim of minimising the width of the disturbed area.

- Existing clearings or canopy gaps near the trail route should be used for helicopter-drop locations. Additional areas of vegetation should not be cleared for this purpose.

- Soil, rocks, or any other material, should not be pushed or dumped into the surrounding natural areas along the trail during construction. In particular, such material should not be piled on top of understorey vegetation within the indigenous forest or in seasonally damp areas.

- Vegetative material that is cleared should be scattered along the trail margins, where suitable, avoiding the formation of large piles of debris.

- Excess soil or substrate that cannot be re-used in another part of the trail should be placed in areas of minimal ecological impact (such as recently disturbed areas) and then revegetated.

- Indigenous ground tier plants within the trail route should be removed carefully where possible and then used for site rehabilitation, to the extent practicable.

11.4 Minimise erosion and sediment run-off

Detailed guidelines for reducing erosion and sediment run-off are provided in the Department of Conservation's Track Construction and Maintenance Guidelines (DOC 2008), and include the following:

- The trail should be designed and constructed in a way that reduces the need for steep grades that are at higher risk of erosion. Where possible, switch-backs and contouring trails should be used in preference to cutting trails through steep terrain.

- All trail surfaces should be compacted to ensure that they do not quickly erode due to water run-off and use. A plate compactor or small roller should be used to compact trail materials, where feasible.

- In more-level terrain, the trail should be gently benched (*c.*4% grade) to allow water to drain from the trail into the trail margins.

- Rolling grade dips should be utilised to divert water off the trail and into the surrounding vegetation, and should be installed every 10-15 metres along the length of the trail. Such dips should not be constructed near streams.

- Trails that are cut through slopes should have a batter that slopes away from the trail that should not be of greater than 90°.

- Soil that is excavated should not be heaped at the site for extended periods of time (i.e. greater than one week). Any loose, heaped soil should be covered with a tarpaulin if it is to be left in place for longer three days, to prevent water run-off eroding the fill.

- Stockpiles of gravel (and any cement) should be stored securely prior to use in trail construction, to prevent leakage onto the forest floor, or into waterways.

- No cement should enter waterways.

- A plan should be prepared for the management of hazardous substances and any spills.

- Excess fill should be used to level the trail in other areas or used to construct an outer edge of the trail, rather than discarding it as loose fill.

- Trail fill should be compacted to an angle that is similar to the surrounding slope and covered with indigenous vegetation (for example, small ferns) or humus and

surface litter (sourced from cleared vegetation within the trail footprint), to reduce erosion and surface run-off.

- In-slope side drains may be needed to collect water run-off from the trail surface. These drains should be no less than 25 centimetres in width and 20 centimetres in depth.

- Drainage pipes may be needed to drain excess water pooling on the in-slope side of the trail. These pipes should be black polyethylene (smooth bore) and measure at least 20 centimetres in diameter and of sufficient length to prevent erosion on the downslope exit of the pipe.

- Sediment controls such as silt traps, coir logs, barriers, and in cases of high sediment loads, silt socks that contain sterilised hay, should be placed in locations where erosion and sediment run-off is likely to occur during the construction stage of the trail.

11.5 Avoid or minimise potential adverse effects on indigenous fauna

Pekapeka/Bats

- The main priority to minimise the effects on bats is to avoid the removal of all trees >15 centimetres dbh within the footprint of the proposed trail. Based on the site visits in September 2021, it is very likely that removal of larger trees can be avoided.

- If there is no way to avoid the removal of tree(s) that are >15 centimetres dbh, then a Bat Management Framework for sites where the presence of bats is confirmed should be followed, based on the best-practise methods available at the time of construction. This Framework should be prepared by a qualified and approved bat ecologist, endorsed by the Department of Conservation, and could include 1) pre-felling visual inspections of the tree(s) for any evidence of bats, or 2) pre-felling acoustic monitoring of potential roost trees, and 3) options for the management of any bats that are killed or injured. Tree felling should only take place between 1 October and 30 April, when weather conditions are appropriate.

Indigenous Birds, Lizards, and Terrestrial Invertebrates

- To minimise effects within forested areas, a canopy should be maintained above the trail, to enable fauna to continue to be able to move across the trail.

- Adverse effects on indigenous birds, lizards, and terrestrial invertebrates will be minimised if the removal of larger trees (>15 centimetres dbh) is avoided.

- Brown kiwi are known to be present in the general area. If active burrows are located during construction, the trail should be rerouted to provide a minimum 20 metre buffer from the burrow.

- Vegetation clearance/construction workers should check work sites and machinery at the start of each work day, to ensure that kiwi are not present.

- Adverse effects on whio can be avoided by using suitable construction techniques at the bridge locations and by avoiding sediment loss into waterways (see Section 11.4).

- If chicks or eggs from the nest of an At Risk or a Threatened bird species, or a bird species that is protected under the Wildlife Act (1953), are found within the area to be subject to vegetation clearance, work should not be undertaken within this section of the trail until the chicks have fledged or until the eggs have hatched and the chicks have fledged. Work can still proceed 10 metres or more away from a nest site.

- Where possible, the removal of indigenous trees and scrub that may provide nesting sites for indigenous birds should be undertaken outside of the main nesting period for indigenous forest birds (early spring to mid-summer). This will avoid unnecessary harm or distress to nesting adult birds, nestlings, and fledglings that may be present within the footprint of the proposed trail.

- The low number of lizards likely to be present on the narrow trail alignment means that a large-scale, targeted lizard salvage operation is not suggested. Foliage and other vegetative material that is cleared should be removed from the alignment and scattered in the adjacent forest, which will enable arboreal lizards to escape. A Lizard Discovery Protocol should be prepared by a herpetologist (lizard ecologist) and implemented if lizards are discovered prior to or during vegetation clearance and trail construction works.

- Soil invertebrates which are exposed during excavation will be relocated with the substrate they were exposed within. Upon completion, leaf litter will spread naturally over the trail surface, which will improve the opportunities for terrestrial invertebrates to move across the trail.

Aquatic Fauna

To protect the high-quality freshwater habitats in the Mangawhero River and its tributaries, the following actions should be implemented, particularly during construction of the proposed bridges and boardwalks:

- Barriers to fish passage (including temporary diversions) should not be created.

- Good sediment management is critically important to avoid sediment discharges into waterways (see Section 11.4 for further details). The extent and duration of earthworks in the riparian zones should be kept to a minimum, to reduce disturbance of soil, and riparian vegetation and habitats.

- Trail construction should avoid the alteration of natural drainage patterns and natural ground surface levels.

- Any areas of vegetation that are disturbed or cleared within 30 metres of a waterway, and are not to be within the final trail footprint, should be rehabilitated and replanted with appropriate indigenous understorey and groundcover vegetation. Plants for rehabilitation plantings, if required, should be sourced from the site and include species such as kiokio, piupiu/crown fern, and mānuka.

Seedlings and saplings of indigenous trees and shrubs should also be used for revegetation, where appropriate.

- Areas that are cleared for the trail footprint, should be formed with the gravel trail surface as soon as possible to minimise soil erosion and disturbance.
- If there are large open areas that are not suitable for re-planting, or vulnerable areas that are prone to erosion, biodegradable and natural matting (e.g. coconut fibre) could be installed to help increase stability.
- Stockpiles of gravel (and any cement) should be stored securely prior to use in trail construction, to prevent leakage onto the forest floor or into waterways. Stockpiles should be removed from the site following construction.
- No large piles of soil should be left close to the streams or river, either during or following construction. This will minimise soil runoff during rainfall events and reduce the risk of overloading sediment management devices.

11.6 Education and management of trail users

The trail will provide an opportunity for the local community and visitors to Ruapehu District to further appreciate, learn about, and engage with the natural environment of Ruapehu.

The importance of biosecurity should be actively promoted with trail users. Education about pest animals and pest plants, and their control should be incorporated into trail signage, brochures, or any promotional material about the trail. It is important that all equipment and other gear used on the trail (bikes, clothing, footwear, packs) is free from seeds, plant fragments, pest animals, or excessive dirt. Promotion of biosecurity is particularly useful for these types of trails because it leads to an increased general awareness of this issue and trail users may often be from other parts of Aotearoa New Zealand and other countries (and may be recent arrivals here).

Trail signage should advise trail users to stay on the formed route and take all litter out with them to be disposed of properly.

Dogs should be prohibited from the trail. Dogs pose a threat to indigenous fauna and as such contradict one of the overall aims of the trail which is to promote and encourage the protection and enhancement of indigenous biodiversity. Exemptions can be provided for dogs to be used for pest control, biodiversity monitoring, or Search and Rescue, subject to appropriate training, certifications, and other controls (e.g. muzzles).

12. MITIGATION

12.1 Overview

Potential ecological effects of the construction and subsequent use of this stage of the Te Ara Mangawhero Trail can be less than minor, subject to the use of good techniques to avoid and minimise potential adverse effects. Formation of the trail will nevertheless require the clearance of a corridor of vegetation within Tongariro National Park and

some disturbance of indigenous fauna. Ecological effects of the development and ongoing use of the trail can be mitigated by undertaking activities that will enhance the ecological integrity of the high-quality diverse indigenous ecosystems that are present.

Options for mitigation include monitoring and control of pest plants, sustained pest animal control, and targeted restoration planting, as discussed below. There will be a range of opportunities for members of Ngāti Rangi and the local community to be involved in conservation activities associated with the trail. To maximise the effectiveness of pest plant and pest animal control, a plan could be developed for these activities, to complement existing management within the local area.

12.2 Implement a pest plant management plan

Margins on both sides of the length of the trail should be subject to an ongoing weed management plan, addressing monitoring and control priorities, and methods to contain, control, and eliminate pest plants from the trail margins. This strategy will improve the rate of recovery of indigenous vegetation along the margins of the trail by reducing competition by weeds.

For three years following completion of construction, the entire route should be checked annually for the presence of any pest plants. Any infestations should be recorded (GPS location, species of pest plant, and density) and controlled promptly, with adequate follow-up monitoring and control to ensure eradication. After three years, the weed management plan should be revised because the priorities and demands for monitoring and control may change.

Pest plants that are currently present in places alongside the proposed trail include:

- Blackberry (*Rubus fruticosus*).
- Broom (*Cytisus scoparius*).
- Heather *(Calluna vulgaris)*.
- Cotoneaster (*Cotoneaster glaucophyllus*).
- Lawson's cypress (*Chamaecyparis lawsoniana*; one tree near the trail end in Section 4).
- Lodgepole pine (*Pinus contorta*; small trees in Section 2, Vegetation and Habitat Type D).

12.3 Implement pest animal control

The trail is likely to be used as a travel route by pest animals. As such, sustained pest animal control should be implemented along the trail margins. Long-term intensive control of introduced pest animals would improve the quality of habitats for indigenous fauna within the surrounding area. In particular the establishment of pest animal control along Sections 1b, 2, and 3 could provide enhanced protection of riparian habitats for whio along the Mangawhero River, to contribute to the success of ongoing and future pest animal control projects within the wider National Park.

To maximise the effectiveness of pest animal control, a pest animal control plan could be developed and implemented in coordination with the Department of Conservation and any other local parties who are currently controlling pest animals in the vicinity.

The pest animal control plan should identify priorities for monitoring and control, as well as methods, e.g. kill-traps or bait stations. There will be opportunities for local companies or community groups to sponsor or assist with the maintenance of traps.

12.4 Restoration planting

Small-scale targeted restoration planting could be undertaken within areas of exotic grassland in Section 3 or adjacent to the gravel road in Section 2, which was identified as an opportunity during the site visits. Although indigenous vegetation will regenerate naturally within these areas, restoration planting could speed up this process. Plantings in Section 3 could also provide screening of the trail to obscure the view of the Ohakune Water Supply Pond from trail users.

Locally-sourced species should be used for planting that are representative of vegetation within this part of Tongariro National Park. Plants should be 'hardened off' prior to planting, to ensure that they are acclimatised to the conditions. Restoration planting should comprise a range of early and mid-successional species (such as mānuka, koromiko, and rautāwhiri), which will establish a canopy cover relatively quickly. Humus and leaf litter that is removed to form the trail surface in nearby forest could also be spread in the planting area to provide a natural assemblage of indigenous species. Saplings of indigenous trees (and understorey plants) that are removed from the footprint of the proposed trail (subject to approval by the Ruapehu WorX ecologist and a Department of Conservation representative) could be transplanted into the restoration areas.

Later successional species (such as rimu) do not need to be planted because the forest in the surrounding area will provide an excellent source of seed of these species and natural regeneration will lead to a more natural pattern of recovery over time than planting. It will be necessary to ensure that control of browsing pest animals (such as possums, rabbits, hares, and feral deer) is undertaken until the plants have become well established, to reduce plant mortality. Regular maintenance will be required for at least three years, including control of any pest plants that establish within the planting areas and any infill planting that is required.

13. CONCLUSIONS

This first stage of the proposed Te Ara Mangawhero Trail will provide a new opportunity for visitors and local residents to enjoy the diverse range of vegetation and habitats associated with the ngahere (forest), awa (river), and previously cleared areas on the lower slopes of Ruapehu, within Tongariro National Park.

The proposed alignment will pass through various indigenous vegetation and habitat types, including one of the best remaining examples of podocarp forest in the southern Ruapehu area, podocarp/kāmahi forest, black beech forest, and areas in various stages of regeneration back to indigenous cover. The trail will feature the high-quality and fast-flowing Mangawhero River, as well as the Tutara Stream, Wairimu Stream, and associated tributary streams. Four vegetation and habitat types along the proposed route are defined as Threatened or At Risk habitats in the Horizons One Plan. A range of

Threatened and At Risk indigenous plants and fauna species are known to occur within the vicinity.

The proposed trail route will primarily utilise previously-disturbed areas/sites, associated with the Bennett and Punch logging tramlines, existing roads and tracks, and the Ohakune Water Supply pipeline, to minimise the potential for adverse ecological effects on adjacent intact indigenous ecosystems. This will ensure that the clearance of larger indigenous trees can be avoided. Within the trail corridor clearance of indigenous vegetation will be limited to the understorey species and smaller trees, that have established following disturbance in the last 80 years or so. Retention of larger trees will enable potential effects on indigenous fauna to be avoided or minimised. Appropriate sensitive construction techniques and sediment management will be important, in particular to avoid adverse effects on aquatic fauna and whio at each of the nine bridge locations. With appropriate management, all of the potential ecological effects of this stage of the proposed Te Ara Mangawhero Trail can be avoided or reduced to less than minor.

The proposed trail will provide new opportunities for the control of pest plants and pest animals to complement existing conservation management in the local area. Pest animal control stations near the Mangawhero River could provide greater protection for whio. In specific locations there are also opportunities to enhance the recovery of indigenous vegetation within previously-disturbed areas. The relative ease of access provided by the trail could improve opportunities for Ngāti Rangi and the local community to engage with conservation activities associated with the trail on the lower slopes of Ruapehu.

ACKNOWLEDGMENTS

Gerrie Knoetze (GHD), Rowan Sapsford (Roam Consulting), and Warren Furner (Ruapehu District Council) provided client liaison and background information on the project. Paul Carr (Ruapehu WorX) led the meeting and site visits, along with Megan Younger (Ruapehu WorX and Ngāti Rangi ecologist/environmental researcher), and Dean Sherrit (Cheal Ruapehu). Kemp Dryden (Ngāti Rangi Trust Pou Ārahi) and Hoani Ponga (Ngāti Rangi Chief Executive) are thanked for their kind welcome to the Ngāti Rangi office.

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VASCULAR PLANT SPECIES, TE ARA MANGAWHERO TRAIL ROUTE, SEPTEMBER 2021

INDIGENOUS SPECIES

Gymnosperms

Dacrycarpus dacrydioides	kahikatea
Dacrydium cupressinum	rimu
Libocedrus bidwillii	kaikawaka
Pectinopitys ferruginea	miro
Podocarpus laetus	Hall's tōtara
Podocarpus nivalis	snow tōtara, tauhinu
Prumnopitys taxifolia	mataī

Monocot. trees and shrubs

Cordyline banksii	tī ngahere, forest cabbage tree
Cordyline indivisa	toi, mountain cabbage tree

Dicot. trees and shrubs

Alseuosmia turneri	
Aristotelia serrata	makomako, wineberry
Beilschmiedia tawa	tawa
Brachyglottis repanda	rangiora
Carpodetus serratus	putaputawētā
Coprosma dumosa	
Coprosma foetidissima	hūpiro
Coprosma grandifolia	kanono, raurēkau, raurākau, manono
Coprosma lucida	karamū, kāramuramu, glossy karamū
Coprosma propinqua var. *propinqua*	mingimingi
Coprosma rhamnoides	
Coprosma tenuifolia	
Coriaria arborea var. *arborea*	tutu
Coriaria plumosa	tutu-papa
Dracophyllum filifolium	
Elaeocarpus dentatus	hīnau, whīnau
Elaeocarpus hookerianus	pōkākā
Fuchsia excorticata	kōtukutuku, kōnini
Fuscospora fusca	red beech, tawhairaunui
Fuscospora solandri	black beech
Gaultheria antipoda	tāwiniwini, koropuka, takapo, taupuku
Griselinia littoralis	kāpuka
Leptecophylla juniperina var. *juniperina*	prickly mingimingi
Leptospermum scoparium agg.	mānuka
Leucopogon fasciculatus	mingimingi
Lophozonia menziesii	silver beech, tawhai

Melicytus ramiflorus subsp. *ramiflorus*	māhoe
Myrsine divaricata	
Myrsine salicina	toro
Neomyrtus pedunculata	rōhutu
Nestegis cunninghamii	black maire, maire rau nui
Olearia rani var. *colorata*	heketara
Olearia virgata	
Ozothamnus leptophyllus	tauhinu
Pennantia corymbosa	kaikōmako
Pittosporum colensoi	rautāwhiri, rautāhiri
Pseudopanax arboreus	whauwhaupaku, puahou, five finger
Pseudopanax colensoi	orihou, mountain five finger
Pseudopanax crassifolius	horoeka, lancewood
Pseudowintera axillaris	horopito
Pseudowintera colorata	mountain horopito
Raukaua anomalus	
Raukaua simplex	haumangōroa
Schefflera digitata	patē
Veronica stricta var. *stricta*	koromiko, kōkōmuka
Weinmannia racemosa	kāmahi

Dicot. lianes

Clematis paniculata	puawānanga
Metrosideros diffusa	rātā
Metrosideros perforata	aka
Rubus cissoides agg.	tātarāmoa, tātaraheke , bush lawyer
Rubus schmidelioides var. *schmidelioides*	tātarāmoa, bush lawyer

Lycopods and psilopsids

Lycopodium deuterodensum	puakarimu
Lycopodium volubile	waewaekoukou

Ferns

Asplenium bulbiferum	mouku, hen and chicken fern
Asplenium flaccidum	makawe, ngā makawe o Raukatauri
Asplenium polyodon	petako
Blechnum chambersii	rereti, nini
Blechnum colensoi	peretao
Blechnum discolor	piupiu, crown fern
Blechnum filiforme	pānako
Blechnum fluviatile	kiwikiwi, kiwakiwa
Blechnum novae-zelandiae	kiokio
Blechnum penna-marina subsp. *alpina*	
Blechnum vulcanicum	korokio
Cyathea dealbata	ponga, silver fern
Cyathea smithii	kātote, soft tree fern
Dicksonia fibrosa	whekī-ponga, kurīpākā

Dicksonia lanata var. *lanata*	tuakura
Dicksonia squarrosa	whekī
Gleichenia microphylla	waewaekākā, tangle fern
Histiopteris incisa	mātātā, water fern
Hymenophyllum demissum	irirangi, piripiri, filmy fern
Hymenophyllum dilatatum	matua mauku, filmy fern
Hymenophyllum rarum	mauku, filmy fern
Hymenophyllum revolutum	mauku, filmy fern
Hymenophyllum sanguinolentum	piripiri, filmy fern
Leptopteris hymenophylloides	heruheru
Leptopteris superba	heruheru, ngutukākāriki, ngutungutu kiwi, Prince of Wales feathers
Lygodium articulatum	mangemange
Microsorum pustulatum	kōwaowao, pāraharaha, hound's tongue fern
Notogrammitis heterophylla	
Paesia scaberula	mātātā
Pneumatopteris pennigera	pākau
Polystichum vestitum	pūniu, prickly shield fern
Pteridium esculentum	rārahu, bracken
Sticherus cunninghamii	waekura

Orchids

Corybas iridescens	
Corybas trilobus	
Earina autumnalis	raupeka
Earina mucronata	peka-a-waka

Grasses

Austroderia fulvida	toetoe
Microlaena avenacea	bush rice grass

Sedges

Carex uncinata	kamu matau a Maui, kamu
Eleocharis acuta	spike sedge
Ficinia nodosa	wīwī

Monocot. herbs (other than orchids, grasses, sedges, and rushes)

Astelia fragrans	kakaha
Astelia aff. *nervosa*	mauri, kakaha
Dianella nigra	tūrutu
Phormium cookianum subsp. *hookeri*	whaririki, mountain flax

Dicot. herbs (other than composites)

Acaena anserinifolia	piripiri, hutiwai
Cardamine sp.	

Epilobium rotundifolium
Hydrocotyle dissecta
Hydrocotyle moschata

NATURALISED AND EXOTIC SPECIES

Gymnosperms

Chamaecyparis lawsoniana	Lawson's cypress
Pinus contorta	lodgepole pine

Dicot. trees and shrubs

Berberis glaucocarpa	barberry
Calluna vulgaris	heather
Cotoneaster glaucophyllus	cotoneaster
Cytisus scoparius	broom
Erica lusitanica	Spanish heath
Lupinus arboreus	lupin
Rubus sp. (*R. fruticosus* agg.)	blackberry

Grasses

Agrostis capillaris	browntop
Dactylis glomerata	cocksfoot
Festuca rubra subsp. *rubra*	red fescue
Lolium arundinaceum subsp. *arundinaceum*	tall fescue

Composite herbs

Cirsium vulgare	Scotch thistle
Pilosella officinarum	mouse-ear hawkweed
Taraxacum officinale	dandelion

Dicot. herbs (other than composites)

Lotus pedunculatus	lotus
Plantago lanceolata	narrow-leaved plantain
Ranunculus repens	creeping buttercup

AVIFAUNA SPECIES, TE ARA MANGAWHERO TRAIL ROUTE, SEPTEMBER 2021

INDIGENOUS

Gerygone igata	riroriro; grey warbler
Rhipidura fuliginosa placabilis	pīwakawaka; North Island fantail
Tadorna variegata	pūtangitangi; pari; paradise shelduck

INTRODUCED

Carduelis carduelis	goldfinch
Carduelis chloris	greenfinch
Emberiza citrinella	yellowhammer
Fringilla coelebs	chaffinch
Turdus merula	Eurasian blackbird
Turdus philomelos	song thrush

SITE PHOTOGRAPHS

Section 1a

Plate 1: Section 1a of the proposed trail. An old tramline cutting within rimu-mataī-miro forest. Note: red arrow indicates the direction towards Ohakune. 16 September 2021.

Plate 2: Section 1a. Proposed location for the Wairimu Stream bridge at the site of the existing water pipeline. Red arrow indicates the direction towards Ohakune. 16 September 2021.

Plate 3: Section 1a Example of a large podocarp tree (yellow arrow) on the margin of the old tramline within rimu-matai-miro forest. Note: red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 4: An example of a section of the Mangawhero Forest Walk that would be widened to *c.*1.5 metres wide to accommodate the Te Ara Mangawhero Trail. 16 September 2021.

Plate 5: An existing bridge on the Mangawhero Forest Walk that would be replaced with a 1.5 metre wide bridge to accommodate the Te Ara Mangawhero Trail. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 6: Section 1a. Proposed location of the trail on the old tramline within rimu-mataī-miro/kāmahi forest. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 7: Section 1a. Example of a location on the old tramline within rimu-mataī-miro/kāmahi forest, where the trail could be positioned around a putaputawētā tree. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 8: Section 1a. Example of large emergent podocarp trees adjacent to the old tramline within rimu-mataī-miro/kāmahi forest. A dense tier of small-leaved shrubs is present. Note: red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 9: Section 1a. Example of forest margin near the start of the trail. Note: red arrow indicates the direction of Ohakune. 16 September 2021.

Section 1b

Plate 10: Section 1b. Mānuka-horoeka scrub on the eastern margin of Mountain Road. Red arrow indicates the direction of Ohakune. 17 September 2021.

Plate 11: Section 1b. Mānuka scrub on the western margin of Mountain Road. Red arrow indicates the direction of Ohakune. 17 September 2021.

Plate 12: Section 1b. Tramline cutting near the Bennett and Punch tramline bridge within black beech-silver beech forest. Red arrow indicates the direction of Ohakune. 17 September 2021.

Plate 13: Section 1b. Example of the old tramline within black beech-silver beech forest. Red arrow indicates the direction of Ohakune. 17 September 2021.

Section 2

Plate 14: Section of the gravel road with exotic grassland and rārahu/bracken fernland on the margins. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 15: Existing culvert under the gravel road at NZTM E1809687 N5637728. Broadleaved indigenous forest is present on both sides of the gravel road. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 16: Existing gravel road through broadleaved indigenous forest near NZTM E1809687 N5637728. 16 September 2021.

Plate 17: Seedlings of toi (indicated by red arrows) on the margin of the existing gravel road. 16 September 2021.

Plate 18: Existing gravel road with mānuka scrub and rārahu/bracken fernland on the margins. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 19: Proposed location of small bridge on the edge of black beech forest. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 20: View from black beech forest towards the location of the proposed small bridge. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 21: A larger black beech tree within the black beech forest. 16 September 2021.

Plate 22: Location of the proposed raised boardwalk in the black beech forest. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 23: View from black beech forest across Tutara (Serpentine) Stream in the location of the proposed bridge. Red arrow indicates the direction of Ohakune. 16 September 2021.

Section 3

Plate 24: View from near the Ohakune Water Source towards the Tutara (Serpentine) Stream bridge. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 25: View along the old tramline in the direction of Ohakune. 16 September 2021.

Plate 26: Patch of mānuka scrub on the old tramline near the Bennett and Punch tramline bridge. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 27: Example of existing gap within mānuka scrub from the old tramline. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 28: Hillslope where exotic grassland with patches of early successional scrub transitions into indigenous broadleaved species scrub. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 29: Indigenous broadleaved species shrubland from the true left side of the Mangawhero River, Bennett and Punch tramline bridge. Red line indicates the proposed location of the bridge. 17 September 2021.

Plate 30: Indigenous broadleaved species scrub on Section 3 of the proposed trail route. Note: red arrow indicates the direction of Ohakune. 16 September 2021.

Section 4

Plate 31: Section 4 of the proposed trail route. Large toi alongside the tramline. Red arrow indicates the proposed location of the trail in the direction of Ohakune. 16 September 2021.

Plate 32: Section 4 of the proposed trail route. A bank alongside the tramline. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 33: Section 4 of the proposed trail route. Dense kiokio and toetoe on the existing tramline. Red arrow indicates the direction of Ohakune. 16 September 2021.

Plate 34: Proposed location of the Section 3 bridge from the true left side of the stream. Red arrow indicates the proposed location of the bridge and in the direction of Ohakune. 17 September 2021.

Plate 35: Upstream view of the proposed location of the Section 3 bridge from the true-left side the stream. Note: red arrow indicates the proposed location of the bridge and trail in the direction of Ohakune. 17 September 2021.

Plate 36: Section 4. Proposed trail route on the existing tramline within black beech forest. Red arrow indicates the direction of Ohakune. 17 September 2021.

Plate 37: Section 4. Example of black beech forest. Red arrow indicates the direction of Ohakune. 17 September 2021.

Plate 38: Clearing at the end of the proposed trail. Red arrow indicates the direction of Ohakune. 17 September 2021.

Plate 39: Small stream within mānuka scrub, about 50 metres before the end of the proposed trail. 17 September 2021.

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Appendix 9. Te Ara Mangawhero Te Waiū-o-Te-Ika

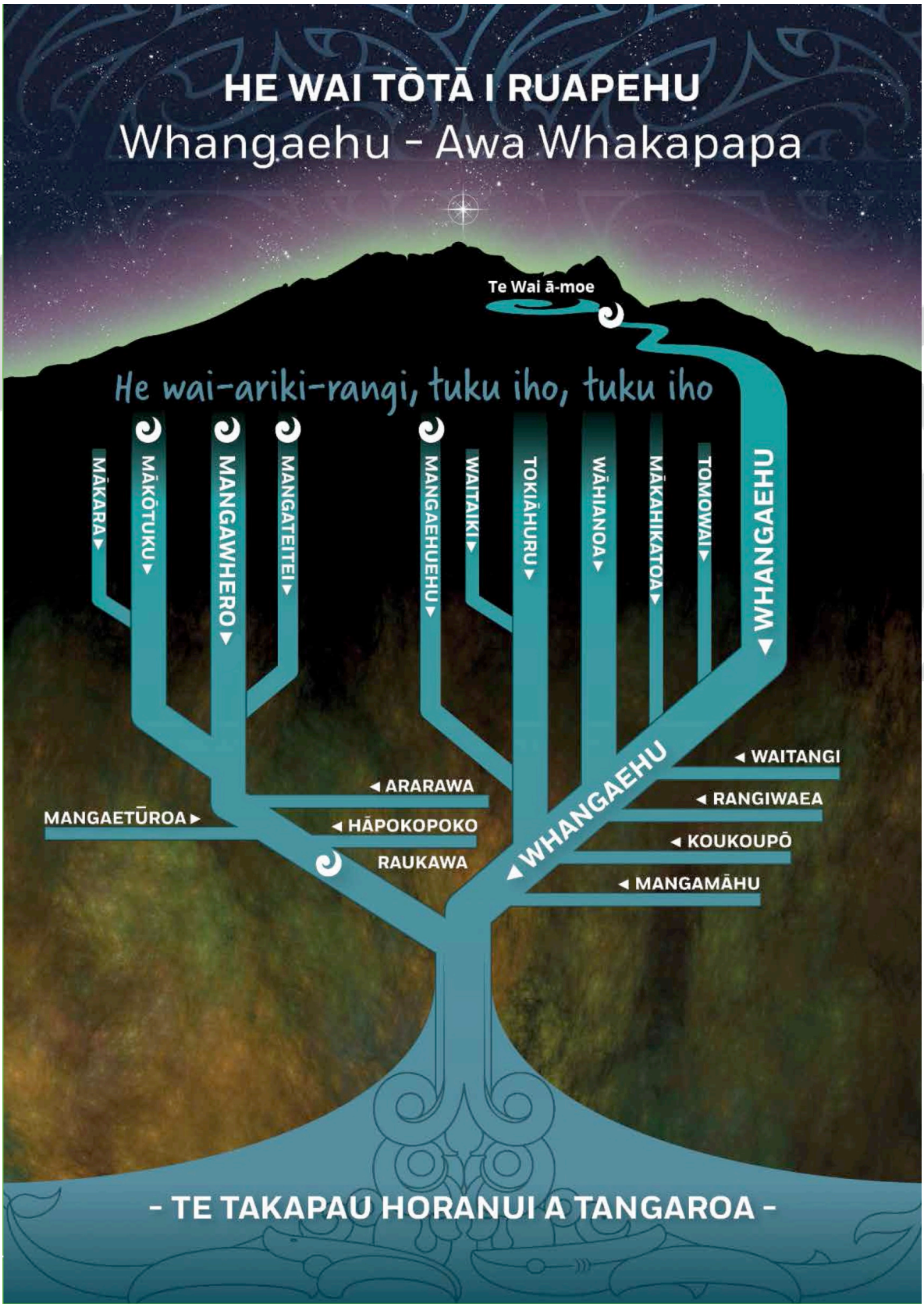
Te Ara Mangawhero Te Waiū-o-Te-Ika information

Te Waiū-o-Te-Ika

Ngāti Rangi maintains a strong and connected relationship with our freshwater, fostered through our whakapapa connections with the landscape we have resided in from time immemorial. Mouri is the lifeblood that exists in all things; it is the fundamental element that brings health and wellbeing to all facets of life. Mouri is the element that flows through us and returns life repeatedly in a perpetual cycle. As tangata tiaki, it is the responsibility of Ngāti Rangi to advocate, protect, and enhance the mouri of waterways that flow through our rohe.

Te Waiū-o-Te-Ika is a legal framework for the Whangaehu River catchment from Te Wai ā-moe to the sea, incorporating its tributaries and all its physical (including mineral) and metaphysical elements, as an indivisible and living whole. The framework focuses on recognising, promoting, and protecting the health and wellbeing of the awa, and the intrinsic relationship of Ngā Iwi o Te Waiū-o-Te-Ika with the awa and our responsibility to care for, protect and use the awa in accordance with our kawa, tikanga, and ritenga.

Te Waiū-o-Te-Ika framework is inclusive and recognises and promotes the mana of all Iwi with connections and interests in the Whangaehu River catchment, putting the mana of Te Waiū-o-Te-Ika at the centre. Much of the framework provides collectively for Ngā Iwi o Te Waiū-o-Te-Ika, and not just Ngāti Rangi. Ngā Iwi o Te Waiū-o-Te-Ika have a collective connection and interest in the health and wellbeing of the awa and will work together to restore the mouri and the health and wellbeing of the awa and its people.



The waterways flowing through the proposed phase one areas of Te Ara Mangawhero originate on Ruapehu and form the Mangawhero River. The Mangawhero River is an important freshwater tributary of the Whangaehu River. Consequently, the proposed areas for trail establishment are encompassed within the framework of Te Waiū-o-Te-Ika.

The Ngāti Rangi Claims Settlement Act 2019 provides statutory recognition of Te Waiū-o-Te-Ika as a living and indivisible whole from Te Wai ā-moe to the sea and through a set of intrinsic values firmly based in our kawa and tikanga, Te Mana Tupua and Ngā Toka Tupua. These intrinsic values reflect expectations of underpinning cultural foundations for increasing the health and wellbeing of the catchment.

Concerning this application, the settlement Act requires that any persons exercising or performing a function, power, or duty (decision-makers) under:

- The Conservation Act 1987 and National Parks Act 1980 (amongst other Acts) must recognise and provide for Te Mana Tupua and Ngā Toka Tupua.

- The Resource Management Act 1991 (amongst other Acts) must have particular regard to Te Mana Tupua and Ngā Toka Tupua.

Te Waiū-o-Te-Ika in its fullest sense is still being implemented. It is noted that Ngā Wai Tōtā, the co-governance entity for Te Waiū-o-Te-Ika is yet to be established.

The proposed trail development will result in a variety of outcomes, including:

- The trail will traverse and showcase a wide range of ecologically and culturally significant forest and river margin habitats on the lower slopes of Ruapehu. Enabling recreational access will create connection, health and wellbeing benefits, and enable greater environmental and conservation outcomes.

- As tangata tiaki, Ngā Waihua o Paerangi Trust and Ruapehu WorX will establish, manage and maintain the trail which will enhance connection, care and reciprocity for the location while providing employment and growth opportunities for local people.

- The aim is to build a sustainable trail that has minimal impact, resists erosion through proper design, and blends with the environment. The route has been designed to maximise the use of previously disturbed sites/areas and to avoid and minimise the potential for adverse effects on intact indigenous ecosystems. To respect the sensitive nature of the natural landscape the trail construction methodology is based around the wellbeing of the taiao.

- The trail requires the placement of nine new bridges across some small streams, the Tutara Stream and the Mangawhero River. Ruapehu WorX's sensitive construction techniques along with erosion and sediment control will avoid any adverse effects on the waterway including aquatic flora and fauna at each of the nine bridge locations. Therefore, while we recognise the placement of bridges affects the essence of

waterways, disruption of the mouri of each waterway will be minimised as much as possible.

- New opportunities for the control of pest plants and pest animals to complement existing conservation management in the local area will result from the establishment of the trail. In specific locations, there are also opportunities to enhance the recovery of indigenous vegetation within previously disturbed areas. These ecological improvements will result in enhanced mouri of the area.

- Although interpretation has not been developed yet, it is important to note that this is a key element of the proposed trail. Interpretation will not only add to the trail experience but will also provide an opportunity for important natural, cultural and historical korero associated with the land and the trail to be told. Increased knowledge will enable connection with the area to be developed and inspiration to be drawn.

- Business cases have demonstrated that the proposed trails will benefit the Ruapehu District's economy.

The establishment of the proposed trail will result in renewed and enhanced connection and kaitiakitanga, which benefits health and wellbeing – physically, spiritually, culturally, and economically. Placing the taiao at the forefront of decision-making minimises the degradation of mouri of the waterways and enables improvements in the ecology and mouri of the surrounding areas. The combined effect is raised individual and community inspiration, sustenance, prosperity, and growth now and for future generations. Holistically speaking, as the mouri of the taiao and mana of individuals and communities will be enhanced, the mana of Te Waiū-o-Te-Ika will be uplifted.

The outcomes of the development of the proposed areas of Te Ara Mangawhero entwine as an integrated management approach to uphold the intrinsic values that represent the essence of Te Waiū-o-Te-Ika, therefore giving effect to Te Mana Tupua and Ngā Toka Tupua.

Appendix 10. Geotechnical Assessment

Ruapehu WorX Limited, Ohakune

Te Ara Mangawhero Trail, Tongariro National Park, Ohakune

Geotechnical Assessment of Bridge Abutments

210700
4 November 2021

Ruapehu WorX Limited, Ohakune

Te Ara Mangawhero Trail, Tongariro National Park, Ohakune

Geotechnical Assessment of Bridge Abutments

Prepared by: s9(2)(a)

Chartered Geotechnical Engineer
MEng Sc (Geotech), BSc (Geology), CPEng, CMEngNZ

Approved for Release s9(2)(a)

Registered Professional Surveyor

Date:	4 November 2021
Reference:	210700
Status:	Final
Revision:	NA
Previous Revision Date:	NA

cheal

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Appendices -

1. Scala Results

1. INTRODUCTION

Cheal Consultants Limited (Cheal) has been engaged by Ruapehu WorX Limited (WorX) to carry out geotechnical assessment for the proposed Mountain to Sea Trail extensions.

This report focuses on assessment of the abutment areas of 6 proposed bridge sites and follows a geotechnical desktop study that was done by Cheal (Ref. 200297) for Ruapehu District Council (C/-Roam Consulting Limited) in June 2020. This earlier report covered a broader (higher level) scope and looked at potential geotechnical issues for route select for the Horopito, Te Ara Mangawhero and The Missing Link trails (Figure 1). These two reports should be read in conjunction.

Figure 1: Proposed Location of the Trails (Google Earth Pro)

The 6 bridge sites covered by this report are located on the Te Ara Mangawhero and Horopito Trails, in Sections 1, 3, 4 & 11. The bridge references are as follows:

1. **1.10.B** – (8m) adjacent to existing town water (twin) supply pipes.
2. **1.13.B** – (6m) replacement for existing bridge.
3. **3.8.B** – (30m) at location of existing tramline bridge piers/remains.
4. **4.2.B** – (6m) downstream of the water intake weir.
5. **4.5.B** – (17m) downstream of the water intake weir.
6. **11.2.B** – (17m) site of an old tramline bridge.

Extracts from Cheal (Draft) plans showing the locations of the bridge sites are included as Figures 2a, 2b and 2c.

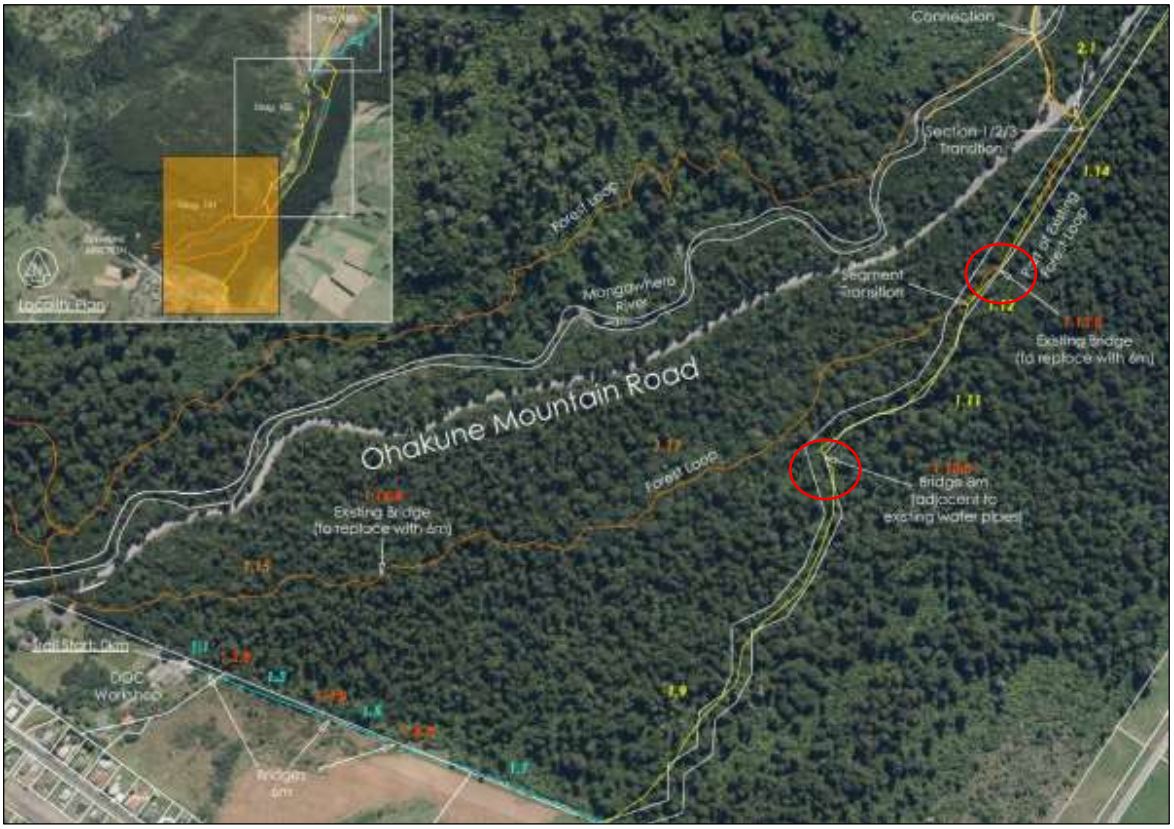

Figure 2a: Bridges 1.10 & 1.13

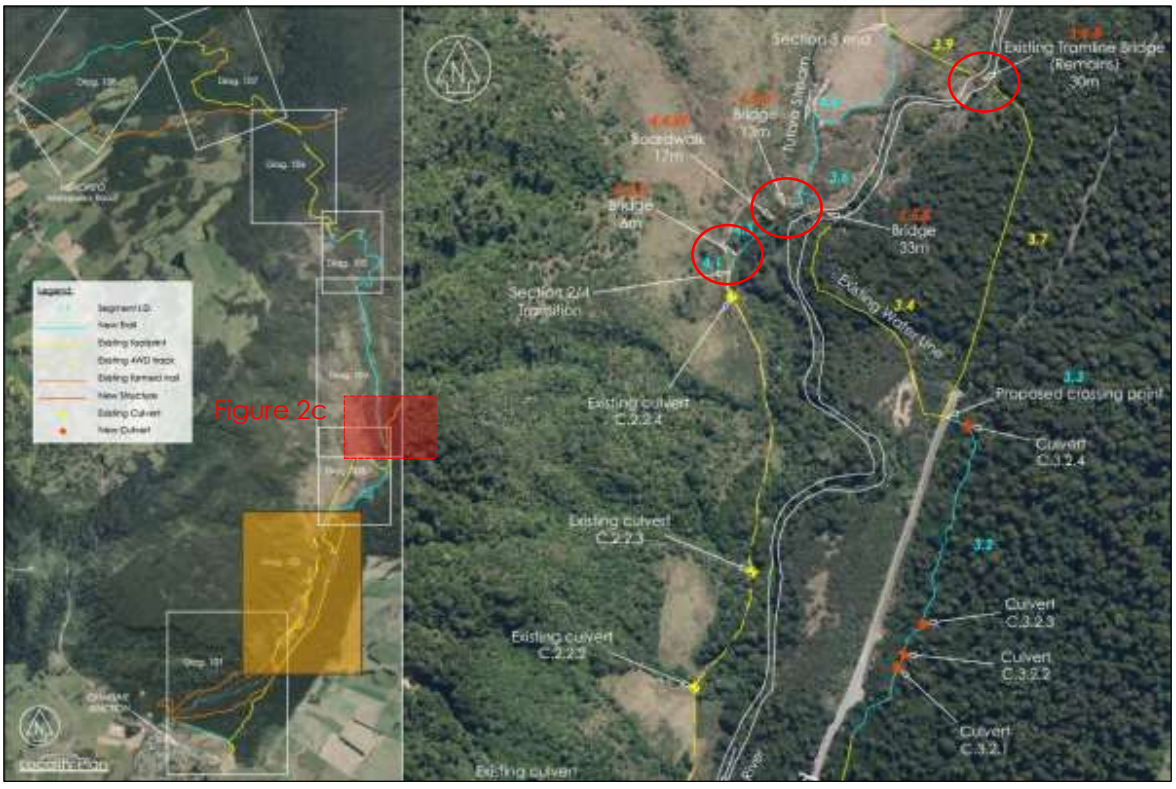

Figure 2b: Bridges 3.8, 4.2 & 4.5

Figure 2c: Bridges 11.2

It is our understanding that the bridges are being designed by GHD and will follow a relatively standard Sawn Timber Bridge design similar to that shown in Figure 3. These details are examples from Department of Conservation (DOC) plans and were supplied by the structural engineer (GHD). The bridges will either be founded on a ground beam, or bored timber piles (or similar).

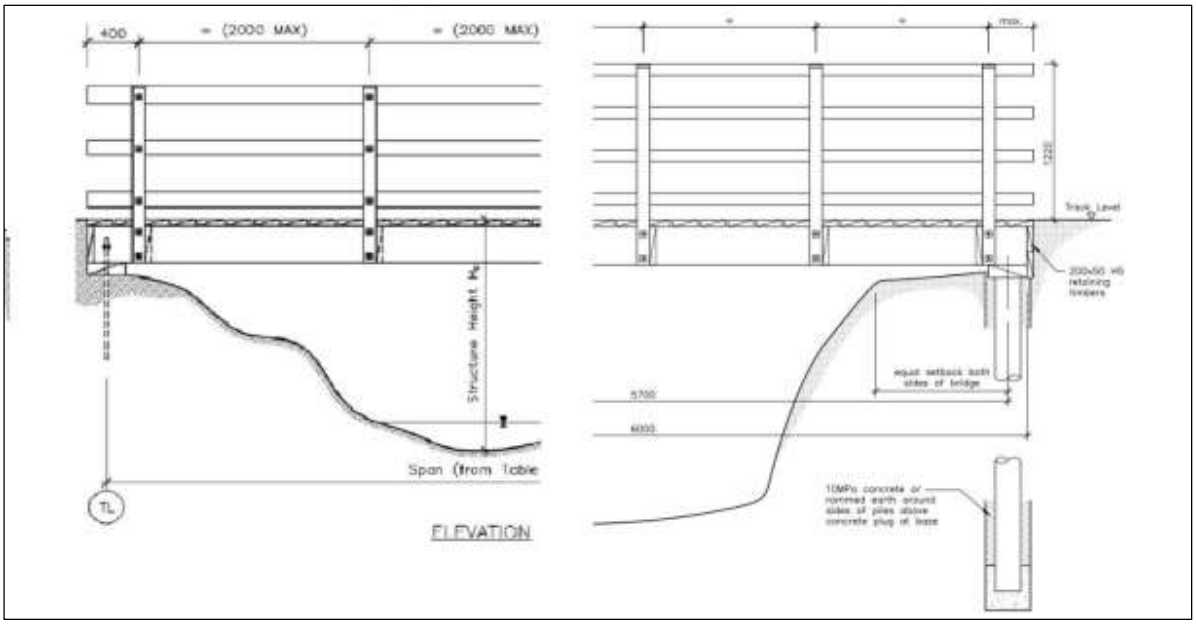

Figure 3: Examples of standard bridge structure (Cropped from DOC drawings)

Much of the trail(s) is only accessible by walking, and due to the general topography and dense vegetation cover, no mechanical equipment could be taken to the sites. Therefore, our geotechnical investigation comprises visual observation with hand measurements (inclinometer and 8m builder tape), and Scala Penetrometer testing. This will be complemented by topographic survey that was carried out by Cheal. This information has been provided separately.

The aim of the geotechnical assessment is to provide the structural engineer with advice on:

1. The general topography and site conditions
2. Site subsoil classification (NZS 1170.5:2004)
3. Soil profile (Geology) at each of the abutments
4. Bearing capacities for the bridges foundation(s)

In particular the structural engineer wanted advice on the risk of erosion, liquefaction, and lateral spreading.

2. GENERAL ADVICE

The following advice is generic and can be applied to each of the bridge sites covered by this report. Further sections will describe each site in more detail and, where applicable, provide site-specific advice.

2.1. Geology

The geology of the area is outlined in the previous Cheal geotechnical desktop report (Ref. 200297: June 2020 – Section 3.1), which covers a wider area, and looked at the risk associated with various route options. The following is a summary of the geology, but the previous report should be referred to where more detail is required.

Generally, the underlying 'bedrock' is described as sandstone or siltstone from the early Pleistocene aged Matemateaonga Formation (Whangamomona Group). These materials could include shell beds and minor conglomerate sequences.

It is expected the sandstone/siltstone is buried by late Pleistocene fan deposits comprising poorly sorted gravel, sands, clay and loess. Overprinting these deposits could be lahar flows from Mt Ruapehu, which could include andesitic gravel and sands with minor debris deposits.

It is our experience that much of the foothills and surrounding plans are blanketed by ash deposits. These tend to have a silt consistency, with relatively minor proportions of fine sand, and are usually non plastic. Although these deposits are relatively loose, some very weak welding would have occurred during deposition and in places can result in some 'apparent' cohesion that enables this material to stand in unsupported faces.

2.2. Soil Strength Parameters

Based on our observations across the sites there are 3 main material types. These are described below, and typical soil strength parameters are provided in Table 1.

Table 1: Soil Strength Parameters

Unit	Soil Description	Typical Scala Results	Typical Soil Strength			
			Density γ'	Friction ϕ'	Cohesion c'	Undrained Shear S_U
FILL	SILT, non-plastic Poorly compaction	1 Blow/ 100	15kN/m^3	32°	Nil	15kPa
A	SILT, non-plastic, firm (poorly welded)	2 – 3 blows/ 100mm	17kN/m^3	32°	5kPa	50kPa
C	GRAVEL, silty with some boulders	20+ blows/ 100mm	19kN/m^3	38°	6kPa	N/A
D	MUDSTONE (weathered)	20+ blows/ 100mm	19kN/m^3	34°	25kPa	250kPa

2.2.1. Unit A: SILT

The silts are likely to be the result of ash deposition and typical this unit is a few metres thick. The silts often contain small amounts of fine sand and is usually dark brown (dark reddish brown). Being relatively recent ash, this unit is loose and can have a slight porous structure in places. This material is non-plastic, but the depositional process has resulted in some very weak welding, which in places can result in 'apparent' cohesion. This property enables this material to stand subvertical in unsupported faces. We would expect the 'apparent' cohesion to be reduced once this material is remoulded/disturbed.

2.2.2. Unit B: GRAVEL

The gravels were seen at most sites and are typical poorly graded with much of the gravels being rounded to sub-rounded medium to coarse stone. The unit contains a significant number of boulders, which are generally sub-angular and 200mm – 300mm diameter, although in places some are a few metres across. The larger gravels tend to be clast supported and are infilled with silts. This material can contain various minor amounts of sand but is generally tightly packed between the gravels. This may lead to relatively poor permeability.

In some exposures there is bedding within the gravels, and this is typically the result of better grading and a distinctive change in upper gravel size. Individual beds range in thickness and can be some metres thick.

2.2.3. Unit B: MUDSTONE

Fresh mudstone was only encountered at one site but was seen exposed in riverbanks along lengths of the river. The material is generally grey but may weather to a yellowish-brown colour. The texture is silt with some fine sand and appeared to be relatively intact and homogeneous.

2.3. Seismic Parameters

2.3.1. Site Subsoil Class

Based on our observations we considered that Subsoil Class C (Shallow Soil) would be appropriate for all sites.

Class B (Rock) allows for up to 3m of soil over rock, and at a number of sites the underlying sandstone/siltstone was seen or inferred. However, without more detailed investigation we do not recommend using this class.

2.3.2. Peak Ground Accelerations

For structural design in terms of NZS 1170.5:2004 a Hazard Factor (Z) of 0.27 can be used to determine *weighted* Peak Ground Accelerations (PGA). No Near-Fault Factor (Section 3.1.6) is required.

For slope stability and/or liquefaction it is recommended that *unweighted* PGAs are determined using the NZTA Bridge Manual. For Ohakune we recommend a PGA coefficient ($C_{0,1000}$) of 0.35 with an Effective Magnitude (M_{eff}) of 6.2.

2.4. Liquefaction

Due to the nature of the investigation a quantitative liquefaction analysis (such as the Simplified Methods) cannot be carried out. However, based on our observation, most of the sites had coarse gravels exposed at the founding level of the bridges and within the stream beds. Based on this, we considered that it is likely that the potential for liquefaction and lateral spread would be low.

If a higher level of certainty is required, Boreholes with SPTs and/or CPT would be required at each of the sites.

2.5. Pile Installation

Bored or driven piles would be appropriate where embedded in the silts that blanket most of the sites, but both methods would be limited in the gravels. Although piles could be founded on the top of the gravels, they would be too dense to drive a timber post into. As outlined above, the gravels are coarse and contain boulders, and therefore pre-drilling a post hole would be very difficult without large mechanical equipment.

It is very unlikely that screw-in piles would penetrate the gravels.

2.6. Abutment Setback

It is very difficult to accurately assess the detailed ground conditions at some of the abutments due to the thickness of vegetation and/or the difficulties with access at some of the sites. However, in general most the stream/riverbanks comprise coarse gravels and boulders, which tend to be blanketed with a layer of silt. This unit is usually 1.0m – 2.0m thick, with the initial part of the unit being relatively weak.

Signs of 'historic' erosion was seen at most sites, but only a few sites appeared to be affected by 'active' erosion. The level of investigation required to determining a regression rate for any of the sites is outside of the scope of this assessment, however as a general guide, where a setback is required to mitigate future erosion (or slumping) a setback distance could be based on an active earth failure wedge. This method is likely to be conservative and would involve projecting a line back (and up) from the stream/toe of bank. For gravels, an angle of 36° should be used, or 29° where the soil profile is dominated by silts (or similar).

Where the risk of erosion is considered critical, and more certainty is required, a more rigorous investigation would be required and is likely to include machine mounted investigation equipment or lab testing.

3. SITE-SPECIFIC ADVICE

In general, for each of the bridge sites a sketched geomorphological plan and sketched sections through each abutment are included. The lines of the sections are indicated on the plan. These sketches show the main topographic features and indicate the soil types where they were exposed or can be inferred. The sketches are based on site measurements using a handheld inclinometer and 8m steel builders' tape. The plans are not to scale but the sections have been plotted based on the site measurements. Measurements are included where applicable.

A key for the symbols used in the sketched plan is included below (Figure 4).

Site photos showing the typical site conditions are included, and the position and orientation of the photos are shown on the plan (and/or sections).

Scala Penetrometer testing (Scala) was carried out at each abutment and typically reached a depth of approximately 1m - 2m. The locations of the Scalas are shown on the plan and the sections. Depths where 100 kPa (3 blows/100mm) were measured is indicated on the sections. It is generally assumed that refusal occurs at the top of the gravel unit.

Scala results (blow counts/100mm) are included in Appendix 1.

Scala results and the correlation with Stockwell (1977) have been used to estimate *Allowable Bearing Capacity* (All. BC). This would include a Factor of Safety (FOS) of 3, giving *Ultimate Bearing Capacity* (ULT. BC). It is an assumption of Stockwell that the FOS will limit settlements of typical light residential building loading to 25mm. This cannot be verified for this project based on the current level of investigation.

Where limit state design is being used, a *Design Strength* (q_{dbs})can be calculated from the Ult. BC using a *Strength Reduction Factor* (Φ) of 0.5 for static cases and 0.8 for seismic cases.

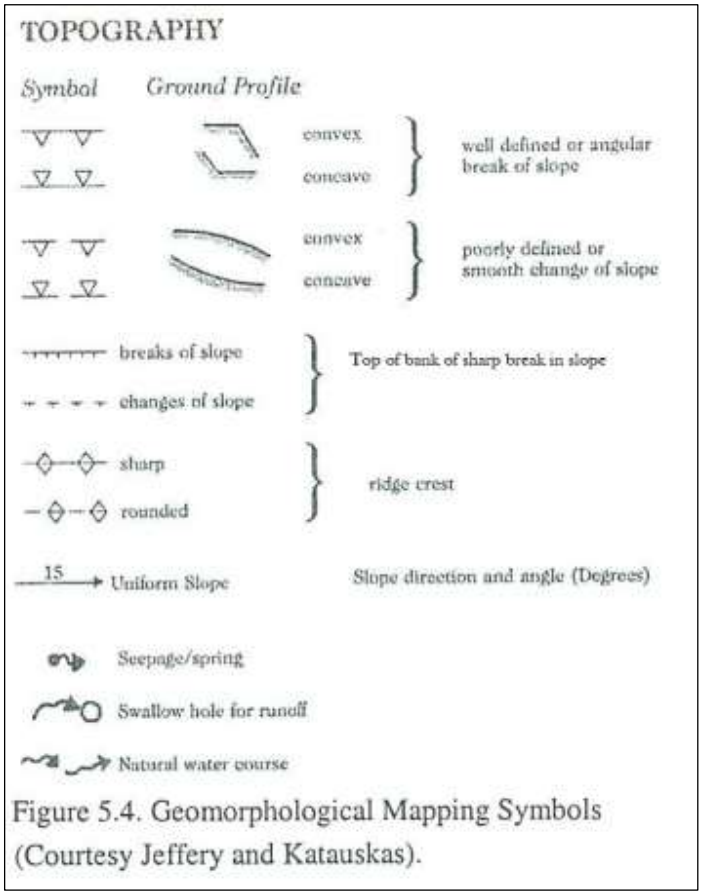

Figure 5.4. Geomorphological Mapping Symbols (Courtesy Jeffery and Katauskas).

Figure 4: Key to Sketched Plans

3.1. Bridge 1.10.B

3.1.1. General

This site is located along an existing tramline alignment, and currently the stream is crossed by two water pipes, which it is our understanding are the main feed for Ohakune.

A sketch plan (Figure 5) and two sections from either side of the pipe alignment are included (Figure 6). References to site photos and Scala testing are included on the plan. Scala results are included in Appendix 1.

Generally, the topography at the site is relatively flat, although on the northern side of the stream there is a slightly raised terrace to the west. The stream flows from east to west and is relatively straight and regular through the site. Beyond the site, the stream may meander slightly, and the start of a bend can be seen upstream of the bridge site (Site Photo 1.10.B - 01). Where the pipes cross the stream, the bed is approximately 4.0m wide and at the time of investigation the water depth was about 200mm – 400mm. The stream bed is mainly 'muddy', but some stone is seen scattered across the bed.

As the tramline approaches the stream, the formation has been built up with embankments. This is quite pronounced on the northern abutment, and less so on the southern abutment.

3.1.2. Northern Abutment

On the northern abutment the original ground appears to have sloped gently towards the stream at about 3° with a 1m high streambank formed by a moderate slope of about 23° (see Section AA').

The top of the embankment is about 4m wide, and batters are typically 2.0 – 2.5H:1.0V. At the edge of the stream the embankment is approximately 1m higher that the surrounding ground level. On the western side of the embankment there is a drainage feature that appears to have scoured out along the toe of the embankment (see Section BB" & Site Photos 1.10.B - 03 & 04). This feature is at the end of a slight depression that has formed between the raised tramline and the terrace slope. Back from the stream edge the ground surface was relatively dry, but groundwater seepage was observed from the scour feature and appears to be flowing constantly into the stream.

No soil was exposed on the northern side of the stream, but the Scala testing indicates the embankment has been poorly compacted with blow counts of 1(or less) blow/100mm down to a depth of 700mm. It is assumed this represents the extent of the fill material (likely to be dark brown, non-plastic silt) and blow counts increase to 2 blows/100mm then 3 blows/100mm through the insitu soils. At a depth of 1.9m, the blow counts increase markedly, and refusal is reached (20+ blows/100mm). This depth is likely to mark the start of the gravels.

Scala results indicate that a shallow ground beam founded on the embankment fill would have an *Allowable Bearing Capacity* (All. BC) of about 35 kPa. Where piles are extended down into the insitu soils, the Ult. BC would be 210 kPa at a depth of 700mm and 300 kPa at a depth of 1.2m.

It should be noted that although the end bearing of the pile is better, the lateral capacity of the pile would be strongly influenced by the upper fill material, which is poor.

Where piles are extended to the gravels, the Ult. BC would be in the order of 1,000+ kPa. It is unlikely that piles would be able to be embedded into the gravels.

3.1.3. Southern Abutment

The ground level on the southern side of the stream appears to be slightly higher than the northern side, and in general the streambank is formed by ground sloping at approximately 22°. This may have resulted in a shorter length of embankment, which appears to be wider (7m).

Although higher, this side of the stream is generally wetter and there are pools of standing water some distance back from the stream (approx. 100mm). It looks like this area was drained when the embankment was built as there is a formed cut channel cut along the eastern side of the embankment/tramline alignment (Site Photo 1.10.B - 02). This channel is approximately 1.5m deep with batters of 0.5H:1.0V (63°) and is 0.7m across the invert. At the time of investigation there was a steady flow of water through the channel.

Soils seen in the side of the channel are insitu and are sandier than the typical description included in Section 2.2. The soil is described as sand with some silt. The unit is dark brown, and the sands range from fine to medium sized, but include occasional fine angular gravels. The soil is firm to stiff and weakly welded 'clumps' of soil taken from the face can be crushed with strong finger pressure. We consider that the soil strength parameter provided in Table 1 for the Silt (Unit A) are appropriate for this material.

Scala testing on this embankment shows a general trend similar to the northern side but indicates the fill material (1 blow/100mm) is approximately 900mm thick and the gravels are at a depth of about 2.2m. This is likely to reflect a slight height difference in the two embankment levels and when plotting on the sketched sections it appears the invert of the stream is more-or-less running along the top of the gravels.

3.1.4. Additional Advice

In general, there appears to be a lot of surface water or seepage at the site and although the embankments on both sides have been built up to about 1m – 1.5m above the surrounded ground surface, the insitu soil may be very wet (or saturated). This has implication for liquefaction following a moderate to large earthquake and at this site where the insitu soils are surcharged by the embankment fill, there could be a tendency for lateral spread and shallow seated slumping at the abutments.

The extent of spread/slumping cannot be determined based on the current level of investigation, but site observations indicate a number of lower angle slopes at 22° that have formed close to the water level and may represent soil strengths with elevated pore water pressures. Based on this, the extent of slumping could be approximated by a slump angle projected back from the edge of the stream at 2.5H:1.0V. Where the top of the embankment is about 2.5m above the stream level, this would indicate slumping could extend back by 6m -7m from the stream edge.

No indication of scour was seen along the edge of the stream, but some active erosion has occurred along the side of the northern embankment (possibly caused by seepage and ground water). This appears to be historic, but some consideration may need to be made for additional drainage or riprap.

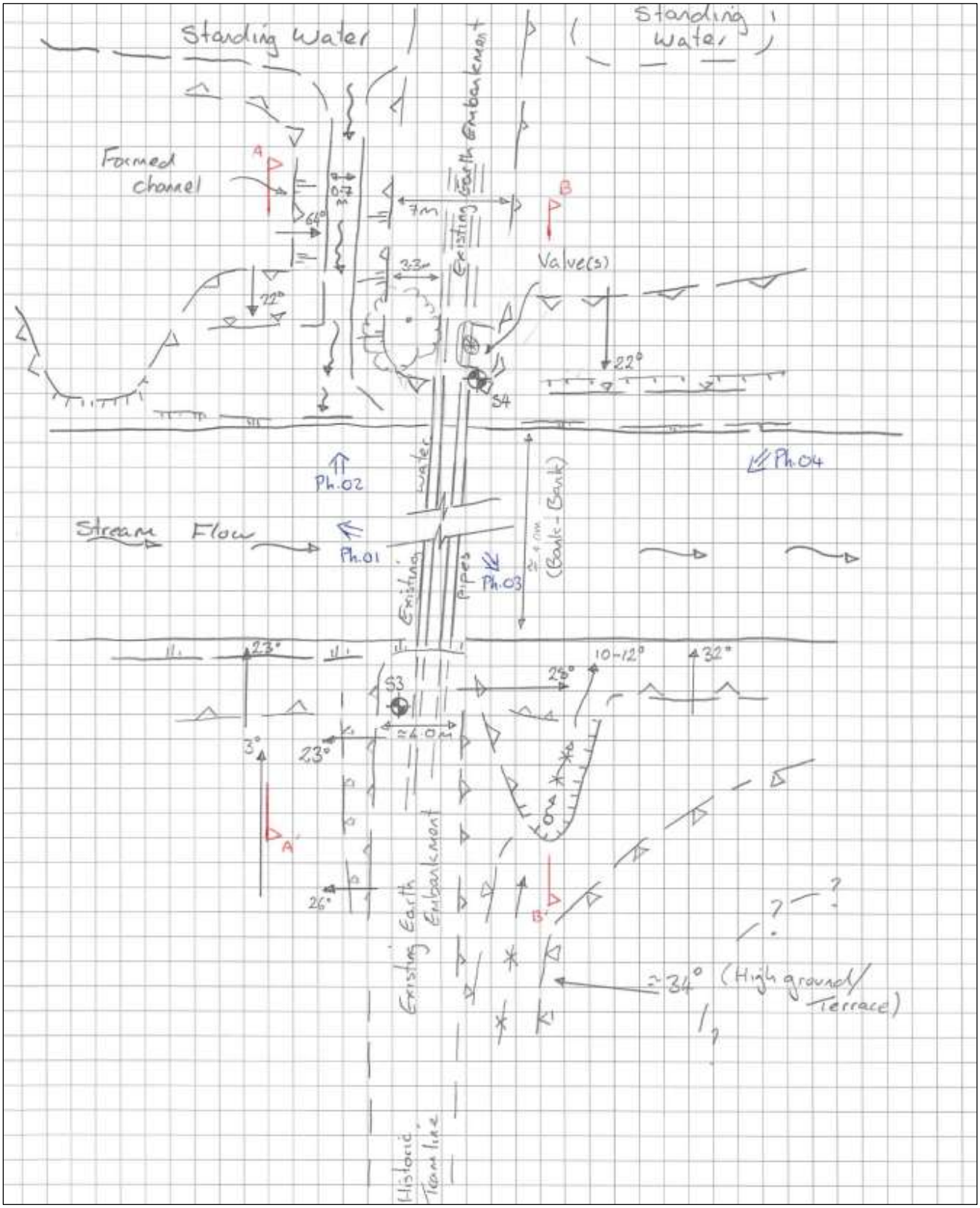

Figure 5: 1.10.B Sketched Plan

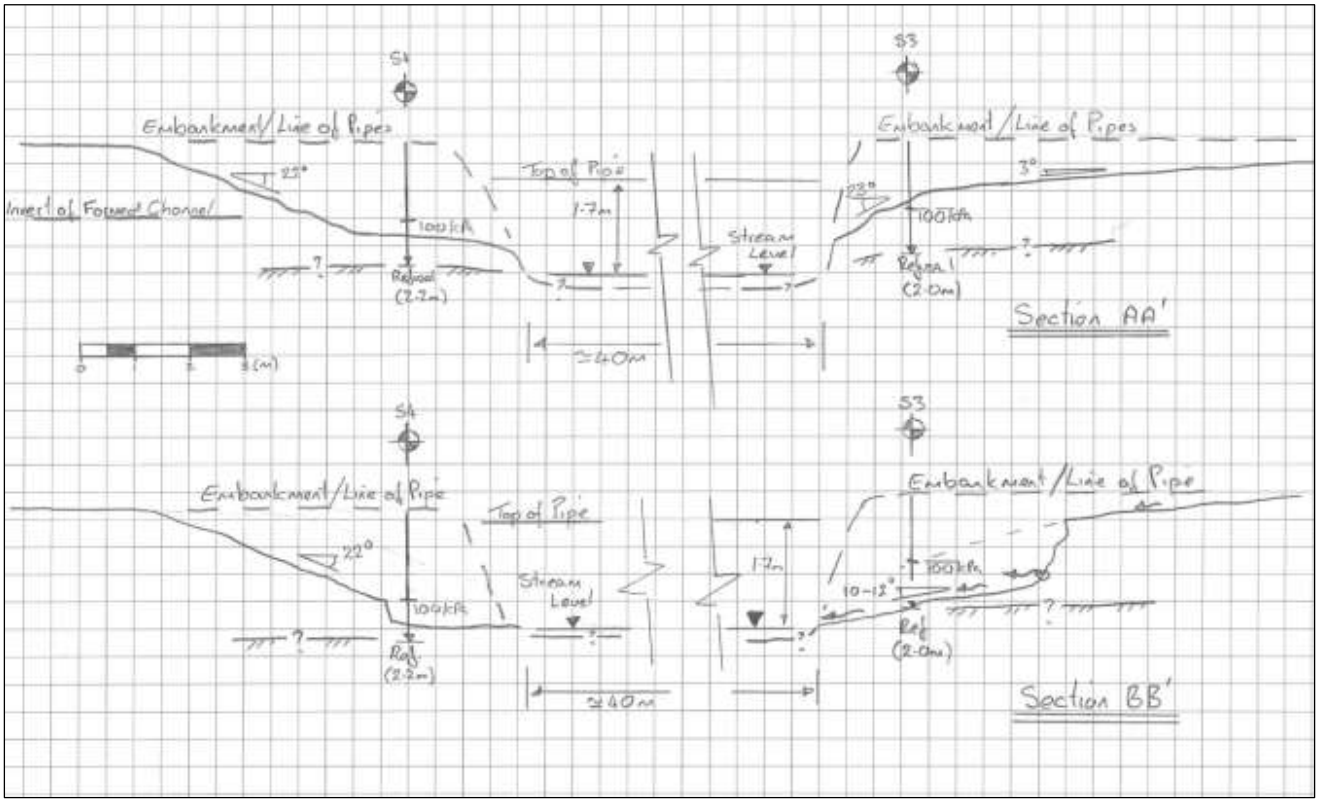

Figure 6: 1.10.B Sketched Sections

Site Photo: 1.10.B - 01

Site Photo: 1.10.B - 02

Site Photo: 1.10.B - 03

Site Photo: 1.10.B - 03

3.2. Bridge 1.13.B

3.2.1. General

This site is located along a walking track and includes an existing timber bridge, which is about 7m long and 1m wide. The path is relatively straight leading to the bridge but on the southern side of the stream has a slight 'dog-leg' and passes through a tree trunk laying on the ground.

A sketched plan and a sketched sections are included as Figures 7 and 8. References to site photos and Scala testing are included on the plan. Scala results are included in Appendix 1.

There are a number of large native trees along the track and those in close proximity to the bridge have been indicated on the plan with off-set measurement from the edge of the path.

The stream flows east to west and in general the topography is undulating and the northern approach to the bridge includes a small siding cut, which is about 1.5m high. Although the stream occupies a relatively narrow incised channel it may follow a wider gully that runs more northeast – southwest, and within the gully the line of the stream may include a series of relatively tight meanders with the bridge located close to the inflection point between two oppose bends.

The bridge has a series of timber piers set about 1.5m from each end of the deck and supports a water pipe that is located under one side (west) of the bridge (Site Photo 1.13.B - 01). The abutments/piers have been locally armoured with riprap, but some of this may have been washed away (or moved) and some scour is seen next to piers (Site Photo 1.13.B - 02). Typically, the riprap is

100mm – 250mm diameter stone (rounded) and below the bridge leaves an invert width of about 1.3m (Site Photo 1.13.B - 03).

Upstream of the bridge the channel is 'clogged' with tree branches and thin branches and the stream profile was difficult to determine beyond the bridge. However, at each end of the bridge it appears the channel has scoured out on each side of the bridge to leave lower slopes, or a stepped profile. At the north-east corner of the bridge, some scour may have formed a localised flow channel down past the piers. At the north-west pier there is significant scour around the water pipe, and this has resulted in a localised overhang of soil and vegetation. This feature may be part of a large area of bank regression that is forming on the outer side of a bend in the stream alignment and could be exasperated by overland flow from a localised gully feature.

Scala testing indicates that there is a hard substrate where the testing refused. At the northern abutment this is at a depth of approximately 2.3m, which is a level similar to the invert of the stream. At the southern abutment the Scala refused at about 1m, indicating a possible step in the substrate across the stream. However, the relative ground levels at the Scala tests should be checked with the survey to confirm these observations.

Based on general observation from the wider area it is likely the substrate is the gravels, and it is likely a relatively local source was used for the riprap. The soils seen in the streambanks and the areas of scour dark brown silt, consistent with the description in Section 2.2. The Scala readings through the silts were initially 1 blow (or less)/100mm for the first 800mm of depth, then increases to 2 – 4 blows/100mm down to the refusal depth (1m on Sth/2.3m on Nth).

All. BC at ground level would be in the order of 35 kPa, but where piles were extended to about 1m, would be at least 100 kPa (1000+ kPa at refusal depth).

3.2.2. Additional Advice

The stream velocity appeared to be quite swift and locally the stream bed dropped through a series of low steps/rapids, although this perception could be influenced by vegetation laying across the stream channel. Scour appears to be a significant issue at the site and as the bridge is located where the flow switches between horizontal curves, erosion protection may need to extend some distance downstream of the bridge. A setback distance may need to be considered for this site.

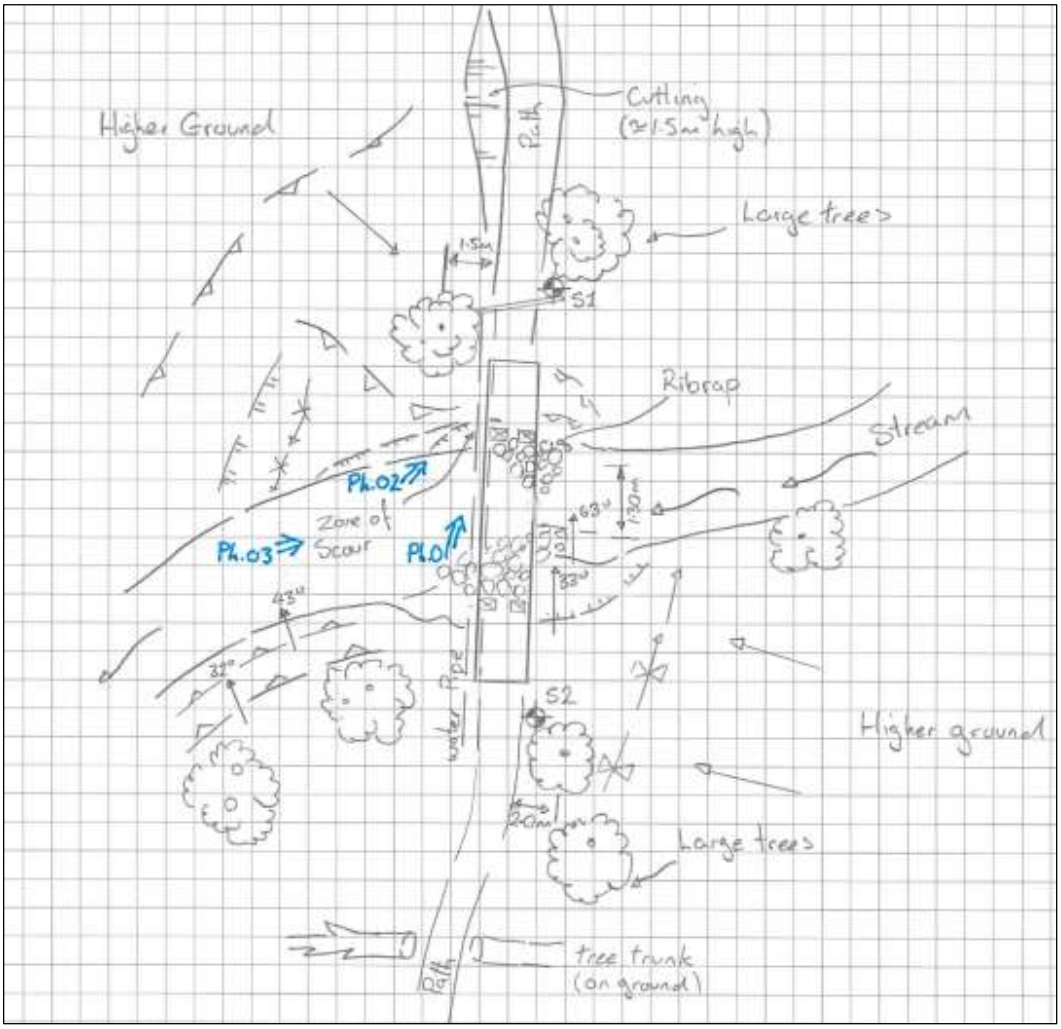

Figure 7: 1.13.B Sketched Plan

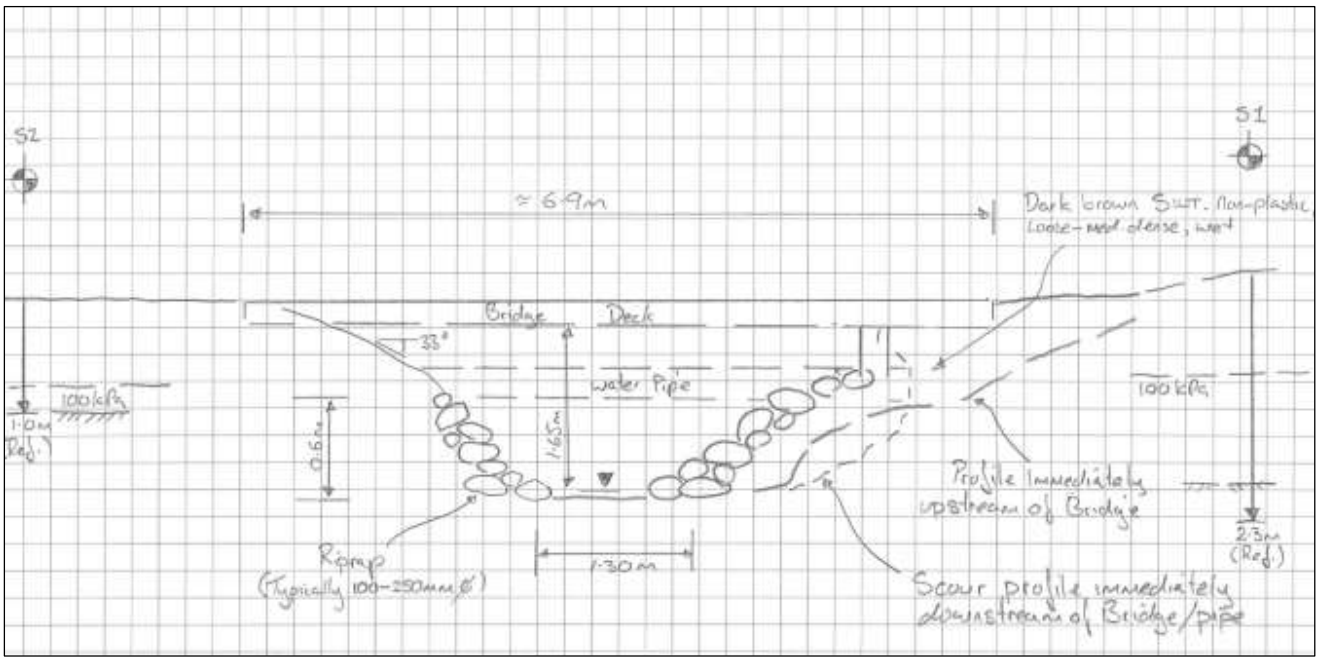

Figure 8: 1.13.B Sketched Sections

Site Photo: 1.13.B - 01

Site Photo: 1.13.B - 02

Site Photo: 1.13.B - 03

3.3. Bridge 3.8.B

3.3.1. General

This site is located on the Mangawhero River and is the location of an iconic tramline bridge. This bridge includes a concrete abutment and piers with a bridge structure of large timber beams. All of the decking has gone and many of the beams have rotted out and collapsed. However, it is our understanding that the structural engineer is considering utilising the existing piers and abutments.

A sketched plan (Figure 9) showing the wider topographic features at the site is included along with sketched sections (Figure 10 & 11) of each side of the river. Site photos and Scala test locations are shown on the plan, and Scala results are included in Appendix 1.

Generally, the site is located on a long sweeping bend in the river with the inside of the bend on the western side. The grade of the river at the bridge site is quite steep and there are a series of rapids and midstream islands in the riverbed, and it is estimated that river level drops by about 1m in the vicinity of the bride (Site Photo 3.8.B - 05).

3.3.2. Eastern Abutment

The eastern side of the river has been eroded to form near-vertical riverbanks around the outside of the bend and these extend to a higher plateau level that extends back towards Ohakune Mountain Road (Site Photo 3.8.B - 03). This side of the river is vegetated with forest and thick undergrowth, and the area around the eastern abutment was overgrown with thick vegetation, making inspection very difficult. This was made more difficult by the risk of collapsed bridge beams that were 'hung-up' in the trees (Site Photo 3.8.B - 01).

The line of the tramline could not be recognised, and no abutment structure was seen on this side of the river. The topography has been indicated on the sketched section and generally sloped steeply down to the river from a higher terrace level with a number of narrow benches close to river level. It is possible one of these narrow benches was formed as part of the abutment.

A short distance downstream (≈20m – 30m) the area was clearer of vegetation and the ground profile could be seen better. This profile is shown on the sketched section and indicates that the upper terrace level is approximately 7m – 8m above the river level. However, as outlined above, the riverbed drops through a series of rapids over a very short distance. Gravels were exposed in a steep bank below the terrace level, and these are described as medium- to coarse-sized with some larger boulders, typically up to 300mm diameter (Site Photo 3.8.B - 02). The gravels are sub-rounded with the boulder being slightly more angular (sub-angular) and are clast supported. The infill (matrix) between the gravels is a tightly packed silt.

The gravel face is standing at 85° but appears to be slowly fretting as a debris fan of collapsed material (gravels) has formed a lower angle slope that leads down to a level platform at the edge of the river. This profile may have been formed by erosion, which could have locally regressed the riverbank back by approximately 5m – 10m.

3.3.3. Western Abutment

The topography on this side of the river is dominated by a series of relatively flat river terraces that steadily increase in elevation towards the hills/bluffs to the west. The vegetation is mainly grass lands and pockets of Manuka. The tramline approaches the river on an embankment and at the abutment the top of the embankment is about 2m above the surrounding terrace level (Site Photo 3.8.B - 06).

There is a pier at the eastern edge of the river and the form of the riverbank changes on either side of the pier. On the upstream side the ground profile slopes down to the river edge, whereas downstream of the pier there is a near-vertical riverbank that is approximately 2m high. The riverbank exposes coarse gravels, and large boulder up to a few metres across can be seen along the base of the bank and across the riverbed (Site Photo 3.8.B - 03).

Scala testing carried out on the river terrace indicates there is approximately 900mm - 1.2m of silt blanketing the gravels, and blow counts show that most of the silt unit is very weak with typical blow counts of 1 blow /100mm (i.e., 35 kPa All. BC). Where foundations are extended to the gravels the Ult. BC would be in the order of 1,000+ kPa.

The embankment is approximately 4m wide across the top and batters may have originally been constructed at 2.5H:1.0V. Further back, the tramline enters a box cutting as the upper river terraces continue to gain elevation.

3.3.4. Additional Observations

In general, the riverbanks along the upper side of the bend are steep and expose coarse gravels and boulder similar to those described above. Over some sections a thickness of silt was seen above the gravels, and this was generally a few metres thick.

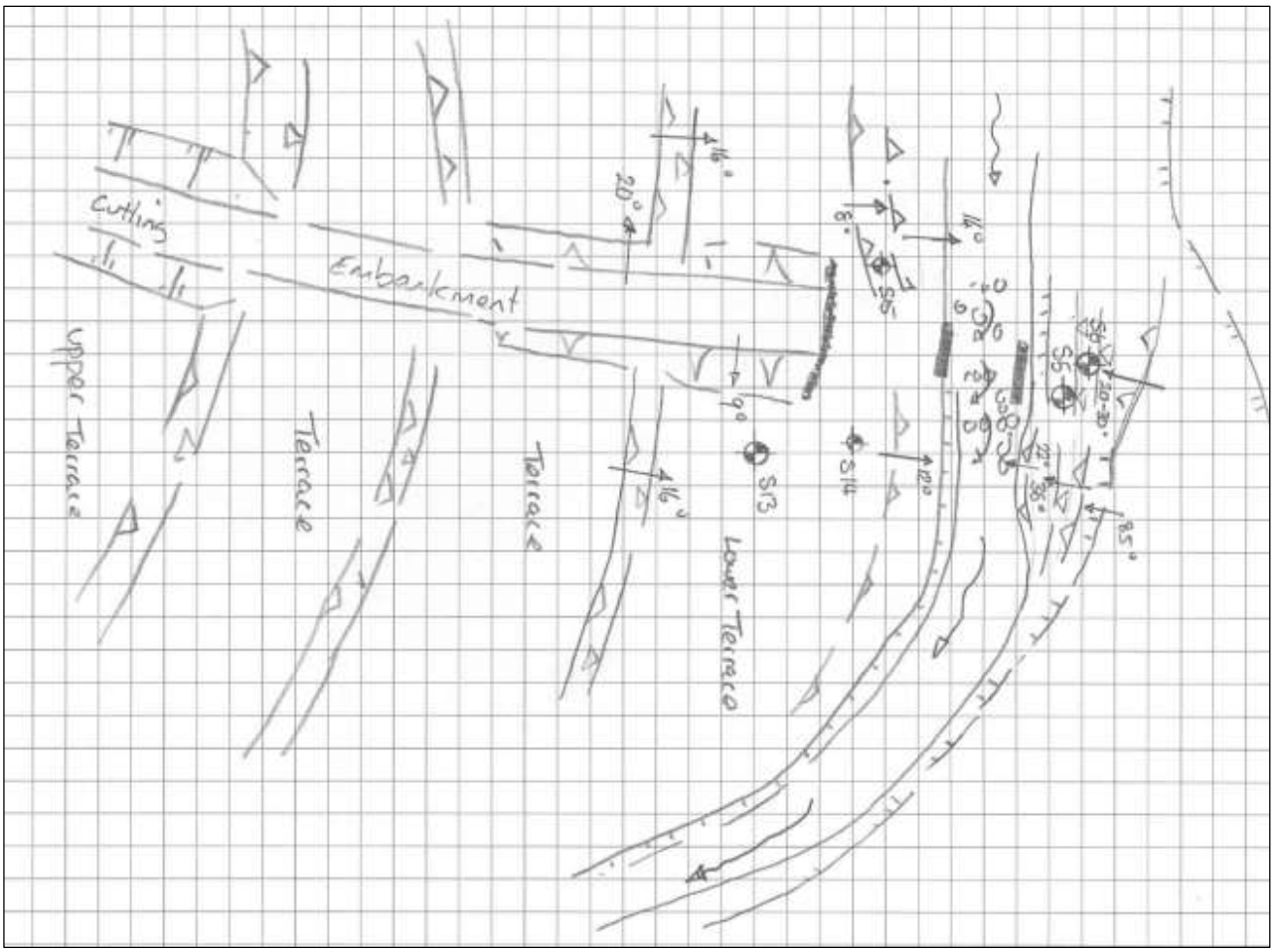

Figure 9: 3.8.B Sketched Plan

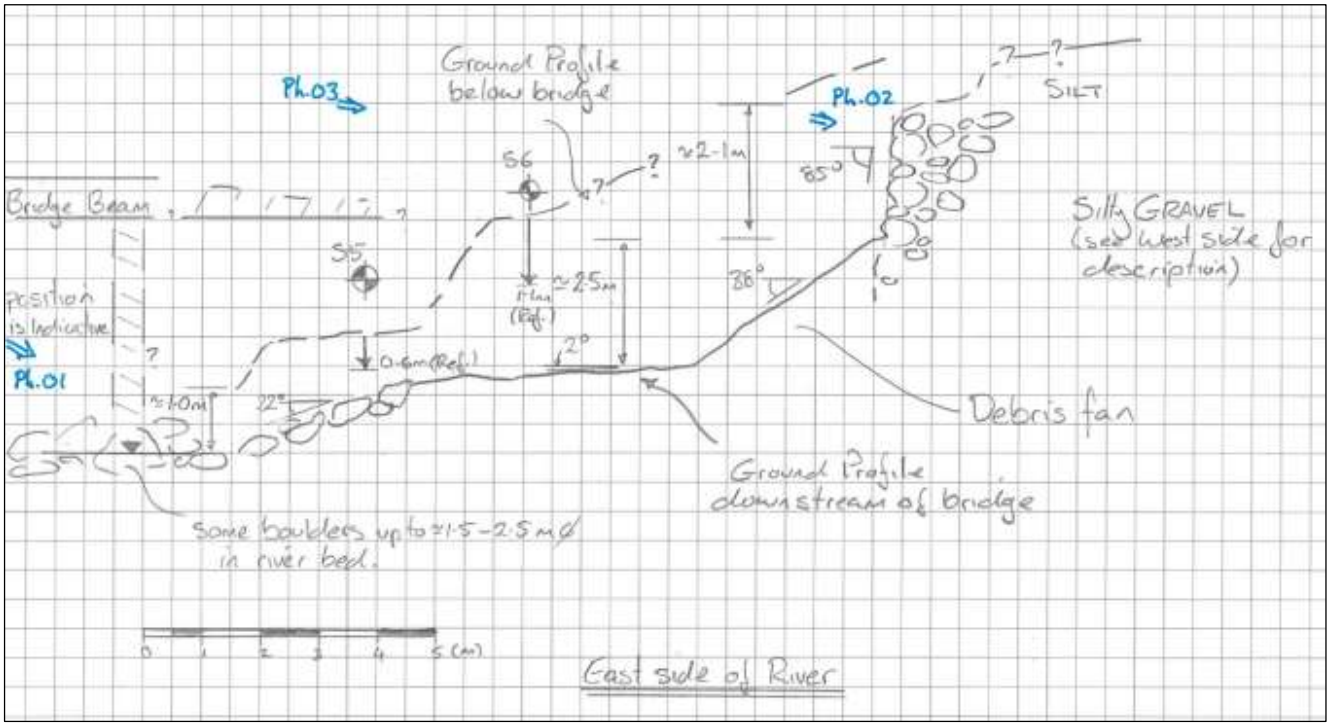

Figure 10: 3.8.B Sketched Section

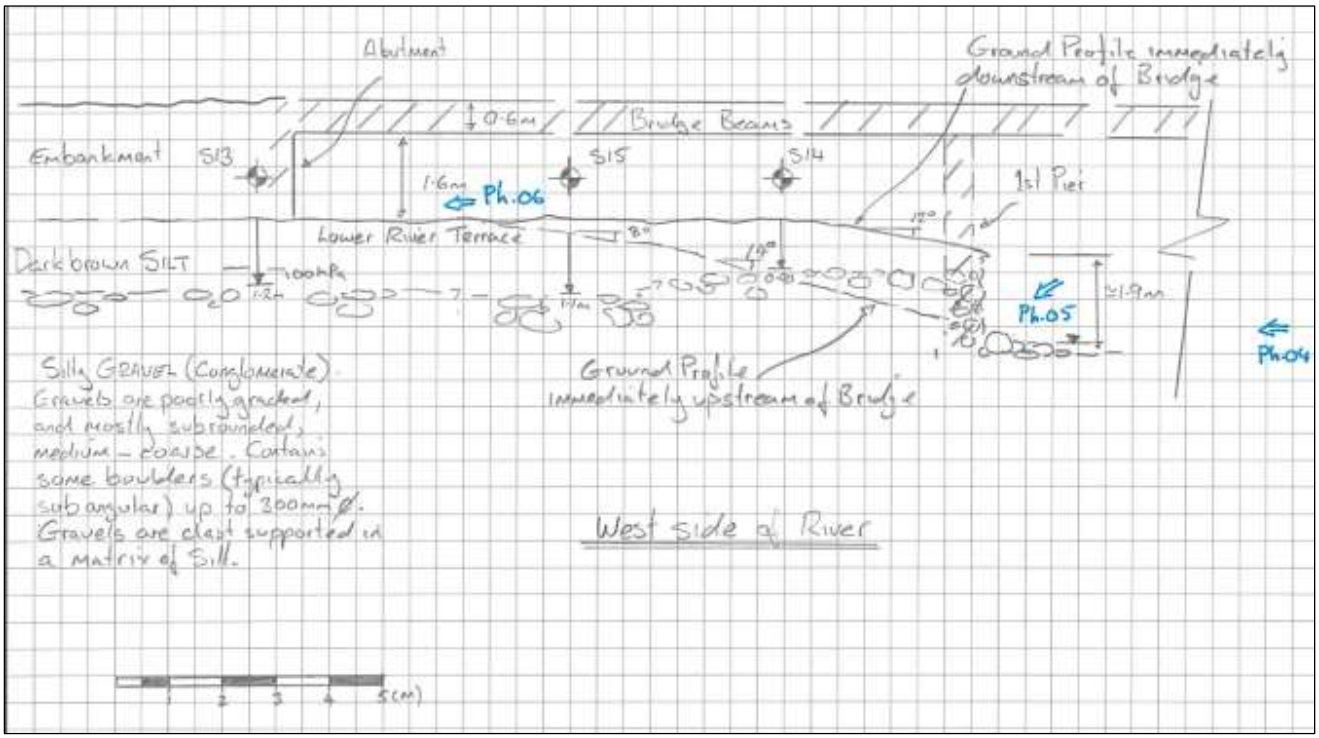

Figure 11: 3.8.B Sketched Section

Site Photo: 3.8.B - 01

Site Photo: 3.8.B - 02

Site Photo: 3.8.B - 03

Site Photo: 3.8.B - 04

Site Photo: 3.8.B - 05

Site Photo: 3.8.B - 06

3.4. Bridge 4.2.B

3.4.1. General

This site is a small tributary of the Mangawhero River and is located in relatively dense vegetation. The stream channel is approximately 2m wide and about 1.5m deep. The banks are relatively steep resulting in a typical "V" shaped cross section. Due to the scale of the site, no sketched plan or section has been included. However, Site Photos 4.2.B-01 and 02 show the general form of the stream and surrounding topography.

Scala testing (S18 & S19) was done on either side of the channel and indicate there is only 20 kPa – 35 kPa of All. BC in the initial 700mm – 800mm of depth. Below this depth the strength increases markedly with 100 kPa All. BC (or better). Based on the Scala reading, gravels are anticipated at depths of approximately 1.2m. Scala results are included in Appendix 1.

Site Photo: 4.2.B - 01

Site Photo: 4.2.B - 02

3.5. Bridge 4.5.B

3.5.1. General

This site is located on the Tutara Stream, which is a tributary of the Mangawhero River, and downstream of the main water intake weir. The stream is winding and at the site flows in a general southeast direction. The ground to the northeast is a series of low river terraces that extends along the river from the Old Tramline Bridge (Site 3.8.B). The northwest side of the stream is dominated by a high-level terrace, but the tramline follows a narrow bench located above the streambank.

A sketched plan and sketched sections are included as Figures 12 & 13. References to site photos and Scala testing are included on the plan. Scala results are included in Appendix 1.

This stretch of the stream is relatively straight and the profile is quite regular with the stream having incised down through the gravels to form a relatively narrow, steep sided channel (Site Photo 4.5.B – 03). Gravels were seen in both banks, but mudstone is exposed at the base of the southwest bank (Site Photo 4.5.B – 04). There are also a series of steps in the stream bed and downstream of the site there are a series of low waterfalls that lead out into the confluence with the Mangawhero River (Site Photo 4.5.B – 01 & 02). It is likely the stream is running along the top of the mudstone, and the steps in the stream bed are possibly bedding within the unit. We would anticipate that the mudstone extends beneath the gravels with a sub-horizontal interface. Mudstone was seen in the riverbank on the opposite side of the Mangawhero River.

In general, the mudstone has the texture of silt with some fine sand and, where exposed at the site, is yellowish brown. On the opposite side of the Mangawhero River the mudstone is dark grey. The mudstone is typically slightly weathered and weak, and no significant defects were seen.

The gravels are consistent with the description included in Section 2.2, and boulders scattered across the stream bed are typically up to 200mm diameter, although some larger boulders (≈ 0.5m) are present.

Scala testing was carried out at two levels on the northeast side of the stream and show that the gravel unit is approximately 2.0m – 2.5m thick. Blanketing the gravels is dark brown silt, which is relatively weak with blow counts of 1 (or less)/100mm down to a depth of 800mm – 1.0m. Scala testing (S16) was carried out back from the stream edge on a higher river terrace and blow counts increased to 3 – 4 blows/100mm before refusing on the gravels. These increased blows may represent a stiff silts layer, or a sandier transition into the coarse gravels.

All. BC at ground level would be about 20 kPa - 35 kPa, but where piles were extended to a depth of about 1m, would be approximately 100 kPa. Where founded on the gravels All. BC would be in the order of 1000+ kPa.

3.5.2. Additional Advice

No active scour was seen on the steeper southwest bank, but some localised regression/slumping was mapped along the northwest bank, approximately 20m down-stream of the site. This is possibly the result of a 'back-eddie' caused by localised restrictions/obstacles in the channel but may need to be considered in the overall design process for the abutments.

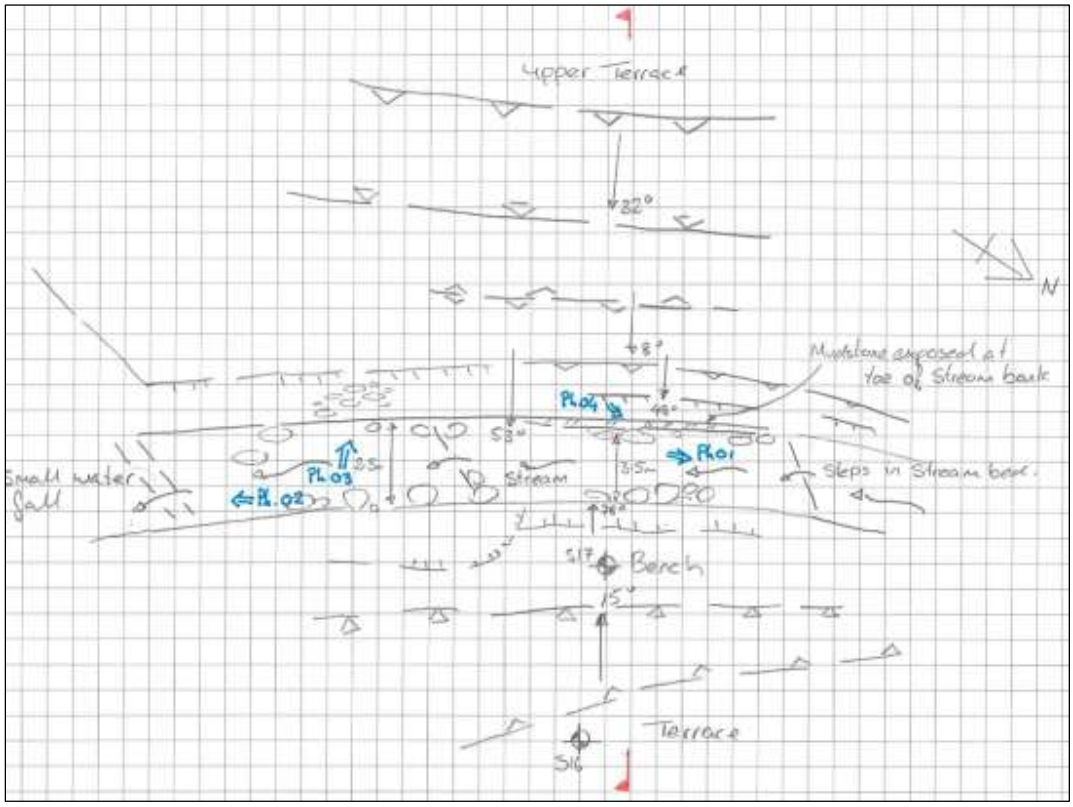

Figure 12: 5.4.B Sketched Plan

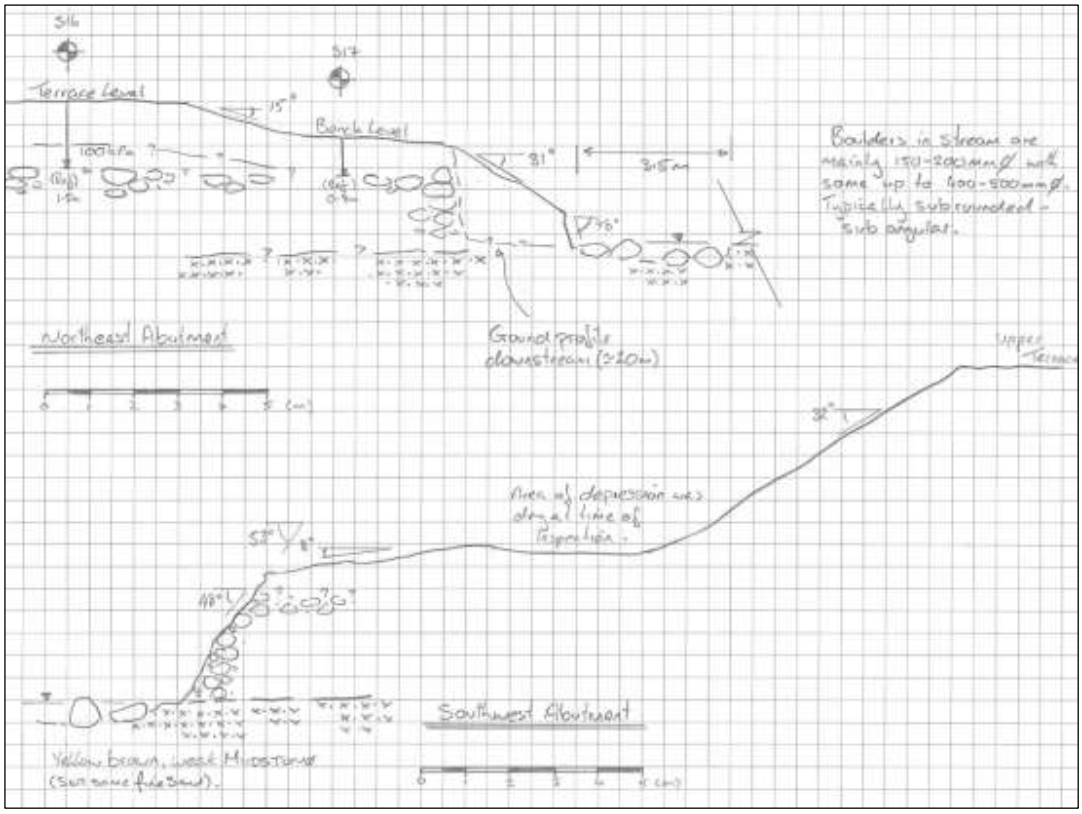

Figure 13: 5.4.B Sketched Section

Site Photo: 5.4.B - 01

Site Photo: 5.4.B - 02

Site Photo: 5.4.B - 03

Site Photo: 5.4.B - 04

3.6. Bridge 11.2.B

3.6.1. General

This site is located where the old tramline crossed a tributary of the Mangawhero River. At this site the stream generally flows to the south and drains a gully system associated with a prominent ridgeline/plateau to the west. The topography is generally steep, and the original tramline is likely to have been constructed as a sideling cut approximately 7m above the stream level. The original bridge is all but gone and the only remnants comprise a couple of undressed logs and a few metal bridge spikes.

Sketched sections showing each side of the stream are included as Figure 14. References to site photos and Scala testing are included on the section. Scala results are included in Appendix 1.

The stream bed is relatively rough, and the flow is generally turbulent as it steps down a number of small waterfalls and rapids (Site Photo 11.2.B – 02). The stream has deeply incised a narrow channel through the gravels and a short distance downstream (≈500m) the streambanks close in to form a narrow gorge and a waterfall (and/or rapids). This possibly marks the confluence with the Mangawhero River.

3.6.2. Eastern Abutment

The eastern side of the stream is a narrow ridgeline that drops away on the far side to the Mangawhero River. It is likely this larger topographic feature was formed from mudstone but at the stream level, gravels were exposed in the bank (Site Photo 11.2.B – 01). Scala testing at the top of the streambank, and further up the slope, indicates these gravels extend back into the hillside.

Overlying the gravels is a relatively thin layer of silt (ash) and/or topsoil, and Scala blow counts were generally 1 (or less) blows/100mm down to a depth of about 400mm – 500mm. For this depth range an All. BC of about 20 kPa - 35 kPa could be used for a shallow ground beam.

Where the abutment is within a few metres of the top of the streambank, piles founded at depths greater than 500mm are likely to encounter the gravels and All. BCs would nominally be 1,000 kPa. Where the embankment is further back, the depth of soil will be greater (approx. 1m) and the lower 500mm could provide an All. BC of 70 kPa.

3.6.3. Western Abutment

The western abutment is likely to be formed on the end of the old tramline formation, which appears to have been benched into the hillslope. From the tramline level the slope drops down to the stream at approximately 50° - 55°. Gravels were exposed in most of the slope but directly below the tramline is a layer of silt (Site Photo 11.2.B – 04). This material is 3.0m – 3.5m thick and relatively consistent with the typical description provided in Section 2.2. Locally, the silt forms a very steep slope (72°), however part of the face may have collapsed to leave a slight overhang and this feature may be very close to the proposed location of the bridge abutment.

Scala testing was done on the tramline formation and refusal was met at a depth of 600mm. It is assumed refusal was on gravels, but if this is the case, it indicates the silt layer forms a 'wedge' of material. The silt was seen in a series of small cutting above the tramline and appears to generally blanket the natural slopes. However, it is possible that silt was pushed over the outer edge of the cut bench to form sideling fill and widen the formation for the tramline.

As with the western side, the Scala blows through the silt are very low (less than 1 blow/100mm over the initial 500mm) and indicate All. BC for a shallow ground beam would be in the order of 20 kPa – 35 kPa. Where piles are founded on the gravels the All. BC would be much higher (i.e., nom. 1,000 kPa). However, it is considered that the 'global' stability of the silt would be very low, and there is a risk of this wedge of material collapsing. The consequences could be direct loss of support for a ground beam sitting on this material, or piles being dragged down the face with the slump material.

3.6.4. Additional Advice

We consider that there is an elevated risk from slumping on the eastern side of the stream. Based on the level of investigation carried out, this risk cannot be quantified and therefore we recommend that a very conservative approach is taken in the design of the abutment and foundations, or more investigation and geotechnical analysis is carried out at this site to further assess the risk and provide design advice.

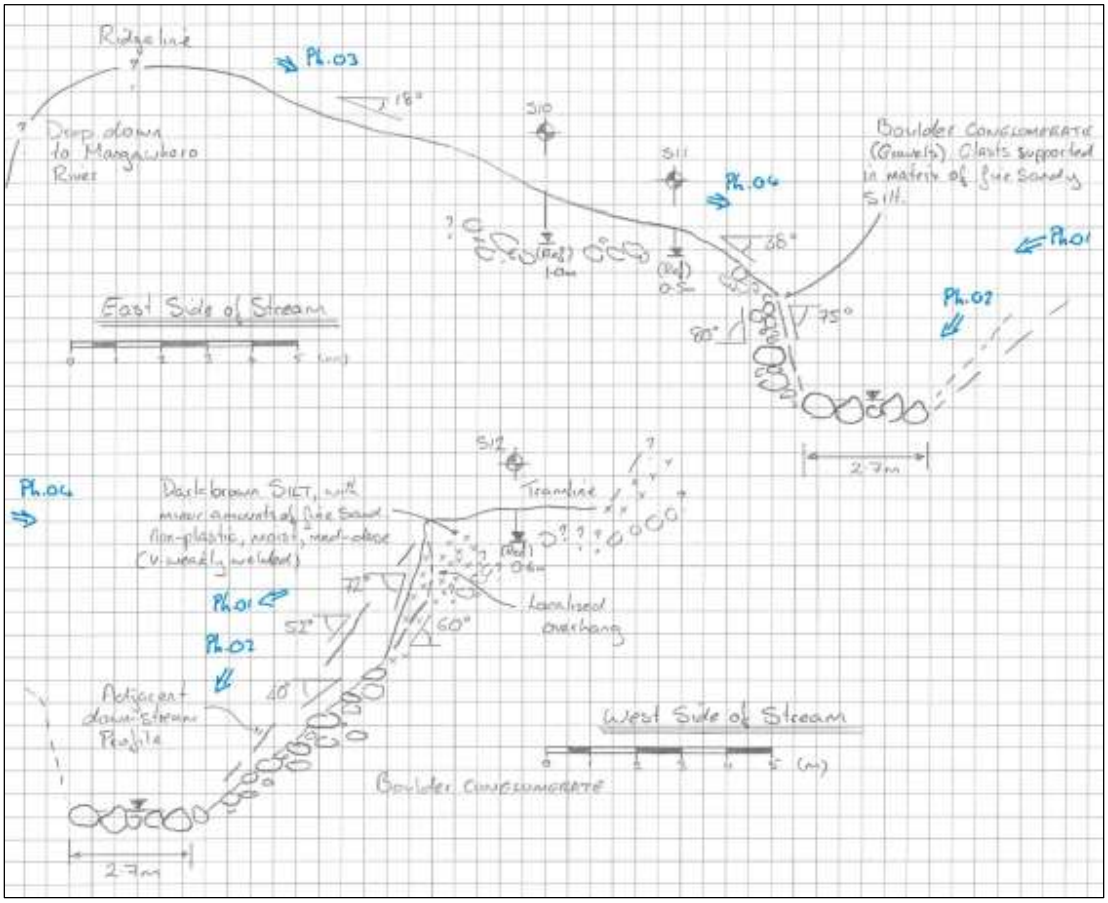

Figure 14: 11.2.B Sketched Section

Site Photo: 11.2.B - 01

Site Photo: 11.2.B - 02

Site Photo: 11.2.B - 03

Site Photo: 11.2.B - 04

4. DISCLAIMER

This Report has been prepared solely for the use of our client with respect to the particular brief given to Cheal Consultants Limited (Cheal).

No liability is accepted in respect of its use for any other purpose or by any other person or entity. All future owners of this property should seek professional geotechnical advice to satisfy themselves as to its ongoing suitability for their intended use.

The opinions, recommendations and comments given in this Report are the result from the application of accepted industry methods of site investigations. As factual evidence over much of

the site has been obtained solely from Observations and Scala tests, which by their nature only provide information about that exact location, there may be special conditions pertaining to this site which have not been identified by the investigation and which have not been taken into account in the report. Any groundwater levels measured during the investigation may change over time.

If variations in the subsoils occur from those described or assumed to exist, then the matter should be referred back to Cheal immediately.

CHEAL CONSULTANTS LIMITED
4 November 2021

Appendix 1

Scala Results

cheal

SCALA PENETROMETER TEST SHEET

CLIENT: Ruapehu WorX
JOB LOCATION: Ohakune Mountain Road
JOB DESCRIPTION: Bridge site scala tests

JOB No: 210700
DATE: 14/10/2021, 15/10/2021, 20/10/2021
TEST BY: JDB

DEPTH: Millimetres Below Ground Level (BGL)			TEST No. / Approximate surface RL														
			1	2	3	4	5	6	10	11	12	13	14	15	16	17	18	19
			1.13.B	1.13.B	1.10.B	1.10.B	3.8.B	3.8.B	11.2	11.2	11.2	3.8.B	3.8.B	3.8.B	4.5.B	4.5.B	4.2.B	4.2.B
0	-	100	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0
100	-	200	1	1	1	0	1	0	1	0	0	1	1	1	1	0	0	0
200	-	300	1	1	0	0	0	2	1	0	1	0	1	1	1	1	1	1
300	-	400	0	1	0	1	1	6	2	1	1	1	1	1	0	1	1	2
400	-	500	0	2	1	1	0	7	1	20	2	2	1	0	1	1	0	2
500	-	600	1	1	1	1	20	6	2		20	1	2	1	1	1	1	1
600	-	700	1	1	1	1		6	2			2	2	1	1	4	2	1
700	-	800	1	3	2	1		5	3			2	3	1	0	20	2	1
800	-	900	2	8	2	1		7	2			3	20	2	1		5	2
900	-	1000	2	20	2	2		8	20			2		2	0		3	3
1000	-	1100	3		2	2		20				3		20	2		3	6
1100	-	1200	5		2	2						20			4		20	11
1200	-	1300	4		3	2									3			4
1300	-	1400	4		3	2									4			4
1400	-	1500	3		3	3									20			5
1500	-	1600	3		3	3												6
1600	-	1700	3		3	3												8
1700	-	1800	3		6	3												8
1800	-	1900	4		13	3												8
1900	-	2000	13		20	8												10
2000	-	2100	18			5												9
2100	-	2200	16			20												10
2200	-	2300	20															9
2300	-	2400																
2400	-	2500																

Appendix 11. Construction Management Plan

RUAPEHU WORX

Hapaitia te ora

Trail Construction Protocol

for the

Te Ara Mangawhero Walking and Cycling Trail

31 July 2022

RUAPEHU WORX
Hapaitia te ora

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1 PURPOSE

This document explains the standards followed, scope of work, methodology and the steps taken to ensure the protection of the cultural, and environmental values of Ngāti Rangi and Koro Ruapehu during the construction of Te Ara Mangawhero within Tongariro National Park is upheld.

2 INTRODUCTION

This document this specific to phase 1 of the proposed Te Ara Mangawhero dual use walking and cycling trail.

Te Ara Mangawhero project is administered across multi government agencies and Ngati Rangi Iwi:

- Ruapehu District Council as the roading authority responsible for the Ohakune Mountain Road and project manager on behalf of Ministry of Business Innovation and Employment.
- Department of Conservation as the project is to be constructed upon Public Conservation Lands and within Tongariro National Park, acknowledgement to the Dual world Heritage UNESCO values and status, Tongariro National Park is one of only 3 UNESCO National parks and the only Dual World Heritage National Park in New Zealand.
- Horizons regional council as requirement for consenting and monitoring of works within water bodies.
- Ngati Rangi as Tangata Whenua that resides on the southern slopes of Koro Ruapehu and landowner of portions of lands where the proposed trail will be constructed.

The principal contractor accountable for the construction of Te Ara Mangawhero is Ruapehu WorX limited Partnership (Ruapehu WorX). It is Ruapehu WorX responsibility to ensure that any sub-contractors working on the project conform to the conditions as set out in this protocol.

The initial first 8.8 km trail development is part of a multi-staged approach of the 19.3km trail known as Te Ara Mangawhero. The purpose of a multi-staged approach is to give confidence of construction methodology, minimal environmental impact, and trail management.

The proposed trail will be an easy, family friendly New Zealand Cycle trail grade 2 trail, built to the Department of Conservation Cycle - Day Visitor – Walking Track for Cyclists/Mountain-Bikers and Pedestrians service standards. This enables a high level of access by users of a wide range of ages and abilities.

The trail will be a minimum 1.2m wide with an all-weather surface placed on existing ballast foundations of the Bennett and Punch tramline and where the terrain permits the trail will extend to 1.8m wide to allow easy passing and shared use.

The existing Bennett and Punch 3m wide tramline allows for curvature and ability to soften the existing straight lines of the tramline. The intention is for the trail to meander through the regeneration and where possible to leave native trees above 2m in height that have re-established since the tramline has been retired.

The proposed trail development will traverse and highlight a wide range of ecologically and culturally significant forest and river margin habitats on the lower slopes of Ruapehu. The proposed route has been designed to maximise the use of previously disturbed sites/areas, and to avoid and minimise the potential for adverse effects on intact indigenous ecosystems.

Ruapehu WorX Limited Partnership

Ruapehu WorX is a trail building company which aims to find the balance and wellbeing of the ngahere, taiao, communities and the people. Enabling connection through recreational in balance with enhancing and protecting the environment to enable healthy parks and connected people - Ko au te taiao ko te taiao ko au.

Ruapehu WorX is a Ngāti Rangi (southern Ruapehu iwi) owned sustainable commercial company with its purpose being to enhance the taiao, communities, people, place, and mana whenua of Koro Ruapehu, Hapaitia te ora – uplift the place and the people.

Ruapehu WorX started in early 2020 and is support by the knowledge of Ngāti Rangi who have been entwined in their rohe for over 1000 years and want to continue to live vibrantly for another 1000 years.

Ruapehu WorX is guided by Ngāti Rangi and the support of the taiao management team and wider collective of kaimahi who have been leading taiao management within Ruapehu since 1992.

Ruapehu WorX is led by Paul Carr, Paul has 32 years' experience in: trail building, project management and construction of numerous iconic remote destinations throughout Aotearoa.

Paul leads an amazing team of ecologist, project managers, gateway navigators, trail builders, landscapers and taiao protectors. All Ruapehu WorX staff have the qualifications required to undertake the tasks required and to be able to utilise the equipment to do so.

The qualifications and experience of key Ruapehu WorX staff are attached in Appendix 2.

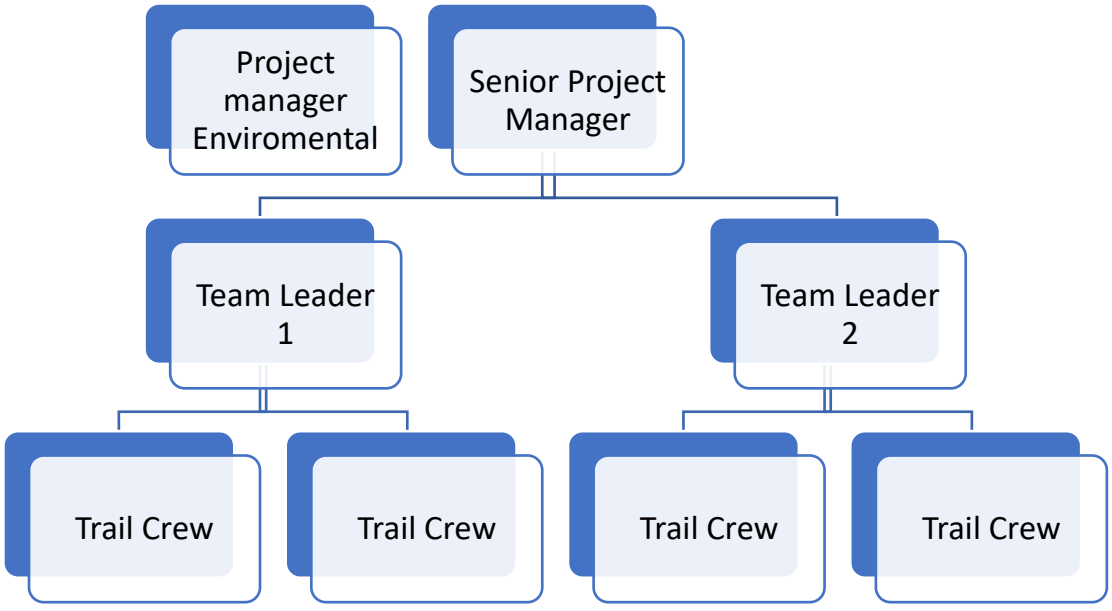
3 TE ARA MANGAWHERO PROJECT STRUCTURE AND RESOURCING

Project Management and Schedule of Staff

Ruapehu WorX committed Kaimahi resource to the construction of Te Ara Mangawhero consist of:

- A senior project manager accountable for all project controls and outcomes.
- Project manager environmental responsible for all ecological controls and outcomes.
- Two qualified competent team leaders responsible for managing two sperate teams.
- As and when required a total of 6 trail crew but limited to 6 depending on demand weather and resourcing.
- Edifice Structure LTD are responsible for the construction of the 9 bridges and 1 boardwalk as part of the first phase of Te Ara Managwhero. Edifice has an experienced team: all holding fall arrest tickets and two with Explosives Tickets. All Edifice staff have current Site Safe Passports, First Aid Certificates, and chainsaw (tree falling) certificates.
- Additionally, a number of subcontractors including but not limited to helicopter operators and transport providers may be on-site from time to time operating under Ruapehu WorX as the principal contract holder. All subcontractors will be managed by the Senior project manager.

The team structure:



Senior Project Manager Ruapehu WorX
Paul Carr

Paul has dedicated 32 years to maintaining and creating iconic tracks and recreational assets throughout Aotearoa, enhancing, and protecting the environment to enable healthy parks and connected people - Ko au te taiao ko te taiao ko au.

Paul has a proven successful career in asset management, maintenance, and construction of new or upgrades to Huts, Structures, cycleway, and walking track projects both in the front country and Backcountry.

A communicator, connector, and enabler of Tangata Whenua to their lands and opportunity to empower knowledge and skills.

Project Manager Environmental Ruapehu WorX
Megan Younger

Megan is passionate about connecting people with our natural spaces. A self-professed “geek,” who takes the teaching from the taiao and apply them to everyday life.

This extends into her workspace; ecological principles can be applied everywhere, noticing nuances in interactions to inform patterns or outcomes and potentially how to change them.

Megan is an accomplished field operator with a knack for applying practical wisdom to decision-making. She is also a strong project manager and administrator. Megan’s combination of Bachelor of Science, Ecological Science and a diploma in project management brings an envious combination and skill set to the Ruapehu WorX team.

Project Manager Structures Edifice
Andrew Hamilton

Andrew built his first bridge some 25 years ago at Stanmore Bay and has seen well over 200 pedestrian bridges installed around New Zealand and overseas under his guidance.

Edifice are New Zealand’s most experienced and trusted pedestrian bridge builders with hundreds of structures completed, including major contracts in Australia, and many throughout New Zealand's National Parks, some with World Heritage status.

Department of Conservation, Regional Councils, City Councils and Golf Clubs are just some of the organisations that own our walking/cyclist bridges. We are currently working on several contracts for national and regional cycle ways. Suspension, swing, cable stay, and solid span pedestrian bridges are our speciality.

Edifice has an experienced team: all holding fall arrest tickets and two with Explosives Tickets. All Edifice staff have current Site Safe Passports, First Aid Certificates, and chainsaw (tree falling) certificates

Helicopter operations
Lake View Helicopters
Brad Williams

Lake View Helicopters have been operating for over 30-years and have grown our business by providing a professional and timely service.
Lake View Helicopters fleet include.

- Huey capable of lifting up to 1700 kg
- The latest B3E Squirrel with dual hydraulic controls for safety and increased internal gross weight, capable of lifting up to 1400 kg
- Late model B2 Squirrel capable of lifting up to 1000 kg
- Late model Bell Jet Ranger 206 capable of lifting up to 500 kg

Helicopter operations
Mid West Helicopters
Steve Ashcroft

New Zealand's newest helicopter company has been formed from the merger of very familiar and established names, Hill Country Helicopter and Aerowork have merged and rebranded as Mid-West Helicopters.

Steve Ashcroft has been providing helicopter services for the Tongariro Department of Conservation team for the last 9 years and has accumulated over 4000 hours flying in Tongariro National Park and the wider Ruapehu District.

Helicopter operations
Becks Helicopters
Alan Beck

Becks Helicopters is the longest serving helicopter operator in New Zealand established in 1972. Beck helicopters Ltd operate the largest capacity agricultural helicopters in NZ.

Becks Helicopters currently operate three Bell 204 UH1 Iroquois helicopters (1.8T lift Capacity) and one Bell 206 Jet Ranger helicopter on numerous types of Agricultural, Fire Fighting, Construction, Utility and Passenger Transport Operations throughout NZ.
Beck Helicopters Ltd was the first helicopter operator in New Zealand to be awarded the prestigious New Zealand Helicopter Association Gold Safety Award

Beck Helicopters Ltd holds current
CAA Part 137 Agricultural Certificate
CAA Part 135 Air Transport Certificate
CAA Part 145 Maintenance and Overhaul Certificate.

Ruapehu WorX Schedule of Plant and Equipment

Machine Type	Machine make/model	HP	Capacity	Weight empty	Attachments
Excavator	Yanmar Vi012	12.5		1265kg	3x buckets Tilt hitch
Excavator	Yanmar Vi017	13.5		1740kg	3x bucket Tilt Hitch
Excavator	Yanmar Vi025-6	20.4		2685kg	3x buckets Pick Root Rake Heli tilt hitch
Mini Loader	Cormidi CMF 1500	37		1500kg	2x buckets Pallet forks Harley rake
Power carrier x3	Cormidi C85	13	800kg	565kg	Self-loading
Power carrier x2	Canycom S160	20.5	1600kg	1310kg	Forward and side dumping
Plate compactor	Weber CF2	7	45kg		
Plate compactor	Weber CF3	13	99kg		
Pedestrian roller	Weber MC85	24	1652kg		
Sheep foot roller	Weber MC85	24	1652kg		
Toyota Hilux 4wd DC utes x3					
Hino 300 light truck					
5x trailers various					
7x Chain Saws	Stihl				
3x Scrub Bars	Stihl				
Post Hole Borer	Stihl				
Backpack Blower	Stihl				
Water Pumps	Honda				
Hand tools	Many				

4 DESCRIPTIONS OF THE SITE

The route of the trail is shown in section 7, detailed maps showing the specific sections found in appendix 1.

The trail is located mainly on public conservation land with exception of two short sections that sit outside the Tongariro National Park: Ohakune Mountain Road at the 3km mark and Urewera Road.

Table 1 shows the legal description of land proposed for phase one development of Te Ara Mangawhero.

Table 1: Legal Description of Land for phase one development of Te Ara Mangawhero

Part Section 1	Block V	Karioi Survey District
Part Section 3	Block I	Karioi Survey District
Part Section 1	Block I	Karioi Survey District
Part Section 16	Block I	Karioi Survey District
Part Section 6	Block I	Karioi Survey District
Part Section 10	Block I	Karioi Survey District
Section 26	Block I	Karioi Survey District
Section 29	Block I	Karioi Survey District
Section 30	Block I	Karioi Survey District
Section 31	Block I	Karioi Survey District
Lot 1	DP 22586	
Lot 2	DP 22586	
Crown Land	SO, 16867	(Marginal Strip)

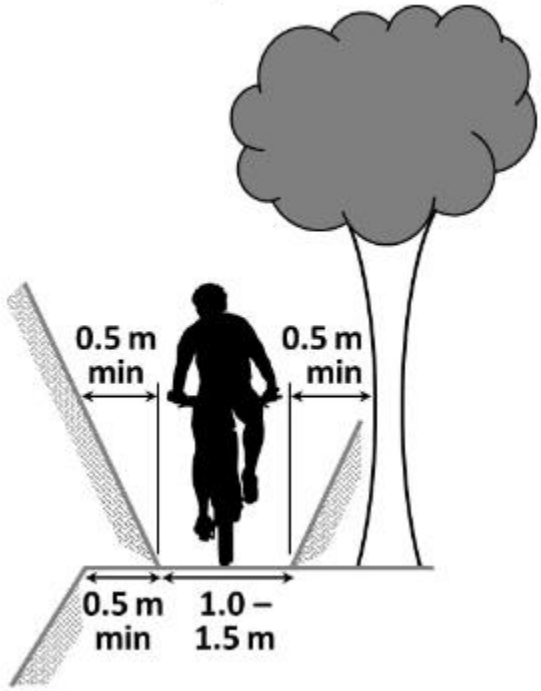
5 TRACK DESIGN MUST DO's

As the trail is to be established on Public Conservation Land (PCL), the design of the trail and associated structures will need to be in accordance with Department of Conservations Cycle Track Service Standards and align with New Zealand Cycle Trail's 2019 New Zealand Cycle Trail Design Guide.

Both are specification for the Department and other agencies responsible for the management of tracks and outdoor visitor structures. It provides guidance on 'track service standards' relative to visitor (user) characteristics and the type of recreational opportunity being provided, and guidance for the engineering design of structures.

The key elements of these standards and general elements of sustainable trail design are set out below and in 0. A trail of these specifications needs to be considered when undertaking the trail set out.

Gradient	0 - 3.5 degrees for at least 95% of the trail (3.5 degrees = 6.0% = 1:17), 3.5-6 degrees for no more than 10m at a time (the less the better)
Width	Single Track: 1.5 metres wide (with adequate horizontal clearance to drops or banks/trees)
Surface	Compacted top-coarse aggregate of maximum AP30mm



NZCT Trail width guidelines for Grade 2 Trails

6 TRAIL SURVEY, SETOUT AND DESIGN

To assist with the survey and design in the field, a design line for the track was created using a CAD mapping software 12D. This provided localised coordinates for the route with respect to ortho-rectified photography of the National Park, supplied via the Land Information (LINZ) Data Service.

This information was uploaded to a single Survey-Grade Trimble GPS Receiver with data logger ready for the field.
During the fieldwork to survey proposed design trail a design line was able to be referenced using the GPS and the route positions recorded. The assessed positional accuracy achieved we would expect to be +/-10m horizontally, given the single receiver used and sky window available due to the bush.

More accurate "fill-in" topographical surveys were carried out for the bridge crossing sites over the Tutara Stream and lower Mangawhero River. These surveys were established in terms of LINZ 5th Order control marks and NZ Vertical Datum 2016 and used a combination of both RTK GPS and total station theodolite equipment. The assessed relative and absolute positional accuracy achieved we would expect to be +/- 50mm for both horizontal and vertical, given the techniques deployed.

The proposed trail alignment was carefully planned to ensure no adverse effects on indigenous vegetation and minimise the effects of the revegetation naturally occurring on the redundant tramline.

This includes rerouting of the alignment around sensitive habitats, placement of fill over root systems where appropriate (rather than excavating through them), avoiding trees >15 centimetres dbh, making the footprint of the trail as small as possible, and ensuring that the margins of the trail are no wider than they need to be. Note that only a relatively small proportion of a tree root system should ever be covered by fill.

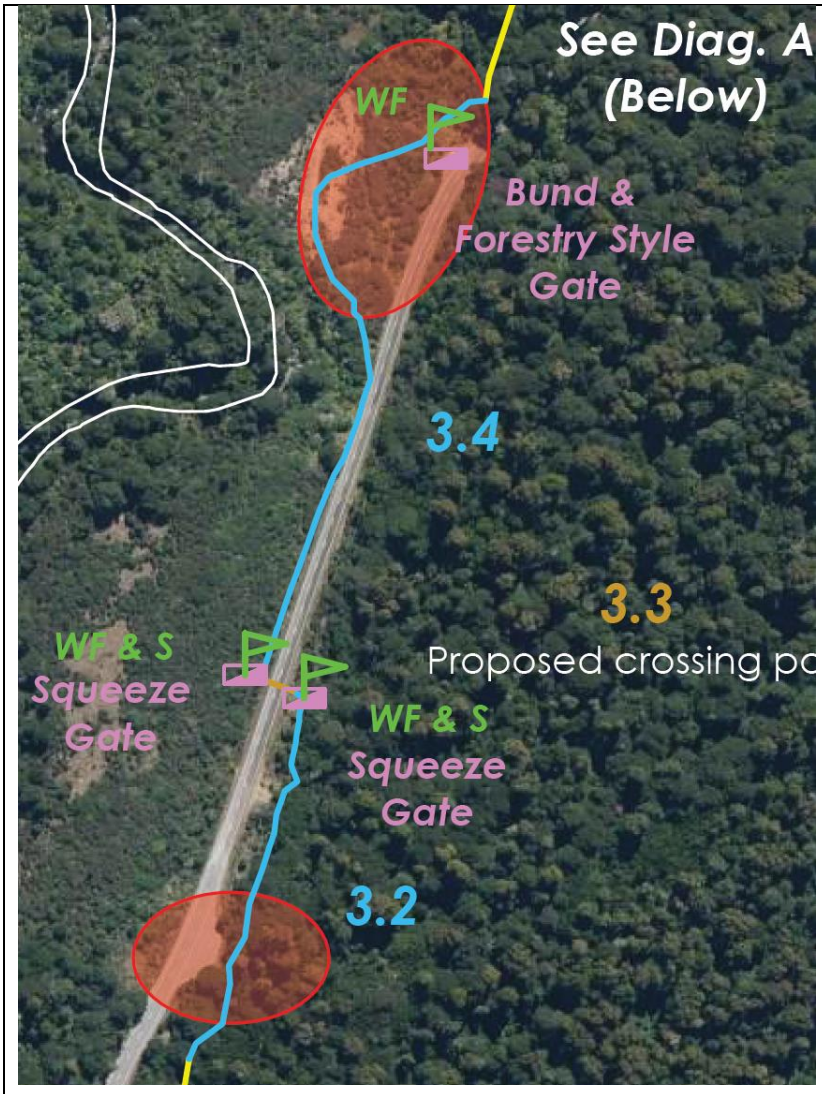
Trail set out principles:

The trail alignment has been carefully planned to avoid and minimise adverse effects on indigenous vegetation.

- Detailed Flagged trail set in an incremental manner has been completed for DOC staff and the public to understand the application prior to public notification.
- A .GPX file of the proposed route and all structures will be provided to local DOC staff.
- Additionally, each section of the trail will be marked using flagging tape to inform the monthly construction meetings, intention to walk over the sections completed plus proposed sections each month with nominated relevant government agencies.
- The proposed trail has been inspected on foot by a Ruapehu WorX qualified ecologist, representative from Ngāti Rangi and Departmental staff. All reports of these inspections are provided as part of this permission process.
- The trail route and construction methodology are finalised based on the feedback of inspections.

Minimal disturbance on the environment and Ngahere has been achieved by the collaborative approach of knowledge sharing and professional expertise of all who have contributed to the final design of the Te Ara Mangawhero, because of this principle adopted early, the Ruapehu WorX team managed to find an alignment that:

- 85% of the track development is placed on top of the existing forestry tramline the Bennet and Punch.
- 7% of new track construction is within a heavily modified Ohakune Mountain Road corridor.
- 4% of new track construction follows the access road for the Ohakune Raw Water pipeline.
- 4% of new track construction on Ngati Rangi privately owned land.



The trail map shown left and below show areas of new track construction in Blue. Total length of new trail is 1353m

The Yellow line is the existing forestry tramline or campground roads. Total length of trail restabilised upon existing modified tramline is 4947m.

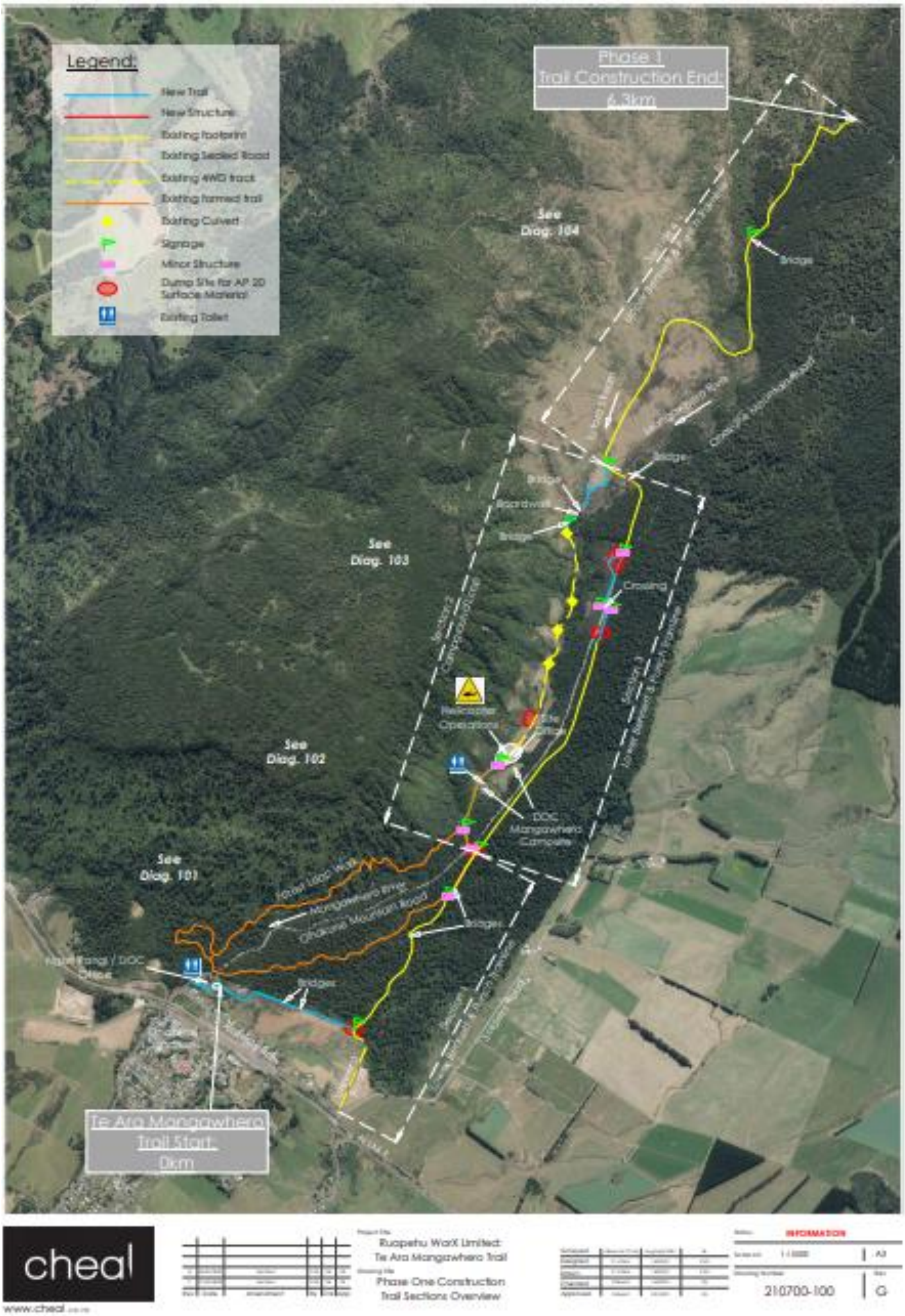
Areas highlighted in red are dump zones for construction materials.

All bridges are marked on the map.

Helicopter operations marked above the Mangawhero Campground; this is a restricted public access area.

Length of sections are marked in track legend with start and end chainage.

7 TRAIL MAP


Legend:
New Trail
New Structure
Existing footprint
Existing Sealed Road
Existing 4WD track
Existing formed trail
Existing Culvert
Signage
Minor Structure
Dump Site for AP 20 Surface Material
Existing Toilet
Phase 1
Trail Construction End:
6.3km
See Diag. 104
See Diag. 103
See Diag. 102
See Diag. 101
Bridge
Boardwalk
Crossing
Helicopter Operations
DOC Mangawhero Campsite
Bridges
Te Ara Mangawhero Trail Start:
0km
cheal
Ruapehu WorX Limited
Te Ara Mangawhero Trail
Phase One Construction
Trail Sections Overview
INFORMATION
A3
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8 TRAIL FORMATION AND SURFACING METHODOLOGY

Trail Construction Overview

The trail formation methodology foundations are based around the wellbeing of the ngahere (forest) and taiao (environment), intention for minimal disturbance on the regenerating native plants that are naturally occurring upon the existing tramline, and the protection of existing root structure of mature native trees.

The methodology is also focussed on the development of a trail that meets the relevant DOC and NZCT standards.

Importantly the trail will have water management and a compacted hardened surface placed, additionally the majority of the proposed trail has a mature tree canopy greatly reducing the potential for erosion from vertical precipitation, the combined will result in a greatly reduced risk of erosion or sediment movement and a resilient trail ensuring a reduce whole of life cost and ongoing maintenance.

The aim is to build a sustainable trail that has minimal environmental impact, resists erosion through proper design, and blends with the environment.

Minimal disturbance on the environment and Ngahere started early in the trail route finding followed by survey and design. because of this principle adopted early in the project timeline the Ruapehu WorX team managed to find an alignment that:

- 85% of the track development is placed on top of the existing forestry tramline the Bennet and Punch.
- 7% of new track construction is within a heavily modified Ohakune Mountain Road corridor.
- 4% of new track construction follows the access road for the Ohakune Raw Water pipeline.
- 4% of new track construction on Ngati Rangi privately owned land.

Key principles of trail development that will be always applied:

- All construction equipment will be steam cleaned at a temperature of 140 degrees before being allowed onsite- this is to eliminate any potential for transport of weed or exotic seeds for being transported into Tongariro National Park.
- To ensure that only the minimum area required for the trails is cleared, the extent of works will be physically marked with stakes and/or flagging tape prior to any vegetation removal. No areas beyond this boundary will be used during construction, e.g., for temporary storage areas for equipment or for disposal of fill.
- No mature trees will be removed in the construction of the track and wherever possible the track will go around any regenerated trees which have a height greater than 2m.
- Trimming of large trees, particularly podocarps, will be avoided or kept to the minimum where absolutely required to form the trail corridor.
- All vegetation clearance is to be undertaken by hand (including the use of handheld machinery such as chainsaws etc).
- Vegetative material that is cleared will be scattered along the track margins, where suitable, avoiding the formation of large piles of debris.
- If required, logs or branches can be chopped into sizeable chunks before scattering along the track margins, but they will not be mulched.

- Physical contact with trees (large branches, and trunks in particular) will be avoided when construction materials are being transported and during construction. All equipment and machinery used during construction will be moved with care.
- Damage to the roots of indigenous trees will be avoided, Large lateral roots, in particular, will not be severed during trail construction.
- The initial trail construction width and area disturbed in the course of construction will be wider than the final ongoing maintained trail width which is to be a minimum of 1.5m to 2m depending on the section and characteristics of the site.
- The overall maximum gradient of the trail is aimed to be an average of 5% but no more than 8%. Short sections specific to the campground loop will have gradient greater than 8%.
- A small percentage of the trail will be across slopes therefore to manage water an outward sloping trail is preferred to a crowned or inward sloping surface which could require an inside drain and use of culverts. This is to assist any water to run across the trail and not down the trail with minimal ongoing maintenance needs.
- On flat country the trail surface is to be crowned with surface slope to each side about 4%, to avoid a trenched/dished trail surface developing with use in a short time.
- Rolling grade dips will be constructed at suitable locations to divert water off the trail and into the surrounding vegetation.
- Where it is necessary if any slip material on the existing tramline will be loaded into a power carrier and placed free of organic material along the design line of rehabilitated tramline. Excess slip material will not be side casted or disposed loosely downslope.

Silt mitigation:

The trail alignment fits within the existing tramline or the Ohakune water lines access roads, this was intentional as desire to have a very small construction footprint with only 18m of new bench being created from the total 8846m of trail.

99.9% of the trail development consists of vegetation removal, within the trail corridor proposed in this Construction Management plan the result is a very small requirement if any need for earthworks.

The vegetation removal will be confined within the intended trail footprint and exposed trail will be covered with a base AP40-60 and capped with a AP20, the physical work of vegetation removal and reinstatement of hardened surface will be completed in conjunction with each other to minimise potential of exposed areas of trail to weather events or erosion.

As there will be no exposed down slope batters, side casting or exposed uphill batters in the trail construction methodology – it is not expected that silt mitigation is required as part of phase 1.

All imported trail surfaces will be compacted to prevent surface material movement or sediment runoff.

Ruapehu WorX project manager is registered with NZ Met Service to receive severe weather warnings and all erosion sediment control measures will be inspected prior to any forecasted significant rainfall events.

Restoration planting:

There is no intention to create laydown areas, stockpiles of overburden, excess fill areas or any large-scale earthworks in the construction of phase 1 of Te Ara Mangawhero.

As the trail vegetation removal will be restricted to the trail footprint, there is no requirement for a restoration planting plan.

Drainage and Storm Water

The soils are predominantly volcanic therefore for the most part the trail surface and its margins are free draining. In places there is a deep layer of organic material which also aids drainage.

The trail will be sloped outwards at 4% to encourage any runoff to go across trail. Where run off is likely to occur shallow swales will be placed across the trail at regular intervals to let the water cross the trail. The finished slopes will be at an angle similar to the existing natural slopes which will result in water being shed from the trail but not concentrated so that it scours the area below the trail.

Further, the following minimum trail construction standards will be used:

- Reverse grade or rolling grade dips will be used as the main water control method.
- Gully crossings are to be armed with local rock where water may flow due to localised heavy rainfall events.
- Side drains if used shall be no less than 250 millimeters in width and 200 millimeters in depth.
- Side drains shall be discharged using out-slope trail formation techniques and armed with local rock, if possible, with culvert pipes used as a last resort.
- Trail drainage culvert pipes if used shall be installed with beveled flange fitting into the inside edge of side drain and with a minimum coverage of 150 millimeters of compacted earth beneath the trail surface material. A plate compactor is to be used to compact material around and over the culvert.
- Any culvert pipes shall be black polyethylene (smooth bore) measuring at least 150mm in diameter and of appropriate length unless specified.

Barriers

Two types of barriers are to be used to defuse potential for trail conflict specifically walking only track the Mangawhero forest loop. The locations of these barriers are shown on the maps.

Squeeze barriers will be used at locations where the trail is accessible to the road. Squeeze barriers allow access by walker and cyclists but exclude motorbikes and larger vehicles. Gates (locked) will be located next to the squeezes to allow access to the trail by machinery for track maintenance etc.

Bike barriers will be placed at locations where walking trails intersect with the shared use trail. These barriers allow easy access for walkers but not those on bikes.

Signs

Wayfinding and safety signage will be installed along the route of the trail as part of the build process.
Safety signage will be installed at road crossings and wayfinding signs at intersections.

Trail signage will be consistent with DOC guidelines and visual look in accordance with the Tongariro National Park Management plan.

Signage will represent the cultural significance of place- Koro Ruapehu and Ngati Rangi Iwi.

Structures

The project will include the construction of bridges, boardwalks, barriers, and signs.

Designs for all structures proposed can be found in Appendix 7.

Ongoing maintenance requirements for the bridges will include 2-yearly checks by trained Ruapehu WorX inspectors and 6-yearly checks by an appropriately qualified bridge engineer.

Ownership of all structures will be with Ngati Rangi and any building or resource consents will be in the name of Ruapehu WorX.

Data on all structures on public conservation land will be maintained and stored on the Ruapehu WorX and Department of Conservation asset management systems to assure ongoing management in the public interest, but they will be recorded as '*owned and maintained by iwi*' and as such will not incur capital charge, depreciation, and ongoing maintenance costs for the Department.

Bridges and boardwalks

Bridge and boardwalk designs proposed can be found in Appendix 7 with the locations of bridges shown in Appendix 1

- All bridges will span over the waterways to avoid contamination. Concrete foundations will be precast offsite where possible.
- Four of the nine bridges are replacements of existing bridges currently in use or reestablishment of historic bridges used to cross the Mangawhero River and tributaries as part of the Bennet and Punch tramline.
- The 34m bridge over the Mangawhero river will reuse all the existing piers and abutments which eliminates the requirement for earthworks and maintains the current visual aspects of the location.
- All structure are constructed with Timber and will weather and soften to fit landscape in the future.
- No concrete work or excavations are intended to happen in the river / stream beds.
- Clearance of vegetation at bridge construction sites is to be kept to a minimum, all construction of structures under the safe lifting capacity of helicopters will be completed off-site. Some structures will require to be manufactured in components and assembled on-site to fit within safe operation of helicopter lifting capacity.
- There is a minimal requirement for a trench excavation and some site leveling required at the bridge sites to allow for the sleeper foundations to be placed level on a compacted surface. This is the only requirement for earth movement at these sites.

- As the below photo shows there is a requirement for some vegetation removal around the existing Abutments, this will be restricted to the immediate area around the bridges and existing abutments.

- Balustrades on bridge sides will be 1200mm high, suitable for off-tarmac cyclists.

- Width and deck capacity of all structures are to be built to a standard that meets loading for a 1.8-ton digger and maintenance machinery.

- Building consent will be obtained from Ruapehu District Council for all bridges over 1 meter high.

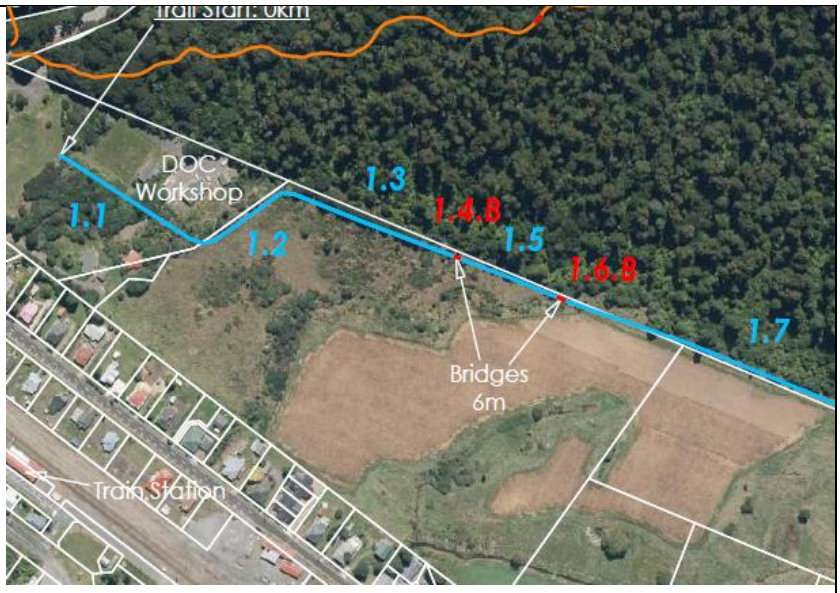
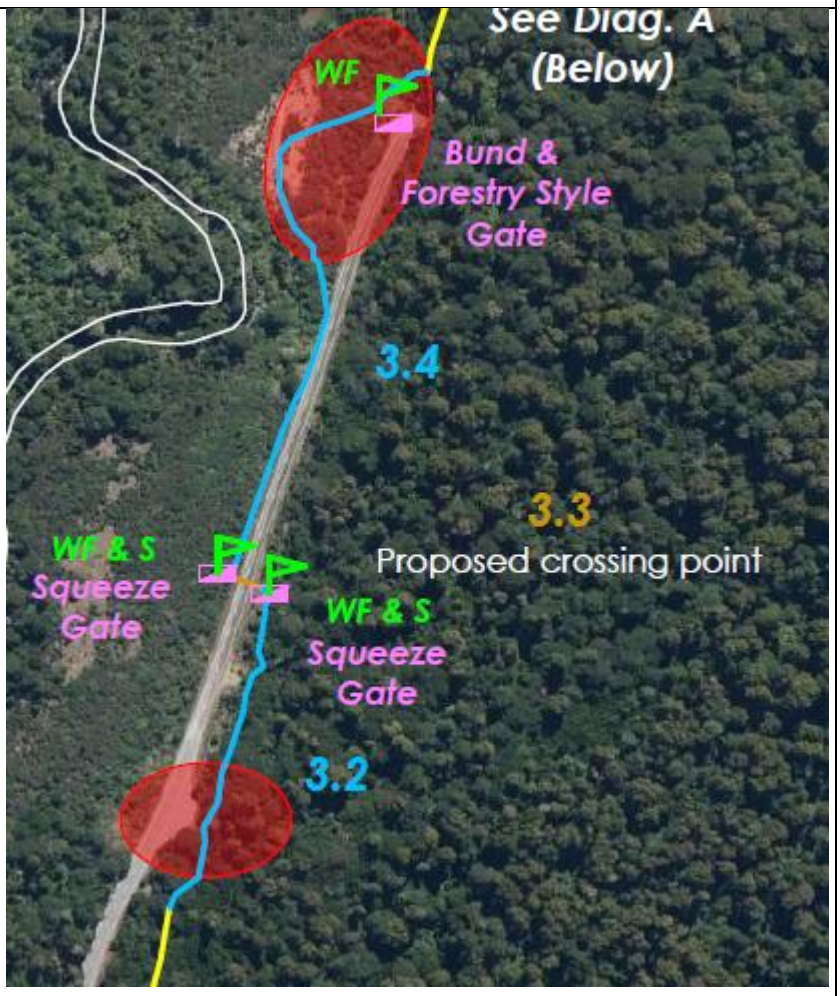
9 SITE SPCIFIC TRACK METHODOLOGY

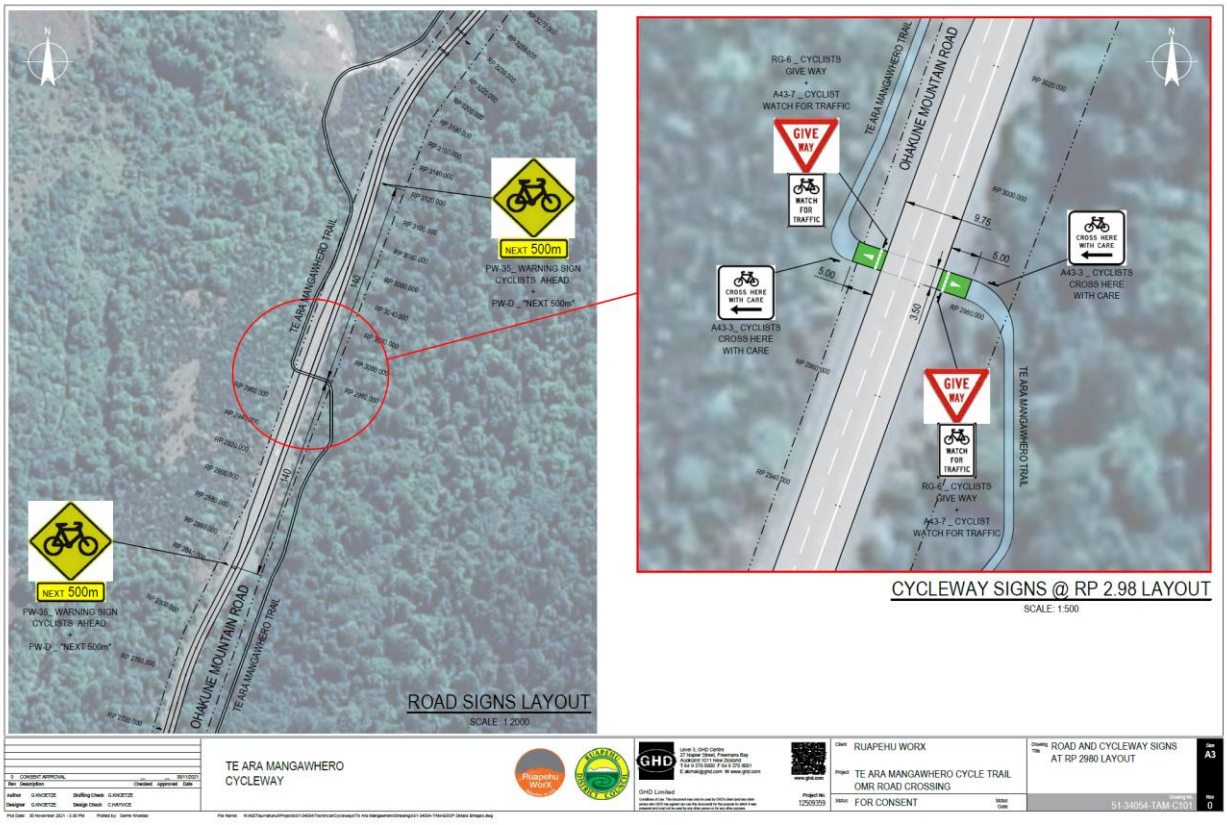
New Track construction blue sections

Before physical construction of any sections of trail Ruapehu WorX will flag the route including curvature and vegetation that will be removed, A walk through with an appointed Department of Conservation officer and GHD project manager will take place and no work will start until written approval is granted by both.

1553m of new track will be constructed on previously disturbed farming, forestry, and road corridor ground, these sections have been highlighted as a blue line on the Trail maps provided. These sections are considered new construction as there has not been an existing tramline or track at these locations before, all the 1553m will constructed on previously modified ground.

The trail construction methodology reflects the requirements in the relevant DOC and NZCT standards and guidelines and will follow the 7.1 Key principles of track development.

Section 1.1-1.2-1.3-1.5-1.7. total lengths 697m The track starts at the DOC field base within TNP and then crosses over onto Ngati Rangi owned land. Easy flat ground requiring 2 bridges at 6m long. Crowned bench 1.5m wide with all-weather AP20 surface placed and compacted.	
Section 3.2 and 3.4 total length 490m This section sits within the Ohakune Mountain road corridor and an old overburden site from the multiple road realignments completed on the Ohakune Mountain Road. The two red zones are the intended staging sites where the gravel required for surfacing will be dropped off by truck and trailer units and then transferred into power carriers to transport onto site. Halfway along the straight section of road will be the location of the crossing point including squeeze gates to prevent unwanted vehicular access onto the new Te Ara Mangawhero track.	



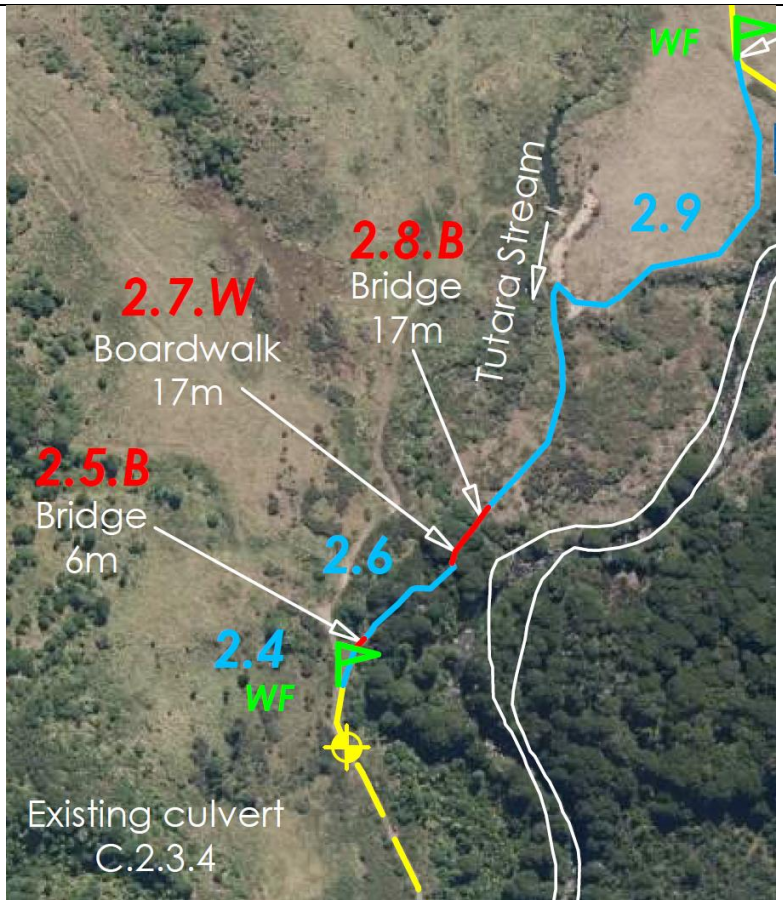
Section 2.4-2.6 and 2.9 total length 366m

This section connects the existing access road for the Ohakune Raw water intake and the Bennett and Punch tramline.

It is only a short section of new track development which follows the existing bench created when the Ohakune raw water line was installed.

It requires a 17m bridge install over the Tutara Stream which will have a 17m boardwalk built on the true right as an approach to the bridge. The purpose of the boardwalk is to eliminate the need for earthworks in this section of new trail.

The trail alignment purposefully directs access away from the Ohakune Raw water intake.



Trail follows retired farming land which is predominantly covered in exotic grasses as shown in the below photo typical of this location.

Methodology for this location is to cut and remove grass as low as possible to the ground, then spray the remaining grass with a mild glyphosate mix to remove any remain organic layer (**Note** this is only within the 1.5m wide track width).

It is not intended to need any excavation or earthworks along the new blue sections of track development, the ground is flat and within grade along the length of new track.

Once organic layer has been cut a base course of AP60 will be laid followed by AP20 top coarse resulting in a compacted resilient trail surface providing a reduce ongoing maintenance or any potential erosion issues.

Photos left shows the new section of trail following the old water line bench which is already in place

Trail development on existing tramline Yellow Line:

Before physical construction of any sections of trail Ruapehu WorX will flag the route including curvature and vegetation that will be removed, A walk through with an appointed Department of Conservation officer and GHD project manager will take place and no work will start until written approval is granted by both.

4,912m of the proposed trail will be on the existing Bennett and Punch tramline. The tramline has provided a unique opportunity to develop a new trail network without the requirement of normal method of excavation or earth works to create a new bench. The tramline has retained its 2.5-3m wide elevated crowned bench which has provided great foundations to place a new 1.5m all-season trail network on.

The establishment of a new dual use grade 2 trail upon the existing Bennett and Punch tramline requires the placement of a locally sourced weed free all-season surface material and base course upon the existing ballast and where present humus layer that forms the elevated tramline.

The placement of material will be achieved by tracked low ground pressure machinery carting weed free local AP 60 scoria base course and AP 20 volcanic top course material from pre-approved staging sites along the Ohakune Mountain Road.

The new trail construction methodology reflects the requirements in the relevant DOC and NZCT standards and guidelines and will follow the 7.1 Key principles of track development.

The guidelines and recommendations from the (Assessment of Ecological Effects for a proposed shared use trail on the lower slopes of Mount Ruapehu) provides the foundations and is fundamental to the methodology of the construction of new trail upon the Bennett and Punch tramline.

As its intended to be a dual use trail there is requirement for both walkers and cyclists to share space within the corridor created, this will require a vegetation clearance corridor of up to 2m wide to allow for safe passage of both types of recreational users.

It is important to retain the humus layer as it has enabled the ngahere to repair itself from the damage created in the original tramline construction. The preferred method of construction is to leave the humus layer in place resulting in significantly reduced damage to the re-established root structure of the neighbouring trees.

ASSESSMENT OF ECOLOGICAL EFFECTS FOR A PROPOSED SHARED USE TRAIL ON THE LOWER SLOPES OF MOUNT RUAPEHU

Historic tramline within rimu-mataī-miro/kāmahi forest, Section 1b. Red arrow indicates the direction towards Ohakune. 16 September 2021.

Contract Report No. 5405d

December 2021

Project Team:
Angela Simpson - Field evaluation and report author
William Shaw - Project management and peer review

Prepared for:
Ruapehu District Council
C/- GHD
Taumarunui

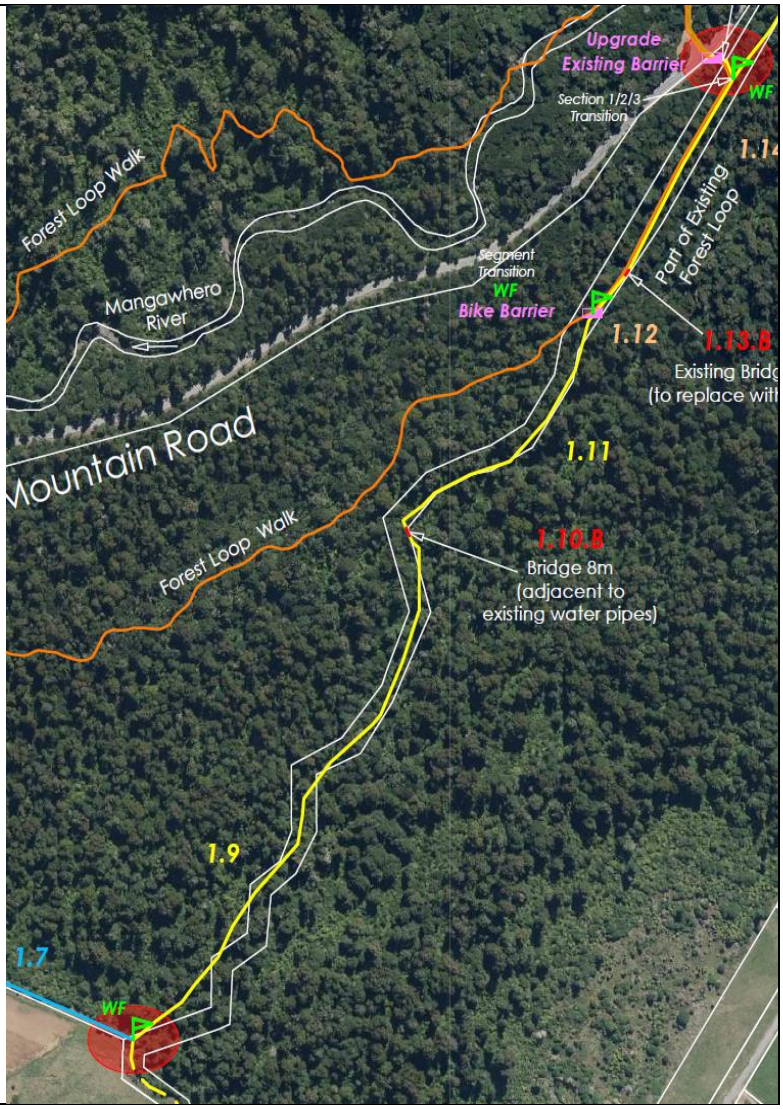
A typical section of the Bennett and Punch tramline with consistent tree canopy over the entire length of lower tramline, these sections have various accumulation of humus layers ranging in depth of 50mm-200mm. As this organic humus layer is the lifeline supporting the neighboring tree's, the proposed methodology is for minimal or no excavation where possible, to ensure the long-term health of a tree is maintained. Choosing not to excavate allows for subsurface lateral roots to remain in the humus layer and pass undamaged under the track, the extent of feeder root loss will be limited to those beneath the footprint of the trail. This methodology prevents the damage to adjoining vegetation and tree roots reducing construction effects to less than minor.	

The trail is diverse regards to flora along the intended 6.3km route, once crossing the Mangawhero River the tramline no longer has the tree canopy of the lower Bennett and Punch and is dominated by a range of exotic pasture grasses with patches of early regeneration rārahu and mānuka scrub.

The relatively flat topography of this area means that the ground on both sides of the old tramline bench is seasonally damp in places. Standing tree stumps are scattered throughout the area, remnants of logging that was undertaken between 1909 and the 1950s.	

Section 1.9-1.11

Section 1.9-1.11 is existing Tramline with regenerated vegetation along the length of these sections – Total length 802m including an 8m bridge.
The material for the resurfacing of this section will be stockpiled at the Urewera RD end as highlighted in red on the map.
Note: this section will have the new RAW water pipeline installed along it, this is a separate project to the TAM but will be constructed in conjunction with the trail build.



Section 1.12-1.14 is still existing Tramline but is currently part of the Mangawhero loop track- total length is 246m including the construction of a new 6m bridge.

Section 2.3

The upgrade of the existing Ohakune raw water intake service road. Total Length 1228m

This location is where the site office and helicopter staging point will be for the phase 1 build. (Marked in White)

This access road is north of the Mangawhero campground, historically this road is not open to vehicle traffic but allows public access beyond a locked gate at the entrance.

The existing road is currently heavily rutted and not consistent with the Grade 2 guidelines, but as there is only short portion of the existing road that has a gradient greater than 6% but less than 10%.

This distance once consideration of enter length of trail constructed is less than 1% of new trail will still result in the entire being a grade 2 trail.

It has been decided that the environmental effects of trying to achieve gradient in some sections of trail do not warrant the need to achieve grade as the whole of track will still be a achieve as a grade 2 standard.

The vegetation on the existing road will be left to soften the current 3m wide bench down to the desired 1.5m wide track.

The road will need to be reshaped with a crown to allow water control and remove of the current ruts, this will include four culverts which also require regraded and shaped to remove the current ruts and water retention.

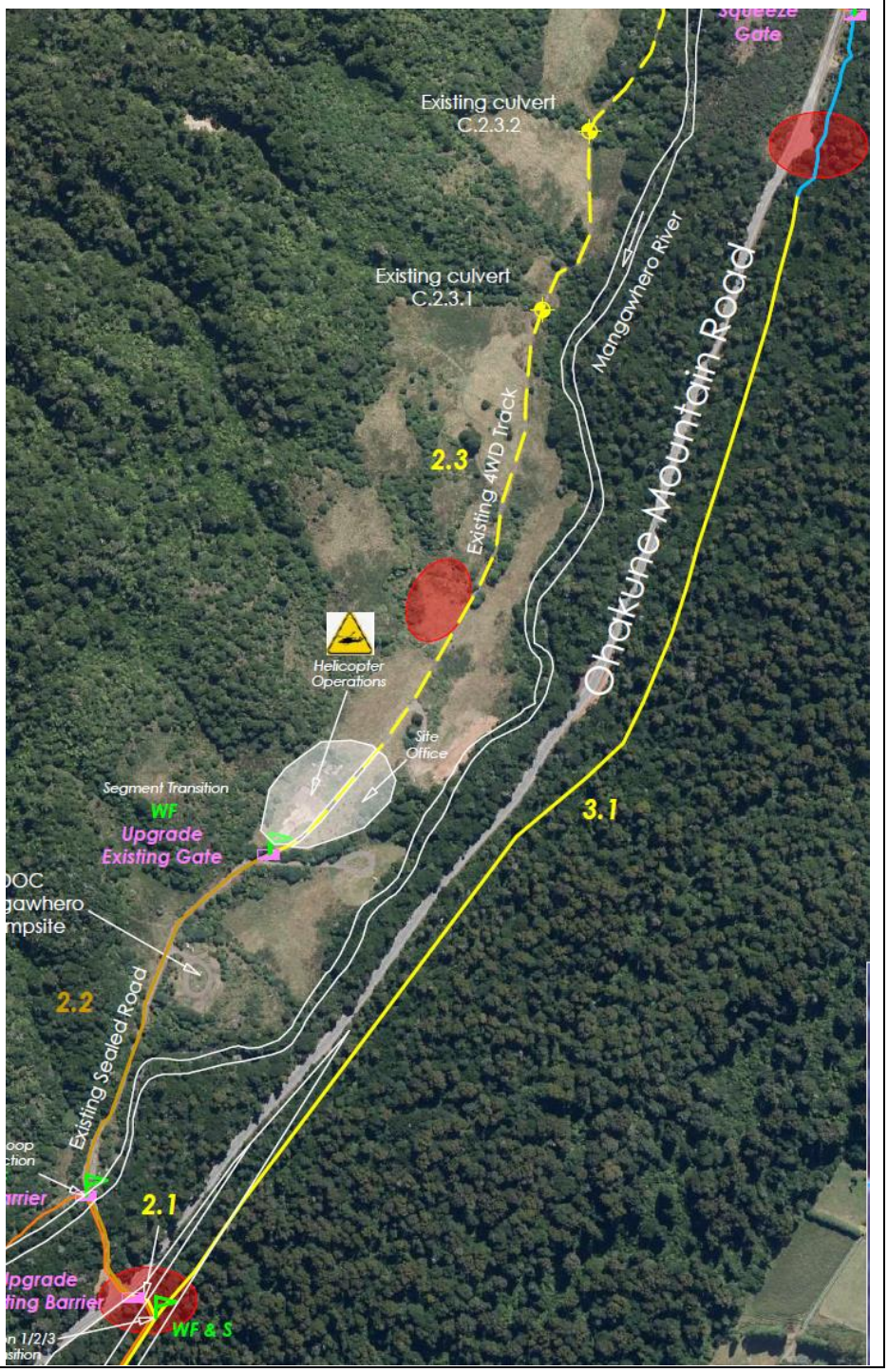
Section 3.1

Total length 1141m existing Bennet and Punch tramline.

This section currently had the old and will have the new Raw water pipeline follow along the trail, As the final design for the raw water line is not finalised the detail of design is not included in the CMP. But acknowledge the need to work collaboratively if this project were to go ahead.

A typical section of the Bennett and Punch tramline with consistent tree canopy over the entire length of lower tramline, this section has various accumulation of humus layers ranging in depth of 50mm-200mm. As this organic humus layer is the lifeline supporting the neighboring tree's, the proposed methodology is for minimal or no excavation where possible, to ensure the long-term health of a tree is maintained.

The intention to have two stockpile sites for aggregate to be transport from. These are marked on the map and shown as red.



Section 3.5-3.7

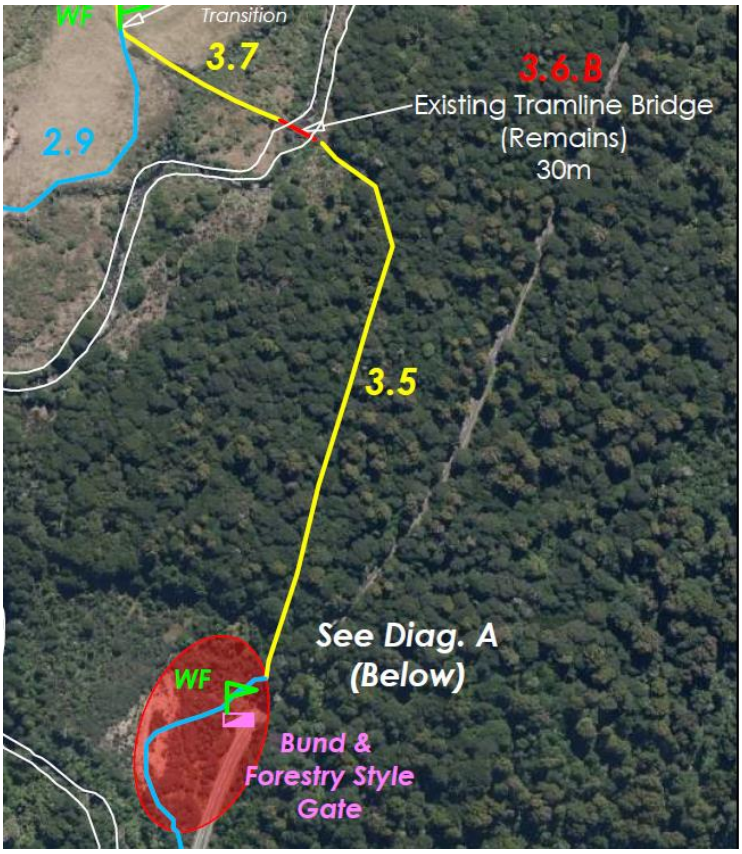
The total length of this section of trail is 506m including a 34m bridge over the Mangawhero river.

There are currently still the remains of the original tramline bridge at the same location, intention is to reuse the existing piers and foundations and replace the beams and bridge decking and handrails.

3.5 and 3.7 are typical section of the Bennett and Punch tramline with consistent tree canopy over the entire length of lower tramline. This section has various accumulation of humus layers ranging in depth of 50mm-200mm.

As this organic humus layer is the lifeline supporting the neighbouring tree's, the proposed methodology is for minimal or no excavation where possible, to ensure the long-term health of a tree is maintained.

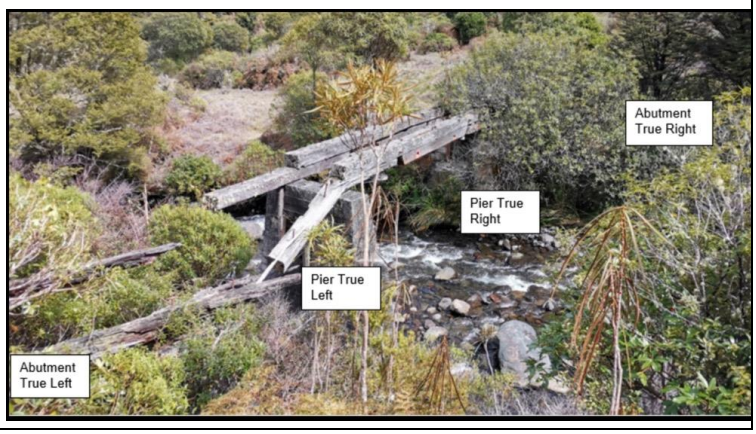
This proposed methodology is easily achieved as the existing bench still has good, crowned formation and drainage either side of the tramline.



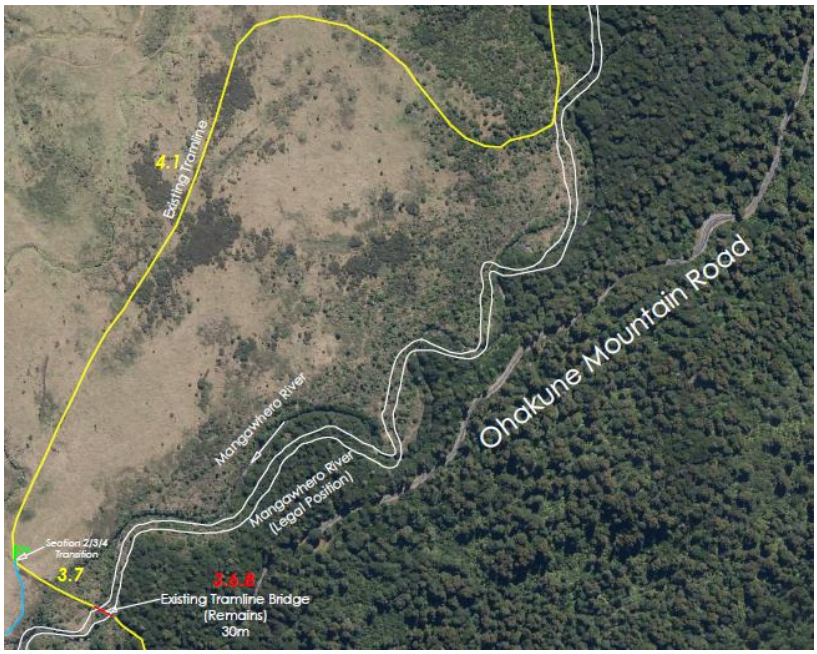
The Existing 34m bridge in its current state.

Note: Both piers and abutments will be used as the foundations for new bridge that will be placed on top.

No excavations required in or within river catchment and vegetation removal will be kept within the 2m wide corridor of the new trail.



Section 4.1

Total length 1378m The existing tramline still retains its original shape, elevation and ballast of mixed cut-face and oval river stone mixed with local ash subsoil. Proposed methodology specific to this location is to clear the existing tramline of pasture grasses / organics and reshape and compact the existing ballast / ash material, where required placement and compaction of weed free blended AP 20 material will occur. The material will be carted to site by tracked low ground pressure power carriers.	
The upper Bennett and Punch tramline is relatively free of a humus layer as is covered in pasture and has little or no tree canopy.	

Section 4.2 and 4.4

The total length of this section of trail is 1127m including a 19m bridge.

There are currently still the remains of the original tramline bridge at the 19m bridge site, unfortunately the existing remains cannot be reused in any form.

The 4.2 and 4.4 section of the Bennett and Punch tramline has consistent tree canopy over the entire length of lower tramline, this section has various accumulation of humus layers ranging in depth of 50mm-200mm.

This section has considerable amounts of forestry relics and is the site of an old mill, it has a slight incline on the tramline which still has the original train located just below the 4.2 mark on the map. It is intended to clear the current blackberry from around the old train and preserve it as a point of discussion for the recreational users of the trail.

This section does require a small number of earthworks to clear slips and trenches from the failed block existing culverts.

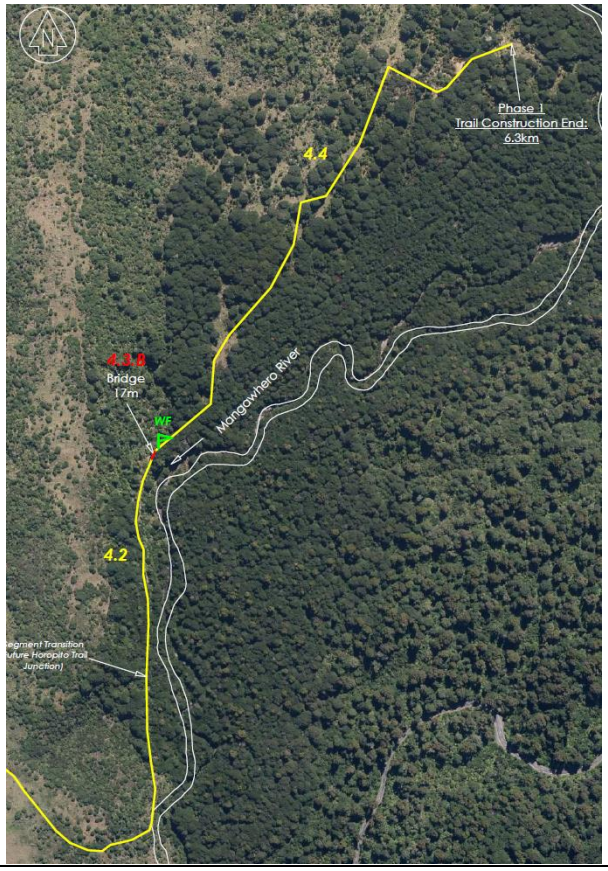


Plate 35: Section 4 of the proposed trail route. Dense kiokio and toetoe on the existing tramline. Red arrow indicates the direction

10 INDICATIVE SCHEDULE OF WORKS

Koro Ruapehu is unique for many reasons, he is the largest Volcanic Mountain in the North Island consisting of alpine, subalpine, virgin podocarp ngahere and heavy deforested modified landscapes.

Because of the diverse landscapes, uniqueness, and sensitiveness of Ruapehu early in the planning and design it was decided to implement a phased approach to the build of the Te Ara Mangawhero.

The phased approach is to start in Ohakune utilising the existing modified forestry tramlines / mill sites in the first construction season October through to May -following construction seasons continuing to Waitonga Falls carpark utilising the existing Blyth track and finishing in 2024-25 season at the Massey University Alpine Club Hut connecting the Round the Mountain Track.

The phased approach is to give confidence to all government authorities and conservation groups how the new trail will have a minimal environmental and small footprint built on existing modified forestry tramlines and existing trail networks.

It is intended bridges and boardwalks will be pre-cut and built where applicable in the winter months outside of the construction season.

11 ECOLOGICAL EFFECTS

The trail has been designed and constructed in a manner consistent with the recommendations of the Assessment of Ecological Effects for a proposed shared use trail on the lower slopes of Mount Ruapehu.

The first stage of the proposed Te Ara Mangawhero trail will traverse and highlight a wide range of ecologically and culturally significant ngahere and river margin habitats on the lower slopes of Ruapehu.

The proposed trail route will primarily utilise previously disturbed areas/sites, associated with the Bennett and Punch logging tramlines, existing roads and tracks, and the Ohakune Water Supply pipeline, to minimise the potential for adverse ecological effects on adjacent intact indigenous ecosystems. This will ensure that the clearance of larger indigenous trees can be avoided. Within the trail corridor clearance of indigenous vegetation will be limited to the understorey species and smaller trees, that have established following disturbance in the last 60 years or so.

Ruapehu WorX methodology proposes minimal excavations and retention of the humus layer which allows for subsurface lateral roots to remain in the humus layer and pass undamaged under the track, the extent of feeder root loss will be limited to those beneath the footprint of the trail. This methodology prevents damage to adjoining vegetation and tree roots reducing construction effects to less than minor.

Ruapehu WorX sensitive construction techniques and ESCP identified in this construction management protocol, will avoid any adverse effects on aquatic fauna and whio at each of the nine bridge locations.

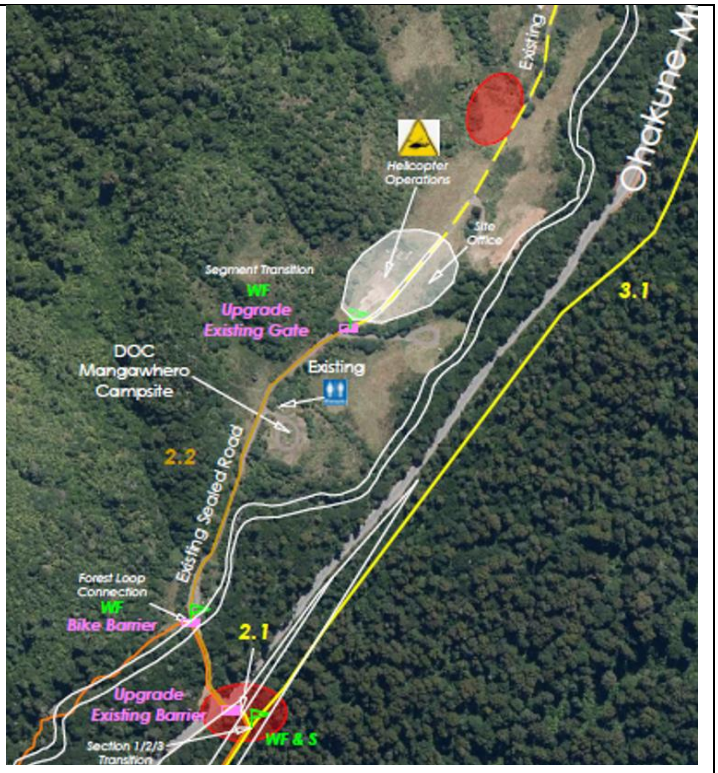
The proposed trail will provide new opportunities for the control of pest plants and pest animals to complement existing conservation management in the local area. Pest animal control stations near the Mangawhero River could provide greater protection for whio. In specific locations there are also opportunities

to enhance the recovery of indigenous vegetation within previously disturbed areas. The relative ease of access provided by the trail will improve opportunities for Ngāti Rangi and the local community to engage with conservation activities associated with the trail on the lower slopes of Ruapehu.

In addition, prior to starting work, all trail crew will go through an ecological induction run by a qualified ecologist. This induction will include explanation of the important ecological values and species of the area and those practices important in the trail development process required to ensure that these values are protected.

12 HELICOPTER OPERATIONS

Transport of AP20- AP60 surface material will be required for the surfacing of section 4.4 3 Bridges will require Helicopter operations as part of the construction process 284 helicopter movements are anticipated as part of the construction of phase one Te Ara Managwhero.	

All helicopter operations will be conducted from the site office beyond the gate from the Mangawhero Campground. This area is flat and has been used before as a site office and dump zone from the Ohakune Mountain Road upgrades. An aircraft use application will be submitted to the Department prior to commencement of the trail build. All helicopter operations will be notified to local DOC office 48 hours before intended day of operation.	

13 MATERIALS AND STAGING SITES

All timber materials used will be structural grade SG8 free from nots or defects

All aggregate is sourced from local quarry on the flanks of Ruapehu and free of weed source.

- AP60 – Scoria Pit Taura metal Supplies Ltd, Ohakune
- AP20 – Berry's Pit, Tohunga Junction, Ohakune

All dump sites are marked on the trail map in (appendix 1) highlighted in red, all dump sites will have an active traffic management plan in place along the Ohakune Mountain Road.

14 SITE OFFICE AND PUBLIC ACCESS

Site office and staging point for helicopter operations are located at site 2.2 on the trail maps provided, this is north beyond the Mangawhero campground, the site office is a fully enclosed mobile trailer with attached solar panels providing power and storage of most equipment.

Intention is for the mobile site office to be removed at the end of every working day.

No fuels will be stored on site or within Tongariro National Park.

Excavators and power carriers will be left on site or on trial during the construction of the various stages.

The Mangawhero campground currently has two dry vault Norski toilets at location which service the campground. In addition, it currently has a locked gate beyond the campground which will be used to temporarily restrict public access when machinery is in operation or helicopter operations are in flight.

Public access will be on occasions temporarily restricted at the various construction sites depending on the activity or risk to public, this will be communicated by signage at location and an alternative route provide if necessary.

All temporary access restrictions and alternate access routes to various locations will be arranged in conjunction with DOC and communicated accordingly.

All structures will be closed to public until code of completion is granted and deemed safe for public use.

Fully self-contained toilets for kaimahi working on the construction will be in various position along the trail.

15 ACCIDENTAL DISCOVERY PROTOCOL

The proposed route of the trail is away from any known wāhi tapu sites. It is possible that unknown wāhi tapu sites could be discovered during the construction of the track.

Staff working on the trail will be trained to identify any potential wāhi tapu sites. If they find or suspect a wāhi tapu site, they will be instructed to stop work immediately and follow Ngāti Rangi policy and inform appropriate iwi leaders and the Department of Conservation. If any human bones are found the Police will also be contacted.

16 HERITAGE PROTECTION PROTOCOL

Paul Mahoney of the Department of Conservation has undertaken a review of the route of the trail with specific focus on the heritage aspects of the tramlines. Paul has prescribed the following heritage protection protocol for the development of Te Ara Mangawhero along the Bennett and Punch tramline.

- During restoration work, maintain the character of the tramline; stick to the route; do not widen the cuttings.
- Drainage culverts may be installed.
- The remaining wooden sleepers and bridge beams are not practical to preserve.
- Any objects discovered should be photographed and left initially where they are while the image is sent for identification.
- Any major artefacts such as log bogies and rails should be saved and put to the side of the trail for restoration.

17 HAZARDOUS MATERIALS

Refilling of machinery or plant will be restricted to designated areas away from water courses or bodies of water, all fuel storage containers will be double bunded with anti-spill nozzles to reduce potential for spills on-site.

No fuels or hazardous substances will be left or stored on site, additionally all equipment will have locks on fuel tanks to prevent public access.

All machinery or plant will be serviced off-site and before transport will be steam cleaned to prevent transportation of pathogens, weed sources and soils.

Daily site meetings/briefings and training identifies risk and potential issues to ensure all potential effects are minimised and contained within the construction zone. Spill kits will be on-site for fast response to any unseen accidents.

18 WINTER WORK

No winter works or onsite construction is scheduled to happen during the winter period of 1 June to 30 September.

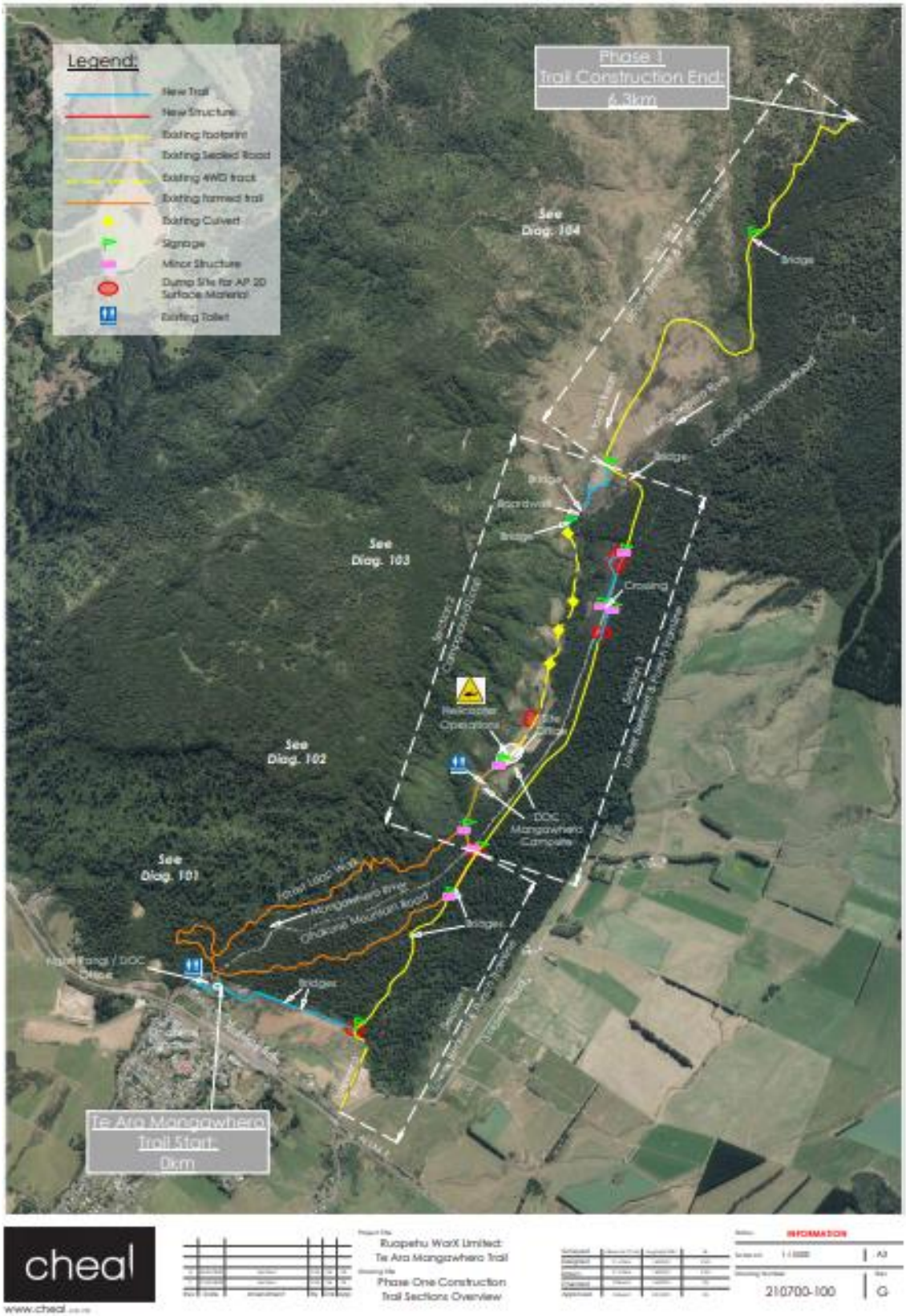
Phase 1 will be completed between the Months of October – May, depending on the Permissions process and start dates it is anticipated all construction should be completed by Mid-May 2023.

19 PERMISSIONS

All parts of the Te Ara Mangawhero will be built and maintained in accordance with relevant permission (concession, works approval and resource consent) documents that were obtained to develop the trail.

All conditions that form part of those permissions will be complied within the development of the trail and associated structures.

Appendix 1. Te Ara Mangawhero Maps



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Ruapehu Worx Limited:
Te Ara Mangawhero Trail

Phase One Construction
Trail Section Detail

INFORMATION

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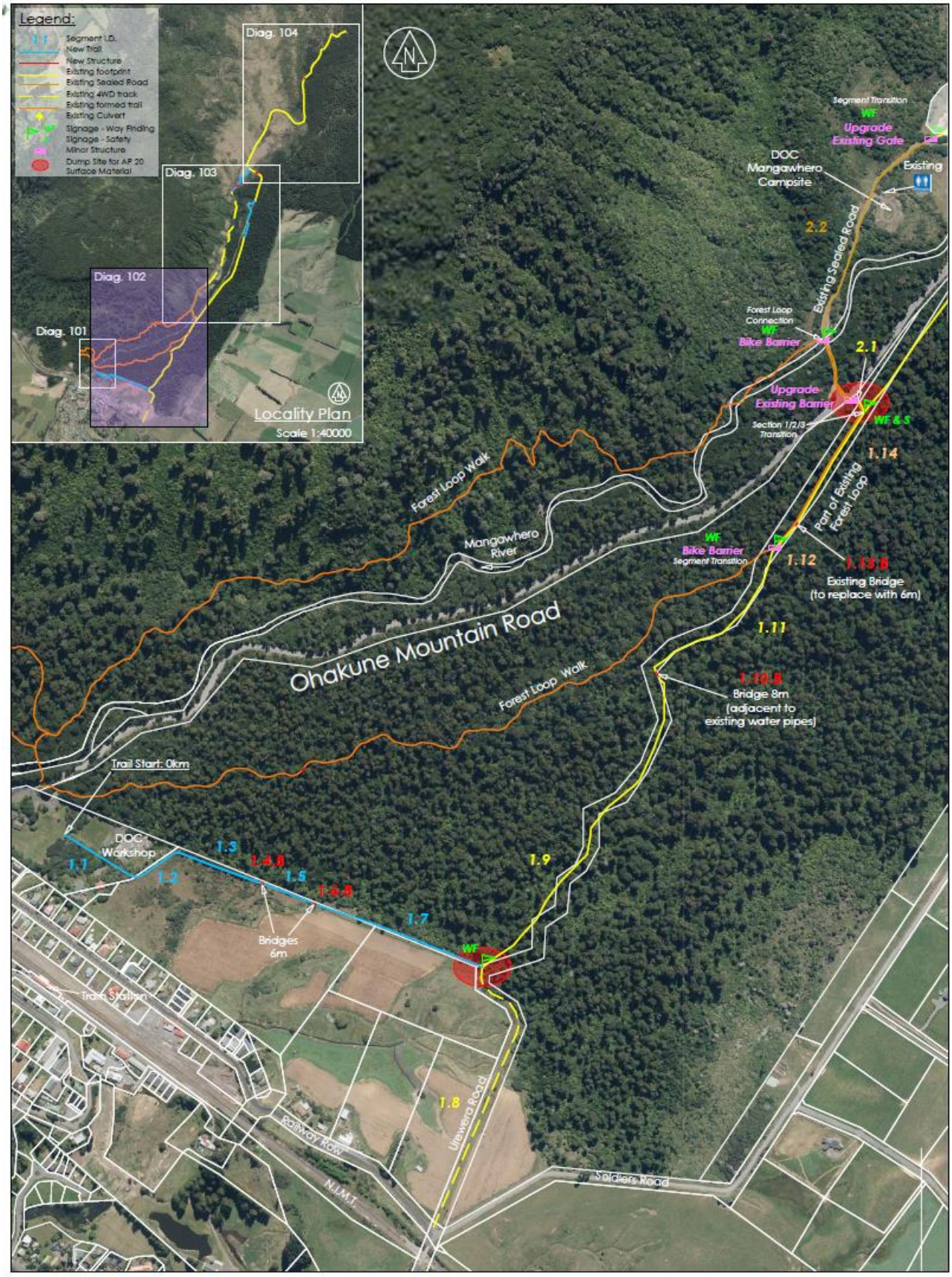

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Rev	Date	Amendment	By	Chk	App
F	11/04/22	WC Revision	CJO	DS	DS
D	09/03/22	Trail & Dump Site	CJO	DS	DS
C	26/11/21	Signage & Minor Structure	CJO	DS	DS
B	18/11/21	Phase One Construction	CJO	DS	DS
A	29/10/21	Information	CJO	DS	DS

Project Title
Ruapehu WorX Limited:
Te Ara Mangawhero Trail

Drawing Title
Phase One Construction
Trail Section Detail

Surveyed	J.Brown & P.Cox	Aug-Sept 2021	JB
Designed	C.Jones	14/09/21	CJO
Drawn	C.Jones	14/09/21	CJO
Checked	D.Sheriff	14/09/21	DS
Approved	D.Sheriff	29/10/21	DS

Status: INFORMATION

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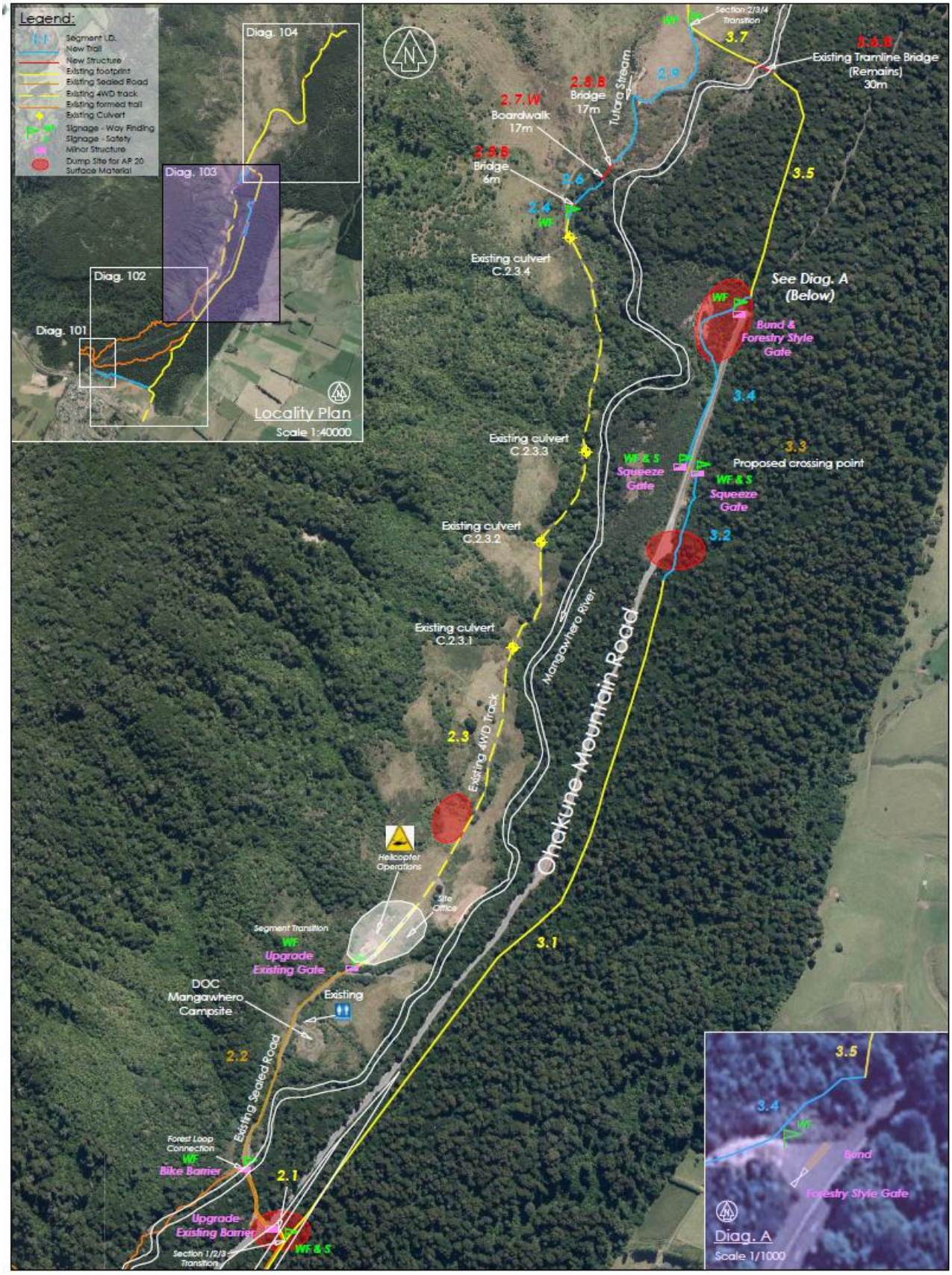
Drawing Number		Rev
210700-102		E



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Rev	Date	Amendment	By	Chk	App
F	11/04/22	WC Revision	CJO	DS	DS
D	09/03/22	Shelf & Dump sites	CJO	DS	DS
C	26/11/21	Signage & Minor Structures	CJO	DS	DS
B	08/11/21	Phase One Construction	CJO	DS	DS
A	29/10/21	Information	CJO	DS	DS

Project Title
Ruapehu WorX Limited:
Te Ara Mangawhero Trail

Drawing Title
Phase One Construction
Trail Section Detail

Surveyed	J.Brown & P.Cave	Aug/Sept 2021	JB
Designed	C.Jones	14/09/21	CJO
Drawn	C.Jones	14/09/21	CJO
Checked	D.Sheriff	14/09/21	DS
Approved	D.Sheriff	29/10/21	DS

Status: INFORMATION

Scale A3	1:5000	A3
Drawing Number	210700-103	Rev E

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Rev	Date	Amendment	By	Chk	App
C	1/04/21	WC Revision	CJO	DS	DS
B	29/1/21	Phase One Construction	CJO	DS	DS
A	29/10/21	Information	CJO	DS	DS

Project Title
Ruapehu WorX Limited:
Te Ara Mangawhero Trail

Drawing Title
Phase One Construction
Trail Section Detail

Surveyed			
Designed	C.Jones	14/09/21	CJO
Drawn	C.Jones	14/09/21	CJO
Checked	D.Sheet	14/09/21	DS
Approved	D.Sheet	29/10/21	DS

Status: INFORMATION

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Drawing Number	210700-104	Rev C

RUAPEHU WORX
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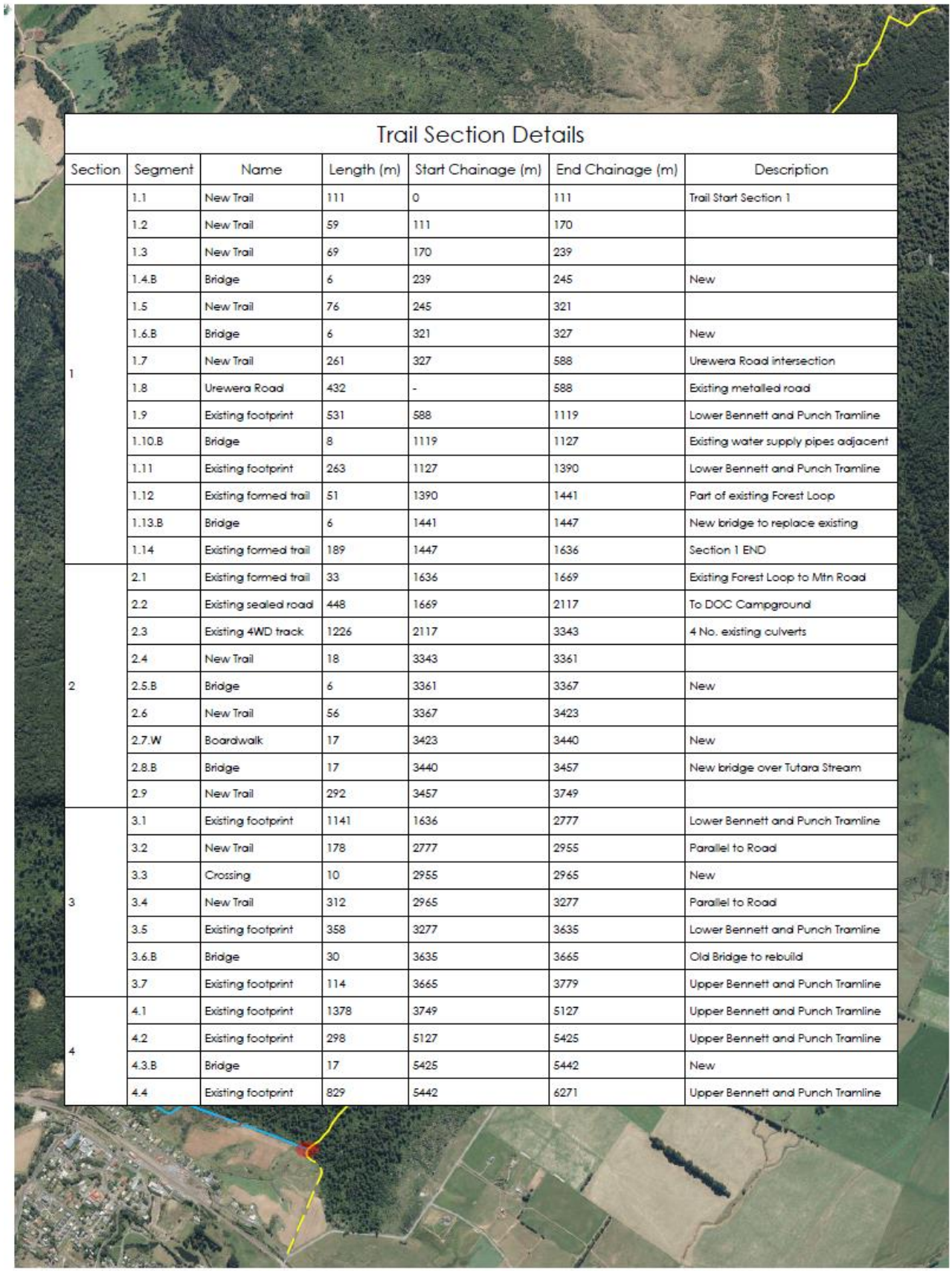

Trail Section Details

Section	Segment	Name	Length (m)	Start Chainage (m)	End Chainage (m)	Description
1	1.1	New Trail	111	0	111	Trail Start Section 1
	1.2	New Trail	59	111	170	
	1.3	New Trail	69	170	239	
	1.4.B	Bridge	6	239	245	New
	1.5	New Trail	76	245	321	
	1.6.B	Bridge	6	321	327	New
	1.7	New Trail	261	327	588	Urewera Road intersection
	1.8	Urewera Road	432	-	588	Existing metalled road
	1.9	Existing footprint	531	588	1119	Lower Bennett and Punch Tramline
	1.10.B	Bridge	8	1119	1127	Existing water supply pipes adjacent
	1.11	Existing footprint	263	1127	1390	Lower Bennett and Punch Tramline
	1.12	Existing formed trail	51	1390	1441	Part of existing Forest Loop
	1.13.B	Bridge	6	1441	1447	New bridge to replace existing
	1.14	Existing formed trail	189	1447	1636	Section 1 END
2	2.1	Existing formed trail	33	1636	1669	Existing Forest Loop to Mtn Road
	2.2	Existing sealed road	448	1669	2117	To DOC Campground
	2.3	Existing 4WD track	1226	2117	3343	4 No. existing culverts
	2.4	New Trail	18	3343	3361	
	2.5.B	Bridge	6	3361	3367	New
	2.6	New Trail	56	3367	3423	
	2.7.W	Boardwalk	17	3423	3440	New
	2.8.B	Bridge	17	3440	3457	New bridge over Tutara Stream
	2.9	New Trail	292	3457	3749	
3	3.1	Existing footprint	1141	1636	2777	Lower Bennett and Punch Tramline
	3.2	New Trail	178	2777	2955	Parallel to Road
	3.3	Crossing	10	2955	2965	New
	3.4	New Trail	312	2965	3277	Parallel to Road
	3.5	Existing footprint	358	3277	3635	Lower Bennett and Punch Tramline
	3.6.B	Bridge	30	3635	3665	Old Bridge to rebuild
	3.7	Existing footprint	114	3665	3779	Upper Bennett and Punch Tramline
4	4.1	Existing footprint	1378	3749	5127	Upper Bennett and Punch Tramline
	4.2	Existing footprint	298	5127	5425	Upper Bennett and Punch Tramline
	4.3.B	Bridge	17	5425	5442	New
	4.4	Existing footprint	829	5442	6271	Upper Bennett and Punch Tramline

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Rev	Date	Amendment	By	Chk	App
A	18/11/21	Phase One Construction	CJO	DS	DS

Project Title
Ruapehu WorX Limited:
Te Ara Mangawhero Trail

Drawing Title
Phase One Construction
Engineering Table

Surveyed	J.Brown & P.Cran	Aug-Sept 2021	JB
Designed	C.Jolliffe	14/09/21	CJO
Drawn	C.Jolliffe	14/09/21	CJO
Checked	D.Sheriff	14/09/21	DS
Approved	D.Sheriff	29/10/21	DS

Status: INFORMATION
Scale A3: Not to scale | A3
Drawing Number: 210700-105 | Rev: A

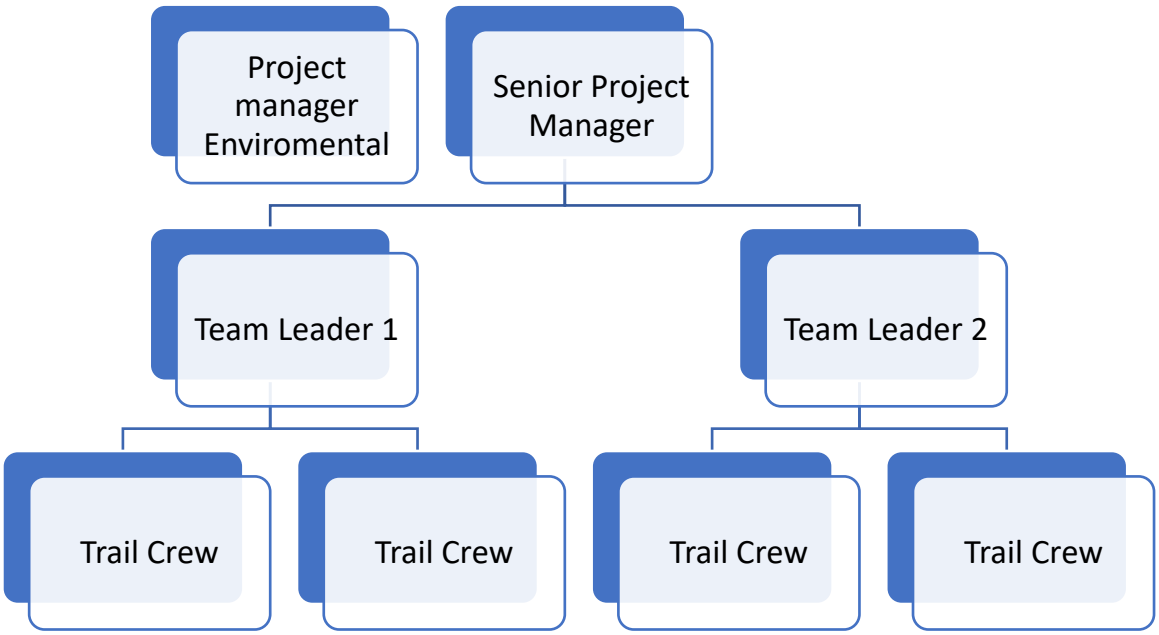
Appendix 2. Key Staff Qualifications and Experience

Project Management and Schedule of Staff

Ruapehu WorX committed Kaimahi resource to the construction of Te Ara Mangawhero consist of:

- A senior project manager accountable for all project controls and outcomes.
- Project manager environmental responsible for all ecological controls and outcomes.
- Two 2 qualified competent team leaders responsible for managing two sperate teams.
- As and when required a total of 6 trail crew but limited to 6 depending on demand weather and resourcing.
- Edifice Structure LTD are responsible for the construction of the 9 bridges as part of the first phase of Te Ara Managwhero. Edifice has an experienced team: all holding fall arrest tickets and two with Explosives Tickets. All Edifice staff have current Site Safe Passports, First Aid Certificates, and chainsaw (tree falling) certificates.
- Additionally, a number of subcontractors including but not limited to helicopter operators and transport providers may be on-site from time to time operating under Ruapehu WorX as the principal contract holder. All subcontractors will be managed by the Senior project manager.

The team structure:



RUAPEHU WORX
Hapaitia te ora

Senior Project Manager
Paul Carr

Profile

Paul has dedicated 32 years to maintaining and creating iconic tracks and recreational assets throughout Aotearoa, enhancing, and protecting the environment to enable healthy parks and connected people- Ko Au te taiao ko te Taioa ko au.

Paul has a proven successful career in asset management, maintenance, and construction of new or upgrades to Huts, Structures, cycleway, and walking track projects both in the front country and Backcountry.
A communicator, connector, and enabler of Tangata Whenua to their lands and opportunity to empower knowledge and skills.

Skills and Abilities
Delivery of Projects and Services

- Extensive industry experience in light civil construction, track/trail construction, Structures, building and remote location infrastructure construction.
- Extensive Knowledgeable in the Project Management Framework, Prince 2, and developer of project management frameworks.
- Complete understanding of DOC track Standards and NZ Cycleway standards and guidelines.

Public Conservation Parks and Reserve Infrastructure

- Development and delivery, through personal company – Backcountry Construction Ltd., numerous cycle trail, tracks, huts, structures, and amenities in and around remote locations for the Department of Conservation.
- Consultation services for local and regional councils and New Zealand Cycle Ways.

Asset Management Systems

- Competent in Asset Finder, RAMM asset management, SAP Asset Management Integrated System, SAP Business Integrated Finance Systems and Technology One Finance.

Project Manager Environmental
Megan Younger

Profile

Megan is passionate about connecting people with our natural spaces. A self-professed "geek," who takes the teaching from the taiao and apply them to everyday life.

This extends into her workspace; ecological principles can be applied everywhere, noticing nuances in interactions to inform patterners or outcomes-and potentially how to change them.

Megan is successful in the field with a knack for the practical, but also strong administratively, Megan's combination of Bachelor of Science -Ecological Science and a diploma in project management brings an envious combination and skill set to the Ruapehu WorX team.

Skills and Abilities

Bachelor of Science - Ecological Science
Undergraduate degree achieved 2016, University of Auckland
Focus on conservation ecology and environmental sciences

Graduate Diploma - Project Management
Due to complete December 2021; Sothern Institute of Technology
Dissertation research focus in cultural differences affecting project outcomes in Aotearoa

Evidence of projects by key Ruapehu WorX staff:

Back Country Projects:

- Milford track -Rebuild of Glade House Milford track.
- Milford Track -Redevelopment of Quintin Lodge Milford track.
- Milford Track-Redevelopment Pompalona Lodge Milford track.
- Milford Track-Sandfly point shelter redevelopment.
- Milford Track- Pass Hut maintenance and repairs.
- Routeburn Track -New Build of the Harris saddle shelter Routeburn Track.
- Routeburn Track- Redevelopment of Routeburn Falls lodge.
- Routeburn Track-Redevelopment of Lake Mackenzie Lodge.
- Various sections of Te Araoa – the long pathway.
- Structures on the Te Paki coastal Track.
- Matemateaonga track widening, water control, slip removal and vegetation control.
- Mountains to Sea cycle trail repairs and maintenance.

Front Country track – Day visitor and Short Stop Traveller:

- Construction of new peninsula walk - Mahinepua Track Far North.
- Paihia Lockout track.
- Akeake new construction of trail network and viewing platforms.
- Flagstaff Hill -Russel, new structure bridges boardwalks and resurfacing of all trails.
- New Marsden Cross track
- Numerous Maintenance contracts on recreational assets across the Far North and Northland Districts.
- Waitangi Mountain Bike Park feasibility and business case development.
- Paihia coastal track Far North district council.
- Marton Sash and Door new trail development.
- Old coach road resurfacing.
- New trail network in Tainui and Tauroa reserve- Havelock North

Island Biosecurity projects:

- Cape Brett track repairs and maintenance.
- Whangamumu Track realignment and Whaling station restoration.
- Urupukapuka Island facilities upgrade, 12 km of new tracks, toilets, bridges, 3x campground shelters and supporting infrastructure- surfacing of trails and staircases.
- Motuarohia Island – Bay of Islands track Maintenance and repairs.

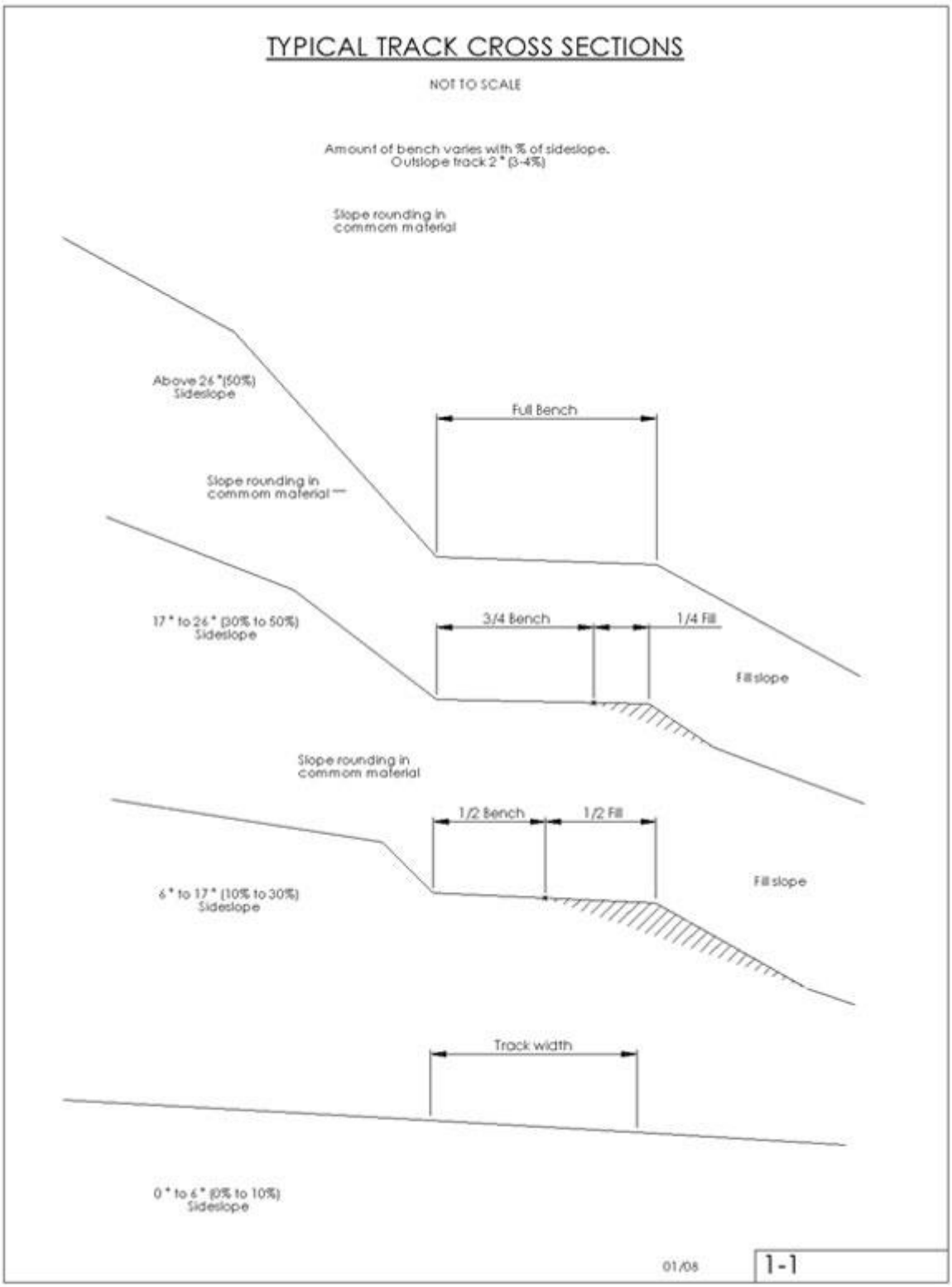
Kauri Protection Projects:

- Kauri Walk Puketi forest Park.
- Opua forest park track maintenance $120K Kauri – Research and development of Kauri die back protection methodology.
- New Opua Kauri walk-- Protection of Kauri die back – boardwalks and viewing platforms.

Appendix 3. Notes on trial construction near larger trees

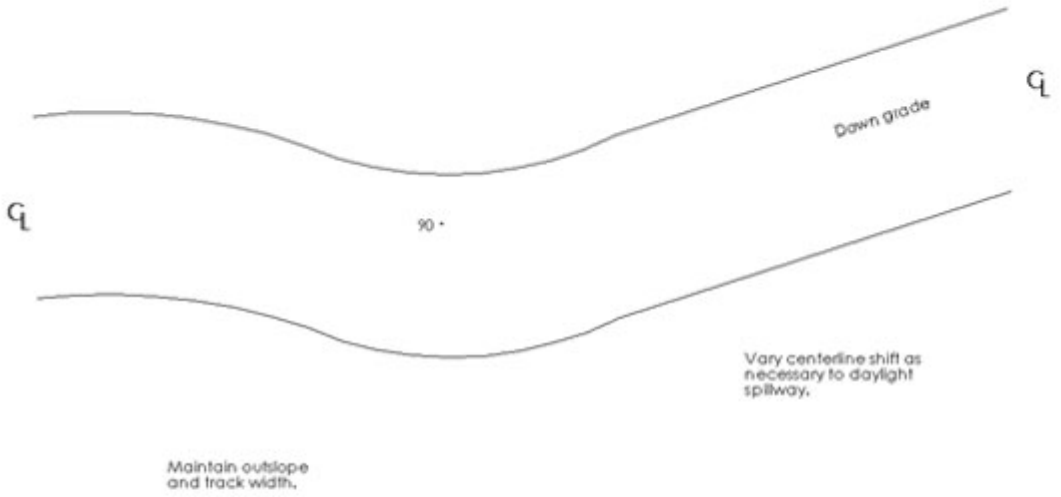
Species	Common Name	Distance within which large surface laterals are likely to be common	Notes on Trial Construction Near Large Trees
Dacrydium cupressinum	Rimu	3 meters	Highly variable surface root length. Large trees in close proximity to trail should be assessed on a case-by- case basis.
Podocarpus laetus	Halls Tōtara	4-6 meters	Separation distance of 4 metres should avoid large surface roots of most trees. Some larger trees may have large surface roots out to 6 metres.
Pectinopitys ferruginea	Miro	4-8 meters	Separation distance of 4 metres should avoid large surface roots for most trees. Some larger trees may have large surface roots to 8 metres.
Prumnopitys taxifolia	Mataī		
Weinmannia Kāmahi racemosa	Kāmahi	2 meters	Trail can be as close as 0.5- 1 metres from trees less than 20 cm diameter if no large surface laterals are damaged.

Appendix 4. Trail Construction Drawings



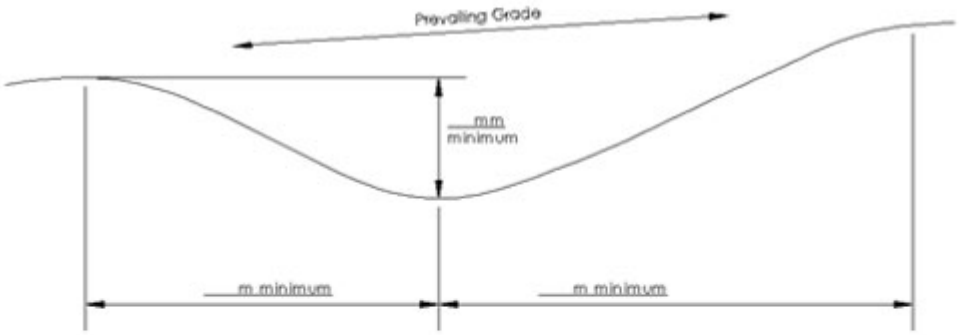
Drainage DIP

NOT TO SCALE



PLAN VIEW

Refer 'Drainage Dip' table for dimensions under Water Management

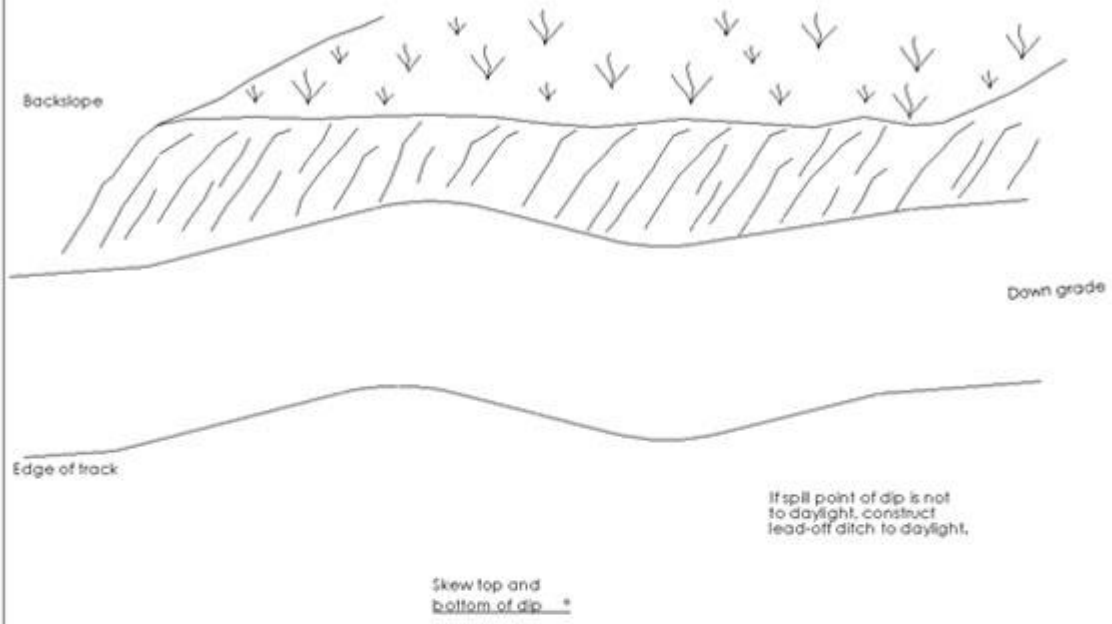


PROFILE

01/08 2-1

ROLLING DIP

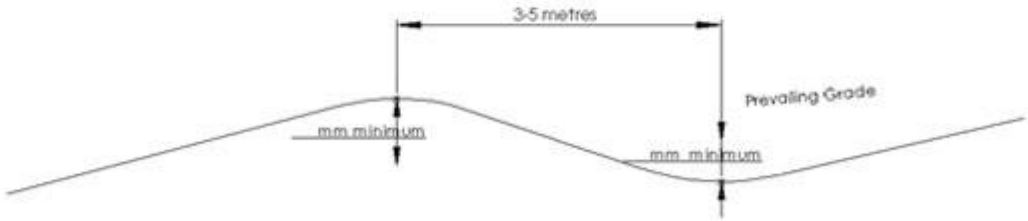
NOT TO SCALE



If spill point of dip is not to daylight, construct lead-off ditch to daylight.

Skew top and bottom of dip *

PLAN VIEW

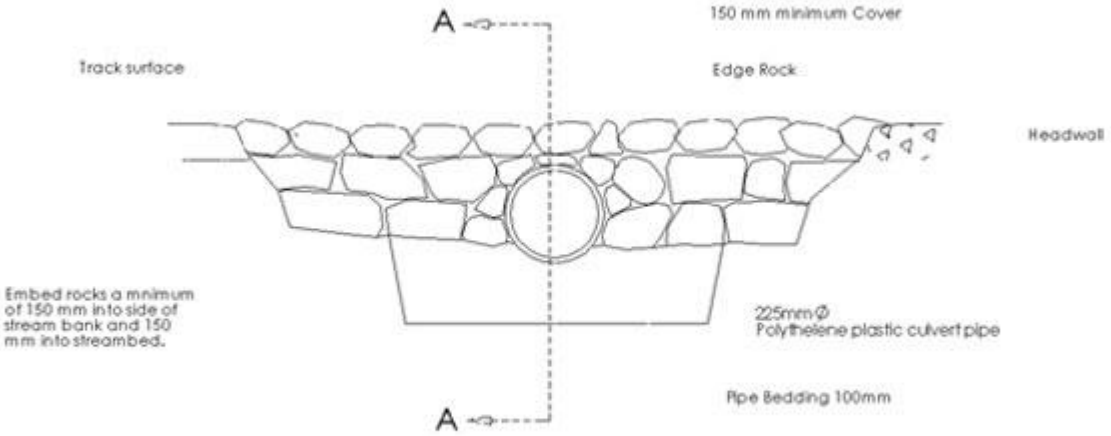


PROFILE

01/08 2-2

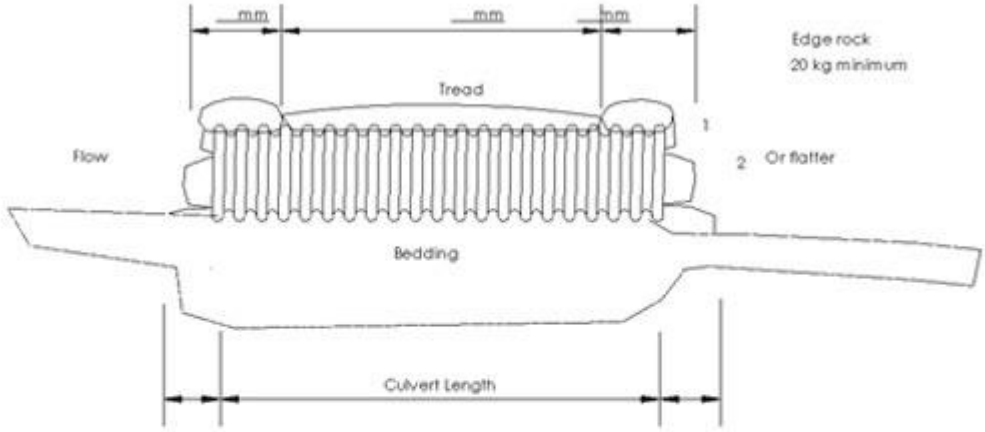
CULVERT WITH HEADWALLS

NOT TO SCALE



END VIEW

Headwall rocks:
20 kg minimum,
50% larger than
30 kg



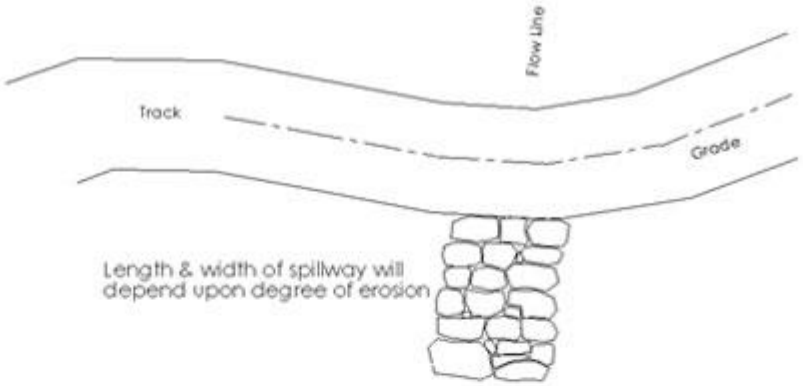
SECTION A-A

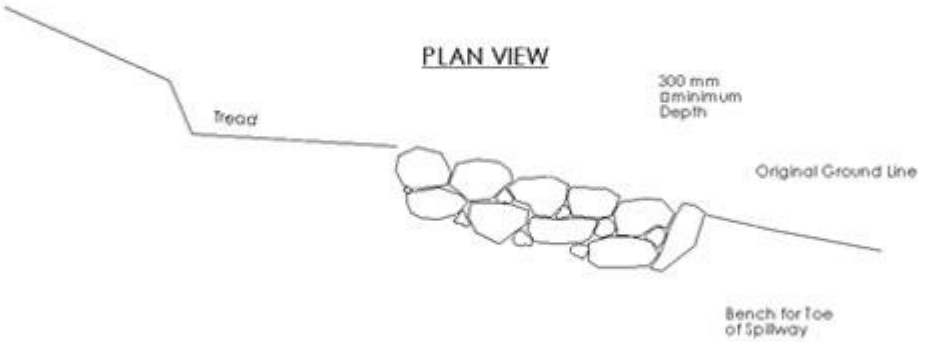
01/08

4-1

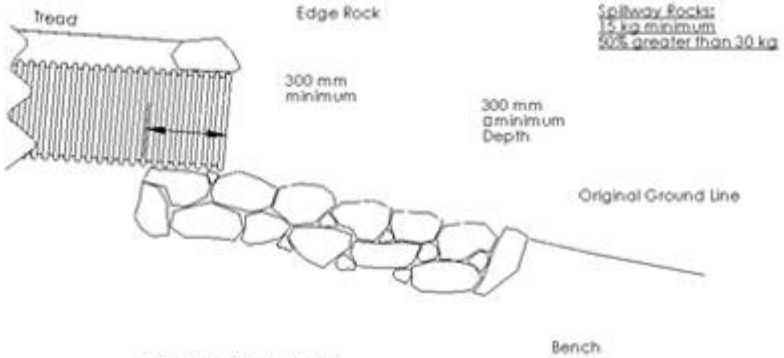
ROCK SPILLWAY

NOT TO SCALE





TYPICAL CROSS SECTION
DRAINAGE DIP OR CROSS DRAINAGE



TYPICAL CULVERT
CROSS SECTION

01/08

4-3

Appendix 5.

Erosion Sediment Control Plan

1 Introduction

Te Ara Mangawhero will be an extension of the Mountains to Sea – Ngā Ara Tūhono – and the government's New Zealand Cycle Trail Project – Ngā Haerenga.

The initial first 8.8km trail development is part of a multi-staged approach of the 19.3km trail known as Te Ara Mangawhero. The purpose of a multi-staged approach is to give confidence of construction methodology, minimal environmental impact, and trail management.

The proposed trail will be an easy, family friendly grade 2 trail that enables a high level of access by users of a wide range of ages and abilities. As the trail is a shared use trail, its design considers dual use and dual flow of users. The design has incorporated a range of tools to facilitate safe use by people on foot and on bike.

The trail will be minimum 1.2m wide with an all-weather surface placed on existing ballast foundations of the Bennett and Punch tramline and where the terrain permits the trail will extend to 1.8m wide to allow easy passing and shared use.

The Bennett and Punch 3m wide tramline allows for curvature and ability to soften the existing straight lines of the tramline. The intention is for the trail to meander through the regeneration and where possible to leave native trees above 2m in height that have established since the tramline has been retired.

The proposed trail development will traverse and highlight a wide range of ecologically and culturally significant forest and river margin habitats on the lower slopes of Ruapehu. The proposed route has been designed to maximise the use of previously disturbed sites/areas, and to avoid and minimise the potential for adverse effects on intact indigenous ecosystems.

2 Purpose of this report

Ruapehu Worx and Ruapehu District Council (RDC) are seeking to obtain the relevant consents for work to the new cycle/ walking bridges that cross the Mangawhero and Tutara Rivers within Tongariro National Park on the southern flanks of Mt Ruapehu (Ohakune).

This Erosion and Sediment Control Plan (ESCP) has been prepared to cover the construction of the new cycle trail bridges across the Mangawhero and tributaries.

The new trail will ensure walkers and cyclists have a safe wilderness experience which is separated from the Ohakune Mountain Road, the trail starts at Ohakune Junction and finishes at the Massey University Alpine Club Hut carpark.

This ESCP is only intended to cover construction of Phase 1 (the first 8.8km of Te Ara Managawhero), The first phase of the project comprises of the placement of a 1.5m wide trail network upon the existing Bennet and Punch tramline.

The Bennet and Punch tramline has regenerated native ground cover over an existing ballast rock and hard wood sleepers still in place, the existing tramline has presented a unique opportunity to establish a new trail network on an already formed bench. The trail construction requires removal of the native regenerated ground cover plants within the 1.2m -1.8meter-wide footprint of the proposed new trail and replaced with a compacted AP20 hardened surface.

The principal objective of erosion and sediment control is to avoid causing or accelerating the erosion of soils and limiting the extent and duration of any erosion or sediment generation.

Where this is not achievable, the secondary objective is the effective and efficient treatment of sediment discharges to avoid damaging effects to downstream waterbodies.

This ESCP will cover the following matters:

- Plan preparation
- Control measures
- Stabilisation
- Management
- Contingencies.
- Contact details of key personnel

3 ESCP PREPARATION

Preparation of this ESCP has involved the following:

- Site inspection
- Review of proposed engineering drawings
- Identification of appropriate erosion and sediment control techniques

The "Erosion and Sediment Control Guidelines for the Wellington Region, 2002, Re-printed June 2006" has been used to identify the erosion and sediment control measures appropriate for this project.

The primary measures to be implemented to avoid erosion and the generation of sediment are:

- Limiting the extent of earthworks by keeping the disturbed area to a minimum.
- Establishing stormwater controls to divert clean water away from earthwork areas
- Prompt stabilisation of disturbed ground

Good management will ensure that this ESCP is followed correctly and that the site is operated in a responsive manner. The following management initiatives are included within this ESCP:

- Regular inspections by Contractor, Engineer, and Horizon's staff.
- Training of and meetings with all project staff; and
- Regular maintenance of ESCP measures.

4 METHODOLOGIES

General

Referring to the maps attached in Appendix 1 pg34,35,36,37,38,39 the work comprises of the construction of 9 new cycle/ walking bridges over the Mangawhero and tributaries of Mangawhero and the re-establishment of 6237m of the existing Bennet and Punch Tramline.

Table 1 – Scope of sites within the riparian catchment:

Description	Length in Meters	Location on map
Bridge New	6	1.2.B
Bridge New	6	1.4.B
Bridge New	6	1.6.B
Bridge Existing water supply pipes adjacent	8	1.10.B
New bridge to replace existing	6	1.13B
Bridge New	6	2.5.B
New bridge over Tutara Stream	17	2.8.B
Mangawhero Old Bridge site to rebuild	34	3.6.B
Bridge old Bridge site to rebuild.	19	4.3.B

The proposed trail development will re-establish the existing gentle gradient/topography of Bennet and Punch Tramline whilst retain the majority of the re generation and vegetation. There will not be any significant excavations, so construction period is not anticipating any destabilised slopes or soil washing out a newly formed trail.

There are minimal proposed earthworks required to form the bridge approaches and will not result in batters with unstable slopes, it is anticipated that all sites only require some striping of vegetation on the existing abutments which are already in place.
Prior to any removal of vegetation, excavation or filling commences, all erosion and sediment control (ESC) measures associated with the area of earth works will be constructed in accordance the "Erosion and Sediment Control Guidelines for the Wellington Region".

The is no requirement to stockpile any earthworks or material at any of the Bridge locations, all approach ramps material will be compacted on day of placement and any bridge construction debris (if any) will be transferred off site.

Winter Work

No winter works or onsite construction is scheduled to happen during the winter period of 31st May to 30th September.

Sequence of new Trail Construction Work

The development of new trail network upon the existing Bennet and Punch tramline is a standing, fallen vegetation removal exercise whilst leaving the humus layer behind, creating a 2m wide corridor upon the existing Bennet and Punch tramline.

Excavations will be limited to minor on the existing Bennet and Punch and minimal for the development of new 216m connection trail between Tramline and existing 4WD access track.

For construction of earthworks for new trail:

- All precautions will be taken during the construction phase to minimise any sediment or erosion.
- Best practice construction means will be employed to ensure potential effects from machines (including biosecurity effects and hazardous materials / hydrocarbon spill effects) are minimised- eliminated and contained within the construction zone.
- Vegetation clearance will be kept to a minimum (forest floor and sub canopy species) and where possible the trail will be diverted around large trees and species of significance.
- On occasion a AP60 scoria base coarse will be used to build a base for the trail and create grade dips or crowned surface of trail, all aggregates will be compacted in layers not exceeding 100m in loose thickness.
- The Trail will be sloped outwards at 4% to encourage any runoff to go across the Trail.
- Trails will have a genital gradient not exceeding 6 degrees.
- Construction of grade dips, water diversion channels and decanting earth bunds.
- Placement 80% cut faced AP20 aggerate and compacted with vibration to create a hardened trail surface

Sequence of Bridge Construction Work

The sequencing of work reflects the two distinct construction components. The bridge structure and the bridge approaches.

Construction of bridge approaches is achieved by importing AP60 scoria compacted at 100mm thickness layers, this eliminates the requirement of earthworks or creating borrow pits to gain earth for creating approach ramps.

Construction of the abutment piles at each end of the bridge structure will be undertaken within the area where ESC measures have been established.

Abutments new require minimal earthworks to create a flat compacted site for the precast sleeper foundations installation and the existing abutment that will be reused require vegetation removed from around the base.

All vegetation cut to ground level only and leaving all existing vegetation at ground level enabling protection from erosion, no bare or exposed loose earth will be left around the base of new or existing abutments.

For construction of Abutments -piles and bridge approaches:

- Install silt fences around perimeter of proposed area of construction.

For construction of the 9 bridges, two methodologies' have been considered. Construction for the short span (6m and 8m) and the longer span (>8m) either from in-situ placing or from temporary staging works.

For construction from in-situ placing (longer spans):

- Minimum vegetation removal from the existing tramline were required to create a sufficiently safe working platform.
- Minimum excavation to allow for pile foundation placement, no loose soils or overburden will be left of site.
- All fabrication of bridge components will be completed of site.
- All timber decking, beams, balustrades, and handrails are to be pre-cut to length and all holes to be pre-drilled to eliminate potential for contaminants to enter river.
- All prefabricated components will be lifted into place by Helicopter

- Lifting capacity of Helicopter will require bridge beams to be lifted in modular or individually and placed on top of pile caps and secure
- Installation of safety barriers and other ancillary items will be completed while working from the bridge deck itself.

For construction from lifting in place (short spans):

- Undertake minor vegetation removal to existing tramline to create a sufficiently safe working platform.
- Excavation by either hand shovel or mechanical of an equally level from both sides of riverbanks a compacted platform to allow placement of precast sleeper foundation.
- Placement and securing of preconstructed bridges upon sleeper foundation.

In-River Works

In-river works will be carried out in accordance with Horizons Environmental Code of Practice for River Works - June 2010.

No In-river works are expected to be required in the construction of the 9 new bridges.

All activities carried out over the river shall be assessed multiple times each day to ensure no contaminants enter the river.

No excavators, power carriers or motorised machinery will be moving through or used in the river.

In the event of any contaminant spill into the river the contractor shall notify the RDC Utilities Manager and the Engineer's representative immediately. The contractor shall cease all work until the spill is contained and cleaned up. Work shall not recommence until the contractor has received such written advice from the RDC Utilities Manager and the Engineer's representative.

Where there is any potential for river levels to rise such that construction plant could be flooded, all construction plant, equipment and materials will be moved to safe levels.

Photo of existing abutment/piers of the 34m bridge over the Mangawhero river.

Intention to reuse all Abutments and Piers at this location significantly reducing risk of erosion or sediment movement. Some vegetation will be removed to allow placement of new timber structure, vegetation will be cut to ground level and removed from the abutments and piers.

ESC Measures

Silt Retention Ponds (SRP)

No SRPs are proposed for this project

Decanting Earth Bunds (DEB)

No DEBs are proposed for this project

Water Diversion Channels (WDC)

No DEBs are proposed for this project

Stabilisation and Revegetation.

As there is no intention to create stockpiles of overburden or requirement of large-scale earthworks outside the trail 2m wide footprint there is no requirement for stabilisation or revegetation.

All vegetation removed from the 2m wide footprint of new trail will be covered with an imported combination of a compacted hardened AP20 surface material or were applicable an imported compacted subbase of a AP60 Scoria.

MANAGEMENT

Roles and Responsibilities

The Contractor shall be responsible for:

- Implementing and managing the ESCP
- Inspections of implemented ES control measures
- Reporting on inspections undertaken

The Engineer shall be responsible for:

- Ensuring SESC staff visit the site after rain events to undertake the process to deal with any dirty water on site.
- Updating the ESCP
- Liaison with Horizons, DOC and RDC
- Independent inspections of implemented ES control measures

Meetings

As part of the regular site meetings held between the Contractor and the Engineer, there shall be a specific agenda item for erosion and sediment control. This item shall cover:

- Results of inspections undertaken by the Contractor, Engineer and Horizons.
- Programmed erosion and sediment-controlled works including maintenance activities.
- Potential risks based upon forecasted weather patterns.
- Opportunities for innovation and improvement.

Ruapehu WorX shall also hold daily toolbox meetings with all staff on site. At this meeting there shall be a specific agenda item for erosion and sediment control. These toolbox meetings are an effective way of quickly disseminating information and obtaining feedback. A record of these meetings detailing will be forwarded to the Engineer on request.

Flooding Risk

Construction of the works will require working near the river.

All practicable efforts will be undertaken to monitor forecasted and actual rain events and river levels to identify if heavy rainfall is likely to result in river levels with the potential to cause overtopping any temporary structures.

Horizons River Information Services provide automatic river height alerts to assist the contractor with daily planning.

It may be necessary at times to cease works within the riparian of the river if rainfall conditions and/or weather events are not considered suitable.

Ruapehu WorX is required to address the procedures for heavy rainfall and potential flooding in their Health and Safety Plan.

In the event of an un-forecasted heavy rainfall, all practicable measures will be taken to cease works and remove sediment and/or loose construction debris from within the river channel.

When the rainfall event has ceased and weather conditions are deemed suitable, and before construction works recommence, inspections will be undertaken as described below.

Inspections

During construction, on the first working day of each week or on the day before and the day following any rainfall event, Ruapehu WorX shall inspect all ES control measures to ensure they are operating correctly and achieving the erosion and sediment control objectives.

An example of an Erosion and Sediment Control Inspection sheet is attached.

If any ESC measure is found to not be operating correctly the following will occur:

- Cease work in the area
- Reduce the catchment area
- Construct additional ES control measures

In addition to the above inspections, the Engineer and Horizons will undertake their own inspections to ensure compliance with the consent conditions and the approved ESCP.

Within 24 hours of each inspection Ruapehu WorX shall provide the Engineer and Horizons with a copy of the report detailing non-compliance identified and the measures undertaken to rectify the non-compliance.

Information from the reporting provided by Ruapehu WorX will identify any performance issues with the ES control measures implemented. The Engineer will advise the Contractor of any actions required to improve performance of the ES control measures.

The success of implementing of the ESCP will be measured by the level of non–compliance identified during inspections and the time taken to remediate any non-compliance identified.

Updating

This ESCP is a “live document” and shall be updated as necessary through the duration of the project. Any proposed changes to this ESCP are required to be submitted to Horizons for acceptance before being implemented. At all times, the latest approved copy of this ESCP will be kept on site by Ruapehu WorX.

EMERGENCY

Should the site be subject to an earthquake, eruptions, extreme climatic event or human error, all ES control measures at this site shall be inspected to identify any resulting damage or failure.

Where ES control measures have been damaged or have failed, Ruapehu WorX shall as necessary:

- Redirect water away from areas of damage or failure by using appropriate ES measures such as temporary silt fences diversion channels or contour drains.
- Repair or replace the ES control measure, as necessary.
- Undertake surface stabilisation.

In the event that remedial work described above is not able to remediate the damage or failure encountered then RM will engage a suitable SESC to advise on solutions acceptable to the Engineer and Horizons.

KEY CONTACT DETAILS

Contact details of key people during the earthworks are as follows:

Contractor:	Principle- Ruapehu WorX – Paul Carr 0278395294
	Bridge contractor-Edifice - Andrew Hamilton 0272207840
ESC Consultant:	To be advised
Engineers Representative:	GHD- Gerrie Knoetze 021027040688

8 Erosion and Sediment Control Inspection

DATE: ……. TIME: ……

INSPECTED BY: …… SIGNATURE…….…

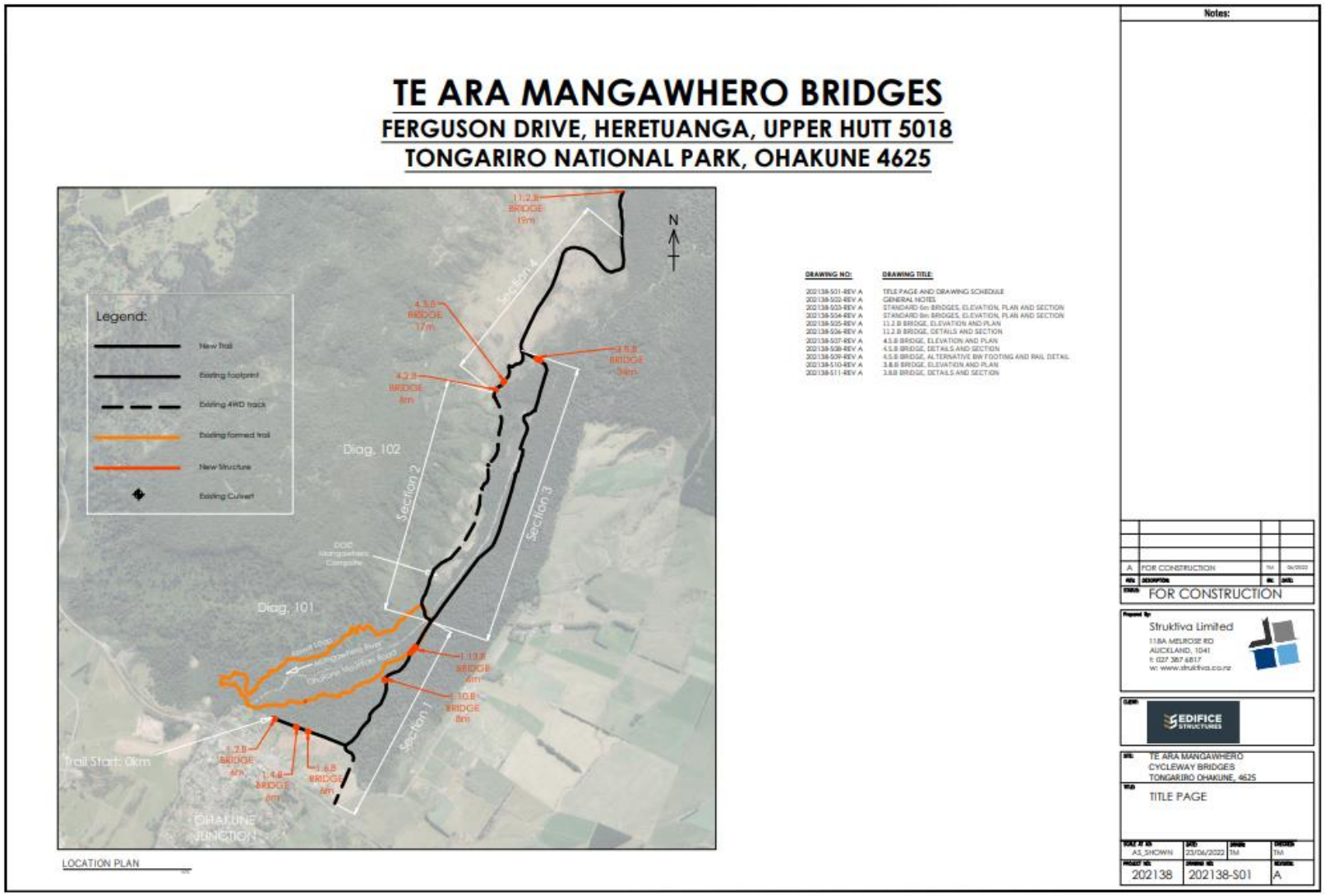
INSPECTIONS:

ESC MEASURE	REMDIAL WORK REQUIRED	
	YES	NO

REMEDIAL ACTIONS:

ESC MEASURE	DESCRIBE REMEDIAL ACTIONS REQUIRED	DATE COMPLETE

Appendix 6. Bridge and Boardwalk Design



TE ARA MANGAWHERO BRIDGES

FERGUSON DRIVE, HERETUANGA, UPPER HUTT 5018
TONGARIRO NATIONAL PARK, OHAKUNE 4625

LOCATION PLAN

DRAWING NO:	DRAWING TITLE:
202138-S01-REV A	TITLE PAGE AND DRAWING SCHEDULE
202138-S02-REV A	GENERAL NOTES
202138-S03-REV A	STANDARD 6m BRIDGES, ELEVATION, PLAN AND SECTION
202138-S04-REV A	STANDARD 8m BRIDGES, ELEVATION, PLAN AND SECTION
202138-S05-REV A	11.2.B BRIDGE, ELEVATION AND PLAN
202138-S06-REV A	11.2.B BRIDGE, DETAILS AND SECTION
202138-S07-REV A	4.5.B BRIDGE, ELEVATION AND PLAN
202138-S08-REV A	4.5.B BRIDGE, DETAILS AND SECTION
202138-S09-REV A	4.5.B BRIDGE, ALTERNATIVE BW FOOTING AND RAIL DETAIL
202138-S10-REV A	3.8.B BRIDGE, ELEVATION AND PLAN
202138-S11-REV A	3.8.B BRIDGE, DETAILS AND SECTION

Notes:

A	FOR CONSTRUCTION	TM	06/2022

FOR CONSTRUCTION

Struktiva Limited
118A MELROSE RD
AUCKLAND, 1041
t: 027 387 6817
w: www.struktiva.co.nz

EDIFICE STRUCTURES

TE ARA MANGAWHERO
CYCLEWAY BRIDGES
TONGARIRO OHAKUNE, 4625

TITLE PAGE

SCALE AT A3	DATE	DRAWN	CHECKED
AS SHOWN	23/06/2022	TM	TM

PROJECT NO.	DRAWING NO.	REVISION
202138	202138-S01	A

RUAPEHU WORX
Hapaitia te ora

GENERAL

1. UNLESS OTHERWISE NOTED, ALL LEVELS ARE IN METERS, AND ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS SHALL NOT BE OBTAINED BY SCALING FROM DRAWINGS.
3. ALL DISCREPANCIES SHALL BE REFERRED TO THE DESIGN ENGINEER FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
4. WHERE THE CONTRACTORS PROPOSAL AND THESE DRAWINGS ARE BASED UPON THE BRIDGE SPANS PROVIDED BY THE CLIENT FOR THE PURPOSES OF PRICING THE CONTRACTOR SHALL CONFIRM ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF WORK. WHERE ANY DISCREPANCY IS FOUND BETWEEN THE CLIENT MEASUREMENT AND AS-FOUND REQUIREMENTS THESE DESIGNS, PRICE AND TIME SHALL BE REVISED.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN, INSTALLATION AND MAINTENANCE OF ALL NECESSARY TEMPORARY WORKS TO ENSURE STRENGTH AND STABILITY OF THE STRUCTURE AND ADEQUATE SUPPORT TO THE EXISTING SERVICES THROUGHOUT THE COURSE OF THE WORKS.
6. WHERE PROPRIETARY PRODUCTS ARE SPECIFIED IN THE DOCUMENTS THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE PRODUCT FOR APPROVAL.
7. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CURRENT CODES OF PRACTICE EXCEPT WHERE VARIED BY THE SPECIFICATION AND/OR DRAWINGS.
   - AS/NZS 1170 STRUCTURAL DESIGN ACTIONS
   - AS/NZS 4680 HOT DIP GALVANISED (ZINC) COATINGS ON FABRICATED FERROUS ARTICLES
   - AS/NZS 2312 GUIDE TO THE PROTECTION OF IRON AND STEEL AGAINST EXTERIOR ATMOSPHERIC CORROSION
   - NZS 3101 CONCRETE STRUCTURES STANDARD
   - NZS 3104 SPECIFICATION FOR CONCRETE PRODUCTION
   - NZS 3109 CONCRETE CONSTRUCTION
   - NZS 3114 CONCRETE SURFACE FINISHES
   - NZS 3111 METHODS OF TEST FOR WATER AND AGGREGATE FOR CONCRETE
   - NZS 3112 METHODS OF TEST FOR CONCRETE
   - NZS 3121 SPECIFICATION FOR WATER AND AGGREGATE FOR CONCRETE
   - NZS 3404 STEEL STRUCTURES PARTS 1&2
   - NZS 3603 TIMBER STRUCTURES STANDARD
   - NZS 4711 QUALIFICATION TESTS FOR MANUAL METAL ARC WELDERS
   - NZS 4761 CODE OF PRACTICE FOR SAFETY IN WELDING AND CUTTING
   - AS/NZS 1554.1 PART 1: WELDING OF STEEL STRUCTURES
   - AS/NZS 2980 QUALIFICATION OF WELDERS FOR FUSION WELDING OF STEELS
   - AS/NZS 3678 HOT-ROLLED PLATES, FLOORPLATES AND SLABS
   - AS/NZS 3679 HOT-ROLLED BARS AND SECTIONS PARTS 1&2
   - AS/NZS 4671 STEEL REINFORCING MATERIALS
   - AS/NZS 4680 HOT DIP GALVANISED COATINGS ON FABRICATED FERROUS ARTICLES

FOUNDATIONS

1. CONTRACTOR TO CHECK LOCATION OF EXISTING SERVICES PRIOR TO ANY EXCAVATION. NOTIFY ENGINEER OF ANY CONFLICTS AND AWAIT APPROVAL BEFORE PROCEEDING.
2. PROPOSED EXCAVATION WORKS SHOULD BE KEPT FREE OF WATER. PROVIDE ADEQUATE DRAINAGE TO ENSURE FORMATION IS NOT AFFECTED BY MOISTURE. PREVENT FOUNDATION DRYING OUT DUE TO EXPOSURE. PLACE BLINDING, FOOTINGS AND BACKFILL AS SOON AS PRACTICABLE AFTER EXCAVATION.
3. ENSURE EXCAVATIONS ARE STABLE AND PROTECT SURROUNDING PROPERTY AND SERVICES FROM ADVERSE EFFECTS OF GROUND WORKS. PROVIDE TEMPORARY SHORING WORKS DURING CONSTRUCTION AS REQUIRED
4. NO BACKFILLING OR HARDFILLING SHALL BE DONE UNTIL THE WORK HAS BEEN INSPECTED BY THE ENGINEER.

CONCRETE

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH NZS 3104:1991 AND NZS 3109:1997.
2. FOUNDATIONS GENERALLY TO COMPLY WITH NZS 3109 EXCEPT AS VARIED BY DRAWINGS.
3. GIVE NOTICE TO ENGINEER AND CONTRACT ADMINISTRATOR, AT LEAST 24 HOURS PRIOR TO FOUNDATION INSPECTION BEING REQUIRED. AT INSPECTION FOUNDATION TO BE CLEAR OF OBSTRUCTIONS LIKE, BACKFILL, SITE CONCRETE AND REINFORCING.
4. USE FALSEWORK AND FORMWORK OF SUFFICIENT STRENGTH TO RETAIN AND SUPPORT THE WET CONCRETE TO THE REQUIRED PROFILES AND TOLERANCES. SELECT FORMWORK FINISH TO PRODUCE THE SPECIFIED FINISHED QUALITY. ENSURE TIMBER OR PLYWOOD USED FOR FORMWORK IS NON-STAINING TO THE SET CONCRETE.
5. SECURELY FIX AND BRACE FORMWORK SUFFICIENTLY TO SUPPORT LOADS AND WITH JOINTS AND LININGS TIGHT ENOUGH TO PREVENT WATER LOSS.
6. CLEAN FORMWORK. KEEP FORMWORK WET BEFORE CONCRETE IS PLACED.
7. UNLESS STATED OTHERWISE SPECIFIED CONCRETE STRENGTH AT 28 DAYS SHALL BE 17.5 MPA.
8. MAXIMUM AGGREGATE SIZE 19MM READY-MIXED TO NZS 3104. PROVIDE DELIVERY DOCKETS LISTING MIX AND DESPATCH DETAILS FROM AN APPROVED READYMIX PLANT SUITABLY GRADED IN ACCORDANCE WITH NZRMC (BASED ON NZS 3104:1991).
9. CALCIUM CHLORIDE SHALL NOT BE USED.
10. CONCRETE SHALL NOT BE PUMPED WITHOUT THE ENGINEER'S PRIOR APPROVAL.
11. CONCRETE ADMIXES SHALL NOT BE USED WITHOUT ENGINEERS APPROVAL.
12. CONCRETE IS TO BE SUITABLY VIBRATED TO ENSURE FULL COMPACTION. THE METHOD OF VIBRATION MUST BE IN ACCORDANCE WITH NZS 3109.
13. ALL EXPOSED CONCRETE SURFACE SHALL BE TO NZS 3114 F5 FINISH.
14. TOLERANCES TO BE AS PER NZS 3109.
15. CURE CONCRETE IN ACCORDANCE WITH NZS 3109 FOR 7 DAYS.
16. DO NOT MAKE HOLES, PENETRATIONS, RECESSES, CHASES, (OTHER THAN THOSE SHOWN ON DRAWINGS) WITHOUT APPROVAL OF ENGINEER.

STRUCTURAL TIMBER

1. ALL TIMBER CONSTRUCTION, SHALL BE IN ACCORDANCE WITH NZS 3603.
2. ALL SAWN TIMBER SHALL BE H3.2 OR H5 TREATED, AND OF STRUCTURAL GRADE SG8. ALL ORDERS OF TIMBER SHALL BE APPROVED PRIOR TO PLACEMENT OF THE ORDER.
3. MAIN BRIDGE BEAMS SHALL BE GL10, H3.2 TREATED. ALL OTHER GLULAM MEMBERS SHALL BE GL8 H3.2 TREATED TIMBER.
4. ALL BOLT FIXING TO TIMBER SHALL BE STAINLESS STEEL GRADE 316 UNLESS NOTED OTHERWISE.
5. ALL BOLT FIXINGS SHALL BE PROVIDED WITH A WASHER AT EACH END OF SIZE NOT LESS THAN:
   - 50×50×5mm FOR BOLTS NOT EXCEEDING 20mm DIAMETER
   - 65×65×6mm FOR BOLTS 20mm AND LARGER DIAMETER

SAFETY IN DESIGN

1. THE SAFETY RISK MITIGATION ITEMS BELOW ARE BASED ON DESIGN OFFICE EXPERIENCE AND DO NOT NECESSARILY ACCOUNT FOR ALL CONSTRUCTION, OPERATION, MAINTENANCE AND DEMOLITION SAFETY RISKS. BASED ON INFORMATION AVAILABLE WHEN THIS DRAWING WAS MADE, IN ITS CAPACITY AS DESIGNER ONLY.
2. OPERATION, MAINTENANCE AND DEMOLITION PHASES OF THE ASSET, INCLUSION [OR NOT] OF ANY ITEM DOES NOT REDUCE OR LIMIT OBLIGATIONS OF CONSTRUCTOR, USER, MAINTAINER AND DEMOLISHER TO UNDERTAKE APPROPRIATE RISK MANAGEMENT ACTIVITIES TO REDUCE RISK.
3. CONSTRUCT BUILDING ELEMENTS THAT CONTRIBUTE TO SAFETY, SUCH AS HANDRAILS AND TOE BOARDS, FALL ARREST SYSTEMS, ACCESS STAIRS, etc AS EARLY AS POSSIBLE.
4. PROVIDE SAFETY BARRIERS AT EDGES OF OPENINGS AND ELEVATED AREAS.
5. P REVIEW ADEQUACY OF WORKING SPACE AVAILABLE FOR CONSTRUCTION ACTIVITIES. ENSURE SEPARATION OF PLANT AND PERSONNEL ON SITE, INCLUDING MOVEMENTS OF BOTH.
6. LOCATE LIFTING SLEW AND LAY DOWN AREAS AWAY FROM REGULAR CONSTRUCTION TRAFFIC.
7. PROVIDE PROTECTION TO PERSONNEL FROM PLANT AND EQUIPMENT.
8. ENSURE ISOLATION SAFE SYSTEMS OF WORK OR PROTECTIVE MEASURES ARE INSTALLED BEFORE WORKING NEAR LIVE ELECTRICAL INFRASTRUCTURE. PROVIDE PROTECTION OF ELECTRICAL OVERHEAD WIRING SYSTEMS DURING CONSTRUCTION.
9. WRITTEN RISK ASSESSMENTS ARE ADVISED FOR ACCESS TO OPEN EXCAVATIONS.
10. PROVIDE ACCESS AND EGRESS TO EXCAVATIONS APPROPRIATE IN CASE OF INUNDATION, COLLAPSE OR ENGULFMENT.
11. LOCATE STOCKPILES AND HEAVY EQUIPMENT INCLUDING CRANES AWAY FROM BURIED SERVICES AND BUILDING BOUNDARIES WHERE ADJACENT BASEMENTS ARE PRESENT.
12. SEEK ADVICE FROM SUITABLY QUALIFIED GEOTECHNICAL OR STRUCTURAL ENGINEER PRIOR TO OPERATION OF HEAVY SURFACE PLANT AND EQUIPMENT OR STOCKPILING MATERIAL NEAR OPEN EXCAVATIONS OR EXISTING RETAINING STRUCTURES.
13. DO NOT STOCKPILE MATERIALS BEHIND OR EXCAVATE IN FRONT OF EXISTING RETAINING WALLS UNTIL WALL STABILITY HAS BEEN REVIEWED BY SUITABLY QUALIFIED STRUCTURAL ENGINEER.
14. SEEK ADVICE FROM SUITABLY QUALIFIED STRUCTURAL ENGINEER BEFORE LAYING SERVICES BELOW EXISTING FOOTING LEVELS.
15. HAVE LOAD CAPACITY OF STRUCTURES VERIFIED BY SUITABLY QUALIFIED STRUCTURAL ENGINEER BEFORE LOADING OR STORING MATERIALS ON EXISTING OR PARTIALLY COMPLETED STRUCTURAL ELEMENTS.
16. SEEK ADVICE FROM SUITABLY QUALIFIED STRUCTURAL ENGINEER IF PLANNING CRANE LIFTS OR HOIST INSTALLATION ON PARTIALLY ERECTED OR SUSPENDED STRUCTURES.
17. SEEK ADVICE FROM SUITABLY QUALIFIED STRUCTURAL ENGINEER BEFORE CORING, CHASING, CUTTING OR REMOVAL OF EXISTING CONCRETE AND REINFORCEMENT.
18. HAVE SUITABLY QUALIFIED STRUCTURAL ENGINEER UNDERTAKE STRUCTURAL CHECK OF EXISTING CONCRETE, MASONRY AND STUD WALLS WHERE FIXINGS OR EQUIPMENT IS TO BE ATTACHED.
19. INSTRUCT SERVICES CONTRACTORS UNDER NO CIRCUMSTANCES CAN STRUCTURAL MEMBERS BE CUT, NOTCHED OR DRILLED TO ACCOMMODATE NEW SERVICES.
20. ESTABLISH LOCATIONS OF LIVE EMBEDDED SERVICES BEFORE CUTTING THROUGH SLABS, etc.
21. DEVELOP STEELWORK / PRECAST / TILT UP INSTALLATION SAFE WORK METHOD STATEMENT TO ELIMINATE AND MINIMISE INSTALLATION RISKS, AND HAVE REVIEWED BY SUITABLY QUALIFIED STRUCTURAL ENGINEER PRIOR TO ERECTION.
22. DO NOT CUT OR UNBOLT ANY STRUCTURAL MEMBERS WITHOUT SEEKING REVIEW BY SUITABLY QUALIFIED STRUCTURAL ENGINEER.
23. PROVIDE BUCKLING STABILITY TO LONG SPAN BEAMS, TRUSSES etc DURING ERECTION. IF UNSURE, CHECK WITH SUITABLY QUALIFIED STRUCTURAL ENGINEER PRIOR TO LIFTING AND INSTALLATION.
24. MINIMIZE SITE BASED TREATMENTS (eg WELDING, CUTTING, SPRAY PAINTING, GRIT BLASTING, etc). PROVIDE ADEQUATE PROTECTION, SCREENING AND VENTILATION TO MINIMIZE HAZARDS TO PERSONNEL IF SITE BASED TREATMENT IS UNAVOIDABLE TRY TO AVOID WORKING IN CONFINED SPACES. IF CONFINED SPACES WORK CANT BE AVOIDED, PROVIDE SAFE WORK METHOD STATEMENT ADDRESSING MITIGATION OF RISKS. PROVIDE ADEQUATE SIGNAGE TO TEMPORARY AND PERMANENT CONFINED SPACES TO AS2865.
25. AVOID HOT WORKS ON SITE PARTICULARLY IN TIMBER FRAMED STRUCTURES. HOT WORKS TO COMPLY WITH CLIENT PROCEDURES FOR APPLICABLE "HOT WORKS PERMITS".
26. DETERMINE APPROPRIATE METHOD OF PAINT REMOVAL AND DISPOSAL BEFORE STRIPPING PAINT, PARTICULARLY ON HISTORIC STRUCTURES. COATINGS CONTAINING COAL TAR EPOXIES, BITUMENS AND ASPHALTS, ZINC CHROMATE AND LEAD PRESENT A HEALTH RISK. PROVIDE SCREENING TO PUBLIC AND ENVIRONMENT FOR PAINT REMOVAL AND CLEANING OPERATIONS. USE ENVIRONMENTALLY APPROPRIATE RESTORATION METHODS DURING MAINTENANCE AND REPAIR WORK.
27. MAKE WORK AREAS SAFE WHERE STRUCTURAL ELEMENTS ARE DAMAGED, CRACKED OR HAVE SUFFERED SIGNIFICANT SECTION LOSS BEFORE ALLOWING GENERAL CONSTRUCTION OR REPAIR ACCESS.
28. REPORT SIGNIFICANT SECTION LOSS OR CORROSION FLAKING BEFORE STARTING PAINTING OR REPAIRS. CONSULT SUITABLY QUALIFIED STRUCTURAL ENGINEER IF SECTION LOSS OR EXTENSIVE CORROSION FLAKING PRESENT BEFORE PROCEEDING WITH WORK.
29. REPORT LOOSE OR MISSING BOLTS etc IN CONNECTIONS ENCOUNTERED DURING DAY TO DAY OPERATIONS.

ABBREVIATIONS ON THE DRAWINGS ARE AS FOLLOWS:

MAX - MAXIMUM
MIN - MINIMUM
FPBW - FULL PENETRACTION BUTT WELD
FSBW - FULL STRENGTH BUTT WELD TOW TOP OF WALL
FW - FILLED WELD
FWAR - FILLET WELD ALL ROUND
SS - GRADE 304 STAINLESS STEEL

DESIGN LOADS

1. 4kPa AS PER NZS1170 AND SNZ HB 8630
2. IL - 2, 50 YEAR DESIGN LIFE

Notes:

A.	FOR CONSTRUCTION	TM	06/2022
REV.	DESCRIPTION	BY	DATE

STATUS: FOR CONSTRUCTION

Prepared By
Struktiva Limited
118A MELROSE RD
AUCKLAND, 1041
t: 027 387 6817
w: www.struktiva.co.nz

CLIENT: EDIFICE STRUCTURES

SITE: TE ARA MANGAWHERO CYCLEWAY BRIDGES TONGARIRO OHAKUNE, 4625

TITLE: GENERAL NOTES

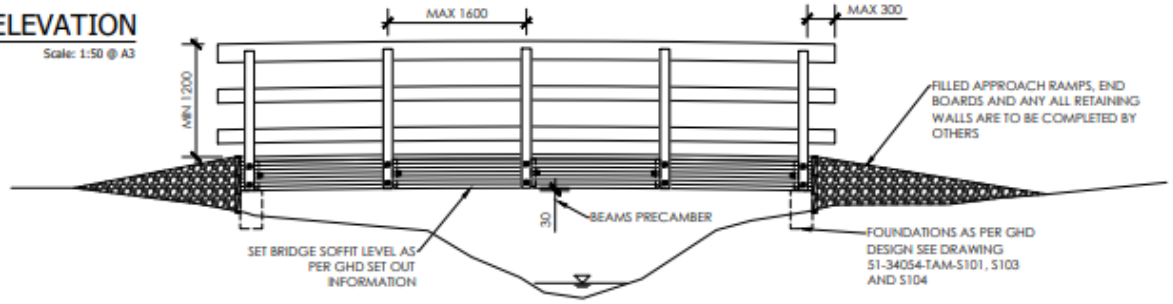
SCALE @ A3	DATE	DRAWN	CHECKED
AS_SHOWN	23/06/2022	TM	TM

PROJECT NO.	DRAWING NO.	REVISION
202138	202138-S02	A

RUAPEHU WORX
Hapaitia te ora

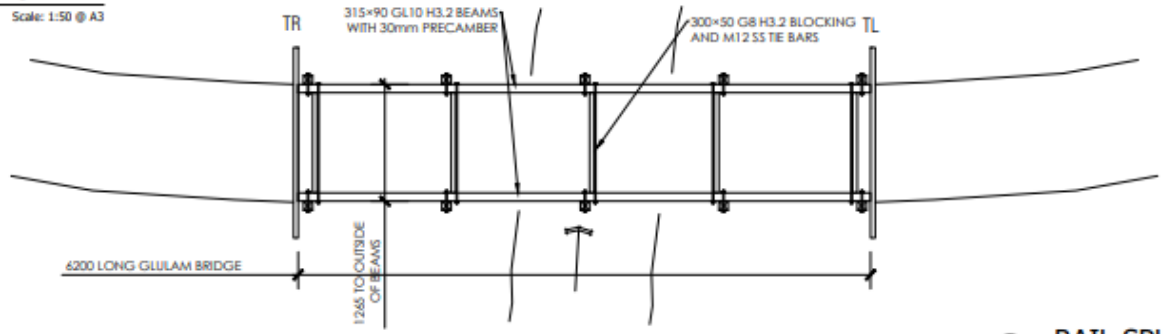
01 6m BRIDGE ELEVATION

Scale: 1:50 @ A3



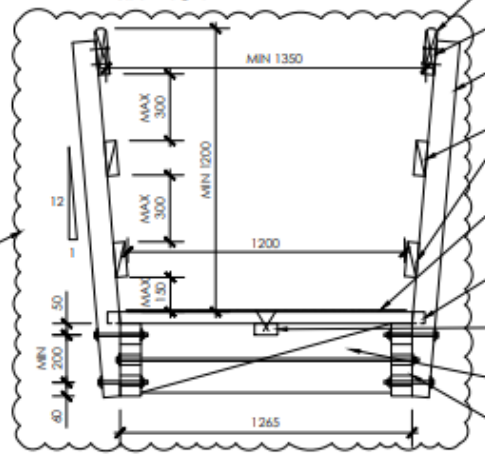
02 6m BRIDGE PLAN

Scale: 1:50 @ A3



A S03 6m BRIDGE SECTION

Scale: 1:20 @ A3



190×45 G8 H3.2 DRESSED TOP RAIL WITH 20mm RADIUS TO TOP EDGES

2-100 ×14G SS BUGLE BATTEN SCREWS 4- SCREWS AT TOP RAIL SPLICE

100×100 G8 H3.2 BALUSTER POSTS @ MAX 1600 CRS FIXED WITH 2-M12 SS 316 ENG BOLTS

150×50 G8 H3.2 ROUGH SAWN MID AND BOTTOM RAIL FIXED WITH 2-100×3.15mm GALV NAILS

1100 WIDE TENSAR SS20 GEOGRID MESH FIXED WITH 19mm SS STAPLES @ 100 CRS ALONG THE EDGES AND 200 CRS INTERNALLY

150×50 G8 H3.2 AND 1375 LONG DECKING PLANKS 15mm GAPS FIXED TO EACH BEAM WITH 2-100×3.15mm GALV NAILS

100×50 CENTRAL CLEAT FIX WITH 2-100×4mm FH SKEW NAILS TO EACH PLANK

300×50 G8 H3.2 BLOCKING WITH M12 SS 316 TIE BAR WITHIN 150mm OF EACH BALUSTER POST

315×90 GL10 H3.2 BEAM WITH 30mm PRECAMBER

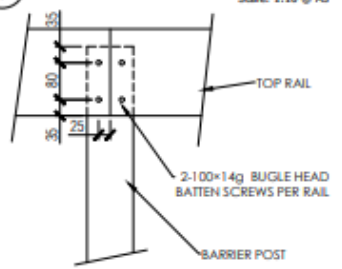
REFER TO GHD DRAWINGS FOR FIXING TO BRIDGE FOOTINGS 51-34054-TAM-S101, S103 AND S104

CHANGES TO GHD DESIGN:

- STEEL BEAMS TO GLULAM BEAMS WITH TIMBER BLOCKING
- DECK PLANKS CHANGED FROM 200×50 TO 150×50
- TOP RAIL CHANGED TO 190×45 DEEP TO ENSURE 1200 HEIGHT CAN BE ACHIEVED
- MID AND BOTTOM RAIL CHANGED TO 150×50 TO ENSURE HORIZONTAL GAPS LESS THAN 300mm
- FIXING CHANGED TO NAILS FOR MID AND BOTTOM RAIL AND BUGGLE HEAD SCREWS FOR TOP RAIL
- BALUSTER POST SPACING CHANGED TO MAXIMUM 1600mm TO ENSURE COMPLIANCE WITH NZS1170

06 S04 RAIL SPLICE DETAIL

Scale: 1:10 @ A3



Notes:

NOTE:
USER GROUP DV AS PER HB SNZ B630
DECK DESIGN LOAD: 4kPa× 0.9 = 3.6kPa
1200kg SERVICE VEHICLE
BARRIER DESIGN LOAD: 0.36kN/m

A	FOR CONSTRUCTION	TM	04/2022
REV.	DESCRIPTION	BY	DATE

STATUS: FOR CONSTRUCTION

Prepared By
Struktiva Limited
118A MELROSE RD
AUCKLAND, 1041
t: 027 387 6817
w: www.struktiva.co.nz

CLIENT: EDIFICE STRUCTURES

JOB: TE ARA MANGAWHERO CYCLEWAY BRIDGES
TONGARIRO OHAKUNE, 4625

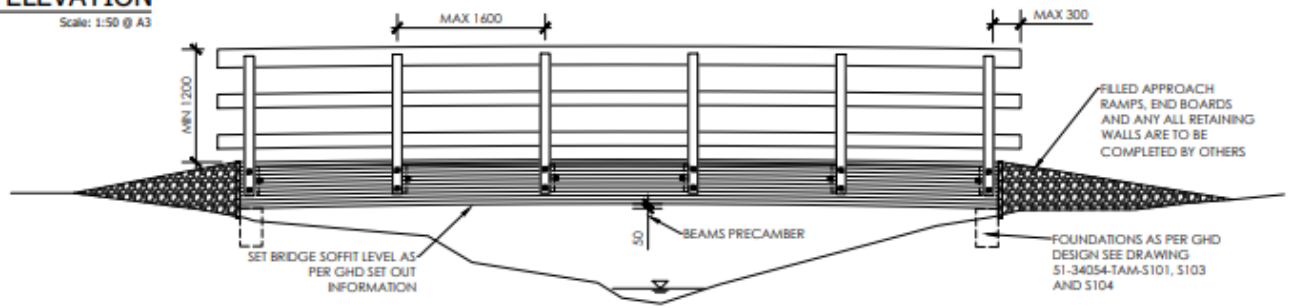
TITLE: STANDARD 6m BRIDGES ELEVATION, PLAN AND SECTION

SCALE AT A3	DATE	DRAWN	CHECKED
AS SHOWN	25/04/2022	TM	TM

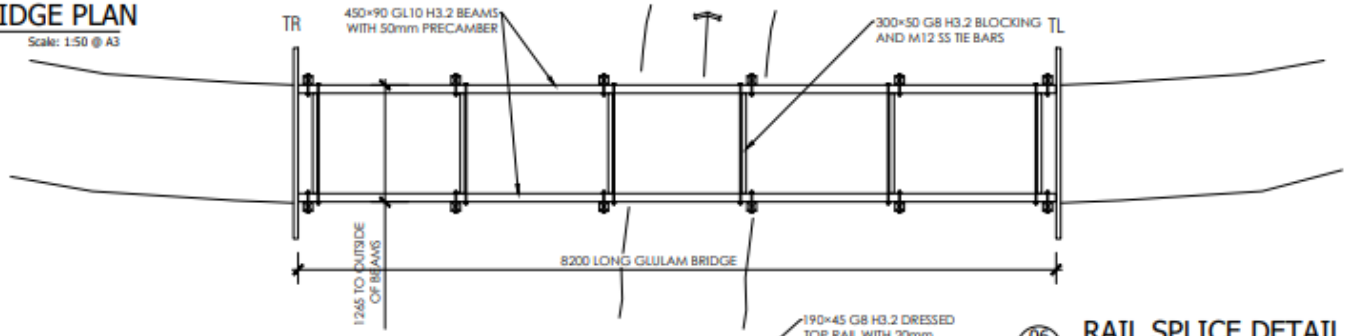
PROJECT NO.	DRAWING NO.	REVISION
202138	202138-S03	A

RUAPEHU WORX
Hapaitia te ora

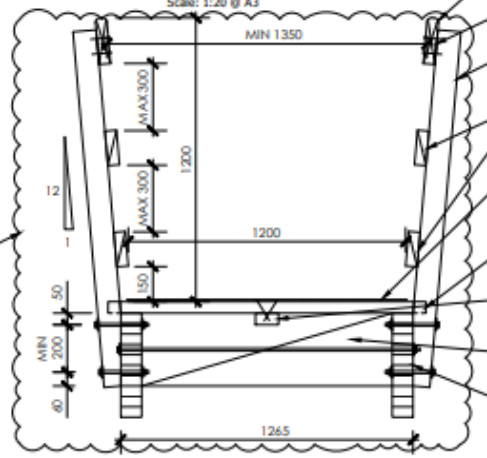
04 8m BRIDGE ELEVATION
Scale: 1:50 @ A3



05 8m BRIDGE PLAN
Scale: 1:50 @ A3



B S04 8m BRIDGE SECTION
Scale: 1:20 @ A3



190×45 G8 H3.2 DRESSED TOP RAIL WITH 20mm RADIUS TO TOP EDGES

2-100 ×14G SS BUGLE BATTEN SCREWS 4- SCREWS AT TOP RAIL SPLICE

100×100 G8 H3.2 BALUSTER POSTS @ MAX 1600 CRS FIXED WITH 2-M12 SS 316 ENG BOLTS

150×50 G8 H3.2 ROUGH SAWN MID AND BOTTOM RAIL FIXED WITH 2-100×3.15mm GALV NAILS

1100 WIDE TENSAR SS20 GEOGRID MESH FIXED WITH 19mm SS STAPLES @ 100 CRS ALONG THE EDGES AND 200 CRS INTERNALLY

150×50 G8 H3.2 1375 LONG DECKING PLANKS 15mm GAPS FIXED TO EACH BEAM WITH 2-100×3.15mm GALV NAILS

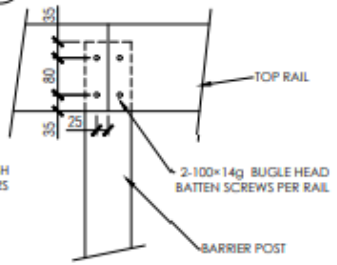
100×50 CENTRAL CLEAT FIX WITH 2-100×4mm FH SKEW NAILS TO EACH PLANK

300×50 G8 H3.2 BLOCKING WITH M12 SS 316 TIE BAR WITHIN 150mm OF EACH BALUSTER POST

450×90 GL10 H3.2 BEAM WITH 50mm PRECAMBER
REFER TO GHD DRAWINGS FOR FIXING TO BRIDGE FOOTINGS S1-34054-TAM-S101, S103 AND S104

CHANGES TO GHD DESIGN:
- STEEL BEAMS TO GLULAM BEAMS WITH TIMBER BLOCKING
- DECK PLANKS CHANGED FROM 200×50 TO 150×50
- TOP RAIL CHANGED TO 190×45 DEEP TO ENSURE 1200 HEIGHT CAN BE ACHIEVED
- MID AND BOTTOM RAIL CHANGED TO 150×50 TO ENSURE HORIZONTAL GAPS LESS THAN 300mm
- FIXING CHANGED TO NAILS FOR MID AND BOTTOM RAIL AND BUGGLE HEAD SCREWS FOR TOP RAIL
- BALUSTER POST SPACING CHANGED TO MAXIMUM 1600mm TO ENSURE COMPLIANCE WITH NZS1170

06 S04 RAIL SPLICE DETAIL
Scale: 1:10 @ A3



Notes:

NOTE:
USER GROUP DV AS PER HB SNZ 8630
DECK DESIGN LOAD: 4kPa× 0.9 = 3.6kPa
1200kg SERVICE VEHICLE
BARRIER DESIGN LOAD: 0.36kN/m

A	FOR CONSTRUCTION	TM	04/2022
REV.	DESCRIPTION:	BY	DATE:

STATUS: FOR CONSTRUCTION

Prepared By
Struktiva Limited
118A MELROSE RD
AUCKLAND, 1041
t: 027 387 6817
w: www.struktiva.co.nz

CLIENT: EDIFICE STRUCTURES

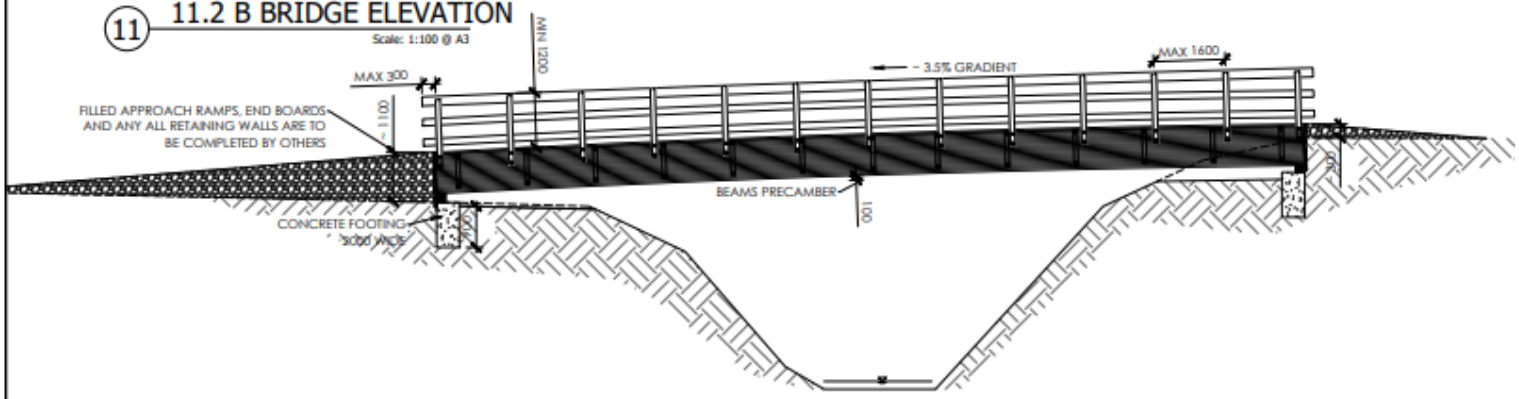
SITE: TE ARA MANGAWHERO CYCLEWAY BRIDGES TONGARIRO OHAKUNE, 4625

TITLE: STANDARD 8m BRIDGES ELEVATION, PLAN AND SECTION

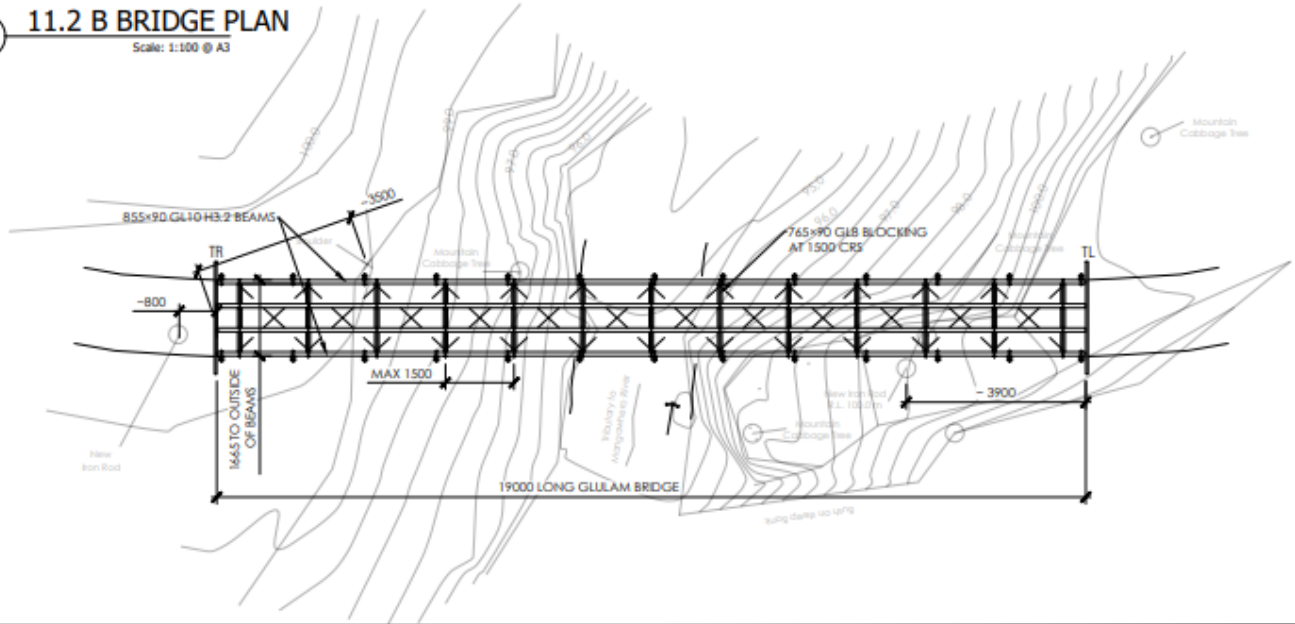
SCALE @ A3:	DATE:	DRAWN:	CHECKED:
AS_SHOWN	23/06/2022	TM	TM
PROJECT NO:	DRAWING NO:		REVISION:
202138	202138-S04		A

RUAPEHU WORX
Hapaitia te ora

11 11.2 B BRIDGE ELEVATION
Scale: 1:100 @ A3



12 11.2 B BRIDGE PLAN
Scale: 1:100 @ A3



Notes:

NOTE:
USER GROUP DV AS PER HB SNZ 8630
DECK DESIGN LOAD: 4kPa× 0.9 = 3.6kPa
3000kg SERVICE VEHICLE
BARRIER DESIGN LOAD: 0.36kN/m

A	FOR CONSTRUCTION	TM	07/2022
REV.	DESCRIPTION	BY	DATE

STATUS: FOR CONSTRUCTION

Prepared By:
Struktiva Limited
118A MELROSE RD
AUCKLAND, 1041
t: 027 387 6817
w: www.struktiva.co.nz

CLIENT: EDIFICE STRUCTURES

JOB: TE ARA MANGAWHERO CYCLEWAY BRIDGES
TONGARIRO OHAKUNE, 4625

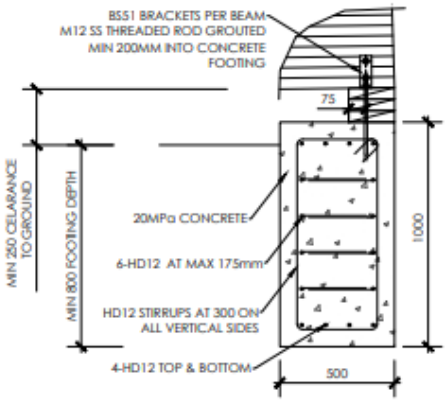
TITLE: 11.2 B BRIDGE ELEVATION AND PLAN

SIZE @ A3	DATE	DRAWN	CHECKED
AS SHOWN	25/06/2022	TM	TM
PROJECT NO.	DRAWING NO.	REVISION
202138	202138-S05	A

RUAPEHU WORX
Hapaitia te ora

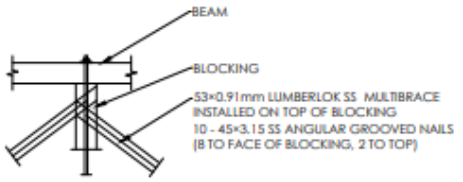
13 S05 FOOTING DETAIL

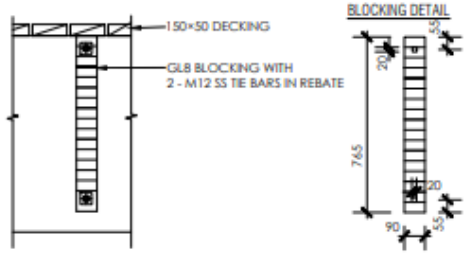
Scale: 1:20 @ A3



14 S05 BLOCKING AND BRACING DETAIL

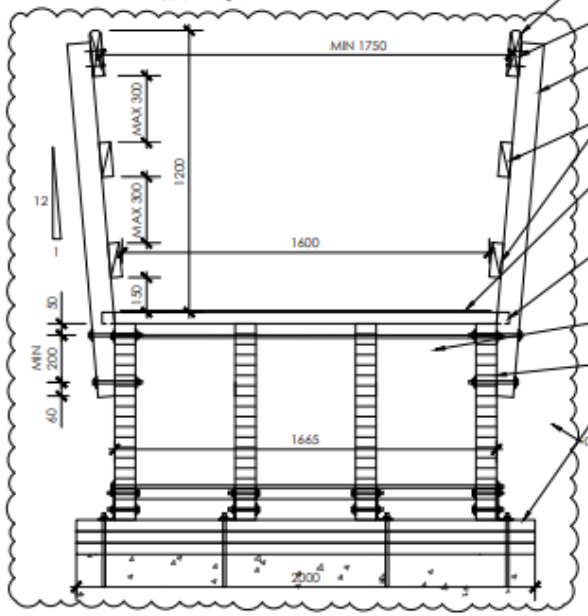
Scale: 1:20 @ A3





C S05 11.2 B BRIDGE SECTION

Scale: 1:20 @ A3



190×45 G8 H3.2 DRESSED TOP RAIL WITH 20mm RADIUS TO TOP EDGES

2-100 ×14G SS BUGLE BATTEN SCREWS 4- SCREWS AT TOP RAIL SPLICE

100×100 G8 H3.2 BALUSTER POSTS @ MAX 1600 CRS FIXED WITH 2-M12 SS 316 ENG BOLTS

150×50 G8 H3.2 ROUGH SAWN MID AND BOTTOM RAIL FIXED WITH 2-100×3.15mm GALV NAILS

1900 WIDE TENSAR SS20 GEOGRID MESH FIXED WITH 19mm SS STAPLES @ 100 CRS ALONG THE EDGES AND 200 CRS INTERNALLY

150×50 G8 H3.2 1775 LONG DECKING PLANKS 15mm GAPS FIXED TO EACH BEAM WITH 2-100×3.15mm GALV NAILS

765×90 GL8 H3.2 BLOCKING WITH 2-M12 SS 316 TIE BARS AT 1500 CENTRES

855×90 GL10 H3.2 BEAM WITH 100mm PRECAMBER

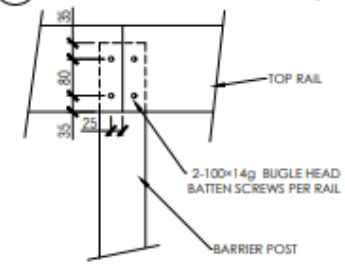
200×50 AND 2000 LONG H5 BEARERS, TYPICALLY 3 REQUIRED

CHANGES TO GHD DESIGN:

- BRIDGE LENGTH EXTENDED TO 19m, DECK WIDTH 1.6M
- STEEL BEAMS TO GLULAM BEAMS WITH TIMBER BLOCKING
- DECK PLANKS CHANGED FROM 200×50 TO 150×50
- TOP RAIL CHANGED TO 190×45 DEEP TO ENSURE 1200 HEIGHT CAN BE ACHIEVED
- MID AND BOTTOM RAIL CHANGED TO 150×50 TO ENSURE HORIZONTAL GAPS LESS THAN 300mm
- FIXING CHANGED TO NAILS FOR MID AND BOTTOM RAIL AND BUGGLE HEAD SCREWS FOR TOP RAIL
- BALUSTER POST SPACING CHANGED TO MAXIMUM 1600mm TO ENSURE COMPLIANCE WITH NZS1170

15 S06 RAIL SPLICE DETAIL

Scale: 1:10 @ A3



Notes:

NOTE:
USER GROUP DV AS PER HB SNZ 8630
DECK DESIGN LOAD: 4kPa× 0.9 = 3.6kPa
3000kg SERVICE VEHICLE
BARRIER DESIGN LOAD: 0.36kN/m

REV	DESCRIPTION	BY	DATE
A	FOR CONSTRUCTION	TM	07/2022

STATUS: FOR CONSTRUCTION

Prepared By
Struktiva Limited
118A MELROSE RD
AUCKLAND, 1041
t: 027 387 6817
w: www.struktiva.co.nz

CLIENT: EDIFICE STRUCTURES

SITE: TE ARA MANGAWHERO CYCLEWAY BRIDGES TONGARIRO OHAKUNE, 4625

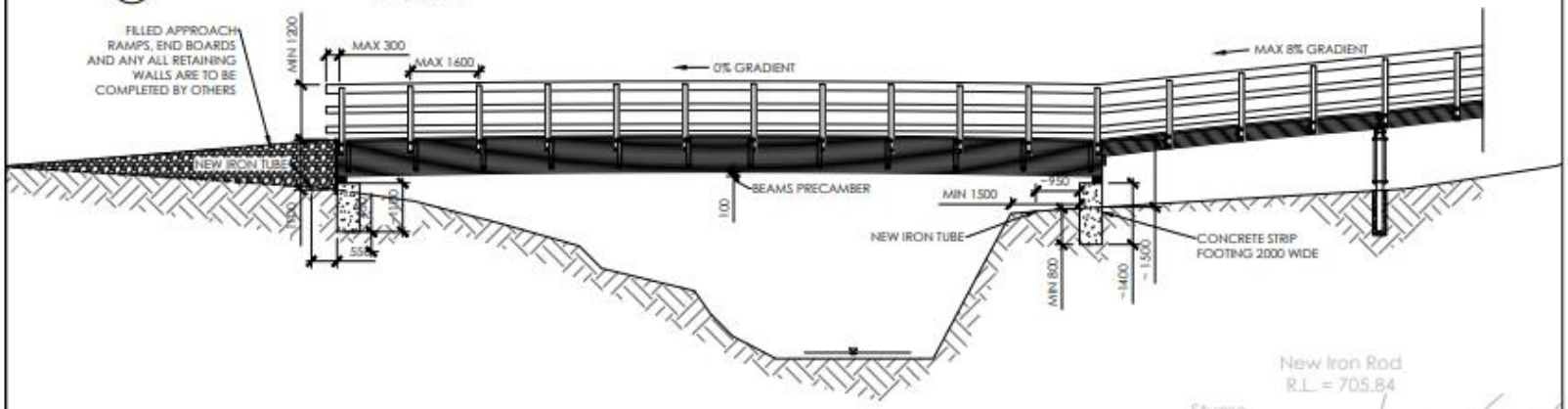
TITLE: 11.2 B BRIDGE DETAILS AND SECTION

SCALE @ A3	DATE	DRAWN	CHECKED
AS SHOWN	23/06/2022	TM	TM
PROJECT NO.	DRAWING NO.	REVISION
202138	202138-S06	A

RUAPEHU WORX
Hapaitia te ora

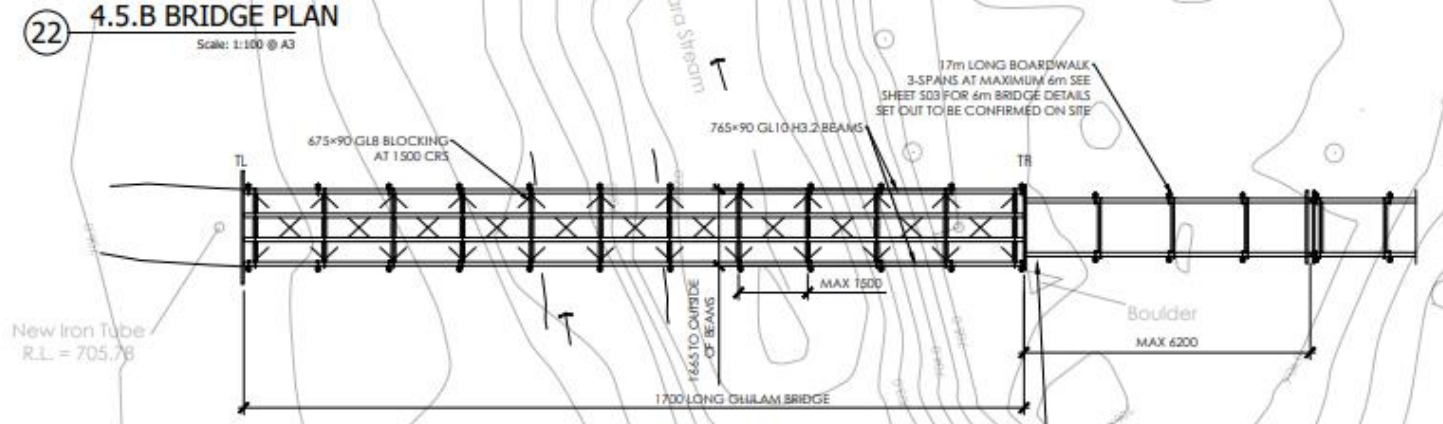
21 4.5.B BRIDGE ELEVATION

Scale: 1:100 @ A3



22 4.5.B BRIDGE PLAN

Scale: 1:100 @ A3



Notes:

NOTE:
USER GROUP DV AS PER HB SNZ 8630
DECK DESIGN LOAD: 4kPa× 0.9 = 3.6kPa
17m SPAN - 3000kg SERVICE VEHICLE
6m SPANS - 1200kg SERVICE VEHICLE
BARRIER DESIGN LOAD: 0.36kN/m

A	FOR CONSTRUCTION	TM	07/2022

FOR CONSTRUCTION

Struktiva Limited
118A MELROSE RD
AUCKLAND, 1041
t: 027 387 6817
w: www.struktiva.co.nz

EDIFICE STRUCTURES

TE ARA MANGAWHERO
CYCLEWAY BRIDGES
TONGARIRO OHAKUNE, 4625

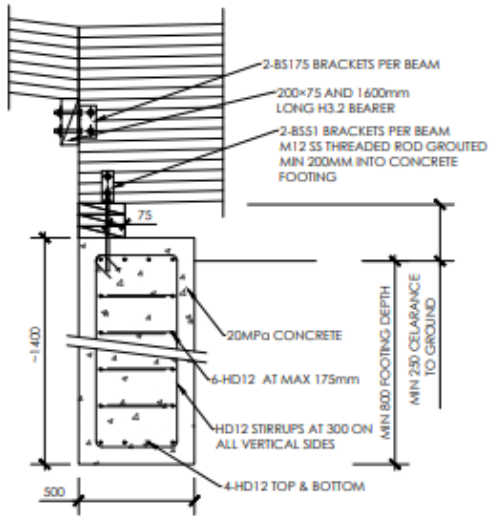
4.5.B - BRIDGE
ELEVATION AND PLAN

SIZE OF AS	DATE	DRAWN	CHECKED
AS_SHOWN	23/06/2022	TM	TM
PROJECT NO.	DRAWING NO.		REVISION
202138	202138-S07		A

RUAPEHU WORX
Hapaitia te ora

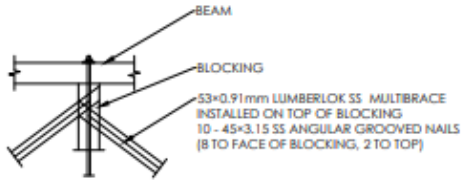
23 S07 FOOTING DETAIL

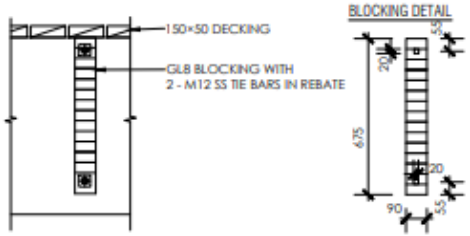
Scale: 1:20 @ A3



24 S07 BLOCKING AND BRACING DETAIL

Scale: 1:20 @ A3





D S07 4.5.B - BRIDGE SECTION

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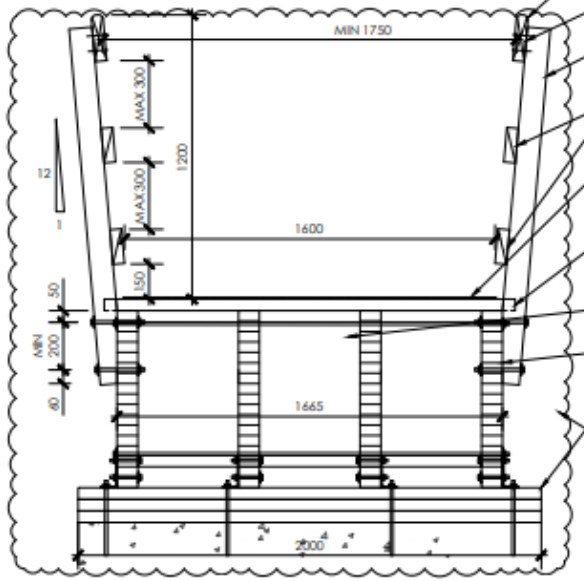

190×45 G8 H3.2 DRESSED TOP RAIL WITH 20mm RADIUS TO TOP EDGES

2-100 ×14G SS BUGLE BATTEN SCREWS 4- SCREWS AT TOP RAIL SPLICE

100×100 G8 H3.2 BALUSTER POSTS @ MAX 1600 CRS FIXED WITH 2-M12 SS 316 ENG BOLTS

150×50 G8 H3.2 ROUGH SAWN MID AND BOTTOM RAIL FIXED WITH 2-100×3.15mm GALV NAILS

1500 WIDE TENSAR SS20 GEOGRID MESH FIXED WITH 19mm SS STAPLES @ 100 CRS ALONG THE EDGES AND 200 CRS INTERNALLY

150×50 G8 H3.2 1775 LONG DECKING PLANKS 15mm GAPS FIXED TO EACH BEAM WITH 2-100×3.15mm GALV NAILS

675×90 GL8 H3.2 BLOCKING WITH 2-M12 SS 316 TIE BARS AT 1500 CENTRES

765×90 GL10 H3.2 BEAM WITH 100mm PRECAMBER

200×50 AND 2000 LONG H5 BEARERS, TYPICALLY 3 REQUIRED

CHANGES TO GHD DESIGN:

- BRIDGE LENGTH EXTENDED TO 19m, DECK 1.6 WIDE
- STEEL BEAMS TO GLULAM BEAMS WITH TIMBER BLOCKING
- DECK PLANKS CHANGED FROM 200×50 TO 150×50
- TOP RAIL CHANGED TO 190×45 DEEP TO ENSURE 1200 HEIGHT CAN BE ACHIEVED
- MID AND BOTTOM RAIL CHANGED TO 150×50 TO ENSURE HORIZONTAL GAPS LESS THAN 300mm
- FIXING CHANGED TO NAILS FOR MID AND BOTTOM RAIL AND BUGGLE HEAD SCREWS FOR TOP RAIL
- BALUSTER POST SPACING CHANGED TO MAXIMUM 1600mm TO ENSURE COMPLIANCE WITH NZS1170

Notes:

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118A MELROSE RD
AUCKLAND, 1041
t: 027 387 6817
w: www.struktiva.co.nz

CLIENT: EDIFICE STRUCTURES

SITE: TE ARA MANGAWHERO CYCLEWAY BRIDGES TONGARIRO OHAKUNE, 4625

TITLE: 4.5.B - BRIDGE DETAILS AND SECTION

SIZE @ A3	DATE	DRAWN	CHECKED
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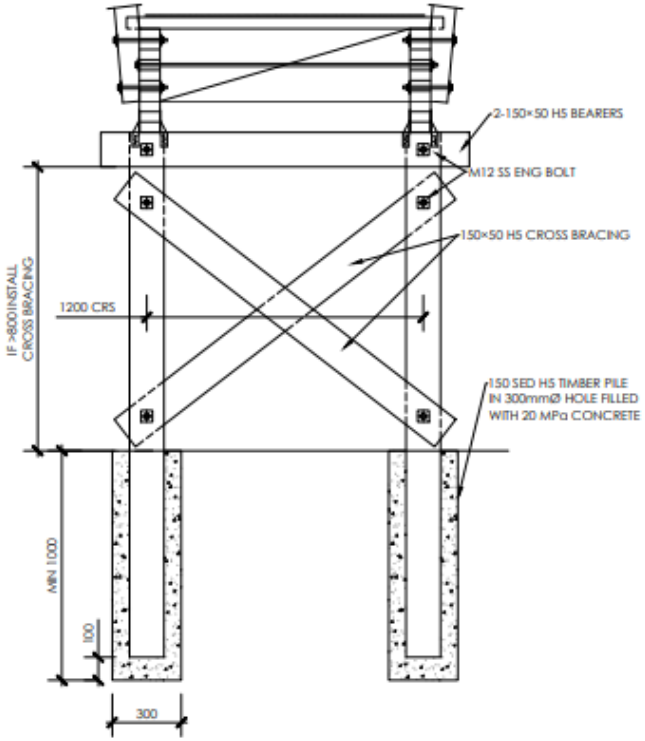
PROJECT NO.	DRAWING NO.	REVISION
202138	202138-S08	A

RUAPEHU WORX
Hapaitia te ora

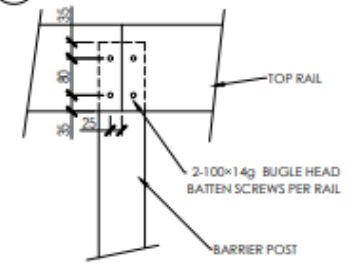
E / S07 BOARDWALK ALTERNATIVE FOOTING

Scale: 1:20 @ A3



25 / S08 RAIL SPLICE DETAIL

Scale: 1:10 @ A3



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TONGARIRO OHAKUNE, 4625

TITLE: 4.5.B BRIDGE ALTERNATIVE BW FOOTING AND RAIL DETAIL

SCALE @ A3	DATE	DRAWN	CHECKED
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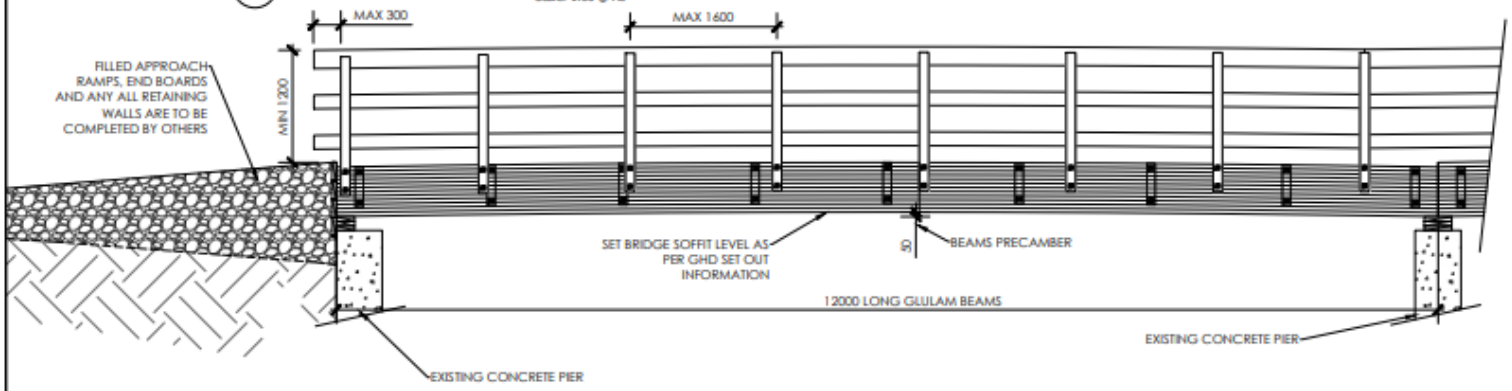
PROJECT NO.	DRAWING NO.	REVISION
202138	202138-S09	A

RUAPEHU WORX
Hapaitia te ora

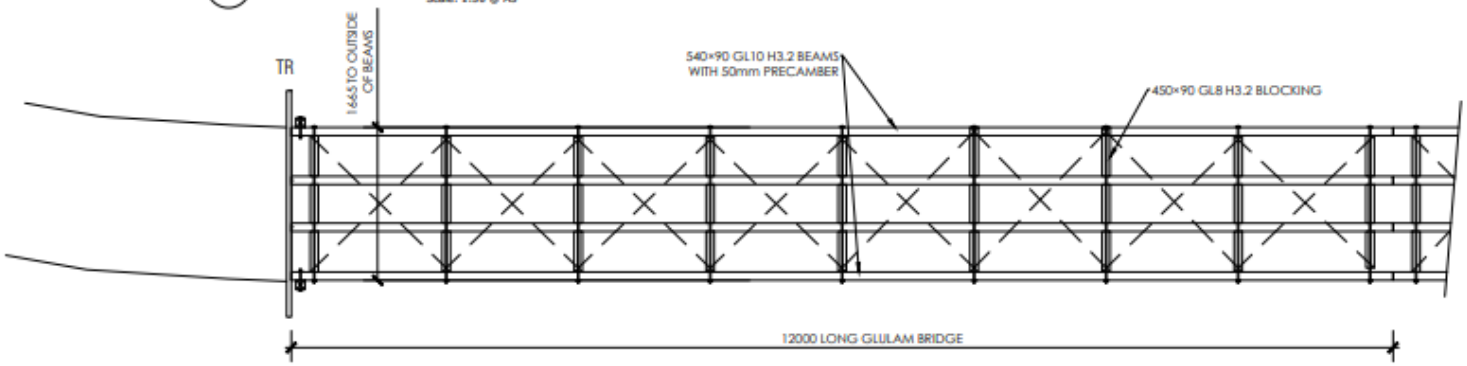
31 3.8.B BRIDGE ELEVATION

Scale: 1:50 @ A3



32 3.8.B BRIDGE PLAN

Scale: 1:50 @ A3



NOTE:
TYPICAL ELEVATION AND PLAN SHOWN.
SEE GHD DRAWIGNS FOR FULL 34M ELEVATION AND SECTION AS WELL AS SET OUT INFORMATION

Notes:

NOTE:
USER GROUP DV AS PER NB SNZ 8630
DECK DESIGN LOAD: 4kPa× 0.9 = 3.6kPa
3000kg SERVICE VEHICLE
BARRIER DESIGN LOAD: 0.36kN/m

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w: www.struktiva.co.nz

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SITE: TE ARA MANGAWHERO CYCLEWAY BRIDGES
TONGARIRO OHAKUNE, 4625

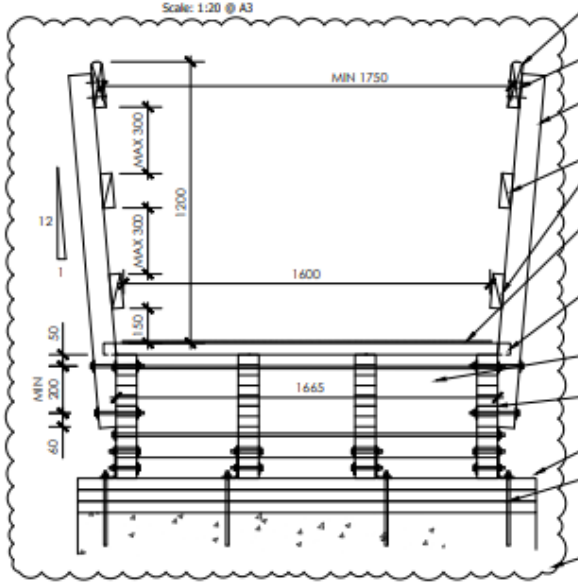
TITLE: 3.8.B - BRIDGE ELEVATION AND PLAN

SHEET SIZE:	DATE:	DRAWN:	CHECKED:
AS_SHOWN	23/06/2022	TM	TM
PROJECT NO.	DRAWING NO.	REVISION:	
202138	202138-S10	A	

RUAPEHU WORX
Hapaitia te ora

D / S10 3.8.B - BRIDGE SECTION

Scale: 1:20 @ A3



190×45 G8 H3.2 DRESSED TOP RAIL WITH 20mm RADIUS TO TOP EDGES

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450×90 GL8 H3.2 BLOCKING WITH 2-M12 SS 316 TIE BARS AT 1500 CENTRES

540×90 GL10 H3.2 BEAM WITH 50mm PRECAMBER

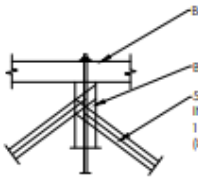
200×50 (300×50 FOR CENTRAL PIERS) AND 1600 LONG H5 BEARERS, TYPICALLY 3 REQUIRED

BS1 BRACKETS PER BEAM M12 SS THREADED ROD GROUTED MIN 200MM INTO CONCRETE FOOTING

CHANGES TO GHD DESIGN:
- STEEL BEAMS TO GLULAM BEAMS WITH TIMBER BLOCKING
- DECK PLANKS CHANGED FROM 200×50 TO 150×50
- TOP RAIL CHANGED TO 190×45 DEEP TO ENSURE 1200 HEIGHT CAN BE ACHIEVED
- MID AND BOTTOM RAIL CHANGED TO 150×50 TO ENSURE HORIZONTAL GAPS LESS THAN 300mm
- FIXING CHANGED TO NAILS FOR MID AND BOTTOM RAIL AND BUGGLE HEAD SCREWS FOR TOP RAIL
- BALLUSTER POST SPACING CHANGED TO MAXIMUM 1600mm TO ENSURE COMPLIANCE WITH NZS1170

33 / S10 BLOCKING AND BRACING DETAIL

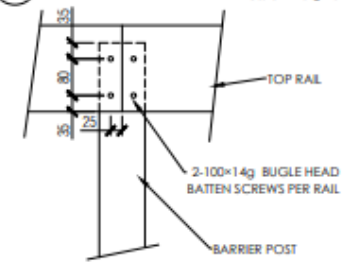
Scale: 1:20 @ A3



53×0.91mm LUMBERLOK SS MULTIBRACE INSTALLED ON TOP OF BLOCKING
10 - 45×3.15 SS ANGULAR GROOVED NAILS (8 TO FACE OF BLOCKING, 2 TO TOP)

34 / S11 RAIL SPLICE DETAIL

Scale: 1:10 @ A3



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TONGARIRO OHAKUNE, 4625

TITLE: 3.8.B - BRIDGE SECTION AND DETAIL

SCALE @ A3:	DATE:	DRAWN:	CHECKED:
AS_SHOWN	23/06/2022	TM	TM
PROJECT NO:	DRAWING NO:		REVISION:
202138	202138-S11		A

Appendix 12. Heritage Assessments

Bennett and Punch Tramway, Ohakune

Initial Info CM-2562670

Paul Mahoney 22 July 2015

Prepared to provide guidance for the possible cycleway development along the tramway route. This route was abandoned upon closure in 1956 and it is deteriorated and largely impenetrable.
This route dates from 1933 so does not have statutory archaeological site protection; nor is it registered as heritage by Heritage NZ.

Heritage Management Process

☑ denotes a task completed

	Management Step (*DOC 6-P framework*)	**Purpose**
1.	History of Bennett & Punch	*To collect and protect the history. This task has been done by Paul Mahoney*
2.	Initial clearance of route [P-1] ☑	*Minimalist to enable access*
3.	Heritage inspection of route [P-1]	*Create a map & gps record & understand heritage features*
4.	Heritage value appraisal [P-3] ☑ *see draft below*	*To identify high and low values*
5.	Heritage Impact Assessment [P-2] ☑ *see draft below*	*To assess the impact of work on values*
6.	Heritage protection rules [P-2] ☑ *see draft below*	*To enable any high values to be conserved & manage the impact of work on low values as cycleway work proceeds*
7.	Train wreck management [P-4-5-6]	*To conserve a site that is the main point of interest along the route*
8.	Interpretation & Web [P-6]	*To bring heritage highlights to life*
9.	History publication [P-6]	*To conserve the full history*

4. Heritage value appraisal

Information	*Value assessment*
History	
Opened 1934. Tramway closed in 1956 when bush cut out. Sawmill burned down 1958. A more modern mill was built nearby on same site. An NPS video exists of the mill working.	This was the last bush tramway in this district when it closed. Nothing of special fame. Was steep and dangerous!
Fabric	
8km of abandoned bush tram route. Sawmill site is privately owned. One rail tractor is a wreck on site, three others exist elsewhere, I own the jigger.	Typical bush tram fabric. Nothing of special note.
Culture	

Was locally important when it opened in 1934 because it provided much needed employment.	Forgotten. Development as a cycleway will bring its history back to life.
Significance summary: This is a fairly typical bush tram route that will be brought to life if it is developed as a cycleway	

5. Heritage Impact Assessment

Management Options 1-3	*Positive impacts*	*Negative impacts*
1. Restore as heritage tramway	Not possible this will ever happen.	None
2. Do nothing – current situation	None	Route progressively becomes totally lost from regrowth, slips, etc
3. Restore as cycle way	Route is reopened; regrowth & slips cleared; drains & culverts reactivated; regular maintenance happens, people visit, stories get told; runaway loco wreck gets stabilized & interpreted.	No durable fabric of enduring value is lost. Care can be taken by applying simple heritage character protection guidelines.

6. Heritage protection rules

The purpose of these rules is to enable any high values to be conserved & manage the impact of work on low values as cycleway construction proceeds. Note that the train wreck will be stabilised and has a separate work plan:

1. The initial clearance of the tram route is minimalist to provide access for a heritage inspection
2. Heritage inspection is done by an experienced person to create a map, a gps record and to understand heritage features
3. During restoration work, maintain the character of the tramline; stick to the route; don't widen the cuttings
4. Drainage culverts may be installed
5. The remaining wooden sleepers and bridge beams are not practical to preserve
6. Any objects discovered should be photographed and left initially where they are while the image is sent for identification
7. Any major artefacts such as log bogies and rails should be saved for possible restoration
8. In particular the train wreck should be stabilised as a key point of interest

Cowern Tramway Route, Horopito

Initial Info CM-2563961

Paul Mahoney 29 July 2015

Prepared to provide guidance for the possible cycleway development along the tramway route. This route was abandoned upon closure in 1952 and it is deteriorated and largely impenetrable. This route dates from 1912 so does not have statutory archaeological site protection; nor is it registered as heritage by Heritage NZ.

Heritage Management Process

	Management Step (*DOC 6-P framework*)	**Purpose**
1.	History of Cowern operation *see summary below*	*To collect and protect the history. This task has been done by Paul Mahoney*
2.	Initial clearance of route [P-1]	*Minimalist to enable access*
3.	Heritage inspection of route [P-1]	*Create a map & gps record & understand heritage features*
4.	Heritage value appraisal [P-3] *see draft below*	*To identify high and low values*
5.	Heritage Impact Assessment [P-2] *see draft below*	*To assess the impact of work on values*
6.	Heritage protection rules [P-2] *see draft below*	*To enable any high values to be conserved & manage the impact of work on low values as cycleway work proceeds*
7.	Manage points of interest [P-4-5-6]	*To manage any key point of interest along the route – only if identified from step 3*
8.	Interpretation & Web [P-6]	*To bring heritage highlights to life*
9.	History publication [P-6]	*To conserve the full history*

1. History Summary

Sawmilling in the Waimarino

Sawmilling in the Waimarino spans a century from 1893 to 1992. From 1906 to 1965 it was a major economic activity in the district. In the area from National Park to Karioi 172 sawmills are recorded. These mills typically employed 25 people, so they represent over 4000 direct jobs (but not all happening at once) plus typically 25% additional consequential service jobs like shopkeepers and school teachers. Towns like Erua, Pokaka, and Horopito died once their sawmills closed.

Sawmilling was undertaken on the flanks of Mt Ruapehu, in what is today Tongariro National Park. Scarcely any of that part of the Park escaped from logging, except the scenic reserves. In the bush on the flanks Erua to Rangataua 14 sawmills built bush tramways to bring logs down to sawmills at Erua (3), Pokaka (3), Horopito (2), Ohakune (3) and Rangataua (3). Practically all these bush tram routes survive but are impossible to trace because they are so overgrown. Similarly, most of the related sawmill sites are today hard to find and half of them have actually been destroyed.

Two tram routes that may possibly be reopened for public access are the Cowern tramway at Horopito and Bennett & Punch tramway at Ohakune. These sites could become valuable reminders of this lost heritage.

Cowern Operation

The supply of post and batten fence materials to farmers has always been a significant commercial activity in NZ. The 1950s saw the advent of the extensive post and batten industry we know today that offers the universally used Radiata pine. The familiar green colour of this pine wood arises from the copper salts used for preservation, pine is not naturally durable.

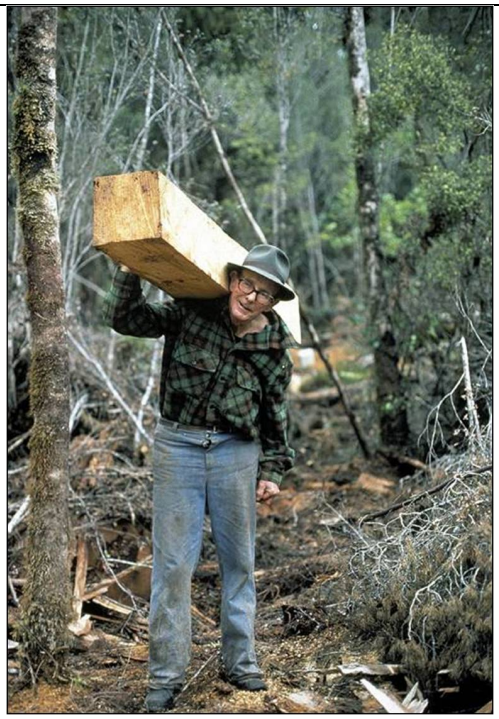
Prior to Radiata pine, an extensive craft industry existed throughout NZ utilising a range of highly valued native species that were naturally durable. Out on the forest floors self-employed workers used age-old hand methods to hand craft posts and battens. This was arduous physical work that attracted strong independent characters. A distinctive aspect of the Cowern operation was that a woman Liza Harrod was one of the hardy splitters.

The approach used cross cut saws across the grain of the wood to fell trees and cut them to length. Splitting axes were then used along the grain of the wood to split out the battens. The posts and battens then had to be brought along rough forest tracks to loading points on the tramway; horse sledges were used along with manual lugging.

William Cowern's bush tramway accessed forests on the west slopes of Mt Ruapehu from 1912 to 1952 to transport these products out of the forest. In 2015 consideration is being given to the Horopito community redeveloping this route as part of a cycleway. Interpretation panels will be used to tell its history to visitors. The tramway provided transport to the town of Horopito on the Main Trunk Railway whence the products were railed to customers.

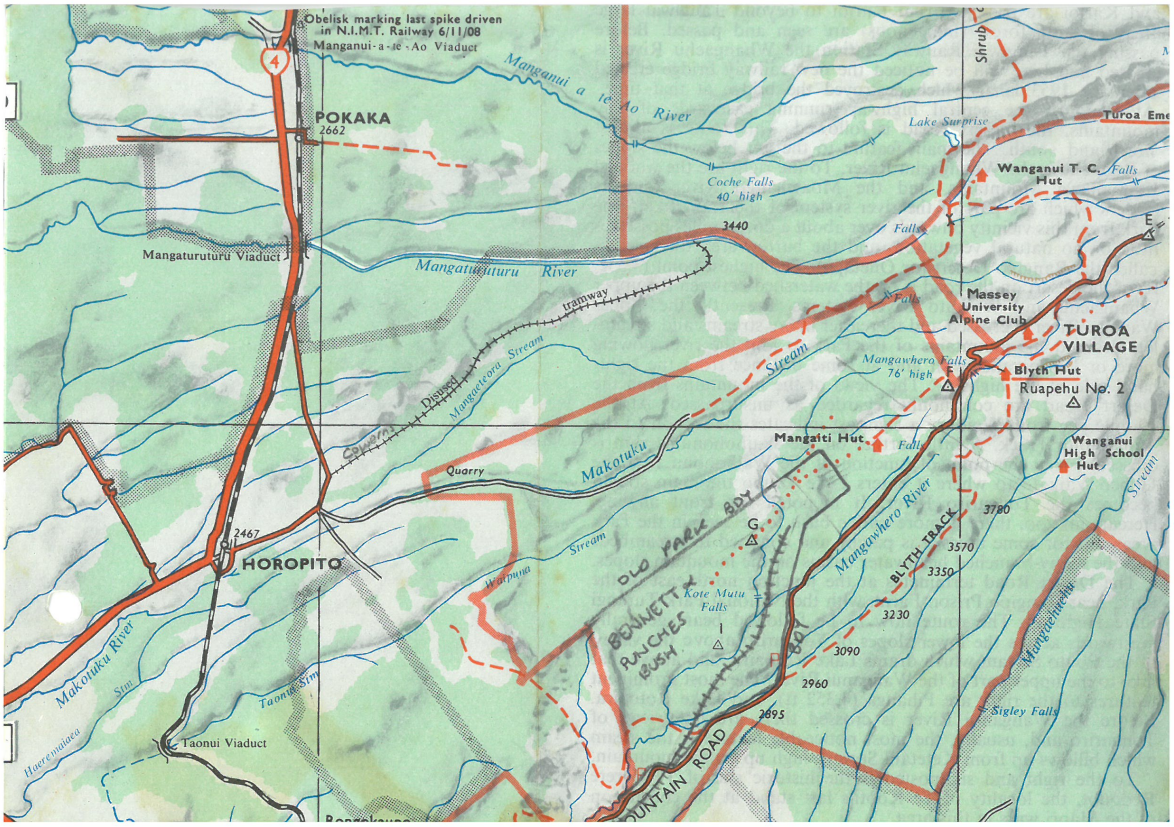
Cowern's tramway accessed an interesting ecological area of forest that grew species that were suited to this business: Kaikawaka, Silver Pine, Yellow Pine, Beech (Black Birch) and Totara. These species had relatively small diameter trunks, the wood split well and was naturally durable when placed in the ground. [*A fuller version is available*]

Splitting was a relic of the craft era of the timber industry & involved traditional hand tools like this squaring broad axe. *This is Bill Oates at work aged 82, not Bill Cowern*

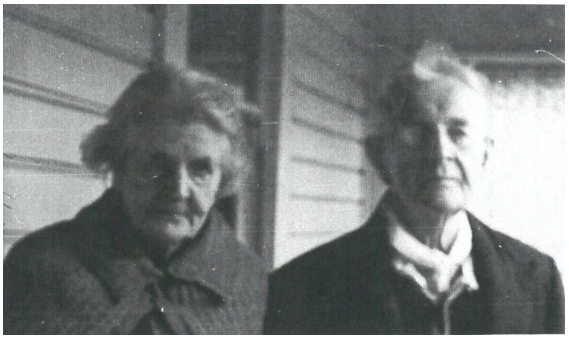


It also required a lot of arduous lugging of heavy loads over rough forest tracks to loading points on bush tramways.

Bill Cowern (William Nicholas Sutherland Cowern) grew up in Kawhia, one of ten children of Frederic and Anne-Jane. As a young working man he went to South Westland where he learned about the silver pine business. He married Annie who was six years older than him. They had no children, but raised two nieces after their mother had died. In retirement they moved to Wanganui.



Cowern's bush tram route was depicted on a ~1960 National Park map and scales at about 6.6km.

	
Bill [83] & Annie [89] in retirement 1966	Bill in retirement 1960s: giving a speech?

4. Heritage value appraisal

Information	*Value assessment*
History	
Sawmill & tramway opened 1912 as Goldfinch & Athey. Tramway closed ~1952 when bush cut out. Sawmill scrapped. Notable that it targeted special durable tree species suited for railway sleepers & fence posts.	This was the second last bush tramway in this district when it closed. Possibly the last tramway in NZ to be worked by horse teams.
Fabric	
6.6 km of abandoned bush tram route with track now rotted away. Site of sawmill & timber yard is privately owned.	Typical bush tram fabric. Nothing of special note.
Culture	
Was locally important when it opened in 1912.	Forgotten. Development as a cycleway will bring its history back to life.
Significance summary: This is a fairly typical bush tram route that will be brought to life if it is developed as a cycleway	

5. Heritage Impact Assessment

Management Options 1-3	*Positive impacts*	*Negative impacts*
1. Restore as heritage tramway	Not possible this will ever happen.	None
2. Do nothing – current situation	None	Route progressively becomes totally lost from regrowth, slips, etc
3. Restore as cycle way	Route is reopened; regrowth & slips cleared; drains & culverts reactivated; regular maintenance happens, people visit, stories get told.	No durable fabric of enduring value is lost. Care can be taken by applying simple heritage character protection guidelines.

6. Heritage protection rules

The purpose of these rules is to enable any high values to be conserved & manage the impact of work on low values as cycleway construction proceeds.

1. The initial clearance of the tram route is minimalist to provide access for a heritage inspection
2. Heritage inspection is done by an experienced person to create a map, a gps record and to understand heritage features

3. During restoration work, maintain the character of the tramline; stick to the route; don't widen the cuttings
4. Drainage culverts may be installed
5. The remaining wooden sleepers and bridge beams are not practical to preserve
6. Any objects discovered should be photographed and left initially where they are while the image is sent for identification
7. Any major artefacts such as log bogies and rails should be saved for possible restoration

As a young man Bill Cowern went to South Westland where he learned about the silver pine business. This picture was taken in a Hokitika studio.

Sources:

Bill Cowern information and images from Janet Forbes, his niece.

Appendix 13. Tongariro National Park Management Plan Review – Landscape opinion

Tongariro National Park
Proposed Ohakune trails
Landscape Opinion of Richard Hart

RICHARD HART
LANDSCAPE ARCHITECT
richard@richardhart.co.nz
0 7 5 7 2 2 9 2 9

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Introduction

Richard Hart Ltd[1] has been engaged to assist in providing a high level landscape opinion of the proposed walk – cycle trails near Ohakune in Tongariro National Park. As the specifics of the trail design are yet to be developed the opinions expressed are general in nature. The purpose of this landscape opinion is to fill a gap in terms of independent landscape review, and so inform the Tongariro National Park Management Partial Review process.

The proposed trails are not anticipated in the Tongariro National Park Management Plan (4.3.2.4, policy 4) and so this partial review is required.

A site visit was undertaken on 27-28th July 2017 to photograph parts of the proposal, and experience the various access points to the trails. This was a vehicle oriented visit with short walks at some entry points due to the restricted time and scope. Weather was poor during the visit including rainfall at lower elevations, and white out conditions at Turoa. However I am familiar with the area from previous recreational visits.

I have been provided, or sourced, the following as background documents;

- Tongariro National Park Management Plan, Partial Review 2017, DoC
- Proposed Ohakune Mountain Road Trail Feasibility Assessment, Perception Planning, 21 June 2016
- Mountains to the Sea Cycle Trail Phase 2; The Missing Link (National Park Village to Horopito), Warren Furner Ruapehu District Council, Feb 2015
- Bennett and Punch Tramway, Ohakune, Initial Info CM-2562670, P. Mahoney 2015
- Cowern Tramway Route, Horopito, Initial Info CM-2563961, P. Mahoney 2015
- Tongariro National Park Management Plan 2006-2016
- Various Topo 50 NZ maps
- Assorted brochures and information from the Ohakune Visitors Centre including Automobile Association "The New Zealand Cycle Trail Guide 2017".
- RMLA & NZILA landscape assessment materials.
- Horizons One Plan and Ruapehu District Plans (online resources)

The proposal

The proposal is described in the Tongariro National Park Management Plan Partial Review 2017[2] and is not repeated here.

There are three essential discrete trails included within the trail proposal, and probably changes to associated carparks, signage and realignment of trails including the "Round the Mountin Track". The three trails are;

1. Turoa to Ohakune – separate off-road trail for cyclists and on-foot users
2. Horopito to Ohakune – "Horpito Link Track" or Old Coach Road return loop

[1] Declaration of interest. Richard Hart is a Ruapehu Alpine Lifts, lifepass holder.
[2] Refer http://www.doc.govt.nz/Documents/getting-involved/consultations/2017/tongariro-national-park-management-plan-partial-review.pdf

3. Mangaturuturu viaduct loop river crossing section of the Horopito to National Park "mising link trail". Only relevant portion is within Tongariro National Park.

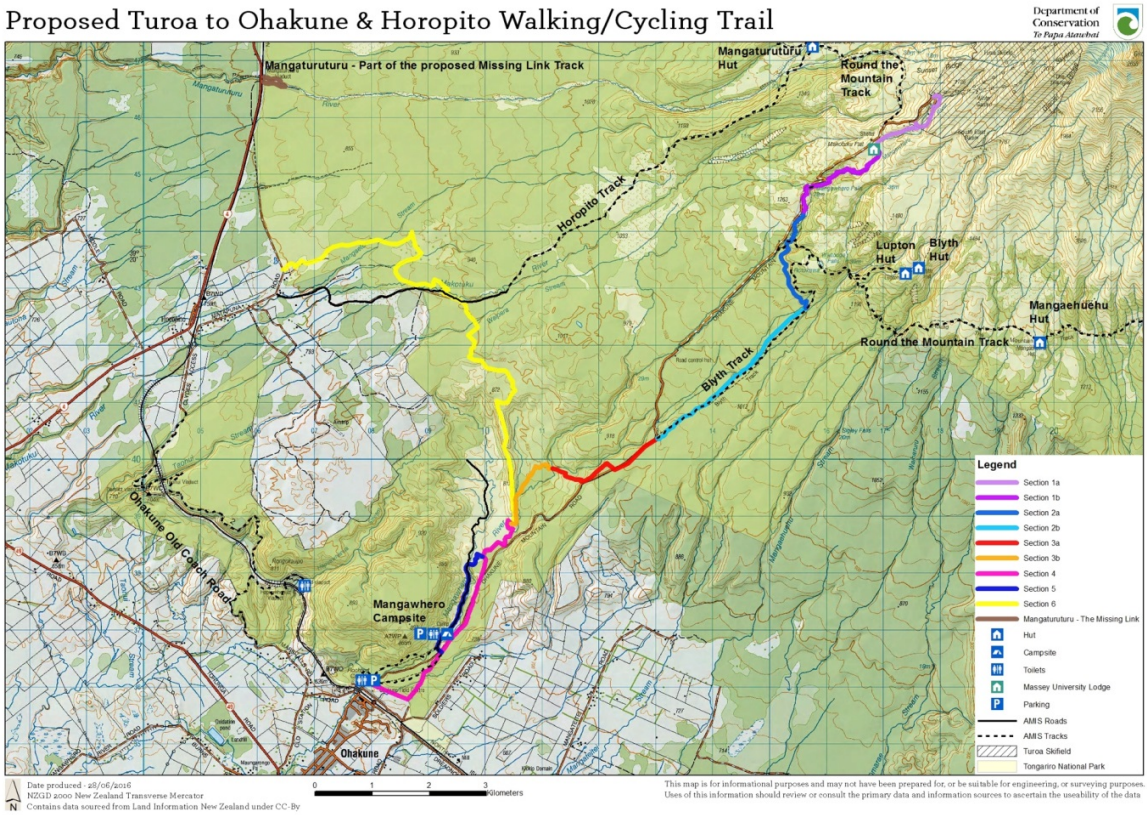

Figure 1 map showing the proposed trails (pg. 18 of TNP MP Feasibility Assessment)

Cultural heritage

I understand a cultural heritage assessment or advice will be provided by tangata whenua as part of the review process in due course.

This opinion assumes the cultural heritage of the park is paramount and cannot be separated from the biophysical and natural attributes of the park including the mountains; Tongariro, Ngaruahoe, and Ruapehu.

The core of Tongariro National Park is a gift to the people of Aotearoa - New Zealand[3]. On 23 September 1887 a deed of gift was signed between paramount chief Horonuku Te Heuheu Tūkino IV of Ngāti Tūwharetoa and the Crown. Tongariro, Ruapehu and Ngāuruhoe - the three mountains that now form the nucleus of Tongariro National Park - were given by the rangatira to the nation. This was New Zealand's first national park, and the first in the world to be gifted by a country's indigenous people. Horonuku wanted to protect the peaks as 'a sacred place of the Crown, a gift forever from me and my people.' He described his connection thus:

> *Ko te Ha o tāku Maunga, ko tāku Manawa*
> The Breath of my Mountain is my Heart

[3] Archives NZ https://www.flickr.com/photos/archivesnz/20454533884

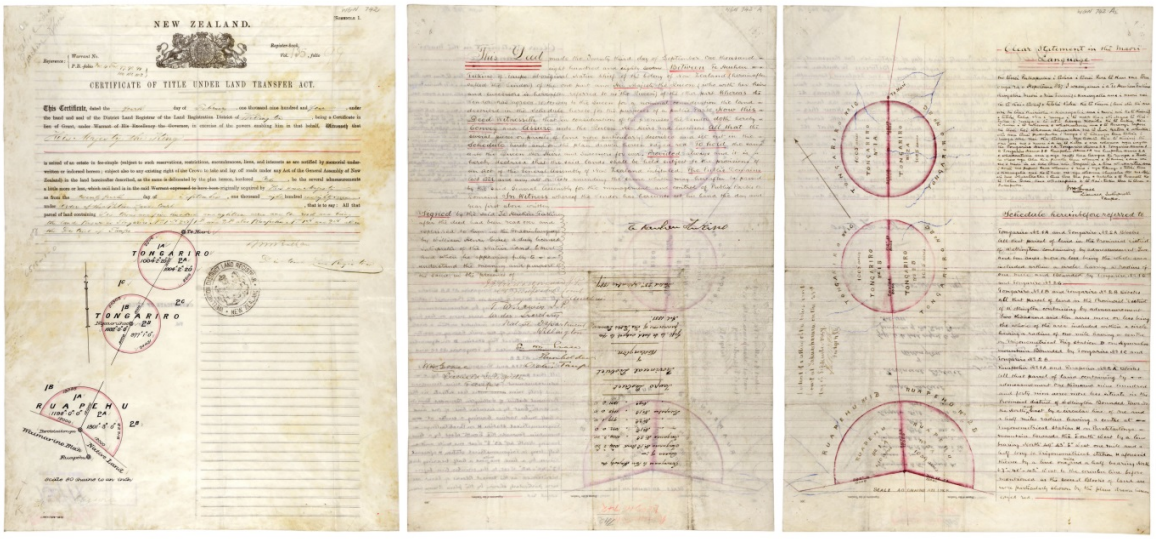

Figure 2 Copy of original deed of gift 1887 between paramount chief Horonuku Te Heuheu Tūkino IV of Ngāti Tūwharetoa and the Crown. This

National Park & World Heritage Site

Tongariro National Park is of such high natural and cultural heritage value that is is a World Heritage site for both its cultural and natural attributes.

The context to the park is described in sections 1.3 and 1.4 of the Tongariro National Park Management Plan. It should be referred to, and is not repeated here.

A gift to the people of New Zealand

In New Zealand, national parks are areas of publicly-owned land that are preserved in perpetuity for their intrinsic worth and for the benefit, use and enjoyment of the public. They consist of areas that contain scenery of such distinctive quality, ecological systems or natural features so beautiful, unique or scientifically important, that their preservation is in the national interest.

Tongariro National Park ('the park') has these characteristics in abundance. Its global significance is reflected in its dual World Heritage classification for natural and cultural heritage.

Many of the values of the park are not found elsewhere in New Zealand. The distinctive volcanic landforms of Mounts Ruapehu, Ngauruhoe and Tongariro and the landscape formed by volcanic processes sit in sharp contrast to the surrounding mountainlands and terraced forest country.

The nucleus of the park was a gift to the people of New Zealand by Te Heuheu Tukino IV (Horonuku), paramount chief of Ngāti Tūwharetoa, in 1887. The mountain peaks were set aside to be protected for and enjoyed by all of the people of New Zealand. From this nucleus the park has grown to encompass an area of 79,598 hectares and today enshrines in its management the purpose of that gift made more than 100 years ago.

There are inherent challenges in managing a sensitive protected site and providing for the varied expectations of hundreds of thousands of visitors per annum. Visitor demands have led to the development of three ski areas and a multimillion dollar recreation and tourism infrastructure. There is an obvious tension between the perceived requirement for infrastructure development and

maintenance, in order to meet visitor requirements, and the preservation ethic which is at the heart of the National Parks Act 1980.

The park is managed by the Tongariro/Taupō Conservancy of the Department of Conservation ('the department'). Day-to-day operation is managed by Ruapehu and Tūrangi/Taupō areas based in Whakapapa Village and Tūrangi respectively.

The Tongariro/Taupō Conservation Board ('the board') is appointed by the Minister of Conservation ('the Minister') to oversee the department's management, monitor its performance against policy documents and play a significant role in the development of the Tongariro/Taupō Conservation Management Strategy ('the CMS') and management plans such as this one. The board is chosen by the Minister to be broadly representative of the general public. By statute, Ngāti Tūwharetoa has a permanent position on the board[4].

The National Parks Act requires Parks to be maintained in their natural state, and that public has right of entry. The provisions of this Act shall have effect for the purpose of preserving in perpetuity as national parks, for their intrinsic worth and for the benefit, use, and enjoyment of the public, areas of New Zealand that contain scenery of such distinctive quality, ecological systems, or natural features so beautiful, unique, or scientifically important that their preservation is in the national interest. Subject to the provisions of this Act and to the imposition of such conditions and restrictions as may be necessary for the preservation of the native plants and animals or for the welfare in general of the parks, the public shall have freedom of entry and access to the parks, so that they may receive in full measure the inspiration, enjoyment, recreation, and other benefits that may be derived from mountains, forests, sounds, seacoasts, lakes, rivers, and other natural features. (underline emphasis added)

Assessment methodology

The methodology starts with a review of relevant landscape planning studies and landscape policy.

Review of existing landscape planning studies

There is an absence of high level landscape assessment studies within Tongariro National Park, with projects typically assessed on a case by case basis. The Tongariro National Park Management Plan does not indicate preferred assessment methodologies for landscape assessment nor does it provide criteria for assessing development. Work outside the scope of that anticipated by the Management Plan therefore needs site specific assessment.

Horizons Regional Council and Ruapehu District Council Plans and policies were searched, and relevant sections are quoted. Both Councils were also contacted to source any background or s.32 Regional and District Scale Landscape Assessments. Based on this investigation no recent assessments have been carried out with the Outstanding Natural Feature(s) and Landscape(s) largely rolled over from previous plans.

Horizons Regional Council has not recently carried out a regional landscape assessment study and relies on the territorial authority to do this. It does list Tongariro National Park as an Outstanding

[4] Extract from Tongariro National Park Management Plan – 2.1 introduction

Natural Feature(s) and Landscape(s) (One Plan, Schedule G – Landscapes, table 6.1) and has criteria for assessment (section 6.7 of One Plan). This list is rolled over from prior plans.

Ruapehu District also lists Tongariro National Park as an Outstanding Natural Feature(s) and Landscape(s).

Landscape Assessment best practice is evolving, with the NZILA having a 2010 best practice note[5]. The Pigeon Bay Environment Court Decision[6] criteria are largely accepted with various modifications according to the authorities priorities. These include but are not restricted to;

(i) the natural science factors - the geological, topographical, dynamic aspects of the landscape;
(ii) its aesthetic values including memorability and naturalness;
(iii) its expressiveness - how obviously the landscape demonstrates the formative processes leading to it;
(iv) transient values - presence of wildlife; or its values at certain times of the day,year
(v) whether the values are shared and recognised;
(vi) its value to tangata whenua;
(vii) its historical associations

The Pigeon Bay decision goes on to emphasise "the richness of human response to landscape and the existence of differing cultural responses; that landscapes are an important component of the environment; and most importantly, that landscapes are the context of all activities on Earth, and thus cannot be readily separated from them."

More recent national policy and guidelines such as the New Zealand Coastal Policy Statement 2010 reflects these factors, and expands on the overlapping matters of; natural character (policy 13), natural features and natural landscapes (policy 15).

Based on available national policy guidance I consider the important landscape matters to be addressed for Tongariro National Park are as follows;

To preserve the natural character of the Tongariro National Park environment and to protect it from inappropriate use and development:

a. avoid adverse effects of activities on natural character in areas of the park with outstanding natural character; and
b. avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the park; including by:
    - assessing the natural character of the park, by mapping or otherwise identifying areas of high or better natural character; and
    - ensuring that the Tongariro National Park Management Plan identifies areas where preserving natural character requires objectives, policies and rules, and include those provisions.

[5] NZILA Best Practice Note Landscape Assessment and Sustainable Management 10.1. https://nzila.co.nz/media/uploads/2017_01/nzila_ldas_v3.pdf
[6] Decision No. C32/99 - Pigeon Bay Aquaculture Ltd, A. Hay and Canterbury RC

Recognise that natural character is not the same as natural features and landscapes or amenity values and may include matters such as:

a. natural elements, processes and patterns;
b. biophysical, ecological, geological and geomorphological aspects;
c. natural landforms such as named and prominent peaks, geocatchements, rock features, scree, wetlands, reefs, freshwater springs, river and lakes;
d. the natural movement of water and sediment;
e. the natural darkness of the night sky;
f. places or areas that are wild or scenic;
g. a range of natural character from pristine to modified; and
h. experiential attributes, including the sounds and smell of the sea; and their context or setting.

To protect the natural features and natural landscapes of the Tongariro National Park from inappropriate use, and development:

a. avoid adverse effects of activities on outstanding natural features and outstanding natural landscapes in the park; and
b. avoid significant adverse effects and avoid, remedy, or mitigate other adverse effects of activities on other natural features and natural landscapes in the park; including by:
c. identifying and assessing the natural features and natural landscapes of Tongariro National Park, at minimum by land typing, soil characterisation and landscape characterisation and having regard to:
    - natural science factors, including geological, topographical, ecological and dynamic components;
    - the presence of water including in lakes, rivers and streams;
    - legibility or expressiveness – how obviously the feature or landscape demonstrates its formative processes;
    - aesthetic values including memorability and naturalness;
    - vegetation (native and exotic);
    - transient values, including presence of wildlife or other values at certain times of the day or year;
    - whether the values are shared and recognised;
    - cultural and spiritual values for tangata whenua, identified by working, as far as practicable, in accordance with tikanga Māori; including their expression as cultural landscapes and features;
    - historical and heritage associations; and
    - wild or scenic values;

Recreation Context

New Zealand Cycle Trails

Nga Haerenga – the New Zealand Cycle Trail (NZCT) is a developing series of “Great Rides”. These are predominantly off-road cycle trails that show case the best of New Zealand’s landscape,

environment, culture and heritage. Nga Haerenga is intended to become a connecting nationwide cycling network[7].

There are currently 22 great cycle rides throughout New Zealand. These rides, including secondary heartland rides, are intended to be more cycle friendly alternatives to riding busy roads. Reducing risks, dangers and conflicts between cycles and vehicles is a major driver of these trails.

One of these "great rides" is the Mountains to Sea Trail – Turoa to Whanganui. This starts at Turoa skifield and currently follows the Ohakune Mountain Road (OMC) to Ohakune then continues to Whanganui via the Old Coach Road.

Figure 5 maps the whole Mountains to Sea trail including an elevation profile.

Ohakune Old Coach Road

The Old Coach Road cycle trail uses mainly the historic Ohakune Coach Road between Ohakune Station and Horopito, and opened in July 2010. This is part of the once named Ruapehu to Whanganui "Nga Ara Tuhono" cycle trail, now called "Nga Haerenga" (mountains to sea trail) and was the first of the national cycleway 'quick start' projects launched.

Figure 3 Photograph of Old Coach Road cycleway near Horopito.

The northern end of the coach road is at Horopito, the home of Smash Palace, the famous auto wreckers yard with hundreds of vehicles waiting to be restored and loved again. A visit here will always be remembered. The long ride along the Coach Road, which starts at Horopito, and goes past the Taonui viaduct and along the Skyline Section to the Hapuawhenua Viaducts, is now an easy andinteresting ride. The cycle trail is a mixture of new narrow track and the wide cobbled Coach Road. There is a new grit surfaced track from the Haeremaere Stream bridge to and from the Taonui Viaduct, and up from the Taonui Stream back onto the coach road. From the Ohakune end of the Skyline Section there is a new gritted track which leaves the Coach Road by the big logs which

[7] Information sourced from AA Traveller, "The New Zealand Cycle Trail Guide" 2017

are more or less opposite the big red gate post, and continues through the bush to the Hapuawhenua Viaducts. From the viaducts the new track passes the tunnel and leads back onto the Coach Road by the big red gatepost, and then winds down hill to the carpark on Marshall's Road at the Ohakune end. A short ride is from Ohakune carpark on Marshall's Road, up the coach road to the old gate post then along the new track to the tunnel, up and over the hill through the bush, and down to the Hapuawhenua viaducts[8].

This is shown on Figure 6 - Map and trail profile Ohakune Old Coach Road.

Round the mountain track

The Round the Mountain Track is a 66km 4-6 day tramp that showcases the varied volcanic landscapes and alpine vegetation on the flanks of Mount Ruapehu. It's a more remote alternative to the Tongariro Northern Circuit Great Walk. Visitors can explore diverse landscapes ranging from mountain beech forest, tussock country and alpine herb fields, to glacial river gorges and gushing waterfalls, and the Rangipo Desert with its wind sculptured sands and volcanic rock.[9]

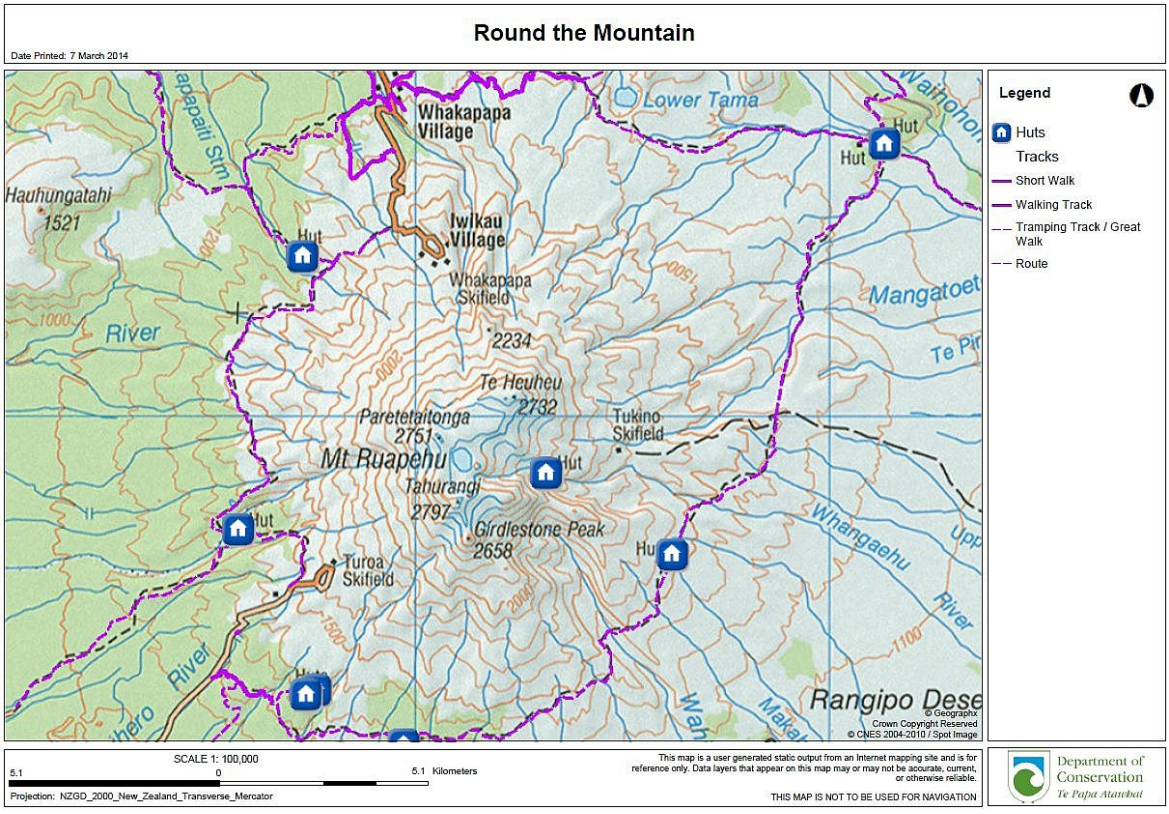

Figure 4 Round the Mountains Track map (DoC)

The round the mountain track currently utilises about 3km of the Ohakune Mountain Round linking the Waitonga Falls – Mangaehuehu hut track with the Lake Surprise – Mangaturuturu hut track sections. Trampers will be able to stay off road and use part of the proposed Turoa to Ohakune Trail. The round the mountain trail could be re-routed to utlilise the proposed trails and perhaps the existing Turoa skifield facilities.

[8] Source http://www.ohakunecoachroad.co.nz/pages/bike-trail.html
[9] Source DoC website http://www.doc.govt.nz/roundthemountain

Figure 5 Map and elevation profile for Mountain to Sea Trail. From AA the NZ Cycle Trail Guide 2016.

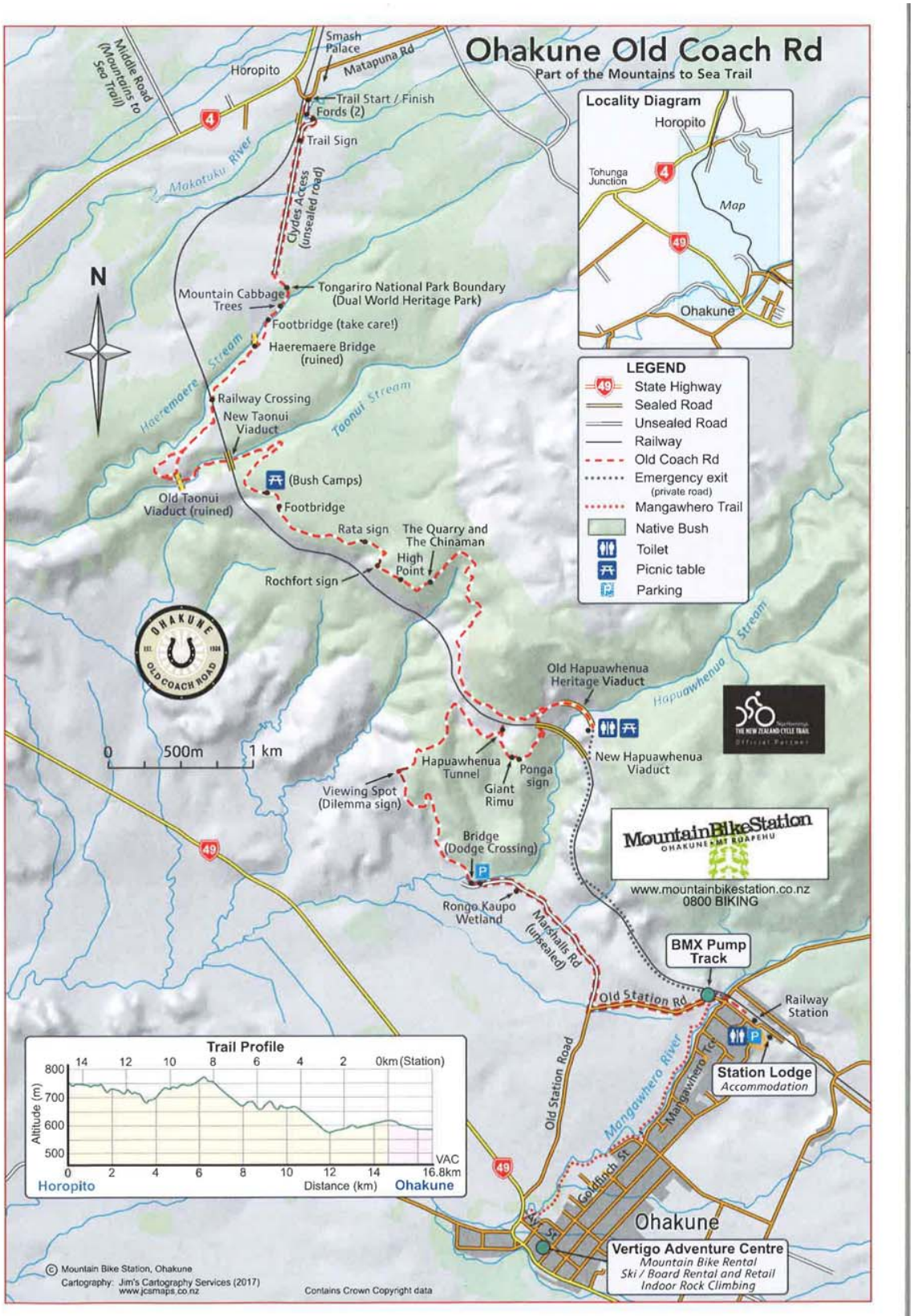

Figure 6 Map and trail profile Ohakune Old Coach Road, © Mountain Bike Station, Ohakune 2017

Landscape Context

Tongariro is New Zealand's oldest national park and a dual World Heritage area. This status recognises the park's important Maori cultural and spiritual associations as well as its outstanding volcanic features[10].

Biophysical & cultural landscape

This is described in section 2 of the Tongariro National Park Management Plan. Separate ecological and cultural assessments are being prepared.

Geology[11]

"Ruapehu volcano is the southernmost of the large active volcanoes of the North Island. Rising to 2797m (9175ft), Mt Ruapehu is the highest mountain in the North Island and the most recent of the North Island volcanoes to have erupted. Ruapehu is located at the southern end of the Taupo Volcanic Zone (TVZ), a spreading segment of the Earth's crust and the source of spectacularly explosive eruptions over the last 2 million years. Subsidence in the central axis of the TVZ has led to prominent active faults developing to the east and west of Ruapehu volcano, which are downthrown towards the mountain. These faults mark the boundary of the TVZ in this region, which terminates 20 km south of Ruapehu's summit.

Ruapehu is largely comprised of the volcanic rock andesite. Accumulations of andesite lava flows interbedded with fragmental rubble radiate from the summit region forming a stratovolcano that rises 2000m from the surrounding lowlands. As stratovolcanoes build up they become steep and have a propensity to collapse generating debris avalanches and lahars that spread outwards onto the surrounding lowlands. These lowlands form a roughly circular apron of fragmented rocks (volcaniclastics) termed the ring plain, mainly derived from debris avalanches and lahars, but also including some river (fluvial) and glacial deposits. Mantling the lowlands are various thicknesses of volcanic ash forming the parent material of most of the soils in the region. Due to the dominantly westerly wind direction, ash thickness for a given distance from the summit is always considerably greater to the east than to the west.

Dominating the summit area is a crater lake which, when full to overflowing contains 8-10 million m3 of acid waters. During historical eruptions (in 1945 and 1995) the lake water has been ejected out of the crater and onto surrounding glaciers, and/or propelled across the outlet and into the Whangaehu catchment. Displacement of lake water during these eruptions was followed by dome extrusion and/or dry ash eruptions. When water again accumulates in the summit crater, phreatomagmatic (or wet) eruptions occur with accompanying water expulsion creating lateral surges and lahars. Lahars generated in such a way are one of the devastating and hazardous of volcanic events. Throughout history, lahars have been responsible for much loss of life in the countries of the Pacific margin, including New Zealand."

The biophysical context is not explored further at this stage. Vegetation is asssessed in the ecological report.

[10] Source DoC website http://www.doc.govt.nz/parks-and-recreation/places-to-go/central-north-island/places/tongariro-national-park/

[11] https://www.gns.cri.nz/Home/Learning/Science-Topics/Volcanoes/New-Zealand-Volcanoes/Volcano-Geology-and-Hazards/Ruapehu-Geology

Landscape planning framework

The main policy document guiding the park management is the Tongariro National Park Management Plan 2006-2016 (ISSN 0111-5804).

The Horizons Regional and Ruapehu District Plans also need to be complied with. These both identify Tongariro National Park as an Outstanding Natural Features and Landscapes but have little further to add as follows.

Ruapehu District Council

NL2 Outstanding Natural Features and Landscapes - Ruapehu District Plan

NL2.2.2 Policies (a) To protect outstanding natural features and landscapes from inappropriate subdivision, use and development. In determining inappropriate subdivision, use and development the following will be taken into account - the degree to which the activity:

(i) Would adversely affect the values specified in Policy NL 2.2.2(c).
(ii) Is necessary to provide for the social or economic wellbeing of communities, or to provide essential utilities, infrastructure or services to the public; and
(iii) Has functional, technical and operational constraints which require it to be located and designed in the manner proposed; and
(iv) Avoids any significant adverse cumulative effects on the characteristics and values of those outstanding natural features and landscapes.

NL 2.2.2(c) To protect, from inappropriate subdivision, use and development, the specified values associated with the following outstanding natural features or landscapes:

(viii) Tongariro National Park (particularly the volcanoes) and specifically its:

1) Visual and scenic characteristics, particularly its visual prominence.
2) Recreational values.
3) Scientific value, particularly the volcanic landscape.
4) Ecological value, particularly the mountainous ecology and the extensive tussock grasslands and wetlands supporting rare indigenous flora.
5) Cultural values and importance to tangata whenua.

Horizons Regional Council

Schedule G: Regionally Outstanding Natural Features and Landscapes

Schedule G is a component of Part I - the Regional Policy Statement.

Table G.1 lists some regionally outstanding natural features and landscapes in the Manawatu Wanganui Region and their associated characteristics and values in narrative form.

The extent of these regionally outstanding natural features and landscapes, in particular the coastline of the Region, has not been well defined. Therefore, assessments will be required using the approach set out in Policy 6-7 and the criteria listed in Table 6.1 at the time that any use or development is proposed for those areas, so that the actual location of the feature or landscape can be defined in relation to the use or development proposal.

Regionally outstanding natural features and landscapes in the Region include the following:

Table G.1 Outstanding Natural Features or Landscapes Characteristics / Values

(a) Tongariro National Park

(i) Visual and scenic characteristics, particularly the park's visual prominence in the Region and the contrast of the Rangipo desert with adjacent landscapes
(ii) Geological features including the Rangataua Lava Flow
(iii) Recreational values, particularly tramping and snow sports
(iv) Scientific value, particularly the volcanic landscape
(v) Ecological value, particularly the mountainous ecology and the extensive tussock grasslands and wetlands supporting rare indigenous flora
(vi) Importance to tangata whenua

Policy 6-7 of the One Plan states;

Table 6.1 Natural Feature and Landscape Assessment Factors Assessment factor Scope

(a) Natural science factors. These factors relate to the geological, ecological, topographical and natural process components of the natural feature or landscape:

(i) Representative: the combination of natural components that form the feature or landscape strongly typifies the character of an area.
(ii) Research and education: all or parts of the feature or landscape are important for natural science research and education.
(iii) Rarity: the feature or landscape is unique or rare within the district or Region, and few comparable examples exist.
(iv) Ecosystem functioning: the presence of healthy ecosystems is clearly evident in the feature or landscape.

(b) Aesthetic values. The aesthetic values of a feature or landscape may be associated with:

(i) Coherence: the patterns of land cover and land use are largely in harmony with the underlying natural pattern of landform and there are no, or few, discordant elements of land cover or land use.
(ii) Vividness: the feature or landscape is visually striking, widely recognised within the local and wider community, and may be regarded as iconic.
(iii) Naturalness: the feature or landscape appears largely unmodified by human activity and the patterns of landform and land cover are an expression of natural processes and intact healthy ecosystems.
(iv) Memorability: the natural feature or landscape makes such an impact on the senses that it becomes unforgettable.

(c) Expressiveness (legibility). The feature or landscape clearly shows the formative natural processes or historic influences that led to its existing character. Indigenous biological diversity, landscape and historic heritage.

(d) Transient values. The consistent and noticeable occurrence of transient natural events, such as daily or seasonal changes in weather, vegetation or wildlife movement, contributes to the character of the feature or landscape.

(e) Shared and recognised values. The feature or landscape is widely known and is highly valued for its contribution to local identity within its immediate and wider community.

(f) Cultural and spiritual values for tangata whenua^ Māori values inherent in the feature or landscape add to the feature or landscape being recognised as a special place.

(g) Historic Heritage values Knowledge of historic events that occurred in and around the feature or landscape is widely held and substantially influences and adds to the value the community attaches to the natural feature or landscape. Heritage features, sites* or structures that are present and add to the enjoyment and understanding of the feature or landscape.

The planning framework is further described by others in this review process.

Landscape Assessment

"Tongariro is New Zealand's oldest national park and a dual World Heritage area. This status recognises the park's important Maori cultural and spiritual associations as well as its outstanding volcanic features."

The actual and potential landscape effects are;

- Effects on natural character
- Effects on cultural heritage
- Effects on Outstanding Natural Features and Landscapes

These are discussed in sequence as follows

Effects on natural character

From the suggested assessment criteria described earlier matters of natural character to be assessed and my assessment is as follows;

Natural Character Criteria	**My Assessment**
a. natural elements, processes and patterns;	Natural elements, processes and patterns explicit and obvious. Outstanding example of volcanic processes and patterns.
b. biophysical, ecological, geological and geomorphological aspects;	Volcanic geomorphology, and associated geoecology explicit and obvious. Outstanding example of volcanic, geothermal, and climate including associated landcover.
c. natural landforms such as named and prominent peaks, geocatchements, rock features, scree, wetlands, reefs, freshwater springs, lakes, rivers and streams;	Numerous named prominent peaks, rock features, volcanic features and lahars, glaciers, lakes, rivers and streams. Highest peak in north island.

Natural Character Criteria	My Assessment
d. the natural movement of water and sediment;	Natural movement of water and sediment intact, active and apparent.
e. the natural darkness of the night sky;	Skifields in winter (night lights, snow making and grooming, car and road lighting, and habitation all reduce natural darkness. Otherwise large areas without night light where dark sky can be experienced.
f. places or areas that are wild or scenic;	Wild and scenic experiences are readily available for visitors away from roads, skifields and out of sight of surrounding farmland.
g. a range of natural character from pristine to modified; and	Tongariro National Park is substantially pristine, except for road and rail, various buildings and infrastructure, ski fields, and trails.
h. experiential attributes, including the sounds and smell of the environment; and their context or setting.	Various outstanding experiences (walk, run, hike, climb, ride, ski, board, kayak, etc) on offer including sounds, smell, context and setting.

Overall Tongariro National Park has outstanding natural character. A more detailed deconstruction of the park through characterisation mapping by topography, volcanism, soils, water, vegetation, and infrastructure including roads and track, built development, historical use would provide a more technical and varying assessment. That is currently beyond the scope of this assessment.

Modifications

Although the park as a whole has outstanding natural character there are many component parts of the park that have lesser, moderate or even low natural character. These are largely the manmade modifications including; roads and carparks, buildings and structures, barriers and signs, trails especially eroded and poorly crafted trail elements.

Other significant modified areas are the recent acquisitions to the park[12] incorporating farmland, cut over forest and old haul lines, tramlines and logging skid sites. Dependent of their level of regeneration and neglect these areas include; rank pasture, old vehicle tracks, and vegetation anomalies in the forest.

Although quantitatively small[13] the trails (6/100ths of one percent) and roads (1/3rd of one percent) criss-cross the landscape and are readily apparent. With severe weather, including frost heave and heavy rainfall induced scouring, trails frequently erode. In places tracks and trails widen where users avoid puddles. The proposed trails are intended to repair, or relocate -replace some trails that are overly steep or eroded, including restoration of abandoned trails.

[12] Refer Map 2 Gift Area and Additions - Tongariro National Park Management Plan
[13] Refer spreadsheet of quantities at the end of this document. Data sourced from DoC website and google maps. This is assumed to be incomplete but helps provide some indicative quantitative assessment.

The roads and trails allow for the recreation, use and enjoyment of the park by visitors, and park officers for management. The roads are LTNZ or TA administered, within road reserve, and technically outside the park however they are an integral part of the park experience and are assessed as such.

The ski fields make up a larger area (1.25% of the Park area) though much of this area remains in natural cover. Skiers and snowboarders are one of the major park user groups with 341,000 winter plus 27,000 summer visitors during the 2016 year[14].

Effects on cultural heritage

This will be addressed by the cultural impact assessment or advice from Tangata whenua.

It is inevitable that to sustainably manage the park any new trails need to be located most sensitively, and be constructed in a craftsman like manner to a high standard. Trails and their structures should not unnecessarily interfere with the natural functioning of the park and its ecosystems.

Notwithstanding this trails potentially provide for safe access of visitors for recreation, education and enjoyment of Tongariro National Park.

Historical tramways and tracks

The Bennett and Punch timber extraction tramway dated from 1933, and closed in 1956[15]. Parts of the proposed Turoa to Ohakune trails may utilise parts of this old tramway formation, as described in the feasibility assessment (3A & 3B Blyth to Mangawhero). As well as potentially reducing earthworks, this provides an opportunity for historic interpretation, and to repurpose heritage that was abandoned. The old tramway formation will otherwise be progressively lost to natural reversion.

As well as use of this tramway old tracks shown on the 1960's Tongariro National Park Map may also be used as track formation is intact with cuttings still existing (feasibility assessment 3A & 3B Blyth to Mangawhero).

The Cowern tramway from Horopito up to the Mangaturuturu Stream operated in the period 1912-1952. This tramway was used for the production of post and batten fence materials for farmers prior to the use of pine. Species harvested include kaikawaka (mountain cedar), silver pine, yellow pine, black beech and totara. The Horopito end of the proposed Horopito Link Trail may use parts of this old tramway formation (feasibility assessment 6 Horopito Link Trail), and provide opportunities for interpretation. The Ohakune end of the Horopito Link Trail potentially shares the lower portion of the Turoa to Ohakune Trail and any corresponding reutilisation of the Bennett and Punch tramway.

[14] From RAL annual report https://cdn.flipsnack.com/widget/flipsnackwidget.html?hash=ftj5b3f81&bgcolor=EEEEEE&t=1468393829

[15] Bennett and Punch Tramway, Ohakune, Initial Info CM-2562670, P. Mahoney 2015. See also Cowern Tramway Route, Horopito, Initial Info CM-2563961, P. Mahoney 2015

At this stage of the Management Plan review the trails are indicative. Alignment is subject to further development.

Figure 7 new natural and historic features are potentially revealed with the upgraded and new tracks (top tributary of Mangatururu – bottom Mangawhero Stream)

Effects on Outstanding Natural Features and Landscapes

The Tongariro National Park is listed as an Outstanding Natural Feature(s) and Landscape(s) in the Horizons Regional Council "One Plan" and the Ruapehu District Plan (DP Map B3 – Rural Features Map).

The effects on Outstanding Natural Feature(s) and Landscape(s) discussed here similarly apply for and cover landscape amenity and visual amenity matters.

Criteria for Outstanding Natural Feature(s) and Landscape(s)	My Assessment
natural science factors, including geological, topographical, ecological and dynamic components;	Spectacular volcanic mountains from old features such as Hauhungatahi to the classic volcano form of Ngaruahoe. Active geothermal activity at Te Maari. Ruapehu highest mountain in the north island.
the presence of water including in lakes, rivers and streams;	Pristine mountain streams and numerous waterfalls, tarns and lakes
legibility or expressiveness – how obviously the feature or landscape demonstrates its formative processes;	Largely intact and protected within Tongariro National Park. Commonly experienced by road and various trails .
aesthetic values including memorability and naturalness;	Hugely impressive large and extensive volcanic plateau, mountain and water feature.
vegetation (native and exotic);	Varied and exceptional flora and fauna. Refer to Nick Singer's ecological report for detail.
transient values, including presence of wildlife or other values at certain times of the day or year;	Seasonal changes, notably winter snow, dark night skys, variable weather
whether the values are shared and recognised;	Highly valued by both maori and non maori residents and visitors
cultural and spiritual values for tangata whenua, identified by working, as far as practicable, in accordance with tikanga Māori; including their expression as cultural landscapes and features;	Highest cultural and spiruitual values as reflected in World Heritage Status. The only World Heritage Cultural site in NZ.
historical and heritage associations; and	Many more modern historical associations related to development rail, road and primary industry including timber extraction and farming.
wild or scenic values;	Many wild and scenic experiences are available in the park from within forested areas, in and above the clouds, during wild weather, and within enclosed catchments.

Overall the park is clearly an outstanding natural feature and landscape. As stated above for natural character a more detailed deconstruction of the park through characterisation mapping by; topography, volcanism, soils, water, vegetation, infrastructure including roads and track, built development, and historical use would provide a more technical, varied and nuanced assessment. This level of characterisation is currently beyond the scope of this assessment.

Trail landscape effects

Roads and trails provide for safe access of visitors to recreate, educate and enjoy Tongariro National Park. They enable tangata whenua, residents and visitors to experience the park.

Figure 8 View of Tongariro crossing track on flanks of Ngaruahoe.

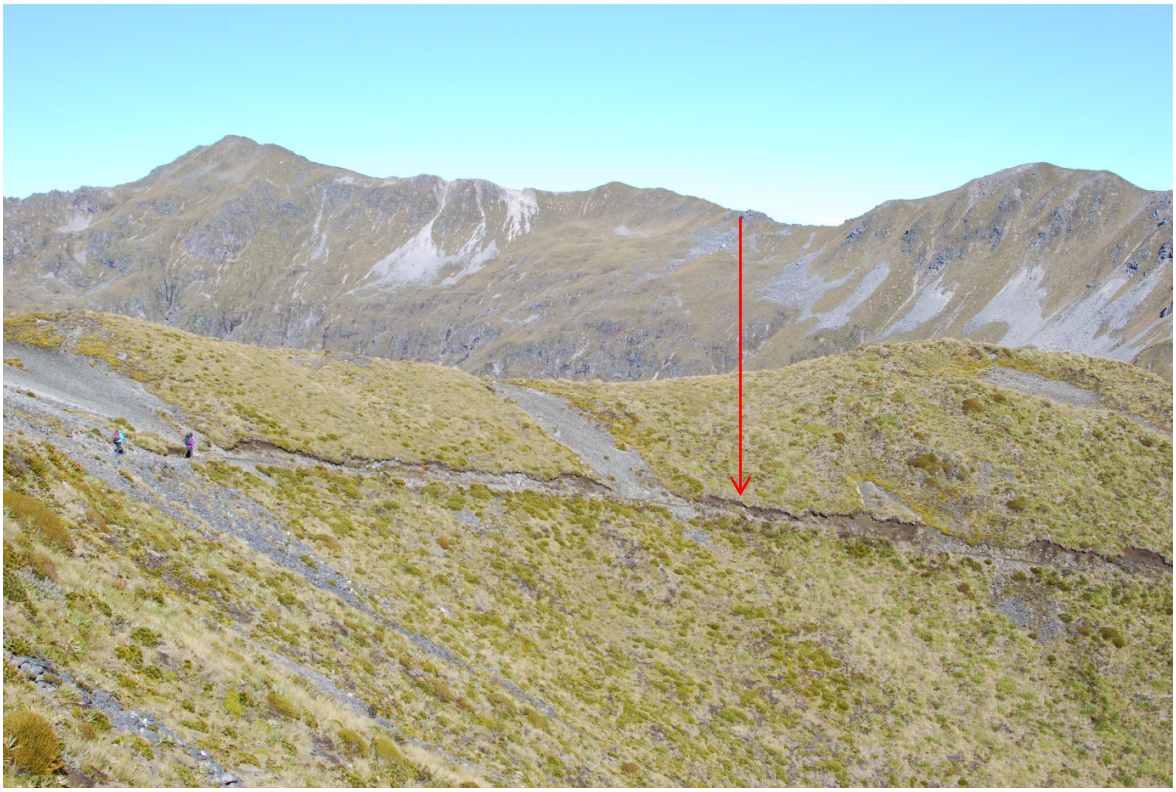

Figure 9 Photograph of Kepler track, near Mt Luxmore, showing trail crossing a prominent slope.

However as shown in the preceding photographs tracks are potentially visually prominent, and care needs to be taken in their construction and management. This is especially the case in open areas such as alpine habitats above the bush-line. Tracks are highly visible when viewing across to prominent alpine slopes for example from roads, more generally from the air (scenic flights), and for track users themselves.

The actual and potential landscape effects of trails on the landscape are as follows;

- destruction or transplanting of vegetation.
- change in vegetation pattern(s).
- construction (cut and fill) earthworks and retaining to form trail platform.
- visual effect of curving and linear lines across slopes.
- natural light and shadow effects highlight the linear nature of trails and tracks.

These indicate careful design of trail alignments are needed to avoid prominent slopes, features and public views. The care and quality of construction has a significant bearing on actual effects. To some extent some effects are inevitable for track users as shown on the proceeding photographs.

As a result trails need to be hidden from key viewing points, visitor access roads, and should avoid crossing commonly viewed or photographed scenery. Trails should be located out of site where possible.

The likely landscape effects of the proposed trails vary and are assessed for the three proposed trail sections as follows.

Turoa to Ohakune

This is a separate off-road trail for cyclists and on-foot users, and can be further broken down into discrete sections based on landscape characterisation;

- the alpine section above the tree line extending from the Turoa base carpark area to forest cover including any open sections along the Mangawhero Stream, and Waitonga falls - Blyth track.
- the Mangawhero River section through lower scrub and forest adjacent the stream.
- forest sections on both existing and new alignment, and subject refinement based on ecological considerations.

The sections of track above the tree line are the most likely to be visible, and so have the greatest landscape effects. Sections of track under the forest canopy will have localised landscape effects. Such effects are experinced by trail users only, and so are of no consequence to others. Any adverse effects will be in relation to natural character, specifically vegetation clerance and the change in vegetation patterns resulting from the track construction. Users may experience an improvement if the track is of a higher standard, and provided it is constructed with care and following renaturalisation of vegetation.

The length of track involved from Turoa to the Blyth - Waitonga Falls track is some 7km. I understand the trail development will use locally sourced rock for armouring. Existing tracks will be upgraded and where they are too steep, re-routed. This section of track includes over 3km of boardwalks and up to eight bridges.

I note the round the mountain track, and the Lake Surprise track could be re-routed to start at Turoa. This requires further investigation, but should probably be considered within this project for completeness. I note the Tongariro National Park Management Plan anticipates that maintenance and upgrading of existing tracks, with a focus on environmental preservation and visitor safety and enjoyment, is a priority[16]. Where tracks become degraded over time they may be re-routed[17], and with restoration carried out on closed and degraded sections.

Tongariro National Park policy also states no new tracks will be provided in the park[18] though it does provide for a review of short walks at Whakapapa Village to maximise the visitor experience. It is unclear why the same does not apply at Ohakune as this has become a major access/ gateway to the park. The reason for this partial plan review is to allow for the further design development, construction and maintenance of the proposed tracks at Ohakune. The proposed trails are also supported in principle by the NZ Walkways Act 1990[19].

It is recommended that the alpine section of the new track is located within the Mangawhero stream catchment and on the same slopes as the OMR as this is already modified by the road, grit and parks areas, and existing tracks. Within this catchment it is also recommended for the track to be substantially on the roadside of the stream, both to reduce visual effects from the Ohakune Mountain Road and similarly so that track users can look across the stream to enjoy undisturbed natural character. Looking down across the trails will be less visible or hidden compared to looking across to them on a facing slope.

Figure 10 Tramper on Ohakune Mountain Road, during site visit.

The proposed track will allow trampers to walk off-road from the Waitonga Falls to the Lake Surprise track or visa versa. This trail provides users a safer off-road alternative. Some trail users may choose to utilise the various OMR access points as smaller loop walks or rides. It is likely that shuttles

[16] Tongariro National Park Management Plan, 4.2.2.4 policy 1.
[17] Tongariro National Park Management Plan, 4.2.2.4 policy 2.
[18] Tongariro National Park Management Plan, 4.2.2.4 policy 4 &5.
[19] Tongariro National Park Management Plan policy 4.3.2.5 policy 1.

from Ohakune to Turoa will provide for cyclists and walkers/runners to use the trail as a downhill only ride or walk/run.

Figure 11 Lake Surprise Walk start on Ohakune Mountain Road (part of round the mountain track). Note marker posts.

Figure 12 Massey University Alpine Club (MUAC) hut and one access point and carpark for the proposed trail.

The proposed track is proposed to follow the true right bank of the Mangawhero Stream down to the Massey University Alpine Club (MUAC) hut and on to the Waitonga Falls, Blyth Track junction. This section is mainly alpine with bare rock, and streambed, tussock and alpine vegetation

prominent. This landscape is sensitive to change and this section of track is likely to have the greatest potential adverse effects on natural and landscape character.

This section of track warrants further study, and a deeper landscape assessment or review once the developed track alignment including long and cross section design is known. It is recommeneded that the track is sited below the OMR, on the true right bank as far as possible to keep it from public view and so trail users do not look straight into the OMR. The various bridges will allow for public recreation and enjoyment of the environment.

Overall I expect the trail to become very popular as it will provide visitors a relatively easy downhill route with varied views, and vegetation. The vegetation changes from true alpine at Turoa, into broken alpine and scrub, to scrub and forest with mountain fir, and beech forest and in its lower parts podocarp hardwood forest. This is an incredible variety of indigenous vegetation over a relatively short distance. Similarly the experience will also be of the small mountain creek growing bigger to become the Mangawhero River near Ohakune. The experience is also from above to below the snow line, and/ or similarly the cloud line depending on season and weather.

On balance I consider the landscape effects of the proposed alpine section of trail are acceptable because;

- there are safety issues involved. I understand traffic experts recommend this as a safer alternative to using OMR.
- the Turoa snowfield area is highy modified with roads, car parking, buildings and lifts.
- the Turoa Road construction also modified this catchment, and the trail will be sited largely within the same catchment and slopes. That is the proposed new section of trail Turoa to MUAC, and MUAC to chainshed will be sited within a modified catchment currently in use for visitor access.
- it utilises existing carparks, grit and stockpile areas along OMR.
- significant work on OMR is avoided.

This assumes the trails will be located senstively, largely out of site and avoiding prominent slopes as viewed from the Ohakune Mountain Road. It also assumes trails will be constructed with minimal earthworks and vegetation clearance.

The section of the proposed trail below the Waitonga Falls – Blyth track is largely within the forest canopy. Much of this construction is permitted under the Management Plan as maintenance and upgrade of degraded track (4.3.2.4 policy 1). Effects on natural character and landscape are largely hidden and so avoided except to the extent the track access points will likely become more obvious along OMR, and through the possible need for additional works for car parking, signage and safe turning in future.

Alternative proposals

The proposal is an alternative to the widening of Ohakune Mountain Road (OMR) to allow for a cycle lane. Widening OMR involve excavation of cut faces, including destruction of vegetation and exposition of bare soils. I agree separating the cyceway from the road is likely to result in significantly lesser effects overall, and a potentially a much better experience for cyclists and

walkers. Widening OMR is likely to result in obvious adverse landscape effects in terms of natural character and visual amenity. This also needs to be considered in the context of the known conflicts between vehicle, cycle, and foot users.

One assumption of this landscape opinion is that provision for a cycle lane is required for safety purposes, and is beyond challenge. It would usually be important to investigate whether the proposed trails are necessary as the Tongariro National Park Management Plan primarily requires for the presevation and conservation of natural character and landscape values. No quantitative analysis of track and road usage was undertaken. However anticipatory planning suggests that with the growth in recreational use of the park an enlarged network of well maintained trails is required.

In terms of the other tracks, Horopito Link Trail and "Missing Link" Mangaturuturu river crossing section, assessing alternatives is beyond the scope of this opinion.

Horopito to Ohakune (Horopito Link Trail)

The Horopito Link Trail or Old Coach Road return loop is a proposed new track through the Tongariro National Park linking Ohakune to Horopito. It also provides an alternative route from Ohakune to Horopito and National Park. As above this opinion assumes the need for this track has been proven.

The track appears to cross terrain comprising; old farmland, scrub and old timber tramways and other tracks as well as the natural areas. The northern portion including the powerline route on the unformed part of Matapuna Road north is boggy. Significant lengths of this 11km track appear to be opening up new parts of the park to visitors. Further information is required especially in terms of ecological sensitivity in the Waipera Stream, Makotuku River and Mangaeteroa Stream catchments near Horopito.

Figure 13 Photograph showing typical terrain above Mangawhero campsite (part of old farm) to river and bush left.

Sections involving utilisation of old farm and logging trails will require minimal earthworks and are likely to have few if any adverse landscape effects. Alternative alignments could utilise the old farm tracks up tributaries of the Mangawhero Stream as shown on the photographs below. These farm

tracks extend some 4km north from Mangawhero camp towards the Horopito track. Topographic maps suggest options through private land or on the Horopito Track access would cause lesser effects within the Tongariro National Park though agreement of landowners is needed. Users would likely suffer a lesser experience though. Users can simply return on the existing Old Coach Road trail so it is not essential, and is listed as a low priority in the feasibility study[20].

Figure 14 Matapuna Road unformed north section follows park boundary to right.

Figure 15 Old farmland north of Mangawhero Campsite showing ridge trail may follow (red arrows)

[20] Proposed Ohakune Mountain Trail Feasibility Assessment, Perception Planning, 21 June 2016 for DoC.

In terms of assessment this track could be deconstructed into smaller lengths; farmland, tram line, scrub, boardwalk, and forest sections. In practice landscape effects of this proposed trail are likely to be minor as this section of the park is relatively inaccessible and not within general public view. Potential effects of vegetation clearance and track construction are likely to be localised. Any adverse effects will be predominantly on natural character.

Further investigation of the landscape effects of this track may be warranted prior to construction, and as part of the developed and detailed design. Triggers for an assessment would be the need for significant earthworks or structures, or adverse effects on the vegetation or ecology. Effects on natural character will be better informed by the ecological assessment. This is not yet available. I expect this trail to open parts of the park not currently available for general use, education and enjoyment, so there may be benefits in terms of public access to the natural environment.

Mangaturuturu viaduct loop river crossing

This is part of the "Missing link" National Park Village to Horopito proposal. A short 1km river crossing section of the Horopito to National Park trail is proposed within Tongariro National Park. This may be necessary so that a larger expensive bridge can be avoided. Most of the "Missing Link " trail is outside the park. This section of trail leads east down into a deep sided gully some 20m to the Mangaturuturu River, bridges the river, and then loops back west climbing up the other side to rejoin the trail outside the park.

The Mangaturturu gully is an attractive gully with steep sides and is largely with a tree and shrub canopy. Further work may be needed to properly assess this section of track if significant earthworks or retaining are required.

Figure 16 Mangaturuturu rail viaduct and road (left) viewing across gorge to attractive waterfall opposite.

This track will be used as a short day visitor walk with destination attractions including the waterfall shown, and the Mangaturuturu Gorge and river crossing bridge. This day visitor walk would typically

start and/or finish at the existing rest area on SH4 a kilometre or so to the south of the Mangaturuturu River. This would be a dual use walk and cycle trail, and may become popular with passing motorists given no short walks are available directly off SH4 between National Park and Ohakune.

Alternatives that would negate the need for using the park at all would be a cycle bridge utilising the existing State Highway bridge or rail viaduct. This section of track is likely to be more cost effective than the larger bridge considered in the Missing Link Feasibility Study[21].

Assuming a route can be constructed that largely follows the natural landform with very minor earthworks I expect the effects of this trail will be fully or substantially hidden from public view. The existing bridges will hide the track from passing motorists, and most of the track will be through forest. If constructed senstively with minimal vegetation clearance and earthworks I expect the landscape effects of this trail to be minor, and limited to effects on natural character (specifically ecological effects). That is it is unlikely there will be consequential landscape effects.

Conclusions and recommendations

Tongariro is New Zealand's oldest national park and a dual World Heritage area. This status recognises the park's important Maori cultural and spiritual associations as well as its outstanding volcanic features.

The scope of this landscape opinion has not attempted to describe, characterise and map the various landscape components that would have been deconstructed within the park but concludes it is correctly designated as having both outstanding natural character, and that it is an Outstanding Natural Feature and Landscape. A more detailed deconstruction of the park through characterisation mapping by; topography, volcanism, soils, water, vegetation, infrastructure including roads and track, built development, and historical use would provide a more technical and varied assessment. This would indicate areas of lesser, moderate and even low natural character and landscape ranking for example; old farmland, disturbed areas used for timber extraction and assorted tramways, old access tracks and trails.

No attempt was made to distinguish between users as to whether they are cyclists or on foot. In landscape and natural character terms these groups of people have equivalent effects and rights to enter the park. Track construction and maintenance standards are provided for in Tongariro National Park Management Plan policy[22]. Conditions are recommended to ensure trails are constructed sensitively, and generally as described in the feasibility assessment 3.2 trail parameters[23].

Balancing the possible effects of the trails on natural character and landscape, that is maintaining the park in its natural state, against that public right of entry utlising trails is subjective. The National Parks Act itself explains the purpose of preserving in perpetuity the national park, for the intrinsic worth and for the benefit, use, and enjoyment of the public, areas of New Zealand that contain

[21]

[22] Tongariro National Park Management Plan - 4.3.2.4 policy 1

[23] Mountains to Sea Cycle Trail Phase 2, The Missing Link (National Park Village to Horopito), Ngā Ara Tūhono Feasibility Study and Business Case , February 2015. Prepared for: Ruapehu District Council and Mountains to Sea Cycle Trail Partnership, by Warren Furner, Ruapehu District Council.

scenery of such distinctive quality, ecological systems, or natural features so beautiful, unique, or scientifically important that their preservation is in the national interest. Further subject to the preservation of the native plants and animals or for the welfare in general of the park, the public shall have freedom of entry and access to the parks, so that they may receive in full measure the inspiration, enjoyment, recreation, and other benefits that may be derived from mountains, forests, sounds, seacoasts, lakes, rivers, and other natural features.

My assessment concludes that provided natural character is preserved none of the proposed trails are inherently contrary to the National Parks Act nor the Tongariro National Park Management Plan, except in so far as policy 4.3.2.4 policy 4 does not provide for them.

Report prepared by

s9(2)(a)

Richard Hart
(Registered Landscape Architect)

RICHARD HART
LANDSCAPE ARCHITECT
NZ 07 572 2929
36 Lee Street
Tauranga 3116
richard@richardhart.co.nz

Appendix; Table of Trails and road lengths

trail	**Length (km)**
Tongariro alpine crossing	19.4
Tongariro Northern circuit	43.1
Round the mountain (Ruapehu)	66.2
Lake Rotopounamu	5
Mounds walk	1
Mt Ruapehu crater	10
Ohinetonga track	4
Ridge track	1.2
Silica rapids	7
Tama lakes	17
Taranaki falls	8
Tawhai falls	1
Tupapakurua falls	11
Whakapapa nature walk	1
Whakapapaiti Valley	16
Whakapapanui	6
Old Blyth track	11
Taurewa loop	4.5
Te Porere Redoubt	2.5
Total	***234.9km @ 2m width equals 47ha***

Roads

Roads	**Length (km)**
Whakapapa mountain road SH48	13.1
Ohakune mountain road	23
Tukino mountain Road	10
Turangi- Ohakune SH1&49	89.8
Turangi – Ohakune SH47&48	85.2
Assorted access roads (estimate)	50
Total	***271.1km @ 10m wide equals 318ha***

Tongariro National Park - area 795.98sq.km or 79,598ha

Appendix 14. Engagement Letters

RUAPEHU
OUR GREATER OUTDOORS

06 December 2021

RE: Support for Mountains to Sea – Ngā Ara Tūhono Cycle Trail

Visit Ruapehu has been approached to support the application for a concession to progress new sections of the Mountains to Sea – Ngā Ara Tūhono Cycle Trail.

The extensions to this cycleway were included in the 2017 Ruapehu Regional Visitor Development Plan, and as part of the ongoing Ruapehu Destination Management Plan work we continue to work with community on product development and promotion opportunities.

The proposed Te Ara Mangawhero trail will offer visitors and locals alike a high-quality downhill biking trail at the base of Mt Ruapehu near Ohakune, connecting the mountains to the sea through connected pathways.

Ohakune is the Southern gateway to the Tongariro National Park and is the access point to the Whanganui River. Traditionally summer is low season for the town, and the realisation of Te Ara Mangawhero gives visitors more reasons to come and stay in the region, increasing spend and improving employment outcomes.

Alongside the economic benefits, the completion of this trail will contribute to wider wellbeings by promoting outdoor activity and engagement with our precious environment, bringing mental and physical health to our community and manuhiri, whilst strengthening our responsibilities under kaitiakitanga.

Visit Ruapehu is the Regional Tourism Organisation responsible for the Ruapehu area.

Please do not hesitate to contact me if you would like to discuss this further.

Yours Sincerely,

s9(2)(a)

Jo Kennedy

General Manager Visit Ruapehu

s9(2)(a)

Ohakune Inc.
PO Box 152
Ohakune

Attention: Department of Conservation

On behalf of Ohakune Inc. we wish to register our strong support for the application for a concession to progress the new sections of Mountains to Sea – Ngā Ara Tūhono cycle trail in Tongariro National Park.

As part of the vision to complete the trail as originally envisioned, the new sections will enable our community, both people and businesses to flourish as a result of the expected additional increase in visitors and the addition of another community asset for local use too.

The trails, including the proposed new sections are expected to help transform our communities with a sustainable stream of visitors spread through the year. Alongside the much-needed economic benefits, we relish the opportunity to connect New Zealanders to their environment, encouraging them to cherish and protect it. We acknowledge that this will also deliver positive health outcomes as users benefit from both the physical and mental health aspects and the community engagement as we come together to support and help where we can on complimentary projects.

New walking and cycling opportunities are critical for our communities' transition towards visitor and local activities that support positive environmentally and culturally sustainable outcomes. The proposed new trails help us to position the Ruapehu region as the true centre of The Great Outdoors.

Creating safe, enjoyable and connected pathways supports the vision for our healthy communities and environment.

erely,

s9(2)(a)

Janelle Hinch
President
Ohakune Inc.
'For the betterment of Ohakune and surrounds'

Ngā Haerenga
NEW ZEALAND CYCLE TRAILS

6 December 2021

To whom it may concern,

Ngā Haerenga New Zealand Cycle Trails is strongly supportive of Mountains to Sea – Ngā Ara Tūhono cycle trail's application for a concession to progress the new sections of the trail in the Tongariro National Park.

Mountains to Sea – Ngā Ara Tūhono is one of Ngā Haerenga New Zealand Cycle Trails 22 Great Rides. Great Rides are the premium multi day cycling experiences in New Zealand, showcasing the best of New Zealand's scenery, culture and heritage.

These new sections will enable the trail to be completed as originally envisaged, resulting in increased visitation and thereby maximising the economic benefits for the local community and the Ruapehu region. Social, environmental and health benefits will also be delivered.

The development of new walking and cycling opportunities in the Ruapehu region are critical to transition the area to visitor and local activities that support positive environmentally and culturally sustainable outcomes.

Completing these sections of Mountains to Sea – Ngā Ara Tūhono will enable the Great Ride opportunity to be fully realised and will strengthen the Ruapehu region's positioning as the centre of The Great Outdoors.

Ngā mihi

Janet Purdey
General Manager
Ngā Haerenga New Zealand Cycle Trails

Ohakune Inc.
PO Box 152
Ohakune

Attention: Department of Conservation

On behalf of Ohakune Inc. we wish to register our strong support for the application for a concession to progress the new sections of Mountains to Sea – Ngā Ara Tūhono cycle trail in Tongariro National Park.

As part of the vision to complete the trail as originally envisioned, the new sections will enable our community, both people and businesses to flourish as a result of the expected additional increase in visitors and the addition of another community asset for local use too.

The trails, including the proposed new sections are expected to help transform our communities with a sustainable stream of visitors spread through the year. Alongside the much-needed economic benefits, we relish the opportunity to connect New Zealanders to their environment, encouraging them to cherish and protect it. We acknowledge that this will also deliver positive health outcomes as users benefit from both the physical and mental health aspects and the community engagement as we come together to support and help where we can on complimentary projects.

New walking and cycling opportunities are critical for our communities' transition towards visitor and local activities that support positive environmentally and culturally sustainable outcomes. The proposed new trails help us to position the Ruapehu region as the true centre of The Great Outdoors.

Creating safe, enjoyable and connected pathways supports the vision for our healthy communities and environment.

Yours sincerely,

s9(2)(a)

Janelle Hinch
President
Ohakune Inc.
'For the betterment of Ohakune and surrounds'

TONGARIRO
National Park
Villages

National Park Village Business Association
17 Carroll Street
National Park Village, 3948

To whom it may concern,

On behalf of National Park Village Business Association, we wish to register our strong support for the application for a concession to progress the new sections of Mountains to Sea – Ngā Ara Tūhono cycle trail in Tongariro National Park.

As part of the vision to complete the trail as originally envisioned, the new sections will enable our community, both people and businesses to flourish because of the expected additional increase in visitors and the local communities

Comprising the

- Te Ara Mangawhero (this application)
- Horopito
- Missing Link

The trails including the proposed new sections are expected to help transform our communities with a sustainable stream of visitors spread through the year. Alongside the much-needed economic benefits, we relish the opportunity to connect New Zealanders to their environment, encouraging them to cherish and protect it, deliver health outcomes as we benefit from both the physical and mental health aspects, the community engagement as we come together to support and help where we can on complimentary projects.

New walking and cycling opportunities are critical as our industry/communities' transition towards visitor and local activities that support positive environmentally and culturally sustainable outcomes. The proposed new trails help us to position the Ruapehu region as truly the centre of The Great Outdoors.

Creating safe, enjoyable and connected pathways supports the vision for our healthy communities and environment.

Yours sin s9(2)(a)

Signatur

Name
Andrea
Designation
National Park Village Business Association

RUAPEHU MTB CLUB

EST. 2010

On behalf of The Ruapehu Mountain Bike Club, we wish to register our strong support for the application for a concession to progress the new sections of Mountains to Sea – Ngā Ara Tūhono cycle trail in Tongariro National Park.

As part of the vision to complete the trail as originally envisioned, the new sections will enable our community, both people and businesses to flourish as a result of the expected additional increase in visitors (and local use too).

Comprising the

- Te Ara Mangawhero (this application)
- Horopito
- Missing Link

The trails including the proposed new sections are expected to help transform our communities with a sustainable stream of visitors spread through the year. Alongside the much-needed economic benefits, we relish the opportunity to connect New Zealanders to their environment, encouraging them to cherish and protect it, deliver health outcomes as we benefit from both the physical and mental health aspects, the community engagement as we come together to support and help where we can on complimentary projects.

New walking and cycling opportunities are critical as our industry/communities' transition towards visitor and local activities that support positive environmentally and culturally sustainable outcomes. The proposed new trails help us to position the Ruapehu region as truly the centre of The Great Outdoors.

Creating safe, enjoyable, and connected pathways supports the vision for our healthy communities and environment.

Yours sincerely

s9(2)(a)

Michelle Gavegan
RMBC Secretary

Mountains to Sea Cycle Trail

E: info@mountainstosea.nz
W: mountainstosea.nz

07 July 2022

To Whom it may concern

Mountains to Sea – Ngā Ara Tūhono Governance group is strongly supportive of the application to progress the new sections of the trail, specifically the proposed Te Ara Mangawhero section in Tongariro National Park.

Mountains to Sea – Ngā Ara Tūhono is one of twenty-three premium Great Rides in New Zealand.

The planned section will help bring to fruition the original vision for connected pathways that provide a conduit for New Zealanders and other visitors to engage with our environment, cultural history, and communities as part of a rich and diverse story that is the journey from the Central North Island Mountains to the Tasman Sea.

As a truly Great Ride, the new section of the path offers both visiting and local walkers and cyclists the opportunity to positively contribute to environmental, cultural, and economic outcomes. The benefits include economic opportunities, health, social wellbeing, and environmental benefits for the local community, and the wider Ruapehu and Whanganui regions as part of the trail halo.

The forecast increase in visitor numbers and lengthened stay in the regions will amplify and add considerable benefit for the overall positioning of both Ruapehu and Whanganui as the place to come, experience and share with the world.

Ngā mihi

Hamish Mc Douall
Chair – Mountains to Sea – Ngā Ara Tūhono
Mayor – Whanganui District Council

Don Cameron
Past Chair
Mayor – Ruapehu District Council

RUAPEHU DISTRICT COUNCIL
Private Bag 1001, Taumarunui 3946, New Zealand
Telephone +64 7 895 8188 • Fax +64 7 895 3256
Email info@ruapehudc.govt.nz
Website www.ruapehudc.govt.nz

22 July 2022

To whom it may concern

TE ARA MANGAWHERO SECTION OF MONTAINS TO SEA - NGĀ ARA TŪHONO

This letter is in support of the application for the Te Ara Mangawhero section of the Mountains to Sea – Ngā Ara Tūhono cycle trail.

The trail is one of the twenty-three Great Rides in New Zealand.

Council has supported this work since the establishment of the first cycleways in 2009. This new section will help bring to fruition the original vision for the trail – from the mountains to the sea. It will provide opportunities for New Zealanders and visitors to engage in with our environment, cultural history, and communities.

The new section of the path offers both visiting and local walkers and cyclists the opportunity to positively contribute to environmental, cultural, and economic outcomes.

The benefits will include economic opportunities, health, social wellbeing, and environmental benefits for the local community, and the wider Ruapehu and Whanganui regions as part of the full trail length.

The forecast increase in visitor numbers and lengthened stay in the regions will amplify and add considerable benefit for the overall positioning of both Ruapehu and Whanganui as the place to come, experience and share with the world.

Yours sincerely

s9(2)(a)

Clive Manley
CHIEF EXECUTIVE

s9(2)(a)

Don Cameron
MAYOR