Te Kaunihera o Te Hiku o te Ika
Far North District Council

Office Use Only
Application Number:

Application for resource consent or fast-track resource consent

(Or Associated Consent Pursuant to the Resource Management Act 1991 (RMA)) (If applying for a Resource Consent pursuant to Section 87AAC or 88 of the RMA, this form can be used to satisfy the requirements of Schedule 4). Prior to, and during, completion of this application form, please refer to Resource Consent Guidance Notes and Schedule of Fees and Charges — both available on the Council's web page.

1. Pre-Lodgement Meeting

Have you met with a council Resource Consent representative to discuss this application prior to lodgement? ◯ **Yes** ✔ **No**

2. Type of Consent being applied for

(more than one circle can be ticked):

- ✔ **Land Use**
- ◯ **Fast Track Land Use***
- ◯ **Subdivision**
- ◯ **Consent under National Environmental Standard** (e.g. Assessing and Managing Contaminants in Soil)
- ◯ **Discharge**
- ◯ **Change of Consent Notice (s.221(3))**
- ◯ **Extension of time (s.125)**
- ◯ **Other (please specify)** _____

The fast track is for simple land use consents and is restricted to consents with a controlled activity status.

3. Would you like to opt out of the Fast Track Process?

◯ **Yes** ◯ **No**

4. Consultation

Have you consulted with Iwi/Hapū? ✔ **Yes** ◯ **No**

If yes, which groups have you consulted with?	Ngati Mahu, Ngati Hine, Te Roroa ki Opua
Who else have you consulted with?	

*For any questions or information regarding iwi/hapū consultation, please contact Te Hono at Far North District Council **tehonosupport@fndc.govt.nz***

5. Applicant Details

Name/s: Far North District Council

Email: [redacted]

Phone number:

Postal address:
(or alternative method of service under section 352 of the act)

6. Address for Correspondence

Name and address for service and correspondence (if using an Agent write their details here)

Name/s: Barker & Associates C/O Makarena Dalton

Email: [redacted]

Phone number:

Postal address:
(or alternative method of service under section 352 of the act)

**** All correspondence will be sent by email in the first instance. Please advise us if you would prefer an alternative means of communication.***

7. Details of Property Owner/s and Occupier/s

Name and Address of the Owner/Occupiers of the land to which this application relates (where there are multiple owners or occupiers please list on a separate sheet if required)

Name/s: Kiwi Rail

Property Address/ Location: Various - Refer to AEE
Taumarere to Opua

Postcode

8. Application Site Details

Location and/or property street address of the proposed activity:

Name/s: Various - Refer to AEE

Site Address/ Location:

Postcode

Legal Description: **Val Number:**

Certificate of title:

Please remember to attach a copy of your Certificate of Title to the application, along with relevant consent notices and/or easements and encumbrances (search copy must be less than 6 months old)

Site visit requirements:

Is there a locked gate or security system restricting access by Council staff? ✔ **Yes** ◯ **No**

Is there a dog on the property? ◯ **Yes** ✔ **No**

Please provide details of any other entry restrictions that Council staff should be aware of, e.g. health and safety, caretaker's details. This is important to avoid a wasted trip and having to re-arrange a second visit.

Please contact planner to arrange site visit requirements. Safety procedures and onsite inductions are required due to operational requirements of the Train.

9. Description of the Proposal:

Please enter a brief description of the proposal here. Please refer to Chapter 4 of the District Plan, and Guidance Notes, for further details of information requirements.

FNDC are seeking to re-establish a new permanent section of the Pou Herenga Tai Twin Coast Cycle Trail, extending from Taumārere to Ōpua Cycle. Involving the construction of a cycle path of various design treatments including mountain bike tracks, formed gravel path, boardwalk and bridge 'clip-on' extensions along a 6.7km section of the trail. It is proposed adjacent to the existing KiwiRail railway corridor within the existing designation.

If this is an application for a Change or Cancellation of Consent Notice conditions (s.221(3)), please quote relevant existing Resource Consents and Consent Notice identifiers and provide details of the change(s), with reasons for requesting them.

10. Would you like to request Public Notification?

◯ **Yes** ✔ **No**

11. Other Consent required/being applied for under different legislation

(more than one circle can be ticked):

- ◯ **Building Consent** Enter BC ref # here (if known)
- ✔ **Regional Council Consent (ref # if known)** Ref # here (if known)
- ◯ **National Environmental Standard consent** Consent here (if known)
- ◯ **Other (please specify)** Specify 'other' here

12. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health:

The site and proposal may be subject to the above NES. In order to determine whether regard needs to be had to the NES please answer the following:

Is the piece of land currently being used or has it historically ever been used for an activity or industry on the Hazardous Industries and Activities List (HAIL) ◯ **Yes** ✔ **No** ◯ **Don't know**

Is the proposed activity an activity covered by the NES? Please tick if any of the following apply to your proposal, as the NESCS may apply as a result. ◯ **Yes** ✔ **No** ◯ **Don't know**

- ◯ **Subdividing land**
- ◯ **Changing the use of a piece of land**
- ◯ **Disturbing, removing or sampling soil**
- ◯ **Removing or replacing a fuel storage system**

13. Assessment of Environmental Effects:

Every application for resource consent must be accompanied by an Assessment of Environmental Effects (AEE). This is a requirement of Schedule 4 of the Resource Management Act 1991 and an application can be rejected if an adequate AEE is not provided. The information in an AEE must be specified in sufficient detail to satisfy the purpose for which it is required. Your AEE may include additional information such as Written Approvals from adjoining property owners, or affected parties.

Your AEE is attached to this application ✔ **Yes**

13. Draft Conditions:

Do you wish to see the draft conditions prior to the release of the resource consent decision? ● **Yes** ◯ **No**

If yes, do you agree to extend the processing timeframe pursuant to Section 37 of the Resource Management Act by 5 working days? ✔ **Yes** ◯ **No**

14. Billing Details:

This identifies the person or entity that will be responsible for paying any invoices or receiving any refunds associated with processing this resource consent. Please also refer to Council's Fees and Charges Schedule.

Name/s: (please write in full) Simone Elsmore

Email: [redacted]

Phone number: [redacted]

Postal address:
(or alternative method of service under section 352 of the act) [redacted]

Fees Information
An instalment fee for processing this application is payable at the time of lodgement and must accompany your application in order for it to be lodged. Please note that if the instalment fee is insufficient to cover the actual and reasonable costs of work undertaken to process the application you will be required to pay any additional costs. Invoiced amounts are payable by the 20th of the month following invoice date. You may also be required to make additional payments if your application requires notification.

Declaration concerning Payment of Fees
I/we understand that the Council may charge me/us for all costs actually and reasonably incurred in processing this application. Subject to my/our rights under Sections 357B and 358 of the RMA, to object to any costs, I/we undertake to pay all and future processing costs incurred by the Council. Without limiting the Far North District Council's legal rights if any steps (including the use of debt collection agencies) are necessary to recover unpaid processing costs I/we agree to pay all costs of recovering those processing costs. If this application is made on behalf of a trust (private or family), a society (incorporated or unincorporated) or a company in signing this application I/we are binding the trust, society or company to pay all the above costs and guaranteeing to pay all the above costs in my/our personal capacity.

Name: (please write in full) Simone Elsmore

Signature: [redacted] **Date** 26-Nov-2024
(signature of bill payer)

MANDATORY

15. Important Information:

Note to applicant
You must include all information required by this form. The information must be specified in sufficient detail to satisfy the purpose for which it is required.
You may apply for 2 or more resource consents that are needed for the same activity on the same form.
You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991.

Fast-track application
Under the fast-track resource consent process, notice of the decision must be given within 10 working days after the date the application was first lodged with the authority, unless the applicant opts out of that process at the time of lodgement.
A fast-track application may cease to be a fast-track application under section 87AAC(2) of the RMA.

Privacy Information:
Once this application is lodged with the Council it becomes public information. Please advise Council if there is sensitive information in the proposal. The information you have provided on this form is required so that your application for consent pursuant to the Resource Management Act 1991 can be processed under that Act. The information will be stored on a public register and held by the Far North District Council. The details of your application may also be made available to the public on the Council's website, www.fndc.govt.nz. These details are collected to inform the general public and community groups about all consents which have been issued through the Far North District Council.

15. Important information continued...

Declaration

The information I have supplied with this application is true and complete to the best of my knowledge.

Name: **(please write in full)** Makarena Dalton

Signature:  Date 29-Nov-2024

A signature is not required if the application is made by electronic means

Checklist (please tick if information is provided)

- ☐ Payment (cheques payable to Far North District Council)
- ☑ A current Certificate of Title (Search Copy not more than 6 months old)
- ☑ Details of your consultation with Iwi and hapū
- ☑ Copies of any listed encumbrances, easements and/or consent notices relevant to the application
- ☑ Applicant / Agent / Property Owner / Bill Payer details provided
- ☑ Location of property and description of proposal
- ☑ Assessment of Environmental Effects
- ☐ Written Approvals / correspondence from consulted parties
- ☑ Reports from technical experts (if required)
- ☐ Copies of other relevant consents associated with this application
- ☑ Location and Site plans (land use) AND/OR
- ☐ Location and Scheme Plan (subdivision)
- ☐ Elevations / Floor plans
- ☐ Topographical / contour plans

Please refer to Chapter 4 of the District Plan for details of the information that must be provided with an application. Please also refer to the RC Checklist available on the Council's website. This contains more helpful hints as to what information needs to be shown on plans.

Pou Herenga Tai Twin Coast Cycle Trail – Taumārere to Ōpua

Assessment of Environmental Effects and Statutory Analysis

25 November 2024

B&A
Urban & Environmental

Prepared for:
Far North District Council

B&A Reference:

WNG20126

Status:

Final Revision 1

Date:

25 November 2024

Prepared by:

Melissa Hallett

Senior Planner, Barker & Associates Limited

Reviewed by:

Makarena Dalton

Senior Associate, Barker & Associates Limited

Contents

1.0 Applicant and Property Details 5

2.0 Background 7

2.1 Consenting History 8

2.2 Relevant Statutory Definitions 8

2.3 Mana Whenua Engagement 11

3.0 Site Context 12

3.1 Site and Surrounding Locality Description 12

4.0 Proposal 14

4.1 Summary of Mitigation Measures Offered 19

5.0 Reasons for Consent 22

5.1 Far North District Plan (FNDP) 22

5.2 National Environmental Standard for Contaminated Soil 23

5.3 Activity Status 23

6.0 Public Notification Assessment (Sections 95A, 95C and 95D) 24

6.1 Assessment of Steps 1 to 4 (Sections 95A) 24

6.2 Section 95D Statutory Matters 25

6.3 Land Excluded from the Assessment 26

6.4 Assessment of Effects on the Wider Environment 26

6.5 Summary of Effects 34

6.6 Public Notification Conclusion 34

7.0 Limited Notification Assessment (Sections 95B, 95E to 95G) 34

7.1 Assessment of Steps 1 to 4 (Sections 95B) 34

7.2 Section 95E Statutory Matters 35

7.3 Assessment of Effects on Persons 36

7.4 Limited Notification Conclusion 37

8.0 Consideration of Applications (Section 104) 37

8.1 Statutory Matters 37

8.2 Weighting of Proposed Plan Changes 37

9.0 Effects on the Environment (Section 104(1)(A)) 37

10.0 District Plan and Statutory Documents (Section 104(1)(B)) 38

10.1 New Zealand Coastal Policy Statement (NZCPS) 38

10.2 National Policy Statement – Indigenous Biodiversity 38

10.3 National Policy Statement – Freshwater Management 39

10.4 Objectives and Policies of the Regional Policy Statement for Northland 2016 40

10.5 Objectives and Policies of the Far North District Plan 40

10.6 Objectives and Policies of the Proposed Far North District Plan 41

10.7 Summary 42

11.0 Part 2 Matters 42

12.0 Other Matters (Section 104(1)(C)) 42

12.1 Record of Title Interests 42

13.0 Conclusion 42

Appendices

Appendix 1 Records of Titles and Gazette Notices

Appendix 2 Copy of Approved NRC Resource Consent (Geotechnical Investigations)

Appendix 3 Ecological Impacts Assessment

Appendix 4 Project Plans

Appendix 5 Civil Report (Supporting Project Plans)

Appendix 6 Bridge Structural Report

Appendix 7 Preliminary Geotechnical Report

Appendix 8 Factual Geotechnical Report

Appendix 9 Ngāti Manu CIA

Appendix 10 Ngāti Hine CIA

Appendix 11 Te Roroa ki Ōpua CIA

Appendix 12 Archaeological Assessment Report

Appendix 13 Rules Assessment

Appendix 14 Preliminary Site Investigation (PSI)

Appendix 15 Construction Methodology Report

Appendix 16 Record of Engagement

Appendix 17 Assessment of Relevant Objectives and Policies

1.0 Applicant and Property Details

To:	Far North District Council (Council)
Site Address:	Various sites comprising the Taumārere to Ōpua New Zealand Railway Corporation (KiwiRail) designation
Applicant Name:	Far North District Council (FNDC)
Address for Service:	Barker & Associates Ltd Level 1, 62 Kerikeri Road Kerikeri, 0230 Attention: Makarena Dalton
Legal Description:	Lot 1 DP 183897, Lots 1 & 2 DP 147225 (refer to Records of Title as **Appendix 1**)
Site Area:	11km stretch adjacent to the Coastal Marine Area from Taumārere to Ōpua
Site Owner:	Public Land (Her Majesty the Queen)
District Plan:	Far North District Plan (**FNDP**) and Proposed Far North District Plan (**PDP**)
Zoning:	FNDP: General Coastal Zone, Rural Production Zone and Conservation Zone PDP: Rural Production Zone and Conservation Zone
Overlays & Controls:	FNDP: Scheduled Site of Significance to Māori MS10-09 PDP: Scheduled Site of Significance to Māori MS10-09, Coastal Environment, High Natural Character (HNC536, HNC522) and Outstanding Natural Character (ONC113)
Designations:	FNDP: New Zealand Railway Corporation Designation (no reference #) PDP: Kiwirail Holdings Limited KRH 'X'
Additional Limitations:	Nil
Locality Diagram:	Refer to **Figure 2.**

Brief Description of Proposal:	FNDC are seeking to re-establish a new permanent section of the Pou Herenga Tai Twin Coast Cycle Trail, extending from Taumārere to Ōpua Cycle. Involving the construction of a cycle path of various design treatments including mountain bike tracks, formed gravel path, boardwalk and bridge 'clip-on' extensions along a 6.7km section of the trail. It is proposed adjacent to the existing KiwiRail railway corridor within the existing designation. The proposal includes earthworks, vegetation clearance, construction of retaining walls, sections of boardwalk and clip on extensions to existing bridges.
Summary of Reasons for Consent:	FNDP: Resource Consent is required as a Discretionary activity for the bulk and location of structures, vegetation clearance, earthworks and setbacks from the Coastal Marine Area and wetlands.

2.0 Background

Pou Herenga Tai Twin Coast Cycle Trail Trust (**Cycle Trail Trust**) was established by Far North District Council (**FNDC**) in 2018 to manage the day-to-day operations and be the governance body of the Pou Herenga Tai Twin Coast Cycle Trail (**Cycle Trail**). The Cycle Trail Trust governance body (trustees) is made up of community representatives, FNDC elected Councillor, landowners and hapū representatives. FNDC remain the owner and leaseholder of the Pou Herenga Tai cycle trail and associated assets. The operational length of the Cycle Trail is 87km (refer to **Figure 1**), divided into four sections as follows:

- Hōreke to Ōkaihau (28km);
- Okaihau to Kaikohe (34km);
- Kaikohe to Kawakawa (11km); and
- Kawakawa to Opua (17km).

Figure 1: Overview of the Cycle Trail (source: NZ Environmental Ecological Impact Assessment)

Currently, there are two temporary alternate routes from Kawakawa to Ōpua, the first is via Whangae and Oromahoe Roads. The second is a shorter, combining a short cycle from Kawakawa to Taumārere Station where cyclists can board the Keteriki Ltd's Vintage Railway service and then continue to Ōpua. There are 42 Trail Partner's (associated businesses) that offer a range of accommodation, bike hire, food and restaurant, transportation and visitor experiences that complement the Cycle Trail activities. The Cycle Trail is one of 23 'Great Rides of New Zealand', a national network of cycling trails developed throughout Aotearoa New Zealand.

This resource consent application seeks to establish and operate a new and permanent section of the Cycle Trail from Taumārere Railway Station to Ōpua; re-establishing the full length of the cycle path and is required to maintain its 'Great Ride' status. The proposed route follows the existing formed rail corridor that is owned by KiwiRail, and leased to the Bay of Islands Vintage Railway Trust.

This Assessment of Environmental Effects (**AEE**) has been prepared on behalf of FNDC in support of an application for resource consent to construct the proposed section of the Taumārere to Ōpua Cycle Trail. This AEE has been prepared in accordance with the requirements of Section 88 of and

Schedule 4 to the Resource Management Act 1991 (**RMA**) and is intended to provide the information necessary for a full understanding of the activity for which consent is sought and any actual or potential effects the proposal may have on the environment.

2.1 Consenting History

During the concept design stage, consent was sought from Northland Regional Council (**NRC**) and granted (APP.045815.01.01) in April 2024 to undertake geotechnical investigations to inform detailed design. Such works have been completed and design has been progressed through to a final proposal. Refer to **Appendix 2** for a copy of the approval.

2.2 Relevant Statutory Definitions

The following outlines a number of relevant definitions that set out the relevant statutory context for this resource consent application. These terms provide the basis for which this resource consent application has been promulgated and assessed, noting that this list is not exhaustive and does not outline all defined terms that may be relevant to this application.

2.2.1 Definition of Site (FNDP)

The FNDP defines 'Site' as follows:

"(a) An area of land which is:

i. Composed of one allotment in one certificate of title or two or more contiguous allotments held together in one or more certificates of title in such a way that the allotments cannot be dealt with separately without the prior consent of the Council; or

ii. Contained in a single allotment on an approved survey plan of subdivision for which approvals under s223 and/or s224 of the Act have been obtained and for which a separate certificate of title could be issued without further consent of the Council.

(b) Except that in the case of:

i. land subdivided under the Unit Titles Act 1972, or stratum subdivision, "site" shall be deemed to be the whole of the land subject to the unit development or stratum subdivision; and

ii. land subdivided under the cross lease or company lease systems (other than strata titles), "site" shall be defined as an area of land containing: • any building, accessory buildings, plus any land exclusively restricted to the users of those buildings; or • a remaining share or shares in the fee simple creating a vacant part of the whole for future cross lease or company lease purposes.

(b) In the case of Maori land within the meaning of Te Ture Whenua Maori Act 1993:

i. includes a parcel of land created by a partition under s289, provided that its area complies with the Residential Intensity rule for the zone in which the land is located; or

ii. parcels of land partitioned and given effect to, by approval of the Maori Land Court, before 28 April 2000.

EXISTING SITE

A site that exists on a survey plan for which a s224 Certificate has been issued by the Council.

Comment: For the purposes of this resource consent application, the "Site" comprises multiple sites that forms the New Zealand Railway Corporation Designation (now known as KiwiRail). The Site comprises multiple parcels of public land vested or gazetted as land for the purposes of 'Railway Corridor' to Her Majesty The Queen. A small section of trail is proposed within unformed legal road owned by Far North District Council.

2.2.2 Specified Infrastructure

The National Policy Statement for Freshwater Management (**NPS-FM**) defines 'Specified Infrastructure' as:

"(a) infrastructure that delivers a service operated by a lifeline utility (as defined in the Civil Defence Emergency Management Act 2002)

(b) regionally significant infrastructure identified as such in a regional policy statement or regional plan

…"

*[**Our emphasis added**]*

Comment: The Regional Policy Statement for Northland 2016 (**RPS**) recognises the need to provide for regionally significant infrastructure to ensure Northland can attract business and investment that contributes to the function of its communities. Appendix 3 of the RPS sets out the criteria to define 'Regionally Significant infrastructure' (**RSI**) as including:

"1) Energy, water, communication

(a) …

2) Transport

(a) State highways;

*(b) Roads as well as **walking and cycling facilities that are of strategic significance as identified in the Regional Land Transport Strategy**;*

…"

Further, Appendix 3 of the RPS includes a map of the Regional Land Transport Strategy which identifies the proposed Taumārere to Ōpua Cycle Trail Route as forming part of the National Cycleway Proposal (refer to **Figure 2**). As such it is considered that the proposal classifies as 'Regionally Significant infrastructure' (**RSI**) in accordance with the RPS. This is relevant for interpretation and application of objectives, policies and provisions of the NPS-FM, National Environmental Standard for Freshwater (**NES-Freshwater**), and Proposed Regional Plan for Northland (**PRP**).

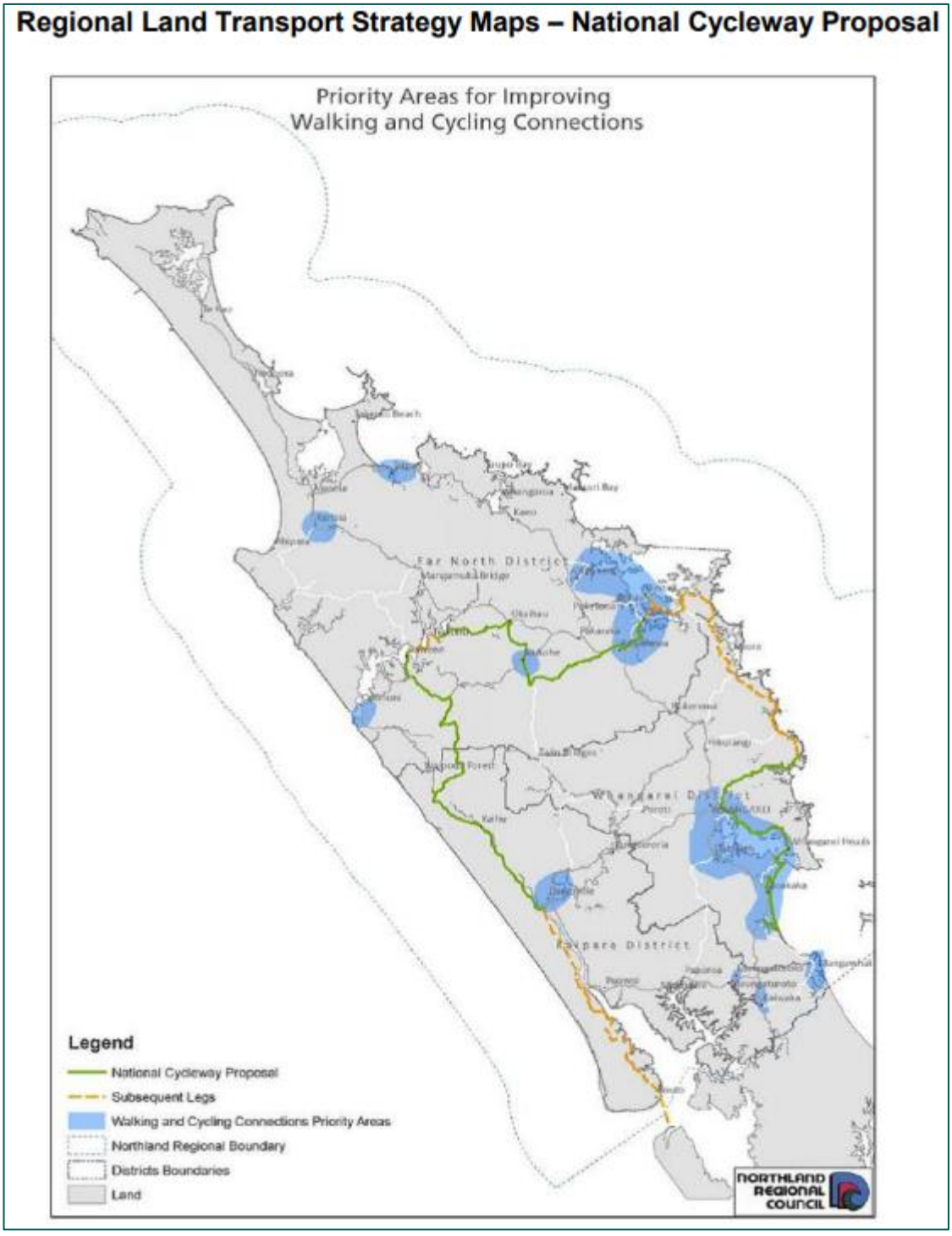


Figure 2: Map Identifying the Cycle Trail as Regionally Significant Infrastructure (Source: Appendix 3 of the RPS).

In summary, the proposed Taumārere to Ōpua Cycle Trail is considered 'Specified Infrastructure' in the NPS-FM and the NES-Freshwater.

2.2.3 Natural Inland Wetland

The National Policy Statement for Freshwater Management (**NPS-FM**) defines 'Natural Inland Wetland' as:

> *"means a wetland (as defined in the Act) that **is not**:*

*(a) **in the coastal marine area**; or*

(b) ….

(c) …

(d) …

(e) a wetland that:

(i) is within an area of pasture used for grazing; and

(ii) has vegetation cover comprising more than 50% exotic pasture species (as identified in the National List of Exotic Pasture Species using the Pasture Exclusion Assessment Methodology (see clause 1.8)); unless

(iii) the wetland is a location of a habitat of a threatened species identified under clause 3.8 of this National Policy Statement, in which case the exclusion in (e) does not apply…"

Comment: NZ Environmental Management (NZ Environmental) has undertaken assessment of the various wetland features present at the site and is enclosed as Appendix 3. The wetland identification assessment was undertaken in accordance with the NPS-FM and NES-Freshwater at Section 5.10 of the Ecological Impacts Assessment Report (EiC), and concludes that while the wetland features (Mangrove Forest, Oioi Rushland / Saltmarsh, Mingimingi Swamp Shrubland, and Raupo / Kuta Rushland's) are saline-influenced, they are not considered to be within the CMA. As such, those wetlands described at Section 10 of the EiC are considered 'natural inland wetlands' under the NES-Freshwater.

2.3 Mana Whenua Engagement

Engagement with mana whenua has been a key focus in the development of this proposal. A record of engagement is provided in Appendix 16. Engagement with mana whenua groups is ongoing and will continue to be a key focus for the project throughout the post approval phase of this project and throughout the implementation and construction phases too.

Engagement has been undertaken with Te Roroa, Ngāti Manu and Ngāti Hine hapu representatives, with each hapū engaged to prepare a Cultural Impact Assessment (CIA). It is highlighted that at the time of lodging this resource consent, Te Roroa's CIA has not yet been finalised and will be submitted to Council once this has been provided.

2.4 Consultation with KiwiRail

Engagement with KiwiRail has been ongoing for a number of years. This process has involved minimum design requirements to ensure safe offsets and separation distances between cyclists and the centreline of the existing rail corridor. KiwiRail and FNDC have an agreement in principle for the new Cycle Trail, however, this cannot be formalised until such time as detailed design has been completed.

3.0 Site Context

3.1 Site and Surrounding Locality Description

The proposed Cycle Trail project stretches from Taumārere in the south to Ōpua in the north and follows the existing railway corridor along the entire length of the route for approximately 6.7km. The proposed Cycle Trail starts from Taumārere Station in the south and ends in an area known as Colenso Triangle near Ōpua. All works are proposed within the rail corridor of the New Zealand Railways Corporation (now known as KiwiRail) designation with the exception of a short stretch of trail which is located in council road reserve (unformed) above Whangae Tunnel. The stretch of this designation and additional area of road reserve between Taumārere and Ōpua is considered the 'site' for the purpose of this proposal (refer to **Figure 3**).

The rail tracks within the corridor have been unused for some time and as such were re-surfaced between 2015 – 2016 with gravel and utilised as a cycle trail for approximately 7 years as part of the Cycle Trail formation. Following the expiry of the lease, the use of the land returned to the current leaseholders, Keteriki Ltd, who began progressively uncovering the tracks to operate a vintage passenger train service. As such, parts of the corridor formation have train tracks to support the Keteriki Train with parts of the corridor covered in metal.

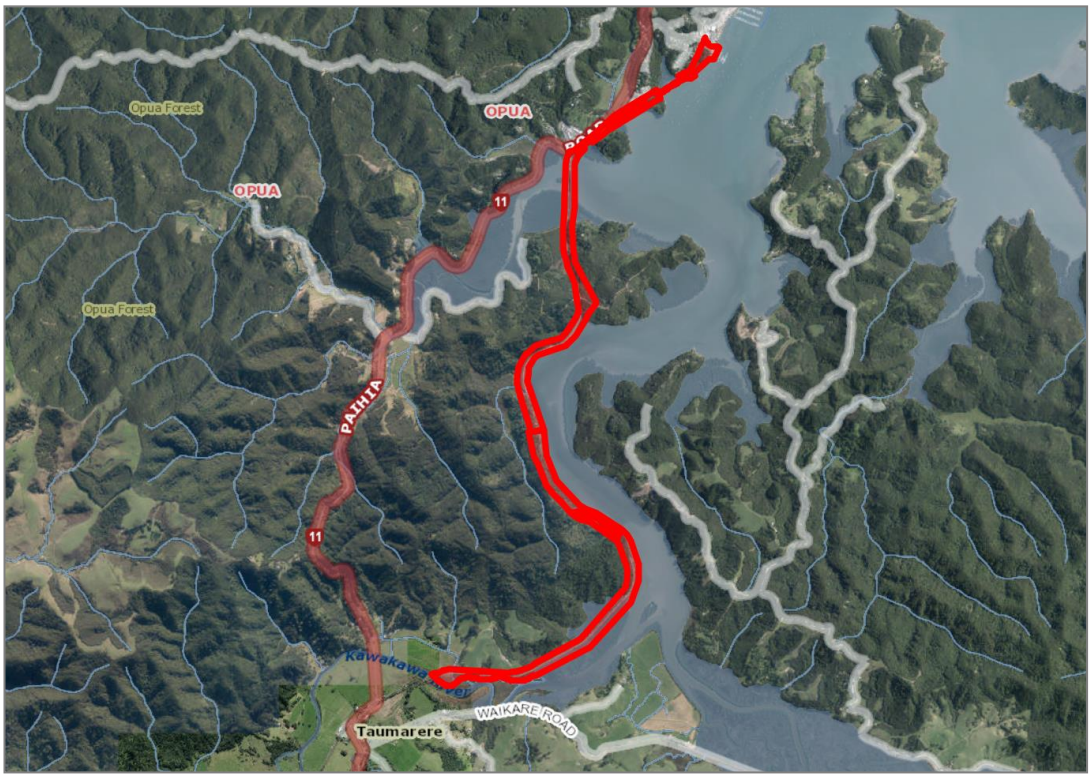


Figure 3: Site Locality (source: Emaps)

The site generally follows the western extent of the Kawakawa River, crossing through the Whangae River mouth towards Ōpua. Parts of the corridor traverse coastal environments, freshwater bodies, natural inland wetlands, coastal wetlands and estuarine environments. Refer to **Appendix 3** for full description of the site's ecological environments. Additionally, and based on Northland Regional Council's (**NRC**) GIS mapping there are also areas that support wading bird populations, marine mammal and seabird areas.

Under the FNDP, the majority of land within the rail corridor is zoned General Coastal with the northern portion zoned Industrial around the Ōpua Marina. No works are proposed within the Industrial Zoned land as part of this proposal. A small portion of the rail corridor is also zoned Rural Production along the western extent of the corridor boundary. As the cycle trail alignment closely follows the existing rail line it is anticipated most works will primarily occur with the General Coastal Zone, however due to the split zoning the proposal has also been assessed against the Rural Production Zone for completeness. There are no natural environmental overlays, however a portion of the trail corridor is subject to a scheduled Site of Significance to Māori (MS10-09). A designation also applies to the land and is held by New Zealand Railways Corporation (now known as KiwiRail) for railway purposes.

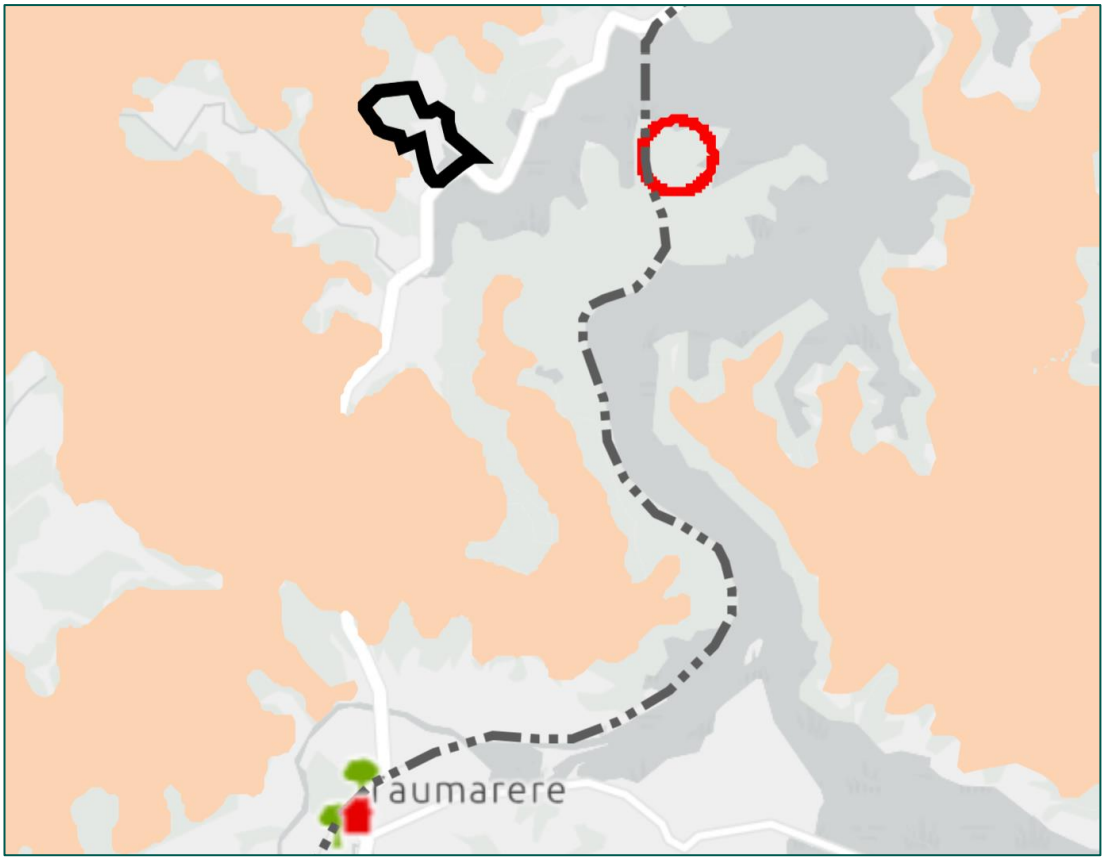


Figure 4: Scheduled Site of Significance to Māori (FNDC GIS)

Under the Proposed Regional Plan for Northland (PRP) February 2024 parts of the site, below mean high water springs (MHWS), are zoned General Marine Zone. Across the length of the site there two areas of High Natural Character (HNC) and one area of Outstanding Natural Character (ONC). All three of these locations are also significant bird areas identified as critical bird habitat. The site is also subject to Coastal Flood Hazard (current, 50-year, 100-year and 100-years+) Overlays by NRC.

The site and surrounding area are also rich in archaeology. A number of archaeological sites are identified within the rail corridor and are largely associated with the construction of the rail and seaport activities from the same time. Additionally, there are a number of archaeological sites of Māori origin that are also known across the length of the site and include features such as pits, terraces and midden.

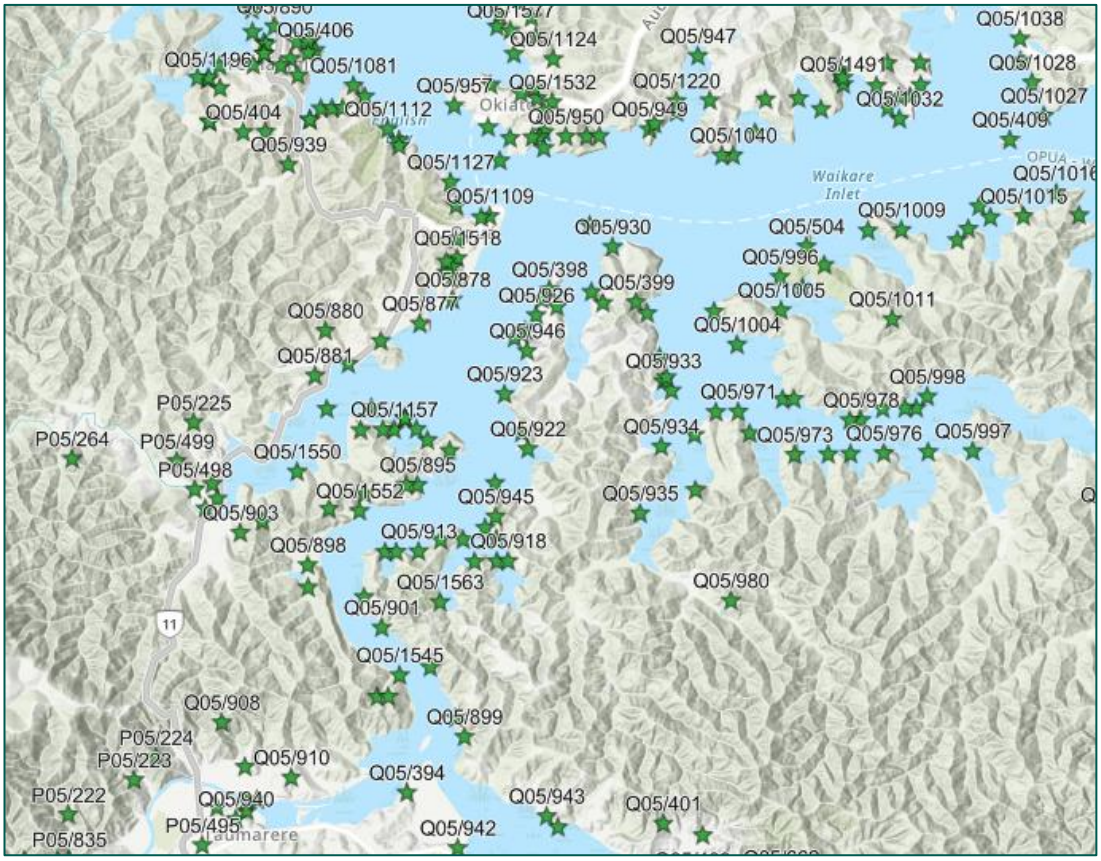


Figure 5: Recorded Archaeology in Proximity to the Site (Source: ArchSite GIS)

4.0 Proposal

A summary of the key elements of the proposal is set out below. More detailed descriptions on particular aspects of the proposal are set out in the plans and technical reports accompanying this AEE.

The proposal involves constructing a 6.7km cycle trail which runs adjacent to the western side of the existing rail line stretching from Taumārere Station in the south to Colenso Triangle in the north. For the most part the cycle trail will adjoin the rail line separated by a safety rail. There are three locations where the cycle trail will pull away from the train line and will loop inland before rejoining the rail alignment to avoid wetlands. The cycle trail is also separated from the train line where a mountain bike style track is proposed above the existing Whangae Tunnel in the northern portion of the route.

The cycle trail is proposed to start at Taumarere Station in the south. The trail will extend for approximately 50m before reaching Long Bridge (existing rail bridge) where cycles will ride along the existing walkway of Long Bridge. From the north side of 'Long Bridge' the trail will follow the landward side of the existing rail and traverse a number of different environments. Upon reaching Whangae Tunnel the cycle trail will wind through the scrub above the tunnel before rejoining the rail on the north side of the tunnel. The trail then follows the rail to the north of Whangae Bridge and runs along Baffin Street to Colenso Triangle.

In summary the proposed works involve:

- Cycle Trail and Structures (design treatments): The proposed trail consists of six key treatment options which have been carefully selected as the most appropriate option in the various environment which the route traverses. These include boardwalks, retained embankment fill, retaining adjoining natural surfaces, on grade trail with no structures, mountain bike style tracks and clip on extensions to existing rail bridges. A summary of these treatments is below in Table 1. Full details of the proposed Cyle Trail are outlined the Project Plans and Civil Report prepared by JAS Civil Ltd at Appendices 4 and 5. Due to the length of the trail and scale of the site and the varying topography throughout, exact details of structure heights and locations are subject to further detailed design prior to construction commencing.
    - Retaining walls: across the 6.7km site 4.336km of retaining walls are proposed. These walls will occur across 20 different treatment areas and are often separated by alternative treatments (at grade trail or boardwalks) which do not require wall structures. The highest walls are proposed to be 2.4m high. The walls will be located both above (retaining existing banks) and below (retaining proposed fill) the cycle trail depending on the various treatment types. All retaining walls will be located outside of the CMA. Typical cross sections of the proposed retaining walls are outlined in Jas Civils plans (refer to typical cross sections A, B, D, E, F and G in Appendix 4).
    - Boardwalks: 1,233 lineal meters of board walk is proposed across eight sections with a combined area of 3,516m2. The width of the board walk will vary depending on treatment sub-type which is reduced where necessary to lessen environmental impacts. The boardwalks are typically less than 1m in height with two sections exceeding 1m in height. Typical cross sections of the proposed retaining walls are outlined in Jas Civils plans (refer to typical cross sections J, J1 and K in Appendix 4).
    - Long Bridge: no works are proposed to Long Bridge. This section of the trail is existing and cyclists will ride along the existing walkway adjoining the rail tracks.
    - Bridge Clip-Ons: three existing rail bridges along the length of the trail, known as Railway Bridge 10, 11 & 12, need to be crossed to provide continuation of the cycle trail. Three "clip-ons" have been proposed to widen each bridge to accommodate the cycle trail without need for additional ground supports. Refer to Appendix 6 to see the Structural Design Report prepared by Kakariki Structural Engineering.
    - Safety Fencing: Safety fencing will be constructed to separate cyclists from the railway along all sections where the trail and rail adjoin each other. The safety rail will be 1.25m high. Where the cycle trail is elevated more than 1m above natural ground level, a 1.1m high fall protection fence will also be provided.
- Coastal Marine Area – all works proposed within the CMA will be limited to driving piles for the proposed boardwalks. There is no other treatment type proposed within the CMA other than bridge clip-ons which require no vegetation clearance or land disturbance. The cycle trail will include four sections of boardwalk which traverse the Coastal Marine Area (CMA) with a combined length of 990m. Three of the four sections of boardwalk within the CMA will be located on the landward side of the existing rail embankment. The fourth stretch will cross the Whangae River alongside Te Raupo Road. Disturbance of the foreshore/seabed associated with the construction of the boardwalks will be limited to piling works only,

including a total of 660 driven piles. The combined area of CMA occupation will be 2,360m^2. The remainder of the works required to complete the cycle trail will occur outside of the CMA.

- **Earthworks:** the total volume of earthworks across the entire application site is 11,382m^3 over an area of 18,886m^2. The earthworks volumes and extents are summarised on each drawing on JAS Civil's Plans provided as **Appendix 4**. A breakdown of earthworks by area of the project site is provided below.

	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m²)	Total Volume of Permanent earthworks - Fill Material (m²)
Dwg 2 - 4620 to 5590m	760	733	115	162	0	3076	600	809
Dwg 3 - 5590 to 6770m	1045	1058	235	705	382	3270	297	1821
Dwg 4 - 6770 to 8130m	1911	2313	53	159	116	5610	2081	1360
Dwg 5 - 8130 to 9870m	370	226	250	750	228	5210	1357	1335
Dwg 6 - 9870 to 10940m	250	189	580	1740	1634	1720	221	366
TOTAL	4336	4519	1233	3516	2360	18886	4556	5691

All earthworks will occur above MHWS. Any land disturbance activity within the CMA will be limited to driving piles for the proposed boardwalks. Such works are excluded from the definition of 'Earthworks' in the Proposed Regional Plan for Northland (**PRP**). As such for the purpose of this proposal there are considered to be no 'earthworks' associated with the construction of any boardwalk structures. Earthworks above MHWS will occur across three environments being within natural inland and coastal wetlands, within 10m of wetlands. The earthworks extents are calculated and defined in NZ Environmental's EiC (**Appendix 3**), with volumes calculated by JAS Civil (**Appendix 4**) as follows:

  - **Cut heights**: Detailed design of the earthworks has not yet been completed. Factual and Preliminary Geotechnical Assessment Reports have been prepared by Tonkin + Taylor (**T+T**) and provided as **Appendices 7** and **8**. T+T's Preliminary Geotechnical Assessment outlines that earthworks cuts of up to a maximum of 15m may be required in localized locations, with the majority of cuts being 8.5m of less to facilitate the formation and construction of the Cycle Trail (Treatment options C, D, E and G). Final design of the required earthworks cuts, retaining walls, and battered slopes will be confirmed as part of detailed design.
  - **Wetlands:** Approximately 420m^2 of works are proposed to occur within wetlands resulting in loss of both vegetation and partial hydrological functions. This generally occurs where wetlands adjoin the current railway embankments and are not able to be avoided. This occurs across three wetland types and equates to 0.002875% of the total wetland area within the application site.
  - **Within 10m of wetlands:** Approximately 3,800m^2 of earthworks is proposed outside of but within 10m of wetlands across the site. Of this 2,500m^2 is associated with the footprint of the trail while 1,300m^2 are temporary works areas.
  - **Terrestrial:** Approximately 18,466m^2 of earthworks is proposed within the terrestrial environment of the site. 15,966m^2 will occur outside of the 10m setbacks of wetlands described above.

- **Vegetation Clearance**: the length of the trail is highly vegetated meaning vegetation clearance is assumed in almost all areas of works. However, terrestrial vegetation is dominated by exotic species with the edges of many of the different environments dominated by exotic and weed species such as gorse, brush wattle, pampas and German Ivy.

- **Terrestrial**: 774m^2 of native vegetation is proposed to be removed from the terrestrial environment of the site. This consists of kānuka shrubland vegetation from three different locations. The areas are defined in Figures 27 and 28 of Appendix 3. Areas 1 and 2 are associated with two sections of mountain bike style track which are proposed to avoid works within the adjacent wetlands. Area 3 is associated with another section of mountain bike style track above the Whangae Tunnel.

  All other vegetation to be removed along the new cycle trail alignment consists of exotic/weeds species.

- **Wetlands (all vegetation types):**

  - 1,670m^2 of vegetation loss is proposed within wetlands across the site. This occurs across three wetland types across six individual wetlands. This is associated with the construction of boardwalks and is calculated based on the footprint of the structure. Actual clearance may be less as only the vegetation required to be cleared for construction will be removed rather than full clearance. Wetland vegetation will regenerate to some extent beneath the boardwalk structures upon completion.

  - 420m^2 of permanent vegetation loss is proposed within wetlands associated with all other treatments. This occurs across three wetland types.

- **Within 10m of wetlands**: Approximately 3,800m^2 of vegetation clearance is proposed outside of, but within 10m of wetlands across the site. Of this 2,500m^2 is associated with the footprint of the trail while 1,300m^2 are temporary works areas where vegetation is expected to regenerate.

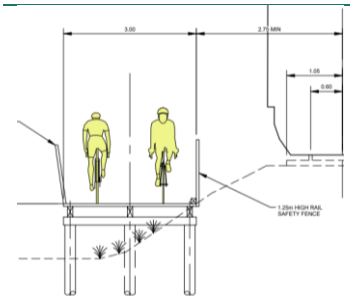
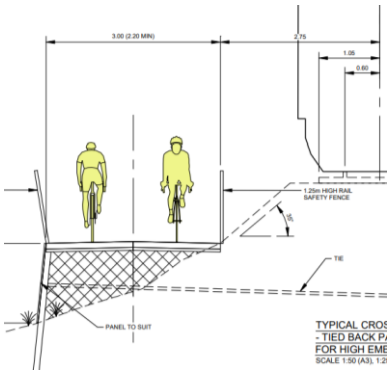
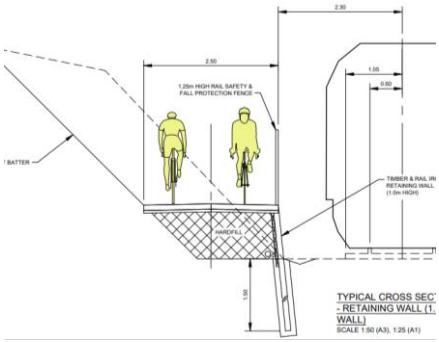
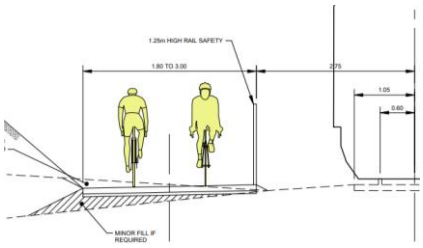
- **Mangroves:** Mangrove forests have been classed as wetlands across the site and as such the removal of mangroves has been included in the above wetland calculations. For the purposes of assessing rules C.1.4 'Mangrove Removal' of the PRP mangrove removal calculations are provided below and are not in addition to the above wetland clearance areas.

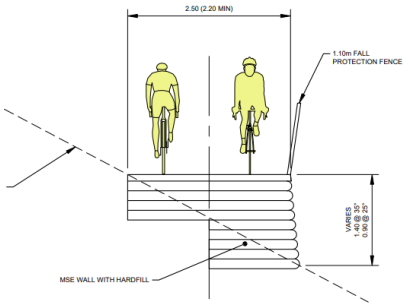
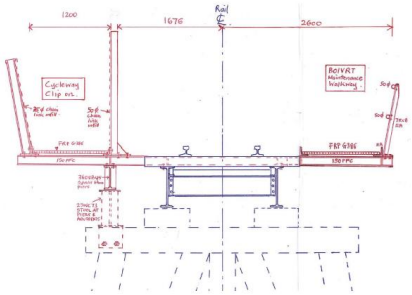
  - 1,500m2 of mangroves are proposed to be removed associated with the construction of boardwalks. These range from seedlings to more mature trees. Use of boardwalks ensures larger trees can be cut to height to reduce the disturbance of the lower marine environment and avoid the requirement to remove saplings/seedlings that are within the footprint of the boardwalk but under the expected height required for the boardwalk.

- **Duration of Consent:** 35 Year consent term is sought for the proposed Coastal Structures and Hard Protection Structures.

Table 1: Structure's and Design Treatment Summary

Treatment/ Sub-type	Works	Application
Boardwalk - J, J1, K, M	• Vegetation clearance • Minor land disturbance for piling	Sensitive environments where earthworks is to be minimised.

	• Construction of boardwalk from rail embankment Total Length: 1,233m	Wetlands and CMA.
Retained within Rail Embankment - A, B 	• Vegetation clearance from rail embankment (weedy/exotic) • Construction of retaining wall • Backfill material from rail embankment. Total Length: 1,500m	Areas where the existing rail embankment is exposed i.e., does not adjoin existing banks. Terrestrial.
Retains Adjoining Natural Surfaces - D, E, F, G 	• Vegetation clearance from rail embankment (weedy/exotic or Kanuka) • Construction of retaining wall above rail • Batter slope above trail or construct second wall above trail. Total Length: 1,610m	Areas where the existing cut slopes adjoin the rail. Terrestrial.
On Grade, Battered Slopes, No Structures – C, H, L 	• Vegetation clearance from rail embankment (weedy/exotic or Kanuka) • Cut or fill to form level trail. • Batter slope above/below trail. Total Length: 1,400m	Areas where the existing cut slopes adjoin the rail above/below where sufficient room is available for required batter angles. Terrestrial.
Mountain Bike Style Track – I	• Vegetation clearance from rail embankment (weedy/exotic or Kanuka)	Areas where the cycle trail deviates from the existing rail route.

	• Cut or fill to form level trail (reduced width). • MSE walls were needed to stabilise banks. Total Length: 960m	Terrestrial – around wetlands and above tunnel.
Bridge Clip Ons – N 	• Additions to existing structures. • No earthworks or vegetation clearance required. Three Clip Ons proposed.	Railway Bridge 10, 11 & 12

4.1 Summary of Mitigation Measures Offered

The Applicant proposes the following mitigation measures as part of the proposed development. These are outlined below with further detail contained within the various technical reports, where applicable:

4.1.1 Ecological Mitigation Measures

The Application Proposes to adopt the necessary recommendations set out in NZ Environmental's EiC (refer to **Appendix 3**), which are summarised below:

- Preparation of an Ecological Management Plan (**EMP**)prepared by a suitably qualified ecologist that addresses the following:
    - Review of the final detailed design, outlining confirming the suitability of the proposed design and construction methodology and associated recommendations that are to be adhered to during construction, including construction monitoring and areas to be demarcated to construction.
    - Ecological monitoring from a suitably qualified ecologist at the start of each section/phase of work to outline the ecologically sensitive areas.
    - A suitably qualified ecologist must be present during mangrove boardwalk construction to move any marine crabs from the footprint.
    - Prior to works commencing a bat ecologist shall assess any trees over 15 cm in diameter at breast height for roost potential and prepare a bat management plan as required.
    - A suitably qualified erosion and sediment control specialist shall develop a comprehensive spill prevention and response plan tailored explicitly to construction.
- Preparation and implementation of a Vegetation Management Plan that outlines the following:

- Planting requirements and species mix;
- Pest plant control measures; and
- Requirement to retain felled indigenous vegetation to create eco stacks.

- Preparation and implementation of a Fauna Management Plan that outlines the following:
  - seasonal constraints and considerations for lizards and birds;
  - salvage during construction to avoid injury/death to individuals including pre-construction surveys;
  - manual searches and supervised vegetation clearance;
  - pre-works nesting bird checks by project ecologists and appropriate exclusion zones where nests are found;
  - Lizard and Snail Management Plan (LSMP) and Wildlife Act Authority Application and Requirements, habitat enhancement requirements for lizards and large invertebrates.
- Preparation of a Wetland Reinstatement and Monitoring Plan including the following:
  - areas of wetland to be reinstated;
  - details of each wetlands current state;
  - monitoring to be undertaken at each wetland area for a minimum of three years post-construction completion.

4.1.2 Māori Cultural Mitigation Measures:

A suite of measures has been recommended in the Cultural Impact Assessments (**CIA**) reports prepared by Te Roroa ki Ōpua, Ngāti Hine and Ngāti Manu (refer to **Appendices 9 – 11**. Those recommendations that are directly related to the management of adverse effects of Māori cultural values have been adopted and are summarised below:

- Strict adherence to accidental discovery protocols where artefacts are of Māori origin to be maintained during all works, including site visits as required. Including accompanying the project archaeologist where appropriate.
- Kaitiaki monitoring to be undertaken throughout the works to mitigate and manage disturbance and effects on the following:
  - Mahinga kai and mahinga mataitai;
  - Rongoa and taonga plant species recovery;
  - Input into the selection of plant species.
- Site blessings (karakia) as appropriate in accordance with Tikanga of the hapū.
- Contractors to be informed about the cultural and environmental risks, and areas of significance and concern are to be clearly identified.

4.1.3 Archaeological Mitigation Measures

The following mitigation measures are proposed in response to the recommendations of the Archaeological Assessment prepared by Geometria Ltd as set out in **Appendix 12**:

- Preparation of an archaeological and Historic Heritage Management Plan prior to the commencement of construction works the addresses the following:
    - Confirms the relevant Authorities have been obtained and outlines any necessary management measures;
    - Outlines any necessary mitigation measures for bridging of historic culverts with boardwalks where encountered, recovering, refurbishing, and re-placing significant railway curtilage (telegraph/telephone poles, line-side and mile markers) and fence posts in their original locations or as near as possible if moved, monitoring of works adjacent to recorded archaeological sites, preparing a document bank of all historic maps and plans and archival material, developing a comprehensive interpretation plan and signage of the cycle trail that includes the Māori and colonial history of the area and ensuring staff are educated on the historic heritage components including accidental discovery protocols.
    - Process for review of plans / changes prior to tendering / construction;
    - Requirements of briefing contractors, particularly in sensitive locations such as at Te Akeake Station, north and south of Whangae Tunnel, and where cuttings are proposed through archaeological sites of Māori origin.
    - Any construction monitoring requirements.
    - Any requirements to adhere to Keteriki's Conservation Management Plan.
- Recording and investigation of archaeological and historic heritage features in accordance with the respective archaeological authorities.

4.1.4 Detailed Design

The Consent Holder to submit the following for approval from Council that confirms:

- Final detailed design of engineering drawings;
- Geotechnical and structural design reports to confirm suitability of final design;
- Final erosion and sediment control measures required;
- Final cut / fill plans of earthworks, including confirmation of any cuts and batters;
- Final retaining wall designs as required, and any associated soil nailing required to stabilise slopes.
- As-builts to be submitted following construction.

4.1.5 Construction Management Plan

The consent holder to submit a finalised Construction Management Plan that addresses the following:

- The timing construction works, including hours of work, key project and site management personnel. Construction hours and timeframes;
- Earthworks requirements, and temporary construction management;

- Publicity and safety measures, including signage to inform adjacent landowners and occupiers, pedestrians etc;
- Erosion and sediment control plan and measures to be in place for the duration of the works, reflective of conditions required from Northland Regional Council consents.
- Earth and site work mitigation and protection measures for the site for a significant storm event.
- Any stormwater diversion measures; and
- The timing of civil engineering, including hours of operation and key project and site management personnel and their contact details.

5.0 Reasons for Consent

A rules assessment against the provisions of the Far North District Plan ('FNDP') is attached as **Appendix 13.** The site is zoned General Coastal, Rural Production and Conservation zone and is not subject to any overlays. The proposal requires consent for the matters outlined below.

The Proposed Far North District Plan ('PDP') contains rules with immediate legal effect, a rules assessment against those rules is enclosed as **Appendix 13**.

5.1 Far North District Plan (FNDP)

General Coastal Zone

- Rule 10.6.5.1.5 Sunlight

  The combined height of structures (retaining walls + safety rails) is likely to exceed 2m for treatments D-G. Due to the irregular boundaries and varying topography it is likely that in various locations across the cycle trail these structures will infringe the recession plane. As such consent is sought for a **restricted discretionary** consent as a matter of conservatism.

- Rule 10.6.5.1.7 Set Back from Boundaries

  The combined height of structures (retaining walls + safety rails) is likely to exceed 2m for treatments D-G. Due to the irregular boundaries it is likely that in various locations across the cycle trail these structures will infringe the 10m boundary setback. As such consent is sought for a **restricted discretionary** consent as a matter of conservatism.

Rural Production Zone

- Rule 10.6.5.1.2 Sunlight

  The combined height of structures (retaining walls + safety rails) is likely to exceed 2m for treatments D-G. Due to the irregular boundaries and varying topography it is likely that in various locations across the cycle trail these structures will infringe the recession plane. As such consent is sought for a **restricted discretionary** consent as a matter of conservatism.

- Rule 10.6.5.1.4 Set Back from Boundaries

  The combined height of structures (retaining walls + safety rails) is likely to exceed 2m for treatments D-G. Due to the irregular boundaries it is likely that in various locations across the

cycle trail these structures will infringe the 10m boundary setback. As such consent is sought for a **restricted discretionary** consent as a matter of conservatism.

Natural and Physical Resource

- Rule 12.2.6.1.3 Indigenous Vegetation Clearance in the General Coastal Zone

  Approximately 774m^2 of Kanuka is proposed to be removed some of which will be within 20m of the CMA. Consent is sought for a **discretionary** activity.

- Rule 12.2.6.1.3 Excavation and/or Filling, Excluding Mining and Quarrying, in the Rural Production Zone

  The total volume of works across the site (both zones) is 21,750m^3 with cuts in excess of 1.5m. Consent is sought for a **discretionary** activity.

- Rule 12.3.6.1.2 Excavation and/or Filling, General Coastal and Conservation Zones

  The total volume of works across the site (both zones) is 11,382m^3 with cuts in excess of 1.5m. Consent is sought for a **discretionary** activity.

- Rule 12.7.6.1.1 Setback from Lakes, Rivers and The Coastal Marine Area

  The proposal includes structures and impervious surfaces within 30m of the CMA. Consent is sought for a **discretionary** activity.

- 12.7.6.1.2 Setback from Smaller Lakes, Rivers and Wetlands

  The proposal includes structures and impervious surfaces within 30m of mangrove wetlands exceeding 1ha in area. Consent is sought for a **discretionary** activity.

5.2 National Environmental Standard for Contaminated Soil

Resource consent is not required under the provisions of the National Environmental Standard for Contaminated Soil(**NES-CS**). A Preliminary Site Investigation Report (**PSI**) prepared by NZ Environmental has been undertaken with judgemental sampling carried out along the 7km length of the site, with consideration against A18, F6, E5 and I categories. The PSI concludes that pursuant to regulation 6(3) of the NES-CS that it is 'highly unlikely' that an activity or industry described in the HAIL has been undertaken on the Site and the likelihood that the soil is contaminated as a result of an activity or industry occurring is low. A copy of the PSI is enclosed as **Appendix 14**.

Taking account of the conclusions of the NZ Environmental, the NES-CS is not considered to be relevant.

5.3 Activity Status

Overall, this application is for a **discretionary** activity.

Resource consent is also required under the Proposed Regional Plan for Northland as a non-complying activity as well as under the National Environmental Standard for Freshwater('NES-Freshwater') as a discretionary activity. Consent has been sought concurrently from NRC for these matters.

6.0 Public Notification Assessment (Sections 95A, 95C and 95D)

6.1 Assessment of Steps 1 to 4 (Sections 95A)

Section 95A specifies the steps the council is to follow to determine whether an application is to be publicly notified. These are addressed in statutory order below.

6.1.1 Step 1: Mandatory public notification is required in certain circumstances

Step 1 requires public notification where this is requested by the applicant; or the application is made jointly with an application to exchange of recreation reserved land under section 15AA of the Reserves Act 1977.

The above does not apply to the proposal.

6.1.2 Step 2: If not required by step 1, public notification precluded in certain circumstances

Step 2 describes that public notification is precluded where all applicable rules and national environmental standards preclude public notification; or where the application is for a controlled activity; or a restricted discretionary, discretionary or non-complying boundary activity.

In this case, the applicable rules do not preclude public notification, and the proposal is not a controlled activity or boundary activity. Therefore, public notification is not precluded.

6.1.3 Step 3: If not required by step 2, public notification required in certain circumstances

Step 3 describes that where public notification is not precluded by step 2, it is required if the applicable rules or national environmental standards require public notification, or if the activity is likely to have adverse effects on the environment that are more than minor.

As noted under step 2 above, public notification is not precluded, and an assessment in accordance with section 95A is required, which is set out in the sections below. As described below, it is considered that any adverse effects will be less than minor.

6.1.4 Step 4: Public notification in special circumstances

If an application is not required to be publicly notified as a result of any of the previous steps, then the council is required to determine whether special circumstances exist that warrant it being publicly notified.

Special circumstances are those that are:

- Exceptional or unusual, but something less than extraordinary; or
- Outside of the common run of applications of this nature; or
- Circumstances which make notification desirable, notwithstanding the conclusion that the adverse effects will be no more than minor.

It is considered that there is nothing noteworthy about the proposal. It is for works associated with relocation of an existing cycle trail to be immediately adjacent to the current alignment. It is therefore considered that the application cannot be described as being out of the ordinary or giving rise to special circumstances.

6.2 Section 95D Statutory Matters

In determining whether to publicly notify an application, section 95D specifies a council must decide whether an activity will have, or is likely to have, adverse effects on the environment that are more than minor.

In determining whether adverse effects are more than minor:

- Adverse effects on persons who own or occupy the land within which the activity will occur, or any land adjacent to that land, must be disregarded.

  The land to be excluded from the assessment is listed in section 6.3 below.

- Adverse effects permitted by a rule in a plan or national environmental standard (the 'permitted baseline') may be disregarded.

  In this case no vegetation clearance for the proposed purpose are a permitted activity and as such there is no relevant permitted baseline with respect to vegetation clearance.

  Earthworks under 5,000m^3 in volume and with cut faces of less than 1.5m are permitted. As such the proposed earthworks will be assessed as it extends beyond this permitted baseline.

- Trade competition must be disregarded.

  This is not considered to be a relevant matter in this case.

- The adverse effects on those persons who have provided their written approval must be disregarded.

  No persons have provided their written approval for this proposal.

The sections below set out an assessment in accordance with section 95D, including identification of adjacent properties, and an assessment of adverse effects.

6.3 Land Excluded from the Assessment

In terms of the tests for public notification (but not for the purposes of limited notification or service of notice), the adjacent properties to be excluded from the assessment are shown in **Figure 6** below.

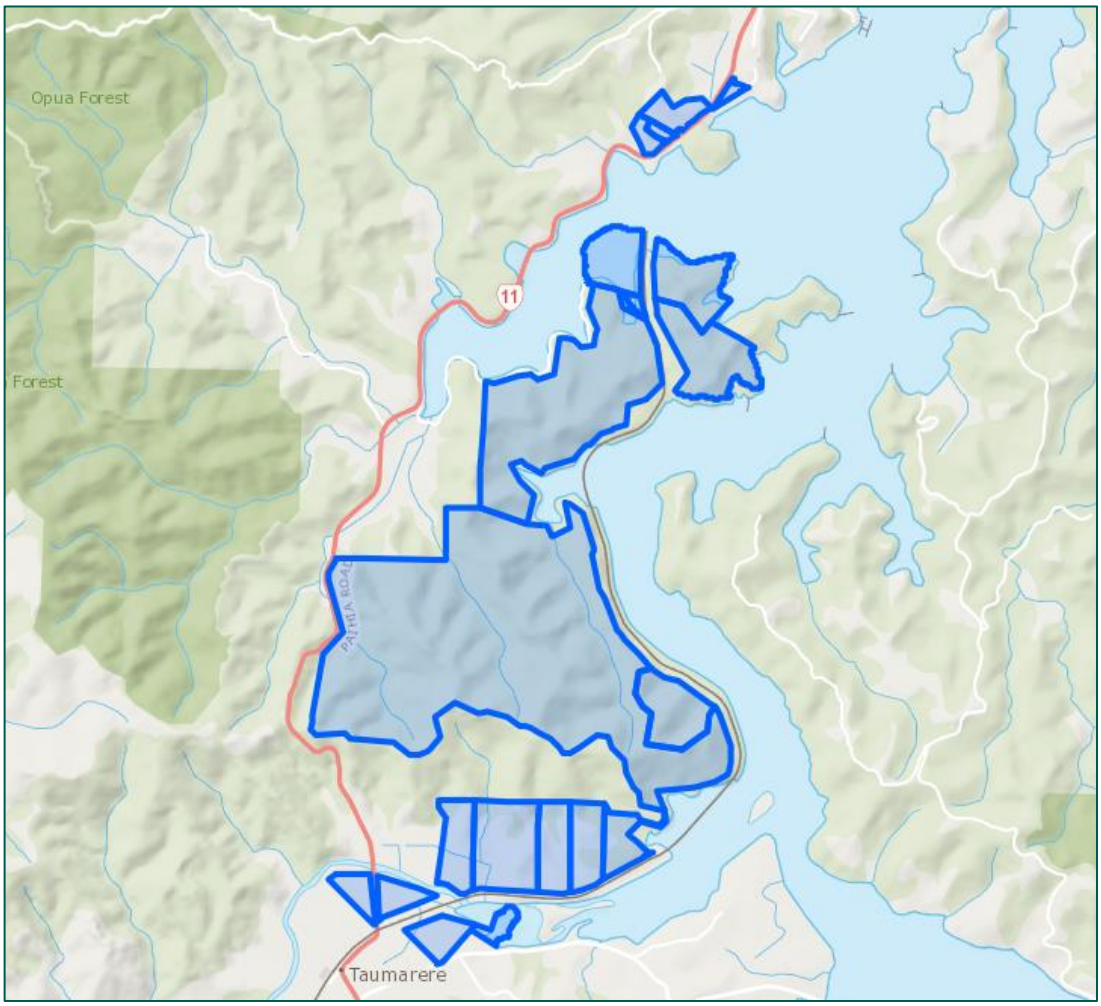


Figure 6: Adjacent properties in relation to subject site. Source: Emap.

6.4 Assessment of Effects on the Wider Environment

The following sections set out an assessment of wider effects of the proposal, and it is considered that effects in relation to the following matters are relevant:

- Natural Character Values;
- Ecological Values;
- Natural Hazards;
- Construction Activities;
- Archaeological Values; and
- Cultural Values.

These matters are set out and discussed below.

6.4.1 Natural Character

The existing railway corridor, structures and associated train activities were established in the late 1900. The continued use of this corridor is provided for in accordance with the KiwiRail designation. Until recently, the existing formed rail corridor was used and operated as the Cycle Trail. The existing activities and infrastructure run along the coastal edge of the Taumārere and Whangae River's and as such this section of the coastline has already been substantially modified. This is evident in the range of structures observed during the site visit including the raised rail embankment and associated bridges and is reflective of the 'General Coastal Zone' that applies to the majority of the site.

All proposed work by this application is proposed to occur within the existing rail designation and adjacent the existing rail corridor infrastructure. The proposed Cycle Trail will be positioned landward of the existing rail, meaning all proposed structures will be separated from the CMA by the railway. All proposed structures including boardwalks and retaining walls will be of timber construction and will remain unpainted to ensure natural weathering of the materials that will blend with the wider landscape. The proposed structures are relatively modest structures with all walls not exceeding 2.4m in height. In locations where the Cycle Trail is required to be constructed above the level of the railway there is typically mature vegetation on the seaward side of the rail making these structures less visible from the surrounding public realm. In more exposed areas the Cycle Trail mostly follows the rail alignment and is positioned level with or slightly below this existing level. As such these will largely appear as a natural extension of the existing railway and not protrude over the top and be visually dominant from the wider environment. Further to this there is approximately 1.4km of trail where no structures are proposed and a further 1km (approximately) of mountain bike style tracks which pass through areas of dense bush meaning they are unlikely visible from surrounding public areas.

Given the overall modified environment and well-established railway and associated structures, the proposed structures are considered to be in keeping with the type and nature of existing structures present in the wider environment.

It is possible that some structures, being retaining walls and safety rails combined, will exceed 2m and also be located within 10m of the edge of the rail corridor. Similarly, some structures may also infringe the sunlight recession planes required in the applicable zones. These infringements, though technical in nature due to the narrow site width, have been sought as a matter of conservatism. For the reasons outlined above it is considered that any infringement resulting from the bulk and location of the structures will not appear visually dominant in the surrounding environment and any adverse effects will be less than minor.

The proposal also involves 18,886m^2 of earthworks across the 6.7km trail. The extent of works in various locations will differ across the length of the trail but on average has been calculated based on the footprint of the trail and allowances for construction buffers depending on the various treatments proposed. Where permanent structures or the surface of the Cycle Trail is not proposed, disturbed areas will be revegetated.

Treatments A & B (shown in Red in **Appendix 4**) involve retained embankment fill that will sit below the existing railway and within the footprint of the existing rail embankment. Similarly, treatments H & L (shown in Blue) involve construction of the trail on existing ground with only minor cut and/or fill required to batter slopes at the edge of the trail. As such treatments A, B, H & L will appear as

natural extensions of the existing railway and will not result in a significant modification to the existing landform.

Treatment I, the mountain bike style track, will require works to form a new trail however these sections of tracks will be located within dense vegetation and as such the works are unlikely to be visible from the public realm beyond those using the track. These sections of the Cycle Trail are designed to follow the existing landform, and as such are not considered to result in a significant modification to the existing landform.

Treatments C, D, E, F & G have potential to result in more substantial and more visible works. These treatments involve either an at grade trail or a raised/retained trail above the level of the existing railway and associated fill as well as extended cut batters above the trail and in the case of treatment D, a second wall above the trail. The combined length of these treatments is 1.7km and in locations where these treatments are proposed there is vegetation cover between the work site and the adjoining CMA reducing the visual impact of works upon completion. Of the proposed works approximately 100m is treatment C. This treatment involves an at grade trail and requires reshaping of existing cuts to achieve a stable cut angle. In this location the existing slopes are on average 8m high but in localised areas extend to 15m. As such reshaping has potential to result in a large cut face however will not significantly change the existing landform and upon completion, revegetation and natural regeneration of existing vegetation there will be no long-term evidence of the works having been completed. Similarly, treatments D, E, F & G will essentially create an elevated tier for the trail and reshaping of the banks above. These too will not result in significant modification and upon completion will be well integrated into the surrounding environment.

Vegetation clearance across the site is similar in nature to the earthworks where the extent of clearance required is directly proportional to the extent of works. As the site is mostly vegetated all earthworks are assumed to result in some form of vegetation clearance although for the most part this is limited to clearance of the edges of various vegetation environments, the majority of which is the removal of exotic and weed species.

Consent is required for the removal of approximately 774m^2 of indigenous vegetation (terrestrial). This consists of kānuka shrubland vegetation from three different locations. The areas are defined in Figures 27 and 28 of **Appendix 3**, with all clearance proposed to accommodate mountain bike style tracks. This design treatment has been selected to minimise the extent of vegetation clearance and land disturbance to established the tracks. Areas 1 and 2 are associated with two sections of mountain bike style track which are proposed to avoid works within the adjacent wetlands. Area 3 is associated with another section of mountain bike style track above the Whangae Tunnel. Due to the location of these works within areas of dense bush it is considered that the narrow clearance will result in less than minor adverse effects on the natural character of the site and surrounding environment.

Overall, taking into account of NZ Environmental's findings, the highly modified receiving environment, the modest scale and nature of the proposed works, the density of the established vegetation cover, adverse effects of the proposal are considered to be no more than minor.

6.4.2 Ecological

NZ Environmental Management have provided an Ecological Impacts Assessment (**EiC**) of the proposed cycle trail construction and associated works and is enclosed as **Appendix 3**. This assessment focuses on vegetation clearance, earthworks and construction as the key areas of

works leading to effects on flora, fauna and the receiving environments. The EiC has been prepared, taking account of and applying the "Effects Management Hierarchy" as set out in Section 6.1.1 of the EiC. Advice from NZ Environmental has been iterative as the design has progressed, resulting in several changes as follows:

- Introducing mountain bike style tracks to avoid structures and works in some natural inland wetland environments;
- Reducing the width of the trail from the minimum design standard of 2.7m in locations to avoid loss of high value mingimingi wetlands and other high value ecological environments;
- Reducing the width of the trail in some locations to avoid reclamation; and
- Increasing the amount of boardwalk to minimise the potential loss of wetland hydrology.

The EiC has undertaken an assessment of the ecological values (habitats and fauna), and concludes that these range from low to very high (refer to Table 4 of their assessment). The EiC provides a detailed assessment of the proposed works and the effects of these which are summarised (with and without management measures) in Table 5. After application of management measures the overall effects of the proposal on the various ecological values is assessed as being ***low*** with potential for some positive effects. Mitigation measures proposed are summarised in Section 4.1 of this report and detailed in Sections 7 & 9 of Appendix 3. These measures have been adopted and are proposed as part of the Ecological mitigation package outlined in Section 4.1.1 of this Report.

NZ Environmental Management conclude that the ecological effects of the proposal are likely ***low*** in scale subject to implementation of the mitigation measures. In summary, the following conclusions are made:

- The loss of wetland edge, buffer, and vegetation cover can be managed to a low level of ecological effects with careful management prior to and during works.
- The effects management hierarchy has been addressed through redefining the project extent and careful selection of treatment types and widths to reduce the footprint as far as practical.
- The project avoids high-value wetland interiors and targets scrubby wetland edges.
- Boardwalks have been utilised wherever possible to ensure the hydrological connectivity of wetlands remains.

Consent is required for 774m^2 of indigenous vegetation (terrestrial). This consists of kānuka shrubland vegetation from three different locations. The required area of clearance equates to 0.61% of this vegetation type present within the application site. The areas are defined in Figures 27 and 28 of Appendix 3. Areas 1 and 2 are associated with two sections of mountain bike style track which are proposed to avoid works within the adjacent wetlands. Area 3 is associated with another section of mountain bike style track above the Whangae Tunnel. These areas are within dense areas of bush and as such are currently not subject to edge effects. The new edge created within these areas of intact forest will be subject to increased edge effects and as such the loss will result in a minor shift from baseline conditions. To manage this effect, pest plant control is proposed in the affected locations to manage encroachment of edge species and encourage a robust edge.

Vegetation clearance has potential to effect fauna in the affected areas. The effects on bird habitat without management is considered to be high. As such the works are proposed to take place outside of nesting seasons and pre-works nesting bird checks by project ecologist are proposed to be undertaken. Where nests are found, close management of these areas will be required until chicks have fledged. Planting is also proposed to be undertaken upon completion to enhance the remaining habitat. Similarly, a condition of consent is proposed for the project ecologist to undertake pre-works check of trees greater than 15cm in diameter for roost potential and apply a bat management plan as required. A Lizard Management Plan (LMP) and Wildlife Act Authority are proposed as conditions of consent to ensure that effects on lizards are appropriately managed and felled indigenous vegetation is proposed to be retained for the creation of habitat stacks. Habitat stacks will also benefit invertebrates in combination with salvaging of indigenous snails as encountered during construction works to avoid injury and death. Overall, it is considered that the effects on birds, bats, lizards and invertebrates can be managed to be low.

Further to this, the proposal also involves structures and impermeable surfaces within 30m of the CMA and wetlands (mangroves) with an area greater than 1ha. The proposed structures and impermeable surfaces will not change the natural drainage flows of the site as stormwater will continue to be via sheet flow to the receiving environment. No change in catchment size is proposed and as such the works are not anticipated to impact the hydrological function of the wetlands or coastal processes of the adjacent CMA.

With respect to temporary construction effects, a draft Construction Methodology Report has been prepared to outline the measures proposed for sediment, erosion and spill prevention. It is anticipated that this would be updated following detailed design and provided to council for approval as a condition of consent. Together with the suite of ecological management plans (and their implementation), it is considered that temporary effects arising from construction can be appropriately managed to a level that is no more than minor and acceptable.

In summary, taking into account the advice of the technical inputs and subject to implementation of conditions of consent the adverse effects of the proposal on ecological effects are considered to be no more than minor.

6.4.3 Natural Hazards

All of the boardwalk structures are mapped by NRC as being subject to coastal flood hazards, these areas correspond with low lying areas near the coast and shorelines. The proposed structures are relatively modest in terms of footprint and mass, are non-habitable and only involve minimal land disturbance to undertake piling. While the structures may at times be susceptible to coastal inundation in the future, the structures themselves are considered to be structurally resilient to the natural hazard risk.

The structures are not considered to exacerbate the natural hazard risk to any other persons, property or land in the wider environment. The railway is existing and the structures are being proposed to also include a cycle trail within the environment for the community to use.

For the reasons outlined above, adverse effects on the localised and wider environment are assessed as less than minor.

6.4.4 Construction Activities

The proposal involves the construction of a 6.7km long cycle trail including 18.886m^2 of earthworks, 4.33km of retaining walls, 1.2km of boardwalks, 3 bridge clip-ons and associated vegetation clearance. A programme of works has not been confirmed, however, construction activities will be undertaken over the next 5 years for the life of this consent.

The works will primarily be undertaken using machinery located on the existing rail line. Construction will be undertaken in accordance with the Construction Report prepared by Ventia (see Appendix 15). This report forms the basis of a Construction Management Report (CMP), and sets out details of construction activities are proposed to occur based on the current concept designs. A condition of consent requiring the preparation of a CMP is anticipated, and will confirm the overall construction methods, any staging requirements and any temporary erosion and sediment control measures required to manage these construction effects.

Where the cycle trail follows the railway alignment machinery will be positioned on the rail line and reach to the adjacent cycleway footprint. Where the trail diverges from the railway the trail will be constructed in stages allowing machinery to locate on the constructed portion or trail while constructing the trail out in front.

During construction works two laydown areas are proposed to be established as a base for plant, machinery and materials. The location of the laydown areas are yet to be finalised but will be located with one in the southern portion of the site and the other near Colenso Triangle in the north. Final locations will be determined based on practicality and accessibility and will be confirmed as part of the proposed CMP taking into account the recommendations of the Archaeological Assessment.

Temporary effects during the construction period are likely to be similar in nature in terms of noise, machinery use and human presence, to that of the current works being undertaken to reinstate the railway or that could be expected on adjoining rural properties. Human presence is expected in this location associated with general public utilising the existing public trail until recently, and will overall be less than minor.

Taking the above into account, it is considered that effects of construction activities can be appropriately managed via implementation of an appropriate CMP. Given the temporal nature of these effects, and subject to adherence to the CMP, it is considered that adverse effects will be managed such that they are no more than minor.

6.4.5 Archaeological Values

The length of the proposed cycle trail is rich in archaeology associated with pre-European occupation and construction and operation of the historic railway. Geometria Ltd have undertaken an Archaeological and Historic Heritage Assessment (Archaeological Assessment) of the proposed cycle trail (Appendix 12).

A range of archaeological features along the length of the trail include, but are not limited to, historic rail hardware, existing railway bridges and associated historic embankments, culverts and drains, telegraph and telephone poles, railway mile markers, station sites, Whangae Tunnel and midden, pits and terraces. The significance and value of these resources is assessed in Tables 7 & 8 of Archaeological Assessment, concluding that these resources have moderate to high historic heritage value. Across the project area it is noted that there is potential for minor to moderate

effects on archaeological features and as such a series of mitigation measures are proposed to minimise effects potential effects. Of note these include bridging of historic culverts with short sections of boardwalks to avoid infilling and identifying railway curtilage features (mile markers, fence posts, telephone poles) and fencing these to avoid damage during works and where works are required, relocating these and repositioning upon completion. Table 10 of the Archaeological Assessment summarises the potential effect, proposed mitigation measure and overall effect of each feature.

Geometria have concluded that overall, the physical archaeological effects on pre-1900 features will be low if the proposed mitigation is adopted. The applicant proposes to adopt the recommendations contained in Section 9 of (as set out in Section 4.13 of this AEE).

Overall, taking into successful implementation of archaeological mitigation package, the effects of the proposal on archaeological values of the site will be no more than minor. Noting that there will likely be an ongoing benefit for the preservation and conservation of the railway historic heritage values of the railway, if appropriately managed.

6.4.6 Māori Cultural Values

MS10-09 is a scheduled Site of Significance to Māori located at Te Raupo in the Appendix 1 of the ODP. Schedule 1F describes this as Te Roroa / Pumuka's Pā and a wāhi tapu. While the works are not proposed within the scheduled extent of MS10-09, the works are proposed in proximity to Pumuka's pā, west of the formed KiwiRail carriageway. As set out earlier, direct engagement has been undertaken with representatives of Te Roroa hapū who are the descents of Pūmuka. For all hapū, Te Awa Tapu o Taumārere is considered significant. The upper catchment begins near maunga Motatau with two streams connecting near the three bridges at Kawakawa. For Ngāti Hine, these waterways provide a way of life that are embedded into their traditional practices referred to in their CIA (refer to Appendix 10) as Ngāti Hinetanga, that have been carried through whakapapa and purakau (stories). For all hapū, their relationship to Te Awa o Taumārere (which includes Kawakawa River) and its tributaries is of particular importance. These waterways held particular significance as key transport routes to the coast and a resource for collecting kai. In addition to the historic uses (transport, collecting kai) and genealogical connections to Te Taumārere o Taumārere, there are several Pā along the Kawakawa River illustrating historic occupation and settlement along the lengths of the waterways.

It is important to note that none of the proposed works or structures will be located within any mapped statutory acknowledgement areas or mapped sites of significance to Māori.

A programme of ongoing engagement with hapū has been undertaken given works are proposed within and adjacent to the CMA, freshwater bodies and in an area of recorded archaeological features that tell a story of historic occupation by Māori. As set out in Section 2.3 of this Report, engagement with Te Roroa ki Ōpua, Ngāti Manu and Ngāti Hine hapū has been undertaken with a record of that engagement summarised in the Appendix 16. All three hapū have been engaged and commissioned to prepare CIAs, and final reports have been obtained by Ngāti Hine and Ngāti Manu and are enclosed as Appendices 9 – 11. In addition to establishing the relationship these hapū hold with the application site and surrounding areas, these CIAs also assess the cycle trail proposal and the effects of this on their respective cultural values.

Each CIA presents the historic relationship and whakapapa of the hapū to the site, Kawakawa Awa, and the surrounding area; with important sites identified at different points along the Kawakawa

and Whangae Rivers. Table 2 below outlines the identified Māori cultural values and comments on how these matters are being avoided, mitigated or remedied.

In summary, the CIA's highlight the following as having the potential for generating adverse effects on the Māori cultural values present at the site:

- Wai (water/s): Impacts on the health of waterways, including Kawakawa River, and the impacts on wetland habitat and taonga species, in particular the Matuku Botaurus poiciloptilius in this location;
- Mahinga kai: potential impacts of construction works on mahinga kai sites;
- Rongoa Māori: potential impacts and loss of rongoa Māori species;
- Mauri: potential impacts of the life force of Te Awa Tapu o Taumārere;
- Wāhi tapu: potential impacts on identified wāhi tapu;
- Taonga tuku iho: potential impacts on archaeology and artefacts of Māori origin;
- Taiao (biodiversity): potential impacts on biodiversity.

The CIAs concludes that the project has the potential to generate adverse effects that are more than minor on the identified Māori cultural values where appropriate mitigation measures are not put in place. To manage potential adverse effects, the CIAs include a suite of recommendations to manage these effects. These include appropriate kaitiaki monitoring, best practice construction management, habitat restoration (replanting, habitat creation, and pest / weed removal).

With respect to potential effects on ecological values, the EiC has recommended a range of mitigation measures, including habitat restoration through pest and weed control, re-planting, management plans for avifauna, lizards and bats and associated ecological monitoring to ensure adverse ecological effects can be appropriately managed. These measures have been adopted by the project as set out in Section 4.1 of this AEE. Further, best practice construction management has also been adopted by the project and will be implemented through appropriate management plans (refer to Section 4.1 of this report).

Engagement with all mana whenua groups is ongoing and the Applicant is committed to continuing this engagement throughout the project to ensure that adverse effects on Māori cultural values are avoided and otherwise appropriately remedied or mitigated to be less than minor in scale. In particular it proposed that cultural monitoring will be undertaken by kaitiaki during the construction period to ensure that cultural values, including those which may be unknown at this time are appropriately managed. In addition, the full suite of accidental discovery protocols will be adhered to in the event of any accidental discoveries throughout the project works. Upon completion the proposal is to be supported by an educational component including storey boards identifying key features along the trail such as significant sites, heritage features and significant flora and fauna to support the ongoing protection of these features. Given there are three hapū involved, ongoing discussions with those hapū is required to confirm the appropriateness of conditions prior to the issue of a decision by Council.

Further, it is clear that Māori archaeological sites and areas throughout the site including midden, pits and terraces are of particular value to mana whenua and will be appropriately managed through necessary archaeological authorities where these cannot be avoided.

The proposed infrastructure does not impact access to the beach ensuring the access to mahinga kai from the costal environment will be maintained. Vegetation clearance across the site has potential to affect mahinga kai although it is noted that the majority of vegetation clearance proposed consists of exotic and weed species and as such these effects in these locations are considered to be less than minor. There are also opportunities through the restoration and revegetation of the site to enhance opportunities for mahinga kai species to be incorporated in the post construction phase.

Taking the above into account, it is considered that adverse effects on Māori cultural values will be managed to a level that is less than minor and acceptable.

6.5 Summary of Effects

Overall, it is considered that any adverse effects on the environment relating to this proposal will be less than minor.

6.6 Public Notification Conclusion

Having undertaken the section 95A public notification tests, the following conclusions are reached:

- Under step 1, public notification is not mandatory;
- Under step 2, public notification is not precluded;
- Under step 3, public notification is not required as it is considered that the activity will result in less than minor adverse effects; and
- Under step 4, there are no special circumstances.

Therefore, based on the conclusions reached under steps 3 and 4, it is recommended that this application be processed without public notification.

7.0 Limited Notification Assessment (Sections 95B, 95E to 95G)

7.1 Assessment of Steps 1 to 4 (Sections 95B)

If the application is not publicly notified under section 95A, the council must follow the steps set out in section 95B to determine whether to limited notify the application. These steps are addressed in the statutory order below.

7.1.1 Step 1: Certain affected protected customary rights groups must be notified

Step 1 requires limited notification where there are any affected protected customary rights groups or customary marine title groups; or affected persons under a statutory acknowledgement affecting the land.

There are no customary marine title groups or protected customary right groups relevant to this application.

7.1.2 Step 2: If not required by step 1, limited notification precluded in certain circumstances

Step 2 describes that limited notification is precluded where all applicable rules and national environmental standards preclude limited notification; or the application is for a controlled activity (other than the subdivision of land).

In this case, the applicable rules do not preclude limited notification and the proposal is not a controlled activity. Therefore, limited notification is not precluded.

7.1.3 Step 3: If not precluded by step 2, certain other affected persons must be notified

Step 3 requires that, where limited notification is not precluded under step 2 above, a determination must be made as to whether any of the following persons are affected persons:

- In the case of a boundary activity, an owner of an allotment with an infringed boundary;
- In the case of any other activity, a person affected in accordance with s95E.

The application is not for a boundary activity, and therefore an assessment in accordance with section 95E is required and is set out below.

Overall, it is considered that any adverse effects on persons will be less than minor, and accordingly, that no persons are adversely affected.

7.1.4 Step 4: Further notification in special circumstances

In addition to the findings of the previous steps, the council is also required to determine whether special circumstances exist in relation to the application that warrant notification of the application to any other persons not already determined as eligible for limited notification.

In this instance, having regard to the assessment in section 6.1.4 above, it is considered that special circumstances do not apply.

7.2 Section 95E Statutory Matters

If the application is not publicly notified, a council must decide if there are any affected persons and give limited notification to those persons. A person is affected if the effects of the activity on that person are minor or more than minor (but not less than minor).

In deciding who is an affected person under section 95E:

- Adverse effects permitted by a rule in a plan or national environmental standard (the 'permitted baseline') may be disregarded;
- Only those effects that relate to a matter of control or discretion can be considered (in the case of controlled or restricted discretionary activities); and
- The adverse effects on those persons who have provided their written approval must be disregarded.

These matters were addressed in section 6.2 above, and no written approval have been obtained.

Having regard to the above provisions, an assessment is provided below.

7.3 Assessment of Effects on Persons

Adverse effects in relation to visual, noise and residential amenity on persons are considered below.

Wider effects, such as coastal character, ecology, Natural Hazards, construction activities, archaeological effects and cultural effects were considered in section 6.4 above, and considered to be less than minor.

All proposed works are to be undertaken on KiwiRail and Far North District Council owned land along the coastal edge of the Kawakawa River. The land adjacent to the works area is largely dominated by dense vegetation and contains limited residential activity. As described in Section 6.4 above, the visual and noise effects of the proposed works will not be dissimilar to the existing use of the public trail, with only temporary construction noise generated during works. In addition, there is one dwelling located at the southern end of the site at 412D Paihia Road. This dwelling will be located approximately 100m from the nearest cycle trail, with the closest treatment being mainly on grade trail. At such distances and respective of the methods proposed in these locations the works are not expected to give rise to any adverse effects on the owners and occupiers of this adjacent site.

Similarly, there is another dwelling nearer the northern end of the site at 206 Te Raupo Road. From this dwelling the nearest section of trail is approximately 115m away and in this location is also proposed to consist of on grade trail requiring the least amount of physical works of any of the treatment options. At this distance any adverse effects of the proposed works are likely to be less than minor.

It is possible that some structures, being retaining walls and safety rails combined, will exceed 2m in height and also be located within 10m of the edge of the rail corridor. Similarly, some structures may also infringe the sunlight recession planes required in the applicable zones. These infringements, though technical in nature due to the narrow site width, have been sought as a matter of conservatism. For the reasons outlined above it is considered that any infringement resulting from the bulk and location of the structures will likely not be visible from any adjoining or adjacent properties and where they are seen, the effects will be indistinguishable from that of structures with compliant bulk and location. Any infringements will not result in any shading of any adjacent properties and will not appear visually dominant. As such any adverse effects are considered to be less than minor.

With respect to all other adjacent land, all structures and physical works will be well set back from adjacent land boundaries and adequately separated to ensure adverse visual amenity and dominance effects will be less than minor.

The proposed works are associated with a well utilised and established rail and cycle trail well known to the community. Further, the topography of the land is such that the majority of properties are elevated from the site, ensuring that obstruction of views will be negligible, if visible at all.

7.3.1 Summary of Effects

Taking the above into account, it is considered that any adverse effects on persons at the adjacent properties will be less than minor in relation to visual, noise and residential amenity effects. Wider

effects, including coastal character, ecology and cultural effects were assessed in section 6.4 above and are considered to be less than minor.

It is considered, therefore, that there are no adversely affected persons in relation to this proposal.

7.4 Limited Notification Conclusion

Having undertaken the section 95B limited notification tests, the following conclusions are reached:

- Under step 1, limited notification is not mandatory;
- Under step 2, limited notification is not precluded;
- Under step 3, limited notification is not required as it is considered that the activity will not result in any adversely affected persons; and
- Under step 4, there are no special circumstances.

Therefore, it is recommended that this application be processed without limited notification.

8.0 Consideration of Applications (Section 104)

8.1 Statutory Matters

Subject to Part 2 of the Act, when considering an application for resource consent and any submissions received, a council must, in accordance with section 104(1) of the Act have regard to:

- Any actual and potential effects on the environment of allowing the activity;
- Any relevant provisions of a national environmental standard, other regulations, national policy statement, a New Zealand coastal policy statement, a regional policy statement or proposed regional policy statement; a plan or proposed plan; and
- Any other matter a council considers relevant and reasonably necessary to determine the application.

As a discretionary activity, section 104B of the Act states that a council:

(a) may grant or refuse the application; and

(b) if it grants the application, may impose conditions under section 108.

8.2 Weighting of Proposed Plan Changes

There are no relevant plan changes that would have a bearing on this application.

9.0 Effects on the Environment (Section 104(1)(A))

Having regard to the actual and potential effects on the environment of the activity resulting from the proposal, it was concluded in the assessment above that any wider adverse effects relating to the proposal will be less than minor and that no persons would be adversely affected by the proposal.

Further, it is considered that the proposal will also result in positive effects including:

- Enabling the construction of Regionally Significant Infrastructure;
- Providing for increased public access to and along the CMA; and
- Enabling recreational use of the cycleway.

Overall, it is considered that when taking into account the positive effects, any actual and potential adverse effects on the environment of allowing the activity are less than minor.

10.0 District Plan and Statutory Documents (Section 104(1)(B))

The following provisions of standards, policy statements and plans of relevance to the proposal are:

- New Zealand Coastal Policy Statement (**NZCPS**);
- National Policy Statement – Indigenous Biodiversity (**NPS-IB**);
- National Policy Statement – Freshwater Management (**NPS-FM**);
- Northland Regional Policy Statement (**RPS**);
- Far North District Plan (**FNDP**).

10.1 New Zealand Coastal Policy Statement (NZCPS)

The NZCPS guides local authorities in their management of the coastal environment. The site is bounded by the coastal estuarine environment of the Kawakawa River along its eastern edge. As a result, a thin strip of land is classified as being in the coastal environment in the NRPS therefore, the NZCPS is a relevant consideration.

The NZCPS seeks to protect the integrity, form, function of the coastal environment, protect and enhance its natural character and maintain and enhance public access while managing natural risks. The NZCPS is assessed in detail in **Appendix 17** although in summary and as assessed in this report, the proposal is considered consistent with the natural character of the coastline and actively builds on opportunities for ecological enhancement through the project footprint. The establishment of the cycle trail will significantly increase opportunities for public access while minimising effects on sensitive environments through the provision of purpose-built infrastructure.

NZ Environmental Management has assessed the ecological values of the Site, and in particular the unique values for coastal ecology including critical bird habitat. Subject to compliance with the proposed mitigation measures all effects can be suitably addressed and overall, it is considered that the proposal accords with the policy direction of the NZCPS.

10.2 National Policy Statement – Indigenous Biodiversity

The NPS-IB came in effect on 4 August 2023 provides direction to protect, maintain, and restore indigenous biodiversity in New Zealand. The core intent of the policies in the NPS-IB is to provide stronger protection for indigenous biodiversity including all forms of indigenous flora, fauna, and fungi, and their habitats.

The sole objective of the NPS-IB is:

(1) The objective of this National Policy Statement is:

(a) to maintain indigenous biodiversity across Aotearoa New Zealand so that there is at least no overall loss in indigenous biodiversity after the commencement date; and

(b) to achieve this:

(i) through recognising the mana of tangata whenua as kaitiaki of indigenous biodiversity; and

(ii) by recognising people and communities, including landowners, as stewards of indigenous biodiversity; and

(iii) by protecting and restoring indigenous biodiversity as necessary to achieve the overall maintenance of indigenous biodiversity; and

(iv) while providing for the social, economic, and cultural wellbeing of people and communities now and in the future.

Policies of the NPS-IB focus upon the management of indigenous biodiversity in an integrated way to ensure that the health and well-being of indigenous biodiversity is maintained and restored. These policies are assessed in detail in Appendix 17.

The Ecological Assessment by NZ Environmental Management (see Appendix 3) concludes the proposed works will result in low adverse effects on the indigenous biodiversity with potential for some positive effects. As a proposal for regionally significant infrastructure, it is noted that avoidance of effects is not required in this instance and instead effects are suitably managed through the effects hierarchy to a point of which there are no residual effects. As such it is considered to be consistent with the objectives and policies of the NPS-IB as upon completion it does not result in a net loss of indigenous biodiversity values while enabling communities to provide for the social, economic, and cultural wellbeing through enablement of regionally significant and specified infrastructure projects.

10.3 National Policy Statement – Freshwater Management

The NPS-FM came in effect on 3 September 2020. The NPS-FM provides direction for regional councils to set objectives for the state of freshwater bodies in their regions and to set limits on resource use to meet these objectives. The core intent of the policies in the NPS-FM is to provide stronger protection for freshwater bodies and wetlands.

The Ecological Assessment carried out by NZ Environmental Management has identified a series of natural inland wetland environments which require consideration under the NPS-FM.

The fundamental concept of the NPS-FM is “Te Mana o te Wai” the fundamental importance of water and recognises that protecting the health of freshwater, protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community. The only objective of the NPS-FM is:

2.1 Objective

(1) The objective of this National Policy Statement is to ensure that natural and physical resources are managed in a way that prioritises:

(a) first, the health and well-being of water bodies and freshwater ecosystems

(b) second, the health needs of people (such as drinking water)

(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

Policies of the NPS-FM focus upon the management of freshwater in an integrated way to ensure that the health and well-being of water bodies and freshwater ecosystems is maintained and improved. These policies are assessed in detail in Appendix 17.

The Ecological Assessment by NZ Environmental Management (see Appendix 3) concludes the proposed works will result in low adverse effects on freshwater values and in the cases of wetland ecosystems have potential to result in positive effects overall. As such it is considered to be consistent with the objectives and policies of the NPS-FM as the effects of any of extent or degradation of wetland values can be suitably mitigated and offset. Further the proposal will enable communities to provide for the social, economic, and cultural wellbeing through enablement of regionally significant and specified infrastructure projects.

10.4 Objectives and Policies of the Regional Policy Statement for Northland 2016

The RPS covers the management of natural and physical resources across the Northland region. The provisions within the RPS give guidance at a higher planning level in terms of the significant regional issues. As such it does not contain specific rules that trigger the requirement for consent but rather give guidance to consent applications on a regional level.

Objectives range from integrated catchment management, improvement of overall quality of Northland's water quality, maintaining ecological flows, protecting areas of significant indigenous ecosystems and biodiversity, sustainable management of natural and physical resources in a way that is attractive for business and investment that will improve the economic wellbeing, enabling economic wellbeing, regional form, the role of tangata whenua as kaitiaki is recognised and provided for in decision making, risks and impacts of natural hazards are minimised, outstanding natural landscapes and features and historic heritage are protected from inappropriate subdivision, use and development. These are assessed in detail in Appendix 17. Based on this detailed assessment it is considered that the proposed development satisfies the relevant objectives and policies for development within the Northland Regional Policy Statement.

10.5 Objectives and Policies of the Far North District Plan

The relevant objectives and policies from the FNDP are contained in Chapter 8 'Rural Environment'. Chapter 10 'Coastal Environment' and Chapter 12 'Natural and Physical Resources'.

Chapter 8 focuses on enabling efficient use and development of the Rural Productive Zone, promoting sustainable management of natural and physical resources, avoiding, remedying or mitigating conflicts between land use activities and the adverse effects of incompatible use or development on natural and physical resources and amenity values.

It is noted only a portion of the subject site is zoned Rural Production Zone and the existing site characteristics, being densely vegetated mean there is currently no rural production use of the site nor is there opportunities for such uses in the future. However, it is noted that the character of the site and its location adjoining rural production land to the west of the site is a relevant consideration.

Objective 8.6.3.2 seeks to enable the efficient use and development of the Rural Production Zone in a way that enables people and communities to provide for their social, economic and cultural wellbeing.

The proposal achieves Objective 8.6.3.2 by maintaining the natural character of the site while providing regionally significant infrastructure which provides for the social, economic and cultural wellbeing of people and communities across Northland.

Policy 8.6.4.1 seeks to enables rural production activities as well as a wide range of activities while ensuring that the adverse effects on the environment, including reverse sensitivity effects, are avoided, remedied or mitigated and are not to the detriment of rural productivity. Policy 8.6.4.7 refers to avoiding the actual and potential adverse effects of conflicting land use activities.

With regard to the policies seeking to manage the effects of the proposal, the assessment in Section 6 demonstrates that the adverse effects of the proposal will be less than minor. Reverse sensitivity and land use incompatibility effects are not considered to arise, with appropriate mitigation proposed to manage this.

Overall, the proposal is considered to be consistent with the anticipated outcomes of the Rural Production Zone.

Chapter 10 focuses on preserving natural character and landscape values, consolidating development in existing areas, providing for low impact methods of public access to the coast, preserving areas of indigenous vegetation and significant habitats of indigenous fauna and ensuring that development occurs in a manner that is compatible with the historic heritage and amenity values of the coastal environment.

Objective 10.3.4 seeks to maintain and enhance public access to and along the coast whilst ensuring that such activities do not adversely affect the character, landscapes cultural values of the coastal environment. Further, Policy 10.4.3 seeks to ensure ecological values are maintained while Policy 10.4.4 refers to ensuring that access to the coast is compatible with the preservation of the natural character and amenity, cultural, heritage and spiritual values of the coastal environment. The assessment provided in Section 6 demonstrates that adverse effects on character, ecology, cultural and heritage values can be appropriately managed to be less than minor while providing for key public infrastructure along the coastline.

Lastly, Chapter 12, in respect of this proposal, seeks to address effects relating to landscapes, earthworks and indigenous vegetation clearance. The relevant objectives and policies of Chapter 12 are addressed in the context of the RPS above. It also considered that these matters have been addressed by the assessment provided within this application with reference to the NPS-FM and NPS-IB. It is therefore considered that the proposal is consistent with the relevant provisions from the Far North District Plan.

10.6 Objectives and Policies of the Proposed Far North District Plan

The proposed Far North District Plan is operative in part with only limited provisions having immediate legal effect.

Under the Proposed Far North District Plan the site is mapped within the Coastal environment. Objectives and policies of the Coastal Environment are focused on maintaining the characteristics and qualities of the natural and built coastal environment. These intentions are addressed in detail in the context of the FNDP above and the NZCPS and RPS and have been assessed in Appendix 17.

Objectives and policies of the Earthworks and Ecosystems and indigenous biodiversity chapters are largely consistent with the operative provisions and as such have not been assessed further.

It also considered that these matters have been addressed by the assessment provided within this application and with reference to the NES-FW and NPS-IB. It is therefore considered that the proposal is consistent with the relevant provisions from the Proposed Far North District Plan.

10.7 Summary

It is considered that the proposed development is generally in accordance with the objectives and policies of the NZCPS, NPS-IB, NPS-FM, RPS and the FNDP.

11.0 Part 2 Matters

Section 5 of Part 2 identifies the purpose of the RMA as being the sustainable management of natural and physical resources. This means managing the use, development and protection of natural and physical resources in a way that enables people and communities to provide for their social, cultural and economic well-being and health and safety while sustaining those resources for future generations, protecting the life supporting capacity of ecosystems, and avoiding, remedying or mitigating adverse effects on the environment.

Section 6 of the Act sets out a number of matters of national importance including (but not limited to) the protection of outstanding natural features and landscapes and historic heritage from inappropriate subdivision, use and development.

Section 7 identifies a number of “other matters” to be given particular regard by Council and includes (but is not limited to) Kaitiakitanga, the efficient use of natural and physical resources, the maintenance and enhancement of amenity values, and maintenance and enhancement of the quality of the environment.

Section 8 requires Council to take into account the principles of the Treaty of Waitangi.

Overall, as the effects of the proposal are considered to be less than minor, and the proposal accords with the relevant PRP objectives and policies, it is considered that the proposal will not offend against the general resource management principles set out in Part 2 of the Act.

12.0 Other Matters (Section 104(1)(C))

12.1 Record of Title Interests

The application site is held in multiple Records of Title being NA112A/450, NA119D/852 and NA125B/736. There are no relevant interests on any of the affected Records of Title.

13.0 Conclusion

The proposal involves geotechnical investigations along the coastal edge of the Kawakawa River from Taumārere to Ōpua.

Based on the above report it is considered that:

- Public notification is not required as adverse effects in relation to coastal character, ecology, natural hazards, construction activities, archaeological effects and cultural effects are considered to be less than minor. There are also positive effects including enablement of a Regionally Significant Infrastructure project and improved public access to the coast;
- Limited notification is not required as no persons will be adversely affected to a degree which is minor or more than minor;
- The proposal accords with the relevant objectives and policies of all relevant higher order planning documents; and
- The proposal is considered to be consistent with Part 2 of the Act.

It is therefore concluded that the proposal satisfies all matters the consent authority is required to assess, and that it can be granted on a non-notified basis.

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**NA125B/736**
Land Registration District	**North Auckland**
Date Issued	12 October 1999

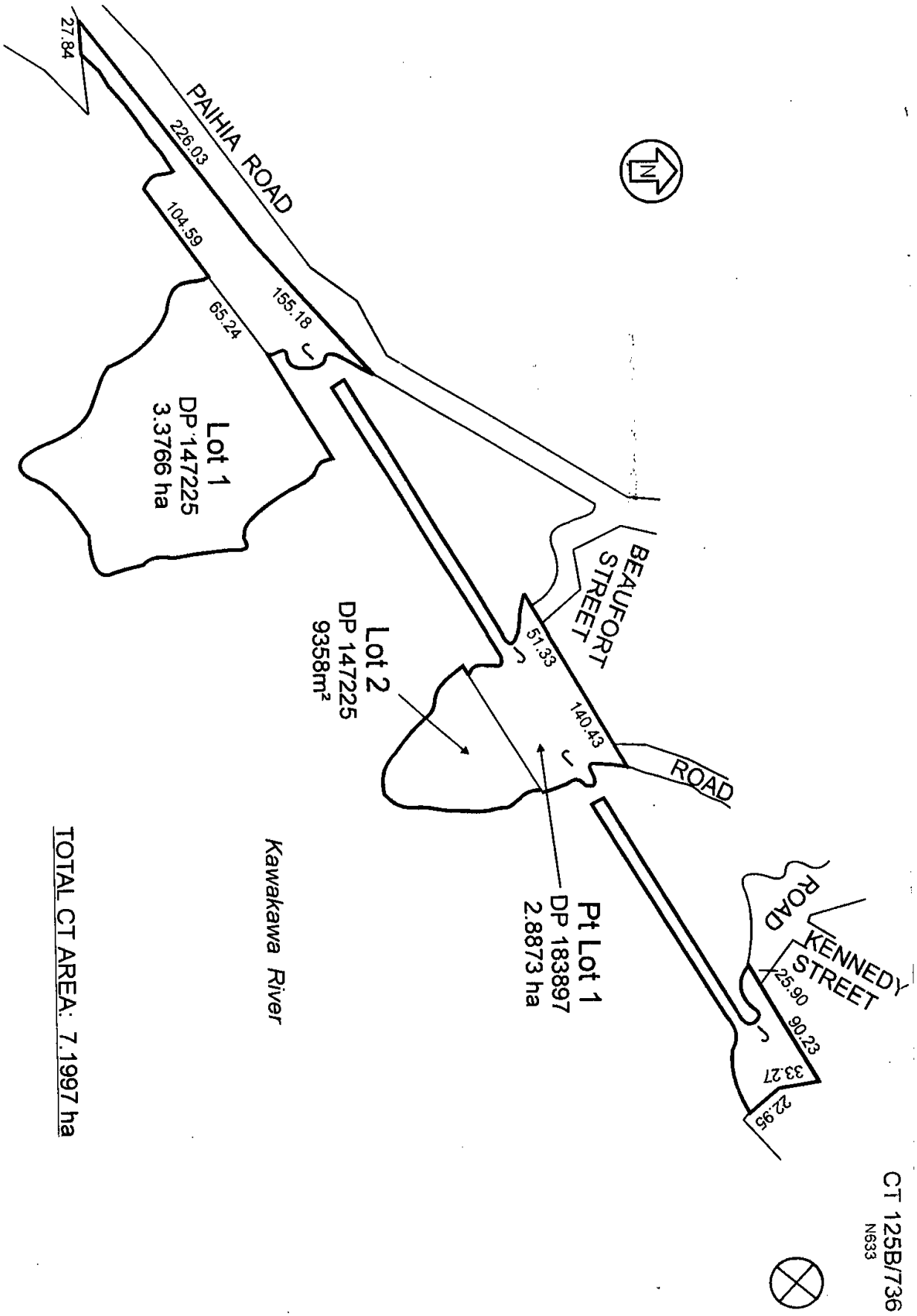
Prior References
NA119D/852

Estate	Fee Simple
Area	7.1997 hectares more or less
Legal Description	Lot 1-2 Deposited Plan 147225 and Part Lot 1 Deposited Plan 183897
Purpose	Railway purposes (rail corridor)

Registered Owners
Her Majesty the Queen

Interests

D574559.1 Gazette Notice declaring the adjoining State Highway No.11 to be a limited access road - 25.1.2001 at 12.09 pm


27.84
PAIHIA ROAD
226.03
104.59
65.24
155.18
Lot 1
DP 147225
3.3766 ha
BEAUFORT STREET
51.33
140.43
ROAD
Lot 2
DP 147225
938m²
Pt Lot 1
DP 183897
2.8873 ha
KENNEDY STREET
25.90
90.23
33.27
22.95
Kawakawa River
TOTAL CT AREA: 7.1997 ha
CT 125B/736
N633

Resource Consent

FILE: 45815
(01 and 02)
New

Document Date: 09.04.2024

Pursuant to the Resource Management Act 1991, the Northland Regional Council does hereby grant a Resource Consent to:

FAR NORTH DISTRICT COUNCIL

To undertake the following activities on Lot 1 DP 183897, Lot 1 DP 147225 and Lot 2 DP 147225 (Taumarere to Ōpua Cycle Trail**)**, at or about location co-ordinates 1700688E 6086756N:

Note: All location co-ordinates in this document refer to Geodetic Datum 2000, New Zealand Transverse Mercator Projection.

AUT.045815.01.01 **Vegetation clearance for geotechnical investigations within a wetland.**

AUT.045815.02.01 **Earthworks associated with geotechnical investigations within a wetland.**

Subject to the following conditions:

1 At least two weeks prior to the commencement of any works authorised by these consents on-site, the Consent Holder must notify the Northland Regional Council's assigned monitoring officer in writing of the date that the works are intended to commence.

Advice Note: *Notification to the Northland Regional Council may be made by email to info@nrc.govt.nz.*

2 A copy of these consents must be provided to every person who is to carry out the works authorised by these consents, prior to any work commencing.

3 The exercise of these consents must not cause any of the following effects on the water quality of any tributary of the Kawakawa River, as measured approximately 10 metres downstream of a discharge point into the tributary, when compared to a site upstream of all land disturbance activities during the same sampling event:

(a) The production of any conspicuous oil or grease films, scums or foams, floatable or suspended materials;

(b) A conspicuous change in colour or visual clarity;

(c) An emission of objectionable odour;

(d) An increase in suspended solids concentration greater than 100 grams per cubic metre.

4 The exercise of these consents must not give rise to any discharge of contaminants, including dust, which in the opinion of a monitoring officer of the Northland Regional Council is noxious, dangerous, offensive or objectionable at or beyond the property boundary.

5 Slash, soil, debris and detritus associated with the exercise of these consents must not be placed in a position where it may be washed into any water body.

Northland REGIONAL COUNCIL
Te Kaunihera ā rohe o Te Taitokerau

6 Work within wetland areas must not occur during the critical breeding season for the Australasian Bittern, being August to January inclusive.

7 These consents do not lapse until their expiry.

8 The Consent Holder must, on becoming aware of any discharge associated with the Consent Holder's operations that is not authorised by these consents:

(a) Immediately take such action, or execute such work as may be necessary, to stop and/or contain the discharge; and

(b) Immediately notify the Northland Regional Council by telephone of the discharge; and

(c) Take all reasonable steps to remedy or mitigate any adverse effects on the environment resulting from the discharge; and

(d) Report to the Northland Regional Council's Compliance Manager in writing within one week on the cause of the discharge and the steps taken, or being taken, to effectively control or prevent the discharge.

For telephone notification during the Northland Regional Council's opening hours, the Northland Regional Council's assigned monitoring officer for these consents must be contacted. If that person cannot be spoken to directly, or it is outside of the Northland Regional Council's opening hours, then the Environmental Hotline must be contacted.

Advice Note: *The Environmental Hotline is a 24 hour, seven day a week, service that is free to call on 0800 504 639.*

9 The Northland Regional Council may, in accordance with Section 128 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions annually during the month of July for any one or more of the following purposes:

(a) To deal with any adverse effects on the environment that may arise from the exercise of these consents and which it is appropriate to deal with at a later stage; or

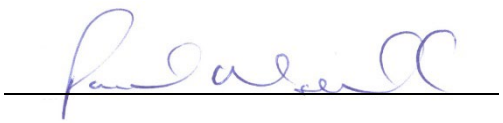
(b) To require the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

The Consent Holder must meet all reasonable costs of any such review.

EXPIRY DATE: **31 MARCH 2029**

Advice Note: *The Heritage New Zealand Pouhere Taonga Act 2014 makes it unlawful for any person to destroy, damage or modify the whole or any part of an archaeological site without the prior authority of Heritage New Zealand Pouhere Taonga.*

These consents are granted this Ninth day of April 2023 under delegated authority from the council by:



Paul Maxwell
Coastal and Works Consents Manager

Prepared for Far North District Council

ECOLOGICAL IMPACT ASSESSMENT

POU HERENGA TAI - TWIN COAST CYCLE TRAIL: TAUMĀRERE TO OPUA SECTION

Report 2022551.1.003_V2_20241112

TABLE OF CONTENTS

SECTIONS

1. EXECUTIVE SUMMARY 4
2. INTRODUCTION 5
2.1 BACKGROUND 5
2.2 PROPOSAL 5
2.3 SCOPE OF THIS REPORT 5
2.4 SITE DESCRIPTION 6
2.4.1 ECOLOGICAL REGION AND DISTRICT 7
2.4.2 SIGNIFICANT NATURAL AREAS / PROTECTED AREAS 7
3. METHODS 8
3.1 DESKTOP ASSESSMENT 8
3.2 SITE WALKOVERS 8
3.3 VEGETATION 8
3.4 FAUNA 8
3.4.1 BIRDS 8
3.4.2 BATS 9
3.4.3 LIZARDS 9
3.4.4 INVERTEBRATES 9
3.5 FRESHWATER ASSESSMENTS 9
3.6 MARINE ASSESSMENTS 9
3.7 WETLAND ASSESSMENTS 9
3.7.1 DESKTOP 9
3.7.2 SITE WALKOVER 9
3.7.3 MAPPING 10
3.8 ASSESSMENT OF ECOLOGICAL EFFECTS 10
4. RELEVANT LEGISLATION 11
4.1 THE WILDLIFE ACT (1953) 11
4.2 REGIONAL POLICY STATEMENT (2016) 11
4.3 NATIONAL POLICY STATEMENT FOR FRESHWATER MANAGEMENT (2023) 11
4.4 NATIONAL POLICY STATEMENT FOR INDIGENOUS BIODIVERSITY (2023) 11
4.4.1 ADHERENCE TO THE EFFECTS MANAGEMENT HIERARCHY 11
4.4.2 NEW ZEALAND COASTAL POLICY STATEMENT (2010) 12
4.5 CONSIDERATION OF NATIONAL AND REGIONAL POLICY: ECOLOGY CONCLUSIONS 12
5. ECOLOGICAL VALUES 13
5.1 EXOTIC AND REGENERATING SCRUB 13
5.2 KĀNUKA FOREST/SHRUBLAND 15
5.3 THREATENED AND AT-RISK PLANT SPECIES 17
5.4 BIRDS 18
5.5 BATS 22
5.6 LIZARDS 22

5.7 INVERTEBRATES 24
5.8 FRESHWATER 24
5.9 MARINE 26
5.9.1 COASTAL MARINE AREA (CMA) AND COASTAL WETLANDS 27
5.10 WETLANDS 27
5.10.1 MANGROVE FOREST 27
5.10.2 OIOI RUSHLAND / SALTMARSH 29
5.10.3 MINGIMINGI SWAMP SHRUBLAND 30
5.10.4 RAUPŌ – KUTA RUSHLANDS 31
5.11 SUMMARY OF ECOLOGICAL VALUES 33
6. ASSESSMENT OF ECOLOGICAL EFFECTS 34
6.1 OVERVIEW 34
6.1.1 ADHERENCE TO THE EFFECTS MANAGEMENT HIERARCHY 34
6.2 SUMMARY OF ECOLOGICAL EFFECTS PRE- AND POST-MANAGEMENT 36
6.3 EFFECTS ASSESSMENT (PRE-EFFECTS MANAGEMENT) 45
6.3.1 TEMPORARY LOSS OF EXOTIC FOREST AND EDGE VEGETATION 45
6.3.2 TEMPORARY LOSS OF KĀNUKA SHRUBLAND 45
6.4 PERMANENT EFFECTS – TERRESTRIAL 45
6.4.1 EXOTIC FOREST AND EDGE VEGETATION LOSS 45
6.4.2 KĀNUKA SHRUBLAND LOSS 45
6.4.3 THREATENED PLANT SPECIES 47
6.5 EFFECTS ON FAUNA 47
6.5.1 BIRDS 47
6.5.2 BATS 48
6.5.3 LIZARDS 48
6.5.4 INVERTEBRATES 48
6.6 FRESHWATER EFFECTS 49
6.7 MARINE EFFECTS 49
6.7.1 COASTAL MARINE AREA (CMA) 49
6.8 WETLANDS OVERVIEW 49
6.8.1 WETLAND VEGETATION LOSS 49
6.8.2 PERMANENT LOSS OF WETLAND 50
6.8.1 MINGIMINGI 50
6.9 EFFECTS BY WETLAND TYPE 51
6.9.1 MANGROVE 51
6.9.2 OIOI 52
6.9.3 RAUPŌ-KUTA 53
6.10 EFFECTS ON WETLAND BUFFERS (10M SETBACK) 56
6.10.1 MANGROVE WETLAND BUFFER LOSS (10M SETBACK) 56
6.10.2 OIOI WETLAND BUFFER LOSS (10M SETBACK) 56
6.10.3 RAUPŌ-KUTA LOSS OF WETLAND BUFFER (10M SETBACK) 57
6.10.4 SUMMARY OF EFFECTS ON WETLAND SETBACKS 57
6.11 CONSTRUCTION EFFECTS ON WETLANDS 57

6.11.1 SEDIMENTATION, SHORT-TERM EDGE EFFECTS, AND OIL SPILLS. 57
6.12 CONCLUSION ON EFFECTS PRIOR TO MANAGEMENT 57
7. EFFECTS MANAGEMENT DETAILS 58
7.1 TERRESTRIAL VEGETATION (KĀNUKA SHRUBLAND) 58
7.2 TERRESTRIAL FAUNA (BIRDS, BATS, LIZARDS, SNAILS, MARINE CRABS) 58
7.2.1 INTRODUCTION 58
7.2.2 AVOIDANCE OF BREEDING SEASONS 58
7.2.3 HABITAT ENHANCEMENT MEASURES 63
7.2.4 SITE-SPECIFIC LIZARD AND SNAIL MANAGEMENT PLAN (LMP) 63
7.2.5 BAT MANAGEMENT TO BE IDENTIFIED. 63
7.3 TERRESTRIAL CONCLUSION 63
7.4 FRESHWATER 63
7.4.1 CONTAINMENT MEASURES: 64
7.4.2 SPILL PREVENTION AND RESPONSE: 64
7.4.3 CONSTRUCTION TIMING: 64
7.5 MARINE 64
7.5.1 CONTAINMENT MEASURES: 64
7.5.2 SPILL PREVENTION AND RESPONSE: 64
7.5.3 CONSTRUCTION TIMING: 65
7.5.4 MARINE FAUNA: 65
7.6 WETLANDS 65
7.6.1 WETLAND LOSS 65
7.6.2 WETLAND VEGETATION LOSS 69
7.6.3 ALL WETLAND IMPACTS 69
8. RESIDUAL EFFECTS 71
9. SUMMARY OF REQUIREMENTS 72
9.1 VEGETATION LOSS 72
9.2 FAUNA 72
9.3 GENERAL CONSTRUCTION EFFECTS 73
9.4 WETLANDS 73
10. CONCLUSION 74
11. APPENDIX A 75
11.1 ECIA FRAMEWORK 75
12. APPENDIX B 79
12.1 REFERENCES 79
13. APPENDIX C 83
13.1 PLANT LIST 83
14. APPENDIX D 90
14.1 DETAILED ASSESSMENT OF ECOLOGICAL VALUES AGAINST CRITERIA 90

LIST OF FIGURES

Figure 1: Overview of the Cycle Trail. 5
Figure 2: DOC PNA's 7
Figure 3: Edge and exotic vegetation within the project footprint. 13
Figure 4: Typical weedy edges of embankments throughout the footprint. 14
Figure 5: Scrappy regenerating native vegetation along the project footprint. 14
Figure 6: Example of bare embankment areas with limited regeneration. 15
Figure 8: Typical regenerating kānuka forest within the footprint. 16
Figure 9: Example of scrubby exotic-dominated areas with scattered kānuka. 16
Figure 10: Example of subcanopy regenerating native vegetation under a kānuka canopy. 17
Figure 11: Species composition of the clay areas subject to disturbance. 17
Figure 12: Saltmarsh habitat suitable for Mātātā, fernbird. 18
Figure 13: Raupō and forest habitats for cryptic species. 18
Figure 14: Significant bird overlays from the NRP (2024). 19
Figure 15: Woody debris piles across the footprint, providing habitat for skinks. 23
Figure 16: Arboreal lizard habitat within the project footprint. 23
Figure 17: DOC classified marine ecosystems at the project area (indicated by black line). 26
Figure 18: Mangrove Forest near the proposed Cycle Trail route. 27
Figure 19: Typical ground tier of mangrove across the route, showing silt and pneumatophores. 28
Figure 20: Threat status of New Zealand's mangrove systems internationally. 28
Figure 21: Oioi saltmarsh adjacent to the project footprint. 29
Figure 22: An example of the embankment's woody weed composition adjacent to saltmarsh. 30
Figure 23: Mingimingi shrubland (right of photograph) near Long Bridge. 31
Figure 24: Mingimingi shrubland Interior. 31
Figure 25: Raupō – kuta rushland near Lone Cow. 32
Figure 26: Larger Raupō dominated area in good health. 32
Figure 27: Key areas of refinement undertaken by the project to avoid wetlands and CMA. 35
Figure 28: The two areas associated with wetland boardwalks 46
Figure 29: Area over the tunnel that will be cleared. 46
Figure 30: Kanuka forest (red) in wider area and loss (white). 47
Figure 31: Mapped mangrove systems (green) across the wider Opua/Kawakawa Area (Macdonald, et al., 2020). White dots indicate the mangroves lost (not to scale). 51

Figure 32: Example of areas where boardwalk would traverse mangrove edge habitat. 52

Figure 33: Mapped oioi systems (orange) across the wider Opua/Kawakawa Area (Macdonald, et al., 2020). White dots indicate the oioi lost (not to scale). 53

Figure 34: Example of Raupō-kuta habitat extending past the project extent in light purple. 54

Figure 35: Example of exotic and woody vegetation along the edge at the raupō-kuta loss. 54

Figure 36: Indication of the woody vegetated area that was targeted to cross. 55

Figure 37: Raupō-kuta boardwalk....56

Figure 38: Example of ecostacks providing additional habitat. 63

Figure 39: Overview of areas for reestablishment of wetland extent in yellow. 66

Figure 40: Area adjacent to the saltmarsh to be reinstated and managed to allow reversion back. 67

Figure 41: Area of mangrove reinstatement. 67

Figure 42: Area of Raupō-kuta-swamp millet reestablishment. 68

Figure 43: Location of severely degraded wetland option for restoration. 68

Figure 44: Severely degraded salt marsh and adjacent exotic-dominated wetland section....69

LIST OF TABLES

Table 1: Native Bird species observed or recorded across the project footprint. 19

Table 2: Lizard species that could be present within the project footprint....23

Table 3: Freshwater records for the project footprint and surrounds. 25

Table 4: Summary of assigned ecological values across the project footprint....33

Table 5: Summary of ecological values and effects on these. 36

Table 6: Permanent Wetland Vegetation Loss (Boardwalk Treatments) and Temporary Clearances. 50

Table 7: Permanent Wetland Loss (All other treatments). 50

Table 8: Key breeding season for fauna expected across the project footprint to avoid. 59

DOCUMENT CONTROL

NZE Quality System:

Document Reference	OpuaCycleTrail EcIAFINAL_2022551.1.003_V2_20241112
Report Revision	2
Report Status	Final
Prepared by	Kelly Hayhurst
Reviewed by	Gary Bramley
Approved by	Grace Henty
Date Created	August 2024
Date Issued	November 2024

1. EXECUTIVE SUMMARY

Far North District Council has engaged NZ Environmental Management (NZEM) to provide an ecological impact assessment (EcIA) for a proposed cycleway relocation. This EcIA follows the Environment Institute of Australia and New Zealand's guidelines (EIANZ) for undertaking Ecological Impact Assessments. Ecological features across the footprint were identified by NZEM ecologists and assessed against actual and potential impacts from the proposal. Using the EIANZ guidelines, appropriate management of ecological effects has been provided where relevant and detailed in this report.

The Pou Herenga Tai (Twin Coast Cycle Trail) in Northland extends 87km between Hōreke in the west and Opua in the east. The eastern end of the 11km Opua to Kawakawa section is located within a former railway corridor, leased to the Bay of Islands Vintage Railway Trust by the Far North District Council. The trust proposes to reopen a section of the railway line between Taumārere and Opua, which will require the relocation of the cycle trail between these points. The relocation is proposed generally adjacent to the existing railway line, which is an approximately 6.5km route from Taumārere Station, terminating just prior to Opua. The majority of the proposed Cycle Trail relocation is located at the periphery between an estuarine environment (or rarely, open water) and native/exotic shrubland on the hillslopes above the Kawakawa River. The proposed Cycle Trail route intersects six key vegetation types - mangrove forest, oioi rushland (salt marsh), kānuka forest/shrubland, raupō – kuta rushland, mingimingi shrubland and exotic vegetation, including pasture. Introduced weeds are abundant across the length of the cycleway but particularly dominant in the narrow corridor on either side of the trail, which was disturbed to create the railway line.

The highest ecological values along the proposed Cycle Trail route are the wetland ecosystems, as they are generally intact, and wetlands are threatened nationally. However, the wetlands are subject to severe edge effects, with pest plant incursions and wind damage evident. In addition to ecosystem and vegetation values, the wetland vegetation is currently providing habitat for nationally and regionally threatened species, including the nationally threatened - critical Matuku-hūrepo (Australasian bittern, *Botaurus poiciloptilus*) and the regionally threatened - declining mātātā (North Island fernbird, *Poodytes punctatus vealeae*). Other ecological value features across the footprint include Kānuka forest/shrubland, fauna habitats for indigenous forest birds, lizards, and invertebrates. Overall, the ecological values for the project's footprint ranged from Low to Very High.

NZEM has been involved with the project since 2020 and the project's initialisation. This involvement has enabled planning to avoid extensive earthworks and other aspects of hard engineering, moving to an ecologically sensitive design with the identification of critical ecological features. These designs include a mixture of boardwalks and retaining walls with imported clean fill material on the side of the railway embankment, combined with pest plant control, edge planting and boardwalks.

The ecological level of unmanaged effects of the proposal ranges from Low to High. These effects arise from the potential for the disturbance or death of indigenous fauna during construction, increased degradation of threatened ecosystems, including 0.04ha of wetland, and the interruptions and loss of habitat and ecosystems. This effects assessment has resulted in the recommendation of a range of ecological management actions, including fauna relocation prior to works, supervised works by an ecologist, best practice sediment and erosion control, wetland reinstatement, and planting along edges and pest plant control across the footprint. When these measures are undertaken, the ecological level of effects is expected to be Low overall, with some positive outputs in the form of increased resilience at the edges of wetlands through pest control and wetland monitoring.

2. INTRODUCTION

2.1 BACKGROUND

Pou Herenga Tai (the Twin Coast Cycle Trail, Northland) extends between Hōreke (Hokianga) in the west and Opua (Bay of Islands) in the east, referred to here as 'the Cycle Trail' (Figure 1). The 87km Cycle Trail was completed between 2012 and 2017. The central point is Kaikohe, from which the trail descends to the east and the west coasts. Between Rangiāhua (west of Ōkaihau) and Opua, the Cycle Trail follows a (primarily) disused railway corridor, with some sections being operated as a tourist attraction run by the Bay of Islands Vintage Railway Trust. One section of the cycle trail (the Taumārere to Opua section) is located on the old railway itself, with gravel covering the lines to facilitate the pathway.

Figure 1: Overview of the Cycle Trail.

2.2 PROPOSAL

The Far North District Council leases the Taumārere to Opua section of the railway for the Cycle Trail. The Bay of Islands Vintage Railway Trust wishes to reopen this section of the railway line between Taumārere and Opua, necessitating relocating the cycle trail at these points.

2.3 SCOPE OF THIS REPORT

This ecological impact assessment (EcIA) is based on the following documents provided by the project team and other information sources:

- Kawakawa To Opua Cycle Trail – Consent Plans (2209-RC-00). By JAS Civil Ltd and dated August 2024.
- Site assessments, as detailed in section 3.2 below.
- Pers. Comms with the Bay of Islands Vintage Railway Trust staff.
- Twin Coast Cycleway Trail Permanent Route Construction Report by Ventia July 2024
- Kawakawa to Ōpua Cycle Trail Client & Functional Requirements document (undated).

Assumptions of this assessment include:

- Site assessments and ecological information gathered were explicitly for the proposal and represent a snapshot in time.
- Given the long-term nature of this proposal, it is recognised that there is uncertainty in the ecological aspects and the risk associated with the predictions.
- The drawings and plans relied on for this assessment will not be varied after consent. Any alterations to them may require further ecological investigations at that point.
- The expected construction methodology has been provided; any alterations may require further ecological investigations.

The overall scope of this report is:

- Identify and describe the current ecological context of the project footprint.
- Based on preliminary designs, identify and describe the actual and potential ecological effects (temporary and permanent).
- Where appropriate, recommend measures to avoid, remedy or manage actual and potential ecological effects (including any proposed conditions/management plan requirements). This hierarchy of management is in alignment with the National Policy Statement for Indigenous Biodiversity (NPS-IB) and National Policy Statement for Freshwater Management (NPS-FW) effects management hierarchy.
- Present an overall conclusion of the project's actual and potential ecological effects after recommended measures are implemented.

2.4 SITE DESCRIPTION

The project footprint is the Taumārere to Opua portion of the Cycle Trail and is approximately 5.15km. From Taumārere Station, the trail runs for 300m, traversing over 'Long Bridge'[1], which crosses over farmland and the Kawakawa River and intersects wetland and saltmarsh habitat. The route remains flat for almost its entire length, except for a detour, which climbs a hill to avoid the railway tunnel ('the Tunnel'). The trail crosses a bridge over the Whangae River before ending at Baffin Street, Opua. The cycleway intersects various coastal habitats, including wetlands dominated by oioi (*Apodasmia similis*), wīwī (*Juncus edgariae*) and estuarine / salt marsh habitats dominated by mangrove (*Avicennia marina subsp. australasica*). At some locations, the trail intersects with fragments of regenerating native forest with a canopy of primarily kānuka (*Kunzea robusta*) with native early successional shrubs in the understorey. Introduced weeds such as gorse (*Ulex europaeus*), Spanish heath (*Erica lusitanica*), and Sydney golden wattle (*Acacia lonigifolia* subsp. *longifolia)* are abundant across the length of the cycleway, but particularly dominant in the narrow corridor on either side of the trail. The presence of exotic and pest plants along the edges is likely attributable to the disturbance associated with creating the railway line. There are six main vegetation types found along the route as follows:

- Mangrove forest.
- Oioi rushland.
- Kānuka forest/shrubland.
- Raupō – kuta rushland.
- Mingimingi shrubland and
- Exotic vegetation, including pasture.

[1] Throughout the project, the various railway components will be referred to colloquially due to their lack of specific naming conventions.

2.4.1 Ecological Region and District

The proposed relocation of the cycleway is located within the Kerikeri Ecological District and Eastern Northland Ecological Region (McEwen 1987; Brook 1996; Conning and Miller 1999). The Kerikeri Ecological District covers approximately 67,600ha, with approximately 21% classified as natural. These natural areas were assessed by Conning and Miller (1999) as the following ecosystems - 31% forest, 52% shrubland, 7% estuarine, 4% freshwater wetlands, and 6% island habitats. The Kerikeri Ecological District's natural areas are fragmented, original coastal vegetation is limited, and invasive and exotic species are common due to human modification and disturbance.

2.4.2 Significant Natural Areas / Protected Areas

Three Department of Conservation (DOC) Protected Natural Areas (PNA) are within the vicinity of the project, notably Opua Forest and the Eastern Bay of Islands estuary which the cycleway traverses. Across the Kawakawa River is the Russell State Forest (Figure 2). Labels in the figure below also indicate protected areas in Northland under the Conservation Act 1987; these are all adjacent to the extent of the railway corridor.

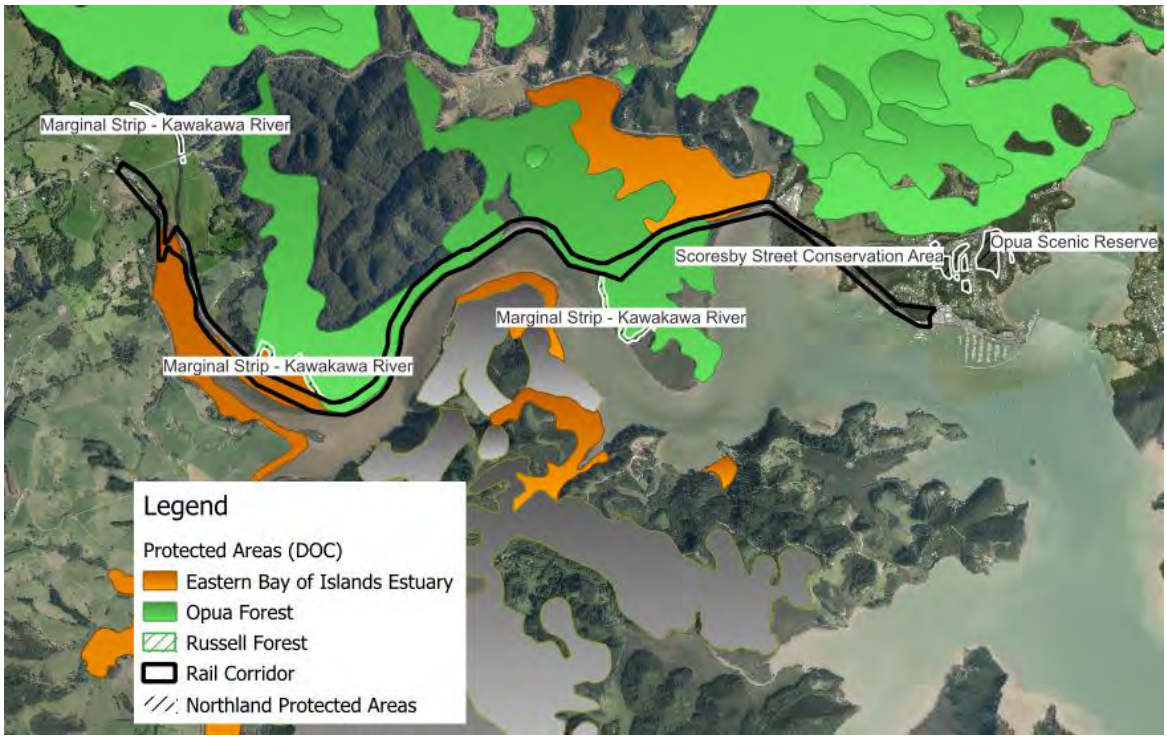


Figure 2: DOC PNA's.

Conning and Miller (1999) evaluated and grouped areas of indigenous vegetation throughout the district, assigning them as either Level 1 sites (being of the highest ecological value) or Level 2 (sites supporting populations of indigenous flora and fauna but of generally lower ecological value than Level 1 sites). The cycleway forms part of Opua Forest (shown in Figure 2), which Conning and Miller (1999) regarded as a Level 1 (highest value) site.

It is noted that although the extent of the forest and estuarine polygons cover the cycle trail and railway, the Indigenous cover at those points has been removed, and the vegetation cover is non-contiguous, as the polygon indicates.

3. METHODS

3.1 DESKTOP ASSESSMENT

To inform the site assessments, national and regional ecosystem databases were searched to ascertain existing information on ecosystems and threatened flora and fauna. Databases and reference documents utilised included:

- Department of Conservation Bat Database 2022
- Department of Conservation Lizard Database 2020
- E-Bird online observation database
- Far North District Council Online Mapping Services and Open Data
- iNaturalist New Zealand
- New Zealand Freshwater Fish Database (Stoffels, 2022).
- The Land Environments of New Zealand (LENZ)
- Estuary Mapping Site (Department of Conservation, 2007).
- NZ Threat Classification System by the Department of Conservation

3.2 SITE WALKOVERS

Given the historical involvement of NZEM with the project, a summary of site assessments is provided below. Detailed investigation methods are described in section three below.

1. Two NZEM ecologists completed a site walkover on September 11, 2020, to inform the project's concept stage. During that visit, records were taken of all birds encountered and key vegetation (exotic and indigenous).
2. An NZEM ecologist visited the Cycle Way on May 29, 2023. During this visit, the project design engineers, and the Ecologist walked the entire cycle trail to confirm no ecological changes or additions from the 2020 assessment. During this walkover, all fauna species encountered were recorded. Key vegetation (ecosystems and species) was recorded and mapped.
3. Wetland areas were identified and mapped on June 29, 2023, by two NZEM ecologists,
4. A further site assessment in June focused on faunal habitats, specifically lizard habitats, cryptic wetland birds, and bats. Vegetation types and ecosystems were also assessed.
5. A site walkover was implemented in May 2024, and again in July 2024 with a high-level assessment of vegetation and habitats undertaken through photographic records.

3.3 VEGETATION

Rapid inventory vegetation assessments (Rose, 2012) (Department of Conservation, 2008) across the project footprint were utilised during the multiple site assessments. The vegetation was evaluated at an ecosystem level, and its associated composition, structure, and integrity were recorded over the footprint. Notable trees, rare and threatened species, pest plants and weed species were documented where observed.

3.4 FAUNA

3.4.1 Birds

Bird surveys focussed on assessing suitable habitat across the project footprint. Opportunistic observations during the walkovers were recorded. Personal communications with railway staff who frequent the area also informed several key species observations.

3.4.2 Bats

During the site walkovers, potential bat habitat was recorded, using industry-standard criteria to guide the assessment. These criteria outline that any tree with a diameter at breast height (DBH) >15cm and at least one identified roosting feature (e.g., knots, cavities, loose bark, cracks, hollows, epiphytes) should be considered a potential bat roost tree (Daniel & Williams, 1984; O'Donnell, 2001).

3.4.3 Lizards

Habitat assessments were carried out across the project footprint to assess areas of potential lizard habitat. Where habitat was identified, if possible, visual encounters and non-destructive manual searches (Anderson et al., 2012; Hare, 2012) were carried out (no lizards were handled).

3.4.4 Invertebrates

A high-level assessment of the habitat of invertebrate fauna was performed. In general, vegetation is used as a proxy for invertebrate presence. No baseline or specific invertebrate surveys were completed.

3.5 FRESHWATER ASSESSMENTS

Specific freshwater assessments (baseline and detailed) were not within scope; however, wetlands within the freshwater/saline interface were recorded, and investigation methods are detailed in section 3.7. A general approach to the freshwater systems was used when considering the systems on the wider landscape scale and the limited impacts on these systems both at a landscape scale and project scale.

3.6 MARINE ASSESSMENTS

Specific marine assessments (baseline and detailed) were not within scope; however, wetlands within the freshwater/saline interface were recorded, and investigation methods are detailed in section 3.7. A general approach to the marine systems was used when considering the systems on the wider landscape scale and the limited impacts on these systems both at a landscape scale and project scale.

3.7 WETLAND ASSESSMENTS

3.7.1 Desktop

A preliminary site scope for wetlands within 100m of the project works was undertaken via a desktop assessment. This assessment included investigating catchment information, previous land use through historical aerial imagery and rainfall data before the site visit.

3.7.2 Site Walkover

During the site walkover, an assessment of potential wetland areas was undertaken. The key criteria included:

- Areas identified at the desktop stage.
- Areas of low-lying ground
- Areas that had potential hydric qualities (i.e. hydrophytic vegetation).

The National Policy Statement for Freshwater Management (**'NPS-FM'**) refers to the Ministry for the Environment (**'MfE'**) wetland delineation protocols (August 2020) to determine the type and legislative status of wetlands. Wetlands were assessed across the footprint based on these delineation protocols to determine compliance with the National Environmental Standard for Freshwater Management (**'NES-F'**, August 2020), specifically for sections 52 – 54.

The delineation method relies on the presence and abundance/dominance of hydrophytic vegetation[2], the presence and distribution of hydric soils[3] , and the consideration of hydrology[4]. The MfE Pasture Exclusion Assessment Methodology[5] can be used to assess potential wetlands in pasture areas.

Under the MfE (2020) method, for this site, NZEM ecologists undertook the following:

i. Determined the project area (the putative wetlands) as above.
ii. Completed a Rapid test.

Due to the wetland types, extents, and intact composition across the project footprint, areas could be identified using vegetation protocols alone. As a result, soil and further hydrological assessments were not required.

3.7.3 Mapping

Wetlands were mapped into online mapping software QGis (https://www.qgis.org/ v 3.38) using a combination of drone imagery (Hoskin Civil, drone flown 2023), GPS points, Avenza Mapping software (https://www.avenza.com/avenza-maps/) and georeferenced photograph locations.

3.8 ASSESSMENT OF ECOLOGICAL EFFECTS

The ecological effects assessment was conducted per the methods outlined in the second edition of the Ecological Impact Assessment ('EcIA') guidelines produced by EIANZ (Roper Lindsay et al., 2018). The guidelines provide criteria to assess ecological values using the matters: 'representativeness', 'rarity/distinctiveness', 'diversity and pattern', and 'ecological context.' Based on the designated values for each matter, the ecological aspects of the site are then assessed using the attributes matrix in Appendix 10 of the EIANZ guidelines. Chapter 6 of the EIANZ guidelines provides criteria for determining the magnitude of effects. See Appendix A for the relevant framework details.

The level of effect can then be determined by combining the value of the ecological feature or attribute with the score or rating for the magnitude of the effect to create criteria for describing the level of effects. Cells with low or very low levels of effect represent a low risk to ecological values rather than low ecological values. A 'moderate' effect level requires careful assessment and analysis of the individual case. These effects can be managed through avoidance, design, or appropriate mitigation actions.

This report primarily assessed impacts at the ecological feature/site scale. After considering the site scale, assessments at the catchment, regional, ecological district and national scales were considered to inform the overall assessment where applicable.

[2] Hydrophytes are plant species capable of growing in soils often or constantly saturated with water during the growing season. New Zealand plants are categorised in Clarkson et al., (2021). New Zealand wetland plant list 2021. Manaaki Whenua - Landcare Research contract report LC3975 for Hawke's Bay Regional Council.
[3] Hydric soils are soils that have been wet for a sufficient time that enables the development of gleyed or anaerobic soil conditions (Fraser et al., 2018),
[4] The tool outlines primary and secondary (direct and indirect) hydrological features for assessing wetlands. The hydrology tool is intended to provide supporting evidence for the vegetation and soil tools.
[5] This tool was developed to identify wetlands in areas of pasture used for grazing that do not meet the definition of ‘natural inland wetland’ under NPS-FM.

4. RELEVANT LEGISLATION

Specific planning assessments are found in the Assessment of Environmental Effects undertaken by Barkers & Associates (date TBC[6]). The following legislative documents and policies guide this ecological assessment:

4.1 THE WILDLIFE ACT (1953)

The Wildlife Act plays a crucial role in ecological effects assessments by providing legal protection to native wildlife. When conducting evaluations under this framework, consideration must entail potential impacts on protected species and habitats. The framework requires consideration of activities that may disturb, injure, or kill native animals. This assessment has considered Wildlife Act matters related to the current proposal.

4.2 REGIONAL POLICY STATEMENT (2016)

The biodiversity aspects of the Northland Regional Policy Statement (RPS) focus on protecting and enhancing the region's natural habitats and ecosystems, particularly those identified as Significant Natural Areas (SNAs). The RPS emphasises safeguarding indigenous species, especially threatened or at-risk species, by regulating activities that could degrade these areas or affect these species. The RPS also prioritises the protection of wetlands and freshwater ecosystems, recognising their critical role in supporting biodiversity, maintaining water quality, and promoting the control of invasive species. The RPS encourages land use practices that enhance and restore native biodiversity, integrating these efforts with the region's broader environmental and cultural values. This assessment has considered regional policy matters related to the current proposal.

4.3 NATIONAL POLICY STATEMENT FOR FRESHWATER MANAGEMENT (2023)

The National Policy Statement for Freshwater Management (NPS-FM) aims to ensure that freshwater resources are managed sustainably to support ecosystem health, human health, and Māori values. It sets out objectives and policies for maintaining and improving water quality, controlling the allocation and use of water, and protecting wetlands and streams/rivers. Local authorities must incorporate these directives into their regional and district plans, ensuring comprehensive and consistent management of freshwater resources nationwide. This document adheres to the National Environmental Standards for Freshwater (NES-F), which outlines the reasons for consent and activity statuses of various activities related to freshwater. This assessment has considered NPS-FM matters related to the current proposal.

4.4 NATIONAL POLICY STATEMENT FOR INDIGENOUS BIODIVERSITY (2023)

The National Policy Statement for Indigenous Biodiversity (NPS-IB) aims to halt the decline of indigenous biodiversity by identifying and protecting significant natural areas, managing adverse effects of development, and promoting ecosystem restoration. It emphasises collaboration with Māori and other stakeholders and integrating traditional knowledge. Local authorities must incorporate these guidelines into their planning documents, ensuring consistent biodiversity conservation efforts nationwide. This assessment has considered NPS-IB matters related to the current proposal.

4.4.1 Adherence to the Effects Management Hierarchy

This project has demonstrated adherence to the hierarchy mandated in both the NPS-IB and the NPS-FW. Details are provided in Section 7.0.

[6] This had not been finalised at the time of this report issue.

4.4.2 New Zealand Coastal Policy Statement (2010)

The New Zealand National Coastal Policy Statement (NZCPS) provides a national framework for managing the coastal environment, focusing on sustainable development and preservation. Key areas include protecting biodiversity, water quality, and natural character while effectively managing coastal hazards like erosion and sea-level rise. It safeguards public access to the coast as well as Māori cultural values and customary rights. The NZCPS aims to balance economic, social, and environmental considerations to support long-term resilience and use.

4.5 CONSIDERATION OF NATIONAL AND REGIONAL POLICY: ECOLOGY CONCLUSIONS

The proposal includes regionally significant areas, and these have been carefully assessed for effects and management in the following report. The project aims to protect indigenous biodiversity in alignment with the NES-FW, NES-IB, and Regional Policy Statement and has adhered to the effects management hierarchy. The loss of wetlands is avoided through careful management, and there are positive outcomes in the form of wetland monitoring, pest plant management and edge planting that will increase the overall biodiversity across the footprint. The project is not reclaiming the coastal area and is expected to provide public access to the coastal environs in alignment with the coastal policy statement. Overall, the project is expected to be consistent with the ecological matters of the relevant legislation if the management detailed in this report is followed.

5. ECOLOGICAL VALUES

Ecological values are considered at a site and catchment scale, considering any factors relevant at ecological district, regional and national scales. Assessment criteria include the ecological values 'representativeness', 'rarity/distinctiveness', 'diversity and pattern', and 'ecological context' (Roper-Lindsay et al., 2018). The full details of the assessment against the criteria of 'representativeness', 'rarity/distinctiveness', 'diversity and pattern', and 'ecological context' (Roper-Lindsay et al., 2018) for each ecological feature are provided in Appendix D.

5.1 EXOTIC AND REGENERATING SCRUB

The majority of the vegetation across the project footprint encompasses wetland vegetation, which is described in section 5.10 below. Aside from the various wetland ecosystems, terrestrial vegetation dominated by exotic species and scattered regenerating indigenous species was the dominant habitat type. Across the footprint, this vegetation was of low to moderate ecological quality, with edge impacts prevalent in the form of pest and exotic plants, areas of exposed soil and substrate, low stature, newly established regenerating indigenous species and patches of indigenous shrubland (Figures 3 -6). Along the footprint, woody weeds such as gorse, cotoneaster (*Cotoneaster glaucophyllus*), brush wattle (*Paraserianthes lophantha*), herbaceous weeds (e.g. ginger - Hedychium spp.), pampas (*Cortaderia selloana*) and climbing weeds like German ivy (*Delairea odorata*), moth plant (*Araujia sericifera*) and eleagnus (*Eleagnus x reflexa*) were commonly encountered.

Figure 3: Edge and exotic vegetation within the project footprint.

Figure 4: Typical weedy edges of embankments throughout the footprint.

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Figure 5: Scrappy regenerating native vegetation along the project footprint.

Figure 6: Example of bare embankment areas with limited regeneration.

Overall, the ecological value of the exotic-dominated/regenerating ecosystem across the project footprint was considered **low,** given the high level of pest plants and edge effects and the very low level of natural pattern and diversity. Vegetation as a habitat for fauna is assessed under section 3.1.2.

5.2 KĀNUKA FOREST/SHRUBLAND

Regenerating forest dominated by kānuka, with common Sydney golden wattle and occasional emergent pine (*Pinus radiata*), was the second most common terrestrial ecosystem along the project footprint (Figure 7). The canopy was approximately 8 – 10m tall with typical diameters at breast height of c.15cm. Other native shrubs, seedlings and saplings were common in the understorey and mānuka and tōwai (*Pterophylla sylvicola*) were occasional in the canopy. This secondary vegetation was reasonably advanced in its succession with common epiphytes such as bush lawyer (*Rubus cissoides*) and epiphytic ferns. Particularly on the embankment nearest the project footprint, weeds such as gorse, prickly hakea (*Hakea sericea*), lillypilly (*Acmena smithii),* and Taiwan cherry (*Prunus campanulata*) were commonly encountered (Figure 8).

Species present in the subcanopy, and shrub layers were those typical of northern coastal forest and included porokaiwhiri (pigeonwood, *Hedycarya arborea*), pūriri (*Vitex lucens*), kohekohe (*Didymocheton spectabilis*), pōhutukawa (*Metrosideros excelsa*), tōtara (*Podocarpus totara*), and tītoki (*Alectryon excelsum*). Tōtara was abundant in all tiers. Common shrubs included kawakawa (*Piper excelsum*), tutu (*Coriaria arboreus*), hangehange (*Geniostoma ligustrifolium*), māpou (*Myrsine australis*), karo (*Pittosporum crassifolius*), karamu (*Coprosma robusta*), māhoe (*Melicytus ramiflorus*), shrubby haloragis (*Haloragis erecta*) and tree ferns such as silver fern (*Alsophila tricolor*) and mamaku (S. *medullaris*) (Figure 9). These species were spread throughout the route where suitable habitats occurred. At open, or more recently disturbed, sites especially across the top of the hill above the tunnel, kūmarahou (*Pomaderris kumeraho*), mānuka, blueberry (*Dianella nigra*) and creeping club moss (*Lycopodium scariosum*) were common (Figure 10).

This vegetation provides habitat for common forest birds such as kūkupa (New Zealand pigeon, *Hemiphaga novaeseelandiae*), tūī (*Prosthemadera novaeseelandiae*), grey warbler (*Gerygone igata*) and the like, as well as North Island brown kiwi (*Apteryx mantelli*). Nearest to Opua there is also a remnant population of North Island weka (*Gallirallus australis greyii*). Overall, the ecological value of the kānuka scrub terrestrial ecosystem was considered **moderate,** given the high level of pest plants and

edge effects, with a very low level of natural pattern but a moderate level of diversity. Vegetation as a habitat for fauna is assessed under section 5.4.

Figure 7: Typical regenerating kānuka forest within the footprint.

Figure 8: Example of scrubby exotic-dominated areas with scattered kānuka.

Figure 9: Example of subcanopy regenerating native vegetation under a kānuka canopy.

Figure 10: Species composition of the clay areas subject to disturbance.

5.3 THREATENED AND AT-RISK PLANT SPECIES

No threatened plant species were recorded in the project footprint, although specific surveys for these were outside the scope of this report. Previously threatened species included kānuka (*Kunzea robusta*), mānuka (*Leptospermum scoparium*), pōhutukawa (*Metrosideros excelsa*) and various rātā species (*Metrosideros sp.*) (see Appendix C for a complete plant list). These species were all considered threatened due to the presence of myrtle rust (*Austropuccinia psidii*) in New Zealand. Myrtle rust is a fungal disease originating from South America that can cause severe defoliation, dieback, and death of affected plants. Due to uncertainty on the effects of this rust, a conservative approach had been undertaken when assigning a threat level to these species, and in 2018, native Myrtaceae species were elevated to at least 'Threatened' status (de Lange et al. 2018). However, in 2024, these species were moved back to Not Threatened (de Lange et al., 2023). Overall, the threatened vegetation's ecological value (botanically) was considered **low**. Vegetation as a habitat for fauna is assessed under section 3.1.2.

5.4 BIRDS

Ecosystems across the project footprint provide resources for various indigenous and exotic bird species. Desktop investigations indicated a range of threatened cryptic wetland species utilise the associated wetland areas, and a range of threatened (Robertson et al., 2021) marine and forest species also have records in the vicinity. Images 3-11 above also illustrate typical habitats for birds across the footprint, and Figures 12-13 illustrate types of wetland bird habitats present.

Notably, the mangrove forest on site is an important habitat for mioweka (banded rail, *Gallirallus phillipensis*, Native—Declining), for which Northland is the national stronghold. In 2017, mioweka presence was registered on the eBird database along the cycle trail at both Opua and Taumārere. The latest Mioweka observations were recorded in 2023 in Opua, confirming continued local presence.

Notable threat statuses are the records of Australasian bittern (Maluku-hūrepo, *Botaurus poiciloptilus*, Nationally Critical) along the footprint and in the wider environments. Fernbird (mātātā, *Poodytes punctatus*) is also present, considered At Risk/Declining, and has been seen and heard over the project footprint and surroundings.

Figure 11: Saltmarsh habitat suitable for Mātātā, fernbird.

Figure 12: Raupō and forest habitats for cryptic species.

The areas in and around the project footprint are considered significant for highly mobile and dispersed marine seabirds and mammals and for birds in general (Northland Regional Plan, 2024) (NRP). The NRC has provided this mapping and indicates areas of nationally or locally important breeding and/or feeding values for threatened bird species, specifically the Australasian bittern, White heron and New Zealand fairy tern. Overall, applying habitat and resource availability values to the presence of threatened and at-risk species immediately adjacent to the works footprint, the ecological value of birds within the project footprint is considered **Very High.**

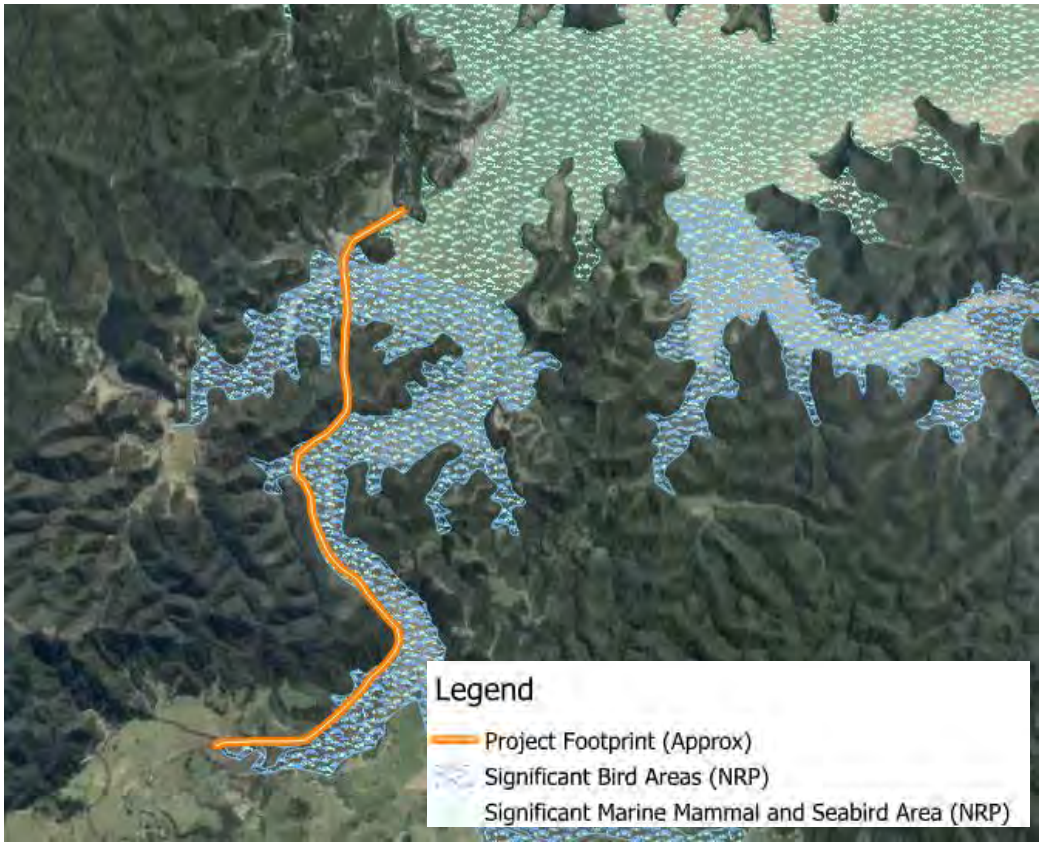

Figure 13: Significant bird overlays from the NRP (2024).

Bird database records and those birds seen during various site assessments are indicated in Table 1.

Table 1: Native Bird species observed or recorded across the project footprint.

Scientific Name	Name/s	Threat Classification (Robertson et al., 2021)	Observed during fieldwork	Habitat on Site
Australasian bittern, matuku-hūrepo	*Botaurus poiciloptilus*	Native - Threatened - Nationally Critical	No*[1]	Wetlands
Caspian tern, Taranui	*Hydroprogne caspia*	Native - Threatened - Nationally Vulnerable	Yes	Marine environs, coastal edges
Grey duck, Pārera	*Anas superciliosa*	Native - Threatened -	No	Wetlands and streams (low likelihood)

Scientific Name	Name/s	Threat Classification (Robertson et al., 2021)	Observed during fieldwork	Habitat on Site
		Nationally Vulnerable		
New Zealand dotterel, Tūturiwhatu	*Charadrius obscurus*	Native - Threatened - Nationally Increasing	No	Marine environs, coastal edges
Banded rail, mioweka	*Gallirallus phillipensis*	Native - At Risk - Declining	No	Wetlands, mangrove forest, coastal margin
Bar-tailed godwit, kūaka	*Limosa lapponica*	Native - At Risk - Declining	No	Marine environs, coastal edges
fernbird, mātātā	*Bowdleria punctata vealeae*	Native - At Risk - Declining	Yes	Wetlands and dense shrubland
little penguin, kororā	*Eudyptula minor*	Native - At Risk - Declining	No	Coastal areas, margins, rocky areas
New Zealand pipit, pīhoihoi	*Anthus novaeseelandiae*	Native - At Risk - Declining	No	Open areas, and grassland
Spotless crake, pūweto	*Porzana tabuensis*	Native - At Risk - Declining	No	Wetland, coastal margin
tarāpunga, red-billed gull	*Larus novaehollandiae scopulinus*	Native - At Risk - Declining	No	Marine environs, coastal edges
White-fronted Tern, tara	*Sterna striata*	Native - At Risk - Declining	Yes	Marine environs, coastal edges
black shag, kawau	*Phalacrocorax carbo*	Native - At Risk - Naturally Uncommon	No	Marine environs, coastal edges, rivers, streams
Little black shag, Kāwau tui	*Phalacrocorax sulcirostris*	Native - At-Risk - Naturally Uncommon	No	Marine environs, coastal edges, rivers, streams
long-tailed cuckoo, koekoeā,	*Eudynamys taitensis*	Native - At-Risk - Naturally Uncommon	No	Forest, shrubland
Variable oystercatcher	*Haematopus unicolor*	Native - At Risk - Recovering	Yes	Shoreline, coastal margin
Australasian Gannet, Tākapu	*Morus serrator*	Native - Not Threatened	No	Marine environs, coastal edges

Scientific Name	Name/s	Threat Classification (Robertson et al., 2021)	Observed during fieldwork	Habitat on Site
grey warbler, riroriro	*Gerygone igata*	Native - Not Threatened	Yes	Open areas, forest and shrubland
kererū, kūkupa	*Hemiphaga novaeseelandiae*	Native - Not Threatened	No	Open areas, forest
kōtare, kingfisher	*Todiramphus sanctus*	Native - Not Threatened	Yes	Open areas, forest, shrubland, shoreline, coastal margin
little shag, kawau, little pied shag	*Phalacrocorax melanoleucos*	Native - Not Threatened	Yes	Marine environs, coastal edges
morepork, ruru	*Ninox novaeseelandiae*	Native - Not Threatened	No	Open areas, forest, shrubland, shoreline, coastal margin
North Island weka	*Gallirallus australis greyi*	Native - Not Threatened	No	Forest, shrubland, wetlands
Northland brown kiwi, Kiwi-nui	*Apteryx mantelli*	Native - Not Threatened	No	Open areas, forest and shrublands
paradise shelduck, pūtangitangi	*Tadorna variegata*	Native - Not Threatened	Yes	Wetlands and marine environs
pīwakawaka, fantail	*Rhipidura fuliginosa*	Native - Not Threatened	Yes	Open areas, forest and shrubland
pūkeko	*Porphyrio melanotus*	Native - Not Threatened	Yes	Open areas s horeline, coastal margin, wetlands
shining cuckoo, pīpīwharauroa	*Chrysococcyx lucidus*	Native - Not Threatened	No	Forest, shrubland
Southern black-backed gull, karoro	*Larus dominicanus*	Native - Not Threatened	Yes	Marine environs, coastal edges
spur-winged plover	*Vanellus miles*	Native - Not Threatened	Yes	Open areas and shrubland
swamp harrier, harrier hawk, kāhu	*Circus approximans*	Native - Not Threatened	Yes	Open areas, forest and scrub
tauhou, waxeye, silvereye	*Zosterops lateralis*	Native - Not Threatened	Yes	Open areas, forest and shrubland
tomtit, ngirungiru	*Petroica macrocephala toit oi*	Native - Not Threatened	No	Open areas, forest and shrubland

Scientific Name	Name/s	Threat Classification (Robertson et al., 2021)	Observed during fieldwork	Habitat on Site
tūī	*Prosthemadera novaeseelandiae*	Native - Not Threatened	Yes	Open areas, forest and shrubland
Welcome swallow	*Hirundo neoxena*	Native - Not Threatened	Yes	Open areas, forest and shrubland
White faced heron, matuku	*Egretta novaehollandiae*	Native - Not Threatened	Yes	Wetlands and marine environs

5.5 BATS

Within the project footprint, there is minimal large vegetation suitable for bat roost trees (prescribed as any tree with a diameter at breast height (DBH) >15cm and at least one identified roosting feature (e.g., loose bark, cracks, hollows, knots, epiphytes) should be considered a potential bat roost tree under industry-standard criteria) (Department of Conservation, 2021). Potential roosting habitat primarily comprises exotic *Pinus* sp. trees in senescence and located outside the footprint.

The wider marine environs connect several freshwater and saltwater transitional ecotones, creating linear pathways for bats to forage and traverse. The closest bat record in the Department of Conservation database (2022 version) is the Long-Tailed Bat (*Chalinolobus tuberculatus* – Threatened, Nationally Critical) (O'Donnell et al., 2017), located 4km away in the Waikino Forest. A desktop search also indicated that long-tailed bats had been recorded on the western edges of Opua Forest along Oromahoe Road in 2019 by the Bay Bush Action community conservation group, c.5km from the project footprint (New Zealand Herald and NZ Bat Conservation Group, 2019). Overall, applying habitat and resource availability values, the ecological value of bats within the project footprint is considered **low, with moderate to high** values in the wider area depending on the habitat available, such as linear feeding pathways and mature trees for roosting.

5.6 LIZARDS

Suitable habitats for a range of lizard species were present along the cycleway within the project footprint in clumping vegetation, rock crevices, indigenous scrub vegetation, and inorganic and woody debris piles (Figures 15,16). Habitat present was appropriate for the copper skink (*Oligosoma aeneum*- At Risk - Declining), shore skink (*Oligosoma smithi*- At Risk - Declining), the forest gecko (*Woodworthia maculata* – Not Threatened), green geckos (Naultinus spp., Northland green gecko (kawariki) (*Naultinus grayii* - At Risk - Declining), Elegant gecko (*Naultinus elegans* - At Risk - Declining) and the Pacific gecko (*Dactylocnemis pacificus* - At Risk - Declining) (Hitchmough et al., 2021).

The closest lizard record is of an unknown *Naultinus* sp. (0.7km to the (direction), within the vegetated areas adjoining McLure Street, Opua). Given its location, it could be either a Northland Green Gecko (kawariki) or an Elegant Gecko. Other records include shore skink and Pacific gecko, and a shore skink was seen during the site walkover in July 2024. Overall, using records and habitat as a proxy for surveys, the ecological value of the project site for indigenous lizards is considered **high**. A summary of lizard species that could be using the cycleway habitats is provided in Table 2 below.

Figure 14: Woody debris piles across the footprint, providing habitat for skinks.

Figure 15: Arboreal lizard habitat within the project footprint.

Table 2: Lizard species that could be present within the project footprint.

Common Name/s	Scientific Name	Threat Classification (Hitchmough et al., 2021)	Seen on site	Habitat Present
Northland green gecko (kawariki)	*Naultinus grayii*	At Risk - Declining	No	Arboreal, occasionally terrestrial. Shrubs and regenerating vegetation, swamplands.
elegant gecko	*Naultinus elegans*	At Risk - Declining	No	Arboreal, occasionally terrestrial. Shrubs and regenerating vegetation.
copper skink	*Oligosoma aeneum*	At Risk - Declining	No	Terrestrial. Inorganic and organic debris, clumping vegetation, rank grass.

Common Name/s	Scientific Name	Threat Classification (Hitchmough et al., 2021)	Seen on site	Habitat Present
shore Skink	*Oligosoma smithi*	At Risk - Declining	Yes	Coastal scrub vegetation and rocky/woody debris.
Pacific gecko	*Dactylocnemis pacificus*	At Risk - Declining.	No	Arboreal and terrestrial. Creviced rock and clay banks, scrubland, swampland, rock outcrops, coastal rock and scrub, under loose bark or dense leaf litter, in epiphytes.
forest gecko (moko-piri-rakau)	*Woodworthia maculata*	Not Threatened	No	Arboreal (in non-alpine habitats). Scrub and shrubland, regenerating Indigenous Forest.

5.7 INVERTEBRATES

While specific invertebrate surveys were not undertaken, habitat for various invertebrates was widely available in different ecosystems, from forest, shrubland, and wetlands to the adjacent estuarine environment. Red and blue damselflies (*Austrolestes* spp.) were observed during the site walkovers, along with North Island Coastal Copper Butterfly (*Lycaena salustius*). Records indicate that kauri snails (*Paryphanta busbyi*) are present in wider forest tracts in the ecological district but are locally extinct from Opua Forest, which joins into the project area (Fenwick, 2021). Kauri snails are one of the named species within the Wildlife Act 1953 that are fully protected, along with *Placostylus hongii* - Flax snail/pupurangi. There was some habitat in the form of broadleaf canopies and leaf litter/dense groundcover in the broader area of the project footprint for pupurangi. They are present on the east coast of Northland between Whangaroa and Whangarei Head (Buckley et al., 2011), although if present, the densities would likely be very low because of the presence of predators which are known to limit their range and numbers (DOC, 2024). Overall, given the range of habitats and resources for invertebrates, the low potential for a threatened and protected invertebrate species to be present and the ecological value of invertebrates is considered **moderate**.

5.8 FRESHWATER

A comprehensive freshwater assessment was outside scope for this report. From the desktop assessment, it was determined that the length of the project footprint crosses a number of unnamed drains, streams and rivers. Unnamed drains have not been included in this desktop assessment. The first waterway to traverse the project footprint is the Waiomio Stream. The Waiomio Stream is present at the point where cyclists using the cycleway exit the State Highway at the eastern edge of the Kawakawa business area, prior to the bowls club. The Waimio Stream has few records in the New Zealand Freshwater Fish Database (NZFFD), with the common bully (*Gobiomorphus cotidianus*) and gambusia (*Gambusia affinis*), a pest fish species recorded (Stoffels 2022).

The project footprint then crosses the Tirohanga Stream adjacent to its adjoining confluence with the Kawakawa River. The Tirohanga Stream is a major tributary of the Kawakawa River and is the main water supply source for the Kawakawa area. It is monitored for swimming values and health by Land, Air, Water Aotearoa (LAWA) (LAWA, 2024). NZFFD records for this stream include īnanga (*Galaxias maculatus*), common smelt (*Retropinna retropinna*), unidentified galaxiid, longfin eel (*Anguilla dieffenbachii*), shortfin eel (*Anguilla australis*) and the common bully (Stoffels 2022). Fish & Game New

Zealand also record this stream as a fishing site for rainbow and brown trout (Fish & Game New Zealand, 2024).

The Kawakawa River then flows beneath the railway bridge at Taumārere (Long Bridge). The river here is tidal, flowing towards the east. Kawakawa River is monitored at Tapu Point for water quality (Northland Regional Council, 2024). A Ministry of Fisheries/NIWA 2011 survey determined that eel stocks in the Kawakawa River are lower than expected (Williams, 2011).

The project footprint follows the path of the Kawakawa River. There are no records in the NZFFD for the Kawakawa River specifically, but there are records for the Otiria Stream. These records include both eel species, kōura (*Paranephrops planifrons*), gambusia, Cran's bully (*Gobiomorphus basalis*), redfin bully (*Gobiomorphus huttoni*), torrentfish (*Cheimarrichthys fosteri*), īnanga and banded kōkopu (*Galaxias fasciatus*) (Stoffels 2022).

The project footprint then utilises the Whangae Bridge to cross the Whangae River at its entry point into the Waikare Inlet. It is a short river, ending in a saltmarsh, draining tributaries originating in Lemon's Hill and the South-Eastern end of the Opua Forest. Oromahoe Road delineates the outer perimeter of these tributaries (NZ Topo Map, 2024). There are no records for the Whangae River in the NZFFD (Stoffels 2022).

A summary of fauna expected to utilise the streams that intersect the project footprint is shown in Table 3 below. Overall, the freshwater environments adjacent to the project footprint contain a moderate diversity of species, including threatened fish, contain a diverse range of habitat types and are considered to be of **very high** ecological value when considering this at a catchment scale.

Table 3: Freshwater records for the project footprint and surrounds.

Common Name/s	Scientific Name	Threat Classification (Dunn et al., 2018)
Longfin eel/tuna	*Anguilla dieffenbachi*	At Risk - Declining
Torrentfish/mokomoko	*Cheimarrichthys fosteri*	At Risk -Declining
Freshwater Crayfish/kōura/kēwai	*Paranephrops planifrons*	Data Deficient
īnanga	*Galaxias maculatas*	Declining
Common bully/toitoi	*Gobiomorphus cotidianus*	Not Threatened
Crans' bully/tītarakura	*Gobiomorphus basalis*	Not Threatened
Redfin bully/ kōpūtea pakikau	*Gobiomorphus huttoni*	Not Threatened
Common smelt/paraki	*Retropinna retropinna*	Not Threatened
Banded kōkopu	*Galaxias fasciatus*	Not Threatened
Shortfin eel	*Anguilla australis*	Not Threatened
Rainbow trout/tarauta	*Oncorhyncus mykiss*	Introduced
Brown Trout	*Oncorhyncus trutta*	Introduced
Mosquito Fish	*Gambusia affinis*	Introduced/pest species

5.9 MARINE

A specific marine survey was not within the scope of this assessment. Therefore, the following is a general description and consideration of this environment from a desktop investigation only. Saline-influenced wetlands are discussed separately within the wetland sections.

The wider marine environs include the Kawakawa River upstream of the Opua Marina and ferry complex, where the Waikare and Kawakawa Rivers merge. Active oyster farms are operating in this area (outside of the project footprint), and regular water quality monitoring for bacteriological water quality in the area is undertaken. As discussed in section 4.4 below, the wider area has substantial mangrove stands and muddy high sedimental substrates and has been classified as a 'drowned valley" estuarine system (Department of Conservation, 2007). The mangroves and saltmarsh within this environment have been categorised as biogenic by the Department of Conservation (2011) as a component of the Marine Protected Areas (MPA) Policy that seeks to protect marine biodiversity by establishing a network of MPAs categorised by their protection level recommendations. Biogenic systems are fragile and provide critical ecosystem services such as stabilising sediments, filtering water, and recycling nutrients. They are also important food sources and culturally significant. Without these systems, rapid ecosystem degradation would occur (National Institute of Water & Atmospheric Research Ltd, 2019).

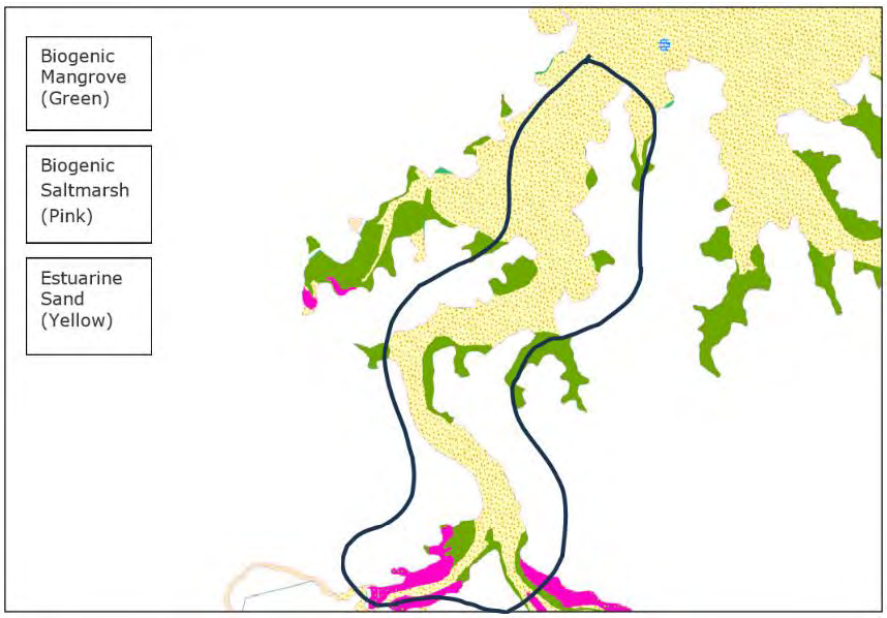

Figure 16: DOC classified marine ecosystems at the project area (indicated by black line).

Given the presence and abundance of several maritime birds (including gulls, shags, herons, and terns) in the area, it is expected that an estuarine fish and invertebrate fauna supports those species. The marine environs within the project footprint were generally sheltered upper estuary mangroves, seagrass beds and marshland, with a high level of sediment and mud and no intertidal rocky substrate. Crabholes were abundant. The area also provides habitat for the estuarine fish species estuarine triplefin or cockabully (*Forsterygion nigripenne*), with the closest record being in the estuarine environment of Wairoa Bay c. 14 kms north of the project footprint. (iNaturalist observation, 2024). Mangrove forests and their ecological values are discussed further in section 4.4. Overall, the marine environments surrounding the project footprint (excluding the mangrove forests) are considered to have **very high** ecological value when considered at a catchment scale (incorporating estuarine, marine, harbour and bays).

5.9.1 Coastal Marine Area (CMA) and Coastal Wetlands

The coastal marine area and mean high water springs (MHWS) are indicated on the resource consent maps (NRC Proposed Regional Plan, 2023 online maps) and were ground-truthed by Hoskin Civil. The wetlands discussed in section 3.4 below are saline-influenced wetlands; however, they are not considered to be within the CMA and are above MHWS. Therefore, they are considered natural inland wetlands under the NES-F and not coastal wetlands, legislatively. It is noted that the entire project is expected to be above MWHS and out of the CMA.

5.10 WETLANDS

The following includes a description of the wetland environs at the project site, briefly mentioning fauna species that would utilise each type and the significance of each wetland type in the ecological district, region and nationally. When assigning value, it is noted that the ecological value for fauna has been addressed in section 3.1.2 above.

5.10.1 Mangrove Forest

Mangroves grow in shallow, low-energy marine environments such as the edges of harbours and estuaries where silt accumulates and provides a substrate for them to grow. Mangroves were the most common wetland type across the project footprint and wider environs. Individual trees up to approximately 10m tall with diameters at breast height of 10 – 30cm formed a canopy without a distinct subcanopy and with an open ground layer comprising sediment and emergent pneumatophores (Figure 17 and 10). Where the project footprint passes mangrove forest, the vegetation on the embankment typically comprises common native and exotic woody species, such as tōtara and gorse, rather than mangroves. Mangroves as habitats for species are of high ecological value, with species such as mioweka (banded rail) present within the project footprint.

Figure 17: Mangrove Forest near the proposed Cycle Trail route.

Figure 18: Typical ground tier of mangrove across the route, showing silt and pneumatophores.

Mangrove systems have an international threat status in New Zealand as "Least Concern" (Bunting et al., 2022) (Figure 19), with a loss of c. 147,359km^2 between 1996 – 2020. In New Zealand, there are competing interests and desires for mangrove management, with the discussion of their apparent spread due to increased anthropogenic sedimentation and the wish for them to be controlled and removed (De Luca, 2015; Morrisey et al. 2007). Overall, the mangrove systems within the project footprint range from young to mature, have good cover, and function as essential ecosystem drivers. It is a resilient system and is not considered rare, increasing in areas. Therefore, the ecological value of these systems is considered to be **moderate**.

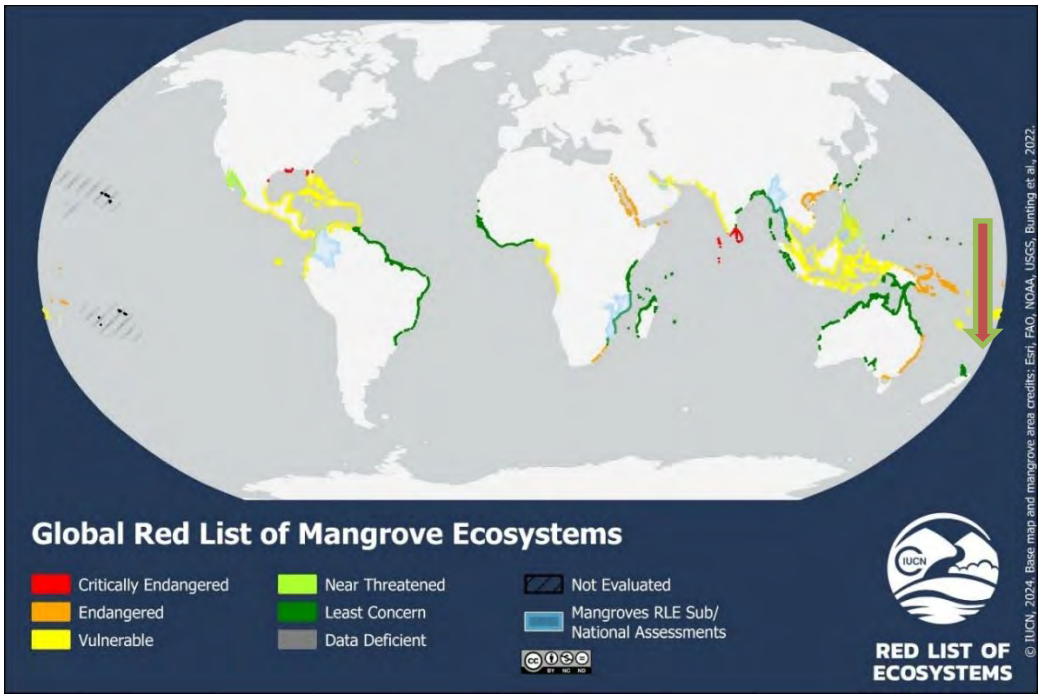

Figure 19: Threat status of New Zealand's mangrove systems internationally[7].

[7] Taken from https://iucn.org/resources/conservation-tool/iucn-red-list-ecosystems/red-list-mangrove-ecosystems

5.10.2 Oioi Rushland / Saltmarsh

Oioi was also commonly encountered along the project footprint and surroundings, and it formed dominant vegetation cover at several locations, including along the edge of the Kawakawa River near its confluence with the Karetu River and south of the Whangae River. This vegetation type is colloquially known as saltmarsh. Like the mangrove forests, oioi rushland across the footprint was almost exclusively monospecific (comprising only one species) (Figure 20). Other species occasionally present, particularly near the margins, were flax (*Phormium tenax*) and mingimingi (*C. propinqua* and *Leucopogon fasciculatus*). Again, where the former railway bisected oioi rushland, the vegetation growing on both sides of the embankment was typically different and included a higher proportion of weeds and terrestrial vegetation (Figure 21).

Species present and utilising the resources within saltmarsh at the project footprint included mātātā (fernbird). The saltmarsh across the project site ranged from excellent and intact to tiny pockets of saltmarsh along the cycleway's edges experiencing extensive edge effects and stunted growth. Saltmarsh does not have a separate regional or national threat status. However, it is considered a contributor as long-term sinks for stormwater contaminants, supports biodiversity, and saltmarsh is mentioned explicitly in regional significance criteria as an ecosystem of importance (Northland Regional Council, 2016). Overall, given the range of sizes and health of the saltmarsh and its significance under the regional criteria, the saltmarsh over the project site is considered to be of **high** ecological value.

Figure 20: Oioi saltmarsh adjacent to the project footprint.

Figure 21: An example of the embankment's woody weed composition adjacent to saltmarsh.

5.10.3 Mingimingi Swamp Shrubland

Near Long Bridge, and occasionally elsewhere along the project footprint on the landward side of the former railway line, were wetland areas dominated by mingimingi (*Coprosma propinqua*) with various rush species (raupō, oioi, kuta) and flax (Figure 22, Figure 23). This wetland vegetation provides habitat for at risk and threatened species such as mātātā (fernbird), matuku-hūrepo (bittern), as well as common species including kotāre (kingfisher). Species from adjoining habitats such as kiwi also use wetland habitats. The Mingimingi Swamp Shrubland areas across the project footprint appeared to be in good health, with ample vegetative cover at the edges protecting the interiors. However, as with the other wetland areas, the edges were often subject to weed and pest plant inclusion, notably pampas at these points. Overall, given the general health and composition representative of this ecosystem type, Mingimingi Swamp Shrubland's ecological value is considered **high**.

Figure 22: Mingimingi shrubland (right of photograph) near Long Bridge.

Figure 23: Mingimingi shrubland Interior.

5.10.4 Raupō – kuta rushlands

Scattered across the project footprint were small wetland areas dominated by raupō and occasional kuta (Figure 24) and other areas where monospecific stands of raupō dominated (Figure 25). Some of these areas may have been induced by the construction of the railway, which would have restricted the ingress of salt water and thereby reduced the marine influences on vegetation at these poorly drained sites. This vegetation provides habitat for wetland birds such as bittern, mātātā (fernbird), crakes (*Porzana tabuensis* and *P. pusilla*) and mioweka (banded rail).

Freshwater raupō dominant stands were the most frequent freshwater wetland type in the Kerikeri Ecological District (Conning and Miller, 1999), often grading into coastal wetlands where salt influences are present. The larger intact areas of raupō throughout the route were in good health; however, the smaller areas and sections immediately adjacent to the current railway were subject to edge effects, with drying and stunted specimens and pest plants prevalent. Overall, given the

general health and composition representative of this ecosystem type, habitat for threatened birds, but its common and modified extents, the raupō – kuta rushland ecological value is considered **High**.

Figure 24: Raupō – kuta rushland near Lone Cow.

Figure 25: Larger Raupō dominated area in good health.

5.11 SUMMARY OF ECOLOGICAL VALUES

The following table (Table 4) summarises each ecological feature and its value assigned for this impact assessment. The full details of the assessment against the criteria of 'representativeness', 'rarity/distinctiveness', 'diversity and pattern', and 'ecological context' (Roper-Lindsay et al., 2018) are provided in Appendix D.

Table 4: Summary of assigned ecological values across the project footprint.

Ecological Feature	Ecological Value[8]
Exotic Scrub	Low
Kānuka Shrubland	Moderate
Threatened Plants	High
Birds	High
Bats	Low (High in surrounding land)
Lizards	High
Invertebrates	High
Freshwater (Catchment scale)	Very High
Marine Environs (Catchment scale)	Very High
Mangrove Wetlands	Moderate
Oioi Wetlands	High
Mingimingi Wetlands	High
Raupō Kuta Wetlands	High

[8] Details of this assessment are provided in Appendix D.

6. ASSESSMENT OF ECOLOGICAL EFFECTS

6.1 OVERVIEW

The nature and level of actual or potential effects of activities for which consent is sought are addressed below. Positive, adverse, cumulative and residual effects are considered, and the assessment informs the nature and scale of impact management required.

6.1.1 Adherence to the Effects Management Hierarchy

The cycleway upgrade has been in project discussion since 2020, with NZEM working with the project engineers to avoid and minimise ecological effects. This approach has included:

The project team has agreed with Kiwirail to reduce the required c.5m setback from the railway centreline in accordance with the Kiwirail - Kawakawa to Ōpua Cycle Trail Client & Functional Requirements document to a minimum of 2.75m setback. Altering the design to reduce this setback has resulted in the avoidance of all of the Mingimingi wetland areas and ensured the route is entirely out of the coastal Marine Area (CMA).

Minimisation of effects has included reducing the extent of wetland encroachment where possible and designing boardwalks over wetland areas that cannot be avoided. Specifically, the reduction of width and change in location has reduced the extent of encroachment on larger, intact areas of mangrove and salt marsh wetlands, as indicated below in Figure 26. In addition to these key areas, the refinement of the treatments and their locations has resulted in all areas of mingimingi, and Raupō-kuta wetland being maintained hydrologically, with just wetland vegetation removal in some areas for the boardwalk of mangroves. A small portion of the edge of the saltmarsh is still required to be removed, where the pathway couldn't be minimised or placed out of the effects zone.

This minimisation has resulted in reduced fragmentation of onsite ecosystems by focusing on areas that are already fragmented or are at the edge of the system rather than through the middle where possible. In areas of mangroves, the boardwalk will ensure that the pneumatophores - the breathing roots - and radial root systems are not crushed and assist in maintaining canopy cover. Habitat for fauna has been generally avoided, and areas already affected by edge effects were targeted for locating the route in preference to intact forest or wetland areas, as demonstrated in Figure 26 by the white arrows.

Together, this means that since the project's commencement, the effects on wetland systems across the footprint have been reduced from potentially very high and unmanageable to manageable.

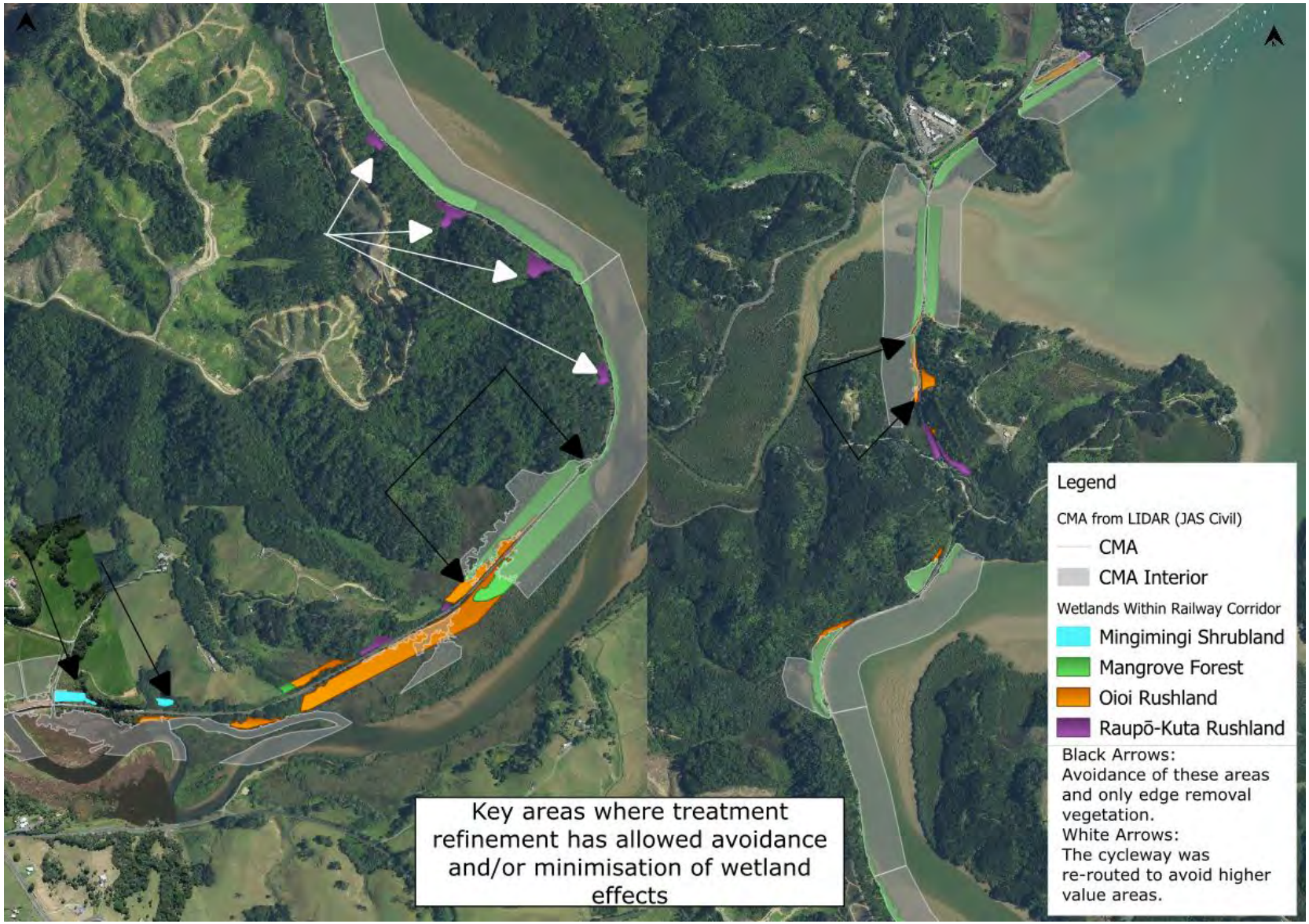

Figure 26: Key areas of refinement undertaken by the project to avoid wetlands and CMA.

6.2 SUMMARY OF ECOLOGICAL EFFECTS PRE- AND POST-MANAGEMENT

The following section outlines the required management of effects on ecological values. It is noted that during the construction phase, treatments are expected to be adjusted as required to be relevant to onsite conditions at the time of construction, **given that the current design is only preliminary**. However, given the uncertainty, the assessment has addressed worst-case effects to ensure the project can occur without adversely affecting the ecological values associated with it. Table 6 below outlines the ecological values and unmanaged levels of effect, then summarises expected management and the resulting final level of effect for the project. This level of detail is then expanded on in the following sections 4.3 (before any management) – 5 (Management) and the resulting level for the project overall.

Table 5: Summary of ecological values and effects on these.

Ecological Feature	Effect	Ecological Value	Magnitude of effect	Level of Effect without Management	Effects Management Measures[9]	Magnitude of Effect After Management as described in Section 5	Level of Effect After Management as described in Section 5
Exotic Forest	Loss of Vegetation (Permanent)	Low	Low	Very Low	None required	No Change	No Change
	Removal of Vegetation (Temporary)	Low	Low	Very Low	None required	No Change	No Change
Kānuka Shrubland	Loss of Ecosystem/Vegetation (Permanent)	Moderate	Moderate	Moderate	Pest plant control over the new edges. Retaining felled indigenous vegetation. Careful placement under ecologist supervision when the track is being cut.	Low	Low

[9] Summarised here and detailed in section7.0 below.

Ecological Feature	Effect	Ecological Value	Magnitude of effect	Level of Effect without Management	Effects Management Measures[9]	Magnitude of Effect After Management as described in Section 5	Level of Effect After Management as described in Section 5
Kanuka Shrubland		Moderate			Planting construction buffers after works, to reinstate the edges.	Low	Low
	Removal of Vegetation (Temporary)		Low	Low	None required	No Change	No Change
	Edge Effects		Low	Low	Planting construction buffers after works, to reinstate the edges.	No Change	No Change
Threatened Plants	Loss of individual plants not documented.	Low	Low	Low	None required	No Change	No Change
Birds	Injury/death to individuals during construction	Very High	Moderate	High	Seasonal Constraints for Nesting Species. Pre-works nesting bird checks by project ecologist. Management of the area if nests are found until the chick/s are fledged.	Negligible	Low
	Disturbance during construction		Low	Moderate	Seasonal Constraints for Nesting Species.	Negligible	Low

Ecological Feature	Effect	Ecological Value	Magnitude of effect	Level of Effect without Management	Effects Management Measures[9]	Magnitude of Effect After Management as described in Section 5	Level of Effect After Management as described in Section 5
Birds Cntd.		Very High			Pre-works nesting bird checks by project ecologist. Management of the area if nests are found until the chick/s are fledged.	Negligible	Low
	Loss of limited amount of habitat and resource		Low	Moderate	Planting will enhance the remaining habitat as required by wetland restoration.	Negligible	Low
Lizards .	Injury/death to individuals during construction	High	High	Very High	Lizard Management Plan (LMP) and Wildlife Act Authority.	Low	Low
	Disturbance during construction		Low	Low	Lizard Management	No Change	No Change
	Loss of habitat and resource		Low	Low	Habitat enhancement is achieved through the retention of woody indigenous vegetation and the creation of habitat stacks.	No Change	No Change
Bats	Injury/death to individuals during construction if present	Low (High in surrounds)	Negligible	Very low/low	A condition of consent to be placed on the project that requires a bat ecologist to assess any trees over 15 cm	No Change	No Change

Ecological Feature	Effect	Ecological Value	Magnitude of effect	Level of Effect without Management	Effects Management Measures[9]	Magnitude of Effect After Management as described in Section 5	Level of Effect After Management as described in Section 5
Bats Cntd					in diameter at peak height for roost potential and apply a bat management plan (and vegetation felling protocols) as required.		
	Loss of habitat and resource		Negligible	Very low/low	None required	No Change	No Change
Invertebrates	Injury/death to individuals during construction	Moderate	Moderate	Moderate – only for poorly mobile species *IF* present (low risk) Low – for all other species	Salvage of snails during construction to avoid injury/death to individuals.	Low	Low
	Loss of habitat and resource	Moderate	Low	Low	Habitat enhancement in the form of leaf litter (native only) piles and woody debris piles from retained indigenous vegetation.	No Change	No Change
Freshwater	Oil Spills	Very High	Low-moderate	Moderate	Develop a comprehensive spill prevention and response plan specifically tailored to construction.	Low	Low

Ecological Feature	Effect	Ecological Value	Magnitude of effect	Level of Effect without Management	Effects Management Measures[9]	Magnitude of Effect After Management as described in Section 5	Level of Effect After Management as described in Section 5
Freshwater	Sedimentation	Very high	Low-Moderate	Moderate	Develop and implement a sediment control plan following best practice erosion and sediment control guidelines. Construction timeframes that consider key spawning seasons.	Low	Low
Marine	Oil Spills	Very High	Low-Moderate	Moderate	Develop a comprehensive spill prevention and response plan tailored explicitly to construction.	Low	Low
	Sedimentation	Very High	Low-Moderate	Moderate	Develop and implement a sediment control plan following best practice erosion and sediment control guidelines. Construction timeframes avoiding winter months.	Low	Low
	Injury/death to marine invertebrates		Low	Low	Construction timing (low tide) in areas of mangrove for the boardwalk.	Low	Low

Ecological Feature	Effect	Ecological Value		Magnitude of effect	Level of Effect without Management	Effects Management Measures[9]	Magnitude of Effect After Management as described in Section 5	Level of Effect After Management as described in Section 5
Wetlands	Loss of Wetland (this includes hydrological loss)	Mangrove:	High	Moderate	High	This loss can be managed by restoring sections of wetland across the footprint and expanding these areas immediately next to the areas of loss. This is reinstating previous wetland areas that have been sedimented and altered by edge effects. Planting of edges and pest plant control to enable edges to reestablish ad provide increased buffer to wetland interiors.	Low	Low
		Oioi		Moderate	High	This loss can be managed by restoring sections of wetland across the footprint and expanding these areas immediately next to the areas of loss. This is reinstating previous wetland areas that have been sedimented and altered by edge effects.	Low	Low– potential for positive via edge planting and management

Ecological Feature	Effect	Ecological Value		Magnitude of effect	Level of Effect without Management	Effects Management Measures[9]	Magnitude of Effect After Management as described in Section 5	Level of Effect After Management as described in Section 5
Wetlands	Loss of Wetland (this includes hydrological loss)	Oioi:	High	Moderate	High	Planting of edges and pest plant control to enable edges to reestablish ad provide increased buffer to wetland interiors.	Low	Low– potential for positive via edge planting and management
		Raupō Kuta:		Moderate	High	This loss can be managed by restoring sections of wetland across the footprint and expanding these areas immediately next to the areas of loss. This is reinstating previous wetland areas that have been sedimented and altered by edge effects. Planting of edges and pest plant control to enable edges to reestablish ad provide increased buffer to wetland interiors.	Low	Low– potential for positive via edge planting and management
		Mingimingi:		Negligible	Very Low	None required	No Change	No Change
		Mangrove:		Moderate	High	The boardwalk allows the protection of	Low	Low

Ecological Feature	Effect	Ecological Value		Magnitude of effect	Level of Effect without Management	Effects Management Measures[9]	Magnitude of Effect After Management as described in Section 5	Level of Effect After Management as described in Section 5
Wetlands	Loss of Wetland (vegetation cover)					pneumatophores, and wetlands will be monitored for health and regenerating mangroves for three years.		
		Oioi:	High	Low	Low	Wetlands are to be monitored for a minimum of three years. The remaining areas cleared for construction to be replanted.	Low	No Change
		Raupō Kuta:		Low	Low		Low	No Change
		Mingimingi:		Negligible	None		Very Low	No Change
	Loss of Wetland Buffer (10m setback)	Mangrove:	Moderate	Moderate	High	. Wetland buffers are to be replanted where available. Monitoring of all wetlands and their buffers for a minimum of three years.	Low	Low potential for positive
		Oioi:	High	Low	Low			
		Raupō Kuta:		Low	Low			
		Mingimingi:		Negligible	None		Negligible	None
	Removal of vegetation resulting in sedimentation and short-term edge effects	All wetlands	Moderate / High	Moderate	High	Develop and effectively implement a sediment control plan following best practice erosion and sediment control guidelines.	Low	Low

Ecological Feature	Effect	Ecological Value		Magnitude of effect	Level of Effect without Management	Effects Management Measures[9]	Magnitude of Effect After Management as described in Section 5	Level of Effect After Management as described in Section 5
Wetlands	Oil Spills	All wetlands	Moderate / High	Moderate	High	Develop and effectively implement a comprehensive spill prevention and response plan specifically tailored to construction.	Low	Low

6.3 EFFECTS ASSESSMENT (PRE-EFFECTS MANAGEMENT)

The 'Effects Management' in Table 5 above summarises the effects and proposed management actions. Section 6.0 provides further detail on managing the following effects and the overall project level of effects.

The following section details the project's effects (temporary and permanent) before any management has been applied.

6.3.1 Temporary Loss of Exotic Forest and Edge Vegetation

Where vegetation is being cleared for route construction or associated infrastructure, construction buffers of up to 4m are expected to be required (Ventia, 2024). Vegetation in the buffer area includes exotic edge vegetation or exotic-dominated growing on the embankments. The clearance is expected to be temporary, as it is to be disturbed for work and will naturally regenerate. The vegetation is (as discussed above) low-quality scrub dominated by either pest plants or weedy non-native species. As a result, the temporary effects of the construction buffer are considered to be a **low** magnitude of effect.

6.3.2 Temporary loss of Kānuka Shrubland

Where vegetation is being cleared for route construction, construction buffers are expected to be required, as described above. For the areas of kānuka shrubland, it is expected that at most locations, the work can be undertaken from the boardwalk, and adjacent vegetation may need to be trimmed. For the area across the tunnel hill, a wider buffer of c. 1.5m may be required to implement this clearance. The clearance is expected to be temporary, as the buffer will naturally regenerate over time - and the ecosystem is a regenerating system already. As a result, the temporary effects of the construction buffer are considered to be a **low** magnitude of effect.

6.4 PERMANENT EFFECTS – TERRESTRIAL

6.4.1 Exotic Forest and Edge Vegetation Loss

Over the footprint of the works, design has been implemented to reduce impact on intact areas of forest carefully. The presence of weedy and exotic-dominated edges means the majority of vegetation affected is of low ecological value. The edge is not substantially increased above the existing in most areas, with the exception of the kanuka forest over the tunnel where the track will cut through to enable safe slope angles for the cycleway path. The removal of some species presents throughout the corridor, such as pampas gorse and wattles will result in an overall reduction in pest plant presence across the footprint. As a result of the above, the expected magnitude of effects is expected to be **low.**

6.4.2 Kānuka Shrubland Loss

There are three areas where kānuka shrubland vegetation will be removed permanently. These are:

- Area 1: Vegetation to be removed to enable a boardwalk around a wetland area – c.250m^2 (Figure 27)
- Area 2: An area on the edges of a wetland will be removed for a boardwalk - c. 235m^2 (Figure 27)
- Area 3: A section of kānuka/mānuka shrubland over the tunnel will be removed to facilitate a new pathway of an appropriate gradient for cyclists - c. 289m^2 (Figure 28).

Figure 27: The two areas associated with wetland boardwalks

Figure 28: Area three over the tunnel that will be cleared.

These sections are all relatively intact examples of indigenous-dominated shrubland, with vegetation present at all tiers. The area over the tunnel and the area around the wetland (Areas 1 and 3) are also not currently subject to edge effects. The extent of permanent loss of this ecosystem is expected to be 774m^2 (0.0774ha), which equates to 0.61% of this vegetation type present within the project footprint. The new edge created within these areas of intact forest will be subject to increased daytime temperatures, wind speeds, lower humidity and high light levels compared to the current baseline. This effect has the potential to be long-term if unmanaged.

It is expected that this loss will result in a minor shift away from the baseline conditions, especially when considering the wider landscape where kānuka shrubland extends beyond the project footprint extensively (see Figure 29. Note that the kānuka extent is likely larger than this, and the kānuka loss is so tiny it is unable to be shown at that scale). However, due to its location over the hill, the change will be discernible, with the potential for long-term lasting effects on the edges of the currently intact bush. Therefore, the expected magnitude of effects for this **is moderate**.

Figure 29: Kanuka forest (red) in the wider area and within the project footprint (white).

6.4.3 Threatened Plant Species

Threatened species observed across the project footprint are threatened due to the presence of myrtle rust and have been allocated this category preventively (de Lange et al. 2018). Myrtle Rust is now widespread across most of the North Island and the top and west coast of the South Island, and in 2018 the New Zealand biosecurity response finished. It was decided there was some resistance to the disease in New Zealand myrtaceous species as there is currently no evidence of large-scale dieback in Myrtaceous species. However, it is still largely unknown what the long-term effects of this rust will be Smith et al., (2019).

The wider terrestrial ecosystems at the site also contain these species, and it is not expected that the removal of predominately kānuka and mānuka will adversely affect the overall populations of these species either locally or nationally.

According to clause 3.9 (4)(c) and Appendix 2 of the NPS-IB, potentially significant ecological areas should not be assigned or managed based on the threat of myrtle rust to kānuka and mānuka alone. Given the above considerations, the threat status and reasoning, combined with the abundance of the species affected in the wider area, the magnitude of effect is expected to be **low**.

6.5 EFFECTS ON FAUNA

6.5.1 Birds

Habitat for birds is present across the site in the form of forest, shrubland, scrub and wetlands. Vegetation removal across the project footprint and associated disturbance during construction (e.g., noise, movement, vibrations) could result in temporary disturbance to birds using the affected habitats. Any mobile or tolerant species, such as birds, are likely to resume normal use

of the Site either when construction ceases or when they habituate to the disturbance. Construction during nesting season has the potential for injury or mortality to indigenous birds and their chicks. There could also be adverse effects on the nesting success of birds if works are undertaken in the breeding season. This breeding disruption could affect the local populations of threatened species.

Habitat for threatened species will be lost temporarily, with most of the loss occurring at the edges of the habitat where more common terrestrial birds utilise, such as insectivorous species (piwakawaka and rioriro). When balanced with the areas remaining for threatened species, this loss is not expected to have a notable adverse effect on local or regional bird populations. Therefore, attributable to potential death or injury to threatened species, the overall magnitude of effects on birds pre management is considered to be **High.**

6.5.2 Bats

The project footprint and construction buffer are not expected to require the removal of large trees, such as those suitable for bat roosts. The proposal does not involve additional lighting that could impact bat activity. Therefore, the overall magnitude of effects on bats is considered to be negligible. To account for uncertainty in design, it is proposed that a condition of consent be placed on the project that requires a bat ecologist to assess any trees over 15 cm in diameter at breast height for roost potential and apply a bat management plan (and vegetation felling protocols) as required.

6.5.3 Lizards

The removal and disturbance of habitat through the removal of vegetation could injure or kill indigenous lizards if they are present and the works are not managed. Lizard habitat within the project footprint ranged from low to moderate value, with areas suitable for arboreal species and other areas more suitable for crevice and ground dwelling species.

Loss of habitat for lizards is expected to be of lower value habitat, with areas of moderate value, such as the areas of Kanuka shrubland buffer, which will regenerate naturally. The permanent loss of habitat is expected to contribute to cumulative effects on lizards nationally without additional management.

Injury or death to a threatened species could affect local populations give the high likelihood of a range of species to be present. Therefore, the overall magnitude of effects on lizards is considered to be **High**.

6.5.4 Invertebrates

The removal and disturbance of habitat through vegetation removal can injure or kill poorly mobile indigenous invertebrates such as kauri snails if they are present. Habitat within the project footprint ranged from low to moderate value for snails and other invertebrates. This loss of habitat is not expected to result in a moderate or high proportion of the habitat being lost, and populations of kauri snail are currently thought to be locally extinct (Fenwick, 2021). Flax snail habitat is limited across the footprint.

Injury or death to a threatened species, of which there is a low potential for at two to be present across the site, could affect very localised populations. Therefore, the overall magnitude of effects on invertebrates (namely – kauri/flax snails) is considered to be **low-moderate**.

6.6 FRESHWATER EFFECTS

No freshwater systems are expected to be directly affected by the proposal, because the works are generally terrestrial, with some infrastructure adjacent to the transitional zone of streams/rivers and the estuarine environments. Sedimentation may increase during the works if not managed, and potential oil spills from machinery could occur, negatively affecting native fish and freshwater invertebrates by smothering gills and altering water chemistry. Interruption to fish migration has the potential to have negative effects on fish populations. Unmanaged impacts are expected to have a **low-moderate** magnitude of effect, given the temporary nature.

6.7 MARINE EFFECTS

It is expected that since no reclamation of the coastal area is proposed, the effects on the marine environment would be limited to potential sedimentation increases during work and potential oil spills from machinery. These events have the potential to negatively affect native fish and marine invertebrates by smothering gills and altering water chemistry. Installing the boardwalk infrastructure across the mangrove vegetation, could potentially displace, temporarily, indigenous fish and crabs. Unmanaged impacts are expected to have a **low- moderate** magnitude of effect.

6.7.1 Coastal Marine Area (CMA)

The project team expects that the works will not infringe upon the coastal marine area indicated on the resource consent planning maps. The CMA was ground-truthed, and then any areas of treatment that extended into this were refined to avoid it (refer to Figure 26). This assessment will not consider this further.

6.8 WETLANDS OVERVIEW

The project team has demonstrated avoidance, where possible, through careful design and soft engineering (i.e. boardwalks to maintain hydrology and low-growing vegetation and realignment to go around wetlands where feasible within the constraints of the railway corridor and health and safety requirements). Each infrastructure treatment (boardwalk, contained within embankment, motorbike style track, tied back panel walls and combination retaining walls) was given an expected construction setback of a range of 0.5 – 4.0m requirement in the Ventia Construction Report. This setback was applied to the calculations to consider as a temporary effect. Table 6 sets out the effects on the wetlands and their 10m setbacks.

6.8.1 Wetland Vegetation Loss

Table 6 outlines the loss of wetland vegetation, but not hydrology, where areas of boardwalk have been applied. It also accounts for any temporary vegetation clearance associated with the construction setbacks. This means that although there will be a loss of vegetation cover at this point, the wetland's hydrology will not be impacted. It is also expected that this will be the worst case, as areas of salt marsh and Kuta will be able to persist under a boardwalk.

Table 6: Permanent Wetland Vegetation Loss (Boardwalk Treatments) and Temporary Clearances.

Wetland Type	Ecological Value	Wetland Veg Lost (boardwalk) (ha)	Wetland Veg Removed (Construction Setbacks – Not Permanent Loss)	Overall wetlands within the project footprint (ha)	Percentage lost (%) (Permanent)
Mangrove	Moderate	0.15	0.04	11.66	0.0171
Oioi	High	0.008	0.01	4.61	0.0003
Raupō / Raupō and occasional Kuta	High	0.009	0.01	1.12	0.0001
Mingimingi	High	0	0	0.21	0.0000
TOTALS	N/A	0.15		17.5	0.0175

6.8.2 Permanent Loss of Wetland

Permanent loss is expected in areas where the type of construction required for the cycleway at each point will result in the loss of wetland – both vegetation and hydrology. Generally, this is an area where wetlands are against the current railway abutments, and this can't be avoided. These areas are being infringed upon by woody vegetation and exotic species as they are subject to ongoing edge effects. Table (7) outlines the loss of wetlands. The proposal impacts only edge wetland; no interior wetland loss is occurring.

Table 7: Permanent Wetland Loss (All other treatments).

Wetland Type	Ecological Value	Wetland Lost (ha)	Overall wetlands within the project footprint (ha)	Percentage lost (%)
Mangrove	Moderate	0.02	11.66	0.00214
Oioi	High	0.02	4.61	0.00071
Raupō / Raupō and occasional Kuta	High	0.002	1.12	0.00002
Mingimingi	High	0	0.21	0.00000
TOTALS	N/A	0.04	17.5	0.00287

6.8.1 Mingimingi

No clearance of mingimingi vegetation or associated hydrological loss would affect the mingimingi wetlands across the project footprint. The mingimingi wetlands and their 10m wetland setbacks are all located outside the expected works. As a result, it is expected that there will be no effect on this system by the project.

6.9 EFFECTS BY WETLAND TYPE

6.9.1 Mangrove

Over the project footprint, there are approximately 11 ha of mangrove wetlands. Considering the landscape scale, mangroves extend much further and continue to expand into the estuarine environment of the Kawakawa River, Whangae River, Waikare River and their tributaries (Figure 30).

There will be a loss of 0.02 ha of mangrove wetland in areas where the wetland adjoins the embankment, and the proposed treatment cannot be kept within the embankment extent. This equates to c. 0.0002% of the broader system available within the project footprint and much less than that within the wider Kawakawa/Opua River estuarine environment as mapped by Northland Regional Council in 2020 (Macdonald et al. 2020). These areas are generally of lower quality because they are subject to edge effects and previous disturbances by the rail corridor and cycleway.

The loss of these strips of mangrove will technically mean the loss of water table connectivity at these points, as the area will be gravelled or cut/filled depending on the treatment, which results in a hydrological loss. This is not expected to extend beyond the immediate footprint as it is on the edge of the wetland extents. As is evident by the current railway passing through the middle of these systems, the water table persists much wider, as does the saline tidal influences.

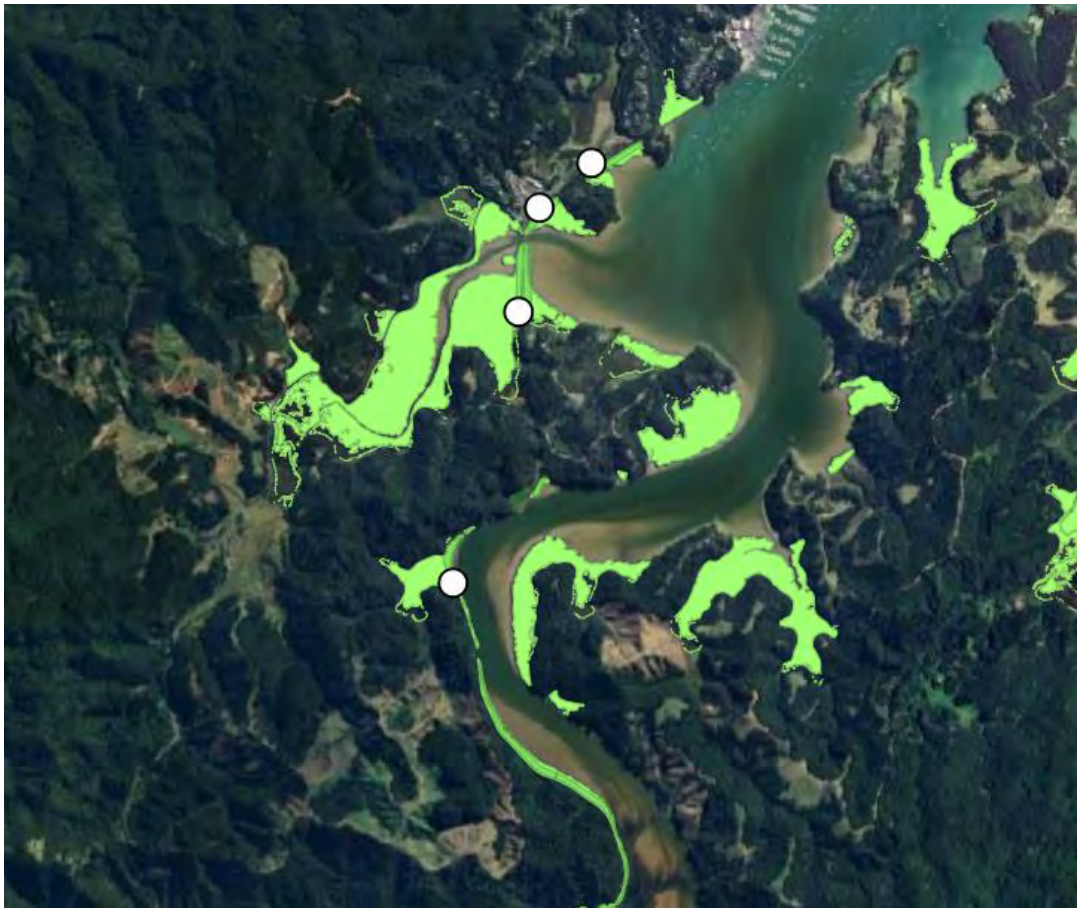

Figure 30: Mapped mangrove systems (green) across the wider Opua/Kawakawa Area (Macdonald, et al., 2020). White dots indicate the mangroves lost (not to scale).

It is expected that there would be a permanent loss of 0.15 ha of mangrove wetland vegetation cover and a temporary loss (due to a construction setback applied to each treatment) of 0.04 ha of vegetation cover. The majority of this is at the edge of this wetland type, where the ecosystem meets the existing embankment. In some instances, the gravel from the embankment has altered the overall vegetation composition and created a combination of woody vegetation cover, pest plant species like pampas and gorse, and scattered mangroves.

For areas of higher ecological value (i.e. more intact edges of mangroves and occasional non-mangrove natives, mature mangroves) towards the northern end of the project footprint (Figure 31), the infrastructure would be a boardwalk. The boardwalk would ensure that the pneumatophores and radial root systems are not crushed and will continue functioning as before the infrastructure. The anticipated construction methodology means that the trees would be cut to height to reduce the disturbance of the lower marine environment and avoid the requirement to remove saplings/seedlings that are there but under the expected height required for the boardwalk.

Figure 31: Example of areas where boardwalk would traverse mangrove edge habitat.

6.9.2 Oioi

Over the project footprint, there is approximately 4.6 ha of Oioi wetland. Within the wider area on a landscape scale, Oioi saltmarsh extends much further within the estuarine environs of the Kawakawa River, Whangae River, Waikare River and their tributaries (Figure 32).

There will be a loss of 0.02 ha of Oioi wetland in areas where the wetland adjourns the embankment, and the proposed treatment cannot be kept within the embankment extent. This equates to c.0.00071% of the wider Oioi systems available within the project footprint and much less than that within the wider Kawakawa/Opua River estuarine environment as mapped by Northland Regional Council in 2020 (Macdonald et al., 2020). These impact areas are generally subject to edge effects, with increased wind exposure, stunted plants, and exotic vegetation encroachment.

The loss of these strips of Oioi will technically mean the loss of water table connectivity at these points, as the area will be gravelled or cut/filled depending on the treatment, which results in a hydrological loss. This is not expected to extend beyond the immediate footprint as it is on the edge of the wetland extents. As is evident by the current railway passing through the middle of these systems, the water table persists much wider, as does the saline tidal influences.

There is expected to be a total permanent loss of 0.06 ha of Oioi wetland vegetation cover across the footprint and a temporary loss (due to a construction setback applied to each treatment) of 0.01 ha. The majority of this vegetation to be lost comprises the edge of this wetland type, where the ecosystem meets the existing embankment. In some instances, the gravel from the embankment has moved down into the wetland areas, altering the overall vegetative composition and creating a combination of woody vegetation and wetland species cover rather than full wetland species cover.

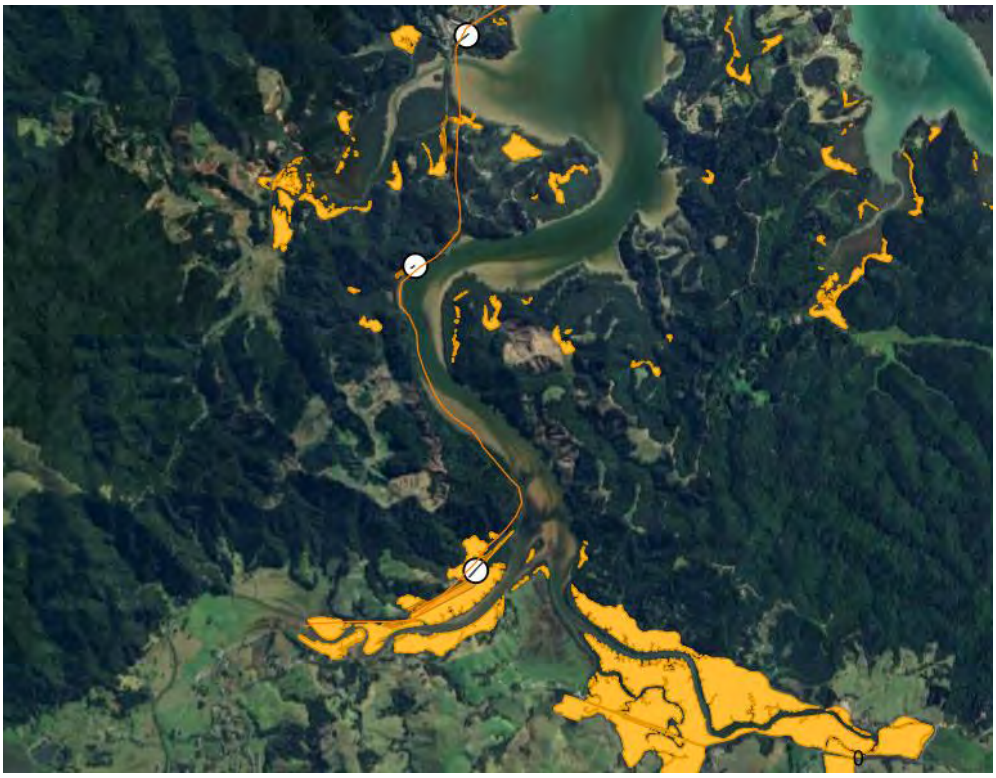

Figure 32: Mapped oioi systems (orange) across the wider Opua/Kawakawa Area (Macdonald, et al., 2020). White dots indicate the oioi lost (not to scale).

6.9.3 Raupō-kuta

Over the project footprint, there is approximately 1.12 ha of Raupō-kuta wetland. Within the broader area at a landscape scale, Raupō-kuta ecosystems extend much further (e.g. at the location of the Raupō-kuta just past the tunnel, Figure 33). This system has not been formally mapped by the council for a landscape assessment as with mangrove and saltmarsh (oioi).

Figure 33: Example of Raupō-kuta habitat extending past the project extent in light purple.

There would be a loss of 0.002ha of Raupō-kuta wetland in areas where the wetland adjoins the embankment, and the proposed treatment cannot be kept within the embankment extent. This equates to c. 0.00002% of the wider systems available within the project footprint. These areas are generally subject to edge effects, with an increase in exotic plants and some woody vegetation scattered through the edges (e.g. Figure 34).

Figure 34: Example of exotic and woody vegetation along the edge at the raupō-kuta loss.

The loss of these slithers of Raupō-kuta will technically mean the loss of water table connectivity at these points, as the area will be gravelled or cut/filled depending on the treatment, which results in a hydrological loss. This is not expected to extend beyond the immediate footprint as it is on the edge of the wetland extents. As is evident by the current railway passing through the middle of these systems, the water table persists much wider, as does the saline tidal influences.

There is expected to be a total permanent loss of 0.04 ha of Raupō-kuta wetland vegetation cover across the footprint and a temporary loss (due to a construction setback applied to each treatment) of 0.01ha of vegetation cover. The majority of this is the edge of this wetland type, where the ecosystem meets the existing embankment. In some instances, the gravel from the embankment has moved down into the wetland areas, altering the overall vegetative composition and creating a combination of woody vegetation cover and wetland species, often with pest plants like pampas persisting.

One area of raupō-kuta that is being impacted has been reduced in extent by changing the design to a boardwalk, crossing at a shorter width than along the current embankment, where woody vegetation on uneven ground persisted (Figure 35), and the wetland itself was scattered in and around rather than being one intact piece of wetland. This approach leaves the well-vegetated, intact edges and larger intact areas of pure wetland in place (Figure 36).

Figure 35: Indication of the woody vegetated area that was targeted to cross.

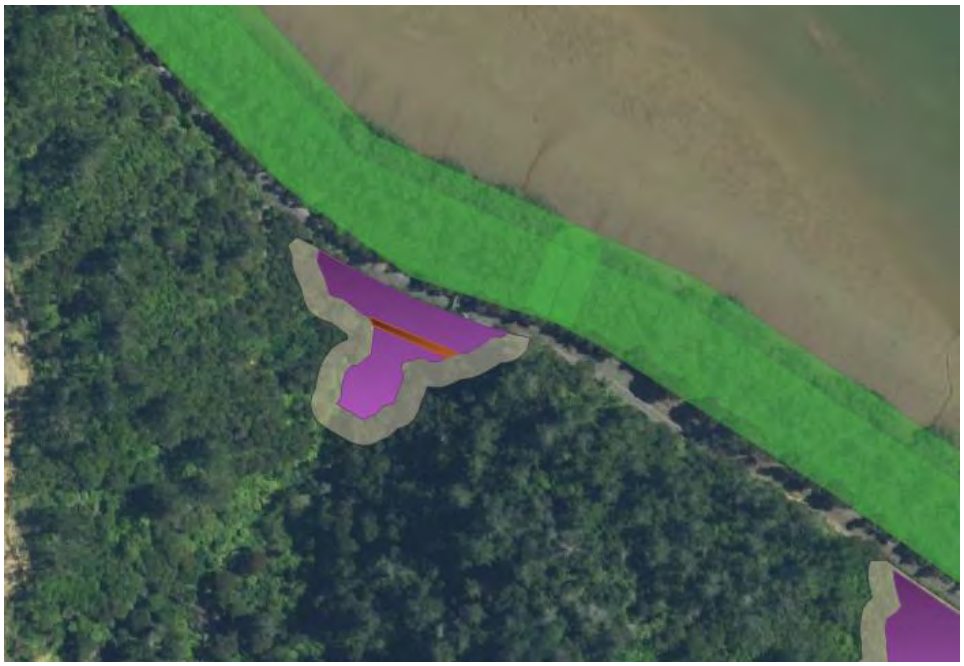

Figure 36: Raupō-kuta boardwalk.

6.10 EFFECTS ON WETLAND BUFFERS (10M SETBACK)

When applying a 10m setback from the wetland delineation and considering constructability and buffer zones to implement this, the following effects are expected on each wetland setback area: Temporary loss occurs when vegetation may be cleared but will regenerate. Permanent loss occurs when there are overlapping wetlands extents, and setbacks are affected by the infrastructure to avoid actual wetland loss.

The expected impacts on these buffers are an increase in edge effects (wind, drying out, temperature changes and increase in weedy species) to the interior of the wetlands, from a reduction in the buffer zone. There is also the consideration that in some areas, this buffer provides habitat for wildlife, namely birds and invertebrates.

6.10.1 Mangrove Wetland Buffer Loss (10m setback)

When applying a construction setback to the infrastructure treatments (as per the Ventia expected constructability report), the permanent loss of mangrove wetland setback cover would be 0.11 ha, and the temporary loss is 0.04 ha. This is expected to be vegetation removal only and not complete hydrological loss. As a result of the above, the magnitude of the effect is expected to be low overall, as existing baseline conditions will be similar to pre-development conditions, but there is the chance that indigenous fauna could be using the habitat at the time of removal.

6.10.2 Oioi Wetland Buffer Loss (10m setback)

When applying a construction setback to the infrastructure treatments (as per the Ventia expected constructability report), the permanent loss of Oioi wetland setback is expected to be 0.05 ha, and the temporary loss is 0.03 ha. This loss is only expected to be vegetation removal and not full hydrological loss, and the vegetation composition is predominantly woody exotic and pest species. The magnitude of the effect is expected to be low - negligible overall, where existing baseline conditions will be similar to pre-development conditions, but there is the chance that indigenous fauna could be using the habitat at the time of removal.

6.10.3 Raupō-kuta Loss of Wetland Buffer (10m setback)

When applying a construction setback to the infrastructure treatments (as per the Ventia expected constructability report), the permanent loss of Raupō-kuta setback vegetation cover is expected to be 0.09 ha, and the temporary loss would be 0.06 ha. This is expected to be vegetation cover only and would not adversely affect wetland hydrology due to the sensitive design methods adopted. The magnitude of the effect is expected to be low overall, where existing baseline conditions will be similar to pre-development conditions, but there is the chance that Indigenous fauna could be using the habitat at the time of removal.

6.10.4 Summary of Effects on Wetland Setbacks

With the sensitive construction methodologies and design adopted and the regeneration of the majority of wetland setbacks vegetatively, the effects on wetland setbacks are considered to be low overall, with some management of fauna at the construction stage envisioned to ensure there is no mortality or injury during works,

6.11 CONSTRUCTION EFFECTS ON WETLANDS

6.11.1 Sedimentation, Short-Term Edge Effects, and Oil Spills.

Without management, the construction activities have the potential to increase sediment load into the wetland areas at the point of works and downslope. In addition, the use of machinery can result in grease and oil spills entering the system. These events have the potential to adversely affect wetland health by killing, displacing, or damaging parts of the flora and fauna communities.

Overall, the majority of the wetland loss is expected to occur at the edge and in degraded portions of the ecosystems, and the loss is expected to be restricted to vegetation and habitat values, not hydrology. These areas are already of lower stature and degraded by the presence of weeds and bare areas. The removal of these will include woody pest plants (e.g., gorse and woolly nightshade), which would improve ecological integrity along the proposed route in the medium—longer term.

Without management, these effects have the potential to degrade multiple systems across the project footprint and harm protected fauna. When considering this while taking into account the temporary nature of these effects, the expected magnitude of effect is **moderate**. Please see section 5.0 for the management of these effects.

6.12 CONCLUSION ON EFFECTS PRIOR TO MANAGEMENT

The aforementioned effects are expected prior to any management. All effects are expected to be manageable to reduce the level of effects across the project. This management and the resulting level of effects are detailed in the following sections.

7. EFFECTS MANAGEMENT DETAILS

7.1 TERRESTRIAL VEGETATION (KĀNUKA SHRUBLAND)

The moderate level of effects for the loss of kānuka shrubland arises from the new edge effects continuing in perpetuity with no active management. To manage this effect, pest plant control must be undertaken across the two key areas (over the hill above the tunnel, and the two areas connected to the raupō-kuta wetlands where the boardwalk goes around the outside). This management will remediate the edge vegetation and promote ecological integrity and connectivity along the route, encouraging a robust edge and wetland setback buffer. This would then enable the remedy and reduction of this particular effect.

Where practicable, indigenous vegetation to be felled will be cut up and retained in the wider bush area, creating habitat and resource for fauna as well as contributing to the decomposition cycle and 'kickstarting' regeneration. Where the tracks are to go through dense kānuka shrubland interfaces (i.e. over the hill above the tunnel), the project ecologist will undertake supervision of track implementation to reduce the extent further when refining the pathway. This process will require clearly defined plans to be prepared, outlining the project footprint, which has not been provided at this stage of the project. It is expected that a detailed design of this area will be undertaken with the advice of an ecologist. The construction buffer will then be replanted to ensure long-term edge effects are minimised, with eco-sourced species appropriate for the ecosystem.

7.2 TERRESTRIAL FAUNA (BIRDS, BATS, LIZARDS, SNAILS, MARINE CRABS)

7.2.1 Introduction

Effects on terrestrial fauna that require management include the potential for injury or mortality to indigenous species and decreased nesting success due to disturbance. In addition, all five indigenous lizards, two species of snail and almost all native birds present within the project footprint are protected under the Wildlife Act 1953. To manage this risk effectively, fauna management is required. The fauna management to be implemented includes:

7.2.2 Avoidance of Breeding Seasons

All vegetation clearance should occur outside the peak native bird nesting season in order to minimise any disturbance risk that vegetation removal and other disturbances would have on nesting birds. Key breeding season for fauna expected across the project footprint is included in Table 8 below, however, in general key avoidance time is 1 August through to the end of February inclusive.

If vegetation clearance is unavoidable during the native bird nesting season, an approved and experienced ecologist or ornithologist shall visually inspect all trees, grassy areas, and shrubs prior to removal to confirm that nesting birds are not present. This includes checking tree cavities and hollows for nesting birds (e.g., morepork, kingfisher). Should any nesting be observed, a minimum 25-metre buffer of vegetation shall be required to remain around the nest site until an approved and experienced ecologist or ornithologist has confirmed that the nest has failed, or the chicks have hatched and naturally left the natal site.

Table 8: Key breeding season for fauna expected across the project footprint to avoid.

Name/s	Scientific Name	Threat Classification (Robertson et al., 2021)	Observed during field work	Habitat on Site	Breeding season (New Zealand Birds online)
Australasian bittern, matuku-hūrepo	*Botaurus poiciloptilus*	Native - Threatened - Nationally Critical	No*[1][10]	Wetlands	August - December
Caspian tern, Taranui	*Hydroprogne caspia*	Native - Threatened - Nationally Vulnerable	Yes	Marine environs, coastal edges	September - December
Grey duck, Pārera	*Anas superciliosa*	Native - Threatened - Nationally Vulnerable	No	Wetlands and streams (low likelihood)	August - December
New Zealand dotterel, Tūturiwhatu	*Charadrius obscurus*	Native - Threatened - Nationally Increasing	No	Marine environs, coastal edges	August – September (Northern Populations)
Banded rail, mioweka	*Gallirallus phillipensis*	Native - At Risk - Declining	No	Wetlands, mangrove forest, coastal margin	Spring – Summer
Bar-tailed godwit, kūaka	*Limosa lapponica*	Native - At Risk - Declining	No	Marine environs, coastal edges	Kūaka begin arriving in NZ in September
fernbird, mātātā	*Bowdleria punctata vealeae*	Native - At Risk - Declining	Yes	Wetlands and dense shrubland	September – February
little penguin, kororā	*Eudyptula minor*	Native - At Risk - Declining	No	Coastal areas, margins, rocky areas	July - February
New Zealand pipit, pīhoihoi	*Anthus novaeseelandiae*	Native - At Risk - Declining	No	Open areas, and grassland	August - February

[10] But documented and seen several times by various personnel working along the railway line and Opua residents.

Name/s	Scientific Name	Threat Classification (Robertson et al., 2021)	Observed during field work	Habitat on Site	Breeding season (New Zealand Birds online)
Spotless crake, pūweto	*Porzana tabuensis*	Native - At Risk - Declining	No	Wetland, coastal margin	August - January
tarāpunga, red-billed gull	*Larus novaehollandiae scopulinus*	Native - At Risk - Declining	No	Marine environs, coastal edges	September - January
White-fronted Tern, tara	*Sterna striata*	Native - At Risk - Declining	Yes	Marine environs, coastal edges	October – February
black shag, kawau	*Phalacrocorax carbo*	Native - At Risk - Naturally Uncommon	No	Marine environs, coastal edges, rivers, streams	All year, mainly autumn - winter
Little black shag, Kāwau tui	*Phalacrocorax sulcirostris*	Native - At-Risk - Naturally Uncommon	No	Marine environs, coastal edges, rivers, streams	October - December
long-tailed cuckoo, koekoeā,	*Eudynamys taitensis*	Native - At-Risk - Naturally Uncommon	No	Forest, shrubland	October – January
Variable oystercatcher	*Haematopus unicolor*	Native - At Risk - Recovering	Yes	Shoreline, coastal margin	From September, fledging as late as March
Australasian Gannet, Tākapu	*Morus serrator*	Native - Not Threatened	No	Marine environs, coastal edges	July - April
grey warbler, riroriro	*Gerygone igata*	Native - Not Threatened	Yes	Open areas, forest and shrubland	July – February, peaking August - January
kererū, kūkupa	*Hemiphaga novaeseelandiae*	Native - Not Threatened	No	Open areas, forest	All year, peaking September - April

Name/s	Scientific Name	Threat Classification (Robertson et al., 2021)	Observed during field work	Habitat on Site	Breeding season (New Zealand Birds online)
kōtare, kingfisher	*Todiramphus sanctus*	Native - Not Threatened	Yes	Open areas, forest, shrubland, shoreline, coastal margin	September - March
little shag, kawau, little pied shag	*Phalacrocorax melanoleucos*	Native - Not Threatened	Yes	Marine environs, coastal edges	July – May, peaking October - December
morepork, ruru	*Ninox novaeseelandiae*	Native - Not Threatened	No	Open areas, forest, shrubland, shoreline, coastal margin	September – February
North Island weka	*Gallirallus australis greyi*	Native - Not Threatened	No	Forest, shrubland, wetlands	Late winter (August) – early summer, although they are known to breed year-round in the right conditions (Beauchamp et al.,1998).
Northland brown kiwi, Kiwi-nui	*Apteryx mantelli*	Native - Not Threatened	No	Open areas, forest and shrublands	Generally, all year, egg laying is May - January
paradise shelduck, pūtangitangi	*Tadorna variegata*	Native - Not Threatened	Yes	Wetlands and marine environs	August - October
pīwakawaka, fantail	*Rhipidura fuliginosa*	Native - Not Threatened	Yes	Open areas, forest and shrubland	August – March
pūkeko	*Porphyrio melanotus*	Native - Not Threatened	Yes	Open areas s horeline, coastal margin, wetlands	All year, peaking August - November
shining cuckoo, pīpīwharauroa	*Chrysococcyx lucidus*	Native - Not Threatened	No	Forest, shrubland	November - Dependent on host species (grey warbler)

Name/s	Scientific Name	Threat Classification (Robertson et al., 2021)	Observed during field work	Habitat on Site	Breeding season (New Zealand Birds online)
Southern black-backed gull, karoro	*Larus dominicanus*	Native - Not Threatened	Yes	Marine environs, coastal edges	October - January
spur-winged plover	*Vanellus miles*	Native - Not Threatened	Yes	Open areas and shrubland	June - December
swamp harrier, harrier hawk, kāhu	*Circus approximans*	Native - Not Threatened	Yes	Open areas, forest and scrub	Egg-laying in October – December, birds pair up from as early as June.
tauhou, waxeye, silvereye	*Zosterops lateralis*	Native - Not Threatened	Yes	Open areas, forest and shrubland	August - February
tomtit, ngirungiru	*Petroica macrocephala toitoi*	Native - Not Threatened	No	Open areas, forest and shrubland	September - February
tūī	*Prosthemadera novaeseelandiae*	Native - Not Threatened	Yes	Open areas, forest and shrubland	September - January
Welcome swallow	*Hirundo neoxena*	Native - Not Threatened	Yes	Open areas, forest and shrubland	August – February. Up to three broods per season.
White faced heron, matuku	*Egretta novaehollandiae*	Native - Not Threatened	Yes	Wetlands and marine environs	June – November, laying peaks in October

7.2.3 Habitat Enhancement Measures

Enhancement of lizard and invertebrate habitat on-site will involve the placement of suitable felled vegetation and woody debris within the retained vegetation to create a minimum of 10 ecostacks, as shown in Figure 37This woody debris will gradually decompose in situ, providing refuge areas for indigenous lizards and snails and encouraging insects, which will provide food for them.

Figure 37: Example of ecostacks providing additional habitat.

7.2.4 Site-Specific Lizard and Snail Management Plan (LMP)

Given the moderate-high habitat available across the footprint, lizard management before and during works should be implemented. This management should be detailed along with salvage measures for threatened land snails under a project-specific Lizard and Snail Management Plan (LSMP) prepared by a suitably qualified ecologist/herpetologist. This plan should include pre-vegetation removal salvage and supervised removal of all habitats (from ground cover to canopy trees). It is noted that these management actions will require a Wildlife Act Authority (WAA) from the Department of Conservation.

7.2.5 Bat Management to be Identified.

To account for uncertainty in design, it is proposed that a condition of consent be placed on the project that requires a bat ecologist to assess any trees over 15 cm in diameter at breast height for roost potential and apply a bat management plan (and vegetation felling protocols) as required.

7.3 TERRESTRIAL CONCLUSION

If these recommendations can be effectively implemented, the post-management magnitude of effects on indigenous fauna is expected to be **low to negligible**.

7.4 FRESHWATER

The following management actions are to be undertaken to reduce the level of effect on the freshwater systems across the project footprint:

7.4.1 Containment measures:

Develop and effectively implement a sediment control plan following best practice erosion and sediment control guidelines. Far North District Council and Northland Regional Council both refer to the Auckland Council GD2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region as appropriate to follow, with further information published in an information flyer (Northland Regional Council, n.d, Far North District Council, 2022). This management will ensure that any significant adverse effects due to sediment mobilisation and turbidity in receiving waters resulting from disturbance to land during the construction phase will be avoided.

7.4.2 Spill prevention and response:

Develop and effectively implement a comprehensive spill prevention and response plan specifically tailored to construction activities involving machinery. This plan should outline preventive measures, such as regular maintenance and inspection of machinery, proper fuel storage, and staff training in spill response procedures.

7.4.3 Construction timing:

Schedule construction activities for the boardwalks during periods of lowest flow/low tide to minimise disturbance to the stream ecosystems and with consideration to freshwater fish migration patterns. Restricting works to low tide will avoid and minimise potential adverse effects from sediment disturbance during construction, keeping the impact local to the disturbance point. To mitigate potential effects on freshwater fauna, all works should be performed outside of the local whitebait migratory season and should avoid all habitats that may be or are known to be utilised as spawning sites by migratory species.

By following these recommendations and implementing appropriate management measures, the expected magnitude of post-mitigation effects is anticipated to be **low**.

7.5 MARINE

Marine habitats have been avoided where practicable, and effects have been reduced by the provision of boardwalks at affected locations. This will allow the natural hydrology to be maintained and reduce the crushing of mangrove pneumatophores and radial root systems, as well as limiting muddy substrate / marine fauna disturbance. No machinery is expected to be required in/on the mudflats, as the boardwalk will be constructed from land. In addition, the following management actions are to be undertaken to reduce the level of effect on the marine habitats across the project footprint:

7.5.1 Containment measures:

Develop and effectively implement a sediment control plan following best practice erosion and sediment control guidelines. Far North District Council and Northland Regional Council both refer to the Auckland Council GD2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region as appropriate, with further information published in an information flyer (Northland Regional Council, n.d, Far North District Council, 2023). This management will ensure that the amount of sediment and turbidity in receiving waters resulting from disturbance to land during the construction phase will be reduced.

7.5.2 Spill prevention and response:

Develop and effectively implement a comprehensive spill prevention and response plan specifically tailored to construction activities involving machinery. This plan should outline

preventive measures, such as regular maintenance and inspection of machinery, proper fuel storage, and staff training in spill response procedures.

7.5.3 Construction timing:

Schedule boardwalk construction activities during periods of lowest flow/low tide to minimise disturbance to marine ecosystems. Restricting boardwalk works to low tide will avoid and minimise potential adverse effects from sediment disturbance during construction, keeping the impact local to the disturbance point.

7.5.4 Marine Fauna:

Using ecologist supervision during construction, marine crabs, which are commonplace across the mangrove estuarine areas, can likely be avoided. If estuarine triplefin (*Forsterygion nigripenne*) is present, work can be done slowly and by small machinery to ensure they move out of the direct impact zone.

By following these recommendations and implementing appropriate management measures, the expected magnitude of post-management effects is anticipated to be **low**.

7.6 WETLANDS

7.6.1 Wetland loss

Wetland loss is expected to have a high level of effect with no management. The following requirements will enable the project to reduce the impacts further:

7.6.1.1 Ecologist Supervision

The construction setbacks will result in a temporary loss of wetland vegetative cover in some areas. To minimise this effect, an ecologist will undertake supervision of track construction at all wetland interfaces to reduce the extent further when refining the pathway (a level of detail not yet able to be assessed). This will involve clear communication between the ecologist and the implementing contractor to reduce the impact on the wetland at construction time. It is also expected that a detailed design can be undertaken with advice from an ecologist to refine this effect and its management. The supervising ecologist will be on site to clearly demarcate the ‘no go’ areas beyond the edges expected to be subject to the works.

7.6.1.2 Reinstating Wetland Areas

In some areas, there is an influx of woody vegetation and pest plants that would previously have been among the wetland extent that can be cleared out. To do this, the project ecologist should identify the areas via a walkover to utilise the construction equipment during earthworks and create a wetland restoration plan for during construction.

This management will target edges of wetland extents, where there is a build-up of sediment and exotic vegetation. The area will be carefully scraped out with a small digger and ecologist supervision to reinstate the area wetland. There are some areas where native vegetation, such as tree ferns, are in the canopy, and pampas, gorse and other pest plant species are in the understorey, with raupō-kuta struggling to come through. These areas will be carefully managed to remove the pest plants to allow for the raupō-kuta to reestablish here, removing pests by hand or machine to suit the conditions.

Given the high amount of pest plant incursion currently occurring across the wetland edges and encroachment outside of the project footprint, wetland reinstatement is expected to

mitigate wetland loss at the point of impact for each wetland type. Using a desktop assessment and previous knowledge of the site, a total of c. 0.7ha of wetland areas have been identified as having the potential to be established (Figure 38). It is expected that by the time of construction, this number will require updating. However, given that the amount is higher than the loss of wetland (0.04ha), it is anticipated that there will be enough areas of reinstatement to manage effects on wetlands.

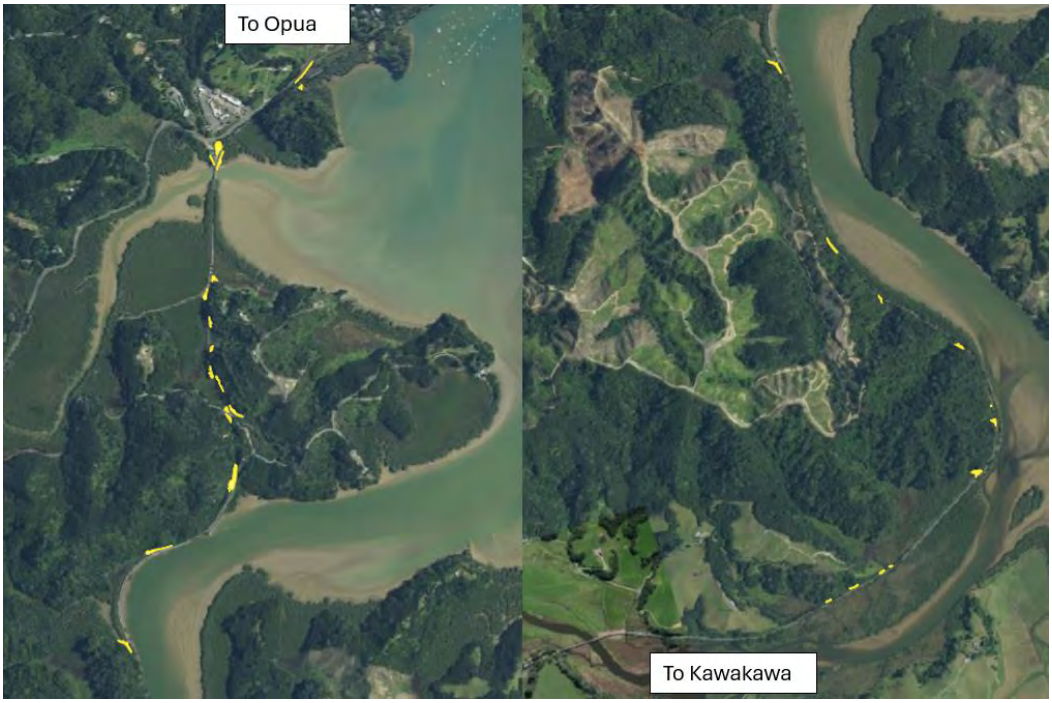

Figure 38: Overview of areas for reestablishment of wetland extent in yellow.

The two largest areas suitable for this are immediately before the tunnel, where a large expanse of pampas has taken over the edges of the salt marsh and can easily be cleared out and maintained to allow the salt marsh to reestablish (c 1211m^2 - Figure 39) and an area of mangrove that has been overrun by English ivy (*Hedera helix*) at the mangrove side of the intersection of Te Raupo Road and Baffin Street (although it is noted at this point that the roads are railway corridors) (Figure 40). Another key area is after the tunnel (or over the hill) heading north towards Opua; there is an area of raupō-kuta being encroached on by pampas and grass species. The native wetland species Swamp millet (*Isachne globosa*) is also prevalent here but is being overrun by other grasses. Removing pest plant species from this area carefully will allow for the native wetland species to persist.

Once this management described above is undertaken, the overall effects on wetlands are expected to be reduced to a low level.

Figure 39: Area adjacent to the saltmarsh to be reinstated and managed to allow reversion back.

Figure 40: Area of mangrove reinstatement.

Figure 41: Area of Raupō-kuta-swamp millet reestablishment.

An additional area identified for restoration is an area of c.2560m^2 by the Far North Holdings stockyard at the junction of Paihia and Beaufort Roads (Figure 42) Roads. The wetland here has been severely degraded, as evidenced by smells, dying vegetation and oil films (Figure 43). With a site-specific wetland management and restoration plan (as this would need to be more detailed than the one recommended for the project's wetland sites), this area could be restored to its previous state. However, given the uncertainty of its future, it is currently being discussed as a potential turnaround area (out of the scope of this project[11]), this is not considered in this assessment of management and subsequent level of effects. This is a recommendation only.

Figure 42: Location of severely degraded wetland (orange) option for restoration.

[11] Pers comms with railway staff and the Hoskin Civil project team.

Figure 43: Severely degraded salt marsh and adjacent exotic-dominated wetland section.

7.6.2 Wetland Vegetation Loss

7.6.2.1 Edge Management

The loss of wetland vegetation cover (but not full wetland loss – i.e. boardwalk areas) has resulted in a high level of effect. To manage this and reduce the level of effect, the project will implement pest plant control management within the new edges and the edges of more expansive wetland areas across the footprint for a minimum of three years. This will increase the health of these edges, ensure that interiors are maintained to high health, and reduce the impact this loss would have. Additionally, the exposed edges through construction buffer requirements will be replanted with eco-sourced species appropriate to the wetland ecosystem, to reinstate these edges.

7.6.2.2 Wetland Monitoring

The wetland areas and setbacks subject to the loss (temporary and permanent) will be monitored bi-yearly for a period of three years by a suitably qualified ecologist to ensure that the wetland systems are maintaining health, and that seedling regeneration is occurring. Monitoring will include basic indicators of health, such as vegetation (native/exotic) composition, death of vegetation, and others as outlined in the New Zealand Handbook for Wetland Monitoring (Clarkson et al., 2004). This monitoring should be outlined in a project-specific wetland monitoring plan.

7.6.3 All Wetland Impacts

7.6.3.1 Containment Measures:

Develop and effectively implement a sediment control plan following best practice erosion and sediment control guidelines. Far North District Council and Northland Regional Council both refer to the Auckland Council GD2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region as appropriate to follow, with further information published in an information flyer (Northland Regional Council, n.d, Far North

District Council, 2023). This management will ensure that the amount of sediment and turbidity in receiving waters resulting from disturbance to land during the construction phase will be reduced.

7.6.3.2 Spill Prevention and Response:

Develop and effectively implement a comprehensive spill prevention and response plan tailored explicitly to construction activities involving machinery. This plan should outline preventative measures, such as regular maintenance and inspection of machinery, proper fuel storage, and staff training in spill response procedures.

7.6.3.3 Construction Timing:

Schedule construction activities during periods of lowest flow/low tide to minimise disturbance to wetland ecosystems. Restricting works to low tide will avoid and minimise potential adverse effects from sediment disturbance during construction, keeping the impact local to the disturbance point, in combination with appropriate sediment controls as above.

By following these recommendations and implementing appropriate management measures, the expected magnitude of post-management effects on wetlands by the project is anticipated to be **low.** There will be a change, but this will be discernible, but the underlying character will remain. The project will result in some positive outcomes in the way of pest plant control around wetlands that are currently being encroached by exotic woody vegetation with no control.

8. RESIDUAL EFFECTS

With careful management prior to and during construction, the loss of wetland edge, buffer, and vegetation cover can be managed to a low level of ecological effects. Fauna management prior to and during construction, in alignment with appropriate permits and seasonal restrictions, will ensure our native fauna are not adversely impacted.

The effects management hierarchy has been addressed by initially redefining the project's extent and treatment widths to produce a footprint that is as small as possible. The project avoids high-value wetland interiors and targets scrubby wetland edges. Boardwalks have been utilised wherever possible to ensure the hydrological connectivity of wetlands remains.

Positive effects of the project include the implementation of wetland monitoring and reinstatement of wetland areas that have, over time, been subject to sediment build-up and pest plant incursions, equalling a potential 0.7ha. As a result of the above, the effects of this project are expected to be able to be managed appropriately, and no residual effects are expected.

9. SUMMARY OF REQUIREMENTS

The following requirements are to be undertaken to manage the effects of the proposed cycleway realignment.

9.1 VEGETATION LOSS

1. The consent holder must provide evidence that the detailed design has been taken into consideration of ecological effects in association with a suitably qualified ecologist in the form of a brief memo outlining this to the council prior to commencing work on site.

2. During construction, a suitably qualified ecologist must be present at the start of each section/phase of work to outline the ecologically sensitive areas and ensure all contractors are aware of these. Areas of ecological value are to be demarcated and not encroached on.

3. A suitably qualified ecologist shall prepare a Vegetation Management Plan that outlines the following management requirements for the project:
    - Planting requirements and species mix for the construction buffer areas used once the construction work has been completed.
    - Pest plant control measures over the new edges of kānuka
    - Pest plant control measures for all wetland systems.
    - The requirement to retain felled indigenous vegetation where feasible and create habitat eco stacks for fauna habitat enhancement and native regeneration.

    This plan should be provided to and approved by the council prior to works commencing on site once a detailed design has been completed.

9.2 FAUNA

4. A suitably qualified ecologist shall prepare a Fauna Management Plan and obtain the necessary permit/s from the Department of Conservation.[12] This fauna management plan shall contain (but is not limited to):
    - Seasonal constraints and considerations for lizards and birds
    - Salvage during construction to avoid injury/death to individuals (lizards, land snails), including pre-construction surveys, manual searches, and supervised vegetation clearance.
    - Pre-works nesting bird checks by project ecologists and appropriate exclusion zones where nests are found.
    - Lizard and Snail Management Plan (LSMP) and Wildlife Act Authority Application and Requirements.

[12] It is noted that this process should be commenced as soon as possible to allow for long timeframes to get a permit application approved.

- Habitat enhancement requirements for lizards and large invertebrates.

This plan shall be provided to the council prior to any works commencing on site.

5. Marine Fauna: A suitably qualified ecologist must be present during mangrove boardwalk construction to move any marine crabs from the footprint.

6. Bats: Prior to works commencing, after the detailed design is known, the project shall engage the services of a bat ecologist to assess any trees over 15 cm in diameter at breast height for roost potential and prepare a bat management plan (including vegetation felling protocols) as required.

9.3 GENERAL CONSTRUCTION EFFECTS

7. A suitably qualified erosion and sediment control specialist shall develop a comprehensive spill prevention and response plan tailored explicitly to construction. This plan shall include (but is not limited to):
    - Best practice erosion and sediment control for across each stage/phase
    - Restricted construction timeframes (i.e. low tide).
    - Monitoring requirements of the control management during works
    - Spill prevention and management.

9.4 WETLANDS

8. Wetland edge planting and pest plant control will be outlined in the Vegetation Management Plan as per above. In addition to this, a suitably qualified ecologist shall prepare a Wetland Reinstatement and Monitoring Plan to be provided to the council and approved prior to construction commencing. This plan shall include:
    - Areas of wetland to be reinstated and expected methodology[13].
    - Details of each wetlands current state (vegetation cover, vegetation conditions, fauna present, general health indicators).
    - Description of the wetlands setbacks available and their vegetation cover, composition and health.
    - Details of bi-yearly monitoring to be undertaken at each wetland area for a minimum of three years post-construction completion, as outlined in the New Zealand Handbook for Wetland Monitoring (Clarkson et al., 2004).

[13] It is acknowledged that this may require a separate resource consent for wetland restoration, which is not addressed by this report.

10. CONCLUSION

The proposed cycle trail has a number of ecological features of high value across its extent that have the potential to be impacted by the project. With careful management, these effects can be mitigated, with the reinstatement of wetland areas and avoidance of faunal injury or death by clearance management. The loss of 0.04 ha of wetland, which, while restricted to the edge and lower health areas and is minor in extent (0.003% of the wider wetlands systems within the project's footprint), is expected to be reinstated over the footprint, resulting in a low overall effect on wetlands.

11. APPENDIX A

11.1 ECIA FRAMEWORK

The following is taken from the second edition of the Ecological Impact Assessment ('EcIA') guidelines produced by EIANZ (Roper Lindsay et al., 2018). The table numbers are as per this document not this report.

Table 4: Attributes to consider when assigning ecological value or importance to a site or vegetation/habitat/community area. (Page 64)

Matters	Attributes to be considered
Representativeness	Criteria for representative vegetation and aquatic habitats: • Typical structure and composition • Indigenous species dominate • Expected species and tiers are present • Thresholds may need to be lowered where all examples of a type are strongly modified Criteria for representative species and species assemblages: • Species assemblages that are typical of the habitat • Indigenous species that occur in most of the guilds expected for the habitat type
Rarity/distinctiveness	Criteria for rare/distinctive vegetation and habitats: • Naturally uncommon, or induced scarcity • Amount of habitat or vegetation remaining • Distinctive ecological features • National priority for protection Criteria for rare/distinctive species or species assemblages: • Habitat supporting nationally Threatened or At-Risk species, or locally19 uncommon species • Regional or national distribution limits of species or communities • Unusual species or assemblages • Endemism
Diversity and Pattern	• Level of natural diversity, abundance and distribution • Biodiversity reflecting underlying diversity • Biogeographical considerations – pattern, complexity • Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation
Ecological context	• Site history, and local environmental conditions which have influenced the development of habitats and

Matters	Attributes to be considered
	communities • The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (from "Intrinsic value" as defined in RMA) • Size, shape and buffering • Condition and sensitivity to change • Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material • Species role in ecosystem functioning – high level, key species identification, habitat as proxy

Table 5 Factors to consider in assigning value to terrestrial species for EcIA (Pg. 67).

Determining factors	Value
Nationally Threatened species, found in the ZOI either permanently or seasonally	Very High
Species listed as At Risk – Declining, found in the ZOI, either permanently or seasonally	High
Species listed as any other category of At Risk, found in the ZOI either permanently or seasonally	Moderate
Locally (ED) uncommon or distinctive species	Moderate
Nationally and locally common indigenous species	Low
Exotic species, including pests, species having recreational value	Negligible

Section 5.2.2 Assessing terrestrial sites or areas using EcIA data:

Table 6. Scoring for sites or areas combining values for four matters in Table 4. (Pg. 69)

Value	Description
Very High	Area rates High for 3 or all of the four assessment matters listed in Table 4. Likely to be nationally important and recognised as such.
High	Area rates High for 2 of the assessment matters, Moderate and Low for the remainder, or Area rates High for 1 of the assessment maters, Moderate for the remainder. Likely to be regionally important and recognised as such.
Moderate	Area rates High for one matter, Moderate and Low for the remainder, or Area rates Moderate for 2 or more assessment matters Low or Very Low for the remainder. Likely to be important at the level of the Ecological District.

Value	Description
Low	Area rates Low or Very Low for majority of assessment matters and Moderate for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Area rates Very Low for 3 matters and Moderate, Low or Very Low for remainder.

Section 5.3 Assigning value to freshwater habitats:

Table 7. Matters that may be considered when assigning ecological value to a freshwater site or area (Pg.70).

Matters	Attributes to be assessed
Representativeness	• Extent to which site/catchment is typical or characteristic • Stream order • Permanent, intermittent or ephemeral waterway • Catchment size • Standing water characteristics
Rarity/distinctiveness	• Supporting nationally or locally Threatened, At Risk or uncommon species • National distribution limits • Endemism • Distinctive ecological features • Type of lake/pond/wetland/spring
Diversity and Pattern	• Level of natural diversity • Diversity metrics • Complexity of community • Biogeographical considerations - pattern, complexity, size, shape
Ecological context	• Stream order • Instream habitat • Riparian habitat • Local environmental conditions and influences, site history and development • Intactness, health and resilience of populations and communities • Contribution to ecological networks, linkages, pathways • Role in ecosystem functioning – high level, proxies

Table 10. Criteria for describing level of effects (Pg. 84).

Ecological Value→ **Magnitude↓**	**Very high**	**High**	**Moderate**	**Low**	**Negligible**
Very high	Very high	Very high	High	Moderate	Low
High	Very high	Very high	Moderate	Low	Very low
Moderate	High	High	Moderate	Low	Very low
Low	Moderate	Low	Low	Very low	Very low
Negligible	Low	Very low	Very low	Very low	Very low
Positive	Net gain	Net gain	Net gain	Net gain	Net gain

12. APPENDIX B

12.1 REFERENCES

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13. APPENDIX C

13.1 PLANT LIST

Scientific Name	Other Name	Status (Threat Status - de Lange et al. 2018). (Pest Status - Northland Regional Council, 2017).
Acacia dealbata	silver wattle	Exotic
Acacia lonigifolia	Sydney golden wattle	Exotic - Sustained Control - NRPMP
Adiantum hispidulum	rosy maidenhair	Not Threatened
Agapanthus praecox subsp. *orientalis*	agapanthus	Exotic - Sustained Control - NRPMP
Ageratina adenophora	Mexican devil	Exotic
Ageratina riparia	mist flower	Exotic
Agrostis capillaris	browntop	Exotic
Alectryon excelsus subsp. *excelsus*	tītoki	Not Threatened
Allium triquetrum	onion weed	Exotic
Alsophila tricolor	silver fern, ponga	Not Threatened
Anthoxanthum odoratum	sweet vernal	Exotic
Apodasmia similis	oioi, jointed wire rush	Not Threatened
Araujia hortorum	moth plant	Exotic
Arundo donax	giant reed	Exotic
Asplenium oblongifolium	huruhuruwhenua, shining spleenwort	Not Threatened
Astelia banksii	coastal astelia, shore kowharawhara	Not Threatened
Avicennia marina subsp. *australasica*	mangrove, manawa	Not Threatened | Qualifiers: SO
Bambusa sp.	bamboo	Exotic
Beilschmiedia tawa	tawa	Not Threatened
Brachyglottis kirkii var. *angustior*	kohurangi, kirk's tree daisy	Not Threatened
Brassica rapa var. *oleifera*	rape, wild turnip	Exotic
Callicarpa rubella		Exotic
Calystegia sepium subsp. *roseata*	pōhue, pink bindweed	Not Threatened | Qualifiers: SO
Cardamine hirsuta	bittercress	Exotic
Carex geminata	cutty grass, rautahi	Not Threatened

Scientific Name	Other Name	Status (Threat Status - de Lange et al. 2018). (Pest Status - Northland Regional Council, 2017).
Carex secta	purei, pukio	Not Threatened
Cenchrus clandestinus	kikuyu grass	Exotic
Cirsium vulgare	Scotch thistle	Exotic
Coprosma arborea	māmāngi, tree coprosma	Not Threatened
Coprosma lucida	karamū, shining karamū	Not Threatened
Coprosma propinqua var. *propinqua*	mingimingi	Not Threatened
Coprosma repens	taupata, looking glass plant	Not Threatened
Coprosma rhamnoides	mingimingi	Not Threatened
Coprosma robusta	karamū, glossy karamū	Not Threatened
Cordyline australis	tī kōuka, cabbage tree	Not Threatened
Cordyline banksii	tī ngahere, cabbage tree	Not Threatened
Cordyline fruticosa	tī pore, Pacific Island cabbage tree	Exotic
Coriaria arborea var. arborea	tutu, tree tutu	Not Threatened
Cortaderia selloana	pampas	Exotic
Corynocarpus laevigatus	karaka	Not Threatened
Cotoneaster franchetii	cotoneaster, Franchet's cotoneaster	Exotic - Sustained Control - NRPMP
Cotoneaster glaucophyllus	cotoneaster, large-leaved cotoneaster	Exotic - Sustained Control - NRPMP
Crocosmia xcrocosmiiflora	montbretia	Exotic
Crucifer sp.	Pānekeneke	Not Threatened
Cyperus ustulatus	coastal cutty grass	Not Threatened
Daucus carota	wild carrot	Exotic
Dianella haematica	swamp blueberry, swamp ink berry	Not Threatened | Qualifiers: DP
Dianella nigra	turutu, New Zealand blueberry	Not Threatened
Dicksonia squarrosa	wheki, rough tree fern	Not Threatened
Didymocheton spectabilis	kohekohe, New Zealand mahogany	Not Threatened
Diphasium scariosum	creeping clubmoss	Not Threatened | Qualifiers: SO
Doodia australis	rasp fern	Not Threatened | Qualifiers: SO
Elaeagnus xreflexa	eleagnus	Exotic - Sustained Control - NRPMP

Scientific Name	Other Name	Status (Threat Status - de Lange et al. 2018). (Pest Status - Northland Regional Council, 2017).
Eleocharis sphacelata	kuta	Not Threatened | Qualifiers: SO
Erica lusitanica	Spanish heath	Exotic
Erigeron bonariensis	wavy-leaved fleabane	Exotic
Erythrina xsykesii	coral tree, flame tree	Exotic
Eucalyptus sp.	eucalyptus	Exotic
Ficinia nodosa	wiwi, knobby club rush	Not Threatened | Qualifiers: SO
Foeniculum vulgare	fennel	Exotic
Fuchsia sp.	fuchsia	Exotic
Fumaria muralis subsp. *muralis*	scrambling fumitory	Exotic
Gahnia setifolia	māpere, gahnia	Not Threatened
Galium aparine	cleavers	Exotic
Geniostoma ligustrifolium var. *ligustrifolium*	hangehange	Not Threatened
Gleichenia dicarpa	tangle fern, swamp umbrella fern	Not Threatened | Qualifiers: SO
Hakea salicifolia	willow-leaved hakea	Exotic - Sustained Control - NRPMP
Hakea sericea	prickly hakea	Exotic - Sustained Control - NRPMP
Haloragis erecta subsp. *erecta*	toatoa, haloragis, fire weed	Not Threatened
Hedera helix	ivy	Exotic - Sustained Control - NRPMP
Hedycarya arborea	porokaiwhiri, pigeonwood	Not Threatened
Hedychium gardnerianum	wild ginger, kahili ginger	Exotic - Sustained Control - NRPMP
Hesperocyparis macrocarpa	macrocarpa	Exotic
Histiopteris incisa	histiopteris, water fern, mātātā,	Not Threatened | Qualifiers: SO
Holcus lanatus	Yorkshire fog	Exotic
Hydrangea macrophylla	hydrangea	Exotic
Hypericum androsaemum	tutsan	Exotic
Impatiens sodenii	sod's balsam, poor man's rhododendron	Exotic
Isachne globosa	swamp millet	Not Threatened
Isolepis cernua var. *cernua*	slender clubrush	Not Threatened | Qualifiers: SO
Isolepis prolifera		Not Threatened | Qualifiers: SO
Jasminum polyanthum	jasmine	Exotic - Sustained Control - NRPMP
Juncus edgariae	wīwī	wiwi, Edgar's rush

Scientific Name	Other Name	Status (Threat Status - de Lange et al. 2018). (Pest Status - Northland Regional Council, 2017).
Kunzea robusta	kānuka	Threatened – Nationally Vulnerable | Qualifiers: DP, De
Kunzea sp.	kānuka	Threatened – Nationally Vulnerable | Qualifiers: DP, De
Lathyrus latifolius	everlasting pea	Exotic
Lemna disperma	common duckweed, kārearea	Not Threatened
Leptospermum scoparium var. *scoparium*	mānuka, kahikātoa	At Risk – Declining | Qualifiers: DP, De
Leucanthemum vulgare	oxeye daisy	Exotic
Leucopogon fasciculatus	mingimingi, tall mingimingi	Not Threatened
Ligustrum lucidum	tree privet	Exotic - Sustained Control - NRPMP
Ligustrum sinense	Chinese privet	Exotic - Sustained Control - NRPMP
Lolium arundinaceum subsp. *arundinaceum*	tall fescue	Exotic
Lonicera japonica	Japanese honeysuckle	Exotic
Lophospermum erubescens	Mexican twist, creeping gloxinia	Exotic
Lotus pedunculatus	lotus	Exotic
Machaerina teretifolia	pakihi rush	Not Threatened | Qualifiers: SO
Medicago lupulina	black medick	Exotic
Melicytus ramiflorus subsp. *ramiflorus*	māhoe, whiteywood	Not Threatened
Metrosideros excelsa	pōhutukawa	Threatened – Nationally Vulnerable | Qualifiers: DP, De
Metrosideros perforata	akatea	Threatened – Nationally Vulnerable | Qualifiers: DP, De
Muehlenbeckia complexa var. *complexa*	small-leaved pōhuehue, scrub pōhuehue	Not Threatened | Qualifiers: SO
Muehlenbeckia complexa var. *grandifolia*	pōhuehue	Data Deficient
Myosotis sylvatica	garden forget-me-not	Exotic
Myrsine australis	māpou	Not Threatened
Nephrolepis cordifolia	tuber sword fern	Exotic
Oenanthe pimpinelloides	parsley dropwort	Exotic
Olearia furfuracea	akepiro	Not Threatened
Oplismenus hirtellus subsp. *imbecillis*	basket grass	Not Threatened

Scientific Name	Other Name	Status (Threat Status - de Lange et al. 2018). (Pest Status - Northland Regional Council, 2017).
Oxalis pes-caprae	Bermuda buttercup	Exotic
Paesia scaberula	lace fern, ring fern, mātātā	Not Threatened
Pakau pennigera	gully fern, feather fern, piupiu, pākauroharoha	Not Threatened | Qualifiers: TO
Palhinhaea cernua	Lycopodium cernuum, waewae kiore	Not Threatened | Qualifiers: SO
Parablechnum novae-zelandiae	kiokio	Not Threatened
Parablechnum novae-zelandiae	kiokio	Not Threatened
Paraserianthes lophantha	brush wattle	Exotic - Sustained Control - NRPMP
Passiflora apetala	bat-wing passionflower	Exotic - Eradication Plants - NRPMP
Passiflora edulis f. edulis	black passionfruit	Exotic
Persicaria sp.	willow weed	Exotic
Phormium tenax	flax, harakeke, kōrari	Not Threatened | Qualifiers: SO
Phyllocladus trichomanoides	tānekaha, celery pine	Not Threatened
Phytolacca octandra	inkweed	Exotic
Pinus radiata	radiata pine	Exotic - Sustained Control - NRPMP
Piper excelsum subsp. *excelsum*	kawakawa, pepper tree	Not Threatened
Pittosporum crassifolium	karo	Not Threatened
Pittosporum umbellatum	haekaro	Not Threatened
Plagianthus divaricatus	salt marsh ribbonwood, mākaka	Not Threatened
Plantago lanceolata	narrow-leaved plantain	Exotic
Podocarpus totara var. *totara*	tōtara	Not Threatened
Polygala myrtifolia	sweet pea shrub	Exotic
Pomaderris kumeraho	kumarahou, gum-digger's soap	Not Threatened
Prunus campanulata	bell-flowered cherry, Taiwan cherry	Exotic - Sustained Control - NRPMP
Prunus xdomestica	plum	Exotic
Pseudognaphalium luteoalbum	jersey cudweed	Not Threatened
Pseudopanax arboreus	five finger, whauwhaupaku	Not Threatened
Pseudopanax crassifolius	horoeka, lancewood	Not Threatened
Pteridium esculentum	bracken, rarauhe	Not Threatened | Qualifiers: SO
Pteris tremula	shaking brake	Not Threatened | Qualifiers: SO

Scientific Name	Other Name	Status (Threat Status - de Lange et al. 2018). (Pest Status - Northland Regional Council, 2017).
Pterophylla sylvicola	towai, tawhero	Not Threatened
Pyrrosia elaeagnifolia	leather-leaf fern, pyrrosia	Not Threatened
Quercus robur	oak, European oak	Exotic
Ranunculus sp.	Underwater ranunculus	
Rhaphiolepis bibas	loquat	Exotic
Rhopalostylis sapida	nīkau	Not Threatened
Roldana petasitis	velvet groundsel	Exotic - Sustained Control - NRPMP
Rosa rubiginosa	sweet brier	Exotic
Rubus cissoides	tātarāmoa, bush lawyer	Not Threatened
Salicornia quinqueflora	glasswort	Not Threatened
Salix sp.	willow	Exotic
Schefflera digitata	patē, seven-finger	Not Threatened
Scirpus sp.		
Selaginella kraussiana	Selaginella, African clubmoss	Exotic
Senecio bipinnatisectus	Australian fireweed	Not Threatened | Qualifiers: SO
Solanum mauritianum	woolly nightshade	Exotic - Sustained Control - NRPMP
Solanum nigrum	black nightshade, poroporo	Not Threatened
Sonchus asper	prickly sow thistle	Exotic
Sonchus kirkii	puha, shore puha, New Zealand sow thistle	At Risk – Declining
Sonchus oleraceus	sow thistle	Exotic
Sphaeropteris medullaris	mamaku, black tree fern	Not Threatened
Sphagnum perichaetiale	sphagnum moss, angiangi	Range Restricted | Qualifiers: DP, SO
Stachys sylvatica	hedge woundwort	Exotic
Stenotaphrum secundatum	buffalo grass	Exotic
Sticherus cunninghamii	umbrella fern, waekura	Not Threatened
Syagrus romanzoffiana	Queen palm	Exotic
Syzygium smithii	lilly pilly, monkey apple	Exotic
Taraxacum officinale agg.	dandelion	Exotic
Tradescantia fluminensis	tradescantia, wandering dew	Exotic
Typha orientalis	raupō, bullrush	Not Threatened | Qualifiers: SO

Scientific Name	**Other Name**	**Status (Threat Status - de Lange et al. 2018). (Pest Status - Northland Regional Council, 2017).**
Ulex europaeus	gorse	Exotic - Sustained Control - NRPMP
Vallisneria australis	eel grass	Exotic - Eradication Freshwater - NRPMP
Verbena officinalis	vervain	Exotic
Veronica salicifolia	koromiko	Not Threatened | Qualifiers: SO
Veronica stricta var. *stricta*	koromiko	Not Threatened
Vitex lucens	pūriri	Not Threatened
Zantedeschia aethiopica	arum lily	Exotic
Zantedeschia aethiopica 'Green Goddess'	green goddess	Exotic
Zealandia pustulata subsp. *pustulata*	hounds tongue fern	Not Threatened

14. APPENDIX D

14.1 DETAILED ASSESSMENT OF ECOLOGICAL VALUES AGAINST CRITERIA

Ecological Feature	Assessment against Criteria[14] a) Representativeness b) Rarity/distinctiveness c) Diversity and Pattern d) Ecological Context	Ecological Value for Each Matter[15]	Combined Ecological Value
Exotic Scrub	**a.** It is not representative of a native ecosystem and is strongly modified. **b.** Not uncommon or native, with no distinctive features **c.** Low level of diversity, providing some habitat for common forest birds **d.** Modified and exotic, low contribution to the wider ecological connectivity.	**a.** Very Low **b.** Low **c.** Low **d.** Very Low	Negligible
Kānuka Shrubland	**a.** Typical structure and a native ecosystem with some modification **b.** It is not uncommon, but it is native. **c.** A moderate level of diversity provides habitat for a range of forest birds. **d.** High connectivity to the wider forested environs.	**a.** Low **b.** Low **c.** Moderate **d.** Moderate	Moderate
Threatened Plants	**a.** No threatened species noted **b.** Not unusual or scarce species **c.** Moderate level of diversity but not threatened species **d.** Threatened species found in the wider area	**a.** Low **b.** Low **c.** Low **d.** Moderate	Low
Birds – species and habitat	**a.** Natural habitat and sites for nationally critical and declining species **b.** Nationally critical and declining species found adjacent to the zone of impact.	**a.** Very High **b.** Very High	Very High

[14] Table 4, in the EIANZ guidelines – Attributes to be considered when assigning ecological value or importance to a site or area of vegetation/habitat/community.
[15] As scored in Table 6 within the EIANZ guidelines – Scoring for sites or areas combining values for four matters in Table 4.

Ecological Feature	Assessment against Criteria[14] a) Representativeness b) Rarity/distinctiveness c) Diversity and Pattern d) Ecological Context	Ecological Value for Each Matter[15]	Combined Ecological Value
	c. There is a high level of diversity for wetland and marine birds, with lower diversity in terrestrial. **d.** Using habitat as a proxy, habitat is available both in the ZOI and wider site connectivity over a range of ecotones.	**c.** High **d.** Very high	
Bat species and habitat	**a.** Using habitat as a proxy, there is no habitat within the ZOI, but some habitat and resources available in the wider area. **b.** There are no records from the area, with the closest being 4km in a managed forested area. **c.** Nationally threatened species are present in the wider area, but there is a low likelihood of bats present within the ZOI. **d.** Likely to have a limited role in the ecosystem functioning at the ZOI	**a.** Low **b.** Low **c.** High **d.** Low	High
Lizard species and habitat	**a.** Modified habitat, creating sites for at-risk and declining species. **b.** At-risk declining species found in the zone of impact and in the wider area. **c.** Using habitat as a proxy, there is likely to be a moderate diversity of lizard species present. **d.** Using habitat as a proxy, habitat is available both in the ZOI and wider site connectivity over a range of ecotones.	**a.** High **b.** Very High **c.** Moderate **d.** High	High
Invertebrate species and habitat	**a.** Modified habitat creates a low-value habitat for threatened terrestrial snails. **b.** Low likelihood of presence, but potential for two threatened snail species. **c.** Low diversity expected.	**a.** Low **b.** High **c.** Low	Low-Moderate

Ecological Feature	Assessment against Criteria[14] a) Representativeness b) Rarity/distinctiveness c) Diversity and Pattern d) Ecological Context	Ecological Value for Each Matter[15]	Combined Ecological Value
	d. Connected habitat known to have limited (if any) populations as well, but hosts habitat and resource for snails.	**d.** Low	
Freshwater Environs (wider environment as no freshwater environs within the project)	**a.** Typical structure and representative of a number of different systems and sizes on the wider catchment scale **b.** Large distinctive feature that contains habitat for a range of threatened species **c.** A diverse range of habitats is available, and there is high diversity at the catchment scale, although heavily modified areas **d.** Very connected and complex environs that span from freshwater to marine.	**a.** High **b.** High **c.** Moderate **d.** High	Very High
Marine Environs	**a.** Typical structure and representative of a number of different systems and sizes on the wider catchment scale **b.** Large distinctive feature that contains habitat for a range of threatened species **c.** A diverse range of habitats is available, and there is high diversity at the catchment scale, although heavily modified areas **d.** Very connected and complex environs that span from estuarine to marine open water.	**a.** High **b.** High **c.** Moderate **d.** High	Very High
Mangrove Wetlands - System and habitat	**a.** Typical structure and composition of the mangroves across the project in alignment with wider ED **b.** Increasing ecosystem, not at risk, habitat value moderate for feeding grounds for birds **c.** Low level of diversity naturally	**a.** High **b.** Moderate **c.** Low **d.** Moderate	Moderate

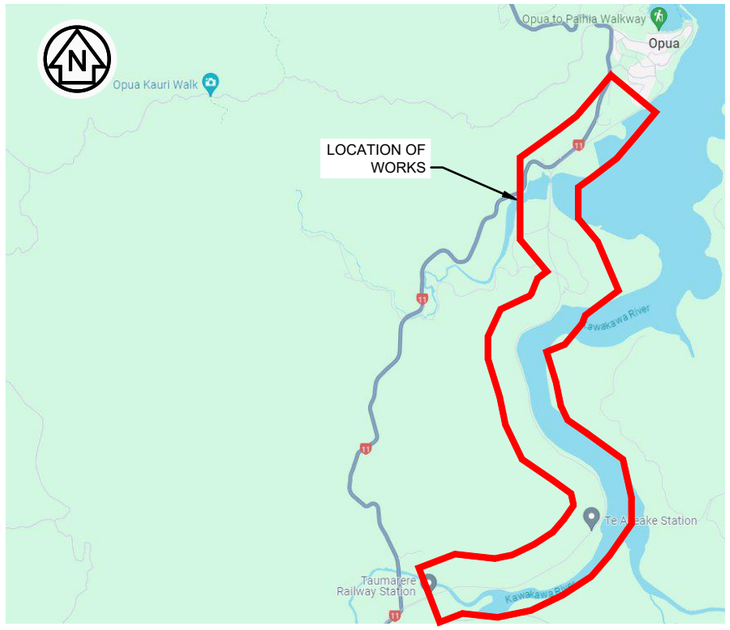
Ecological Feature	Assessment against Criteria[14] a) Representativeness b) Rarity/distinctiveness c) Diversity and Pattern d) Ecological Context	Ecological Value for Each Matter[15]	Combined Ecological Value
	d. Large areas of mangrove with low fragility		
Oioi Wetlands (Saltmarsh) - System and habitat	**a.** At a project scale, the salt marsh was heavily modified and not representative as the majority is an edge. Within the wider ED scale, the saltmarsh has been mapped as extensive with areas of "significant saltmarsh" where the areas exceed 0.5ha (Macdonald et al., 2020) **b.** At the ED scale, saltmarsh is an ecosystem that is declining as mangroves expand and coastal foreshore development continues (Swales et al., 2012)). **c.** Low level of diversity naturally **d.** Within the project footprint areas are small and have limited buffers, resulting in low resilience compared to the larger intact areas outside the footprint.	**a.** High **b.** High **c.** Moderate **d.** Moderate	High
Mingimingi Wetlands - System and habitat	**a.** At a project scale, the mingimingi was somewhat modified and not representative as the majority is an edge. In the broader site and at an ED scale, mingimingi wetland was present in larger areas, although not extensively. **b.** The mingimingi wetland type forms part of the regionally significant 'Saltmarsh ribbonwood–*Bolboschoenus* sp.–*Coprosma* sp.–harakeke association in upper estuaries' as identified in the Whangaruru Ecological District (Booth, 2005), although this ecotype is not commented on within the Kerikeri ED. **c.** Very diverse, intact and forming component of the wider estuarine/wetland complex at the project location.	**a.** Moderate **b.** High **c.** High **d.** Moderate	High

Ecological Feature	Assessment against Criteria[14] a) Representativeness b) Rarity/distinctiveness c) Diversity and Pattern d) Ecological Context	Ecological Value for Each Matter[15]	Combined Ecological Value
	d. Within the project footprint areas are small but have vegetative buffers, resulting in low-moderate resilience compared to the larger intact areas outside the footprint.		
Raupō Kuta Wetlands - System and habitat	**a.** Not representative of this ecosystem at the project footprint scale, although there are representative areas at the wider area and ED scales. **b.** Raupō wetland types are common in the wider ED (Conning and Miller, 1999) **c.** Moderate level of diversity as expected for the size and wetland type. **d.** Within the project footprint, areas are small, and some areas are drains that have been filled with raupō expansion. This results in low-moderate resilience both within the project footprint and the wider area/ ED.	**a.** High **b.** Moderate **c.** Moderate **d.** Moderate	High

Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

KAWAKAWA TO OPUA CYCLE TRAIL

CONSENT DRAWINGS



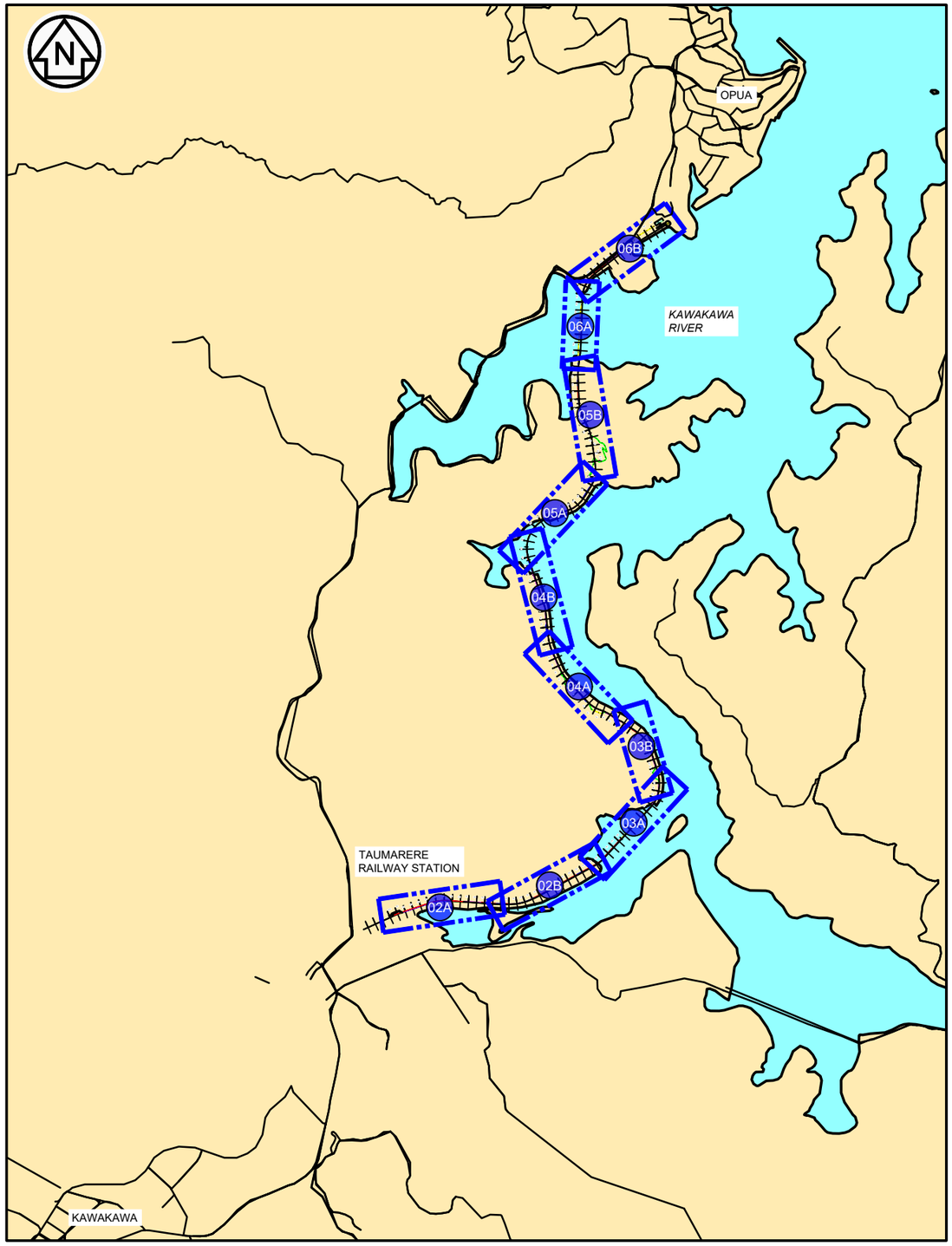
LOCALITY PLAN
NTS

VISUALISATION

DATE: NOV. 2024

JAS CIVIL LTD

2209-RC-00



INDEX PLAN
SCALE: NOT TO SCALE

DRAWING LIST

DRAWING No: 2209 **JOB NUMBER: 2209-RC**

SHEET No.	SHEET TITLE	REVISION
	DAY	4
	MONTH	11
	YEAR	24
00	COVER SHEET, LOCALITY PLAN	1
01	INDEX PLAN & SHEET LIST	1
02	CONSENT DRAWINGS - CHN 4620 TO 5590	1
04	CONSENT DRAWINGS - CHN 5590 TO 6770	1
05	CONSENT DRAWINGS - CHN 6770 TO 8130	1
06	CONSENT DRAWINGS - CHN 8130 TO 9870	1
07	CONSENT DRAWINGS - CHN 9870 TO 10940	1
08	CONSENT DRAWINGS - TYPICAL CROSS SECTION `A' & VISUALISATION	1
09	CONSENT DRAWINGS - TYPICAL CROSS SECTION `B' & VISUALISATION	1
10	CONSENT DRAWINGS - TYPICAL CROSS SECTION `C'	1
11	CONSENT DRAWINGS - TYPICAL CROSS SECTION `D' & VISUALISATION	1
12	CONSENT DRAWINGS - TYPICAL CROSS SECTION `E' & VISUALISATION	1
13	CONSENT DRAWINGS - TYPICAL CROSS SECTION `F' & VISUALISATION	1
14	CONSENT DRAWINGS - TYPICAL CROSS SECTION `G' & VISUALISATION	1
15	CONSENT DRAWINGS - TYPICAL CROSS SECTION `H'	1
16	CONSENT DRAWINGS - TYPICAL CROSS SECTION `I' & VISUALISATION	1
17	CONSENT DRAWINGS - TYPICAL CROSS SECTION `J' & VISUALISATION	1
18	CONSENT DRAWINGS - TYPICAL CROSS SECTION `J1' & VISUALISATION	1
19	CONSENT DRAWINGS - TYPICAL CROSS SECTION `K' & VISUALISATION	1
20	CONSENT DRAWINGS - TYPICAL CROSS SECTION `L' & VISUALISATION	1
21	CONSENT DRAWINGS - TYPICAL CROSS SECTION `M' & VISUALISATION	1

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL
CONSENT DRAWINGS

INDEX PLAN & SHEET LIST

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	01	1

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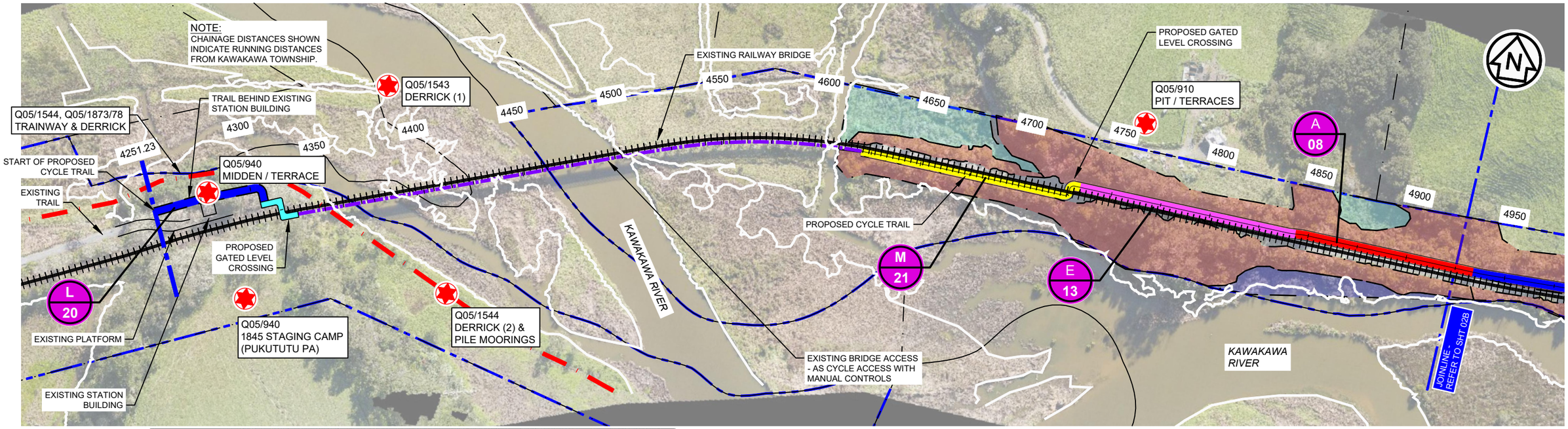
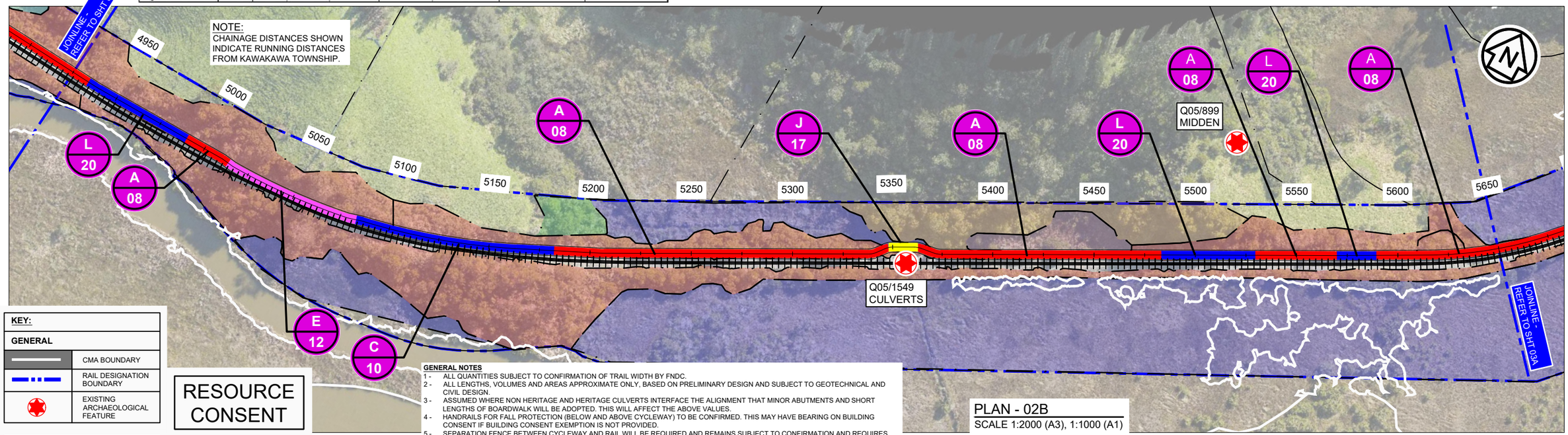


	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m³)	Total Volume of Permanent earthworks - Fill Material (m³)
Dwg 2 - 4620 to 5590m	760	733	115	162	0	3076	600	809

PLAN - 02A
SCALE 1:2000 (A3), 1:1000 (A1)



PLAN - 02B
SCALE 1:2000 (A3), 1:1000 (A1)

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

KEY:

GENERAL

	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

KEY:

ECOLOGY AREAS

	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

RESOURCE CONSENT

KEY:

TRAIL CROSS SECTIONAL TREATMENTS		REFERENCE
	TREATMENT 1 - BOARDWALK	(J)(J1)(K)(M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A)(B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

GENERAL NOTES

1 - ALL QUANTITIES SUBJECT TO CONFIRMATION OF TRAIL WIDTH BY FNDC.
2 - ALL LENGTHS, VOLUMES AND AREAS APPROXIMATE ONLY, BASED ON PRELIMINARY DESIGN AND SUBJECT TO GEOTECHNICAL AND CIVIL DESIGN.
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7- DO NOT SCALE DRAWING.
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9- COORDINATES IN TERMS OF NZTM GEODETIC 2000 DATUM.
10- LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
11- AERIAL PHOTOGRAPHY AND LAND PARCEL INFORMATION SOURCED FROM LAND INFORMATION NZ (LINZ) UNLESS STATED OTHERWISE.

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE	KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS CHN 4620 TO 5590
	PLAN
STATUS	RESOURCE CONSENT
LOCAL AUTHORITY REF:	
SCALE	SHOWN
PLOT DATE	
JOB	2209-RC
SHEET	02
REVISION	1

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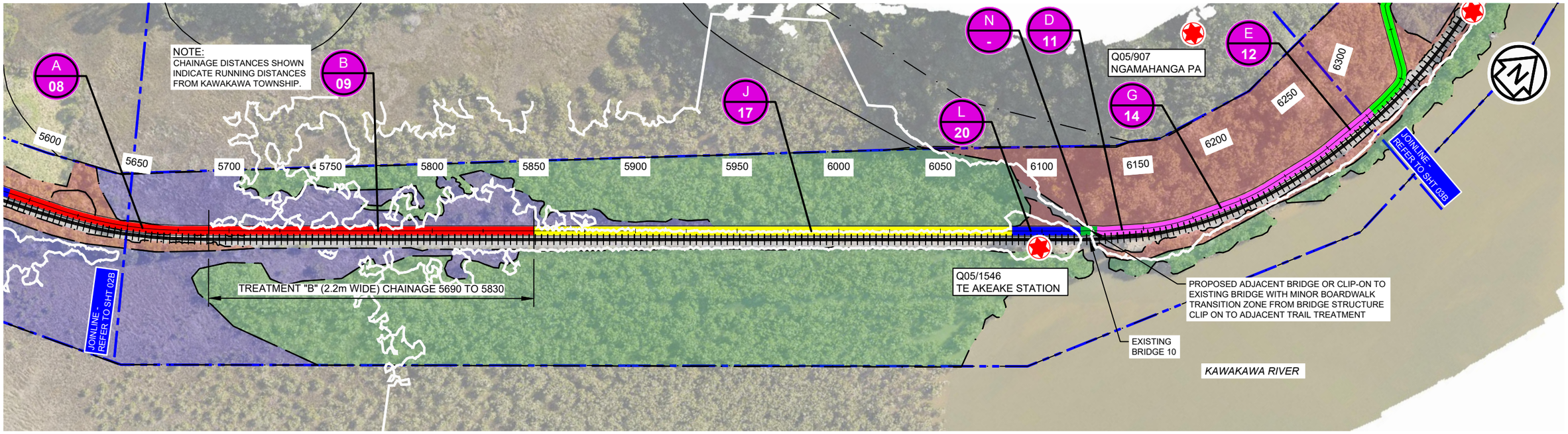

	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m³)	Total Volume of Permanent earthworks - Fill Material (m³)
Dwg 3 - 5590 to 6770m	1045	1058	235	705	382	3270	297	1821

PLAN 03A
SCALE 1:2000 (A3), 1:1000 (A1)

GENERAL NOTES

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7- DO NOT SCALE DRAWING.
8- NOMINAL SCALE IS SHOWN FOR A3 SIZE UNLESS SHOWN OTHERWISE.
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10- LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
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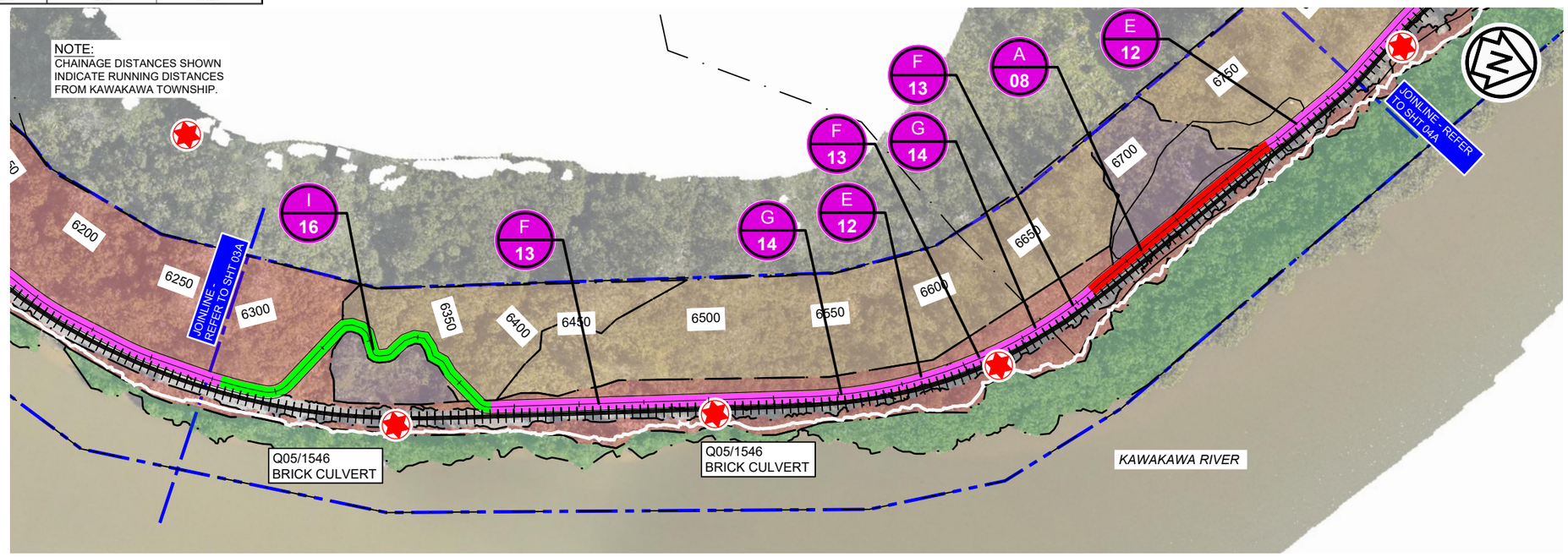

PLAN 03B
SCALE 1:2000 (A3), 1:1000 (A1)

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

KEY:

GENERAL

	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

KEY:

ECOLOGY AREAS

	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

RESOURCE CONSENT

KEY:

TRAIL CROSS SECTIONAL TREATMENTS		REFERENCE
	TREATMENT 1 - BOARDWALK	(J)(J1)(K)(M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A)(B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
CONSENT DRAWINGS
CHN 5590 TO 6770

PLAN

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	03	1

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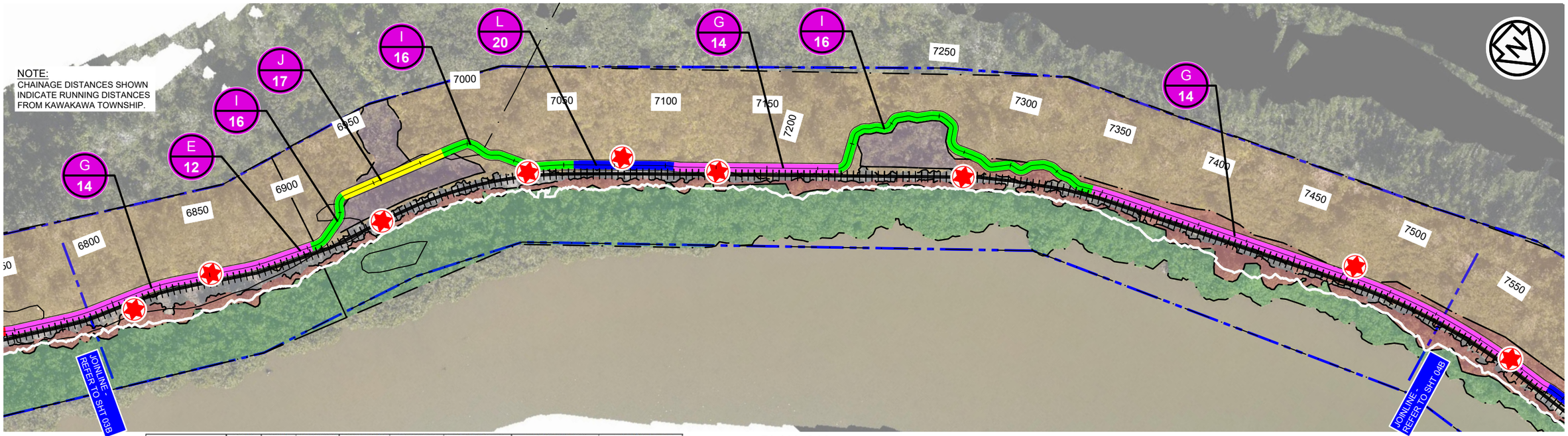
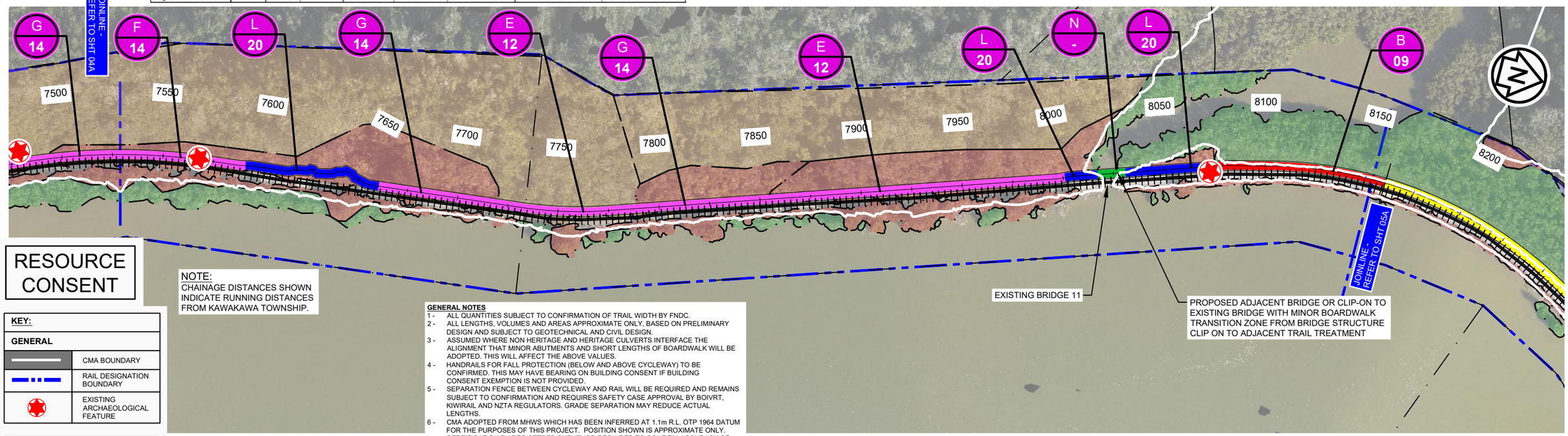


	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m³)	Total Volume of Permanent earthworks - Fill Material (m³)
Dwg 4 - 6770 to 8130m	1911	2313	53	159	116	5610	2081	1360

PLAN -04A
SCALE 1:2000 (A3), 1:1000 (A1)



PLAN 04B
SCALE 1:2000 (A3), 1:1000 (A1)

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

RESOURCE CONSENT

NOTE:
CHAINAGE DISTANCES SHOWN INDICATE RUNNING DISTANCES FROM KAWAKAWA TOWNSHIP.

KEY:

GENERAL

- CMA BOUNDARY
- RAIL DESIGNATION BOUNDARY
- EXISTING ARCHAEOLOGICAL FEATURE

KEY:

ECOLOGY AREAS

- EXOTIC
- KANUKA
- MANGROVE
- MINGIMINGI
- OIOI RUSHLAND
- RAUPO
- RAUPO/ KUTA

KEY:

TRAIL CROSS SECTIONAL TREATMENTS		REFERENCE
	TREATMENT 1 - BOARDWALK	(J) (J1) (K) (M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A) (B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D) (E) (F) (G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C) (H) (L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

GENERAL NOTES

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
CONSENT DRAWINGS
CHN 6770 TO 8130

PLAN

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	04	1

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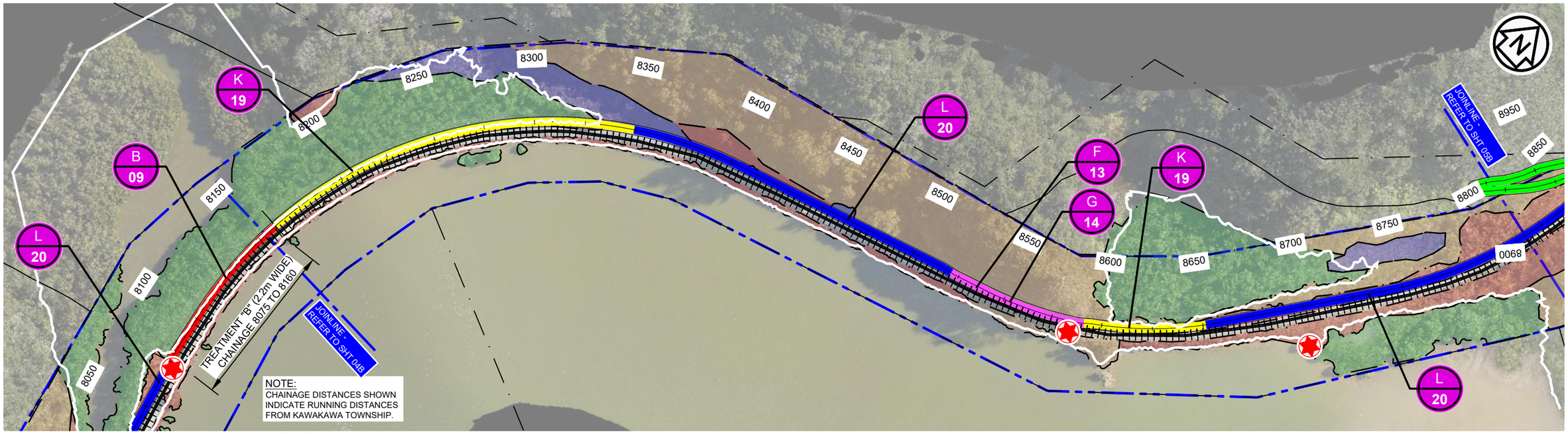
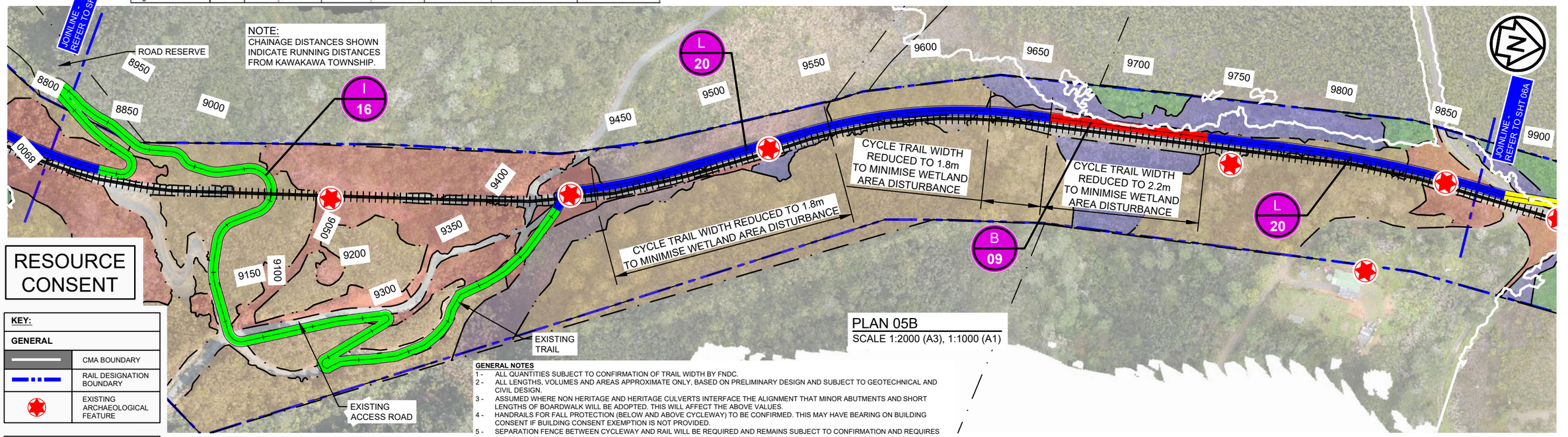


	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m³)	Total Volume of Permanent earthworks - Fill Material (m³)
Dwg 5 - 8130 to 9870m	370	226	250	750	228	5210	1357	1335

PLAN 05A
SCALE 1:2000 (A3), 1:1000 (A1)



PLAN 05B
SCALE 1:2000 (A3), 1:1000 (A1)

RESOURCE CONSENT

KEY:	
GENERAL	
	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

KEY:	
ECOLOGY AREAS	
	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

KEY:		
TRAIL CROSS SECTIONAL TREATMENTS		REFERENCE
	TREATMENT 1 - BOARDWALK	(J)(J1)(K)(M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A)(B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

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1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24
AMENDMENT	APPRVD	DATE

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
CONSENT DRAWINGS
CHN 8130 TO 9870

PLAN

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	05	1

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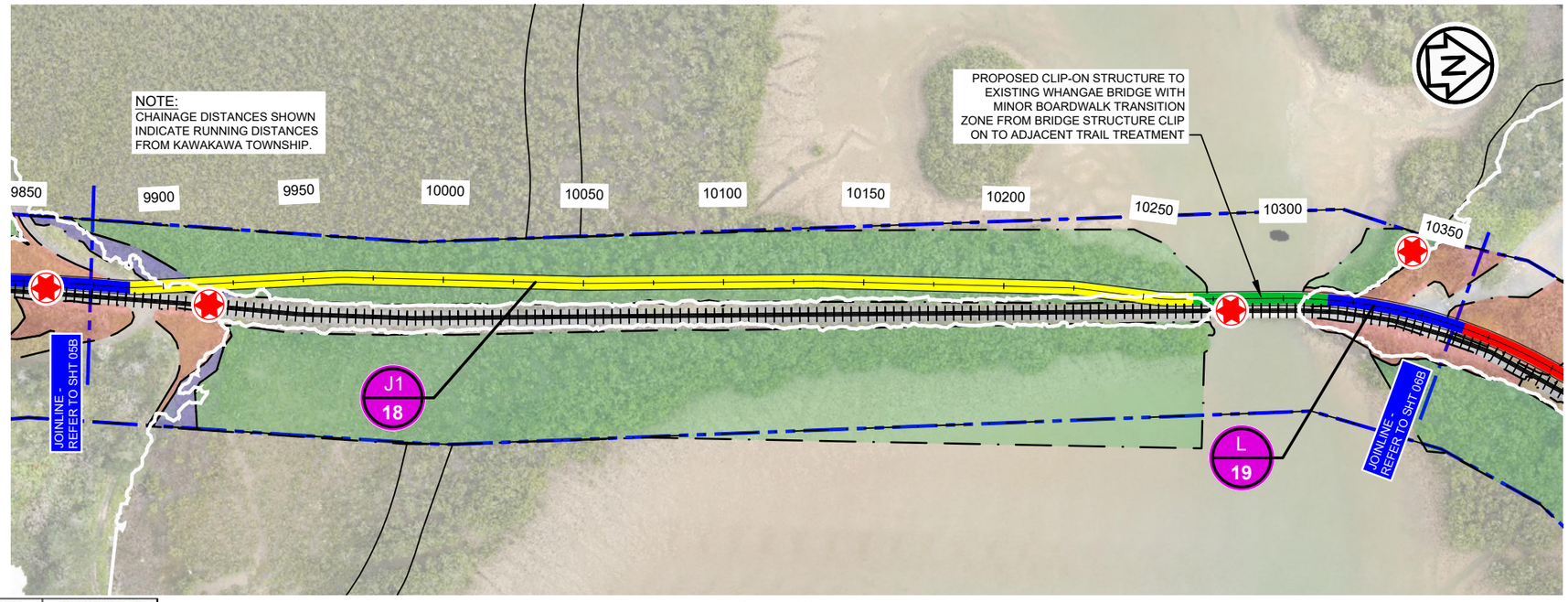
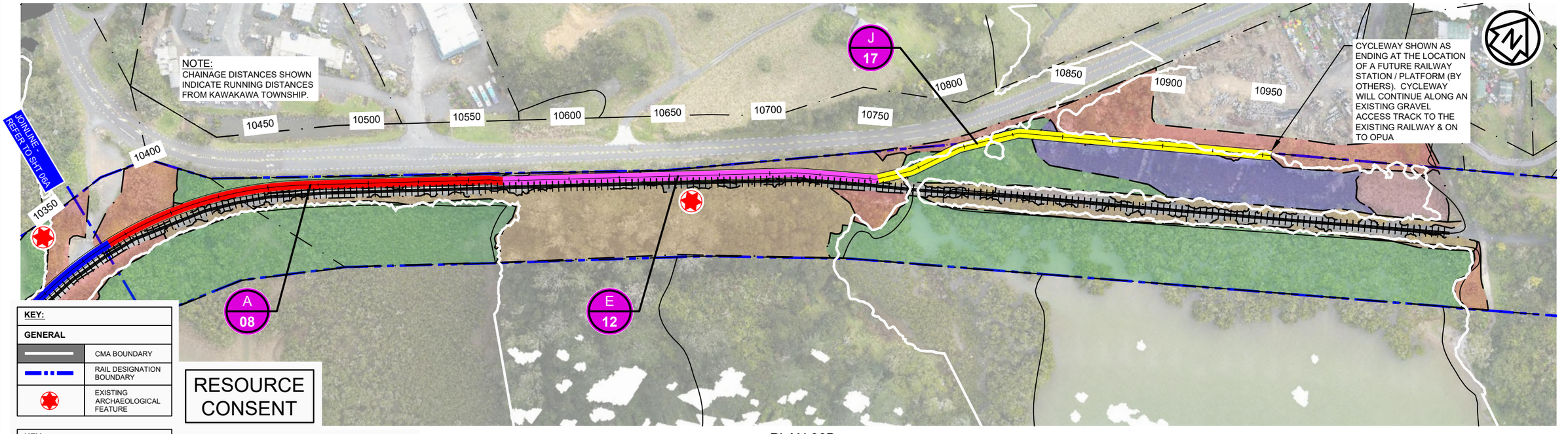
11- AERIAL PHOTOGRAPHY AND LAND PARCEL INFORMATION SOURCED FROM LAND INFORMATION NZ (LINZ) UNLESS STATED OTHERWISE.



	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m³)	Total Volume of Permanent earthworks - Fill Material (m³)
Dwg 6 - 9870 to 10940m	250	189	580	1740	1634	1720	221	366

PLAN 06A
SCALE 1:2000 (A3), 1:1000 (A1)



PLAN 06B
SCALE 1:2000 (A3), 1:1000 (A1)

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

KEY:

GENERAL	
	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

KEY:

ECOLOGY AREAS	
	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

KEY:

TRAIL CROSS SECTIONAL TREATMENTS		REFERENCE
	TREATMENT 1 - BOARDWALK	(J)(J1)(K)(M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A)(B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

RESOURCE CONSENT

1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24
AMENDMENT	APPRVD	DATE

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE	KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS CHN 9870 TO 10940
	PLAN
STATUS	RESOURCE CONSENT
LOCAL AUTHORITY REF:	
SCALE	SHOWN
PLOT DATE	
JOB	2209-RC
SHEET	06
REVISION	1

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KEY:	
GENERAL	
	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

KEY:	
ECOLOGY AREAS	
	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

KEY:		
TRAIL CROSS SECTIONAL TREATMENTS		**REFERENCE**
	TREATMENT 1 - BOARDWALK	(J)(J1)(K)(M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A)(B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

PROJECT QUANTITY SUMMARY

Earthworks	Volume (m³)
Fill (solid)	5691
Cut (solid)	4556
Import Fill (solid)	1135

	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m²)	Total Volume of Permanent earthworks - Fill Material (m²)
Dwg 2 - 4620 to 5590m	760	733	115	162	0	3076	600	809
Dwg 3 - 5590 to 6770m	1045	1058	235	705	382	3270	297	1821
Dwg 4 - 6770 to 8130m	1911	2313	53	159	116	5610	2081	1360
Dwg 5 - 8130 to 9870m	370	226	250	750	228	5210	1357	1335
Dwg 6 - 9870 to 10940m	250	189	580	1740	1634	1720	221	366
TOTAL	4336	4519	1233	3516	2360	18886	4556	5691

NOTE:
CHAINAGE DISTANCES SHOWN INDICATE RUNNING DISTANCES FROM KAWAKAWA TOWNSHIP.

RESOURCE CONSENT

GENERAL NOTES

1 - ALL QUANTITIES SUBJECT TO CONFIRMATION OF TRAIL WIDTH BY FNDC.
2 - ALL LENGTHS, VOLUMES AND AREAS APPROXIMATE ONLY, BASED ON PRELIMINARY DESIGN AND SUBJECT TO GEOTECHNICAL AND CIVIL DESIGN.
3 - ASSUMED WHERE NON HERITAGE AND HERITAGE CULVERTS INTERFACE THE ALIGNMENT THAT MINOR ABUTMENTS AND SHORT LENGTHS OF BOARDWALK WILL BE ADOPTED. THIS WILL AFFECT THE ABOVE VALUES.
4 - HANDRAILS FOR FALL PROTECTION (BELOW AND ABOVE CYCLEWAY) TO BE CONFIRMED. THIS MAY HAVE BEARING ON BUILDING CONSENT IF BUILDING CONSENT EXEMPTION IS NOT PROVIDED.
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6 - CMA ADOPTED FROM MHWS WHICH HAS BEEN INFERRED AT 1.1m R.L. OTP 1964 DATUM FOR THE PURPOSES OF THIS PROJECT. POSITION SHOWN IS APPROXIMATE ONLY. CERTIFICATION BY REGISTERED SURVEYOR REQUIRED TO CONFIRM ACCURACY OF LINE.
7- DO NOT SCALE DRAWING.
8- NOMINAL SCALE IS SHOWN FOR A3 SIZE UNLESS SHOWN OTHERWISE.
9- COORDINATES IN TERMS OF NZTM GEODETIC 2000 DATUM.
10- LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

KEY & PROJECT IMPACT SUMMARIES

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	07	1

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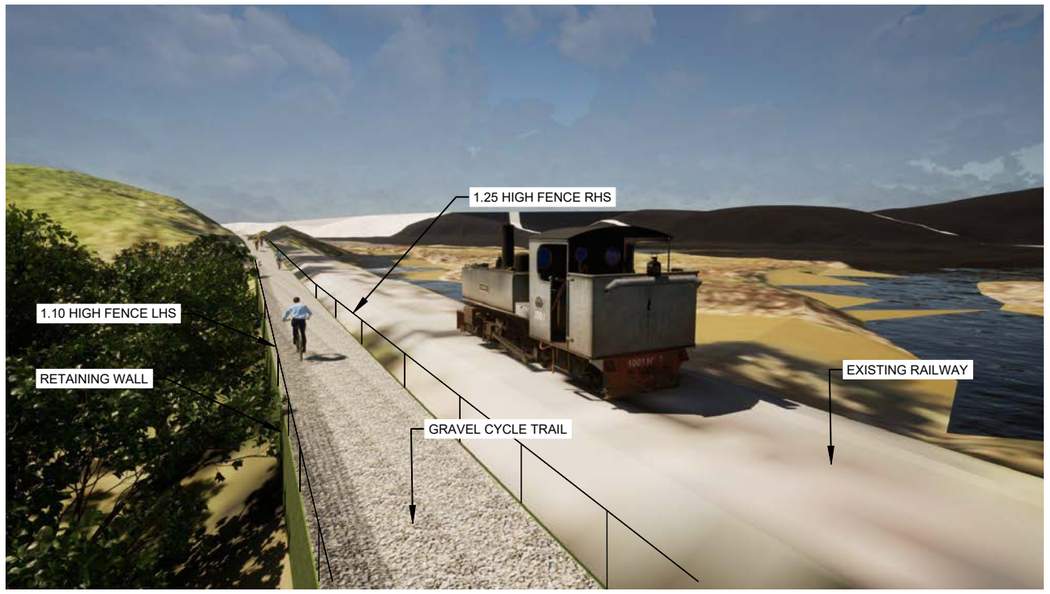
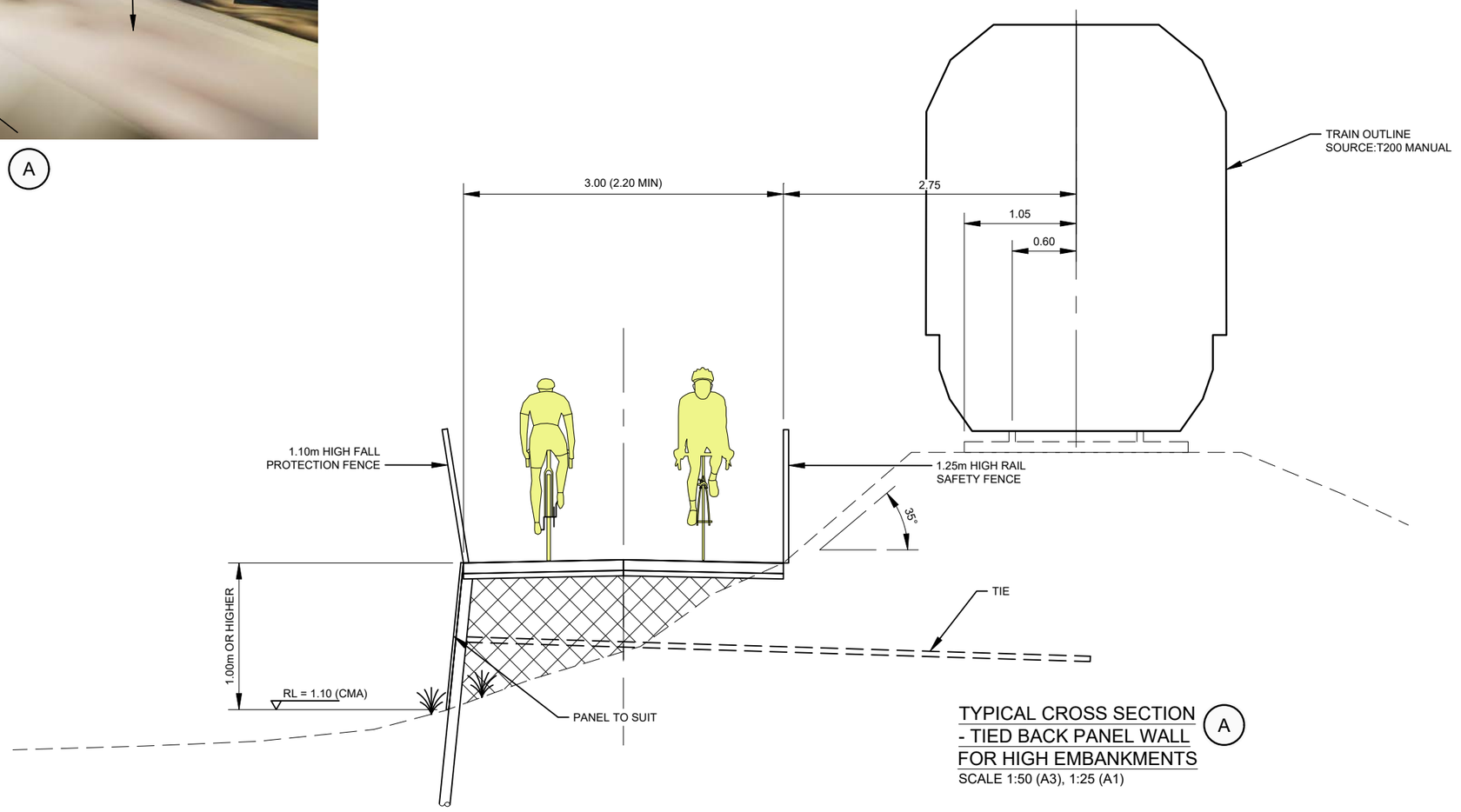


VISUALISATION - TIED BACK PANEL WALL FOR HIGH EMBANKMENTS (A)
NTS



TYPICAL CROSS SECTION - TIED BACK PANEL WALL FOR HIGH EMBANKMENTS (A)
SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

GENERAL NOTES

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council — Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `A' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	08	1

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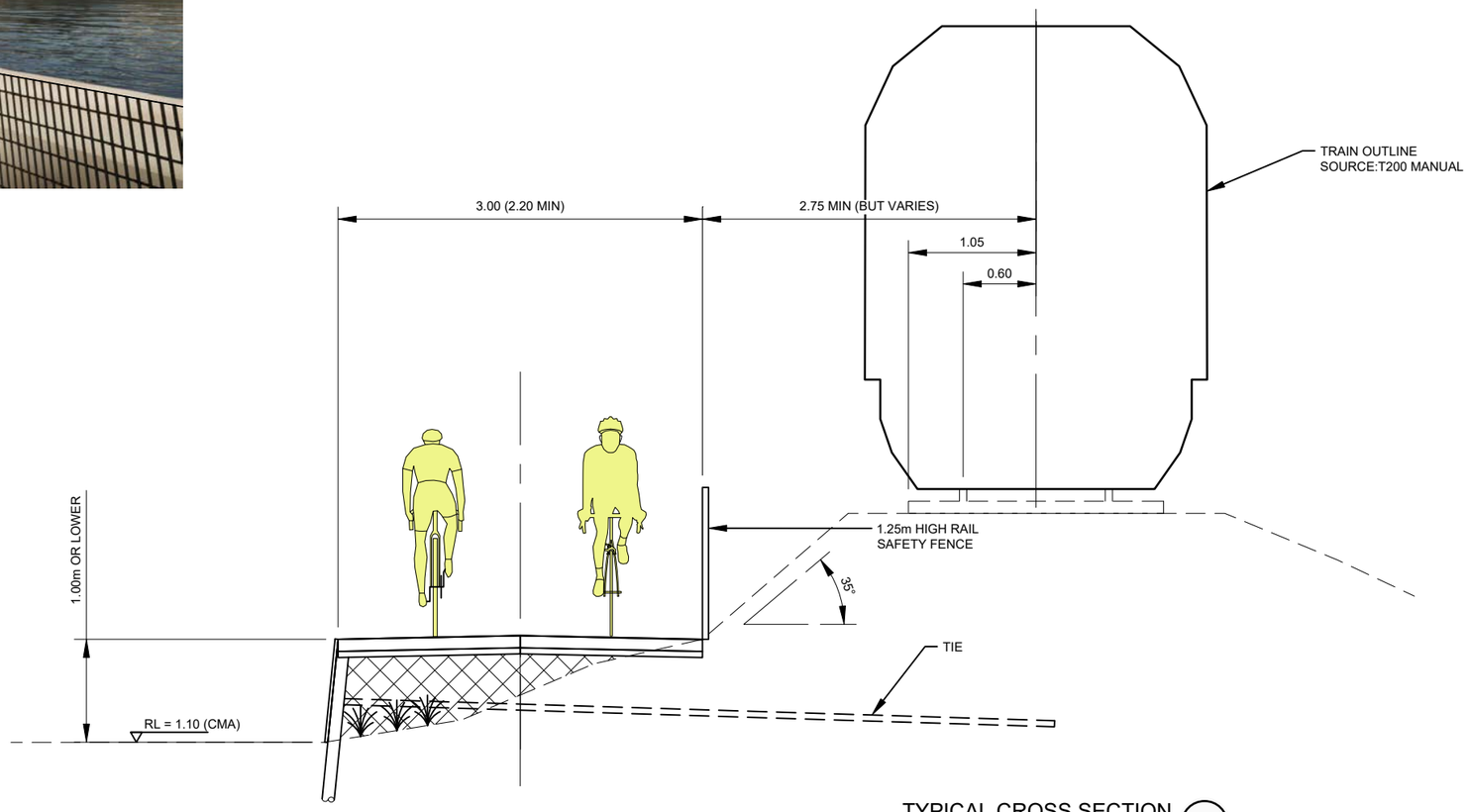
VISUALISATION - TIED BACK PANEL WALL FOR HIGH EMBANKMENTS (B)
NTS



TYPICAL CROSS SECTION - TIED BACK PANEL WALL FOR HIGH EMBANKMENTS (B)
SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

GENERAL NOTES

1 - ALL QUANTITIES SUBJECT TO CONFIRMATION OF TRAIL WIDTH BY FNDC.
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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council — Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `B' & VISUALISATION

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	09	1

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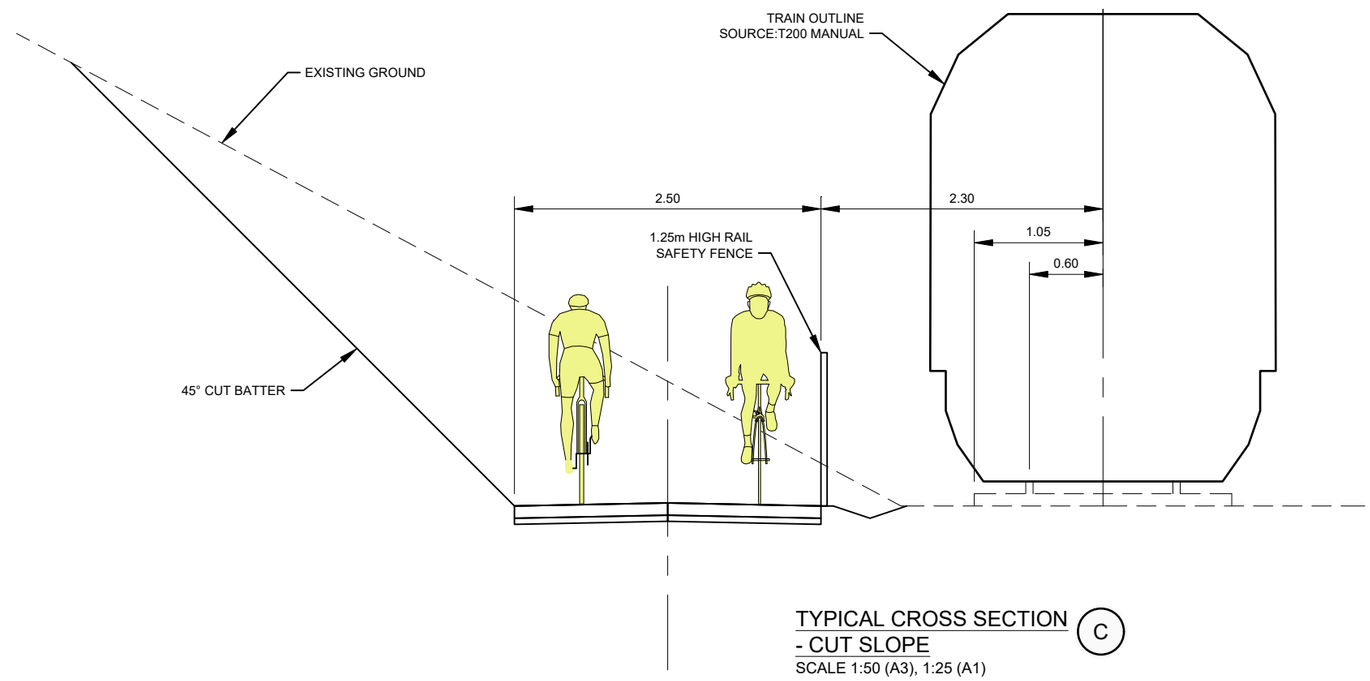

TYPICAL CROSS SECTION - CUT SLOPE (C)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

GENERAL NOTES

1 - ALL QUANTITIES SUBJECT TO CONFIRMATION OF TRAIL WIDTH BY FNDC.
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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `C'

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	10	1

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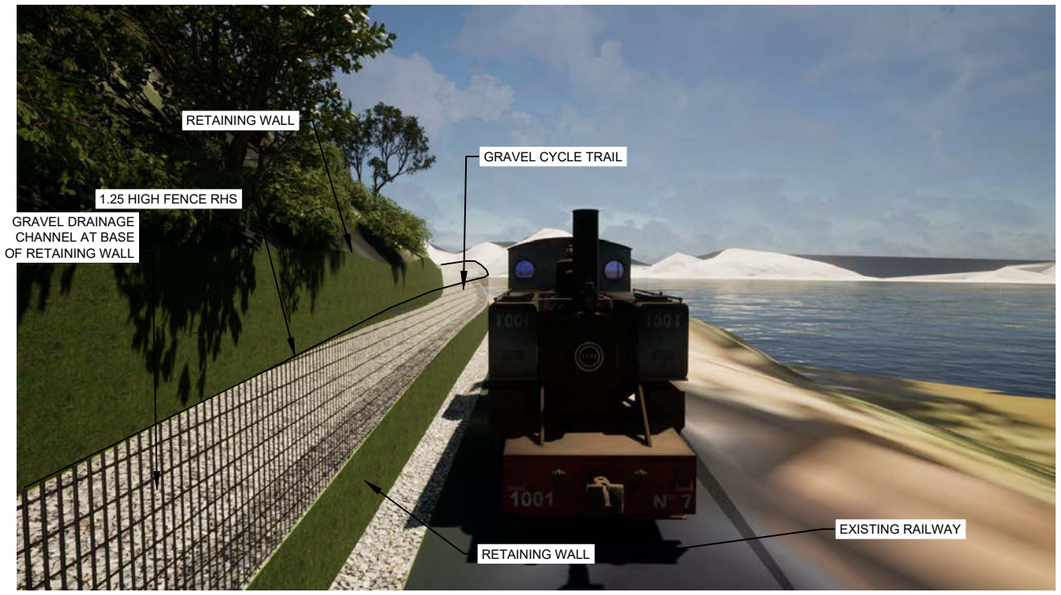
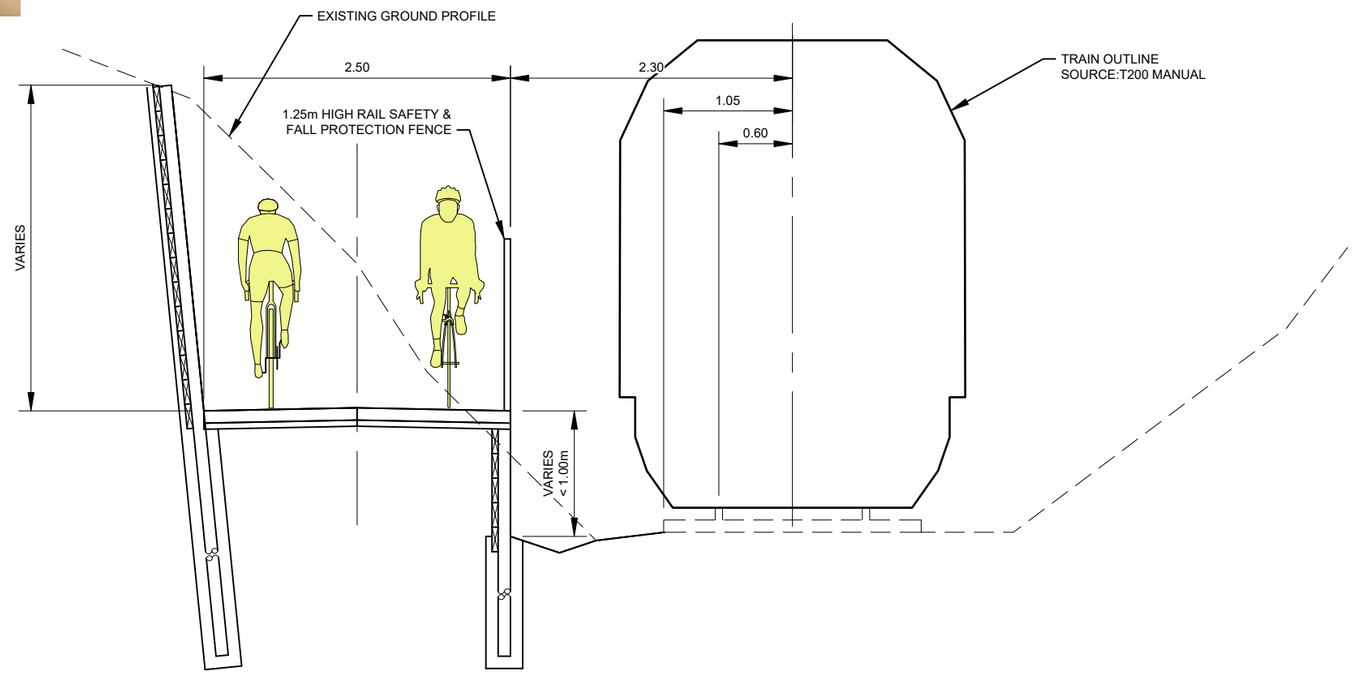


VISUALISATION - COMBINATION RETAINING WALL (D)

NTS



TYPICAL CROSS SECTION - COMBINATION RETAINING WALL (D)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

GENERAL NOTES

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council, Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `D' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	11	1

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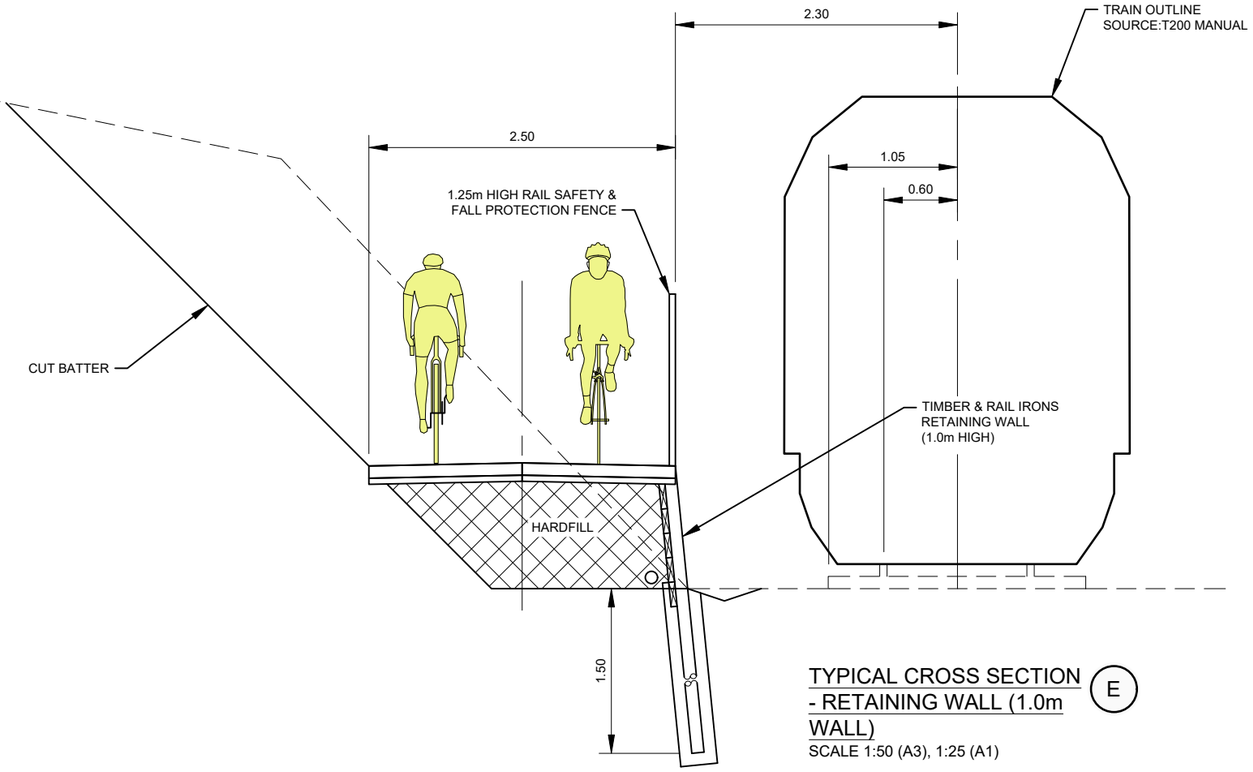
VISUALISATION - RETAINING WALL - RAIL IRONS (1.0m WALL) (E)

NTS



TYPICAL CROSS SECTION - RETAINING WALL (1.0m WALL) (E)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

GENERAL NOTES

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council, Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `E' & VISUALISATION

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	12	1

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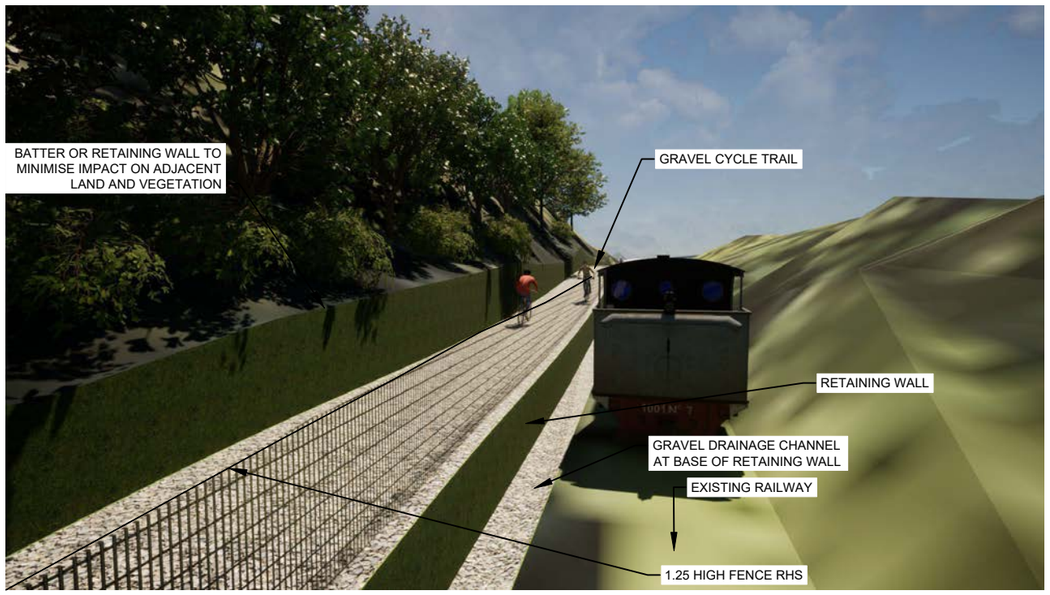
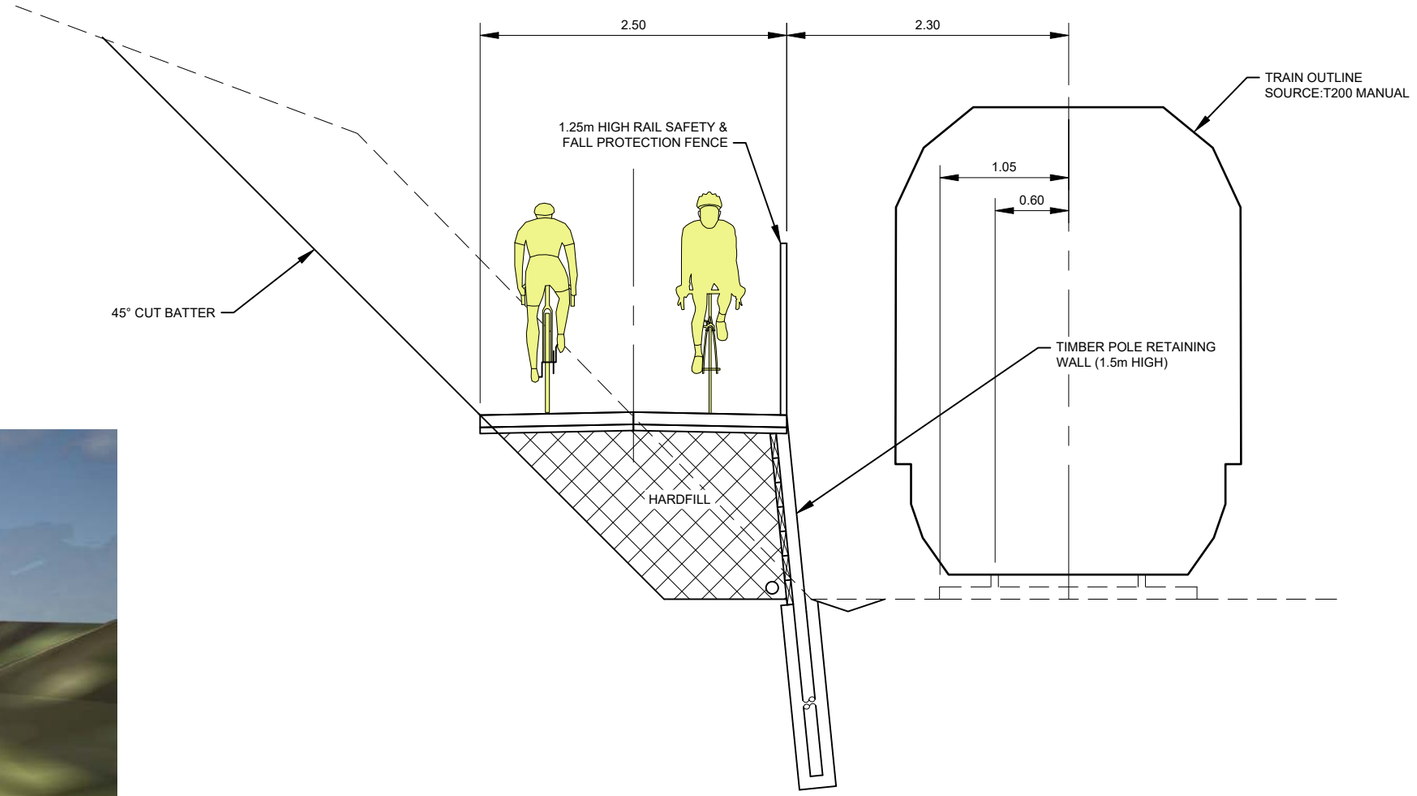


VISUALISATION - RETAINING WALL - RAIL IRONS (1.5m WALL) (F)

NTS



TYPICAL CROSS SECTION - RETAINING WALL (1.5m WALL) (F)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

GENERAL NOTES

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council — Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `F' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	13	1

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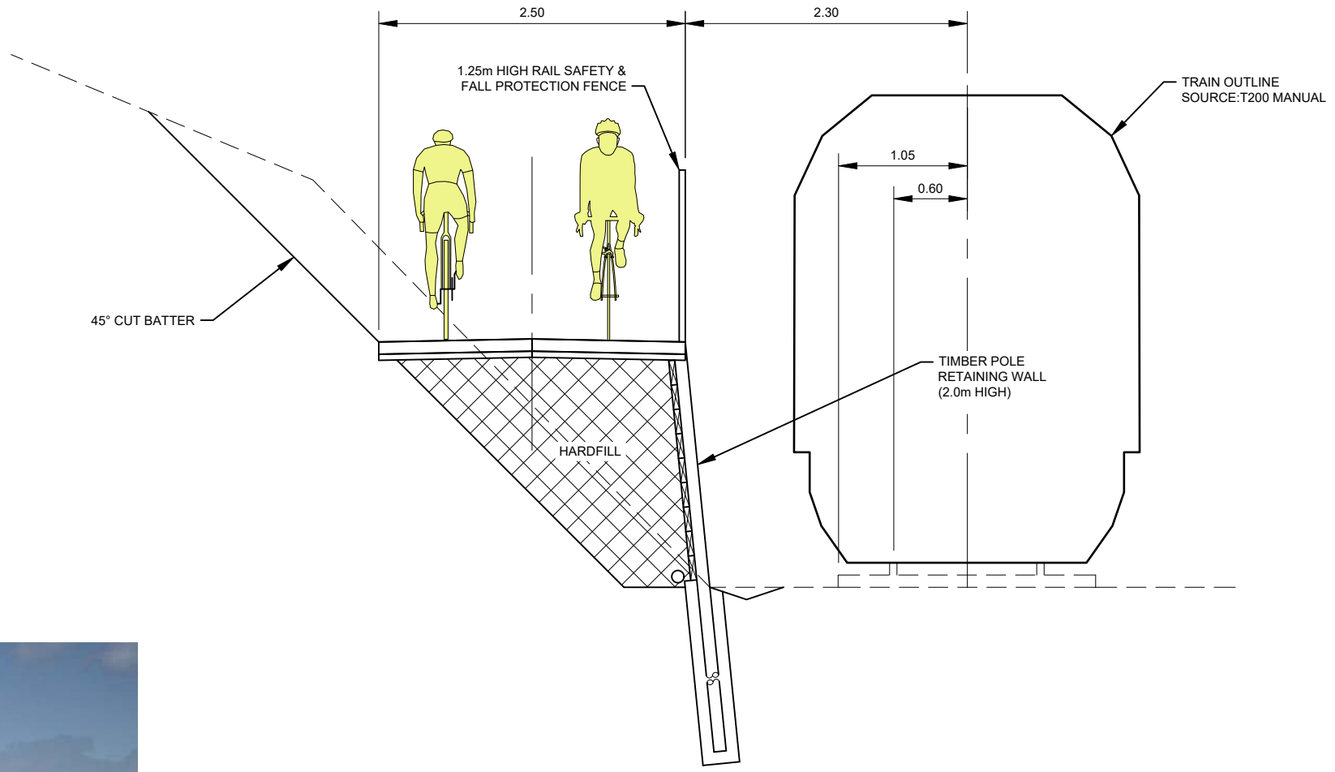
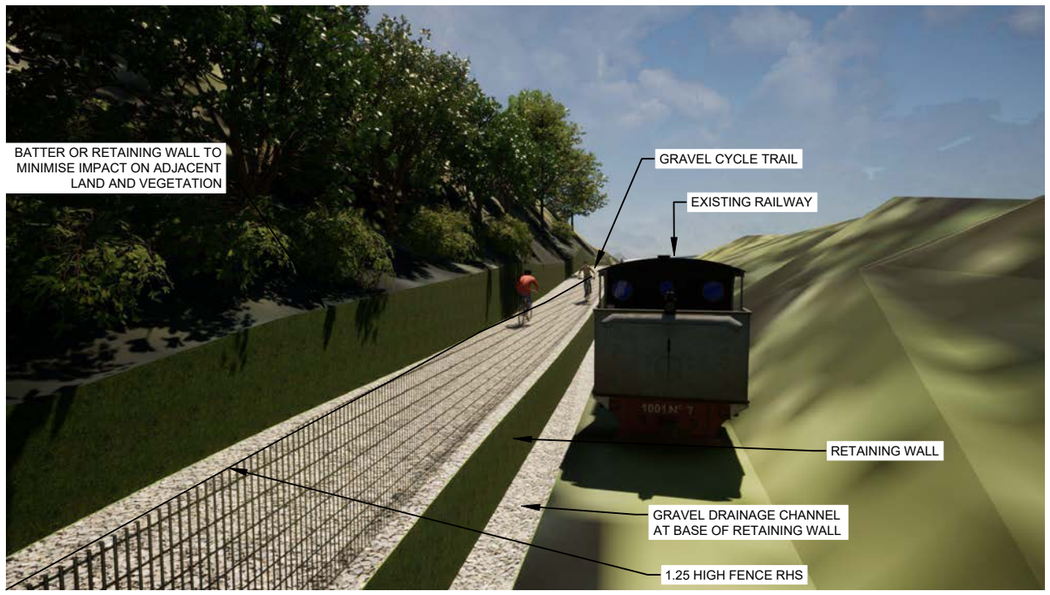


TYPICAL CROSS SECTION - RETAINING WALL (2.0m WALL) (G)

SCALE 1:50 (A3), 1:25 (A1)



VISUALISATION - RETAINING WALL - RAIL IRONS (2.0m WALL) (G)

NTS

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `G' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:			
RESOURCE CONSENT					
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	14	1

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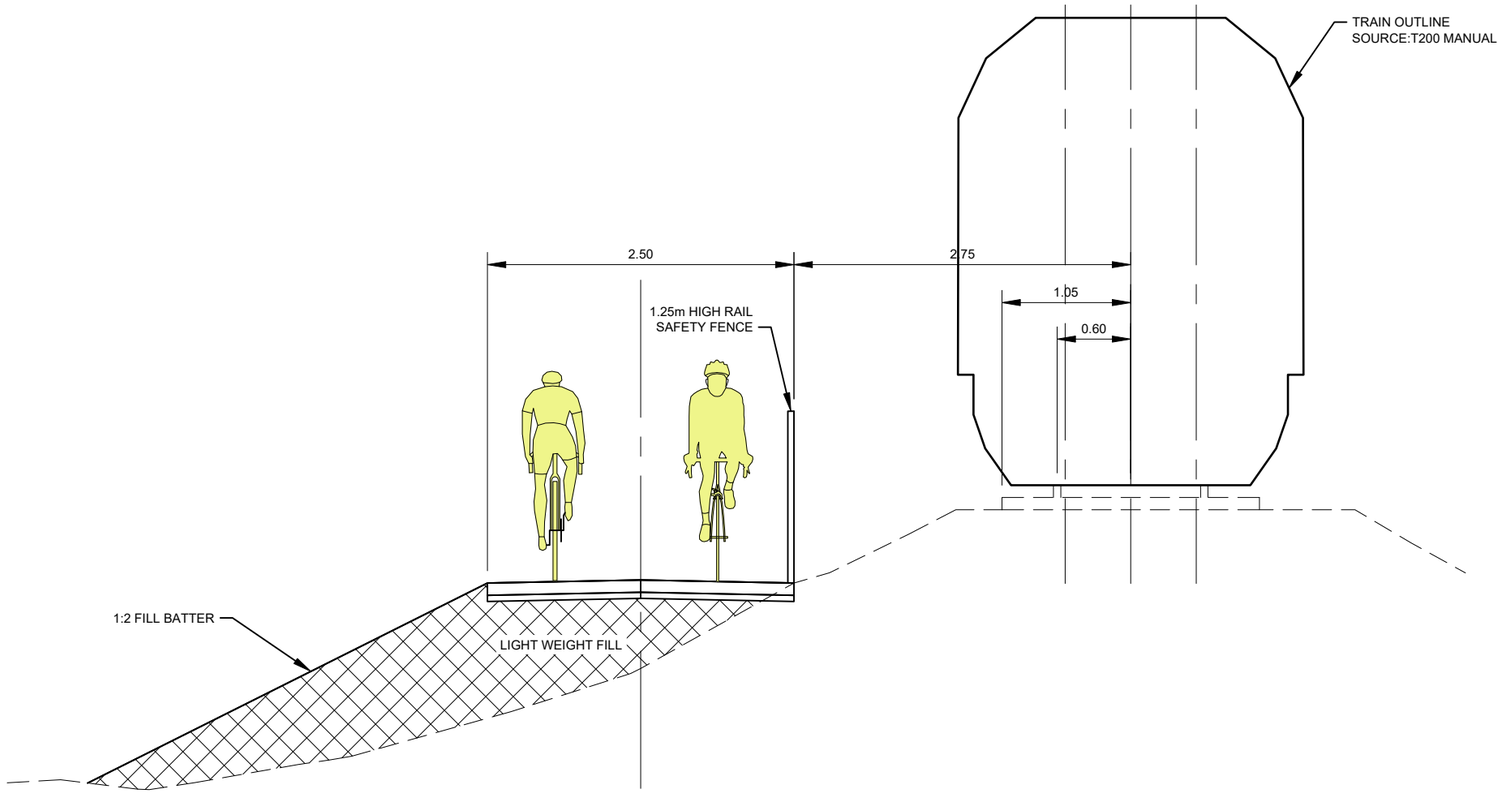

TYPICAL CROSS SECTION - REVETMENT FILL (H)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

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AMENDMENT	APPRVD	DATE
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	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `H'

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	15	1

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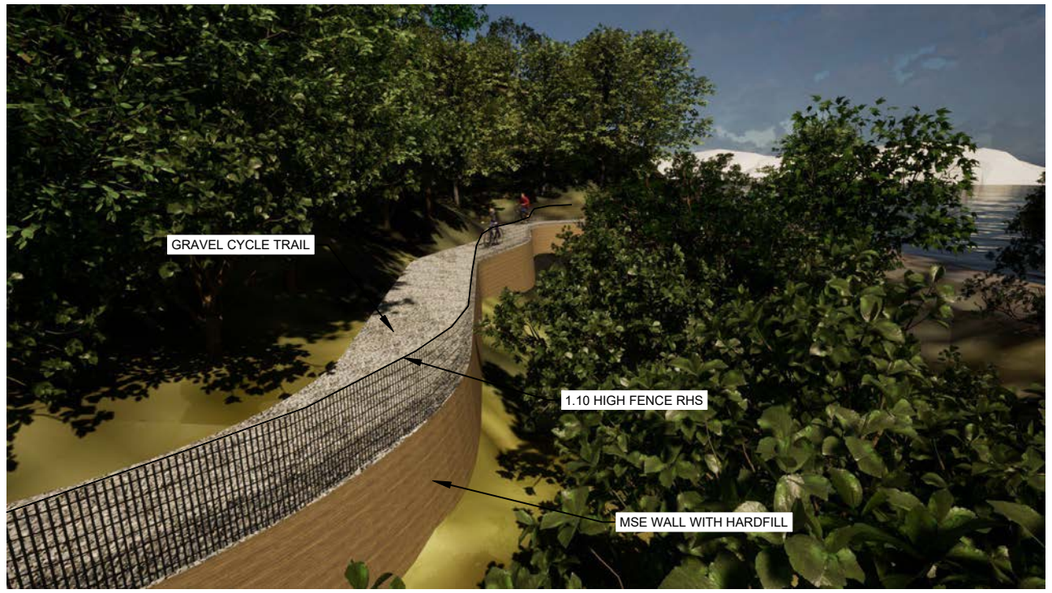
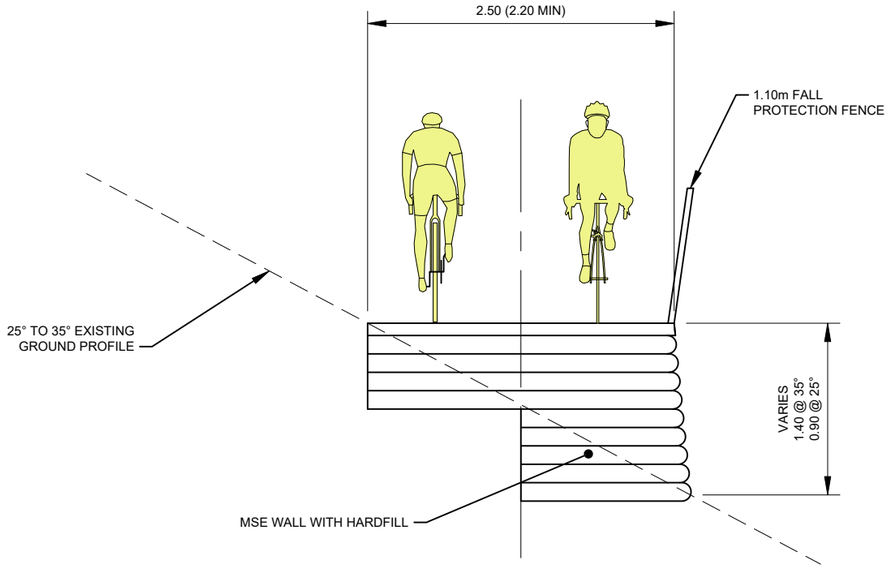


VISUALISATION - MSE WALL IN BUSH - FOLLOWING CONTOUR (I)

NTS



TYPICAL CROSS SECTION - MSE WALL IN BUSH - FOLLOWING CONTOUR (I)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

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DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council — Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `I' & VISUALISATION

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	16	1

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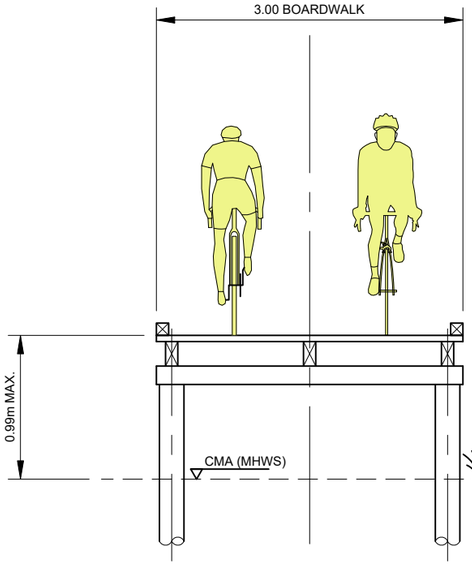
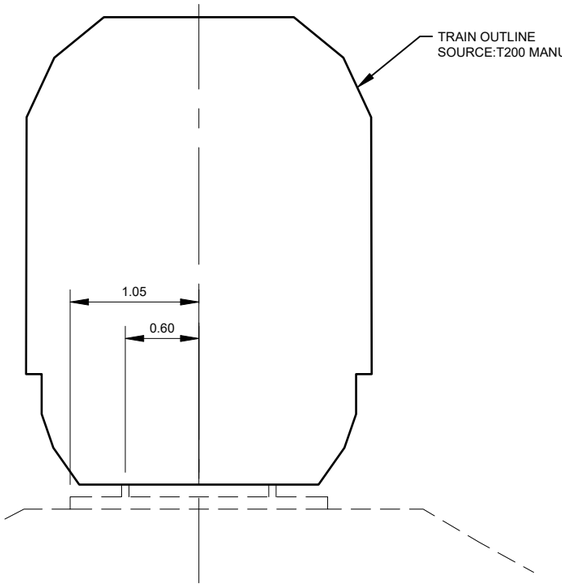
VISUALISATION - BOARD WALK ON PILES (J)

NTS





TYPICAL CROSS SECTION - BOARD WALK ON PILES (J)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

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AMENDMENT	APPRVD	DATE
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	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

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Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `J' & VISUALISATION

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	17	1

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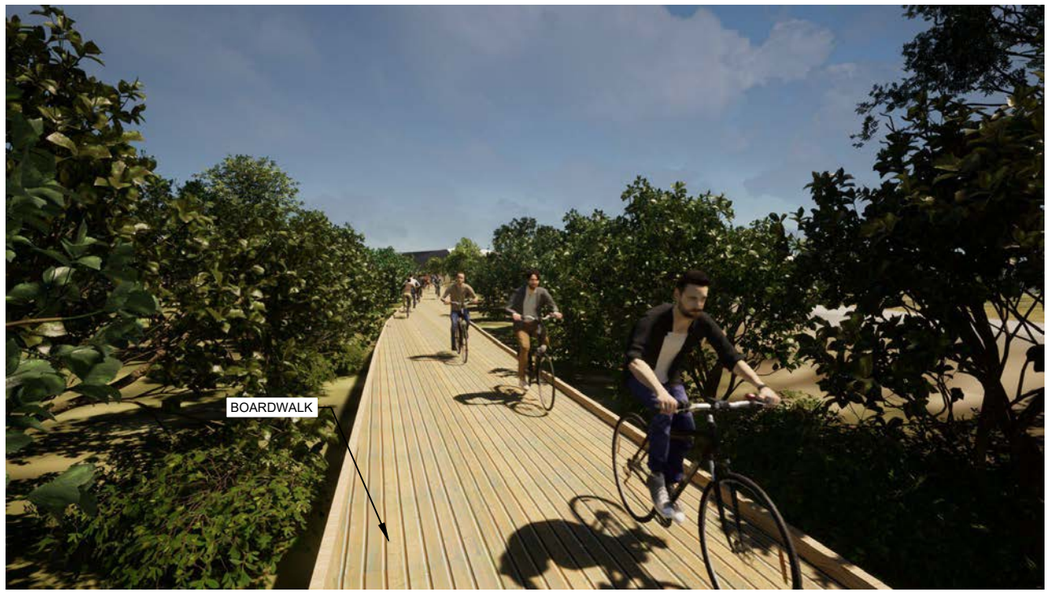
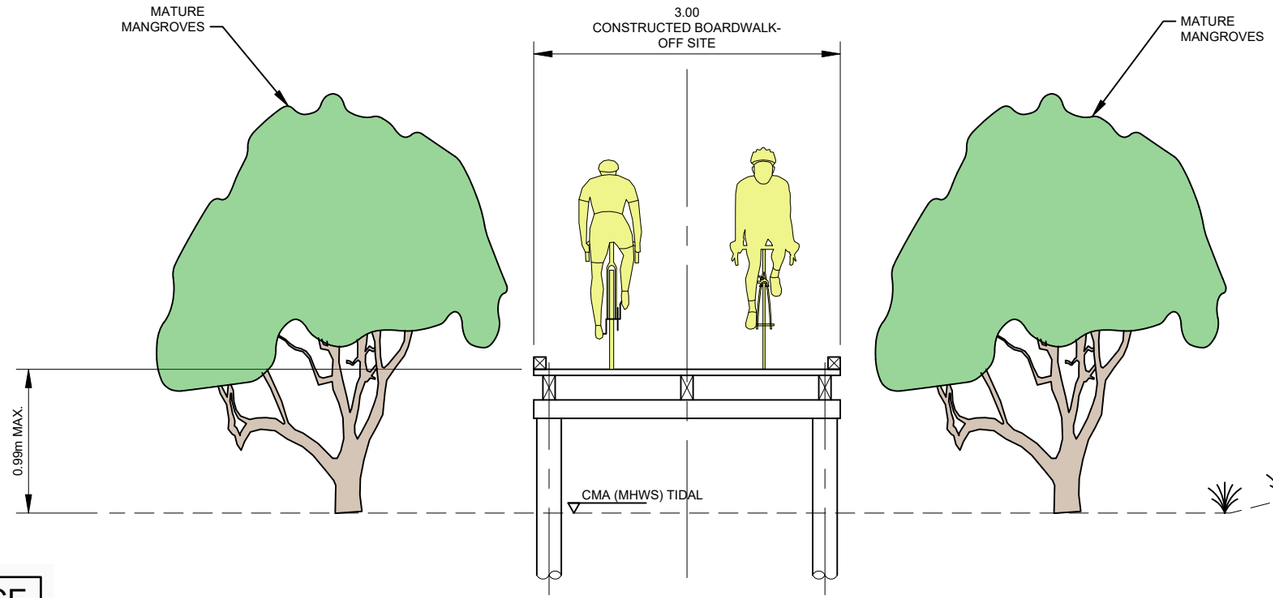
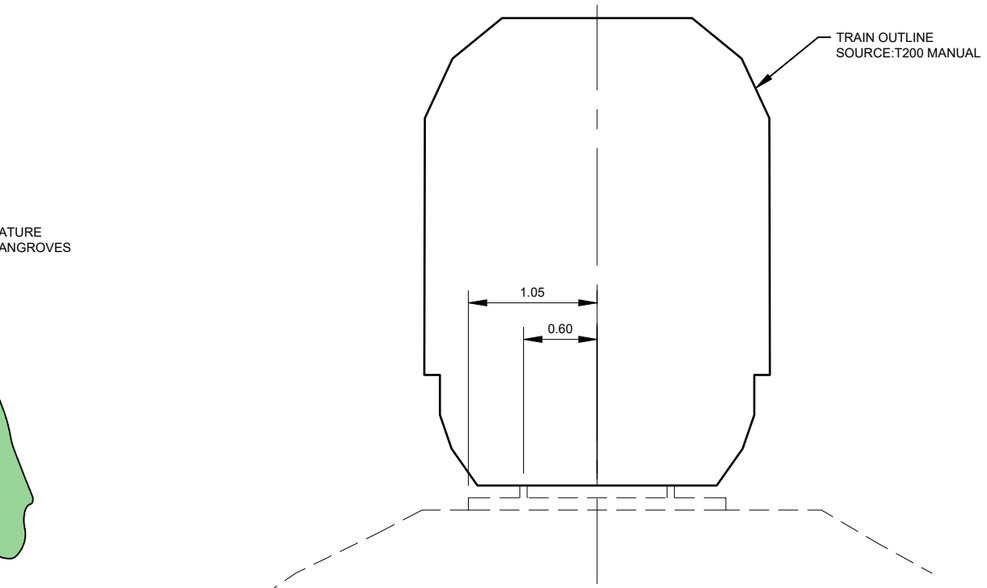


VISUALISATION - BOARD WALK ON PILES J1

NTS





TYPICAL CROSS SECTION - BOARD WALK ON PILES J1

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

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	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `J1' & VISUALISATION

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	18	1

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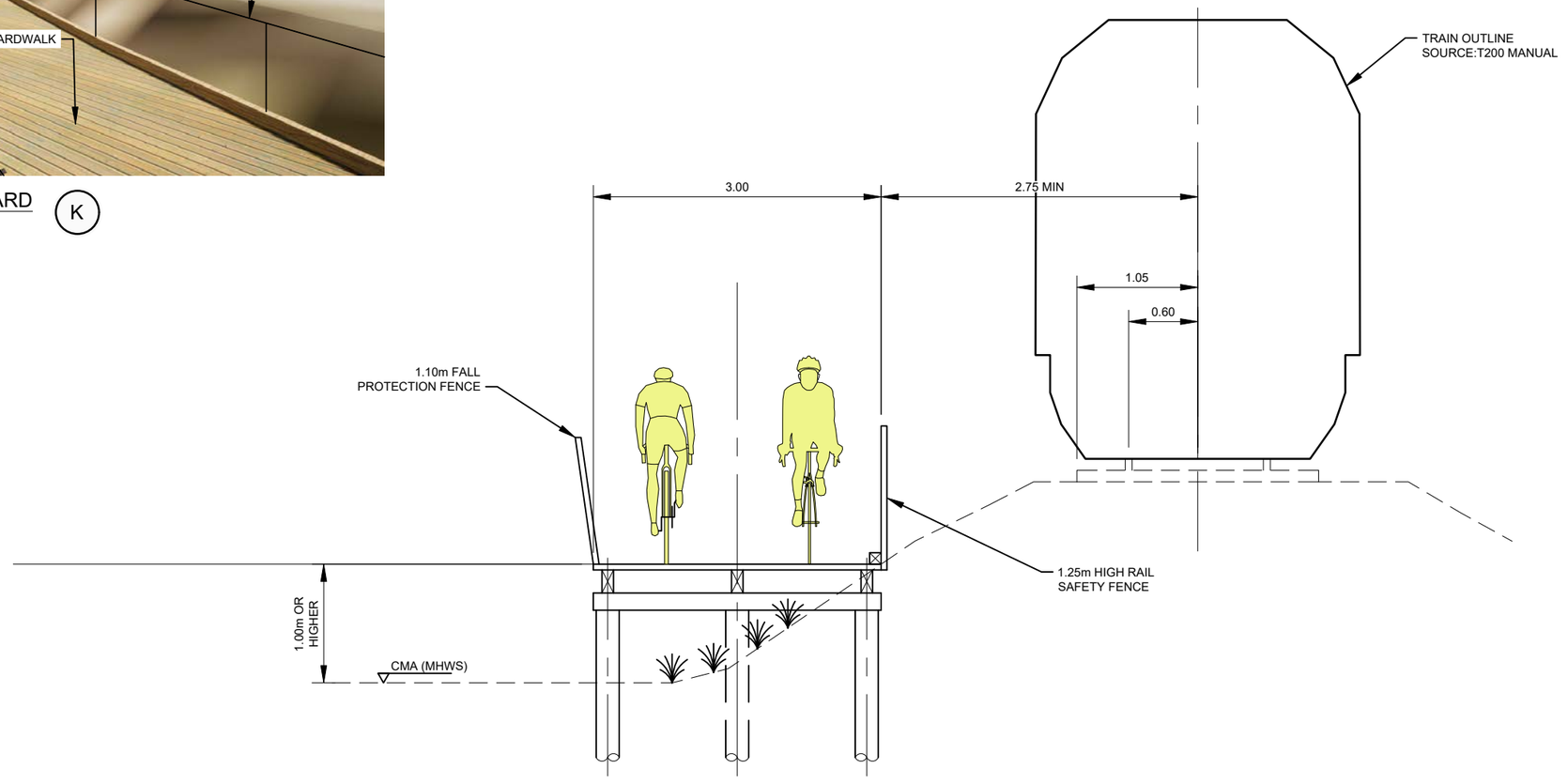
VISUALISATION - BOARD WALK ON PILES (K)
NTS



RESOURCE CONSENT

TYPICAL CROSS SECTION - BOARD WALK ON PILES (K)
SCALE 1:50 (A3), 1:25 (A1)

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

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DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council — Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `K' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	19	1

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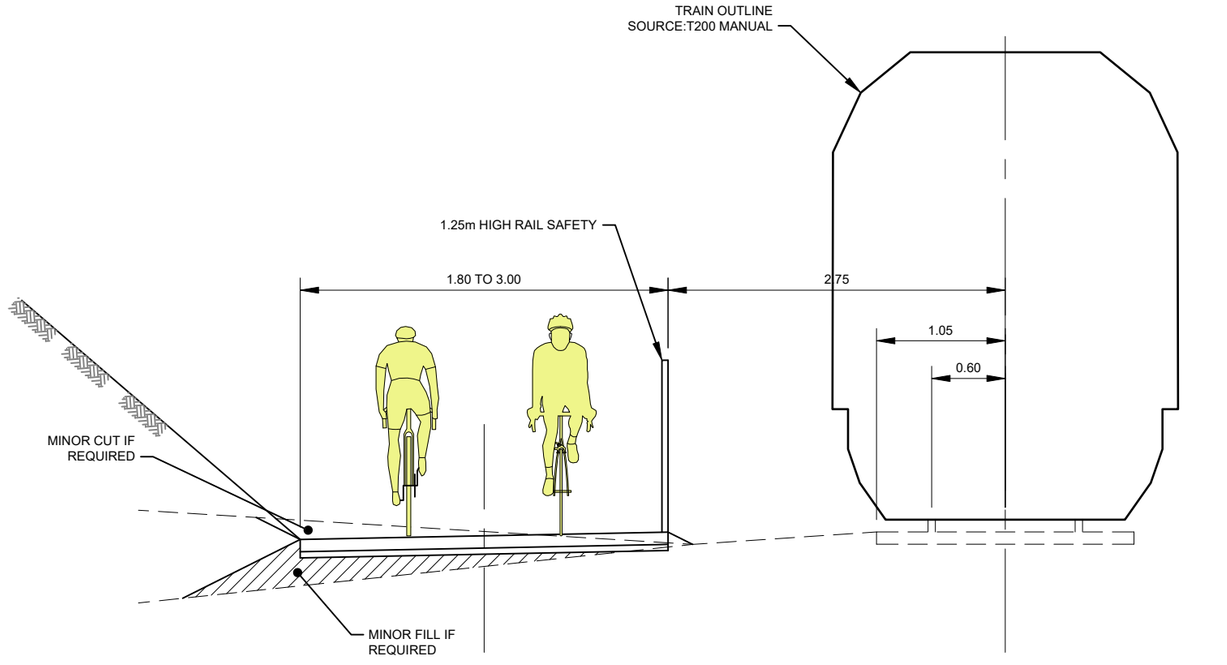
VISUALISATION - TRAIL AT GRADE (L)
NTS



TYPICAL CROSS SECTION - TRAIL AT GRADE (L)
SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

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DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `L' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	20	1

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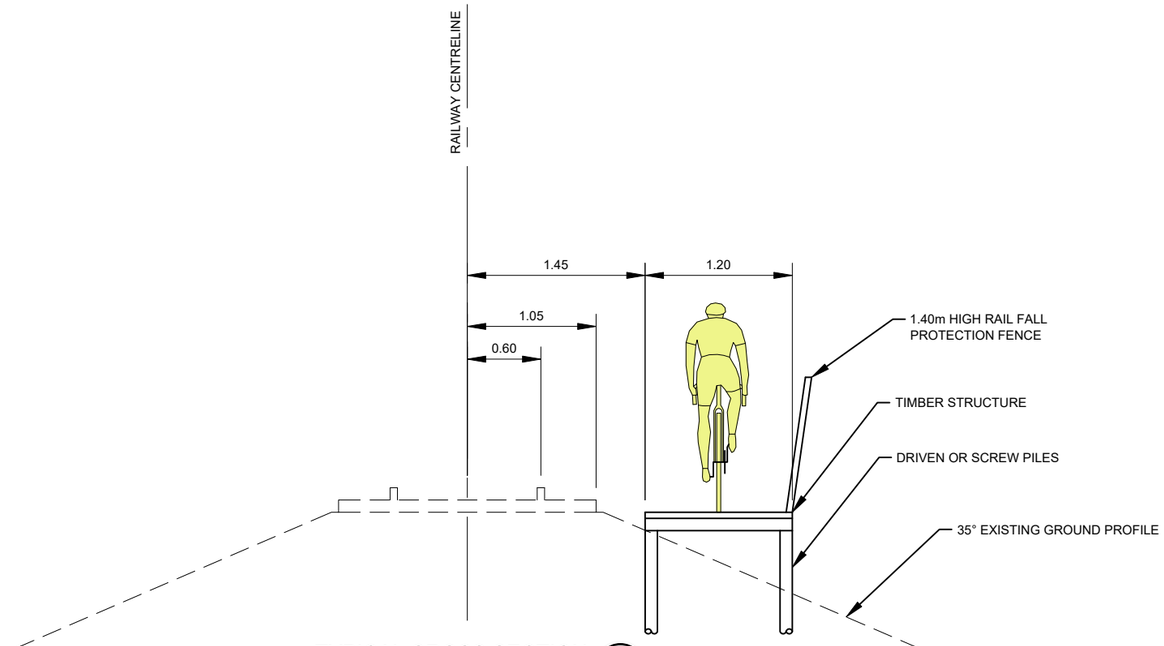
VISUALISATION - CONTINUATION LONG BRIDGE WALKWAY (M)
NTS



TYPICAL CROSS SECTION - CONTINUATION LONG BRIDGE WALKWAY (M)
SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

GENERAL NOTES

1 - ALL QUANTITIES SUBJECT TO CONFIRMATION OF TRAIL WIDTH BY FNDC.
2 - ALL LENGTHS, VOLUMES AND AREAS APPROXIMATE ONLY, BASED ON PRELIMINARY DESIGN AND SUBJECT TO GEOTECHNICAL AND CIVIL DESIGN.
3 - ASSUMED WHERE NON HERITAGE AND HERITAGE CULVERTS INTERFACE THE ALIGNMENT THAT MINOR ABUTMENTS AND SHORT LENGTHS OF BOARDWALK WILL BE ADOPTED. THIS WILL AFFECT THE ABOVE VALUES.
4 - HANDRAILS FOR FALL PROTECTION (BELOW AND ABOVE CYCLEWAY) TO BE CONFIRMED. THIS MAY HAVE BEARING ON BUILDING CONSENT IF BUILDING CONSENT EXEMPTION IS NOT PROVIDED.
5 - SEPARATION FENCE BETWEEN CYCLEWAY AND RAIL WILL BE REQUIRED AND REMAINS SUBJECT TO CONFIRMATION AND REQUIRES SAFETY CASE APPROVAL BY BOIVRT, KIWIRAIL AND NZTA REGULATORS. GRADE SEPARATION MAY REDUCE ACTUAL LENGTHS.
6 - CMA ADOPTED FROM MHWS WHICH HAS BEEN INFERRED AT 1.1m R.L. OTP 1964 DATUM FOR THE PURPOSES OF THIS PROJECT. POSITION SHOWN IS APPROXIMATE ONLY. CERTIFICATION BY REGISTERED SURVEYOR REQUIRED TO CONFIRM ACCURACY OF LINE.
7- DO NOT SCALE DRAWING.
8- NOMINAL SCALE IS SHOWN FOR A3 SIZE UNLESS SHOWN OTHERWISE.
9- COORDINATES IN TERMS OF NZTM GEODETIC 2000 DATUM.
10- LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
11- AERIAL PHOTOGRAPHY AND LAND PARCEL INFORMATION SOURCED FROM LAND INFORMATION NZ (LINZ) UNLESS STATED OTHERWISE.

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

JAS CIVIL Ltd

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `M' & VISUALISATION

STATUS	PLOT DATE	LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE: SHOWN		JOB: 2209-RC	SHEET: 21	REVISION: 1

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JAS Civil Ltd

CIVIL ENGINEERING CONSULTANTS

Twin Coast Cycle Trail -Pou Herenga Tai

Taumarere to Opua Trail Reinstatement

Civil Design Report – 5th November 2024

1. Introduction

JAS Civil has been engaged by Tonkin & Taylor (T+T) to provide civil and geometric concept design for the proposed new Twin Coast Cycle Trail re-alignment from Taumarere Station to Colenso Triangle for Far North District Council (FNDC) as our client.

2. History

The Twin Coast Cycle Trail/ Pou Herenga Tai (TCCT) spans from Opua in the Bay of Islands to Horeke on the Hokianga Harbour. It largely falls within the decommissioned rail corridor owned by KiwiRail and closely follows the existing railway line however, also crosses a parcel of Council road reserve. Bay of Island Vintage Railway (BOIVR) lease and operate rolling stock on the section between Kawakawa and Opua.

The 6.5km section between Taumarere Station and Colenso Triangle – a section within the Kawakawa to Opua portion - had not been used by the BOIVR for some time and has been awaiting upgrade works. In the interim the TCCT has had a short term lease and used the rail embankment to form part of the cycle trail. BOIVR are now upgrading portions of this section of the line and the cycle trail has been displaced.

FNDC as a major stake holder in the TCCT have engaged Tokin & Taylor (T+T) to provide engineering concept design and geotechnical concept assessment for the length of the displaced trail.

3. Site Description

The 6.5km section of rail from Taumarere to Colenso Triangle is made up of cut benched into the toe of slopes and through outcrops, fill embankments across tidal flats, a small tunnel and a number of bridges across water ways. The proposed trail generally follows the rail alignment. The existing trail will remain on the rail embankment from Colenso Triangle to Opua and hence this section was excluded from the concept design by FNDC.

4. Background

FNDC has had numerous concept designs completed for the trail reinstatement over the years. However, complex stakeholder arrangements meant agreement could not be reached between all parties and various standards and safety restrictions associated with the active railway were not fully appreciated.

FNDC engaged Rail Infrastructure Consultants (RIC) to analyse various concept proposals and generate a 'Client Functional Requirements" document. These requirements consider appropriate standards which include;

- KiwiRail – Public Pathways on the Rail Corridor Sept 2018 , Design Guidance for Pedestrian & Cycle Rail Crossings July 2017 and Level Crossing Risk Assessment Guidance March 2021
- Ministry of Business Innovation and Employment –New Zealand Cycle Trail Design Guide 2019.

RIC's "Kawakawa to Opua Cycle Trail - Client & Functional Requirements" document dated September 2022 is included as Appendix A.

5. Project Team

FNDC have appointed Hoskin Civil as project managers to lead the design and compliance teams. These include but are not limited to:

- T+T – Providing geotechnical design service and have engaged JAS Civil Ltd for civil engineering and geometric design and Kakariki Engineering Ltd for structural engineering design.
- NZ Environmental – Ecological assessment and evaluation
- B&A – Planning and consenting tasks
- Ventia – Constructability advice
- Geometria – Archaeological Assessment

6. Design Considerations

6.1. Layout

The concept design layout is shown in the civil engineering drawings[1] attached in Appendix B. These are based on Northland Regional Council LiDAR data, recent drone imagery and site inspections. Vertical datum is OTP and horizontal datum is NZTM 2000.

It should be noted that BOIVR are undertaking rail upgrade works to the south side of the tunnel. As a result of these works the trail alignment and treatments may require minor changes.

Initial concepts proposed revetment fills on the inland side over the lengths of existing rail embankments. Ecology and planning advice was that revetment filling, while within the designated rail corridor, was within minor wetlands and Coastal Marine Area (CMA) and would make consenting more difficult and the design was revised to either board walks or tied back retaining walls within the existing embankment to eliminate/minimise impact in these areas.
These revised options both have considerable design and construction cost implications.

6.2. Geometrics

The ideal geometric design philosophy is to provide a completely separate cycle trail with no direct interface with the BOIVR operations and hence both parties can operate independently. This concept does not achieve this goal and uses Long Bridge maintenance access way as part of the trail and Te Raupo Rd rail crossing as a crossing point, both on a temporary basis. However, the alignment enables the cycleway to be decoupled from the rail in the long term by removing these areas of interface.

6.3. Standards and Guide lines

The 'Client Functional Requirements" specifies the critical design requirements, which are summarised below:

- Grade 1 trail – Easiest – 98% @1:29 gradient with 10m at 1:14 gradient, min. width 2.5m for 2 way
- Grade 2 trail – Easy – 95% @1:17 gradient with 10m at 1:10 gradient, min. width 2.2m for 2 way
- Grade 3 trail – Intermediate – 90% @1:11 gradient with 10m at 1:6 gradient, no min. 2 way width provided.
- General minimum trail offset from the centre line of the rail to the edge of the trail of 2.75m
- Absolute minimum trail offset from the centre line of the rail to the edge of the trail of 2.30m

[1] JAS Civil Ltd. (August 2024). Kawakawa to Opua Cycle Trail – Consent Drawings – 2209-RC-00

The MBIE - New Zealand Cycle Trail Design Guide 2019 – Grade 1-3 data sheets referred to in developing the design are provided in Appendix C.

6.4. Tide/flood levels

The Kawakawa River is tidal upstream of Taumarere (Long Bridge).
T+T prepared a report for Northland Regional Council[2] which provides data for 1:50 and 1:100 year storm tide events in Kawakawa River as 1.5mRL and 1.6mRL static. No dynamic levels are provided but the proposed cycleway is located on the inland side of the rail embankment where most of the areas are mangrove or marsh lands and there is minimal open water reaches so is unlikely to have significant wave actions which would result in increased storm surge levels. The T+T report also provides data of expected sea level rise in Kawakawa River for 2080 (CFHZ1) as an additional 0.6m. Based on this data, in 2080 during a 50 year storm tide event water level may reach 2.2mRL. Levels described in this section are in NZVD2016.

The two large tidal areas inland of the rail embankment do not have large catchments and are serviced by water ways approximately 8m wide out to Kawakawa River hence, it is unlikely these will form any restriction for the storm runoff and hence retain water at a higher level.
The 2080 event exceeds the design life of 25 years (2050) for any of the structures that are proposed to be placed in the areas affected by the tidal and storm events.

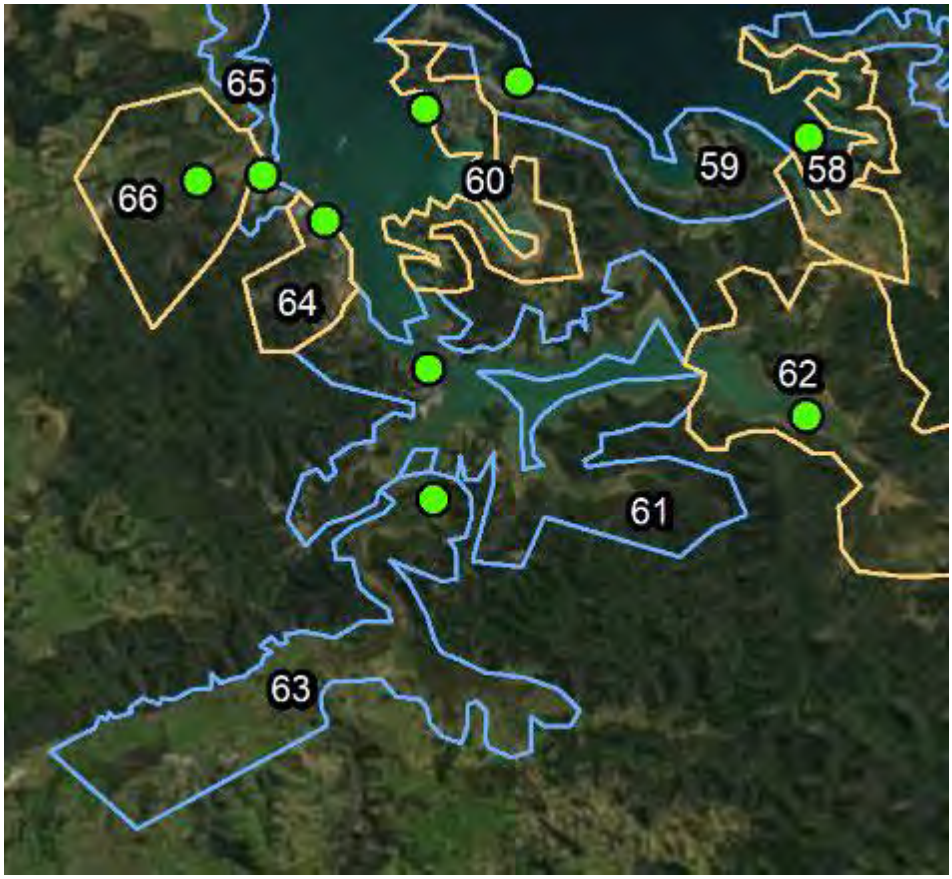

Figure 1: Locations 61 (Opua Okiato) and 63 (Kawakawa River) relevant fir this project. Extract from T+T 2021 report.

[2] Tonkin & Taylor Ltd. (March 2021). Coastal Flood Hazard Assessment for Northland Region 2019-2020.

Number	Name	2020	2080 (+0.6m SLR)	2130 (+1.2m SLR)	2130 (+1.5 m SLR)
		CFHZ0	CFHZ1	CFHZ2	CFHZ3
61	Opua Okiato	1.6	2.2	2.8	3.1
62	Waikare Inlet	1.6	2.2	2.8	3.1
63	Kawakawa River	1.6	2.2	2.8	3.1

Figure 2: Storm tide and extreme flood levels. Location 61 (Opua Okaiato) and 63 (Kawakawa River) relevant for this project. Extract from T+T 2021 report.

6.5. Coastal Marine Area (CMA) Boundary

The CMA boundary shown on the dwgs has been determined from the NRC lidar data.
We have used RL 1.1 OTP datum.
This level is based on data from T+T (2021), Coastal Flood Hazard Assessment for Northland Region 2019-2020, prepared for Northland Regional Council, issued March 2021.

6.6. Fall Barriers/Safety Fences

The New Zealand Cycle Trail (NZCT) Design Guide suggests any fall greater than 0.5m on a minimum width trail may require some form of fall barrier. However, assuming the trail is of suitable width to allow comfortable passing in each direction with suitable edge distances they may not be required. However, the Design Guide refers to SNZ HB 8630:2004 Tracks and Outdoor Visitor Structures for further clarification which indicates if a child less than 6 years of age will be using the trail then NZ Building Code F4 Safety from Falling criteria will apply. Hence, any fall over 1.0m requires a complying fall barrier/safety fence.

F4 has a minimum barrier height of 1.1m however NZTA guidelines suggest cycleway barriers should be a minimum of 1.4m height with a top grab rail (due to a cyclist on a bike being higher off the surface than a person walking). To maximise the useable trail width where barriers are required, these should be splayed outwards 10-15 degrees. Note this may not be possible where rail offset is at minimum of 2.3m.

KiwiRail guidelines for trails on KiwiRail property indicate a rail safety fence is required between the rail traffic and trail users. It specifies 1.25m high chain link fence at a minimum of 6m from the centreline of the rail for main lines. Trails closer to the rail will need to be individually assessed. The Client Functional Requirements document developed by RIC for the project on behalf of FNDC indicates that an offset of 2.75 m from the rail centreline should be adopted where possible, and that 2.3 m could be considered where 2.75 m becomes difficult to achieve. No minimum height for the separation fence is provided.

For the purpose of the project a 1.25 m high separation fence between cycleway and rail has been adopted and a 1.1 m high fence to protect from fall from heights of 1.0m or greater. Separation from the rail of 2.75 m has been adopted where possible, but locally reduces to 2.3 m at local pinch points such as crossing over bridges. We note that the final separation distance and separation fence height from rail is subject to acceptance and inclusion in the BOIVR Rail Operating Safety Case.

6.7. Trail finished level

Existing rail embankment levels vary from approximately 7.0mRL at Taumarere Long Bridge to low stretches of 3.0mRL on the embankments across the marine areas. The tidal mud flats adjoining the embankments are approximately 0.9 – 1.0mRL.

To reduce the requirement for safety fences/barriers and hence limit construction costs, it is proposed to ensure the height of any potential vertical fall is less than 1.0m, where practicable. This applies to board walks and the lower-level section of the tied back retaining walls.

The result of these considerations is a proposed finished trail level of about 2.0m RL has been adopted by the project team to achieve an acceptable balance between capital cost and environmental effects (such as flood and sea level rise) whilst not compromising on safety.
This level is the approximately 200mm below the estimated 2080 50 year storm tide event level (of 2.2 m RL) but has 400mm freeboard to the current storm tide event level of RL 1.6m.

It is assumed that during a 50 year storm event the trail will have limited use. In addition, nuisance flooding is expected to recede quickly and the design components are not expected to be subject to significant degradation due to flooding.

6.8. Trail Geometrics

The trail is designed to comply with NZCT Design Guide 2019, with most of the length being Grade 1-2 with very minor sections that are Grade 3. The Grade 3 sections will apply where there is reduced widths and steeper gradients required to best fit the topography. Trail width will be between 2.5 – 3.0m, however may reduce down to a min of 1.5m in places. At 1.5m, two cyclists can carefully pass in each direction. Reduction of width is only likely where rail offset distances are a minimum of 2.3m and the adjoining topography, CMA boundary and geotechnical constraints do not allow major excavations into the toe of existing batters, where CMA boundary restricts construction and across bridge clip on sections. Steeper gradients will be encountered in the sections of trail over the tunnel. The final vertical alignment will be determined when the final design is completed.

6.9. Rail crossings

Ideally, the trail will be completely separate from the rail operation, however there will be two locations where rail and trail users will interface until the final structures/alignments are constructed and these locations will require some form of controls.

<u>Long Bridge immediately north of Taumarere Station</u>

It is proposed to utilise the existing 1.1m wide rail maintenance access way on the southern side of the bridge. This is 270m long and it is proposed to add an additional 100m of board walk to match the maintenance walkway on the Opua end. Horizontal alignment is a large sweeping curve to the right with minimal sight lines. It is proposed that the trail crosses the rail at Taumarere Station and uses this existing rail maintenance walkway and extension and then crosses back to the northern inland side for the remainder of the trail. The maintenance walkway has a splayed hand rail on the southern side and toe kick rail on the northern rail side. This walkway was used as part of the cycleway route previously. Trail users and rail operations will not be able to use this section concurrently and controls will be required.

Automated control systems would be very costly with the added complexity that there is no power on site or nearby as well as a security risk if a solar network was installed. It is proposed that bridge section and rail crossing at each end are controlled manually with the use of gates closing the cycleway during train operations. This would be a function undertaken by BOIVR train staff. However, what this gate system will comprise requires final agreement between BOIVR and FNDC.

Control methods are yet to be finalised and the final option will require a specific safety review and inclusion in the Rail Operating Safety Case.

We understand that ultimately Long Bridge will have a dedicated trail constructed on the northern side, however this was excluded from the scope of the concept design.

Te Raupo Road crossing north side of the tunnel

The current concept layout proposes to use the Te Raupo Road rail crossing as a trail crossing point. We understand little consideration has been given to the road crossing as there is currently no rail movements in this area. However, this may change in the reasonably short term if BOIVR push ahead with their plans to reinstate the rail to Colenso Triangle. Trail crossing at this point may require a standard railway pedestrian maze or some form of control gates. A safety review will likely dictate the final requirement at this location, subject to it being required due to the eventual passing of trains at this location.

Currently this concept has made no allowance for works in this location due to there being no rail traffic.

6.10. Treatments

A number of treatments have been proposed depending on topography, ecology and planning advice. These are discussed in more detail within the geotechnical assessment report by T+T. Refer to dwg sheet 8-12 in Appendix B.

Treatment 1 – includes details J, J1, K and M which are timber board walks.

With the exception of Detail M, these are specified as an alternative to the revetment filling option and have been developed to reduce adverse ecological impacts. These are located in the marine and terrestrial environments so foundations are likely to comprise piles (see geotechnical report for geotechnical detail) and construction may be difficult. 3.0m width is specified to provide good two way movements without the need for safety fences (if below 1.0m fall height). See below for safety requirements.

Detail M is the continuation of Long Bridge safety access way and is only 1.1m wide with a proposed splayed safety fence and toe kick rail. This is situated at the top of the embankment at the northern end of Long Bridge and is approximately 7.0mRL. This structure is founded within the existing rail embankment which offers more support.

Treatment 2 – Includes details A and B which are tied back retaining walls within the existing rail embankment.

These are specified as an alternative to the revetment filling option and have been developed to reduce adverse ecological impacts. Wall heights for details A and B are estimated to be up to 1m and 2.4m, respectively. It's unlikely, due to the underlying marine soils that a cantilever wall will be suitable at these locations, hence a waler and tie-backs into the existing embankment have been allowed for. Tie-backs are required to be at a depth that they will not impact the rail infrastructure.

Treatment 3 – Include details D, E, F and G which are tiered cantilevered wall (Detail D) and buttress retaining walls (Details E, F and G).

These are specified to provide a suitable platform area for the trail to be constructed against rising ground whilst minimising the extent of excavation, retaining and environmental footprint at the toe of large slopes and still complying with the rail off set requirements. The height of the walls varies and is estimated to be up to about 2m high, subject to detailed design. It is likely the lower retained heights could be constructed using surplus rail irons as posts driven into the existing ground. This would be keeping in the rail environment and help limit costs. Greater retained heights are likely to require drilled and concrete encased timber poles.

Treatment 4 – Includes details C, H and L which are earthwork solutions - cut, fill and revetment fills.

Where topography allows minor cuts and fills to achieve the trail requirements, this treatment will be implemented wherever possible. Cut and fill faces will be left in a natural state. Revetment fills are likely to be the most cost effective solution but carries the highest environmental and planning risk due to the increased footprint near too or within the CMA.

Treatment 5 – Detail I is a Mechanically Stabilised Earth (MSE) wall solution.

This is mountain bike trail type solution is adopted where the trail is constructed in the mature bush or similar. Final route is not determined until construction with alignment to avoid significant features and complement the actual topography. Where filling is required, MSE walls are to be constructed. Higher walls may require geogrids for support. Work is done to have the least impact on the environment.

Treatment 6 – Detail N, Bridges (by others)

Excluding Long Bridge which is discussed above, there are three existing rail bridges crossing waterways that the cycleway also needs to cross. The proposed bridge crossing structures are being developed by Kakariki Engineering Ltd and generally include the following;

- Bridges 10 and 11 are small bridges of approximately 7 to 8 m spans. It is proposed to construct a clip-on structure onto the inland sides of these bridges.
- Bridge 11, Whangae Bridge is a large bridge with a span of approximately 35 m. It is proposed to construct a clip-on to the inland side of the bridge with the clip-on supported off the existing bridge piers and abutments.

Short cantilevers and/or lengths of boardwalk may be required at each end to extend the clip-ons beyond the CMA to prevent the need for earthworks within the CMA. Where possible, maintenance accessway's for rail staff may be constructed on the seaward side.

6.11. Earthworks

Total foot print of the works is 18,890 m2.
Total cut volume is 4,560 m3 -solid measure. This largely where cuts into rising slopes is required. It's envisaged that approximately 60% of this material may be suitable for filling. The remainder will be removed from site as unsuiatble. Due to the very limited access to the site its likely this will be removed from site by rail.
Total fill volume is 5,690 m3 – solid measure. This is filling behind the cantilevered retaining walls and tied back retaining walls. Assuming 60% of the cut material is suitable for fill 2,950 m3 - solid

measure – of fill will be required to be imported. Due to the very limited access to the site its likely this will be imported by rail.

An approved Environment Sediment Control Plan will be required to manage the site during any earth works.
This will need to comply with GD05 - Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region - and be approved by the NRC before work commences.
It is expect the supply and approval of such a plan will be a condition of consent and responsibility of the contractor once he has determined his construction methodology.

6.12. Stormwater

The proposed trail layout does not affect the existing stormwater runoff patterns. Board walk area will allow natural stormwater patterns to continue. The remainder of the trail will have a gravel surface of which large portions are constructed within the existing gravel areas adjoining the rail line. Existing stormwater discharge points will remain and no new points are proposed. It should be noted that most of the existing culverts under the rail are classified as historic and cannot be modified. Where the trail is proposed to be above track level natural runoff across the trail will occur and the water table drain at the base of the wall beside the rail will continue to operate.

6.13. Services

We are not aware of any services running through the proposed trail route. However, services may exist at Te Raupo Road rail crossing and at the gate at the north end of Whangea Bridge for the electric gate. Services should be confirmed and located by the contractor prior to construction.

6.14. Archaeology

Numerous archaeological features are known to exist along the route of the proposed trail.
An archaeological assessment is currently being undertaken and trail design will need to take these into account. Final design should address issues and items raised in the assessment.

7. Conclusions

The concept layout achieves the Client Functional Requirements and provides a Grade 1-3 trail from Taumarere Station to Colenso Triangle, largely separated from the rail operation.

The layout will add some variability to the ride experience with boardwalks, MTB style trail in the bush, elevated section of trail, sensible trail gradient over the tunnel and clip on bridges.
This should enhance the overall experience from the previous trail alignment and be a draw card for users.

The concept solutions provided offers the least resistance for environmental and consenting teams activities and has been developed in collaboration with the project ecologists to avoid adverse impacts to the environment.

Final engineering design is still required but the concept has proven that the trail can be constructed largely as shown.

We understand that the necessary NZTA, KiwiRail and BOIVR approvals will be sought once the consent design has been finalised.

Report prepared by

S Gwilliam

Steve Gwilliam
Civil engineer

Appendix A

Client Functional Requirements

Kawakawa to Opua Cycle Trail - Client & Functional Requirements – September 2022

Kawakawa to Ōpua Cycle Trail
CLIENT & FUNCTIONAL REQUIREMENTS

Organisation name:	Far North District Council
Project name:	Kawakawa to Ōpua Cycle Trail
Document type:	Client & Functional Requirements
Version:	4.0 FINAL Approved
Collated by:	Desiree French (Rail Infrastructure Consultants Ltd)
File name:	**Client & Functional Requirements**

1. Document History

1.1. Version History

Version Number	Version Date	Summary of Changes	Author
0.1	04-07-2022	Working Draft	Desiree French
1.0	29-07-2022	First Issue for Comment	
2.0	22-08-2022	Issued for Review	
3.2	09-09-2202	Issued for Approval	
		FINAL Approved	

1.2. Reviewers

Name	Title	Signature	Date
Kevin Hoskin	FNDC Project Manager, Hoskin Civil		12-09-2022
Steve Cox	Design Manager, RIC		12-09-2022

1.3. Approval

Name	Title	Signature	Date
David Clamp	Manager – Major & Recovery Projects		

1.4. Sign off – Client Requirements

Project Role	Name	Title	Signature	Date
Project Sponsor	David Clamp	Manager – Major & Recovery Projects		

The signatories below acknowledge the views of the stakeholder groups they represent are reflected within this document and have signed on their behalf.

PHTTCCT stakeholder representative	Blue Newport	PHTTCCT Chair		14-09-2022
NAX stakeholder representative	Rowena Tana	NAX Chair		16-09-2022

PHTCCT represents the following stakeholder groups:

Great Rides Status Assessor	Janet Purdey	CE, NZCT / Nga Haerenga
Taumarere - Ōpua Representative	Richard Green	PHTTCCT Trustee
Waipuna – Taumarere Representative	Walton Davis	PHTTCCT Trustee
Taumarere - Ōpua Representative	Anthony (Tony) Williams	PHTTCCT Trustee
Waipuna – Taumarere Representative	Pita Tipene	PHTTCCT Trustee
Okaihau - Utakura Representative	Noeline Inverarity	PHTTCCT Trustee

NAX represents the following stakeholder groups:

BOIVRT stakeholder representative	Sue Hamnett	Chair
Ngati Hine representative	Pita Tipene	Deputy Chair
Kerikeri Steam Trust	Michael Goldfinch	Director
Kawakawa Community and Business Association rep.	Malcolm Francis	Chair
Ōpua Business Association representative	Dan Cleaver	Chair

1.5. Sign off – Functional Requirements

Project Aspect	Organisation	Name	Title	Signature	Date
Technical Compliance representative (Track, Structures, Civils)	BOIVRT	Adam Farrell	Project Manager Rail Restoration		12-09-2022
Operating Requirements (Signals, Level Crossings, Operating Safety Case)	Keteriki	Lau'rell Pratt	General Manager		16-09-2022
Cycle Trail design compliance	PHTTCCTT	Tracy Dalton	Acting Trust Manager		14-09-2022
Rail interface – safety case advice	Rail Infrastructure Consultants	Allan Neilson	Rail Expert Advisor		16-09-2022
RMA & Planning advice	Letica Environmental Planning Ltd	Martell Letica	Principal Planner		12-09-2022
Ecological advice	NZ Environmental Management	Joana Unteregger	Ecologist		12-09-2022
Archaeologist advice	Norther Archaeological Research	Leigh Johnson / Elisabeth Callaghan	Director / Senior Partner		12-09-2022

Input required at detail design stage:					
Cultural Impact Assessment	*Local Hapū / Iwi Representatives*	*Respective Representatives to be advised*			
Consent approval	*FNCD / NRC*				
KR Shared Pathway Policy Compliance	*KiwiRail*	*Royce MacLeod*	*GM – Northern Property Portfolio*		
New Zealand Cycle Trail Design Guide - Compliance	*Nga Haerenga / NZCT*	*Janet Purdey*	*General Manager*		
Rail Regulator – Rail Safety Case Approval	*Waka Kotahi / NZTA*	*Cindia Ciu*	*NZTA Rail Safety officer*		
Archaeological authority	*Pouhere Taonga / Heritage NZ*	*Bill Edwards*	*Area Manager Northland*		

Table of Contents

Contents

1. Document History 2
1.1. Version History 2
1.2. Reviewers 2
1.3. Approval 2
1.4. Sign off – Client Requirements 3
1.5. Sign off – Functional Requirements 4
2. Introduction 7
2.1. Background 7
2.2. Project Scope 8
2.3. Document Purpose 8
2.4. Document Audience 9
2.5. Reading this Document 9
2.6. Document Contributors 10
3. Client Requirements 11
3.1. Strategic Context 11
3.2. Alignment with Stakeholder Objectives 12
3.3. Project Objectives 13
3.4. Project Benefits 13
4. Functional Requirements 14
5. Sustainability 14
6. Safety Assurance 14
7. Operations 14
7.1. Operational Capacity 14
7.2. Interface with rail operations 14
8. Operational Safety Health and Environment, and Risk Management 15
9. Design 16
9.1. Standards and Design Guidelines 16
9.2. Rail Interface Clearances 16
9.3. Planning and consents 17
9.4. Ecological considerations 18
9.5. Archaeological and Heritage Protection 18
9.6. Cultural Requirements and Community Engagement 19
9.7. Future Proofing 20

9.8. Performance 20
10. Construction 20
11. Asset Management 20
12. Maintenance 21
12.1. General Maintenance Principles 21
12.2. Maintainability 21
Appendix A 22

2. Introduction

2.1. Background

The 87km long Pou Herenga Tai Twin Coast Cycle Trail (PHTTCCT) in Northland extends between Horeke in the west and Ōpua in the east and is estimated to take two days to complete across four sections.

The PHTTCC Trail currently holds 'Great Ride' status and is the only Great Ride north of the Hauraki Region. The Great Rides of the New Zealand Cycle Trail network are predominantly off-road trails. They showcase the best of New Zealand's landscapes, environment, culture, and heritage. The trails are located around the country from Northland to Southland.

Great Ride status has a national recognition and standards to ensure the cycling experience is offering world-class visitor experiences, and that the trails create ongoing job opportunities and economic, recreational and health benefits for New Zealanders.

The FNDC established the Cycle Trail Trust in 2018 with a governance board with representatives of both community and hapū associated with the areas that the Trail goes through.

The eastern end of the 11km Ōpua to Kawakawa section has until recently been located within the former railway corridor which the Far North District Council (Council) leases for the purpose from the Bay of Islands Vintage Railway Trust (BOIVRT). The Council opened the Ōpua-Taumarere section of the Twin Coast Cycle Trail along the rail corridor in 2014 on the understanding that the corridor would return to rail when the Bay of Islands Vintage Railway was extended from Taumarere to Ōpua.

The BOIVRT received funding from the Provincial Growth Fund (PGF) to reinstate this section of railway line and the Council was subsequently given notice to vacate the section of the railway corridor by the BOIVRT as the leaseholder in January 2020. Following the commencement of the Rail recovery work (Stage 1), the PHTTCCT ceased to have a continuous connection from Taumarere Station (chainage 4330) through Te Akeake / Lone Cow Railway Crossing (chainage 6900) to Ōpua (chainage 11261).

As a member of the Northern Adventure Experience (NAX), the Council spent time during 2020-2021 with the BOIVRT and the PHTTCCTT working towards making sure that Kawakawa and Ōpua are joined by a scenic railway and a cycle trail.

The intention was to build a new cycle trail alongside the recovered Taumarere - Ōpua section of the railway. However, design complexities, extra safety requirements and inflationary pressures on construction costs made this option more difficult than anticipated.

Council passed a resolution at the end of 2021 to develop an alternative cycle trail connecting Kawakawa and Ōpua[1] via Oromāhoe and Whangae Roads as an interim measure while plans to develop a permanent cycle trail along the railway corridor are progressed as originally planned.

The resolution also suspended its membership of NAX (which was formed to co-ordinate the extension of the railway and development of a new cycle trail within the rail corridor on a similar timeline) in December 2021 until such time as it and NAX are able to proceed with a viable option for

[1] This route travels from Kawakawa via Old Whangae Road (old state highway road reserve, running parallel with SH1 on the eastern side of the '3 bridges') then onto Whangae Road – Oromahoe Road – SH11 (including a crossing point across SH11).

the cycle trail on the rail corridor. The Cycle Trail Trust directors then followed the Council and with drew from NAX.

The Council is currently working with relevant parties to secure a long-term lease within the rail corridor for the cycle trail.

It is also in negotiations to secure a short-term lease over the corridor between Te Akeake and Ōpua to enable the Cycle Trail to use the corridor as it had been doing along this section with an optional addition of a vintage railway ride (via a gold coin) to complete the Taumarere – Te Akeake connection, until BOIVRT commences work to re-instate the sections of the rail line between these two locations.

Council is now working towards presenting a Decision Paper in September 2022 setting out the estimated costs for agreed preferred options for the new cycle trail between Taumarere and Ōpua.

2.2. Project Scope

The project scope includes completion of a continuous Cycle Trail between Kawakawa and Ōpua to deliver a route consistent in quality and experience with that currently making up the rest of the PHTTCCT, and in accordance with the New Zealand Cycle Trust (NZCT) / Nga Haerenga Guidelines to enable the route to retain its Great Ride status with the Ministry of Tourism.

The design of any sections of the cycle way that lie within the rail corridor must comply with the safety requirements of Waka Kotahi as the rail regulator and KiwiRail shared pathway policy requirements.

The aspiration for this cycle trail is to[2]:

- Help retain Te Pou Herenga Tai Twin Coast Cycle Trail's Great Ride status (marketability of the trail)
- Provide value for FNDC ratepayers
- Be a family friendly trail that also accommodates walkers
- Provide an off-road trail connecting communities
- Provide a visitor experience that offers interaction with the BOIVR and TSS Minerva
- Provide access to water views for users
- Respect heritage values and make them accessible to visitors
- Protect the current rail asset and infrastructure
- Respect cultural impact and minimise environmental impact
- Be a local economic multiplier enabling the local hapū and community to offer adjacent visitor experiences

2.3. Document Purpose

This document sets out the Client Requirements and Functional Requirements for the Kawakawa to Ōpua Cycle Trail Project.

The Client Requirements are the high-level requirements for the project which generate the project objectives.

[2] Stakeholder groups were surveyed on their project success criteria and the top priority for each of them is listed here as well as the criteria than ranked within the top five overall. These are listed in no particular order.

Functional requirements define the operational and technical functionality required to achieve the project objectives. Further functional requirements may be developed as part of the design process.

2.4. Document Audience

This document is intended for use by:

- The project stakeholders
- The project design and management team
- Third party suppliers

2.5. Reading this Document

The Clients Requirements and Functional Requirements are detailed within this document. For further background and detailed information on this project please consult the following reference documents which are available upon request:

- NAX Northern Adventure Experience Business case *(Lau'rell Pratt)*
- Northern Adventure Experience funding agreement and revised milestones with Kanoa, August 2022 v3 *(Lau'rell Pratt)*
- PHTTCCT Strategic Plan (*Tracy Dalton)*
- Trail usage statistics (by section) (*Tracy Dalton)*

2.6. Document Contributors

Area of Contribution	Name	Title
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3. Client Requirements

3.1. Strategic Context

Government and local communities co-fund the Great Rides, which provide a healthy and enjoyable way for New Zealanders and international visitors to see the country. The Council owns the Cycle Trail assets and provides the Cycle Trust with annual maintenance and operational grants.

The PHTTCCTT currently has Great Ride status with the Ministry of Tourism. The standards required to achieve Great Ride status are increasing and there is a need for continual improvement along the routes that hold it. Retention of this status is important to attract tourists (domestic and international) to the area as well as to receive access to operations, enhancement & emergency maintenance budgets co-funded by the NZCT.

This loss of connection between the Bay of Islands and Kawakawa for the past 12 months has been and continues to be detrimental to the Great Ride status, business viability for tourist operators, and the regional tourism industry. This impacts not only on tourism and the local economy but also impacts members of the local community who no longer have access to the cycle trail for daily recreational wellbeing and commuting.

A route, adjacent to the 1880-4 bay of islands railway would be unique and have and significant visitor experience value. The cycle trail design would ideally identify and enable connections to the environmental, historic and culturally significant sites along the corridor including the Vintage Railway, Whangae Tunnel, Whangae Estuary, Taumarere River, Taumarere Station, Te Ruapekapeka and Pumuka's Pa, significant wetlands, railway features including the proposed Colenso Terminus and link to the TSS Minerva (1910 steamboat) Jetty in Ōpua.

Opportunities for future economic, social, cultural and environmental activities already suggested include glamping, kayaking, waka, walking and historic and cultural tours, mountain bike trails through adjoining private land, retreats and a native bird sanctuary, biodiversity corridor, oyster production, art, culture, and retail experiences. These are examples of the ideas coming forth from whanau, hapū and community that add to the unique visitor experience and enhance the community wellbeing along the cycle/rail trail.

Council has committed funding in its 2021-31 Long Term Plan to re-instate the Kawakawa to Ōpua section of the Great Ride and resolved to develop a temporary cycle trail on a road route outside the rail corridor from within this funding to connect these two locations while lease negotiations and design options for a Cycle Trail sharing the rail corridor are progressed.

Kanoa (via the PGF) is funding NAX to deliver several projects within the region one of which is the re-instatement of the vintage railway between Taumarere and Ōpua. Part of the original NAX vision used to secure PGF funding was the reinstatement of a shared pathway alongside the vintage railway. Council secured $10.3M in the 2021-2031 Long Term plan for the reinstatement of the cycle trail and this co-funding was a milestone deliverable for the NAX project achieved June 2021. The rail line has been re-instated along the first part of this section between Taumarere to Te Akeake (Lone Cow) but is not yet operational.

The lease the BOIVRT holds with KiwiRail over the rail corridor from Kawakawa to the north end of Whangae Bridge (L58485) extends to 2030 with first right of refusal. BOIVRT have agreed with

KiwiRail to surrender part of their lease for the Shared Pathway which could then be offered for lease under a separate agreement with a longer term.

There are a number of land claims concerning the corridor with the Waitangi Tribunal; BOIVRT and NAX are supportive of the land claim process and future land ownership may be any combination of KiwiRail and the four local hapū. Te Arawhiti have previously advised Council that the existence of Treaty claims over land in the rail corridor does not prevent KiwiRail entering into a lease with the Council. Furthermore, should the land ever be used for Treaty settlement purposes or offered back under Public Works Act the existing lease would be protected. The lease for the corridor north of Whangae Bridge to Opua (L59023) is already sitting with Te Arawhiti and is part of annual lease arrangement with the BOIVRT. BOIVRT have agreed similarly to surrender a section of the corridor for the Shared Pathway and this will need to be negotiated with Te Arawhiti directly instead of KiwiRail.

3.2. Alignment with Stakeholder Objectives

To be successful in its delivery, the Project must align with both NAX objectives, and PHTTCCTT objectives[3].

NAX Strategic Objectives:

- Restore the 1880-4 bay of islands vintage railway and associated features that have local and regional significance (1880-4), between Taumarere and Ōpua.
- Safely relocate the PHTTCCT cycle way alongside the corridor for cyclists and pedestrians, connecting communities off-road Taumarere to Ōpua.
- Connect vintage steam experiences in the Bay of Islands - steam train to steamboat (TSS Minerva).
- Provide training, employment and economic opportunity for local whanau, hapū, communities to be part of the build project and develop visitor experiences alongside the NAX project objects.

The NAX project is about 65% complete across all objectives, but it has agreed with Kanoa (PGF) to delay the delivery of some of their project milestones to allow completion of a jointly agreed cycle way concept design that has potential for a joint rail recovery/Cycle Trail work programme in 2024.

PHTTCCT Strategic Objectives:

- Expediency to re-establish the connection between Kawakawa and Ōpua,
- RE-establish the ‘Twin Coast’ brand,
- Ensure the ride remains a viable Great Ride.
- To enable free and unfettered public use of the route by cyclists and walkers,
- To support development of an economic cycle trail route that is safe, robust and accessible for on-going maintenance.
- Resolution of the lease arrangements within the rail corridor being cognitive of the hapū interests and Treaty of Waitangi settlement claims.

All parties hope that this investment will result in a quality experience for users that also provides capacity to shape and support economic activity in within the local area, that local employment

[3] The council objectives regarding this project fall in line with the PHTTCCT as it is the Cycleway Trust that will manage the route on behalf of council when it is constructed.

opportunities will be generated during construction and that both local users, and domestic and international tourists drawn to the area by the PHTTCCTT Great Ride status, will make an ongoing contribution to the local economy.

3.3. Project Objectives

These project objectives have been designed to satisfy the strategic objectives set out above.

S	Specific Objective:	Restoration of a connection between Kawakawa and Ōpua that allows users to complete their experience of travelling coast to coast along the PHTTCC Trail.
M	Measure:	User experience surveys demonstrating the coast-to-coast cycle trail is in use and providing a great user experience
A	Criteria for Achievement:	New route open to users wishing to move between Kawakawa and Ōpua.
R	Key Delivery Risk:	Whangae / Oramahoe Rd Route - Land purchase negotiations and agreement of SH11 crossing AND, Rail corridor route including train ride via cyclist gold coin donation - availability of rail operations connecting Taumarere and Te Akeake and agreement of short-term rail corridor lease Te Akeake to Ōpua)
T	Timeline:	Completion by December 2022

S	Specific Objective:	Deliver a continuous Cycle Trail between Kawakawa and Ōpua in close proximity to the Bay of Islands Vintage Railway that allows retention of the trail's Great Ride Status
M	Measure:	User experience surveys demonstrating the cycle way provides a user experience worthy of Great Ride Status retention.
A	Criteria for Achievement:	New Cycle Trail open to users wishing to move between Taumarere and Ōpua in proximity to the Bay of Islands Vintage Railway
R	Key Delivery Risk:	Design compliance with planning and regulatory/safety criteria.
T	Timeline:	Indicative Timeline: 2022-2023 Detailed Design and Planning, 2024-2025 Construction

As part of the project objectives the project shall provide a sustainable infrastructure solution that includes:
i) sustainable procurement models and resourcing.
ii) avoiding or minimising environmental impacts as far as practicable.

3.4. Project Benefits

This project seeks to provide design options and a recommended route for the permanent realignment of the PHTTCCT between Taumarere and Opua, meeting Council commitments in the LTP and to enhance the PHTTCCT brand.

Expediently closing this gap benefits the PHTTCCT Trust in addressing their immediate need to provide a continuous route on this Kawakawa to Ōpua section in support of their Great Ride Status. by:

- Constructing a cycle route between Kawakawa and Ōpua via Old Whangae Road, Whangae Road, Oromahoe Road, and SH11, (Ref Council Resolution 2021/72), AND

- Agreeing a short-term lease from BOIVRT for FNDC between Te Akeake and Opua to allow cyclists to make use of re-instated train operations between Taumarere and Te Akeake for a gold coin donation.

The plan to carry out a potentially staged longer-term construction of a shared pathway alongside the vintage railway supports NAXs Strategic Objectives of restoring the heritage railway and associated features, connecting the 'steam experience' with the TSS Minerva steamboat at Ōpua and reinstating the cycle trail within the corridor as set out in the Kanoa funding application.

The longer-term construction of a shared pathway meets the Stakeholder aspirations for the Cycle Trail and enhances the future visitor experience and Great Rides status of the PHTTCCT.

The reinstatement of a continuous connection between Kawakawa and Ōpua will contribute to the Northland Destination Management Plan value: "To enhance the value of our visitors' experiences in collaboration with hapu, iwi and stakeholders, for the benefit of our communities, businesses, the environment and future generations."

4. Functional Requirements

Functional requirements define the operational and technical functionality to achieve the project outcomes. The functional requirements for the project are set out in the following sections. Further functional requirements may be developed as part of the design process.

5. Sustainability

The project will comply with the sustainability best practice which will guide design and construction, ensuring the best outcomes for public amenity, resource efficiency, and compliance.

The project shall comply with all planning approval consent conditions and permitted activity standards.

6. Safety Assurance

Safety Assurance provides adequate confidence to interested parties that the system has been designed and constructed appropriately and can be operated and maintained safely and reliably for its intended life.

Safety Assurance is the process of providing adequate confidence the delivered product is acceptably safe for use. Providing assurance will include demonstrating relevant standards have been complied with including those that govern the Cycle Trail's interface with BOIVR infrastructure and operations where appropriate.

The BOIVRT currently have a Safety Operating Case with Waka Kotahi, and this is relevant for both train operations and construction on and within the corridor. Keteriki Ltd the operating entity established as part of the Kanoa funding will take over this operating license from October 2022. Waka Kotahi will need to authorise approval of the Shared Pathway and the safety systems established as part of the Detailed Design phase and any level crossing of the rail lie will need to be by an accredited Level Crossing Safety Impact Assessment (LCSIA) assessor.

7. Operations

7.1. Operational Capacity

The design of any section of shared pathway between Kawakawa and Ōpua shall provide for a double width Cycle Trail allowing for bi-directional use.

7.2. Interface with rail operations

The design of the route shall ensure optimal interactions between the cyclists and vintage railway including safe separation between trains and cyclists while designing the route, so the proximity of the vintage railway does not detract from the cyclist's experience.

Interruption to a continuous cycling experience caused by interaction with the BOIVR shall be kept to the minimum required to ensure a safe route for cyclists that does not detract from this activity. Currently the BOIVRT are only operating Friday-Sunday, and seven days in the School Holidays. The proposed schedule is 3-6 passenger train journeys per day.

Potential opportunity exists to co-ordinate a joint program of works, for the rail restoration and Cycle Trail construction to minimise the impact on rail operations and offer best value for the Council.

Alternatively, during construction of the Cycle Trail, some Blocks of Line will need to be arranged with the BOIVR where construction work cannot be carried out under live rail conditions. Should this be required, timetabling of any possessions will need to be determined by liaising with the BOIVRT Operations team.

8. Operational Safety Health and Environment, and Risk Management

The project Safety Health and Environment (SHE) and risk management requirements shall be addressed in accordance with all relevant SHE legislation for New Zealand. The project shall adopt effective Risk Management techniques and arrangements within the FNDC SHE Management System to meet these legal obligations.

In particular, safety risk shall be eliminated or minimised So Far As Is Reasonably Practicable (SFAIRP).

The project shall adhere to Safety in Design management principles. Design risk considers how to eliminate hazards or minimise the SHE risks (e.g., death, injury, and ill health to those who will construct, operate, maintain, decommission, or demolish an asset and impacts to the environment).

Safety in Design begins in the conceptual and planning phases of a project offering the greatest opportunity to incorporate improvements that can produce time and cost savings over the life of the asset. The emphasis is on making the right choices about the design as early as possible to enhance SHE performance of the project. These choices may include appropriate methods of construction, ongoing maintenance provisions or materials used.

Mandatory Requirements

- SHE risks shall be identified and management control arrangements developed in concept and planning phases of the project, and

- SHE risks shall be considered for the foreseeable life of an asset.

The BOIVRT Safety Case already includes an extensive RISK Assessment authorised by Waka Kotahi. Any joint construction programme proposal will need to be submitted for approval with Waka Kotahi as Rail Regulator.

9. Design

9.1. Standards and Design Guidelines

The design standards and guidelines set out in this section provide the framework within which the Cycle Trail must be designed.

The New Zealand Cycleways Trust has published the New Zealand Cycle Trail Design Guide[4] 'to assist people involved in planning, designing, or building cycle trails that would make up the New Zealand Cycle Trail (NZCT).'

The NZ Cycle Trail Design Guide provides a framework for defining the visitor experience including gradients, clearances, pinch points, trail alignment and shape, surface materials, visibility, environmental, culture and heritage considerations to be considered in the design.

The guide refers to several supporting standards and guidance documents which must also be considered in the Cycle Trail design:

- DOC Track Construction and Maintenance Guidelines
- Mountain Bike Trail Guidelines
- Sustrans Guidance
- Standards New Zealand HB 8630:2004
- Cycling Network Guidance
- Austroads Guides

Due to the interface with an operational vintage railway, there are additional design standards, guidelines and policies that relate to the rail interface which the design needs to comply with. Some of these are KiwiRail standards that BOIVRT has chosen to adopt in support of their Operational Safety Case.

- Design Guidance for Pedestrian and Cycle Rail Crossings[5]
- T-ST-DE-5215 Public Pathways on the Rail Corridor[6]
- KR Shared Pathway Policy
- T200 Track Handbook[7]
- T-ST-DE-5212 Clearances[8]

[4] Ministry of Business, Innovation and Employment, 5th Edition, 2019
[5] Waka Kotahi & KiwiRail, Version 1, 7 July 2017
[6] KiwiRail Standard, Issues 1.1, 30 December 2019
[7] KiwiRail Standard, Issue 6.0, 3 March 2017
[8] KiwiRail Standard, Issue 1.8, 31 January 2018

9.2. Rail Interface Clearances

The NZ Cycle Trail Design Guide notes, under the section of the guide headed Route Selection that:

"*It is also possible to form rail trails along live rail corridors adjacent to the railway line; this requires fencing if the path is close to the railway line. The greater the separation distance between the path and the railway line the better. KiwiRail will typically require at least 5 m separation from active railway centrelines*".

Kiwirail's Design Guidance for Pedestrian and Cycle Trail Crossings V1 2017 also provides details of the minimum clearances from the track to structures and other infrastructure and requires for new construction on mainlines and loops, a minimum horizontal distance of 2.75 m from the track centreline to the edge of adjacent fixed structures above rail level is required; in practice a minimum of 5 m is recommended (or 4.4 m from the nearest rail track) for continuous structures such as cycleway fences.

The maximum BOIVR line speed is substantially less than the KiwiRail mainline speeds of up to 70km/h being 15km/h on open track and 5km/h over structures. The maximum BOIVR line speed is under the maximum speed of 25km/h normally allowed for all movements in KiwiRail yards, terminals, and sidings.

T200 fig 2 clearance gauge is for a normal speed operating railway, and still allows obstructions at 2.3m – line 6 i.e., for isolated structures up to 2m.

T200 fig 3 line 10 allows 2.3m for 'other structures' on one side of the track only and where staff can safely work on the other side.

As the maximum speed for the BOIVR is 15km/h (i.e., where a rail movement can be expected to stop within half of the clear distance ahead), there is a case to consider 2.3m when 2.75m becomes difficult to provide.

Otherwise, a minimum of 2.75m should be adhered to where reasonably possible.

9.3. Planning and consents

The entire rail corridor is contained within "Coastal Environment" (NZCPS/RPS), except for the span across the Kawakawa River which forms the cross-river boundary with the Coastal Marine Area (CMA).

Biodiversity Values

All activities in the Coastal Environment are obliged to "avoid significant adverse effects" on certain threatened or at-risk biodiversity values while the obligation to "avoid, remedy, or mitigate" other adverse effects on indigenous biodiversity also exists. The ecologists have identified a number of relevant biodiversity values as "occurring" in the vicinity of the proposed Cycle Trail route (see Table 1 of ecologist report).

Activities also have an obligation to maintain the important functions and values of wetlands and must provide biodiversity offsetting or environmental biodiversity compensation, so that residual adverse effects on the important functions and values of wetlands are no more than minor.

Outstanding & High Natural Character

Areas of Outstanding or High Natural Character are present along the existing corridor. Significant adverse effects on the characteristics, qualities and values that contribute to natural character or other natural features and landscapes of these areas must be avoided. A Landscape Architect will need to provide an assessment of significance of effects of the activity (North or South) before a conclusion can be made on the appropriateness of either option at this stage.

All other adverse effects on natural character are to be avoided, remedied, or mitigated including by ensuring the location, intensity, scale and form of activities is appropriate having regard to natural elements and processes, and minimising to the extent practicable indigenous vegetation clearance and modification (seabed and foreshore disturbance, structures, discharges of contaminants).

Natural Hazards

Both coastal and flood hazard overlays apply to the Rail line as a whole.

In areas affected by coastal hazards over at least the next 100-years, avoid increasing the risk of social, environmental, and economic harm from coastal hazards and avoid redevelopment that would increase the risk of adverse effects from coastal hazards.

Development in flood hazard areas must not increase the risk of adverse effects from flood hazards on other property or another person's use of land.

Provided sufficient evidence is presented demonstrating harm and risk are avoided, then this matter will not be an issue. Please note however that hard protection structures will require additional analysis, particularly their impact on coastal and hydrological processes.

Other Matters

The South side has the potential to require reclamation of CMA. Reclamation of land in the CMA must be avoided, unless all the following criteria can be satisfied:

- land outside the coastal marine area is not available for the proposed activity,
- the activity which requires reclamation can only occur in or adjacent to the coastal marine area,
- there are no practicable alternative methods of providing the activity, and
- the reclamation will provide significant regional or national benefit.

9.4. Ecological considerations

Most of the proposed Cycle Trail route is located at the boundary between estuarine mangrove forest (or rarely open water) growing along the edges of the Kawakawa River and regenerating native vegetation growing on the hillslopes above the river. The proposed Cycle Trail route intersects six main vegetation types found along the route, including mangrove forest, oioi rushland (salt marsh), kānuka forest/shrubland, raupo – kuta rushland, mingimingi shrubland and exotic vegetation including pasture. Introduced weeds such as gorse, Spanish heath and Sydney golden wattle are abundant across the length of the Cycle Trail, but particularly dominant in the narrow corridor either side of the trail which was disturbed to create the railway line.

The highest value vegetation types along the proposed Cycle Trail route are the various types of wetlands, oioi. rushland, mingimingi shrubland and raupo – kuta rushland). These habitats are relatively intact and generally of good quality with a low weed presence, except at the margins. The wetland vegetation is also home to nationally and regionally threatened species.

Kānuka forest/shrubland habitats and mangrove forest habitats are of moderate ecological value. This vegetation is representative and forms part of a larger contiguous habitat. This habitat supports threatened, rare and/or distinctive species, but is not a rare habitat type and there is no reason to believe that the habitat affected by the proposal is of unusually high value. The exotic vegetation, including the narrow (2 – 5m) corridors on the embankments either side of the former railway line are of low – negligible ecological value. These habitats are dominated by introduced species such as gorse, pampas, Sydney golden wattle, Spanish heath, tree privet, pampas, Taiwan cherry and woolly nightshade.

Native bird species are relatively abundant along the trail, probably due to the active pest trapping programme along the Cycle Trail.

9.5. Archaeological and Heritage Protection

There are two main pieces of legislation in New Zealand that control work affecting archaeological sites. These are the Heritage New Zealand Pouhere Taonga Act, 2014 (HNZPTA), and the Resource Management Act, 1991(RMA). The Heritage New Zealand (HNZ) administers the Heritage New Zealand Pouhere Taonga Act (HNZPTA). All archaeological sites in New Zealand are protected under the HNZPTA and may only be modified with the written authority of the HNZ.

Historic Heritage is defined as those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, derived from archaeological, architectural, cultural, historic, scientific, or technological qualities. Historic heritage includes:

- historic sites, structures, places, and area,
- archaeological sites,
- sites of significance to Māori, including wāhi tapu, and
- surroundings associated with the natural and physical resources (RMA section 2).

An Archaeological Assessment of Effects of the proposal final design will need to be made, prior to an HNZPT Application being sought.

Recorded Archaeological Sites

The Kawakawa to Opua Railway line is a recorded archaeological site P05/1002 (with the Taumarere to Lone Cow section recorded as Q05/1546) and will be affected by the proposal. As such, the proposal will require an Authority from Heritage New Zealand Pouhere Taonga.

In addition, the railway (Taumarere to Opua) has a number of associated features (for example the 1881 brick culverts; the c.1884 basalt rail embankment footing; the rail bridges; the 1/2 mile and mile markers; telegraph poles; Te Akeake station platform; Lone Cow siding and rail switch (all recorded as part Q05/1546); the railway cottage site (part Q05/877); the brick railway tunnel Q05/1551; the jetty or building foundation (Q05/1552) which is potentially associated with the 1964 rail crash.

Pre-contact and historic sites associated with Maori include *Puketutu* Pa (Q05/940); *Ngamahanga Pa* (Q05/907); *Pumuka* Pa (Q05/ 893, which includes archaeological site features Q05/892, 894, 896, 895,1157, 1158, 1159, 1160). Each of the defended Pa have ancillary features extending down and into the rail corridor. There are possibly further Pa and terraced open settlements above and to the west of the railway.

In addition to the Pa there are Open settlement sites Q05/910, Q05/878, Q05/877, Q05/879 which, along with Puketutu Pa (Q5/940), were bisected by the railway construction in 1881-1884; and Shell midden sites Q05/1159, Q05/1545 and Q05/898.

Appendix A contains maps showing the location of relevant heritage and archaeological sites. A HNZ authority must be sought to undertake work in the vicinity if the areas can't be reasonably avoided.

9.6. Cultural Requirements and Community Engagement

It is important that the project works through all arrangements on the corridor with respect to mana i te whenua and supports a collective approach to KiwiRail and Te Arawhiti and the return of the whenua to the respective hapū.

Local hapu are represented on both the NAX and PHTTCCT Boards and there are MOU and partnership agreements active in the space. NAX-BOIVRT support whanau, hapu and iwi aspirations on the corridor and seek to work positively with respect to KiwiRail, Te Arawhiti and shared area's of interest. This includes support to develop proposals alongside the corridor for their respective interests in terms of training, employment, kaitiakitanga, manakitanga, enterprise and investment.

As historic, heritage places have significant archaeological, cultural, social, spiritual, and traditional value; significant cultural sites for whanau and hapū along the corridor must be considered and respected. These significant sites include but are not limited to; the Whangae Estuary, Taumarere River, Taumarere Station, Te Ruapekapeka Pa, Pumuka's Pa, significant wetlands, and the Ōpua headland.

A Cultural Impact Assessment will need to be carried out as part of the detailed design process with respect to the cultural and heritage considerations.

Concept options will need to be socialised with the community and input sought as part of a formal consultation process that will need to be undertaken during the next stage of design.

9.7. Future Proofing

The Cycle Trail design should consider user projections for both Cycle Trail users and BOIVR users with the intention of accommodating future Cycle Trail user numbers and not frustrating them due to potential future increases in BOIVR service frequency.

Any new requirements from other emerging projects will need to be updated into this document as they are agreed with the Project Stakeholders.

Great Rides requirements and expectations are also continuing to increase in terms of visitor experience and marketability of the cycle trail, the investment in the staged approach future proofs the Great Rides status of the PHTTCCT.

9.8. Performance

The Cycle Trail infrastructure shall allow for the following performance specifications:

- Double width Cycle Trail
- Clearance from all Cycle Trail infrastructure of 2.3m minimum from rail centreline, 2.75m or more where possible
- Grade 1 where possible with limited sections of up to Grade 3 where necessary[9]

10. Construction

During construction and commissioning of the project, normal services on the BOIVR shall be maintained wherever possible, and disruption to rail customers within this period shall be minimised.

Works shall be planned to also minimise disruption to Cycle Trail users.

A joint construction programme to carry out rail restoration and Cycle Trail construction may provide a safe, efficient and cost-effective option for Council.

11. Asset Management

The long-term needs for asset management shall be addressed during the design and construction stages of the project. The delivery and documentation must be consistent with the FNDC asset management system.

12. Maintenance

12.1. General Maintenance Principles

The Cycle Trail installation shall be maintained to the defined principles and standards of a Great Ride. A functionality-centred maintenance approach shall be adopted for the Cycle Trail. This will be established by considering the risks and consequences of failures with the objective of delivering the required functionality and service at the least whole of life cost.

[9] As defined in the New Zealand Cycle Way Design Guidelines, 5th Edition, 2019

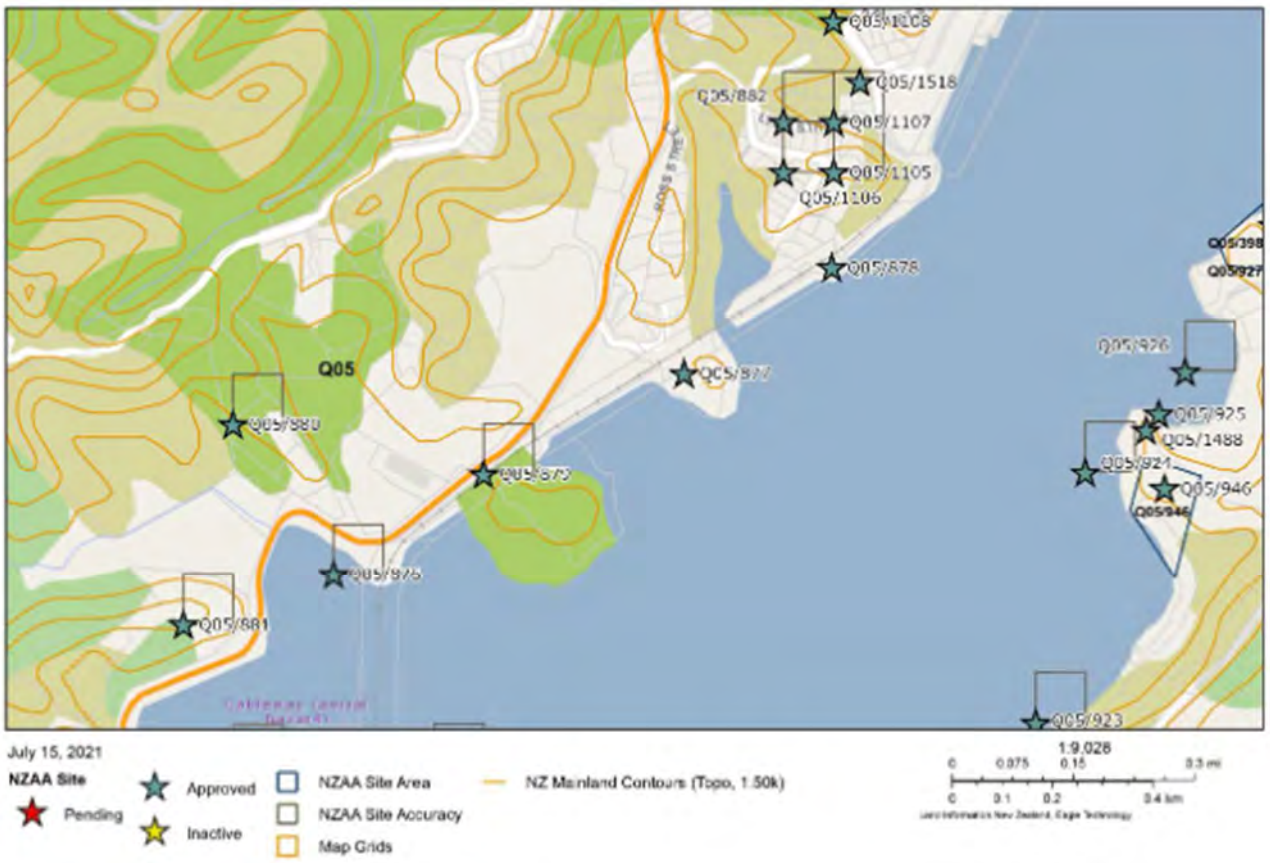
12.2. Maintainability

All systems and infrastructure components shall be designed and specified for safe, efficient, and economical maintenance.

Access to allow cycle trail maintenance shall be allowed for and shall include agreements with BOIVRT where maintenance access from the rail line is required.

It is anticipated that most maintenance work will not require access from the rail so should not impact on rail operations or require specialist hi-rail machinery.

Appendix A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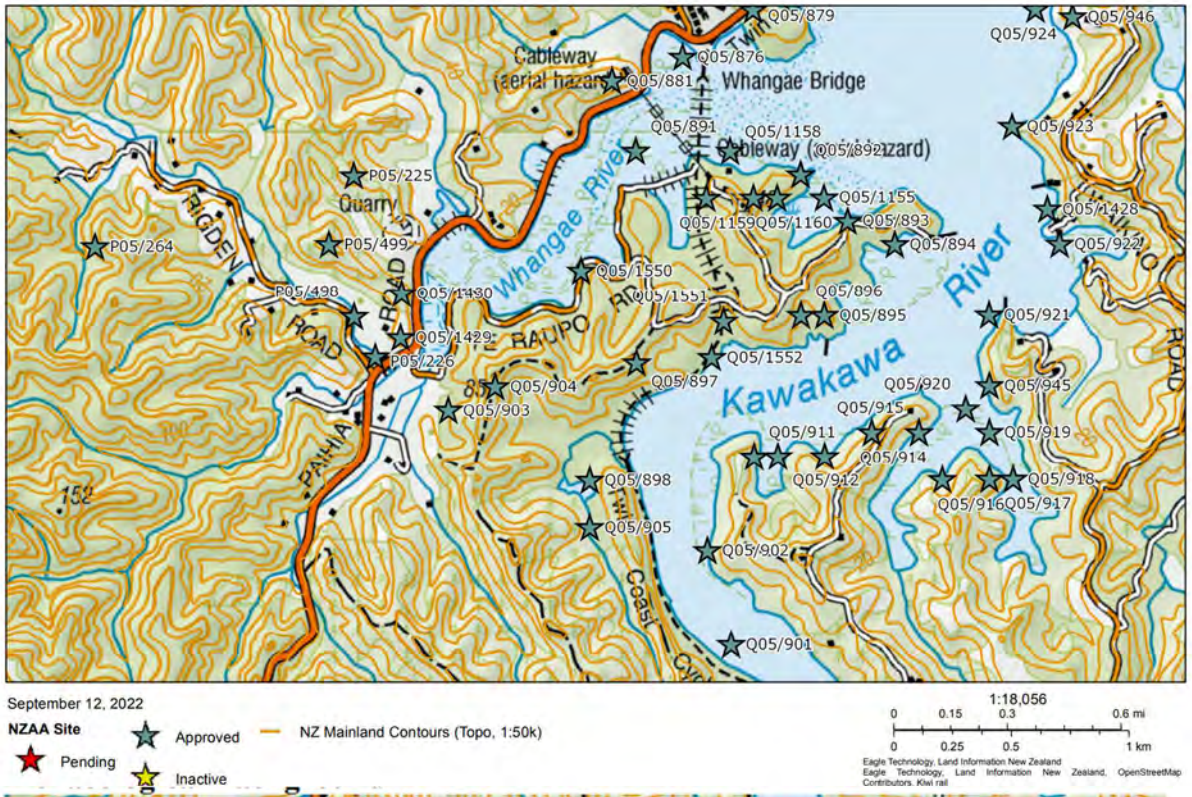
Q05/946
Q05/980
Q05/875
Q05/876
Q05/881
Q05/923
July 15, 2021
NZAA Site
Pending
Approved
Inactive
NZAA Site Area
NZAA Site Accuracy
Map Grids
NZ Mainland Contours (Topo, 1:50k)
1:9,028
0 0.075 0.15 0.3 mi
0 0.1 0.2 0.4 km



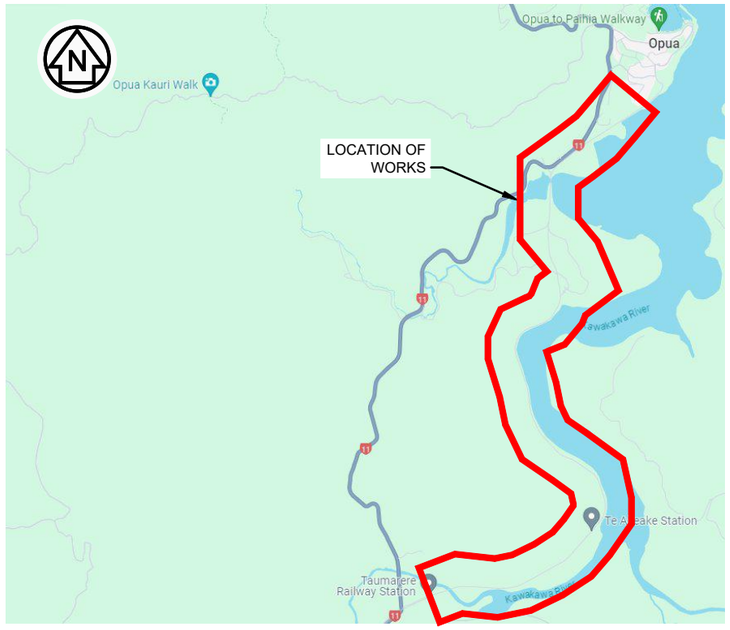
THE RECORDED ARCHAEOLOGICAL SITES IN THE VICINITY OF THE RAILWAY (Courtesy of Archsite, September 2020).

Appendix B
Concept layout Dwgs
Kawakawa to Opua Cycle Trail – Consent Drawings – 2209-RC-00 – August 2024

Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

KAWAKAWA TO OPUA CYCLE TRAIL

CONSENT DRAWINGS



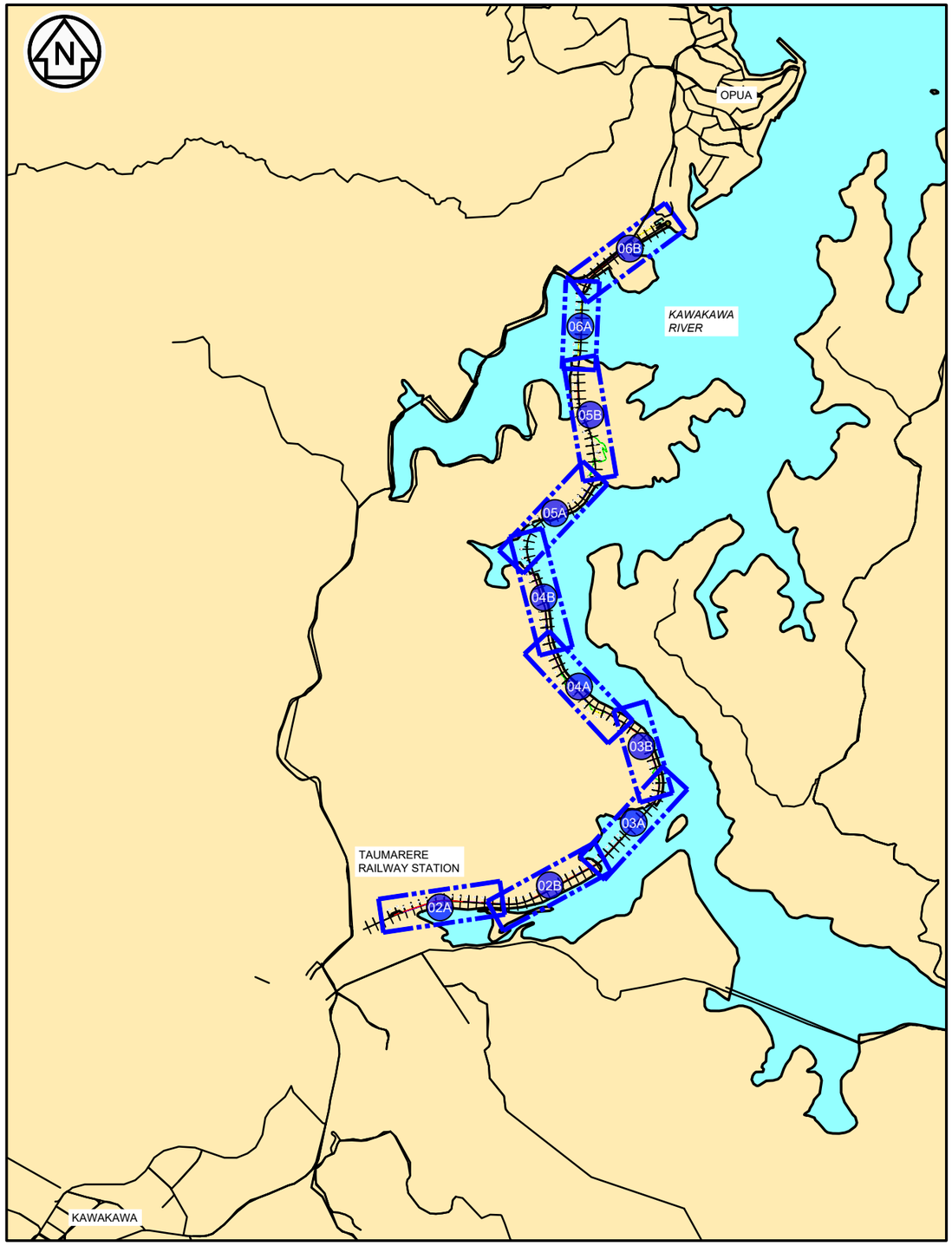
LOCALITY PLAN
NTS

VISUALISATION

DATE: NOV. 2024

JAS CIVIL LTD

2209-RC-00



INDEX PLAN
SCALE: NOT TO SCALE

DRAWING LIST

DRAWING No: 2209 **JOB NUMBER: 2209-RC**

SHEET No.	SHEET TITLE	REVISION				
		DAY	4			
		MONTH	11			
		YEAR	24			
00	COVER SHEET, LOCALITY PLAN	1				
01	INDEX PLAN & SHEET LIST	1				
02	CONSENT DRAWINGS - CHN 4620 TO 5590	1				
04	CONSENT DRAWINGS - CHN 5590 TO 6770	1				
05	CONSENT DRAWINGS - CHN 6770 TO 8130	1				
06	CONSENT DRAWINGS - CHN 8130 TO 9870	1				
07	CONSENT DRAWINGS - CHN 9870 TO 10940	1				
08	CONSENT DRAWINGS - TYPICAL CROSS SECTION `A' & VISUALISATION	1				
09	CONSENT DRAWINGS - TYPICAL CROSS SECTION `B' & VISUALISATION	1				
10	CONSENT DRAWINGS - TYPICAL CROSS SECTION `C'	1				
11	CONSENT DRAWINGS - TYPICAL CROSS SECTION `D' & VISUALISATION	1				
12	CONSENT DRAWINGS - TYPICAL CROSS SECTION `E' & VISUALISATION	1				
13	CONSENT DRAWINGS - TYPICAL CROSS SECTION `F' & VISUALISATION	1				
14	CONSENT DRAWINGS - TYPICAL CROSS SECTION `G' & VISUALISATION	1				
15	CONSENT DRAWINGS - TYPICAL CROSS SECTION `H'	1				
16	CONSENT DRAWINGS - TYPICAL CROSS SECTION `I' & VISUALISATION	1				
17	CONSENT DRAWINGS - TYPICAL CROSS SECTION `J' & VISUALISATION	1				
18	CONSENT DRAWINGS - TYPICAL CROSS SECTION `J1' & VISUALISATION	1				
19	CONSENT DRAWINGS - TYPICAL CROSS SECTION `K' & VISUALISATION	1				
20	CONSENT DRAWINGS - TYPICAL CROSS SECTION `L' & VISUALISATION	1				
21	CONSENT DRAWINGS - TYPICAL CROSS SECTION `M' & VISUALISATION	1				

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL
CONSENT DRAWINGS

INDEX PLAN & SHEET LIST

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	01	1

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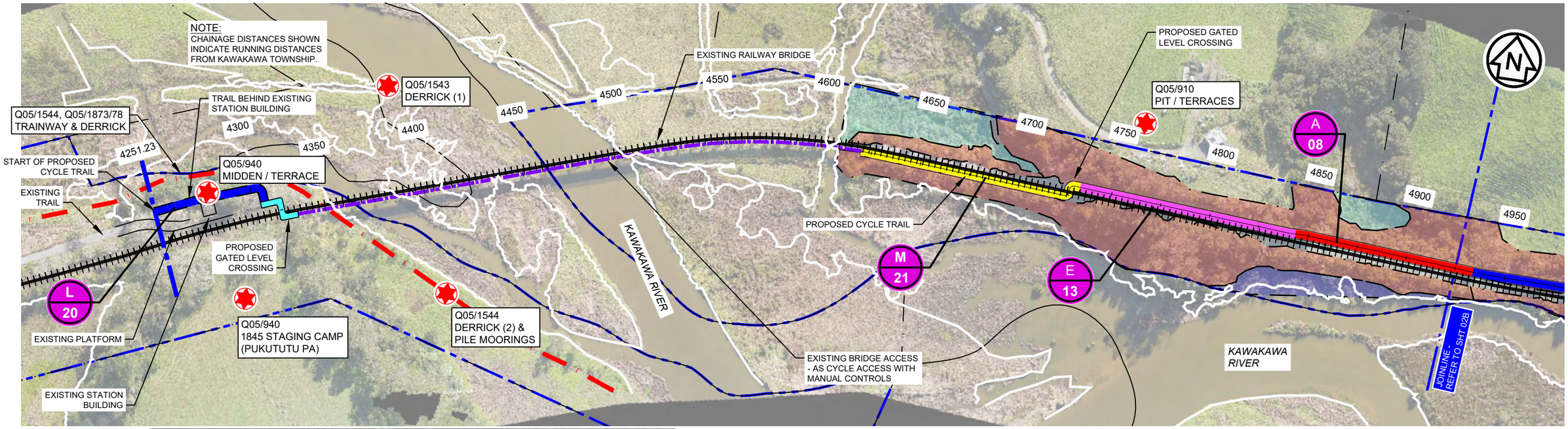
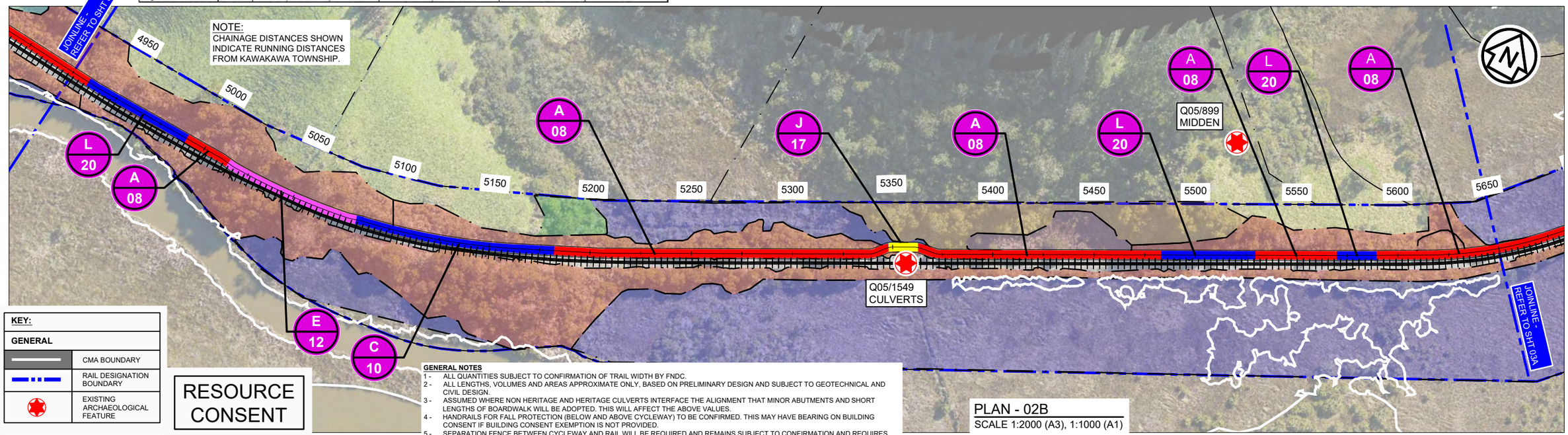


	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m³)	Total Volume of Permanent earthworks - Fill Material (m³)
Dwg 2 - 4620 to 5590m	760	733	115	162	0	3076	600	809

PLAN - 02A
SCALE 1:2000 (A3), 1:1000 (A1)



PLAN - 02B
SCALE 1:2000 (A3), 1:1000 (A1)

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

KEY:

GENERAL

	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

KEY:

ECOLOGY AREAS

	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

RESOURCE CONSENT

KEY:

TRAIL CROSS SECTIONAL TREATMENTS		REFERENCE
	TREATMENT 1 - BOARDWALK	(J)(J1)(K)(M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A)(B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

GENERAL NOTES

1 - ALL QUANTITIES SUBJECT TO CONFIRMATION OF TRAIL WIDTH BY FNDC.
2 - ALL LENGTHS, VOLUMES AND AREAS APPROXIMATE ONLY, BASED ON PRELIMINARY DESIGN AND SUBJECT TO GEOTECHNICAL AND CIVIL DESIGN.
3 - ASSUMED WHERE NON HERITAGE AND HERITAGE CULVERTS INTERFACE THE ALIGNMENT THAT MINOR ABUTMENTS AND SHORT LENGTHS OF BOARDWALK WILL BE ADOPTED. THIS WILL AFFECT THE ABOVE VALUES.
4 - HANDRAILS FOR FALL PROTECTION (BELOW AND ABOVE CYCLEWAY) TO BE CONFIRMED. THIS MAY HAVE BEARING ON BUILDING CONSENT IF BUILDING CONSENT EXEMPTION IS NOT PROVIDED.
5 - SEPARATION FENCE BETWEEN CYCLEWAY AND RAIL WILL BE REQUIRED AND REMAINS SUBJECT TO CONFIRMATION AND REQUIRES SAFETY CASE APPROVAL BY BOIVRT, KIWIRAIL AND NZTA REGULATORS. GRADE SEPARATION MAY REDUCE ACTUAL LENGTHS.
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7- DO NOT SCALE DRAWING.
8- NOMINAL SCALE IS SHOWN FOR A3 SIZE UNLESS SHOWN OTHERWISE.
9- COORDINATES IN TERMS OF NZTM GEODETIC 2000 DATUM.
10- LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
11- AERIAL PHOTOGRAPHY AND LAND PARCEL INFORMATION SOURCED FROM LAND INFORMATION NZ (LINZ) UNLESS STATED OTHERWISE.

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
CONSENT DRAWINGS
CHN 4620 TO 5590

PLAN

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	02	1

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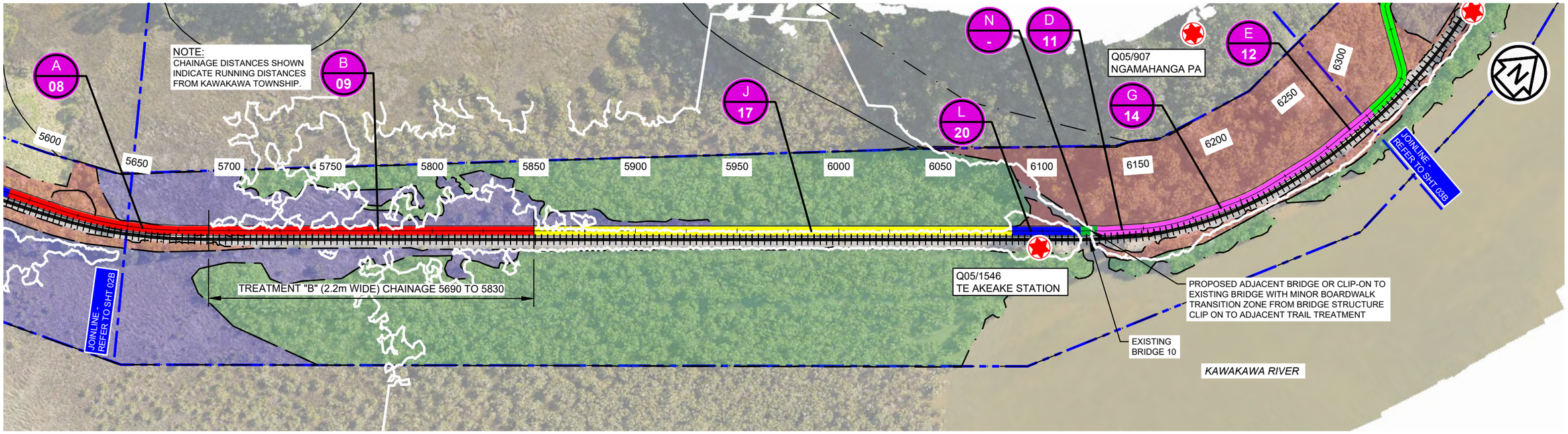

	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m³)	Total Volume of Permanent earthworks - Fill Material (m³)
Dwg 3 - 5590 to 6770m	1045	1058	235	705	382	3270	297	1821

PLAN 03A
SCALE 1:2000 (A3), 1:1000 (A1)

GENERAL NOTES

1 - ALL QUANTITIES SUBJECT TO CONFIRMATION OF TRAIL WIDTH BY FNDC.
2 - ALL LENGTHS, VOLUMES AND AREAS APPROXIMATE ONLY, BASED ON PRELIMINARY DESIGN AND SUBJECT TO GEOTECHNICAL AND CIVIL DESIGN.
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10- LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
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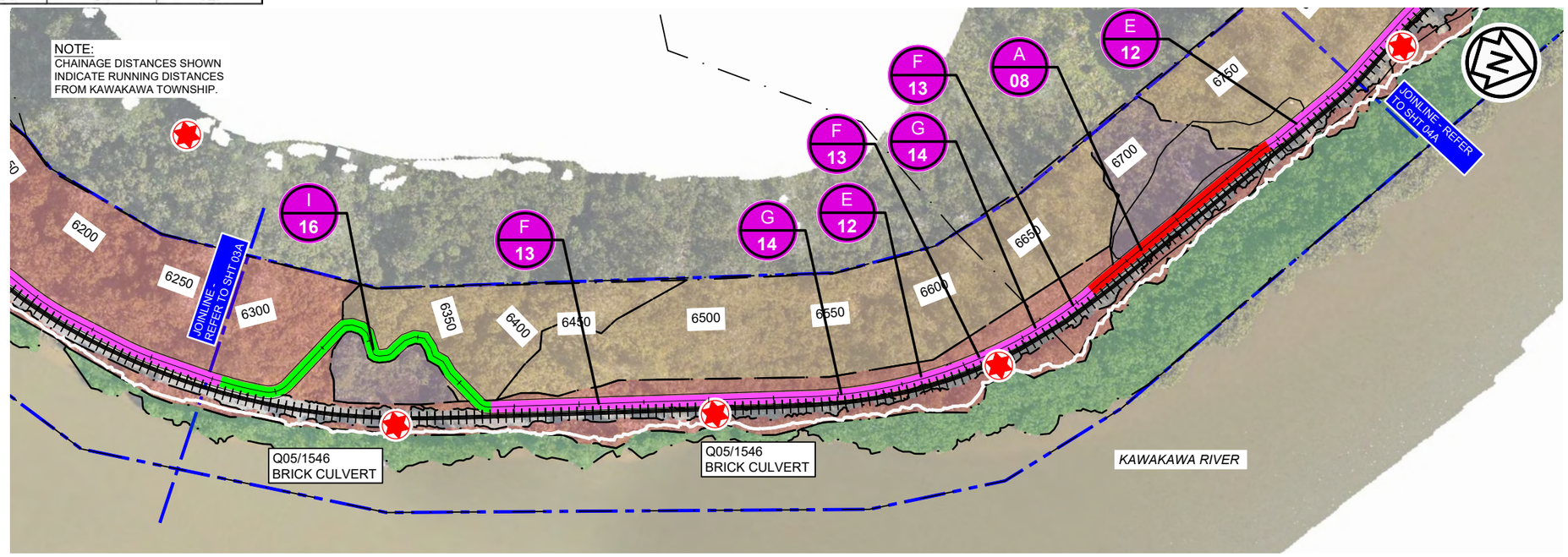

PLAN 03B
SCALE 1:2000 (A3), 1:1000 (A1)

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

KEY:

GENERAL

	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

RESOURCE CONSENT

KEY:

ECOLOGY AREAS

	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

KEY:

TRAIL CROSS SECTIONAL TREATMENTS		REFERENCE
	TREATMENT 1 - BOARDWALK	(J)(J1)(K)(M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A)(B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT
Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
CONSENT DRAWINGS
CHN 5590 TO 6770

PLAN

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	03	1

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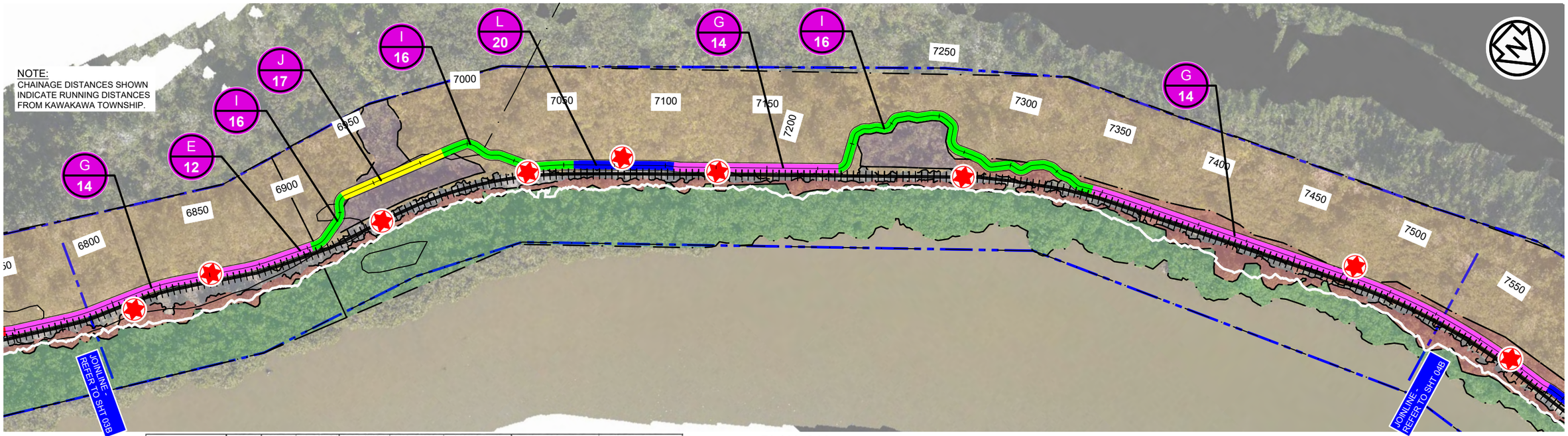
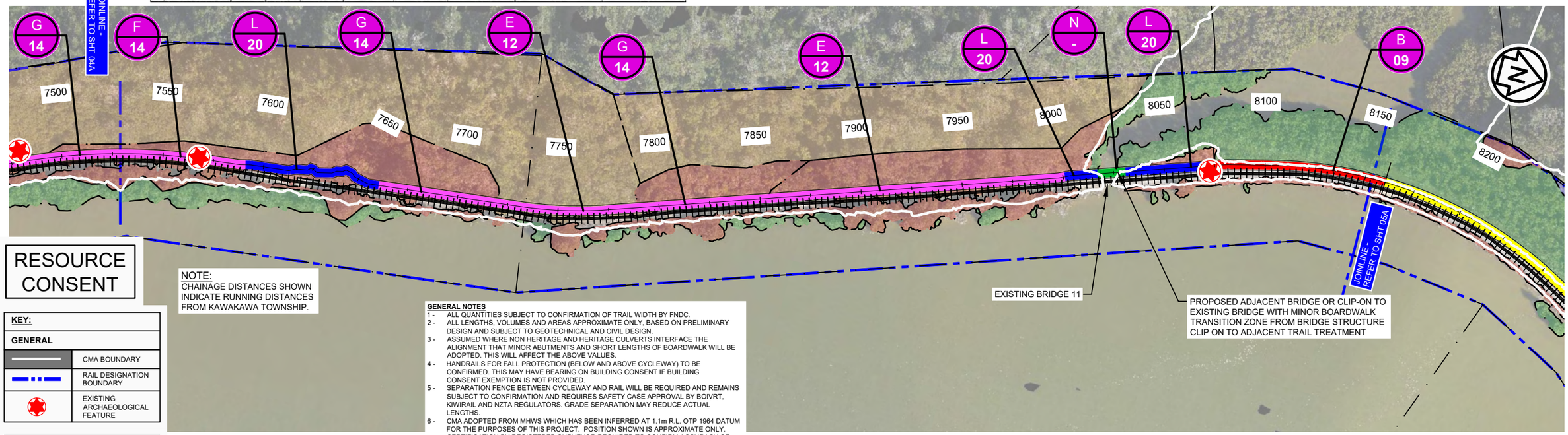


	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m³)	Total Volume of Permanent earthworks - Fill Material (m³)
Dwg 4 - 6770 to 8130m	1911	2313	53	159	116	5610	2081	1360

PLAN -04A
SCALE 1:2000 (A3), 1:1000 (A1)



PLAN 04B
SCALE 1:2000 (A3), 1:1000 (A1)

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

RESOURCE CONSENT

NOTE:
CHAINAGE DISTANCES SHOWN INDICATE RUNNING DISTANCES FROM KAWAKAWA TOWNSHIP.

KEY:

GENERAL	
	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

KEY:

ECOLOGY AREAS	
	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

KEY:

TRAIL CROSS SECTIONAL TREATMENTS		REFERENCE
	TREATMENT 1 - BOARDWALK	(J)(J1)(K)(M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A)(B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

GENERAL NOTES

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
CONSENT DRAWINGS
CHN 6770 TO 8130

PLAN

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	04	1

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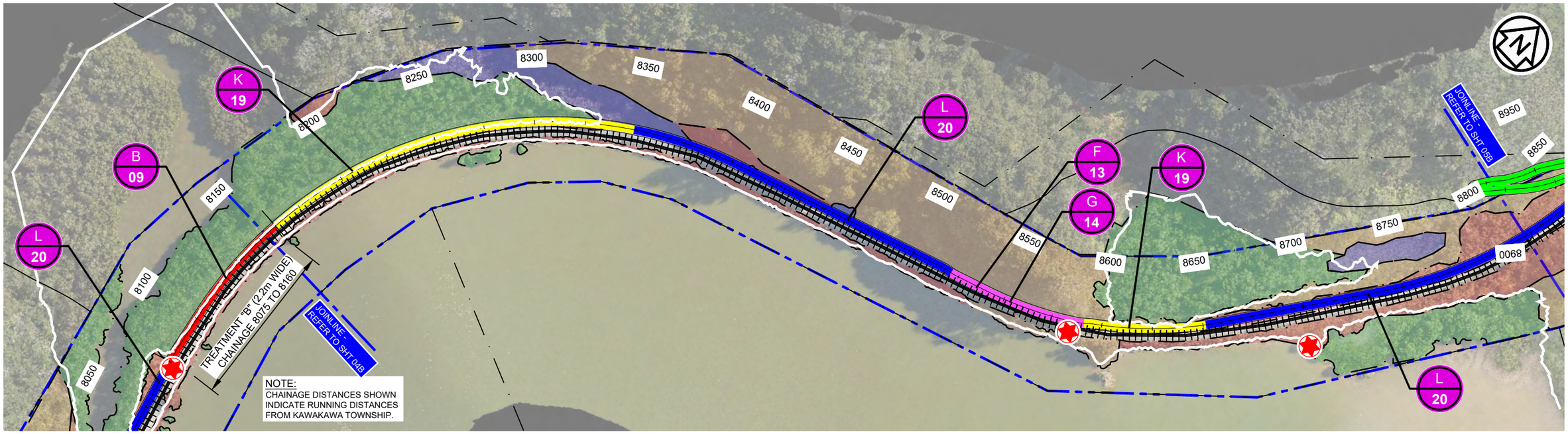
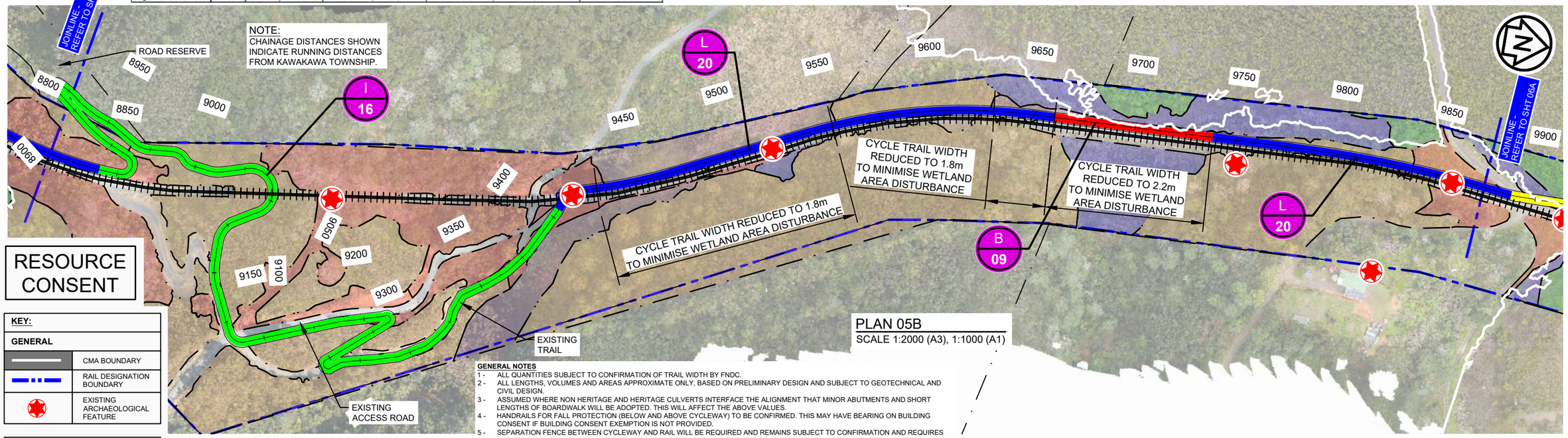


	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m³)	Total Volume of Permanent earthworks - Fill Material (m³)
Dwg 5 - 8130 to 9870m	370	226	250	750	228	5210	1357	1335

PLAN 05A
SCALE 1:2000 (A3), 1:1000 (A1)



PLAN 05B
SCALE 1:2000 (A3), 1:1000 (A1)

RESOURCE CONSENT

KEY:	
GENERAL	
	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

KEY:	
ECOLOGY AREAS	
	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

KEY: TRAIL CROSS SECTIONAL TREATMENTS		REFERENCE
	TREATMENT 1 - BOARDWALK	(J)(J1)(K)(M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A)(B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

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0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
CONSENT DRAWINGS
CHN 8130 TO 9870

PLAN

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	05	1

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GENERAL NOTES

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7- DO NOT SCALE DRAWING.
8- NOMINAL SCALE IS SHOWN FOR A3 SIZE UNLESS SHOWN OTHERWISE.
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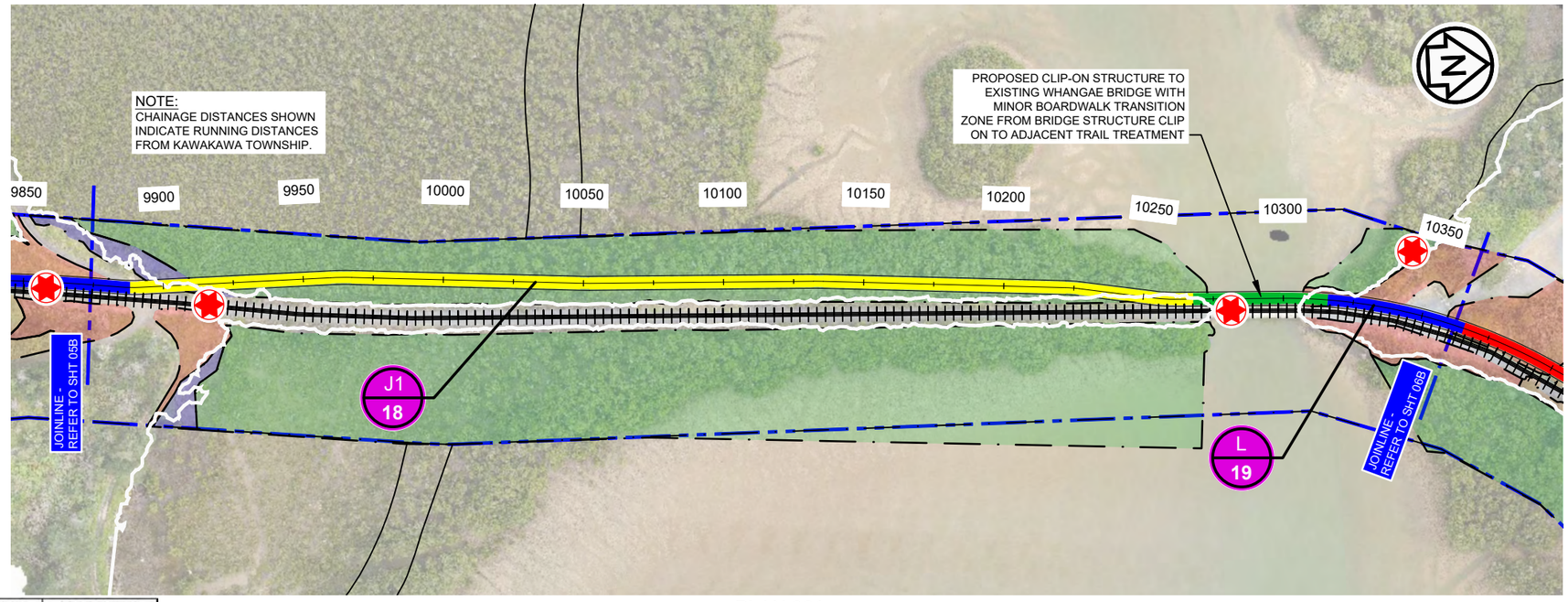
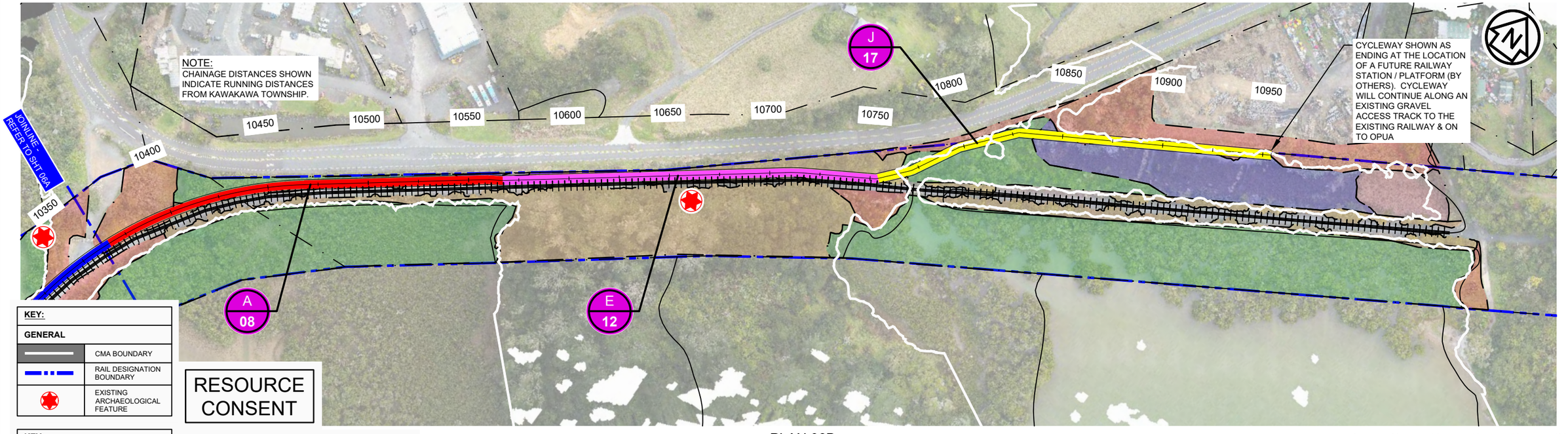


	Wall Length (m)	Wall Area (m²)	Boardwalk Length (m)	Boardwalk Area (m²)	Total CMA Encroachment Area (m²)	Total Area of Permanent Earthworks (m²)	Total Volume of Permanent earthworks - Cut Material (m³)	Total Volume of Permanent earthworks - Fill Material (m³)
Dwg 6 - 9870 to 10940m	250	189	580	1740	1634	1720	221	366

PLAN 06A
SCALE 1:2000 (A3), 1:1000 (A1)



PLAN 06B
SCALE 1:2000 (A3), 1:1000 (A1)

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

KEY:

GENERAL	
	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

KEY:

ECOLOGY AREAS	
	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

KEY:

TRAIL CROSS SECTIONAL TREATMENTS		REFERENCE
	TREATMENT 1 - BOARDWALK	(J)(J1)(K)(M)
	TREATMENT 2 - RETAINED WITHIN RAIL EMBANKMENT	(A)(B)
	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

RESOURCE CONSENT

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council — Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS CHN 9870 TO 10940

PLAN

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	06	1

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KEY:	
GENERAL	
	CMA BOUNDARY
	RAIL DESIGNATION BOUNDARY
	EXISTING ARCHAEOLOGICAL FEATURE

KEY:	
ECOLOGY AREAS	
	EXOTIC
	KANUKA
	MANGROVE
	MINGIMINGI
	OIOI RUSHLAND
	RAUPO
	RAUPO/ KUTA

KEY:		
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	TREATMENT 3 - RETAINED ADJOINING NATURAL SURFACES	(D)(E)(F)(G)
	TREATMENT 4 - ON GRADE, BATTERED SLOPES - NO STRUCTURES	(C)(H)(L)
	TREATMENT 5 - MTB STYLE TRACK IN BUSH, CUTS, FILLS & MSE SLOPES	(I)
	TREATMENT 6 - BRIDGES, EITHER NEW OR CLIP ON EXISTING	(N)

PROJECT QUANTITY SUMMARY

Earthworks	Volume (m^3)
Fill (solid)	5691
Cut (solid)	4556
Import Fill (solid)	1135

	Wall Length (m)	Wall Area (m^2)	Boardwalk Length (m)	Boardwalk Area (m^2)	Total CMA Encroachment Area (m^2)	Total Area of Permanent Earthworks (m^2)	Total Volume of Permanent earthworks - Cut Material (m^2)	Total Volume of Permanent earthworks - Fill Material (m^2)
Dwg 2 - 4620 to 5590m	760	733	115	162	0	3076	600	809
Dwg 3 - 5590 to 6770m	1045	1058	235	705	382	3270	297	1821
Dwg 4 - 6770 to 8130m	1911	2313	53	159	116	5610	2081	1360
Dwg 5 - 8130 to 9870m	370	226	250	750	228	5210	1357	1335
Dwg 6 - 9870 to 10940m	250	189	580	1740	1634	1720	221	366
TOTAL	4336	4519	1233	3516	2360	18886	4556	5691

NOTE:
CHAINAGE DISTANCES SHOWN INDICATE RUNNING DISTANCES FROM KAWAKAWA TOWNSHIP.

RESOURCE CONSENT

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	BWP		5.24
DRAWN	BWP		5.24
SURVEYED	LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

KEY & PROJECT IMPACT SUMMARIES

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	07	1

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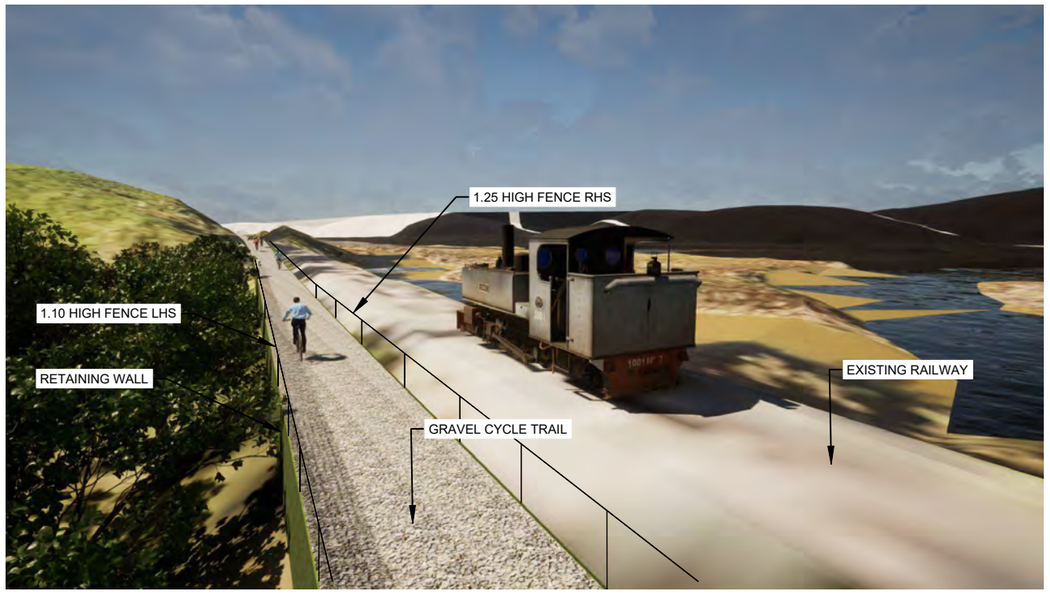
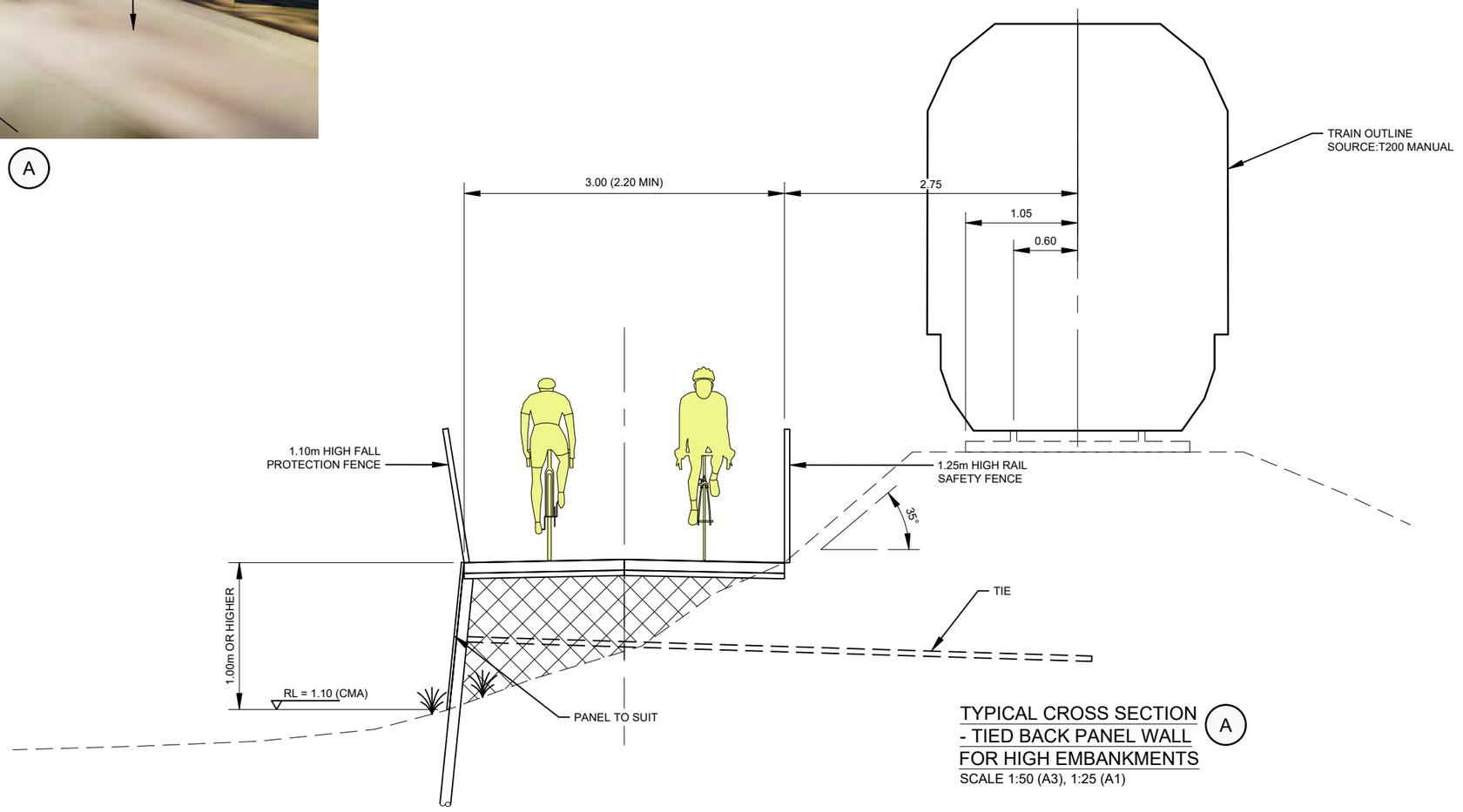


VISUALISATION - TIED BACK PANEL WALL FOR HIGH EMBANKMENTS
NTS

A



TYPICAL CROSS SECTION - TIED BACK PANEL WALL FOR HIGH EMBANKMENTS
SCALE 1:50 (A3), 1:25 (A1)

A

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT
Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `A' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	08	1

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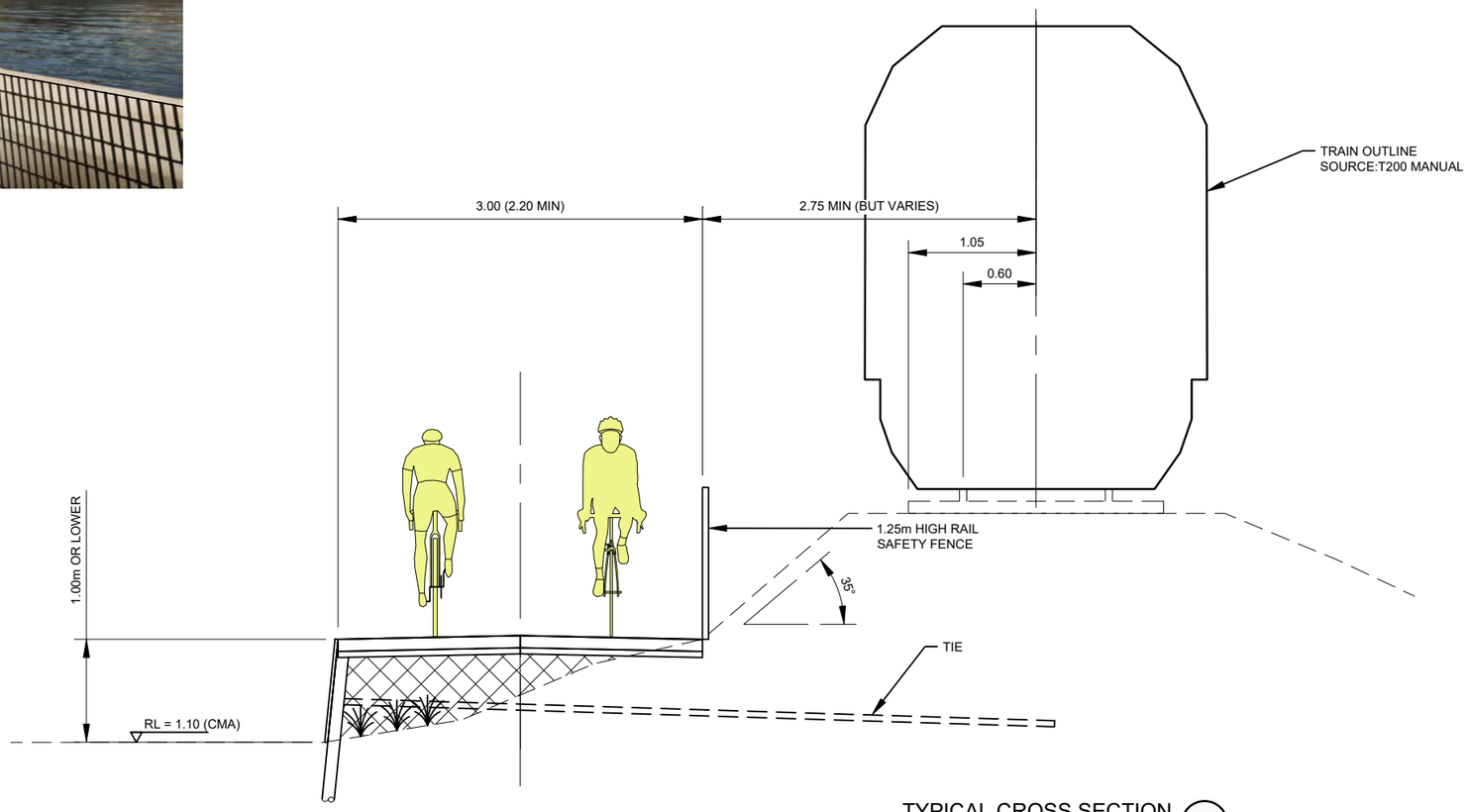
VISUALISATION - TIED BACK PANEL WALL FOR HIGH EMBANKMENTS (B)
NTS



TYPICAL CROSS SECTION - TIED BACK PANEL WALL FOR HIGH EMBANKMENTS (B)
SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council, Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `B' & VISUALISATION

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	09	1

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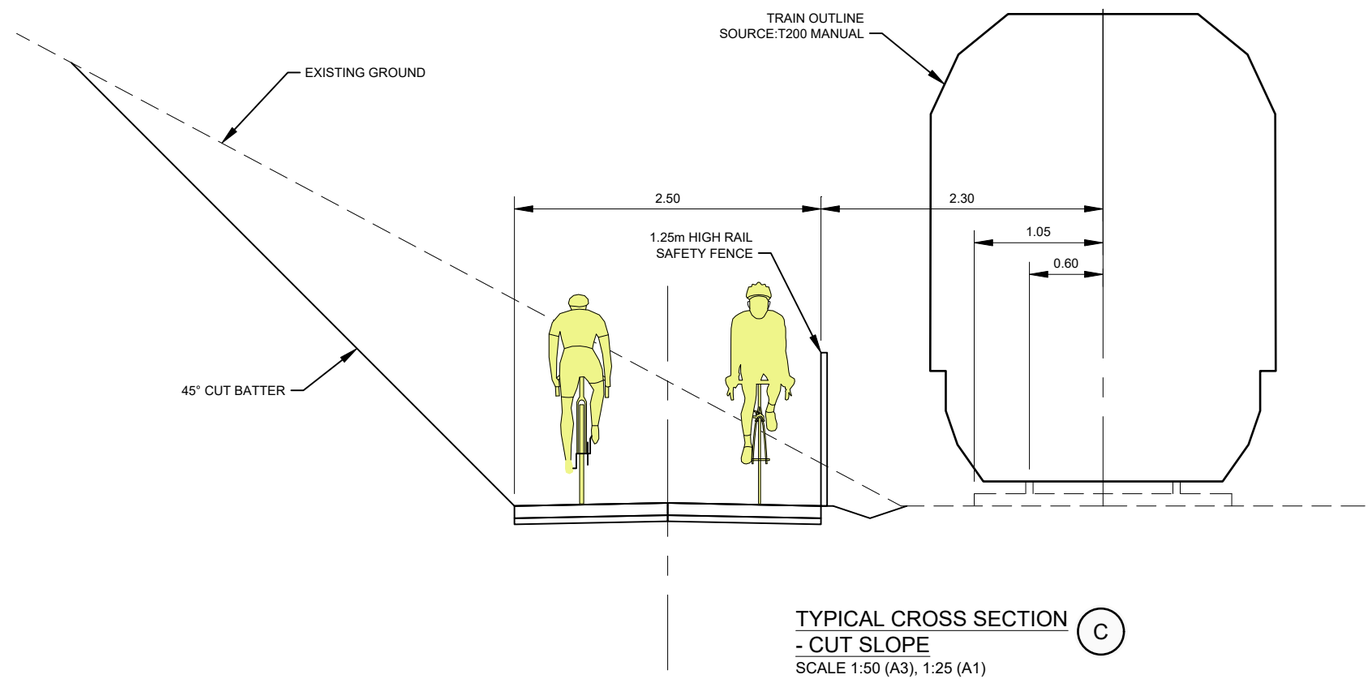

TYPICAL CROSS SECTION - CUT SLOPE (C)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `C'

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	10	1

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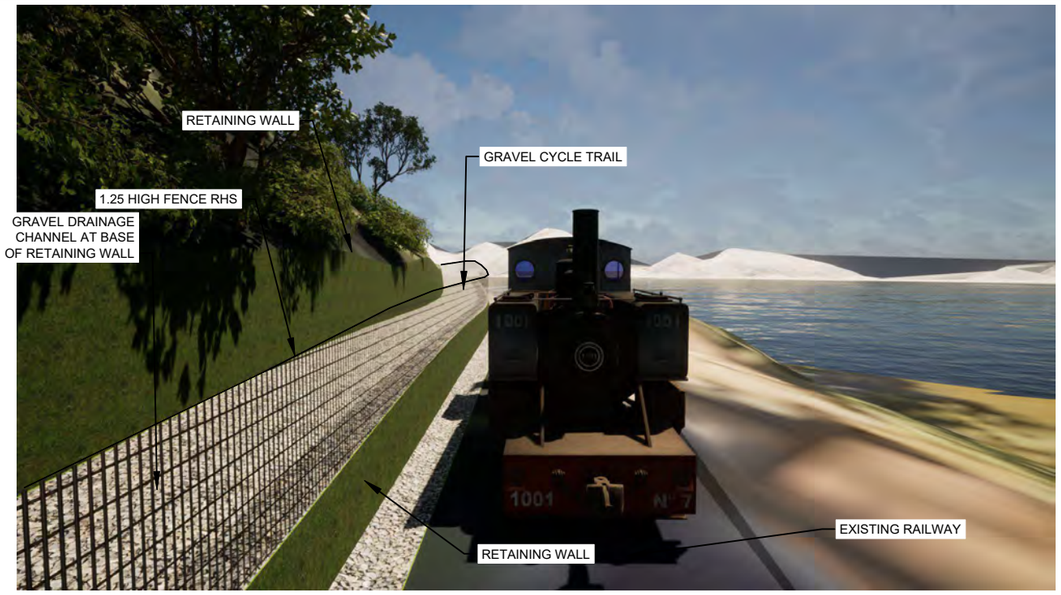
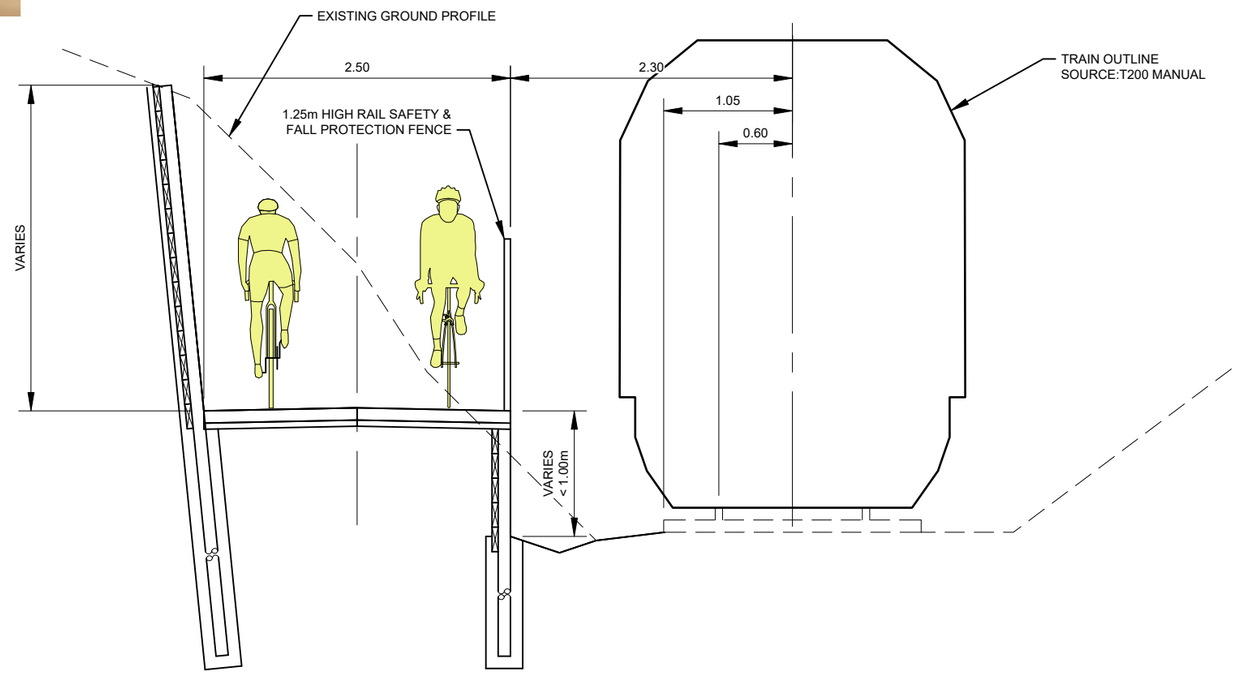


VISUALISATION - COMBINATION RETAINING WALL (D)

NTS



TYPICAL CROSS SECTION - COMBINATION RETAINING WALL (D)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT

Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `D' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	11	1

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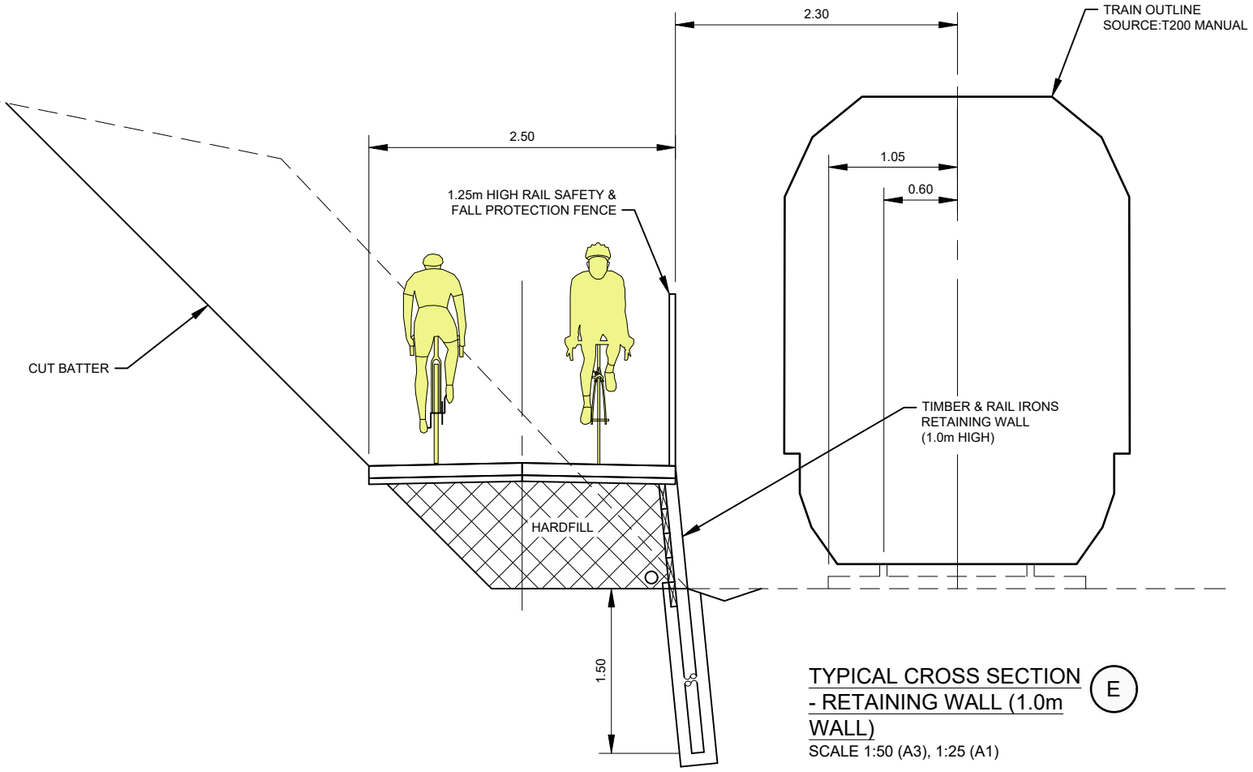
VISUALISATION - RETAINING WALL - RAIL IRONS (1.0m WALL) (E)

NTS



TYPICAL CROSS SECTION - RETAINING WALL (1.0m WALL) (E)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

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AMENDMENT	APPRVD	DATE
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	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council, Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `E' & VISUALISATION

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	12	1

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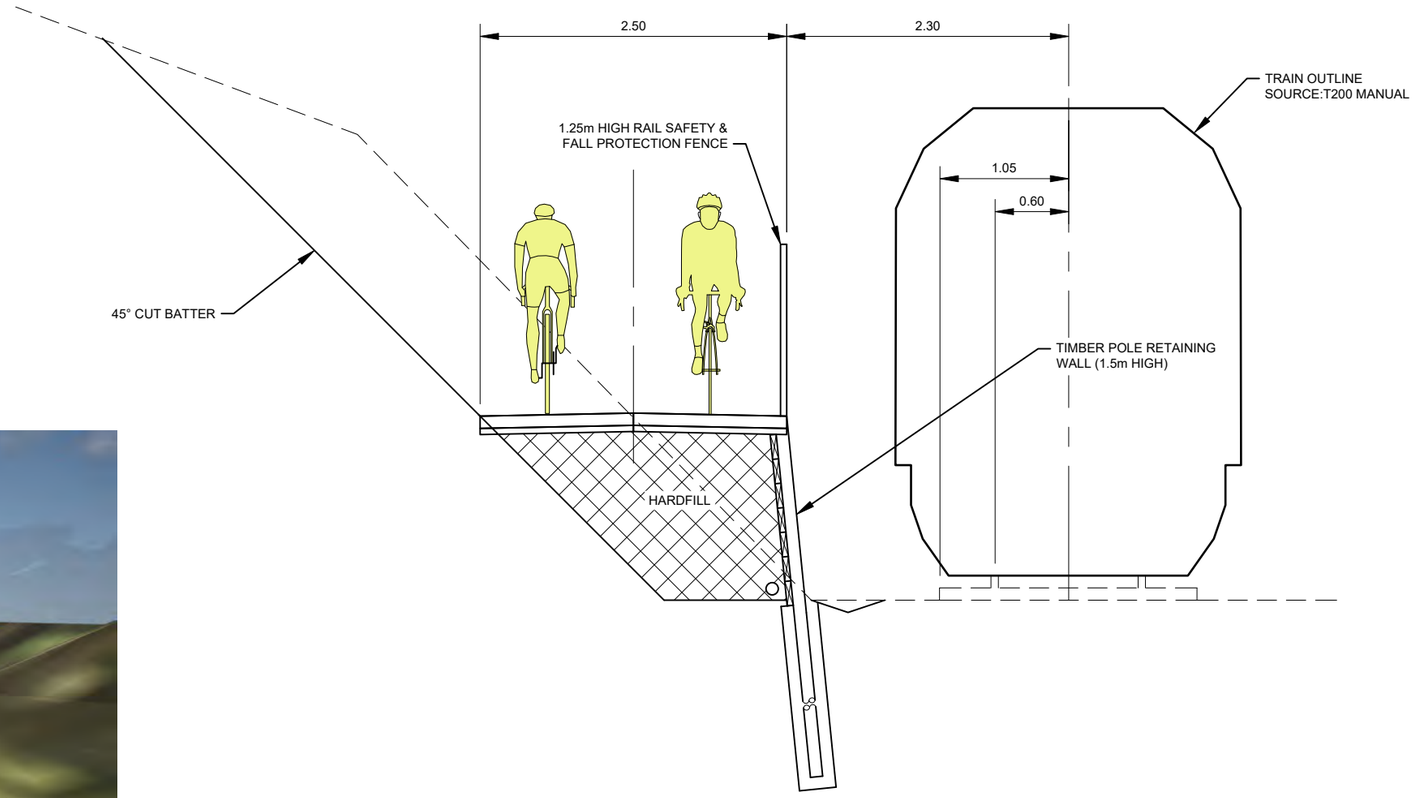
VISUALISATION - RETAINING WALL - RAIL IRONS (1.5m WALL) (F)

NTS



TYPICAL CROSS SECTION - RETAINING WALL (1.5m WALL) (F)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

GENERAL NOTES

1 - ALL QUANTITIES SUBJECT TO CONFIRMATION OF TRAIL WIDTH BY FNDC.
2 - ALL LENGTHS, VOLUMES AND AREAS APPROXIMATE ONLY, BASED ON PRELIMINARY DESIGN AND SUBJECT TO GEOTECHNICAL AND CIVIL DESIGN.
3 - ASSUMED WHERE NON HERITAGE AND HERITAGE CULVERTS INTERFACE THE ALIGNMENT THAT MINOR ABUTMENTS AND SHORT LENGTHS OF BOARDWALK WILL BE ADOPTED. THIS WILL AFFECT THE ABOVE VALUES.
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6 - CMA ADOPTED FROM MHWS WHICH HAS BEEN INFERRED AT 1.1m R.L. OTP 1964 DATUM FOR THE PURPOSES OF THIS PROJECT. POSITION SHOWN IS APPROXIMATE ONLY. CERTIFICATION BY REGISTERED SURVEYOR REQUIRED TO CONFIRM ACCURACY OF LINE.
7- DO NOT SCALE DRAWING.
8- NOMINAL SCALE IS SHOWN FOR A3 SIZE UNLESS SHOWN OTHERWISE.
9- COORDINATES IN TERMS OF NZTM GEODETIC 2000 DATUM.
10- LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
11- AERIAL PHOTOGRAPHY AND LAND PARCEL INFORMATION SOURCED FROM LAND INFORMATION NZ (LINZ) UNLESS STATED OTHERWISE.

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council, Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `F' & VISUALISATION

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	13	1

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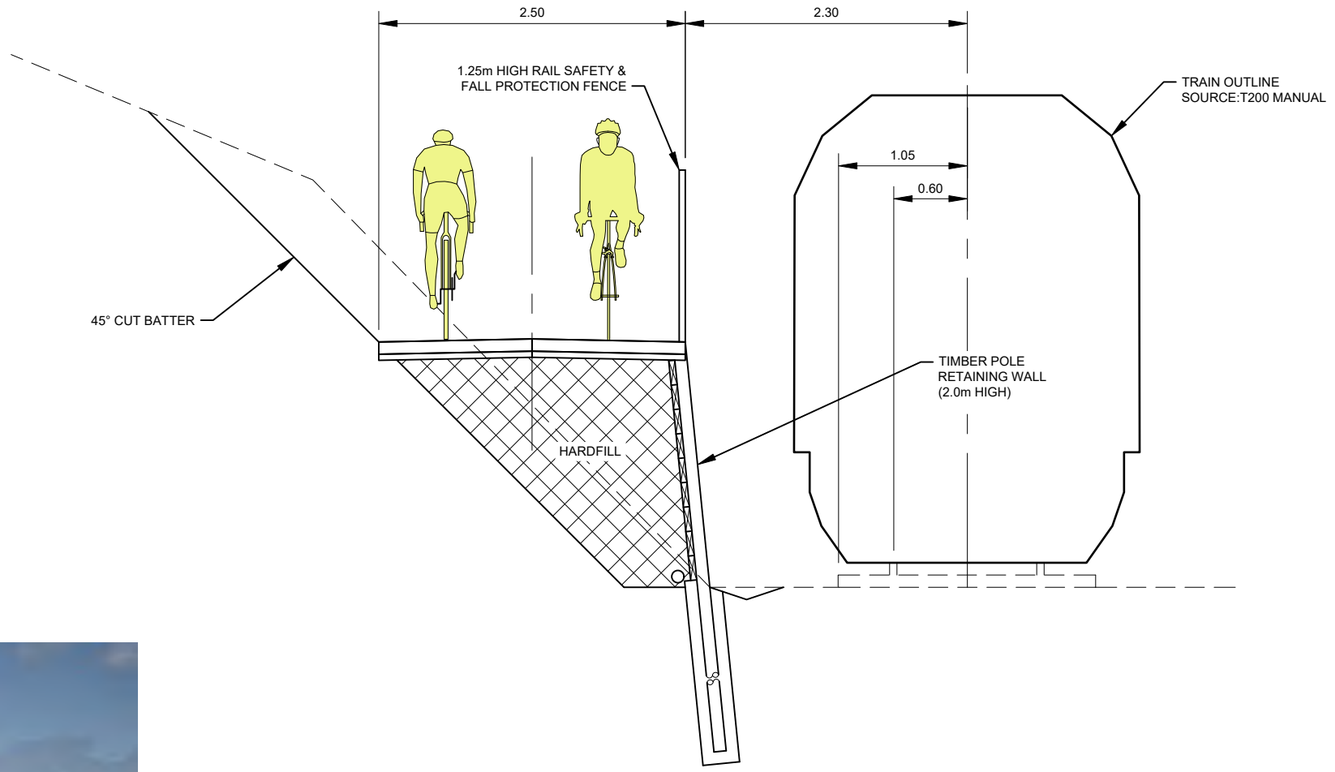
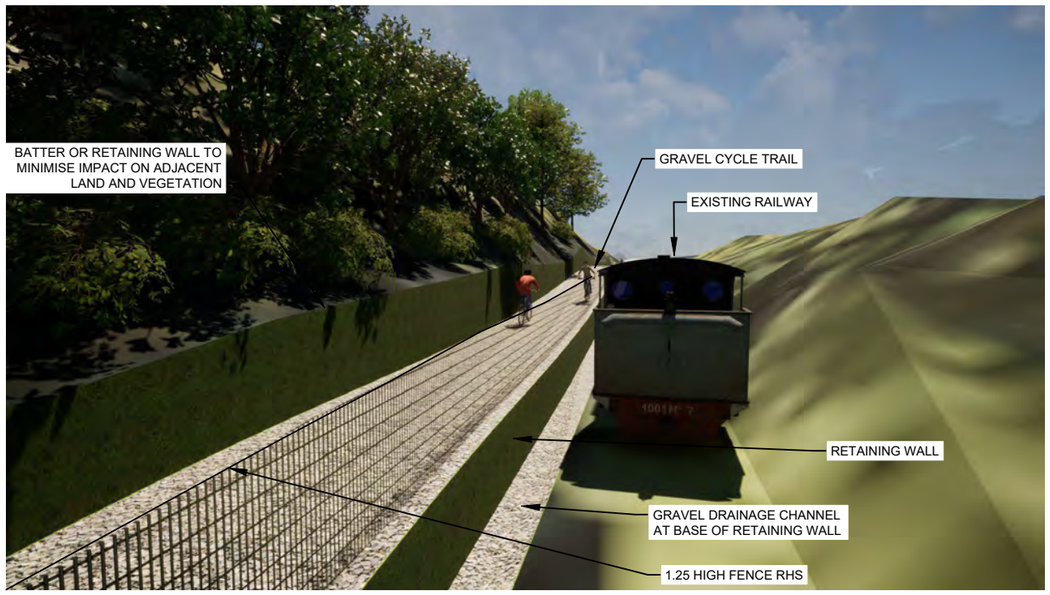


TYPICAL CROSS SECTION - RETAINING WALL (2.0m WALL) (G)

SCALE 1:50 (A3), 1:25 (A1)



VISUALISATION - RETAINING WALL - RAIL IRONS (2.0m WALL) (G)

NTS

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

GENERAL NOTES

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `G' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:			
RESOURCE CONSENT					
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	14	1

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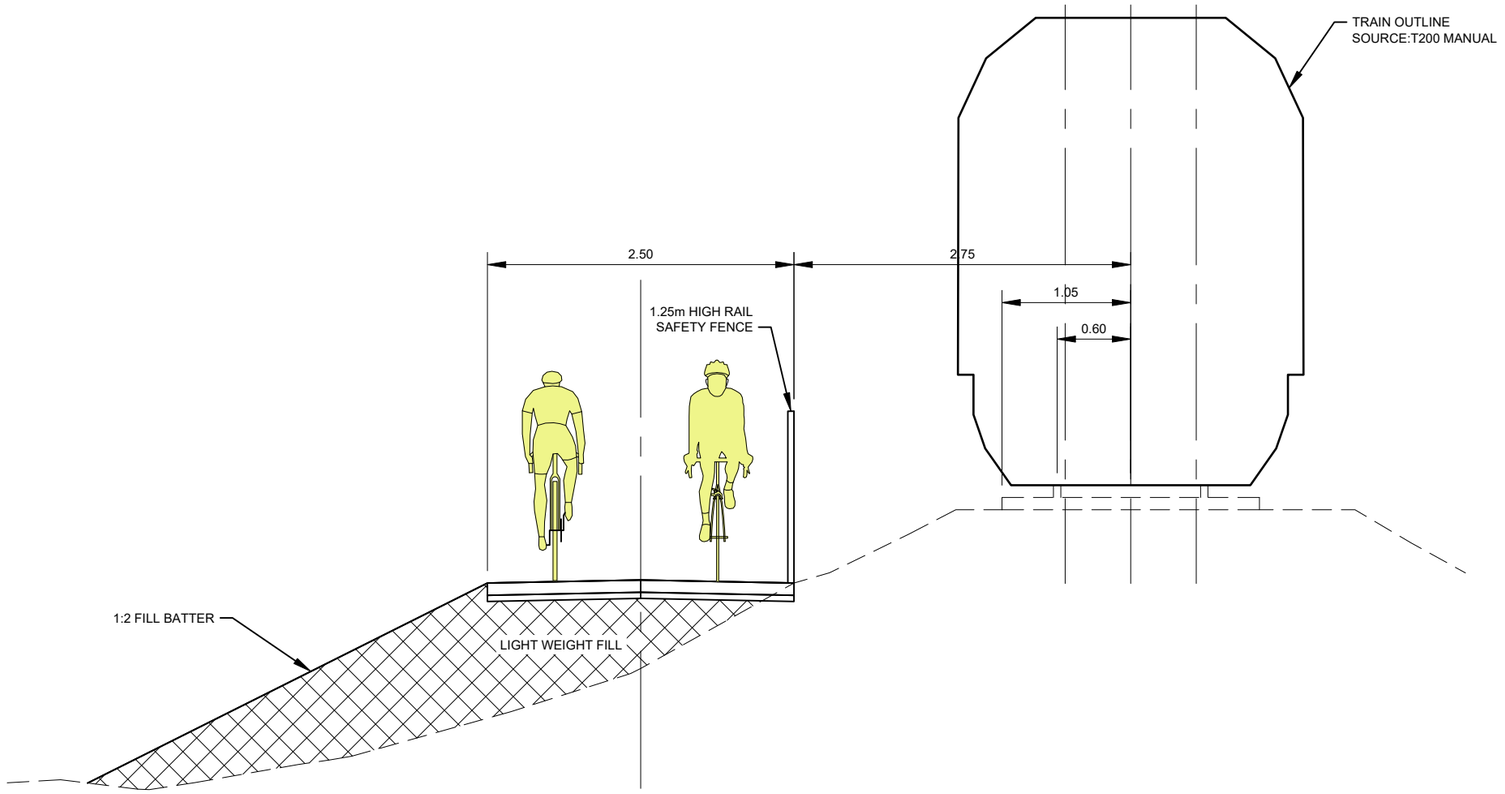

TYPICAL CROSS SECTION - REVETMENT FILL (H)

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

GENERAL NOTES

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `H'

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	15	1

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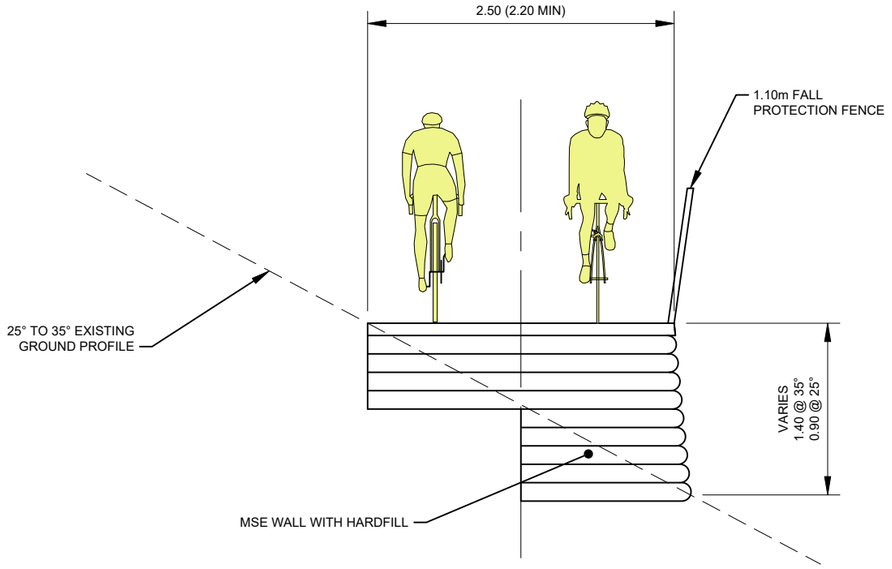
VISUALISATION - MSE WALL IN BUSH - FOLLOWING CONTOUR (I)
NTS



TYPICAL CROSS SECTION - MSE WALL IN BUSH - FOLLOWING CONTOUR (I)
SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

GENERAL NOTES

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council — Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `I' & VISUALISATION

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	16	1

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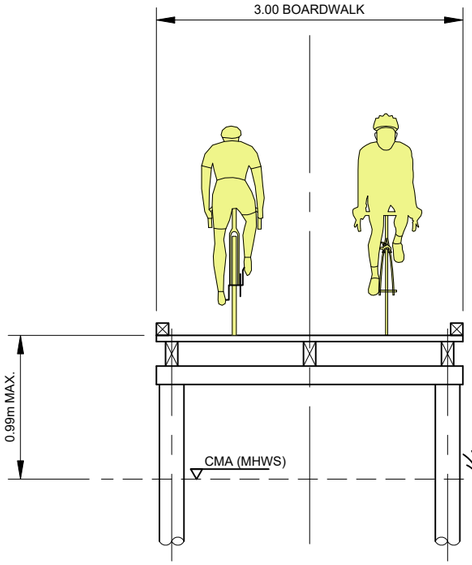
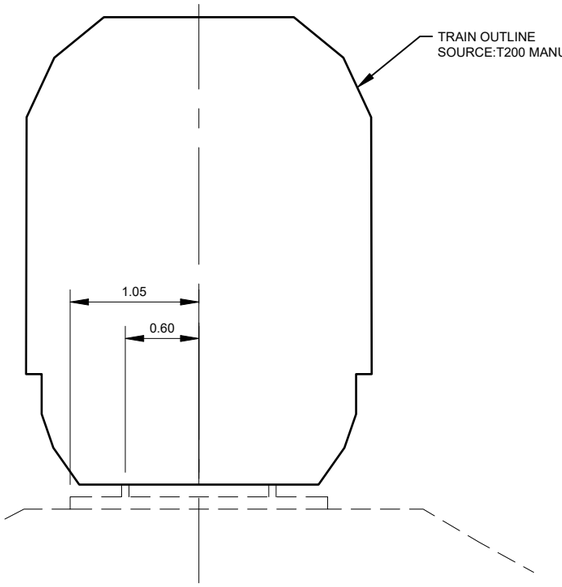
VISUALISATION - BOARD WALK ON PILES (J)
NTS





TYPICAL CROSS SECTION - BOARD WALK ON PILES (J)
SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT: Far North District Council, Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `J' & VISUALISATION

STATUS	LOCAL AUTHORITY REF:			
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	17	1

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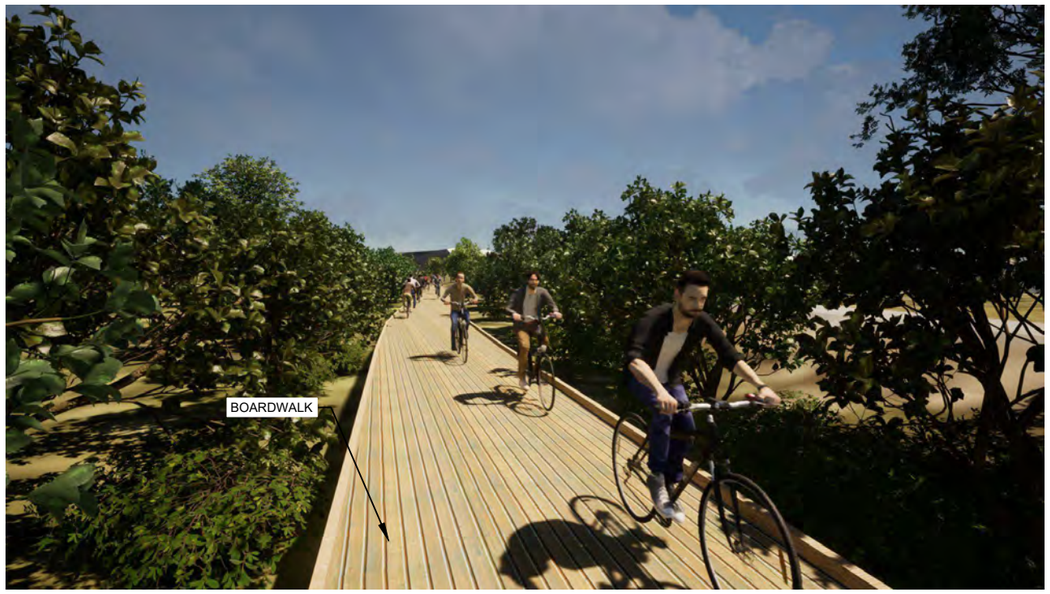
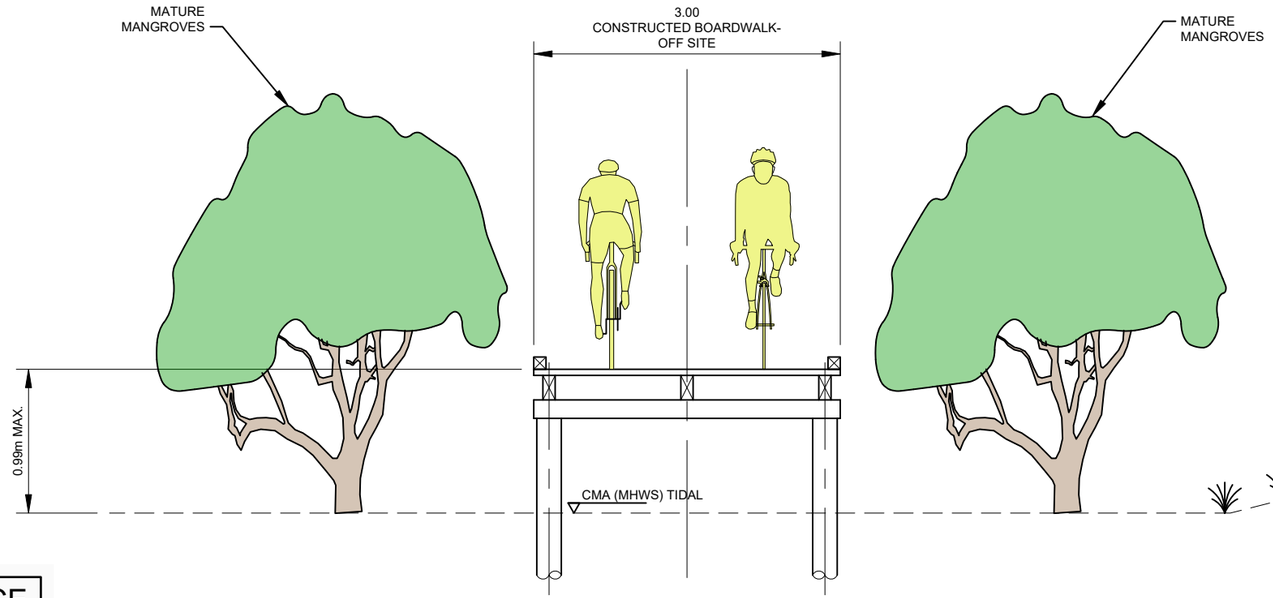
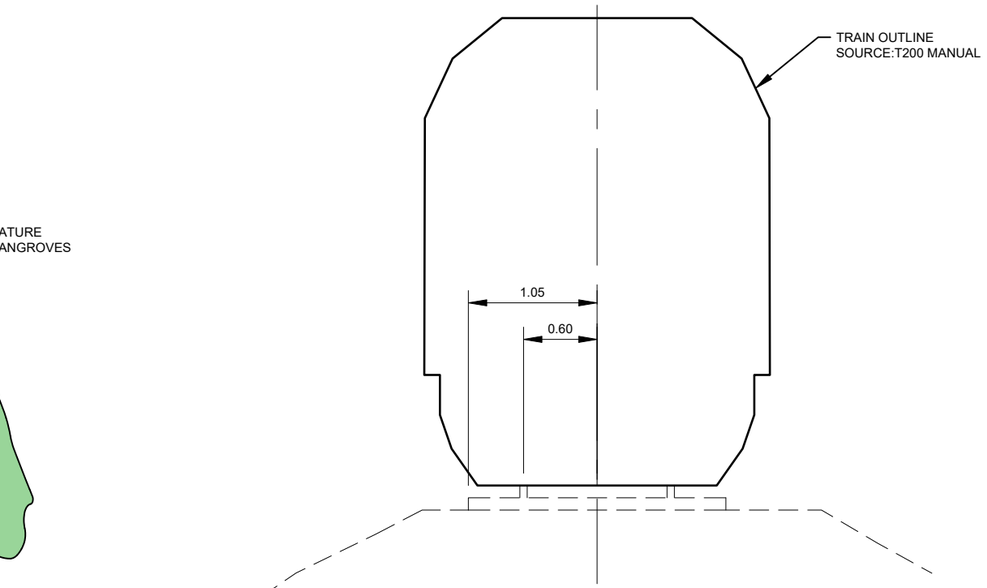


VISUALISATION - BOARD WALK ON PILES J1

NTS





TYPICAL CROSS SECTION - BOARD WALK ON PILES J1

SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m

SCALE 1:50 (A3), 1:25 (A1)

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `J1' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	18	1

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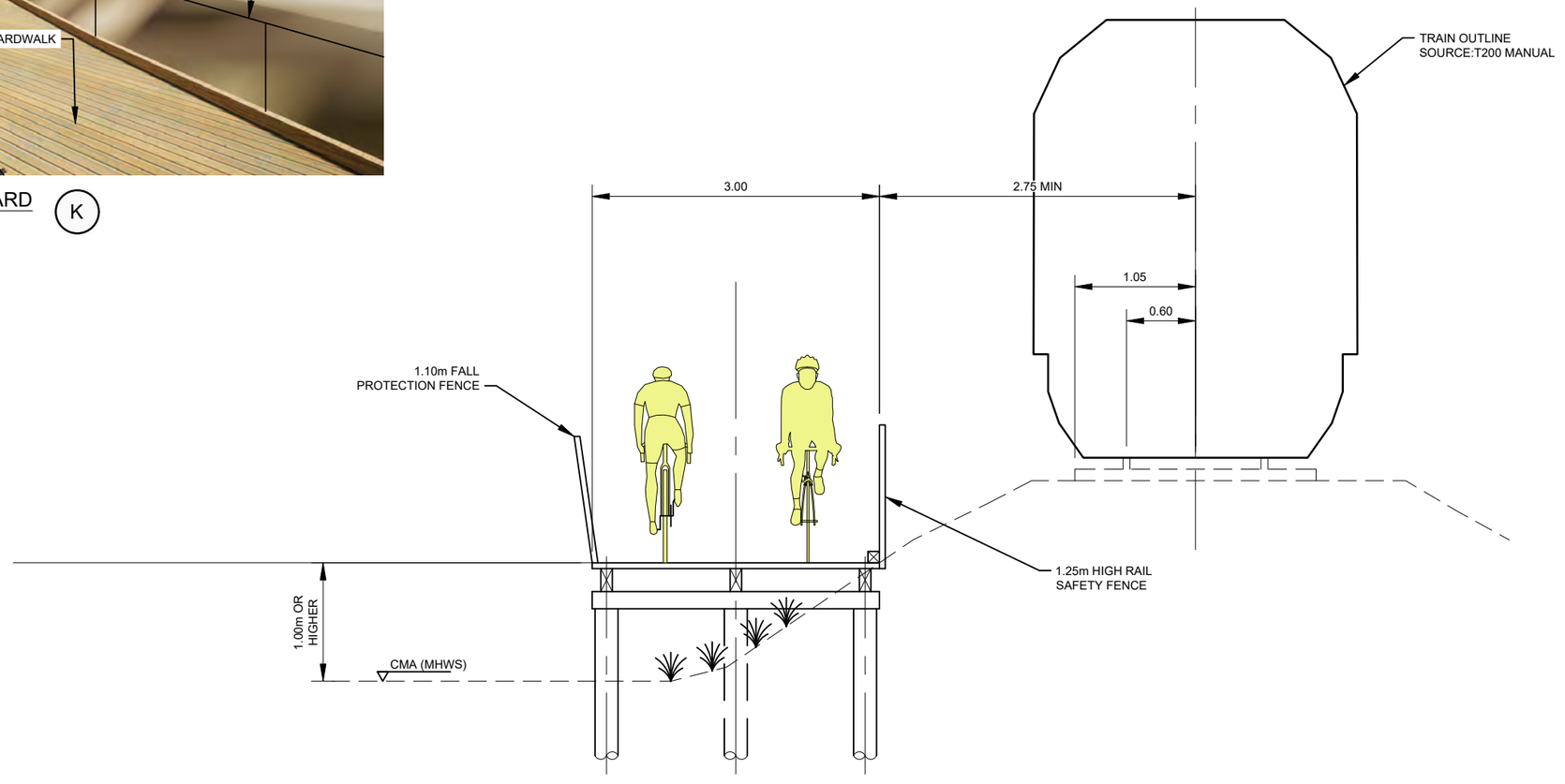
VISUALISATION - BOARD WALK ON PILES (K)
NTS



TYPICAL CROSS SECTION - BOARD WALK ON PILES (K)
SCALE 1:50 (A3), 1:25 (A1)

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

GENERAL NOTES

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AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `K' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	19	1

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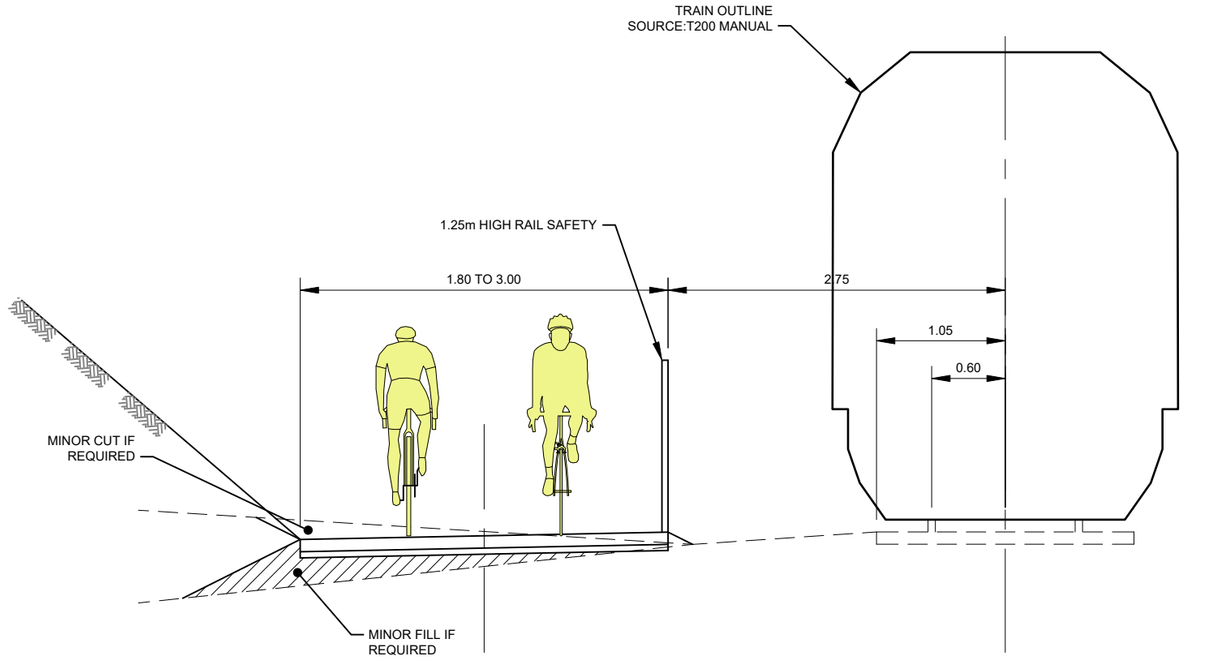
VISUALISATION - TRAIL AT GRADE (L)
NTS



TYPICAL CROSS SECTION - TRAIL AT GRADE (L)
SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

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7- DO NOT SCALE DRAWING.
8- NOMINAL SCALE IS SHOWN FOR A3 SIZE UNLESS SHOWN OTHERWISE.
9- COORDINATES IN TERMS OF NZTM GEODETIC 2000 DATUM.
10- LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
11- AERIAL PHOTOGRAPHY AND LAND PARCEL INFORMATION SOURCED FROM LAND INFORMATION NZ (LINZ) UNLESS STATED OTHERWISE.

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

JAS CIVIL Ltd

CLIENT Far North District Council — Te Kaunihera o Tai Tokerau ki te Raki

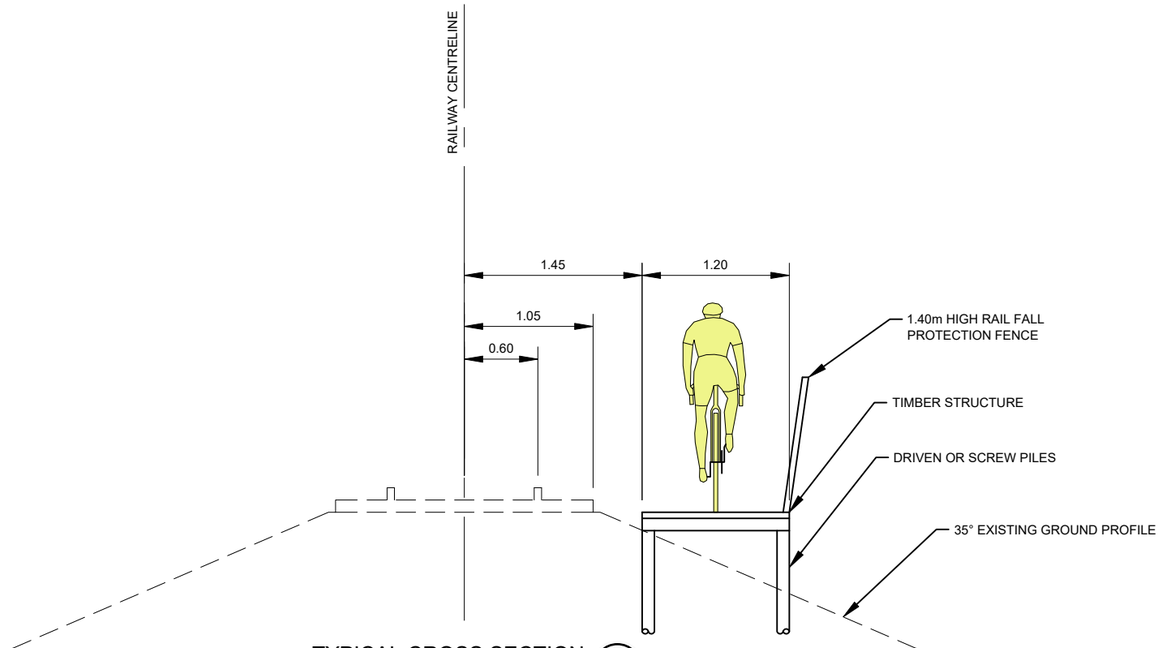
TITLE KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `L' & VISUALISATION

STATUS		LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN		2209-RC	20	1

c:\users\prest\onedrive\documents\pds design\projects\2209 opua cycleway\dwgs\2209_rc_08.dwg

VISUALISATION - CONTINUATION LONG BRIDGE WALKWAY (M)
NTS



TYPICAL CROSS SECTION - CONTINUATION LONG BRIDGE WALKWAY (M)
SCALE 1:50 (A3), 1:25 (A1)

RESOURCE CONSENT

GENERAL NOTES

1 - ALL QUANTITIES SUBJECT TO CONFIRMATION OF TRAIL WIDTH BY FNDC.
2 - ALL LENGTHS, VOLUMES AND AREAS APPROXIMATE ONLY, BASED ON PRELIMINARY DESIGN AND SUBJECT TO GEOTECHNICAL AND CIVIL DESIGN.
3 - ASSUMED WHERE NON HERITAGE AND HERITAGE CULVERTS INTERFACE THE ALIGNMENT THAT MINOR ABUTMENTS AND SHORT LENGTHS OF BOARDWALK WILL BE ADOPTED. THIS WILL AFFECT THE ABOVE VALUES.
4 - HANDRAILS FOR FALL PROTECTION (BELOW AND ABOVE CYCLEWAY) TO BE CONFIRMED. THIS MAY HAVE BEARING ON BUILDING CONSENT IF BUILDING CONSENT EXEMPTION IS NOT PROVIDED.
5 - SEPARATION FENCE BETWEEN CYCLEWAY AND RAIL WILL BE REQUIRED AND REMAINS SUBJECT TO CONFIRMATION AND REQUIRES SAFETY CASE APPROVAL BY BOIVRT, KIWIRAIL AND NZTA REGULATORS. GRADE SEPARATION MAY REDUCE ACTUAL LENGTHS.
6 - CMA ADOPTED FROM MHWS WHICH HAS BEEN INFERRED AT 1.1m R.L. OTP 1964 DATUM FOR THE PURPOSES OF THIS PROJECT. POSITION SHOWN IS APPROXIMATE ONLY. CERTIFICATION BY REGISTERED SURVEYOR REQUIRED TO CONFIRM ACCURACY OF LINE.
7- DO NOT SCALE DRAWING.
8- NOMINAL SCALE IS SHOWN FOR A3 SIZE UNLESS SHOWN OTHERWISE.
9- COORDINATES IN TERMS OF NZTM GEODETIC 2000 DATUM.
10- LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
11- AERIAL PHOTOGRAPHY AND LAND PARCEL INFORMATION SOURCED FROM LAND INFORMATION NZ (LINZ) UNLESS STATED OTHERWISE.

AMENDMENT	APPRVD	DATE
1 ISSUED TO FNDC FOR RESOURCE CONSENT		4.11.24

	BY	CHECKED	DATE
DESIGN	SG/BWP		5.24
DRAWN	BWP		5.24
SURVEYED	NRC LIDAR		2018
APPROVED			

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 (A3), 1:25 (A1)

JAS CIVIL Ltd

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL CONSENT DRAWINGS

TYPICAL CROSS SECTION `M' & VISUALISATION

STATUS	PLOT DATE	LOCAL AUTHORITY REF:		
RESOURCE CONSENT				
SCALE		JOB	SHEET	REVISION
SHOWN		2209-RC	21	1

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Appendix C
NZCT Design Guide - 2019
Grade 1-3 trail - data sheets

CYCLE TRAIL CONTRACTOR SPECIFICATION SHEET

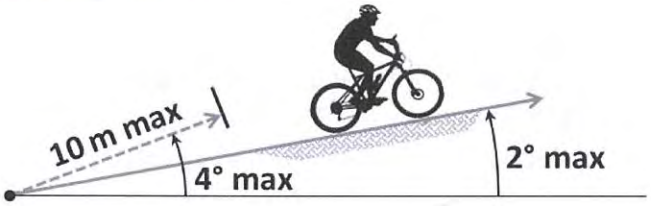
GRADE 1 (EASIEST)

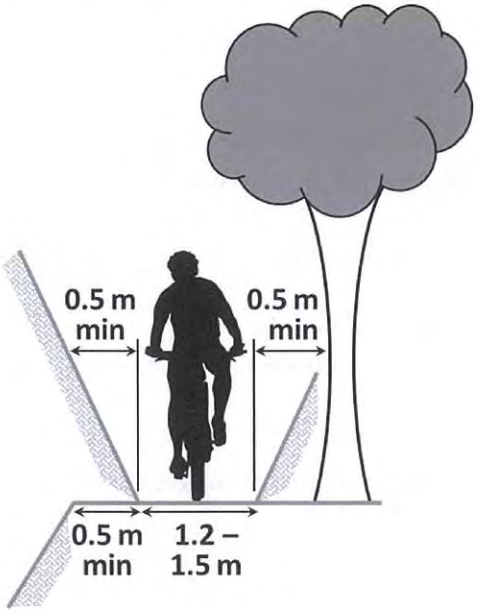

Hawkes Bay Trails
(photo: Jonathan Kennett)

EASIEST

Gradient

- **0 - 2 degrees** for at least 98% of the trail (2 degrees = 3.9% = 1:29)
- **2 - 4 degrees** for no more than **10 m** at a time (the less the better)





Width

- Double Track: **2.5 - 3.0** metres wide
- Single Track: **1.2 - 1.5** metres wide

(with adequate horizontal clearance to drops or banks/trees)

Formation

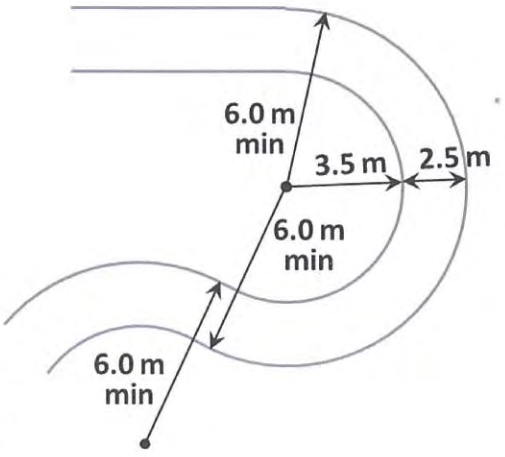
- Mono-slope with **2 - 3 degrees** side slope or crowned surface with **2 - 3 degree** side slopes

Surface

- Compacted top-course aggregate of maximum **AP20 mm**

Radius of turn

- **6 metre minimum** to outside of turn (the more the better)



Grade Reversals

- **Required** at dry water courses if they are not bridged or culverted (water courses that normally have water flowing will be bridged or culverted)

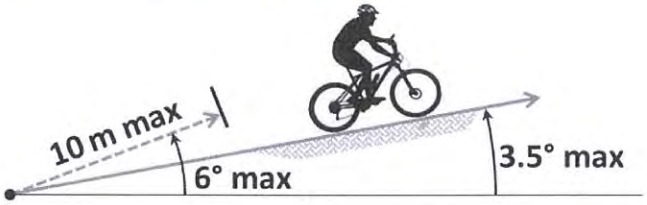
CYCLE TRAIL CONTRACTOR SPECIFICATION SHEET

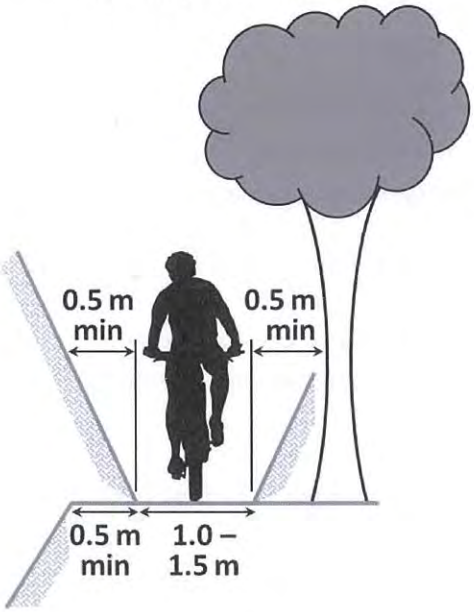
GRADE 2 (EASY)

West Coast Wilderness Trail
(photo: Jonathan Kennett)

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 **10 m** at a time (the less the better)





Width

- Double Track: **2.2 - 3.0** metres wide
- Single Track: **1.0 - 1.5** metres wide

(with adequate horizontal clearance to drops or banks/trees)

Formation

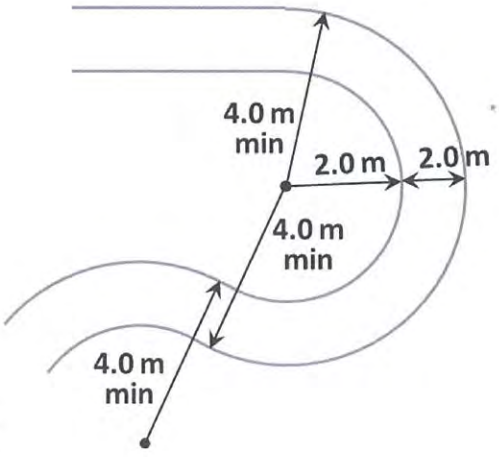
- Mono-slope with **2 - 3 degrees** side slope or crowned surface with **2 - 3 degree** side slopes

Surface

- Compacted top-course aggregate of maximum **AP30 mm**

Radius of turn

- **4-5 metre minimum** to outside of turn (the more the better)



Grade Reversals

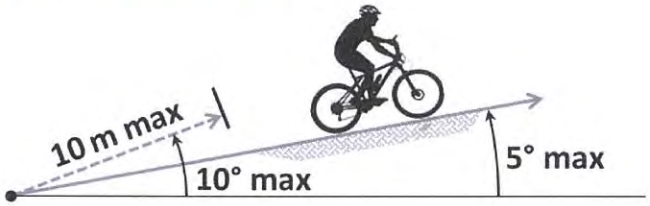
- **Required** at dry water courses if they are not bridged or culverted (water courses that normally have water flowing will be bridged or culverted)

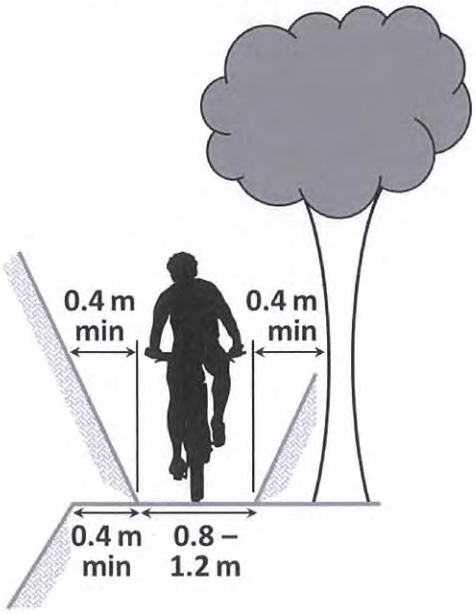
CYCLE TRAIL CONTRACTOR SPECIFICATION SHEET

GRADE 3 (INTERMEDIATE)

Gradient

- **0 - 5 degrees** for at least 90% of the trail (5 degrees = 8.7% = 1:11)
- **5 - 10 degrees** for no more than **10 m** at a time (the less the better)





Width

- Single Track: **0.8 - 1.2** metres wide

(with adequate horizontal clearance to drops or banks/trees)

Formation

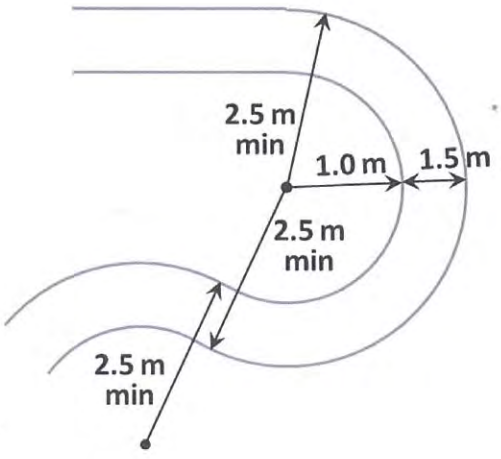
- Mono-slope with **2 - 3 degrees** side slope (crowned surfaces are not desirable)
- Greater side slope (super-elevation = berms) up to **20 degrees** around corners

Surface

- Generally firm, but may have some short muddy or loose sections

Radius of turn

- **2.5 - 4 metre minimum** to outside of turn (the more the better)



Grade Reversals

- **Required** at regular intervals including all water courses (some may have occasional water flowing across them) if they are not bridged or culverted

Structural Engineers Report for

Pou Herenga Tai Twin Coast Cycle Trail (PHTTCCT)

Taumarere to Opua Trail Reinstatement

Proposed cycleway clip on to railway bridges and boardwalk

Prepared by: Richard Greenfield CPEng N° 172071

Dated: October 2024

KAKARIKI ENGINEERING
Structural Engineering
167 Te Toiroa Road, RD3, Whangarei, 0173
Ph 09 434 4322, Mob. 021 563 994

1.0 Introduction

Kakariki Engineering Ltd has been engaged by the lead consultant Tonkin & Taylor Ltd to undertake preliminary design and sketch drawings for the proposed cycleway 'clip on' structures to railway bridges 10, 11 & 12 on the Bay of Islands Vintage Railway (BOIVR) Line between Kawakawa and Opua. Structural design checks and a preliminary design drawing has also been completed for the proposed boardwalk.

This report includes a brief description of the cycleway clip on structures at each of the three bridges and describes the proposed boardwalk structure. The report also discusses railway clearances and finishes with conclusions and recommendations.

2.0 Background

This report shall be read in conjunction with the following reports and preliminary drawings:

- Civil Design Report by JAS Civil Ltd – Draft 27 August 2024
- PHTTCCT Bridge clip-on feasibility Technical Memo by RIC – 8 September 2023.
- Appendix A - Prelim design drawings – Cycleway clip on – Bridge 10_Aug 2024
- Appendix B - Prelim design drawings – Cycleway clip on – Bridge 11_Aug 2024
- Appendix C - Prelim design drawings – Cycleway clip on – Bridge 12 Whangae _16 Aug 2024
- Appendix D - Prelim design drawings – Boardwalk _30 Aug 2024

3.0 Relevant Standards & Guides

Preliminary design of the cycleway clip ons and boardwalk structures have been undertaken in accordance with the following standards and guides:

- AS/NZS 1170:2002 Structural design actions
- Kiwirail T200 Track Handbook
- New Zealand Cycle Trail (NZCT) Design Guide – 5th edition, August 2019
- SNZ HB 8630:2004 New Zealand Handbook – Track and Outdoor Visitor Structures

4.0 Railway Clearances

In September 2023, Rail Infrastructure Consultants (RIC) completed a technical memorandum to review two options for cycleway clip-ons to two bridges (Long Bridge 9 and Bridge 12 Whangae) proposed by Kakariki Engineering Ltd. This memo reviewed the proposal against Kiwirail clearance requirements.

Recommendations of this memo in relation to the cycleway structures covered in this report are discussed in section 5.4.

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5.0 Cycleway 'Clip on' structure

5.1 Cycleway 'Clip on' to Railway Bridge 10 BOIVR

The proposed cycleway 'clip on' at Bridge 10 attaches to the existing concrete mass concrete piers and does not load the hardwood beams supporting the railway (Figure 1). A steel beam is also provided which spans between the abutment piers and floats over the central pier (Figure 2). The abutments for the cycleway consist of tied back precast concrete wingwall and abutment at end 1 (Figure 1). At end 2, only a tied back precast abutment is required.

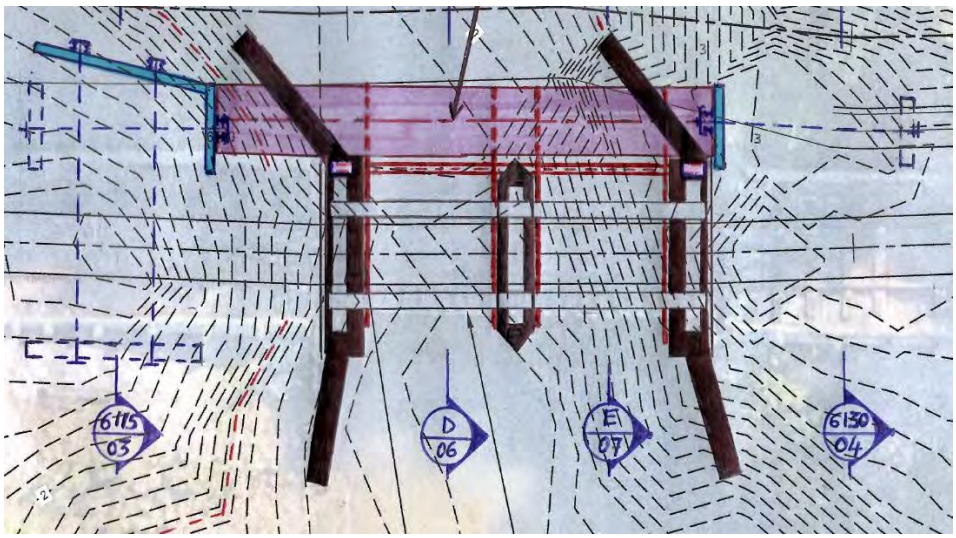

Figure 1 Plan view of cycleway clip on and rail bridge 10 BOIVR. Cycleway is highlighted pink.

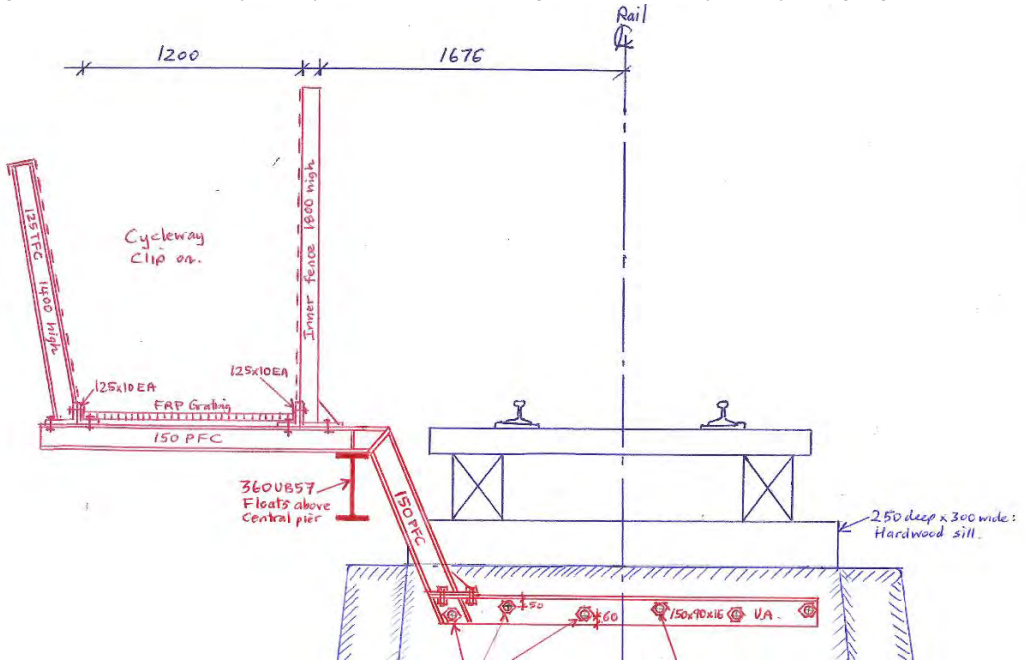

Figure 2 Typical section through cycleway clip on and rail bridge 10 BOIVR.

This 'clip on' is different to the clip ons at bridges 11 & 12. The steel outrigger beams cannot be placed on top of the railway hard wood beams for two reasons:

1. Need access to replace the hardwood beams in the future.
2. The hardwood beam nearest the cycleway clip on would not have adequate capacity to support both the cycleway and railway locomotives.

5.2 Cycleway 'Clip on' to Railway Bridge 11 BOIVR

The proposed cycleway 'clip on' structure at Bridge 11 consists of steel outriggers and braces connected to the existing steel RSJ rail beams (Figures 3 & 4). The abutments for the cycleway consist of tied back precast concrete wingwalls and abutments (Figure 3).

A new cantilevered maintenance walkway is also provided for BOIVR staff as recommended in the RIC Technical memo. This maintenance walkway also provides a counterbalance to the clip-on walkway (Figure 4).

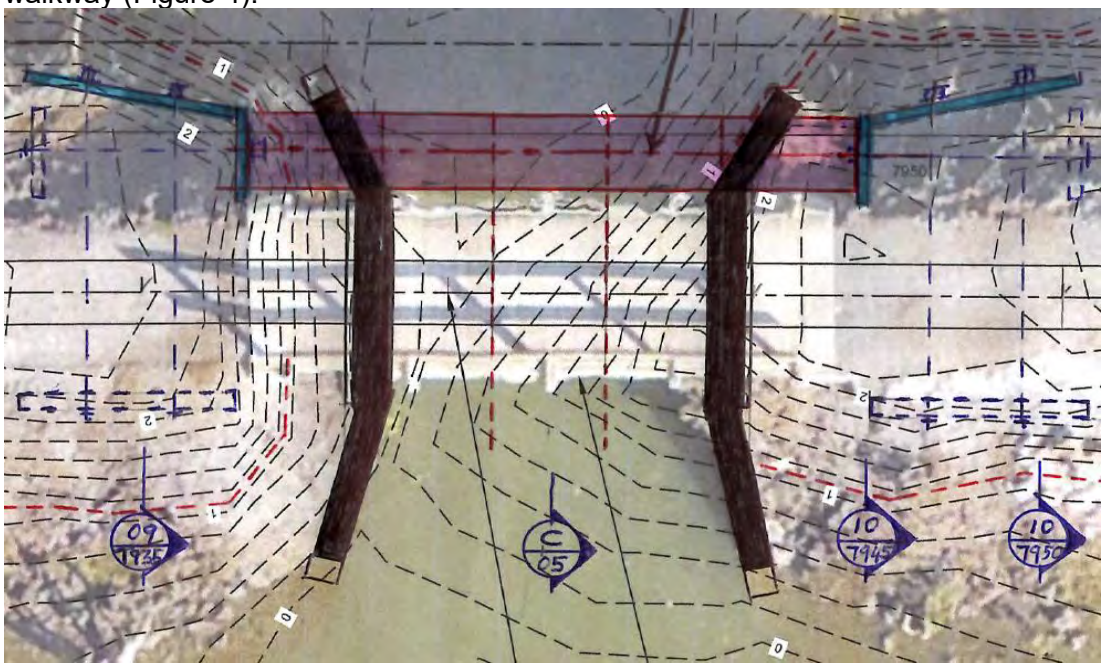

Figure 3 Plan view of cycleway clip on and rail bridge 11 BOIVR. Cycleway is highlighted pink.

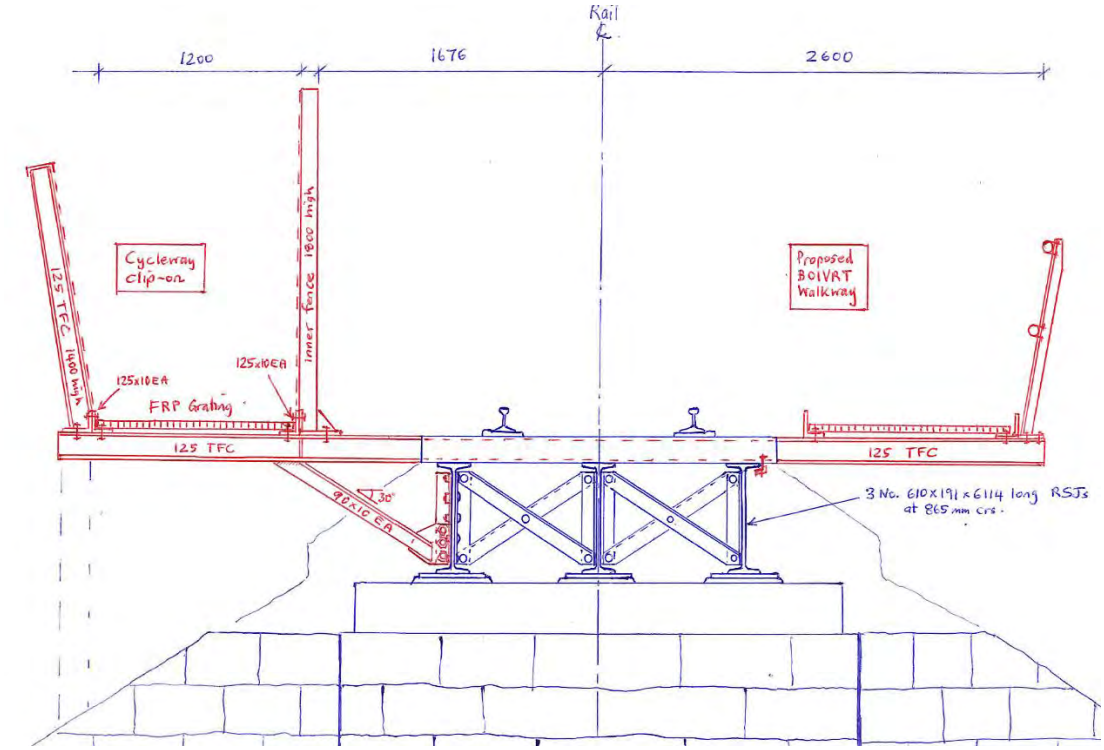

Figure 4 Typical section through cycleway clip on and Rail Bridge 11 BOIVR.

5.3 Cycleway 'Clip on' to Railway Bridge 12 BOIVR - Whangae

The proposed cycleway 'clip on' structure at Bridge 12 consists of steel outriggers and a steel beam spanning between piers 1 & 2 (Figure 6) and piers 4 & 5. The steel beam spanning between mass concrete piers 4 & 5 would require a shorter steel stool as detailed in Figure 6, which shows timber piers 1 & 2. Further detailing of this connection to the mass concrete piers 4 & 5 would be shown at detailed design phase.

Steel outriggers and braces connect to the deeper spans 2 & 3 (Figure 7).

A new cantilevered maintenance walkway is also provided for BOIVR staff and as per the recommendations in the RIC Technical memo. This maintenance walkway also provides a counterbalance to the clip on walkway.

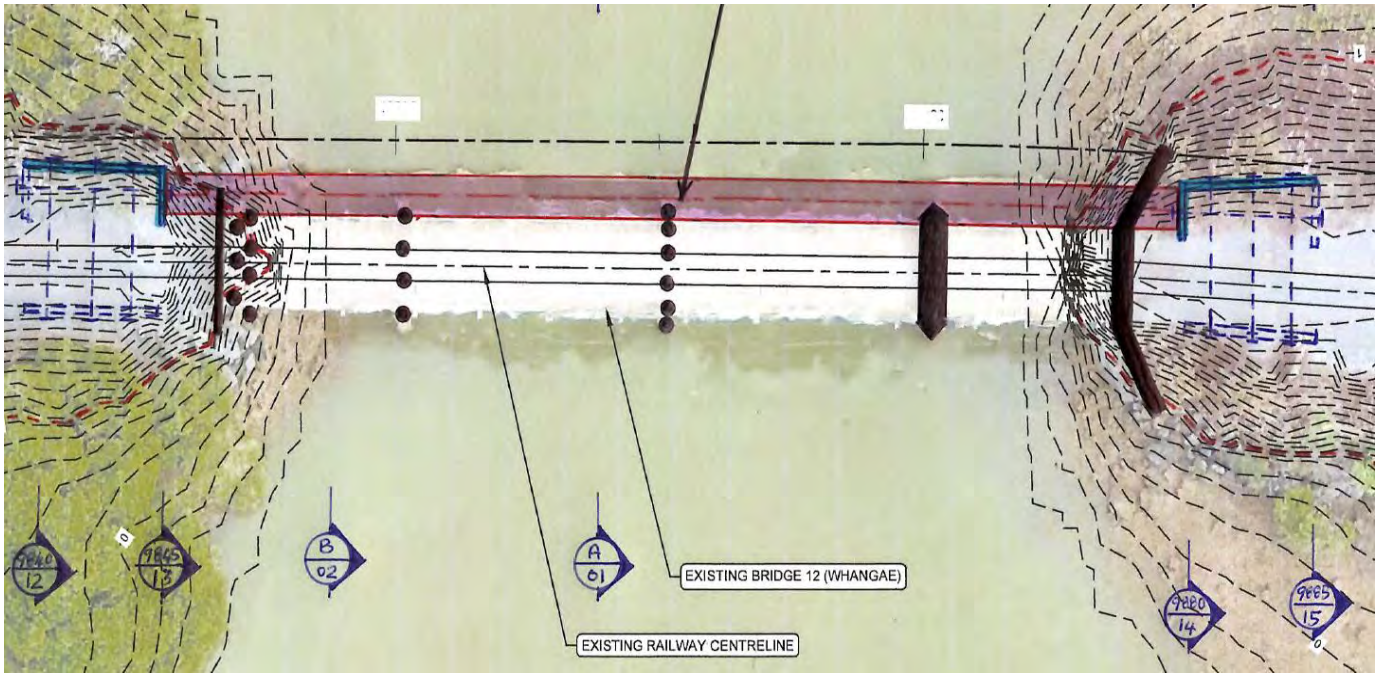

Figure 5 Plan view of cycleway clip on and Rail Bridge 11 BOIVR. Cycleway is highlighted pink.

The abutments for the cycleway consist of tied back precast concrete wingwalls and abutments. The insitu reinforced concrete anchor wall on the seaward side is a standard Tonkin and Taylor Ltd design developed for Kiwirail for their retaining wall tied back anchors (Figure 5). Refer to Appendix C for preliminary design drawings showing this anchor wall.

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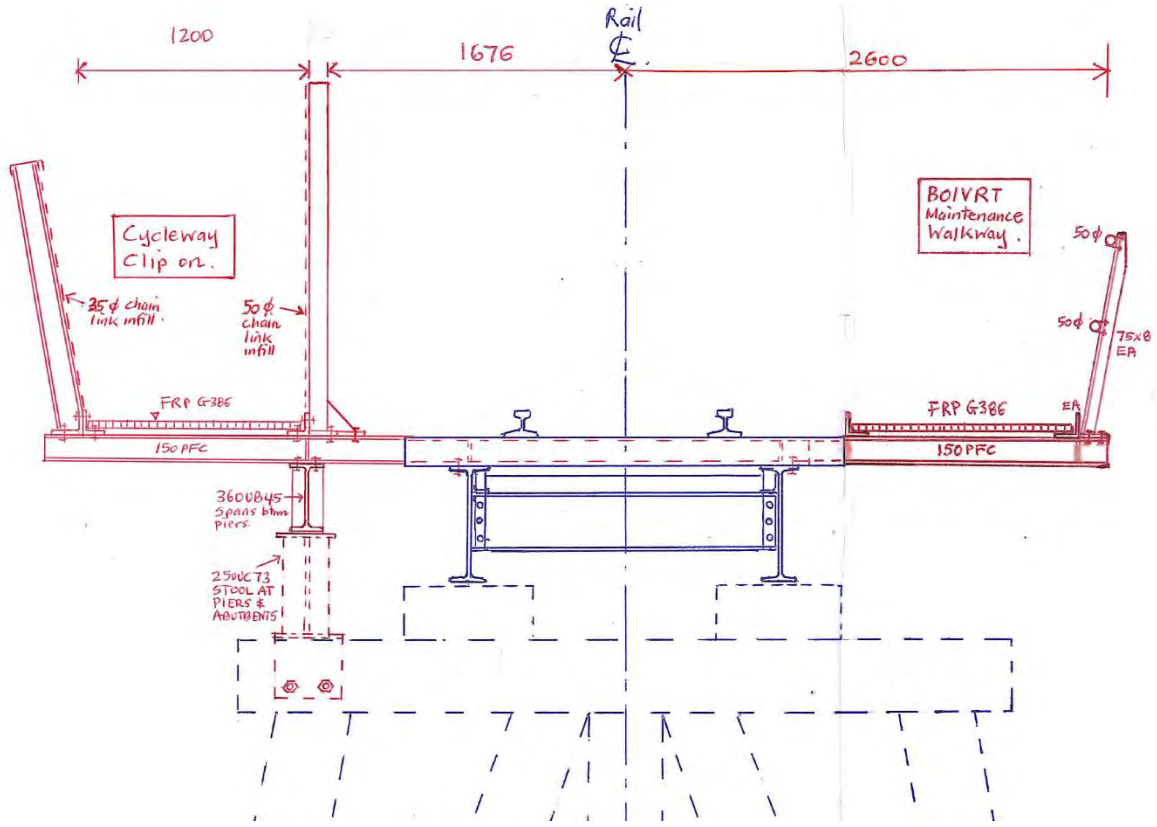

Figure 6 Clip on to Rail Bridge 12 BOIVR Whangae at span 1. Span 4 similar due to mass concrete piers.

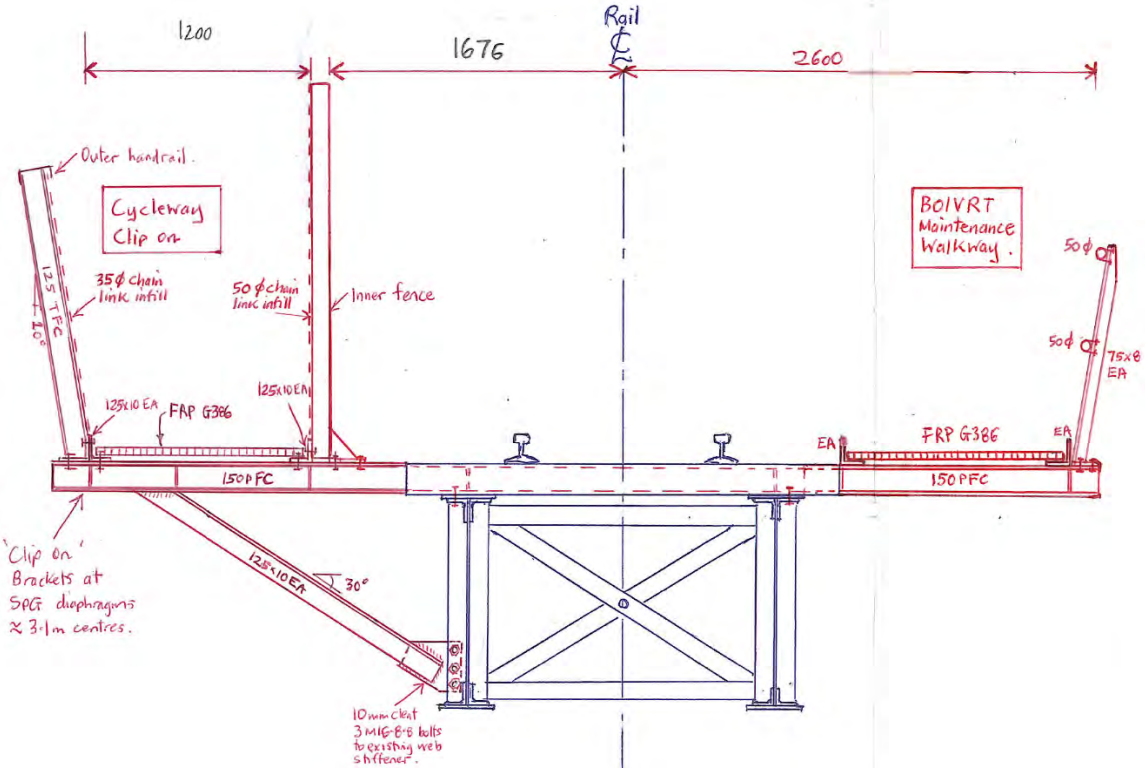

Figure 7 Clip on section at spans 2 and 3 of Rail Bridge 12 BOIVR Whangae.

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5.4 RIC Recommendations

RIC recommendations supported in this report are listed below:

- BOIVR will need to undertake a risk assessment of the proposed clip-on clearances of 1676 mm between track centreline and inner fence compared to the standard Kiwirail clearance of 2300 mm.

- Provide a walkway for emergency access on the other side of the bridge to Kiwirail requirements. This is proposed at Bridges 11 & 12, but cannot be installed at Bridge 10 due to the hardwood beams.

- The inner fence shall be of a suitable height to prevent cyclist inadvertent arm overreach into the standard loading gauge envelope. An inner fence height of 1800 mm is proposed.

RIC has recommended that clearance between track centreline and inner fence of the cycleway should be 2300 mm in line with Kiwirail requirements. We consider that this is not possible to achieve with clip-on cycleways as too much stress would be placed on the existing bridge structures. To achieve clearance of 2300mm, stand alone cycleway bridges would need to be built.

We believe that the proposed clearance of 1676 mm for cyleway clip-ons is sufficient for the following reasons:

- BOIVR operates at much lower speeds than Kiwirail trains (5 kmph over bridges compared to a Kiwirail running speed of 80-90 kmph).

- Kiwirail has mothballed the North Auckland Line (NAL) north of the Kauri Dairy Factory.

- Kiwirail has signalled that it has no intention of running trains to Opua.

- Kiwirail can not run locomotives and rolling stock on the railway line between Kawakawa and Opua since this line is rated for a maximum axle loading of 10.5 tonne axles. Kiwirail now require bridges to support 18 tonne axles. The railway bridges with the proposed clip on cycleway structures would require renewal before Kiwirail could run trains to Opua along with reinstating 5 km of track removed between Moerewa and Kawakawa.

- Historic research undertaken on Bridge 66 ECMT, Otūmoetai, Tauranga, shows that there was once a pedestrian ‘clip on’ walkway to the railway bridge to link the residents of Otūmoetai to the Tauranga city centre, prior to the construction of the road bridge. The requirements for this pedestrian clip on were “*place inner fence 5’6”* (1676 mm) *from the centreline at a height of 3’0”* (914 mm) *above rail level*.” Refer Table 1 comparison.

Kiwirail have previously acknowledged they would support BOIVR’s decision on the proposed cycleway clip-ons.

Bridge id	Status	Inner fence clearance to rail CL	Cycleway width	Inner fence height	Railway speed restriction	Comments
Bridge 66 ECMT	Historic	1676 mm	990 mm	914 mm	80 kmph	
Bridge 5 BOIVR	Current	1665 mm	1500 mm	1400 mm	5 kmph	Inner handrail slopes towards track. No maintenance walkway provided on other side.
Bridge 10 BOIVR	Proposed	1676 mm	1200 mm	1800 mm	5 kmph	
Bridge 11 BOIVR	Proposed	1676 mm	1200 mm	1800 mm	5 kmph	
Bridge 12 BOIVR	Proposed	1676 mm	1200 mm	1800 mm	5 kmph	

TABLE 1 Comparison of historic, current and proposed clip on cycleway widths, inner fence height and clearance to railway centreline (CL), including railway speed restrictions.

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6.0 Proposed Boardwalk structure

The majority of the boardwalk will be located alongside the railway embankment (Figure 8). This enables the boardwalk to be constructed from the railway using a high rail digger. A high rail digger can reach out 6 metres from rail centreline to drive boardwalk piles. This will limit the boardwalk to pedestrian loading of 4 kPa, avoiding significant construction loading from diggers etc.

The boardwalk consists of timber planking on timber joists. Joists span to double bearers bolted to twin pile piers. Piles consist of driven radiata pine timber poles. It is recommended to source radiata pine from the central North Island or from the South Island as timber from these areas is more durable than that from other areas. Sleeving the piles with PVC at ground level will also extend the pile life.

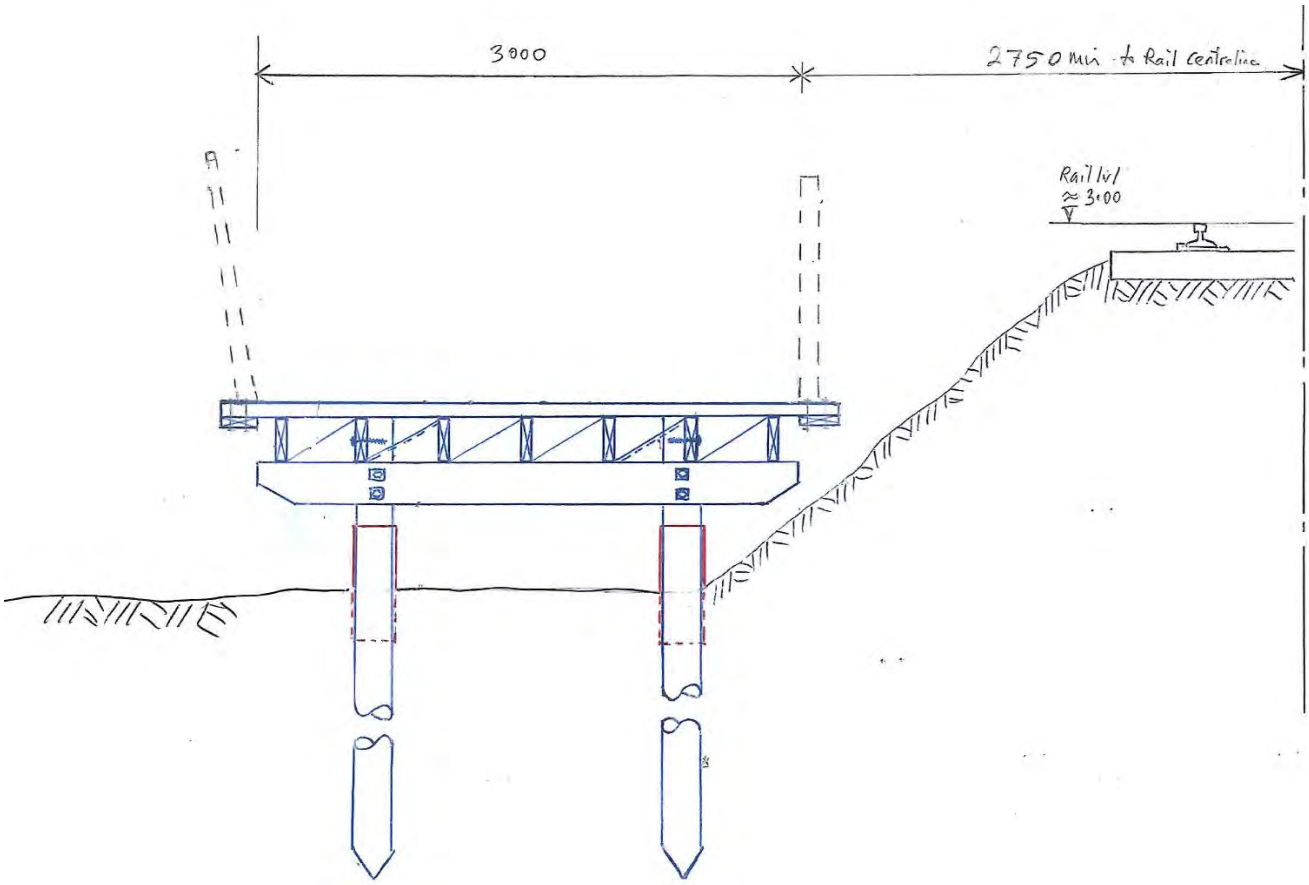

Figure 8 Typical boardwalk section alongside the rail embankment.

As noted in JAS Civil Ltd's Civil Design Report, depending on the topography and requirements of Table 22 of SNZ HB 8630 and proximity to the railway, proprietary safety barriers may be required. These barriers are shown dashed in Figure 8.

Boardwalks located further from the railway embankment, will need to be constructed with heavier timber to meet the construction live loading of 10 kPa. The drawing in Appendix D covers timber sizes for this type of boardwalk.

7.0 Conclusions and Recommendations

The following is recommended/concluded:

- Cycleway clip-ons for Bridges 10,11 and 12 BOIVR are constructed as per details in section 5.

- A new cantilevered maintenance walkway is also provided for BOIVR staff at Bridges 11 & 12 on the other (seaward) side as per the recommendations in the RIC Technical memo. This maintenance walkway also provides a counterbalance to the proposed clip-on walkways.

- An inner fence height of 1800 mm, between the proposed cycleway clip-ons and Railway Bridges 10, 11 & 12 (Whangae). Please note this is based on a maximum train speed of 5 kmph.

- PHTTCCT & BOIVR undertake a safety risk assessment of the proposed cycleway clip-on clearances between track centreline and inner fence of 1676 mm compared to the standard clearance of 2300 mm. This assessment should take into account the factors mentioned in section 5.4 of this report.

- The proposed boardwalk should be built as close as possible to the railway embankment to enable the boardwalk to be constructed from the railway using a high rail digger. This will limit the boardwalk to pedestrian loading of 4 kPa, avoiding significant construction loading from diggers operating from the boardwalk.

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8.0 Limitations

This report has been prepared for the sole use of our client, Tonkin & Taylor Limited, for the particular brief and on the terms and conditions agreed with our client. It may not be used or relied on (in whole or part) by anyone else, or for any other purpose or in any other contexts, without our prior written agreement.

This limitation should be read in conjunction with the engineering new zealand/ACENZ document "Short Form Model Conditions of Engagement as agreed between the client Tonkin & Taylor Limited and Kakariki Engineering Ltd as a Variation 01 to the existing signed agreement on 1st June 2023.

Report prepared by:

Richard Greenfield
NZCE, BE(Hons), CPEng
Chartered Structural Engineer

Attachments:

Appendix A - Prelim design drawings – Cycleway clip on – Bridge 10_Aug 2024
Appendix B - Prelim design drawings – Cycleway clip on – Bridge 11_Aug 2024
Appendix C - Prelim design drawings – Cycleway clip on – Bridge 12 Whangae _16 Aug 2024
Appendix D - Prelim design drawings – Boardwalk_Oct 2024

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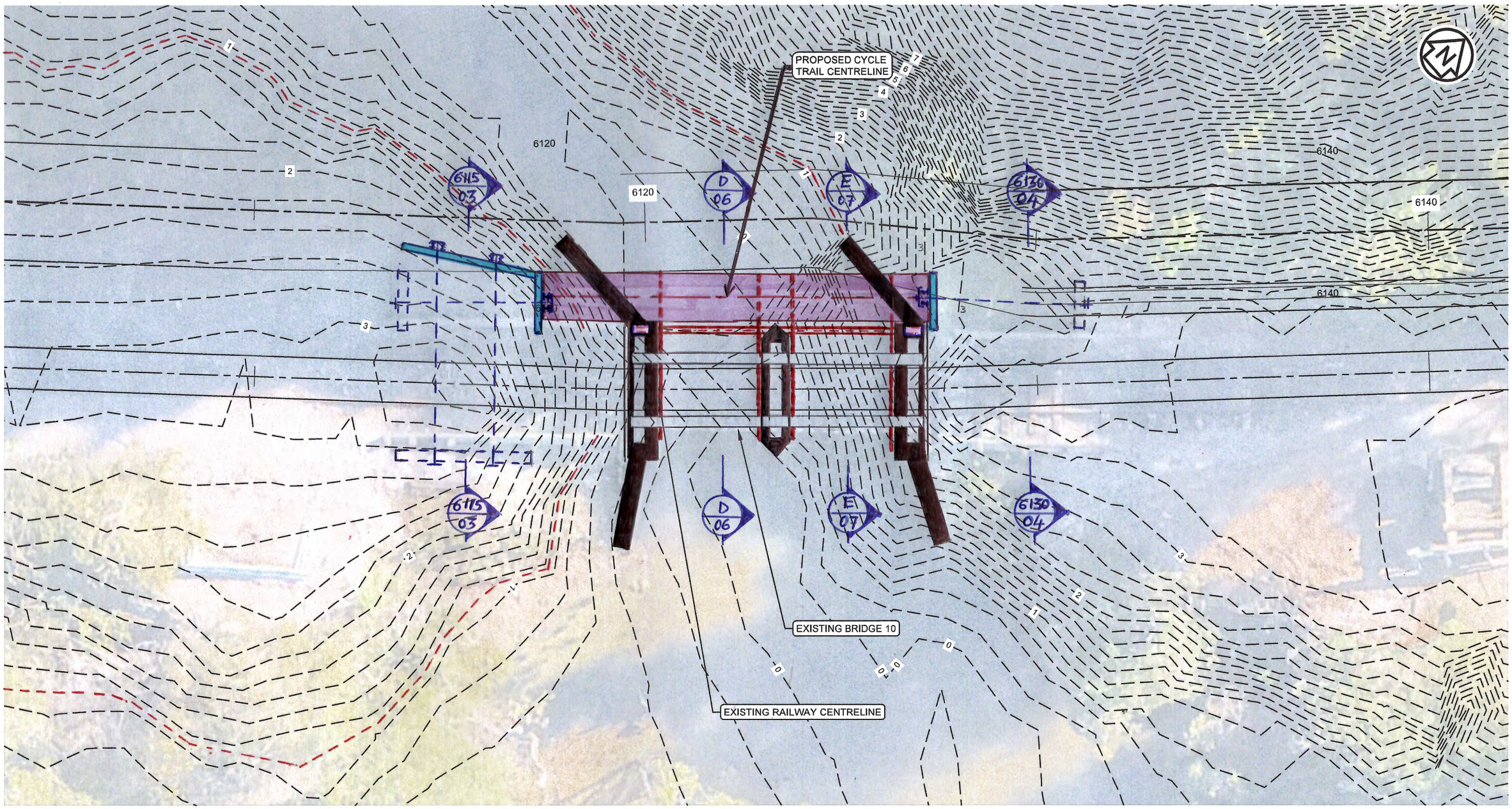

PLAN
SCALE 1:100 (A3), 1:50 (A1)

CONTOUR INTERVALS,
ONE TREE POINT DATUM:
MAJOR: 1.00m
MINOR: 0.20m

0 1 2 3 4 5m
SCALE 1:100 (A3), 1:50 (A1)

NOTES

1. EXTREME CAUTION SHOULD BE TAKEN DURING EXCAVATIONS.
2. THE CONTRACTOR SHALL CHECK FOR AND BE RESPONSIBLE FOR ALL UNDERGROUND AND/ OR OVERHEAD SERVICES.
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5. DO NOT SCALE DRAWING.
6. NOMINAL SCALE IS SHOWN FOR A3 SIZE UNLESS SHOWN OTHERWISE.
7. COORDINATES IN TERMS OF NZTM GEODETIC 2000 DATUM.
8. LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
9. AERIAL PHOTOGRAPHY SOURCED FROM AERIAL VISION AND LAND PARCEL INFORMATION SOURCED FROM LAND INFORMATION NZ (LINZ) UNLESS STATED OTHERWISE.

AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT
Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 10
TOPOGRAPHICAL PLAN
PLAN

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	2024	2209-TOPO	01	1

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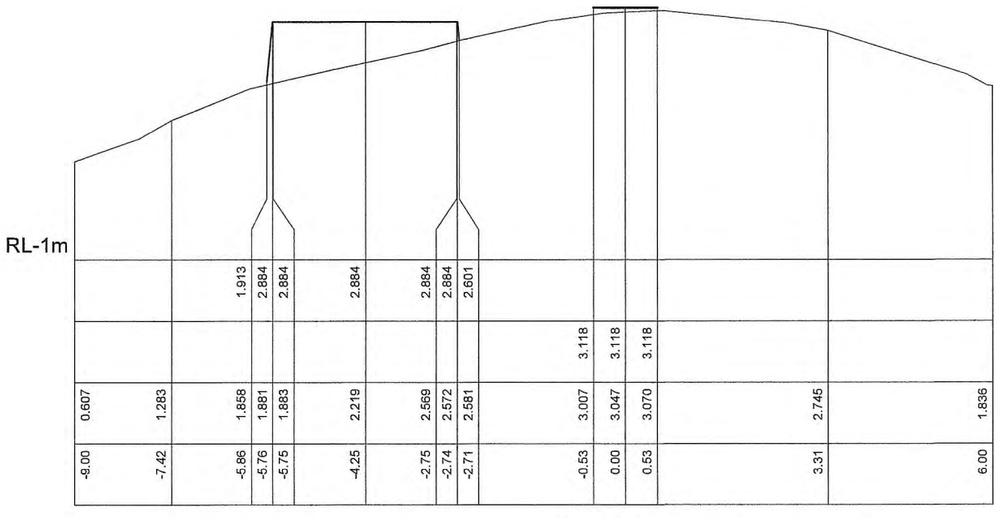
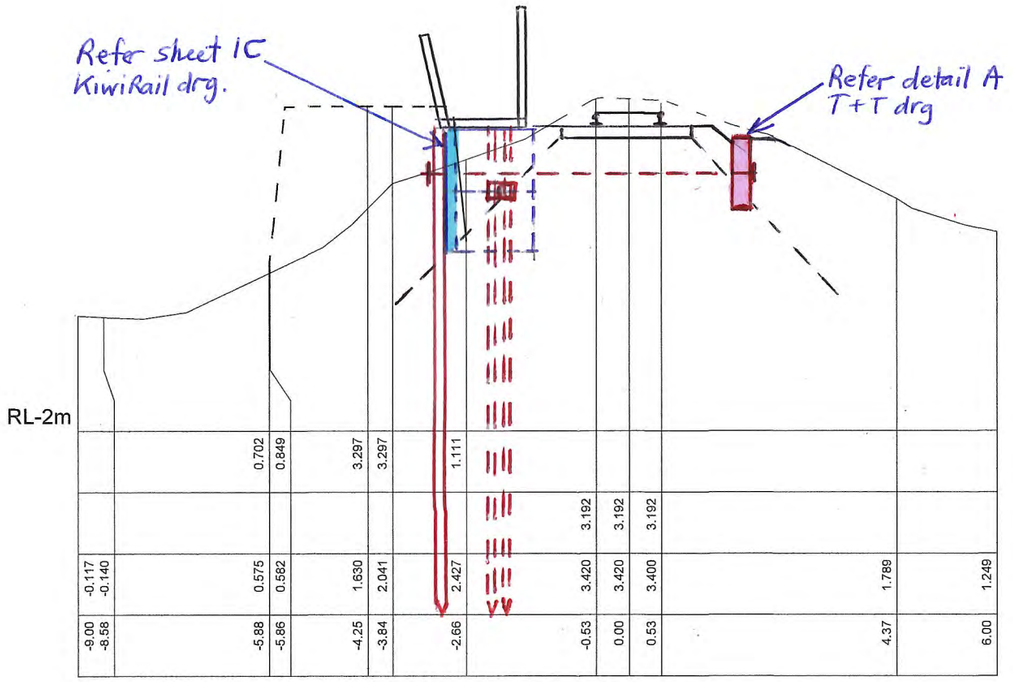
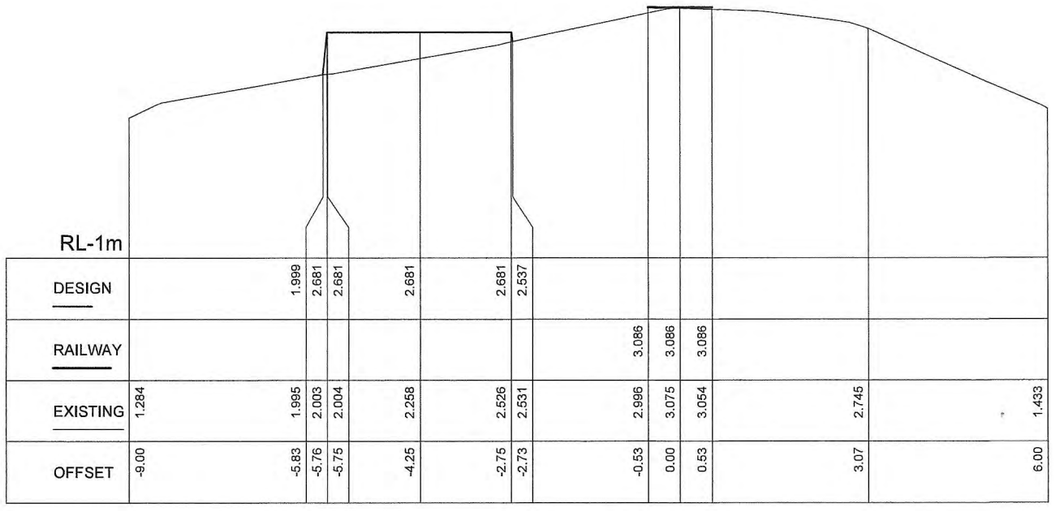
Appendix A - Prelim design drawings – Cycleway clip on – Bridge 10_Aug 2024



Ch 6105.00 m



Ch 6115.00 m



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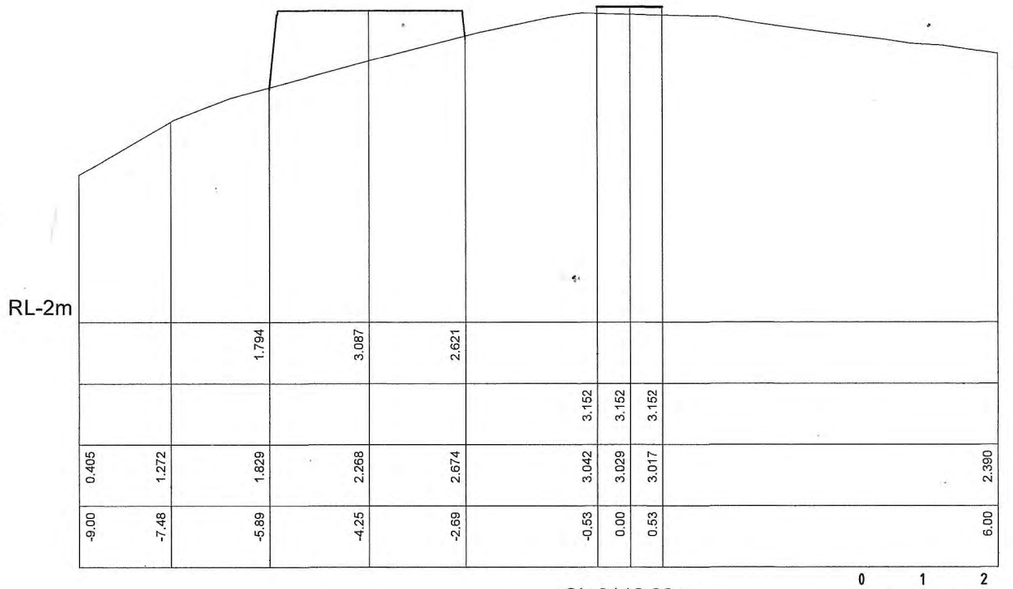

Ch 6110.00 m

0 1 2 3 4 5m

SCALE 1:100 (A3), 1:50 (A1)

NOTES

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AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT

Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE
KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 10
TOPOGRAPHICAL PLAN
CROSS SECTIONS

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	2024	2209-TOPO	03	1

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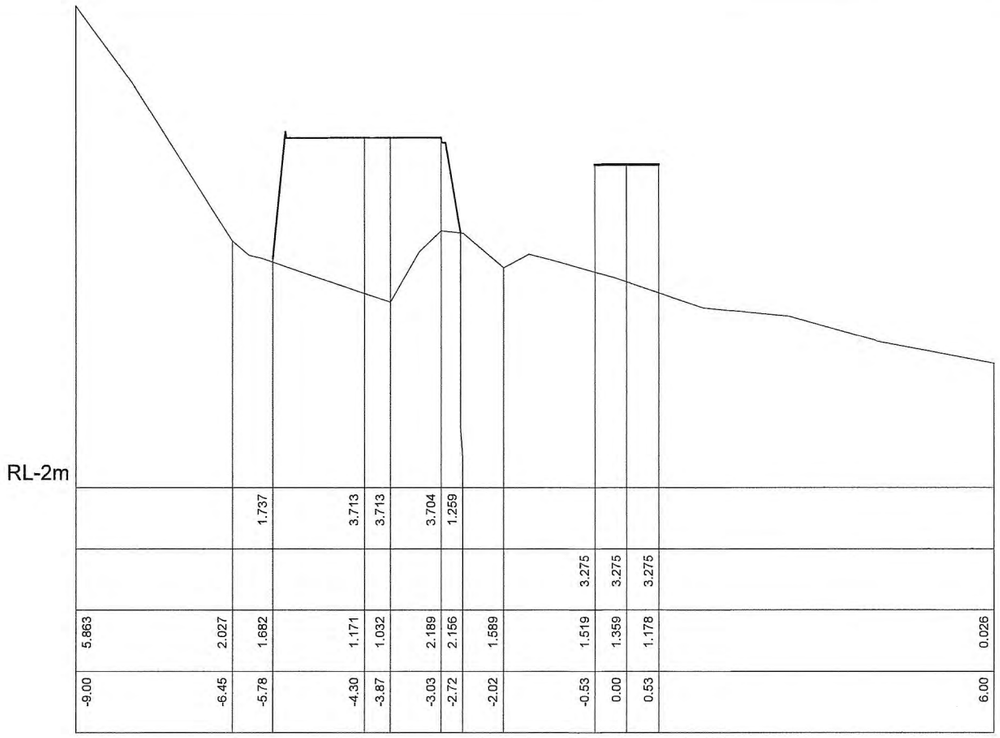

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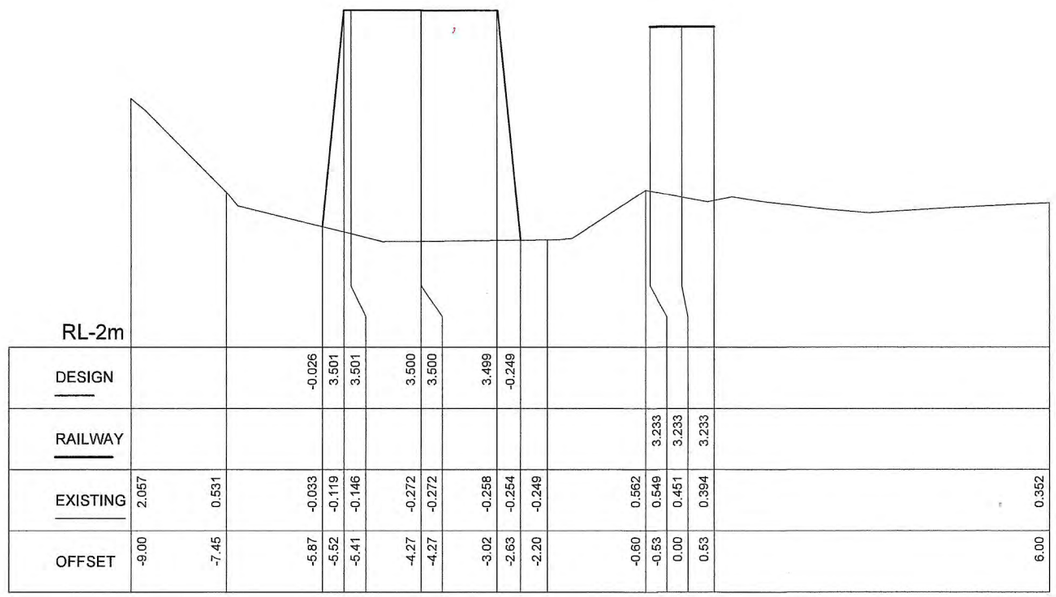

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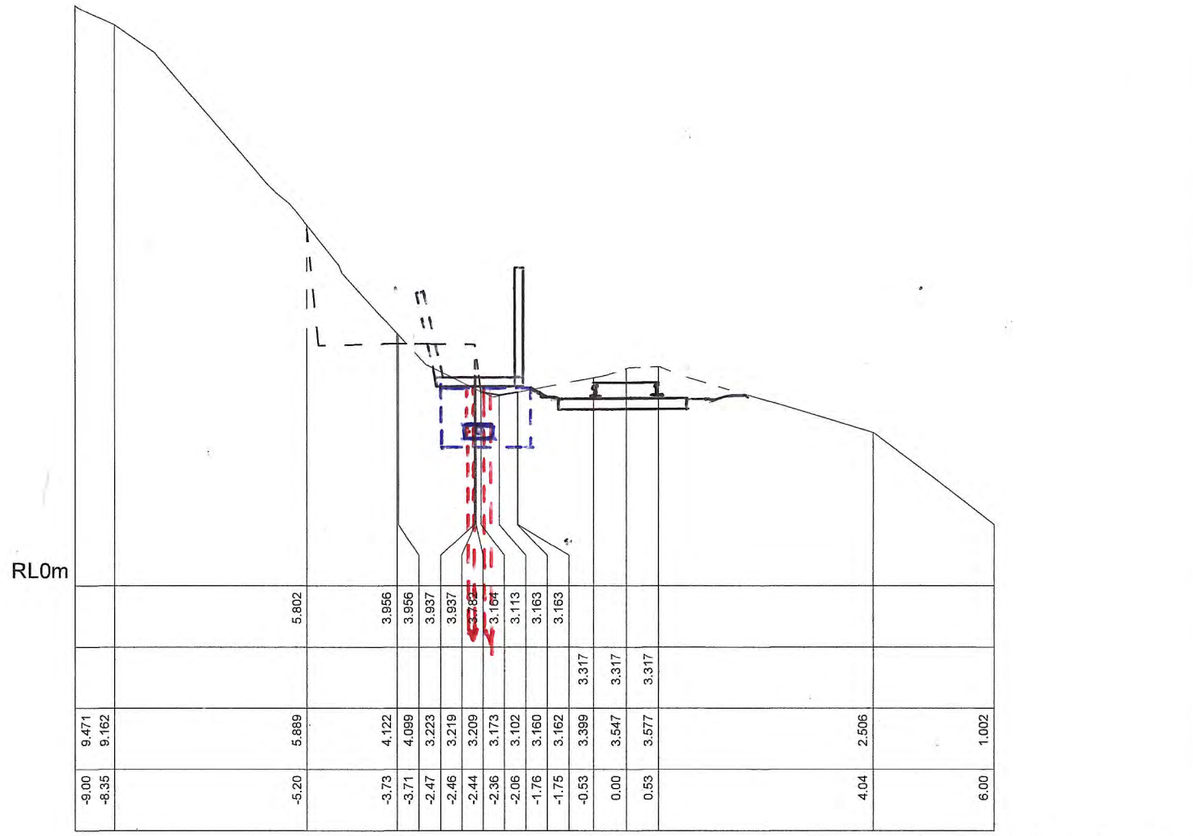

Ch 6130.00 m

0 1 2 3 4 5m

SCALE 1:100 (A3), 1:50 (A1)

NOTES

1. EXTREME CAUTION SHOULD BE TAKEN DURING EXCAVATIONS.
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7. COORDINATES IN TERMS OF NZTM GEODETIC 2000 DATUM.
8. LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
9. AERIAL PHOTOGRAPHY SOURCED FROM AERIAL VISION AND LAND PARCEL INFORMATION SOURCED FROM LAND INFORMATION NZ (LINZ) UNLESS STATED OTHERWISE.

AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT

Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 10
TOPOGRAPHICAL PLAN

CROSS SECTIONS

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	2024	2209-TOPO	04	1

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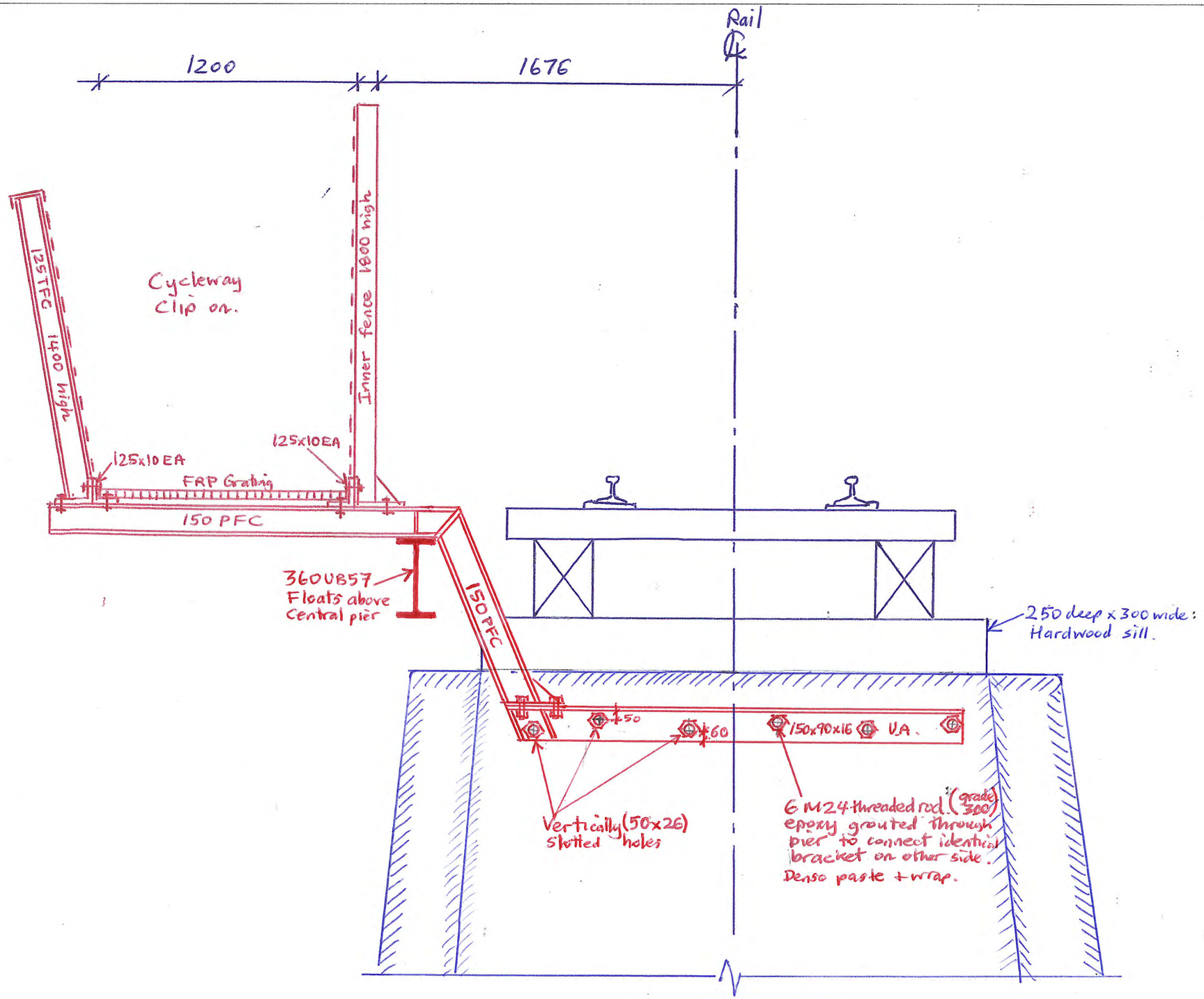
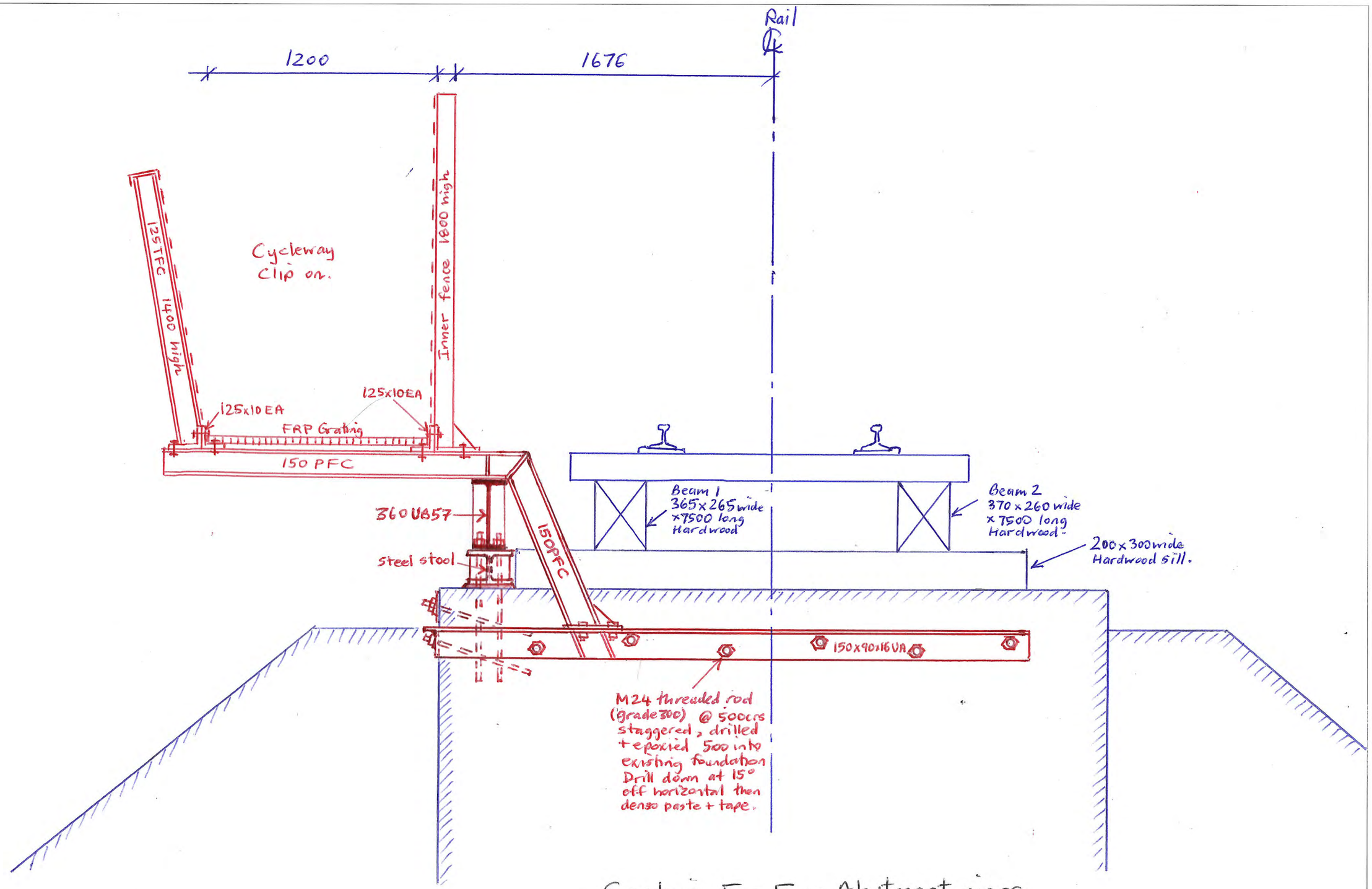


Section D - D

KAKARIKI
Structural Engineering
kakarikiengineering@gmail.com
09 434 4322 / 021 563 994
167 Te Toiroa Road, RD3, Whangarei 0173

Designed	RJG	Project	'Clip on' Cycleway to Bridge 10 piers
Drawn	"		
Checked		Drawing Title	Section D - D - Central Pier
Approved			

Date	2024
Drawing Issue	
Drawing No	06
Revision	



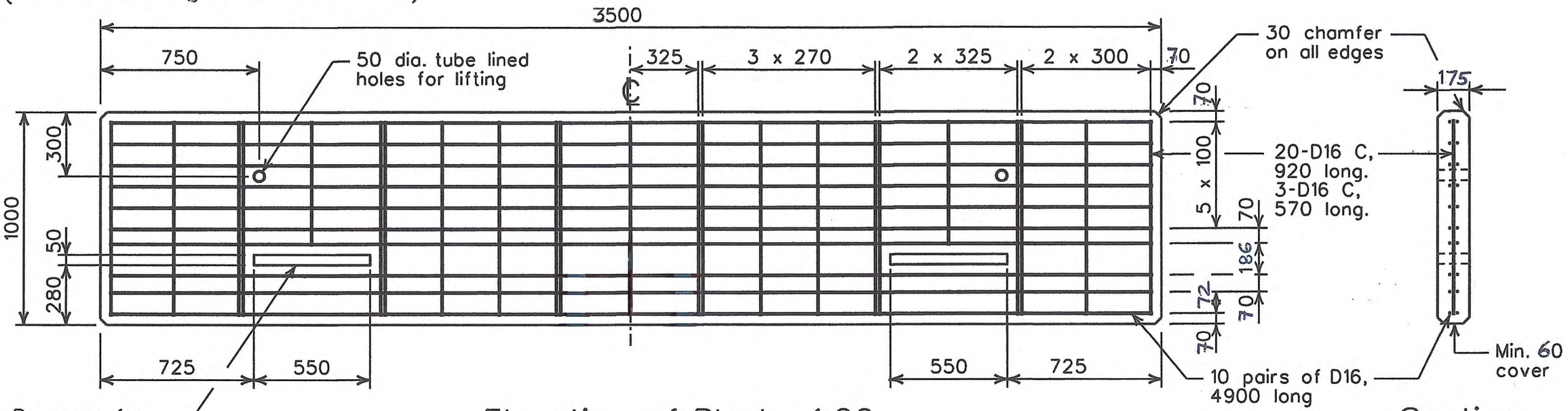
Section E-E - Abutment piers

KAKARIKI Structural Engineering kakarikiengineering@gmail.com 09 434 4322 / 021 563 994 167 Te Toiroa Road, RD3, Whangarei 0173	Designed	RG	Project 'Clip on' Cycleway to Bridge 10 piers	Date	2024
	Drawn	"		Drawing Issue	
	Checked		Drawing Title Section E-E - Abutment piers.	Drawing No	07.
	Approved			Revision	

Concrete shall have a minimum compressive strength of 50MPa at 28 days.
(Cure continuously for at least 14 days)

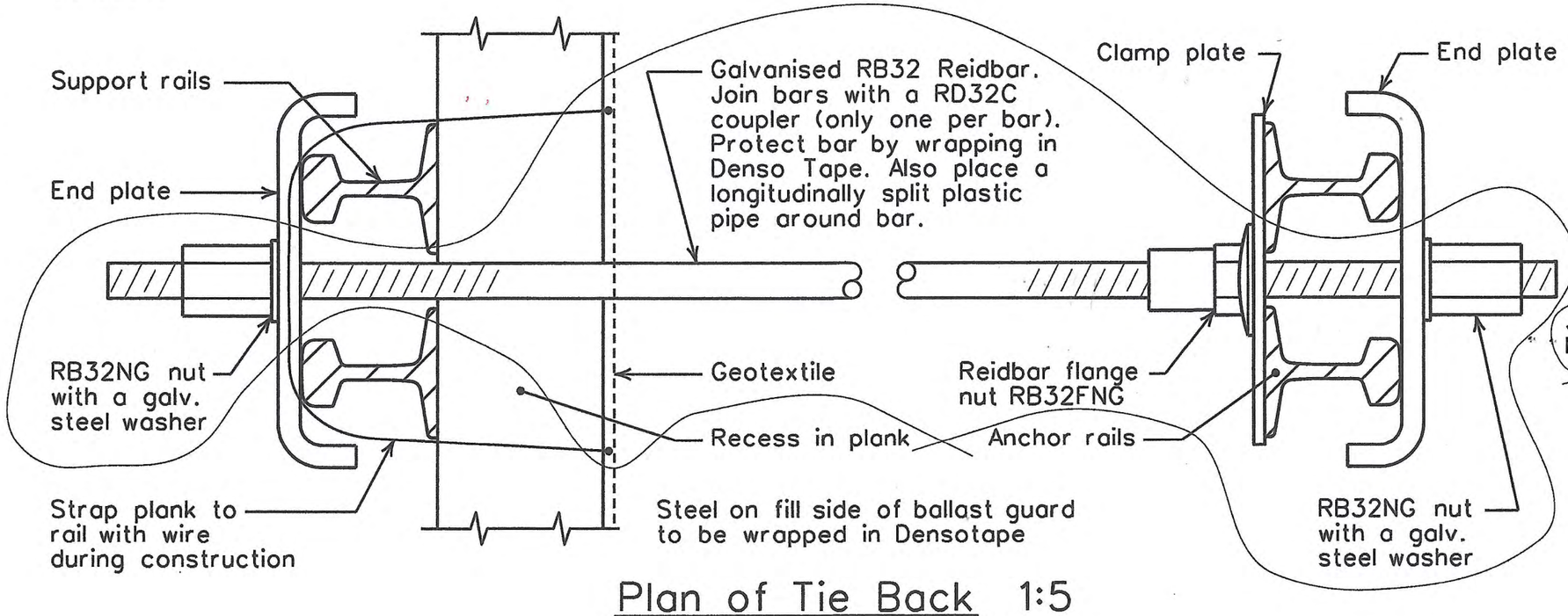
Reinforcing steel shall be Grade 300 and shall comply with AS/NZS 4671:2001

Construction shall comply with NZS 3109:1997

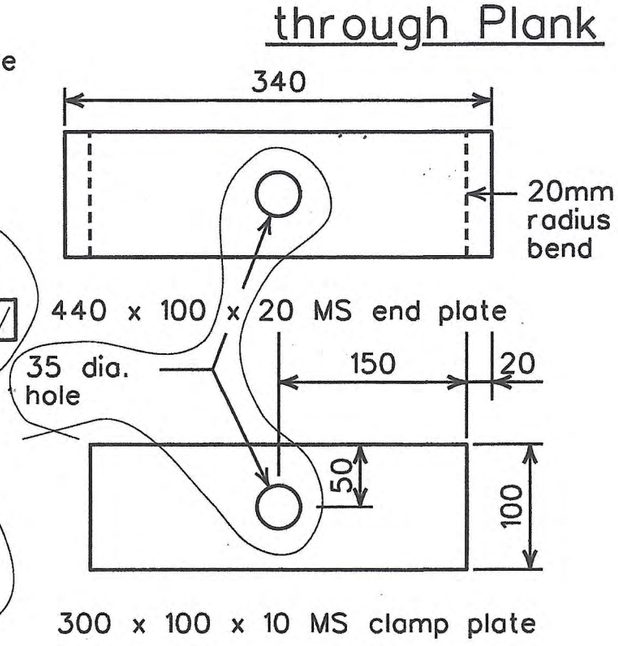


Elevation of Plank 1:20

Section through Plank



Plan of Tie Back 1:5



Plates 1:5

KiwiRail STRUCTURES ENGINEERING WELLINGTON	PRP	CPL	Jun'97	APPROVED S. Grave Amd. C: 24/8/10	SCALES 1:5 1:20
	DSN				
	DRN	MCB	Jun'97		
	CHK	CPL	Jun'97	FILE	

PRECAST CONCRETE – WING WALL

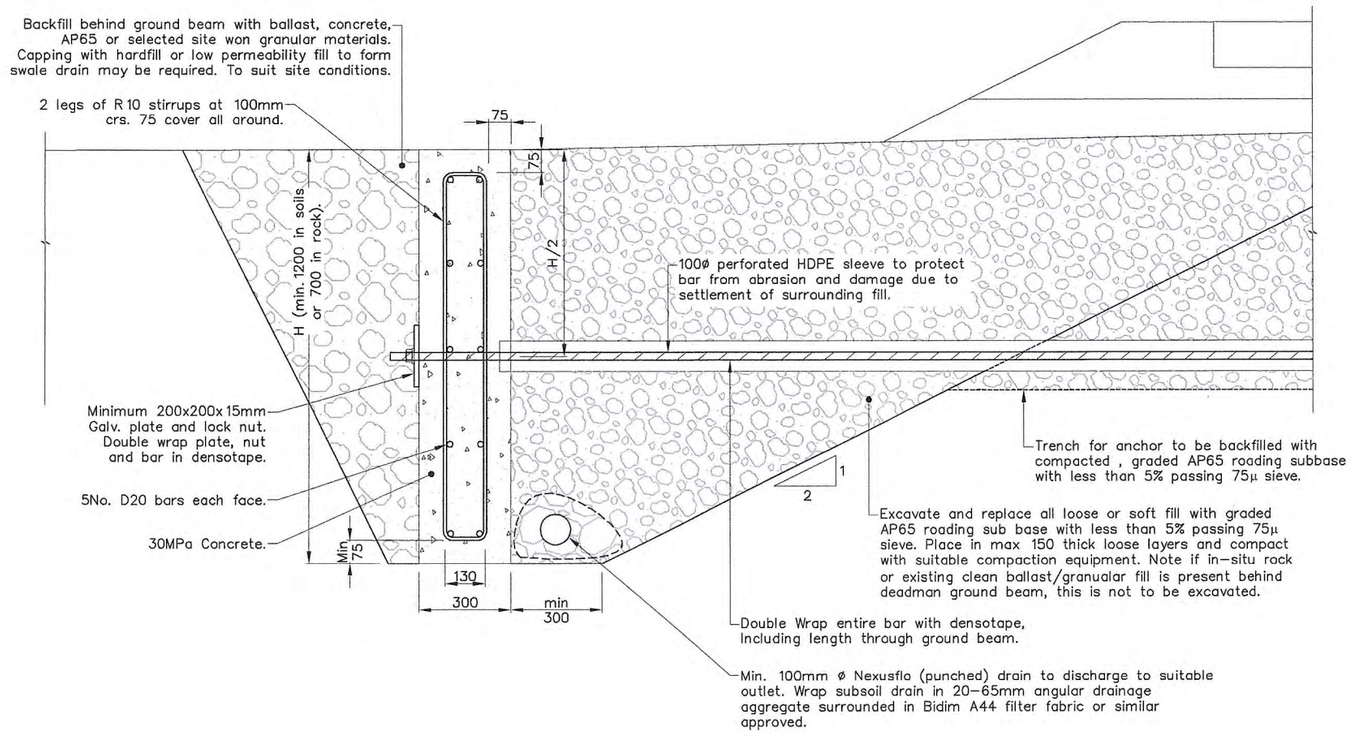
SHEET No. 1C AMD D
SHEETS IN SET
CE No. 100 320

ORIGINAL SIZE mm 150 100 50 20 10 0

100 0 100 200 300 400 500 mm
1:5

200 0 400 800 1200 1600 2000 mm
1:20

A3



DETAIL A 01
SCALE 1:10 : A1
SCALE 1:20 : A3

A3 SCALE 1:20
A1 SCALE 1:10
0 0.1 0.2 0.3 0.4 0.6 0.8 1.0 (m)

A3 SCALE 1:10
A1 SCALE 1:5
0 100 200 300 400 500 (mm)

NOTES CONTINUED:
5. this is a standardised retaining wall design, that must be verified for use by Geotechnical professional (KiwiRail Engineer, or consultant Engineer) in accordance with guidance provided in T+T March 2016 report. Applicability of this standard drawing to be reviewed prior to 30 March 2021.

DRAWING STATUS: CONSTRUCTION ISSUE

REVISION	DESCRIPTION	BY	DATE
B	Construction Issue		
A	Client Review		

DESIGNED :	BHR	Mar. 16
DRAWN :	DSW	Mar. 16
DESIGN CHECKED :		
DRAFTING CHECKED :		

CADFILE : \\85391.0001-001.dwg
APPROVED : / /
This drawing is not to be used for construction purposes unless signed as approved

NOTES :
1. All dimensions are in millimetres unless noted otherwise.
2. Strength of dense granular soil for pile foundations to be verified by subsurface testing, refer T+T's March 2016 report.
3. Any identified seepages to be reported to Structures Engineer prior to construction, refer T+T's March 2016 report.
4. A site specific design is required (i.e. this Standard Design must not be used) where the centre of the rail track is <3m from the retaining wall, or the retained height is >3m.

REFERENCE :

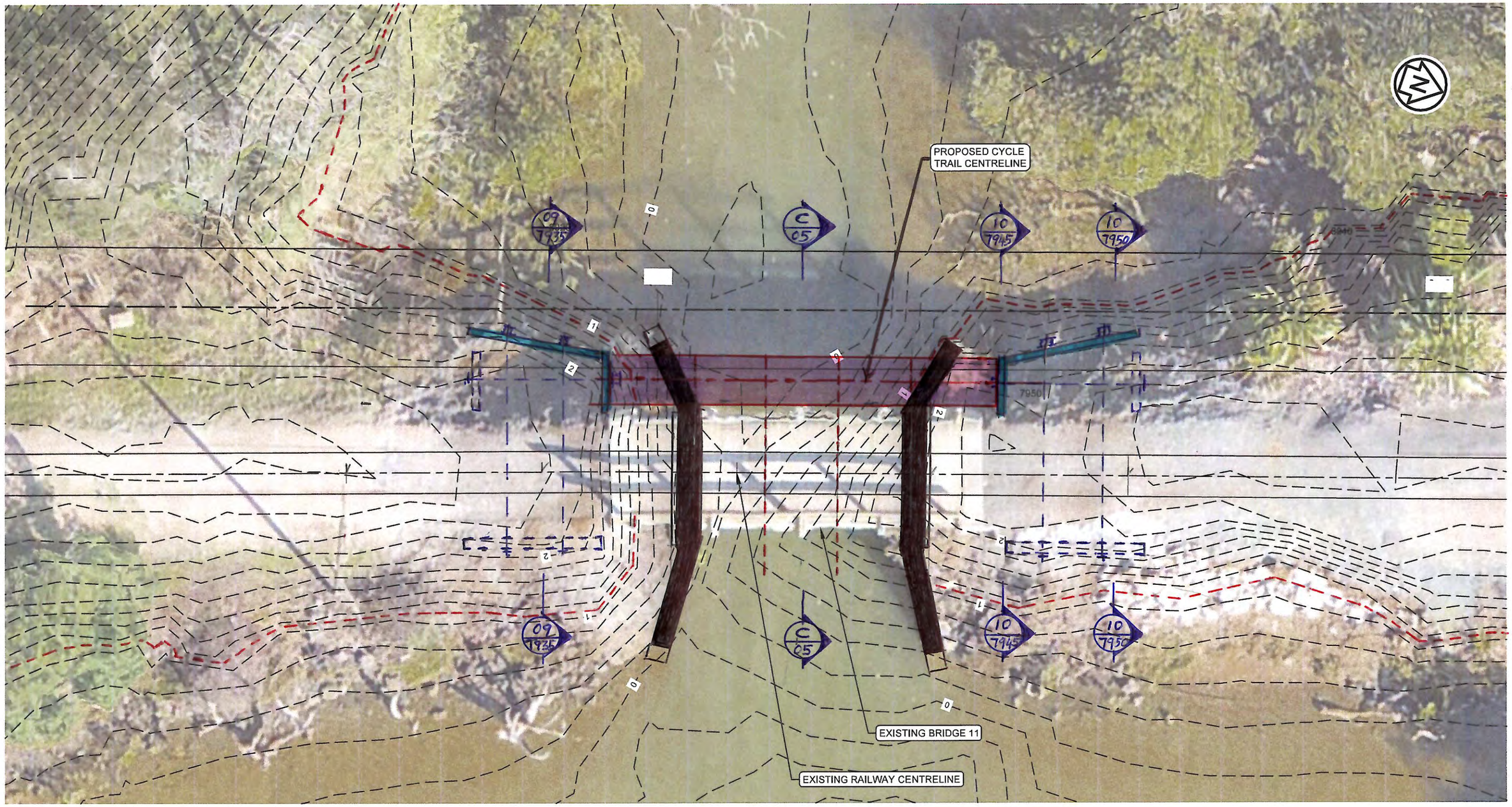
Tonkin+Taylor
Level 4, 2 Hunter St, Wellington
Tel. (04) 381 8560 Fax. (09) 307 0265
www.tonkintaylor.co.nz

CLIENT, PROJECT: KiwiRail

TITLE: STANDARD RAIL IRON RETAINING WALL
Typical Details

SCALES (AT A1 SIZE): AS SHOWN
DWG. No.: CE 120 451 (2 of 2)
REV.: B

Appendix B - Prelim design drawings – Cycleway clip on – Bridge 11_Aug 2024



PLAN
SCALE 1:100 (A3), 1:50 (A1)

CONTOUR INTERVALS.
ONE TREE POINT DATUM:
MAJOR: 1.00m
MINOR: 0.20m

0 1 2 3 4 5m
SCALE 1:100 (A3), 1:50 (A1)

NOTES

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AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT
Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 11
TOPOGRAPHICAL PLAN
PLAN

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	2024	2209-TOPO	06	1

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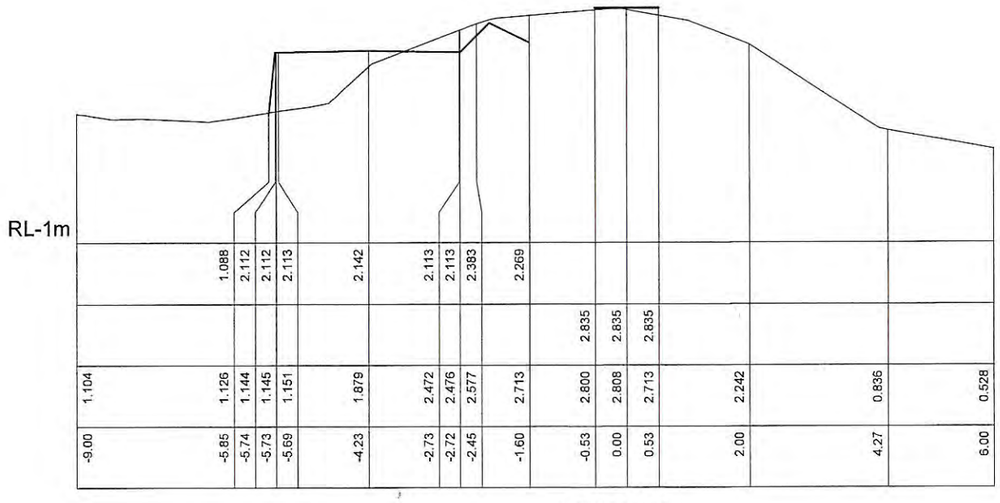
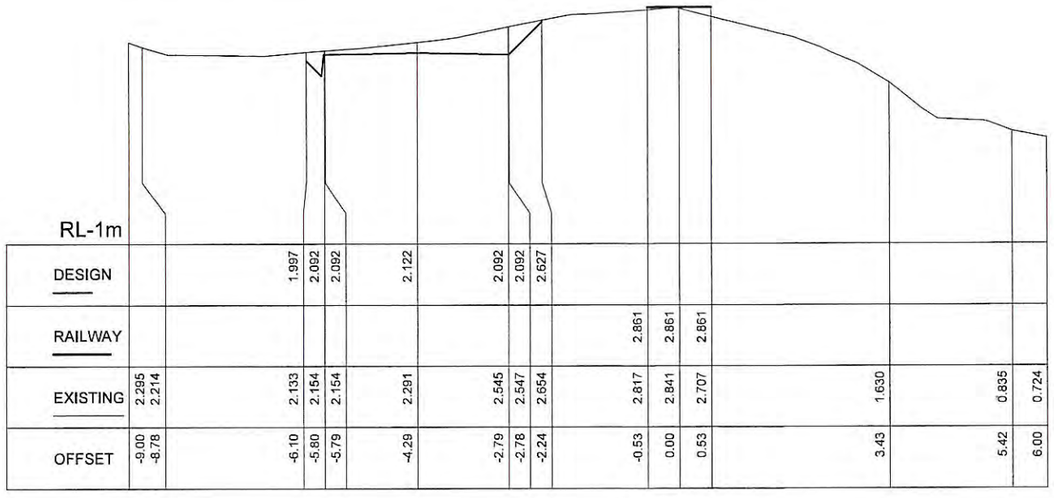
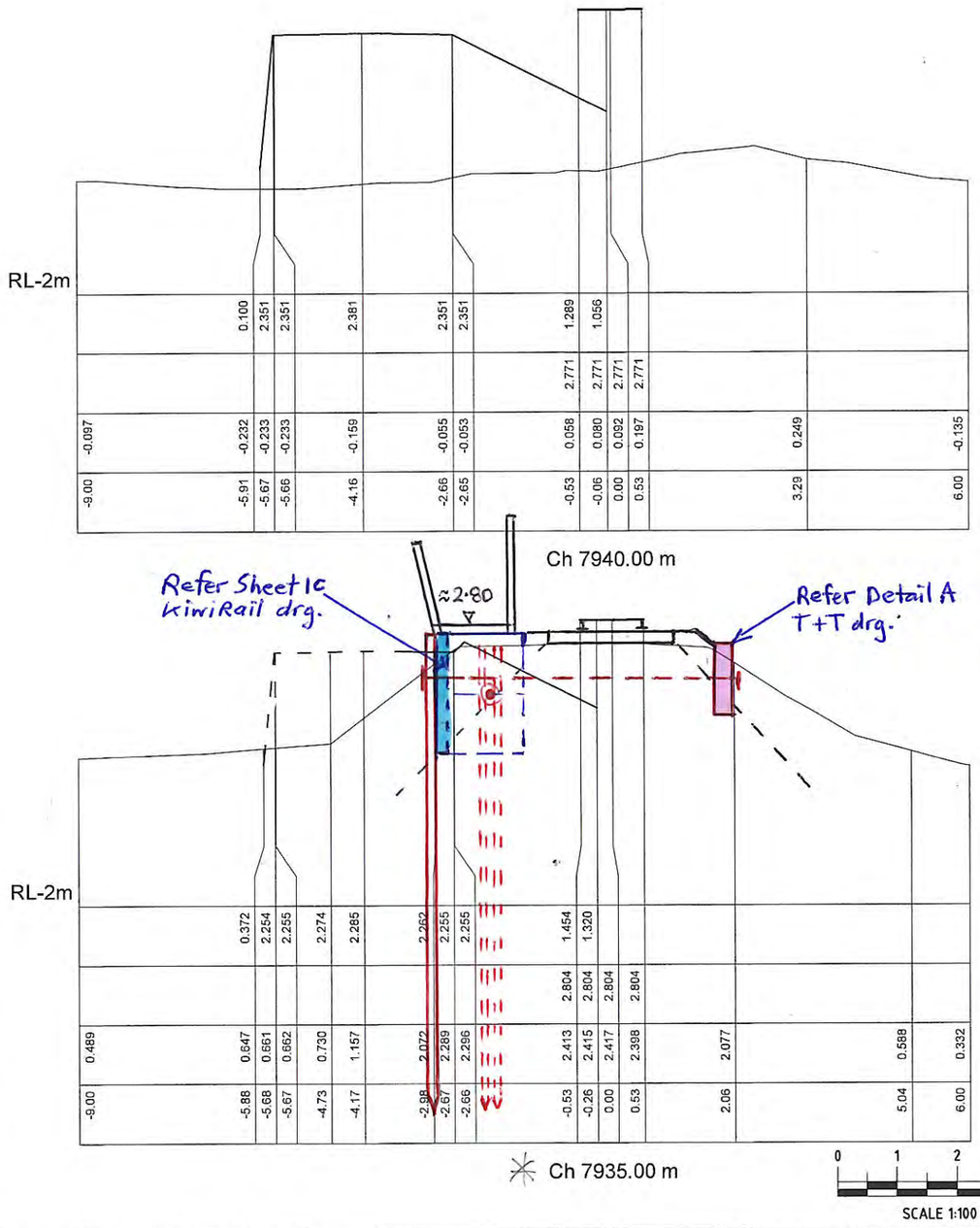


Ch 7930.00 m



Ch 7925.00 m



Ch 7940.00 m

Ch 7935.00 m

0 1 2 3 4 5m

SCALE 1:100 (A3), 1:50 (A1)

NOTES

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AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT: Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 11
TOPOGRAPHICAL PLAN
CROSS SECTIONS

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	2024	2209-TOPO	09	1

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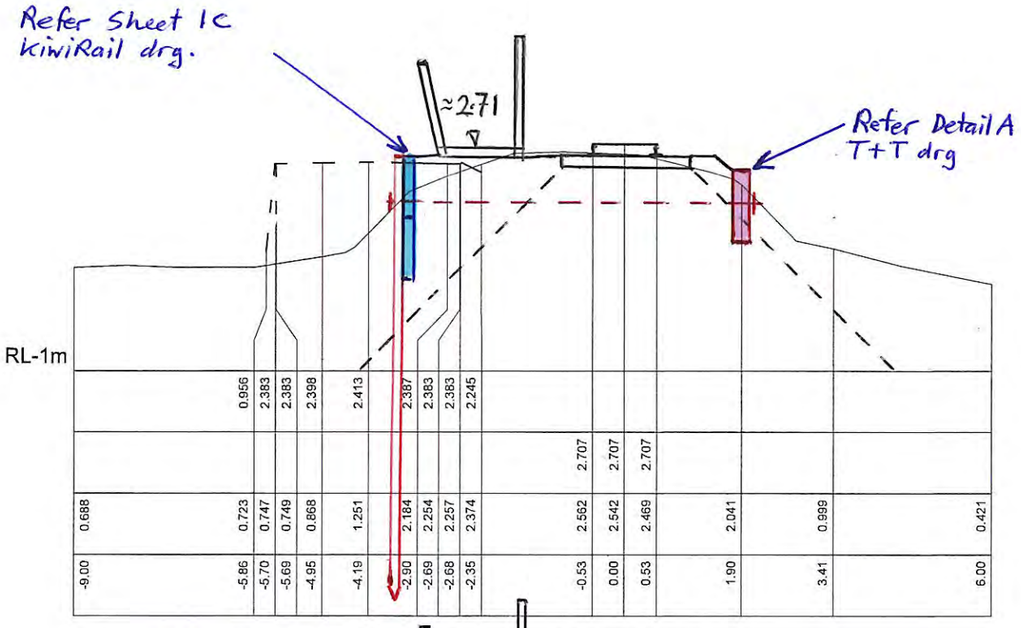
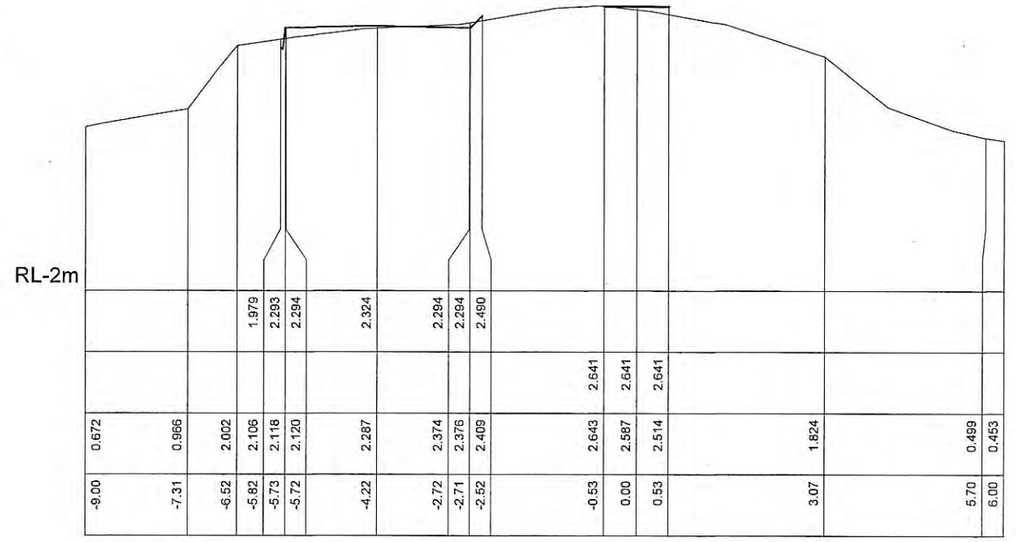


Ch 7950.00 m



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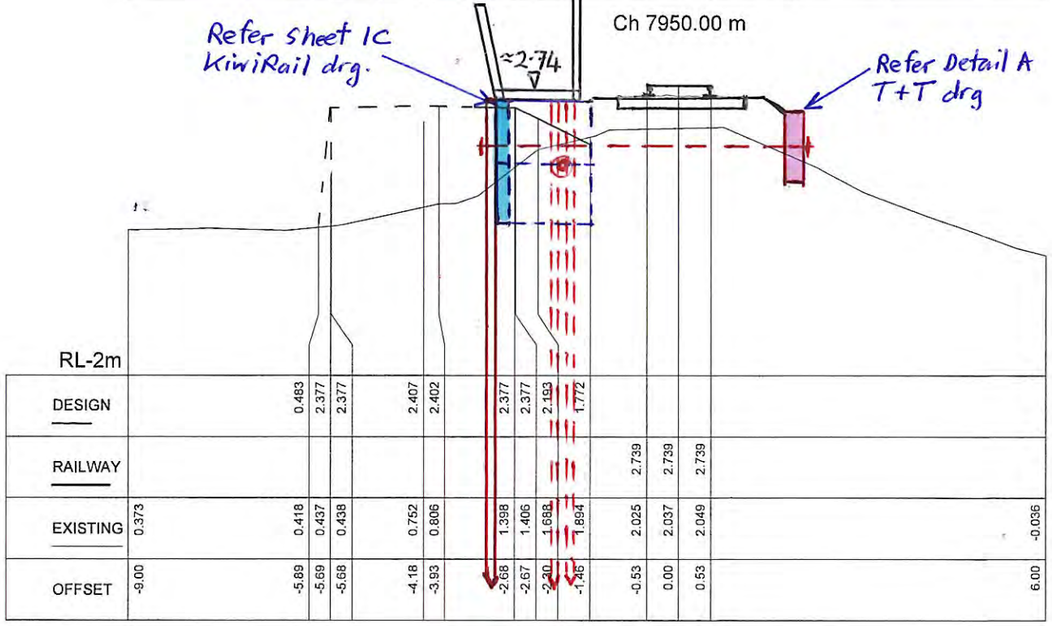
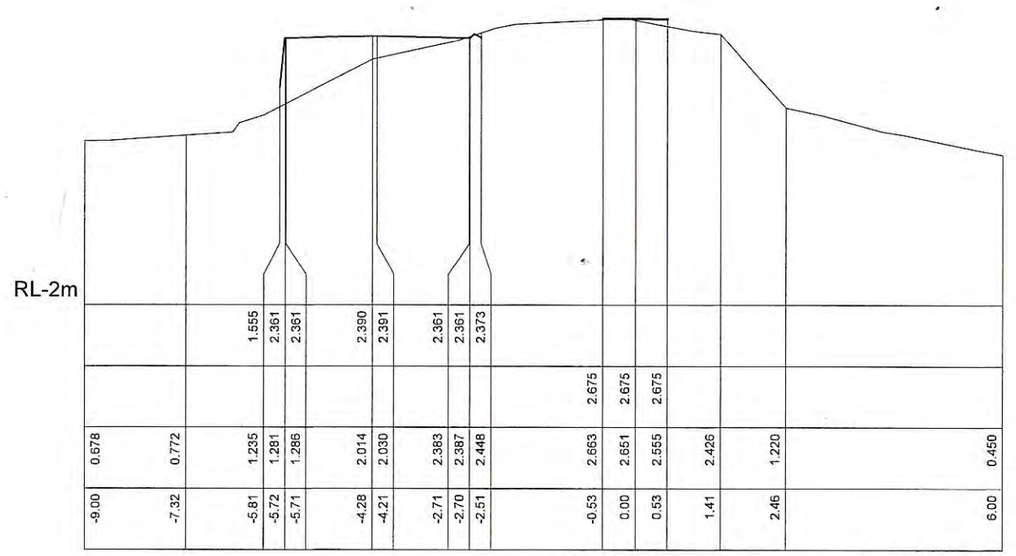


Ch 7945.00 m



Ch 7955.00 m

0 1 2 3 4 5m

SCALE 1:100 (A3), 1:50 (A1)

NOTES

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AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT: Far North District Council
Te Kaunihera a Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 11
TOPOGRAPHICAL PLAN
CROSS SECTIONS

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	2024	2209-TOPO	10	1

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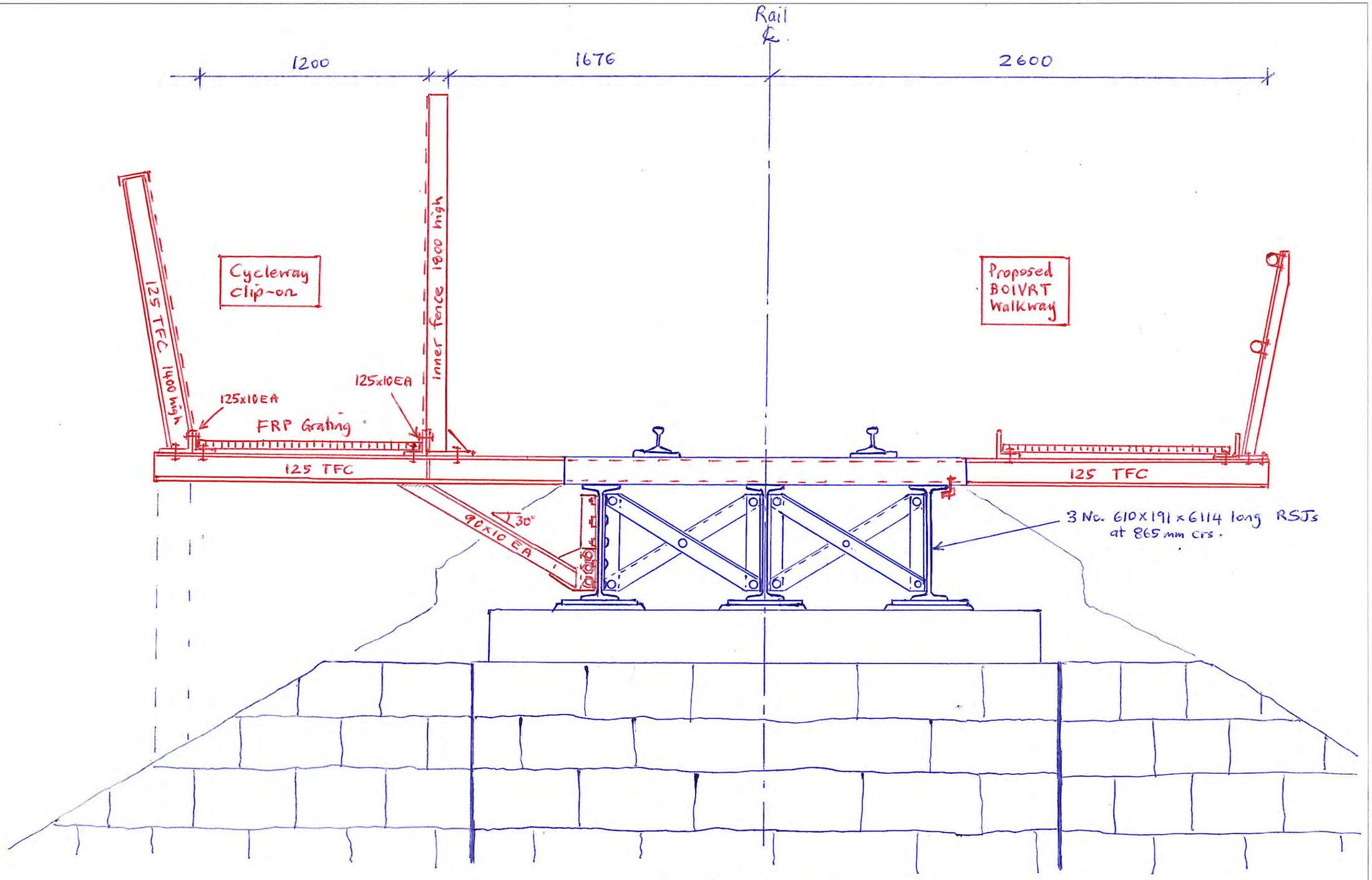


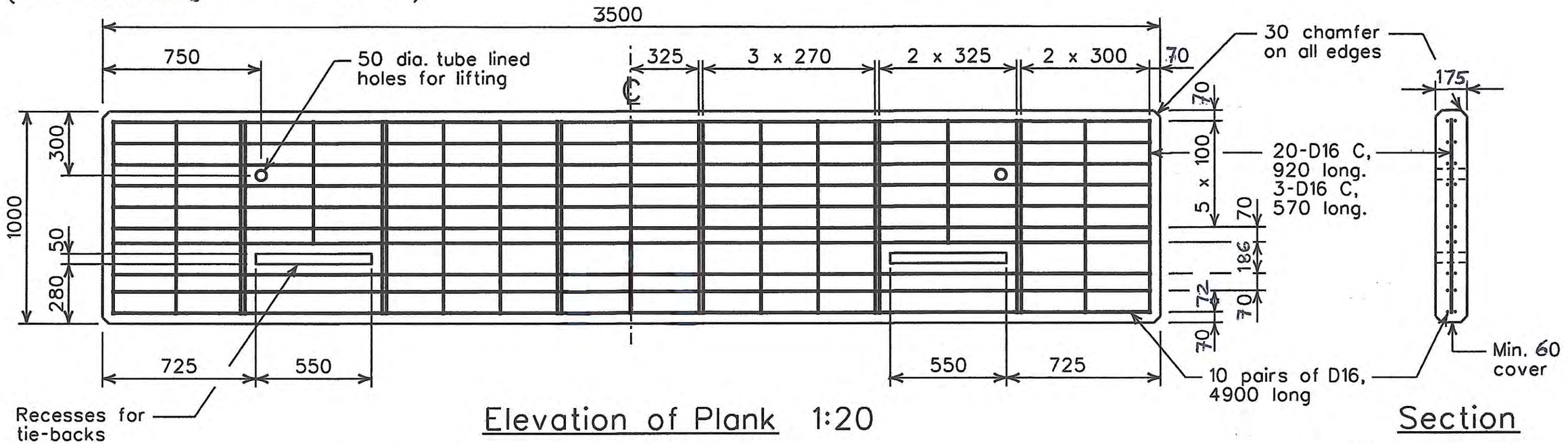
Section C-C

KAKARIKI Structural Engineering kakarikiengineering@gmail.com 09 434 4322 / 021 563 994 167 Te Toiroa Road, RD3, Whangarei 0173	Designed	RJG	Project 'Clip on' cycleway to Bridge 11	Date	2024.
	Drawn	"		Drawing Issue	
	Checked		Drawing Title Typical section C-C	Drawing No	05.
	Approved			Revision	

Concrete shall have a minimum compressive strength of 50MPa at 28 days.
(Cure continuously for at least 14 days)

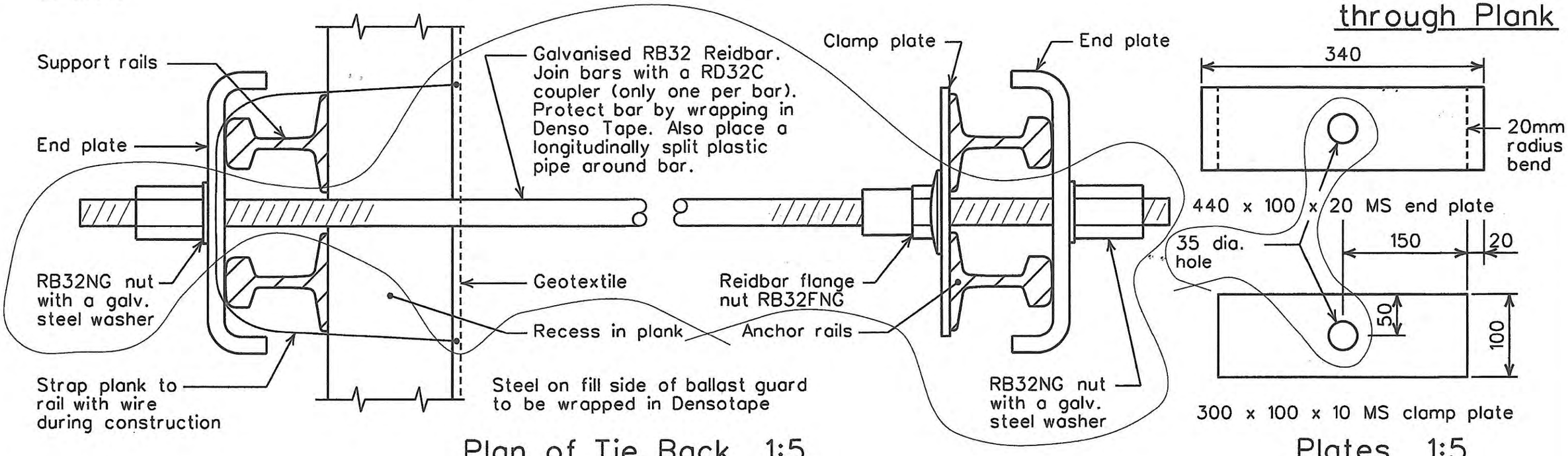
Reinforcing steel shall be Grade 300 and shall comply with AS/NZS 4671:2001

Construction shall comply with NZS 3109:1997



Elevation of Plank 1:20

Section through Plank



Plan of Tie Back 1:5

Plates 1:5

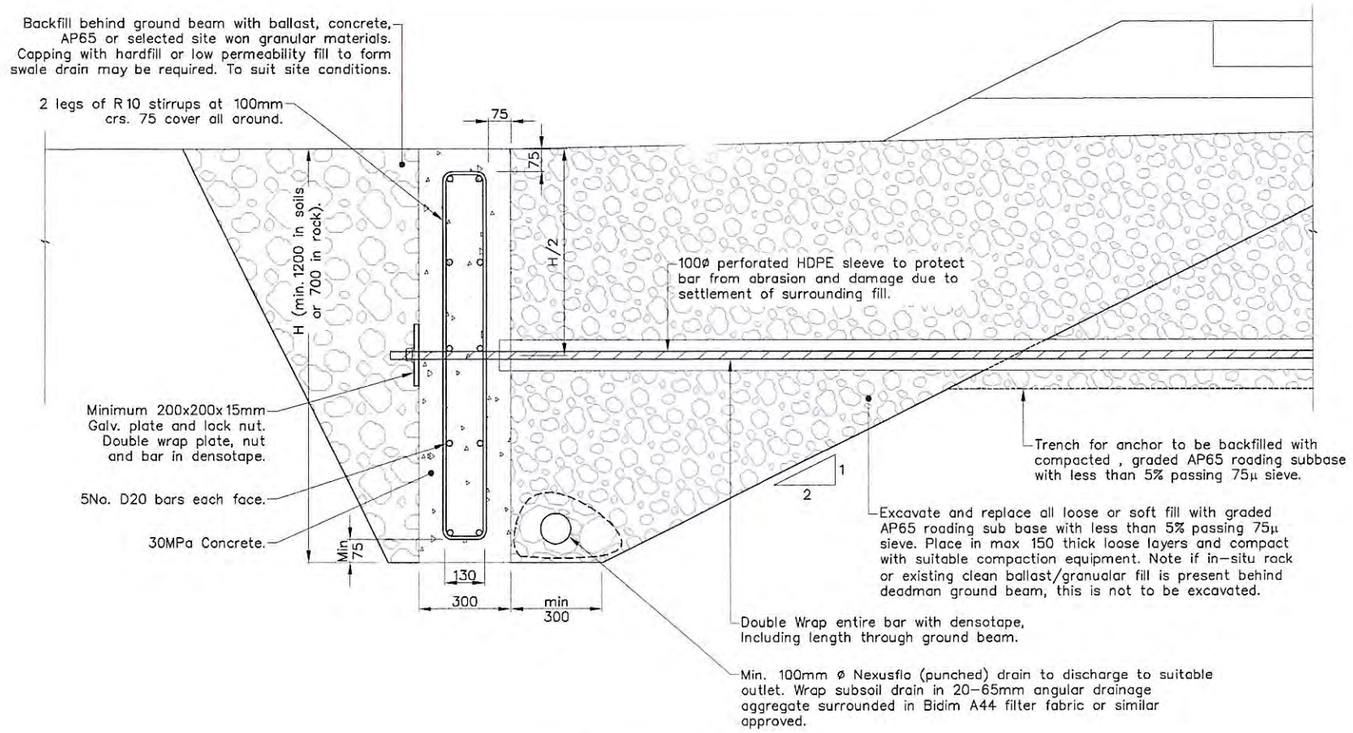
KiwiRail STRUCTURES ENGINEERING WELLINGTON	PRP	CPL	Jun'97	APPROVED S. Grave Amd. C: 24/8/10	SCALES 1:5 1:20	PRECAST CONCRETE – WING WALL
	DSN					SHEET No. 1C AMD D
	DRN	MCB	Jun'97			SHEETS IN SET
	CHK	CPL	Jun'97	FILE		CE No. 100 320

ORIGINAL SIZE mm 150 100 50 20 10 0

100 0 100 200 300 400 500 mm (1:5)

200 0 400 800 1200 1600 2000 mm (1:20)

A3



DETAIL A 01
SCALE 1:10 : A1
SCALE 1:20 : A3

A3 SCALE 1:20
A1 SCALE 1:10
0 0.1 0.2 0.3 0.4 0.6 0.8 1.0 (m)

A3 SCALE 1:10
A1 SCALE 1:5
0 100 200 300 400 500 (mm)

NOTES CONTINUED:
5. this is a standardised retaining wall design, that must be verified for use by Geotechnical professional (KiwiRail Engineer, or consultant Engineer) in accordance with guidance provided in T+T March 2016 report. Applicability of this standard drawing to be reviewed prior to 30 March 2021.

DRAWING STATUS: CONSTRUCTION ISSUE

REVISION	DESCRIPTION	BY	DATE
B	Construction Issue		
A	Client Review		

DESIGNED :	BHR	Mar. 16
DRAWN :	DSW	Mar. 16
DESIGN CHECKED :		
DRAFTING CHECKED :		
CADFILE : \\85391.01-001.dwg		
APPROVED :		

This drawing is not to be used for construction purposes unless signed as approved

NOTES :
1. All dimensions are in millimetres unless noted otherwise.
2. Strength of dense granular soil for pile foundations to be verified by subsurface testing, refer T+T's March 2016 report.
3. Any identified seepages to be reported to Structures Engineer prior to construction, refer T+T's March 2016 report.
4. A site specific design is required (i.e. this Standard Design must not be used) where the centre of the rail track is <3m from the retaining wall, or the retained height is >3m.

REFERENCE :

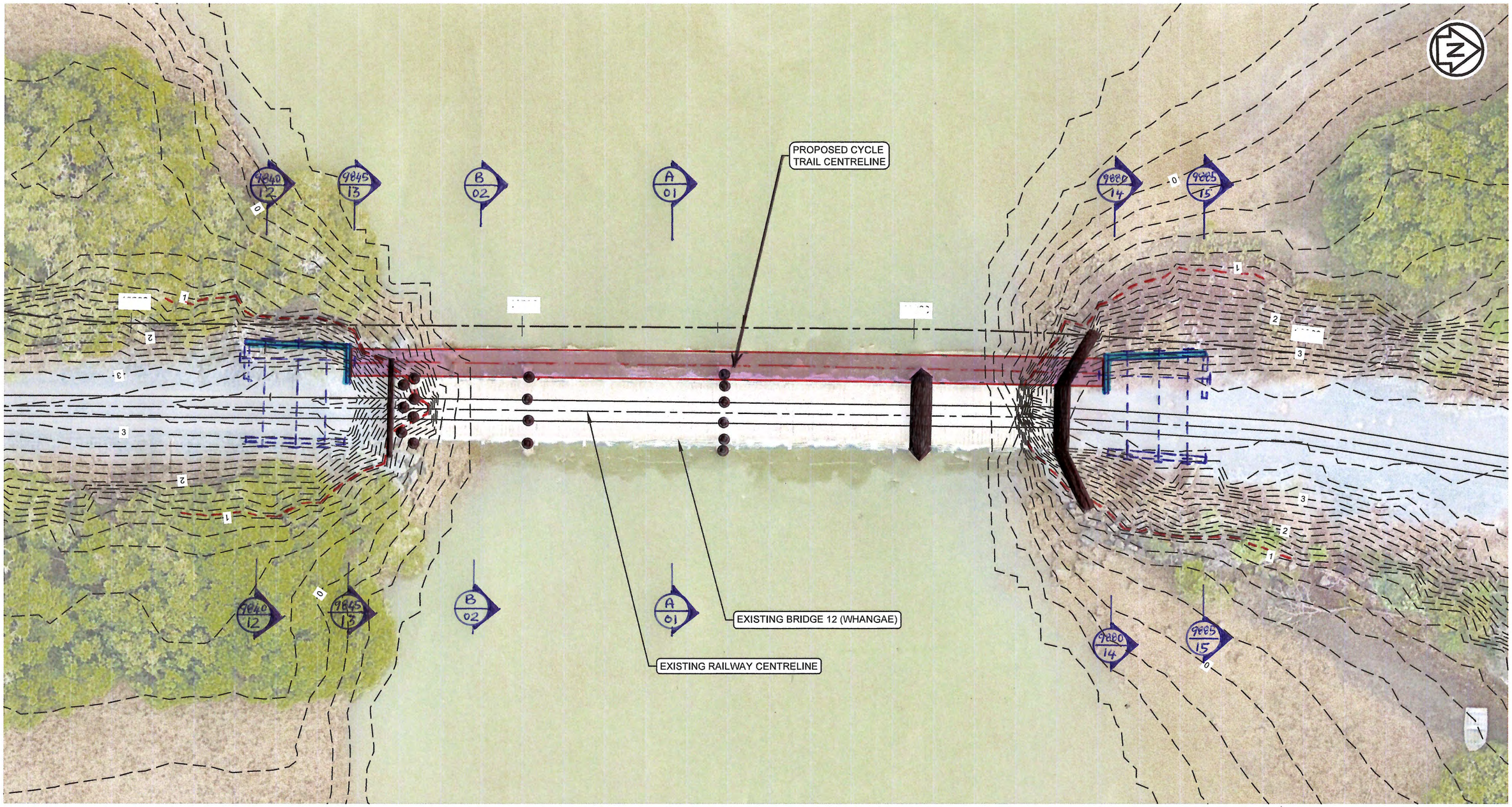
Tonkin+Taylor
Level 4, 2 Hunter St, Wellington
Tel. (04) 381 8560 Fax. (09) 307 0265
www.tonkintaylor.co.nz

CLIENT, PROJECT: KiwiRail

TITLE: STANDARD RAIL IRON RETAINING WALL
Typical Details

SCALES (AT A1 SIZE)	DWG. No.	REV.
AS SHOWN	CE 120 451 (2 of 2)	B

Appendix C - Prelim design drawings – Cycleway clip on – Bridge 12 Whangae _16 Aug 2024



CONTOUR INTERVALS,
ONE TREE POINT DATUM:
MAJOR: 1.00m
MINOR: 0.20m

PLAN
SCALE 1:200 (A3), 1:100 (A1)

0 2 4 6 8 10m
SCALE 1:200 AT ORIGINAL SIZE

NOTES

1. EXTREME CAUTION SHOULD BE TAKEN DURING EXCAVATIONS.
2. THE CONTRACTOR SHALL CHECK FOR AND BE RESPONSIBLE FOR ALL UNDERGROUND AND/ OR OVERHEAD SERVICES.
3. ALL SETTING OUT TO BE CONFIRMED ON SITE WITH THE ENGINEER PRIOR TO COMMENCEMENT OF CONSTRUCTION WORK.
4. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH WDC ENVIRONMENTAL ENGINEERING STANDARDS.
5. DO NOT SCALE DRAWING.
6. NOMINAL SCALE IS SHOWN FOR A3 SIZE UNLESS SHOWN OTHERWISE.
7. COORDINATES IN TERMS OF NZTM GEODETIC 2000 DATUM.
8. LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
9. AERIAL PHOTOGRAPHY SOURCED FROM AERIAL VISION AND LAND PARCEL INFORMATION SOURCED FROM LAND INFORMATION NZ (LINZ) UNLESS STATED OTHERWISE.

AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

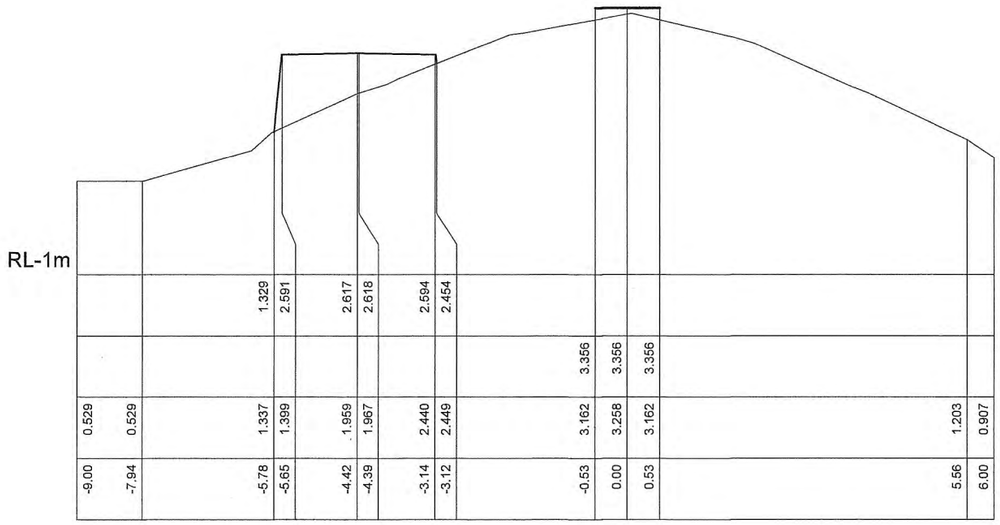
	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT
Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

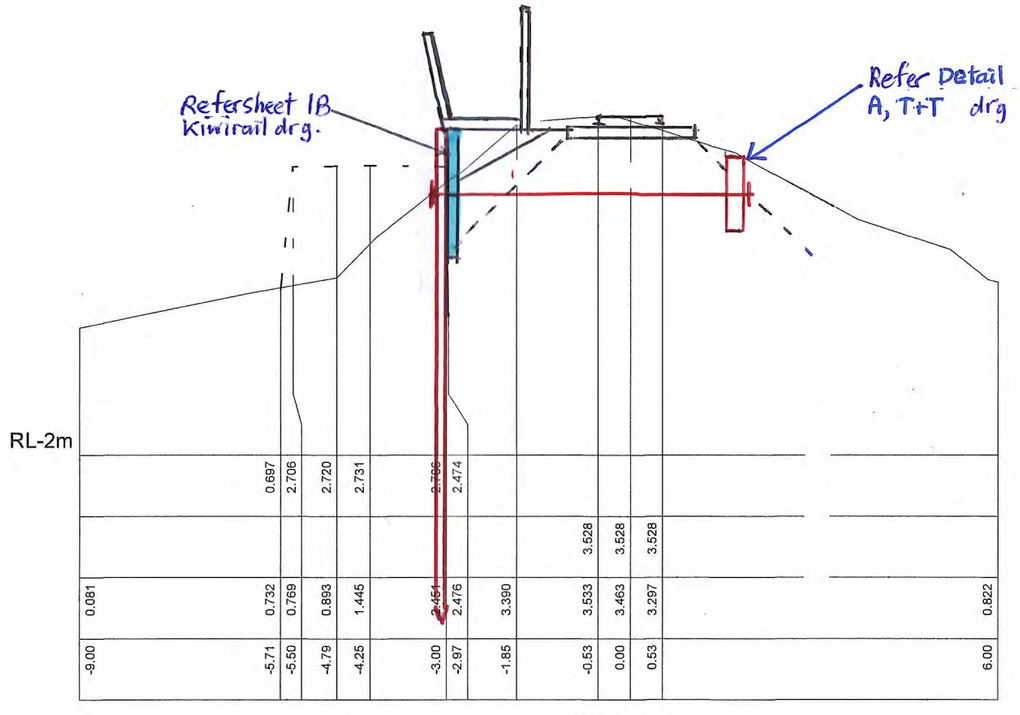
TITLE
KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 12
TOPOGRAPHICAL PLAN
PLAN

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	2024	2209-TOPO	10	1

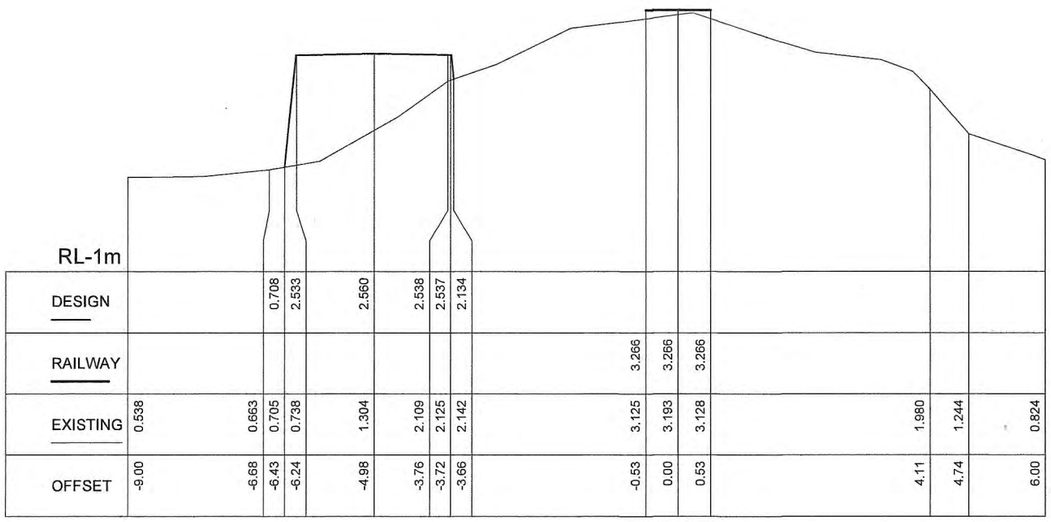
c:\users\prest\onedrive\documents\pds design\projects\2209 opua cycleway\dwgs\2209_eng_03a.dwg



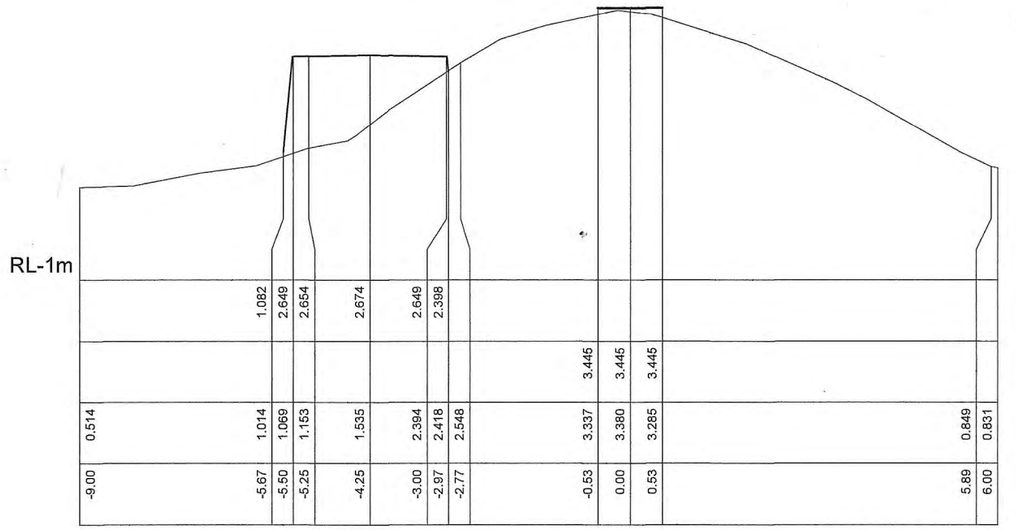
Ch 9830.00 m



Ch 9840.00 m



Ch 9825.00 m



Ch 9835.00 m

0 1 2 3 4 5m

SCALE 1:100 (A3), 1:50 (A1)

NOTES

1. EXTREME CAUTION SHOULD BE TAKEN DURING EXCAVATIONS.
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8. LEVELS IN TERMS OF MEAN SEA LEVEL ONE TREE POINT DATUM.
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AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT

Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 12
TOPOGRAPHICAL PLAN
CROSS SECTIONS

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	13-08-2024	2209-TOPO	12	1

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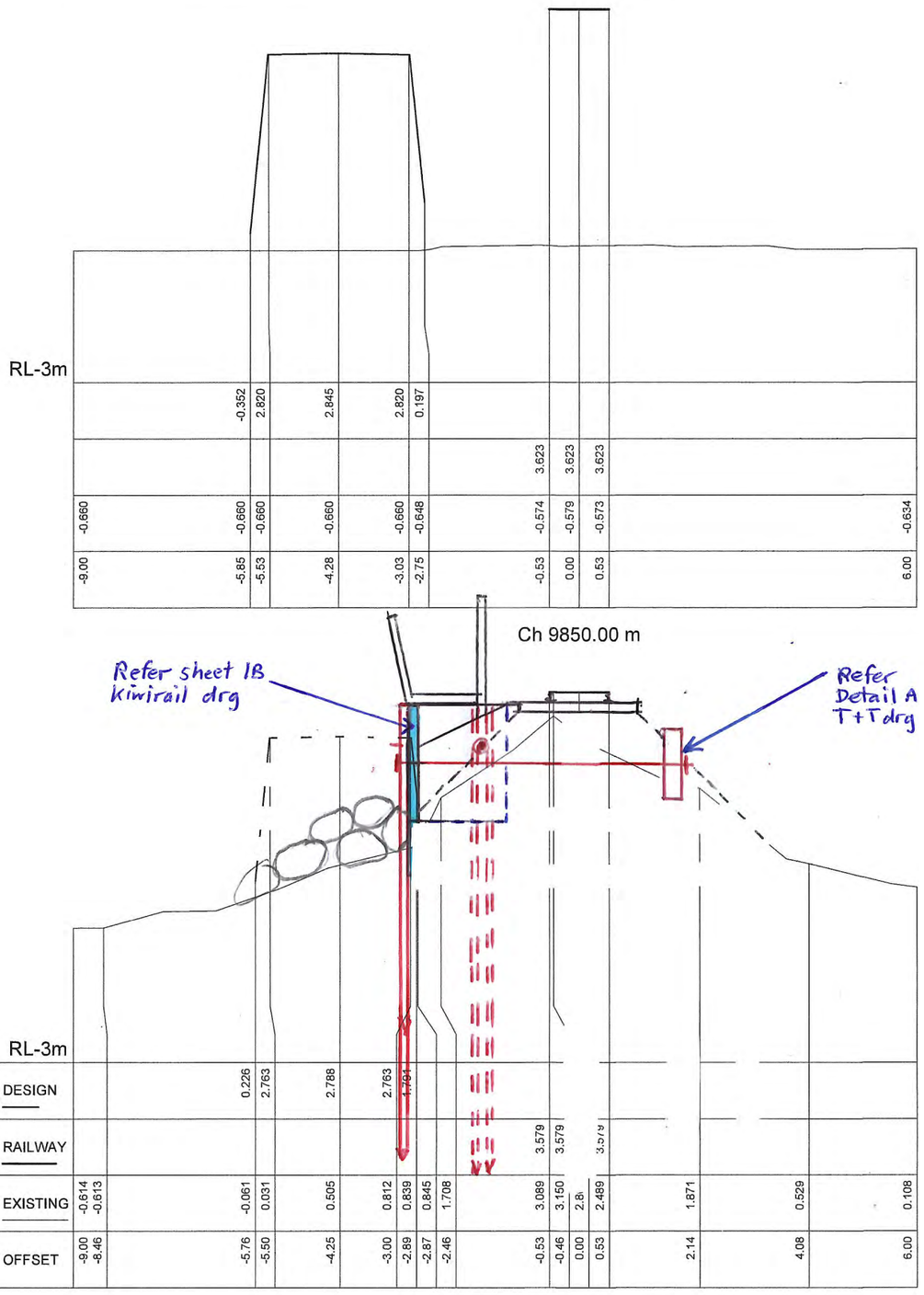

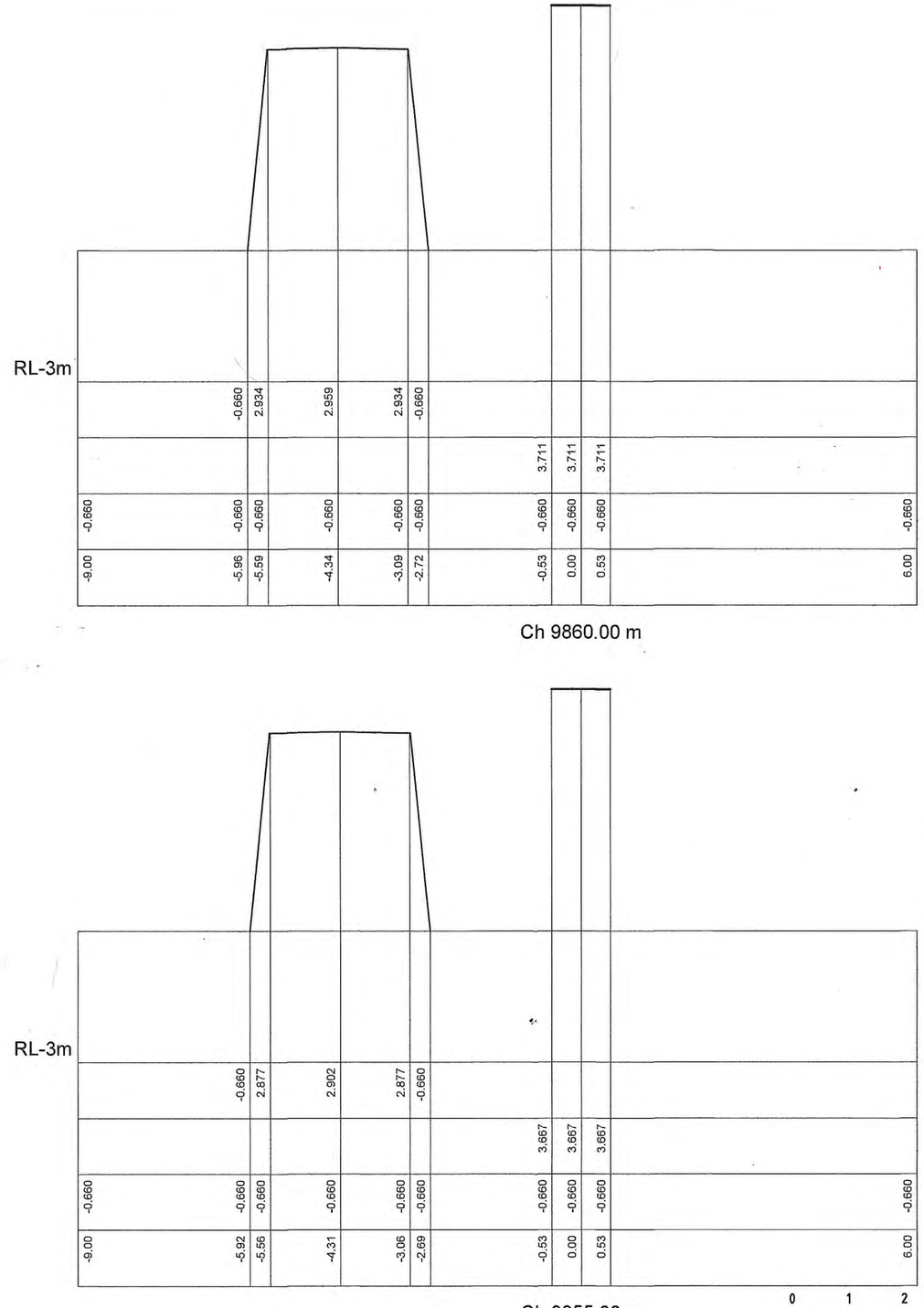

NOTES

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AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT

Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

TITLE
KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 12
TOPOGRAPHICAL PLAN

CROSS SECTIONS

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	13-08-2024	2209-TOPO	13	1

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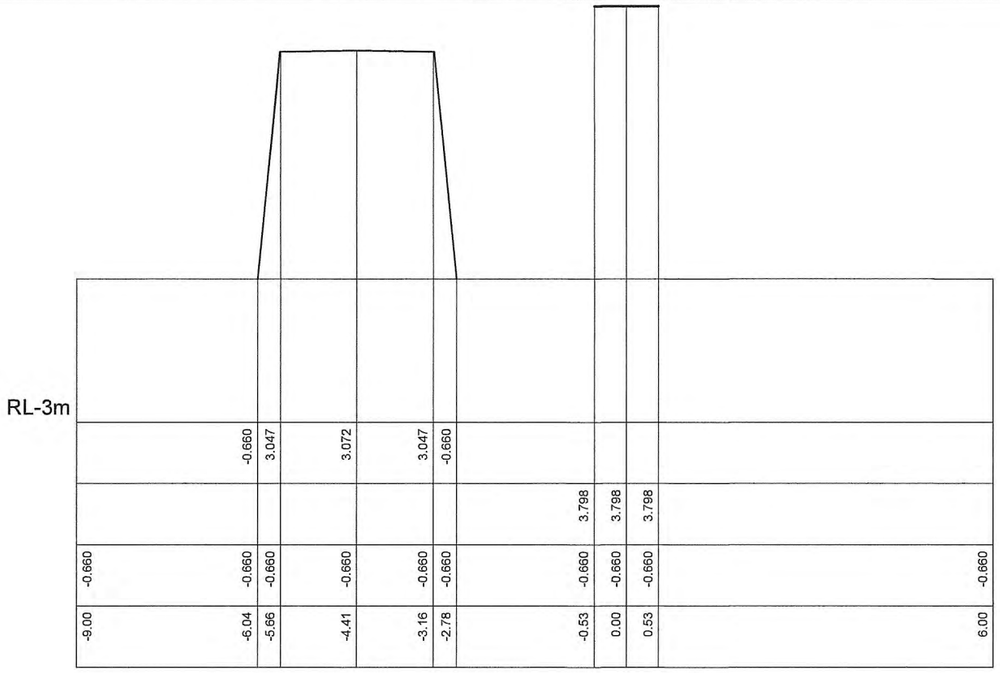
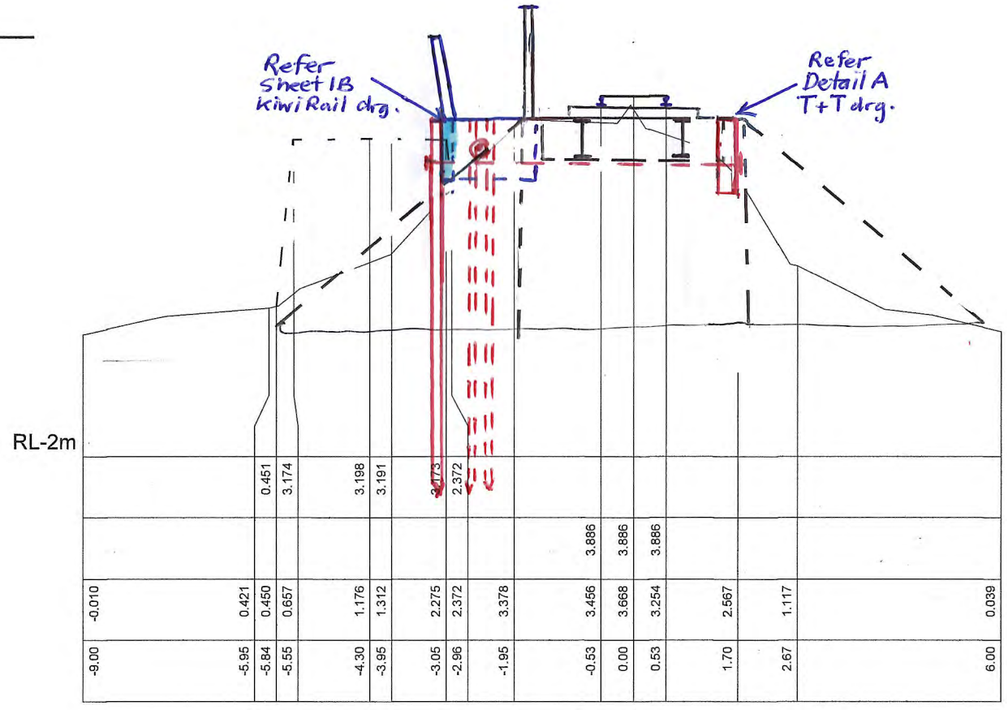
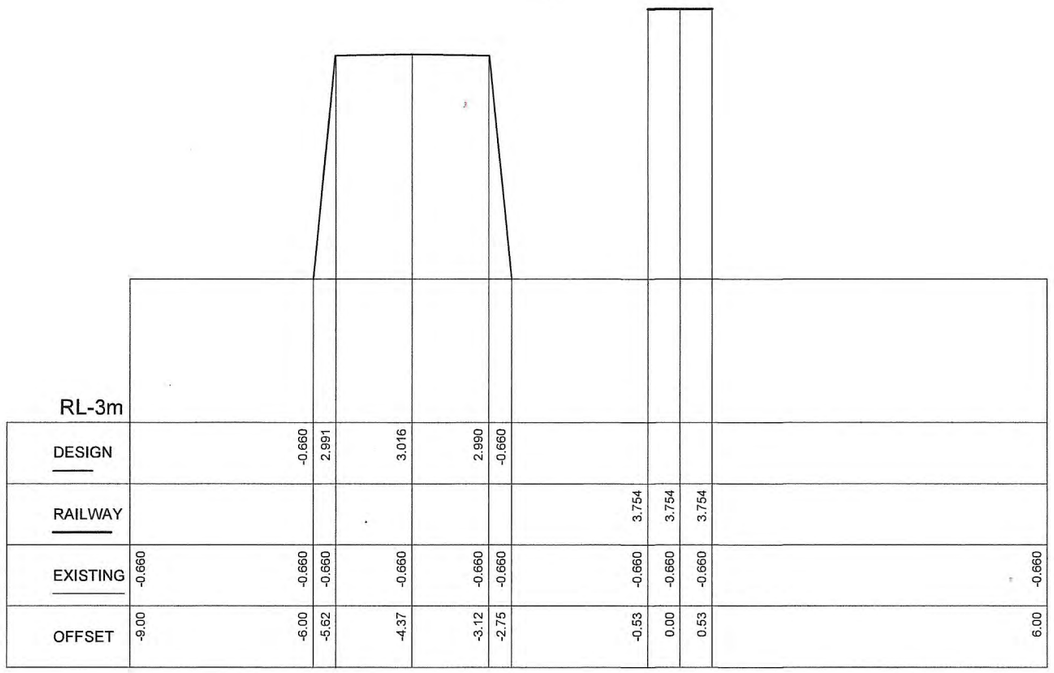


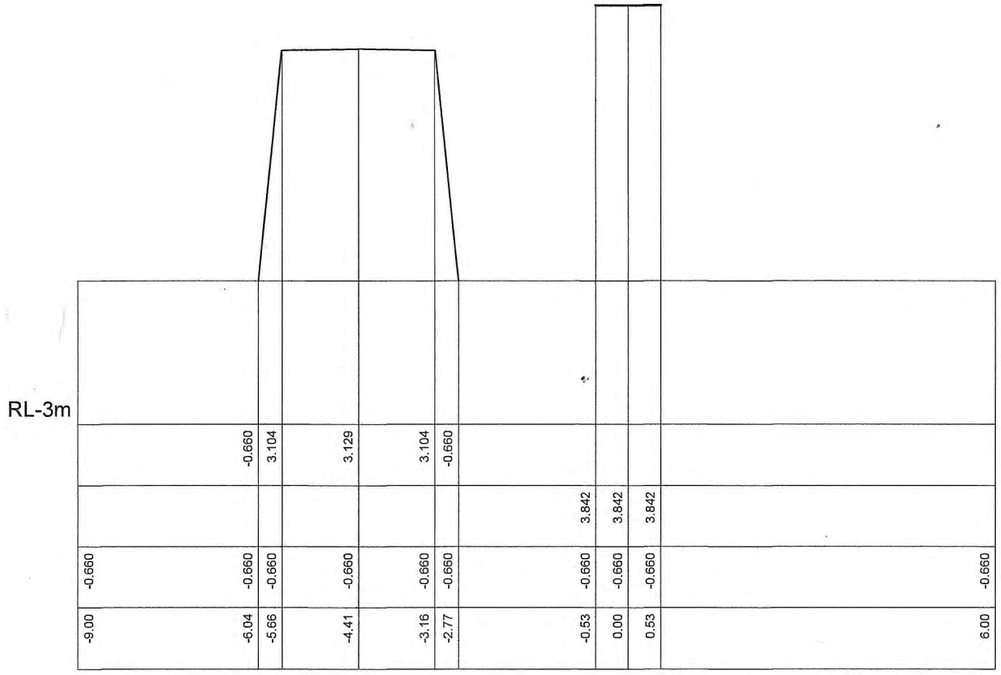
Ch 9870.00 m



Ch 9880.00 m



Ch 9865.00 m



Ch 9875.00 m

0 1 2 3 4 5m

SCALE 1:100 (A3), 1:50 (A1)

NOTES

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AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT

Far North District Council
Te Kaunihera a Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 12
TOPOGRAPHICAL PLAN
CROSS SECTIONS

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	13-08-2024	2209-TOPO	14	1

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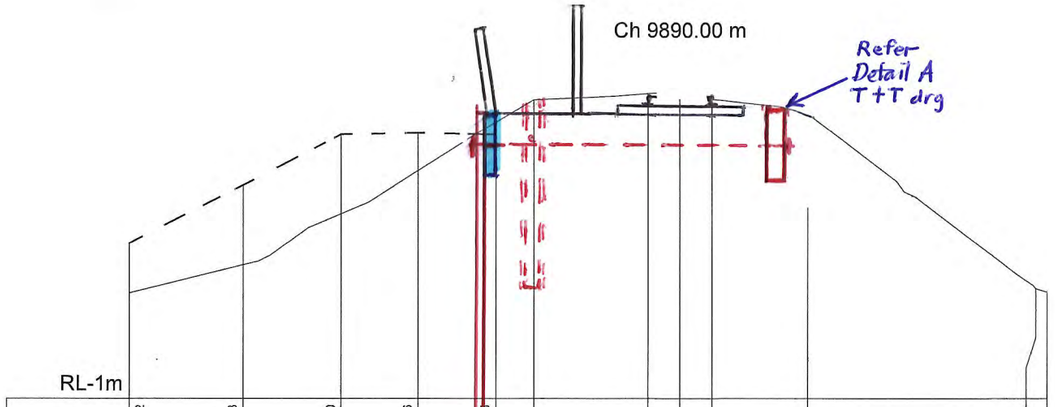
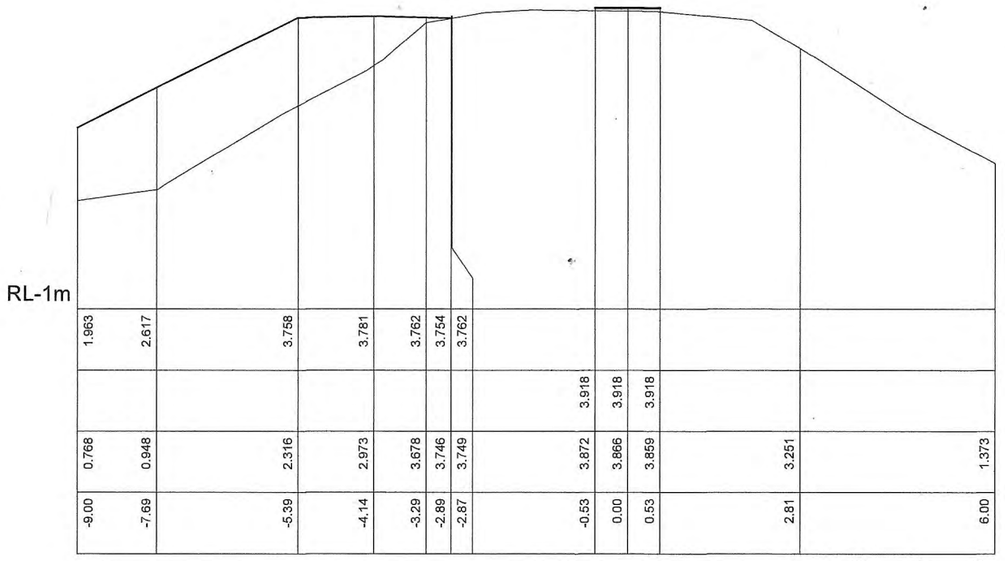


RL-1m												
DESIGN	1.532	2.483	3.310	3.336	3.513							
RAILWAY							3.930	3.930	3.930			
EXISTING	0.722	1.181	2.018	2.722	3.516	3.880	3.981	3.951	3.891	3.652	0.793	0.741
OFFSET	-9.00	-7.14	-5.53	-4.28	-3.00	-2.38	-0.53	0.00	0.53	2.08	5.81	6.00

Ch 9885.00 m



RL-1m											
	1.963	2.617	3.758	3.781	3.762	3.754	3.762				
							3.918	3.918	3.918		
	0.768	0.848	2.316	2.973	3.678	3.746	3.749	3.872	3.866	3.859	3.251	1.373
	-9.00	-7.69	-5.39	-4.14	-3.29	-2.89	-2.87	-0.53	0.00	0.53	2.81	6.00

Ch 9895.00 m

0 1 2 3 4 5m

SCALE 1:100 (A3), 1:50 (A1)

NOTES

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AMENDMENT	APPRVD	DATE
1 PRELIMINARY		9.7.24

	BY	CHECKED	DATE
DESIGN	BWP		7.24
DRAWN	BWP		7.24
SURVEYED	NRC LIDAR		2018
APPROVED			

CLIENT

Far North District Council
Te Kaunihera a Tai Tokerau ki te Raki

TITLE: KAWAKAWA TO OPUA CYCLE TRAIL
BRIDGE 12
TOPOGRAPHICAL PLAN

CROSS SECTIONS

STATUS	LOCAL AUTHORITY REF:			
TOPO				
SCALE	PLOT DATE	JOB	SHEET	REVISION
SHOWN	13-08-2024	2209-TOPO	15	1

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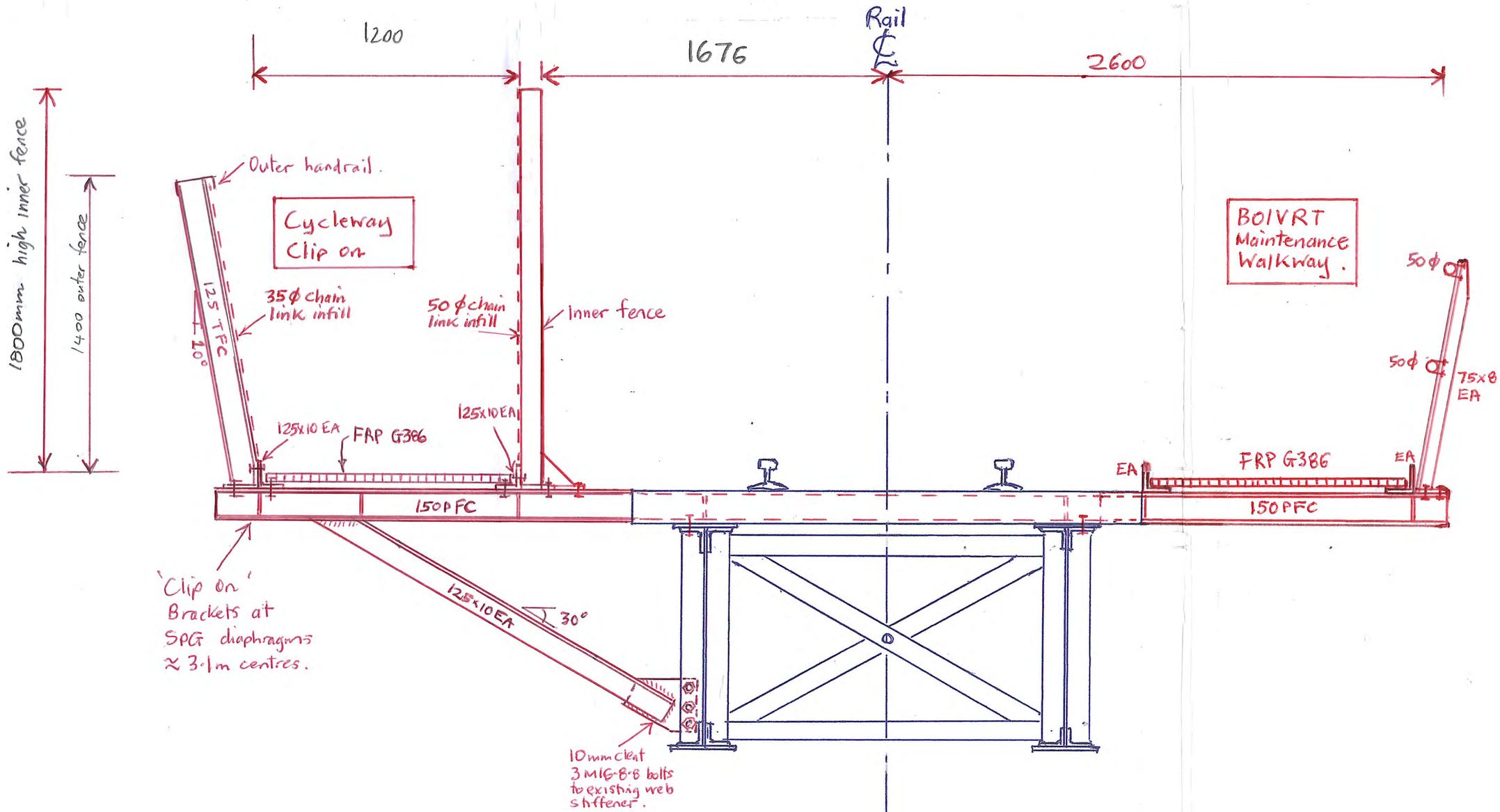
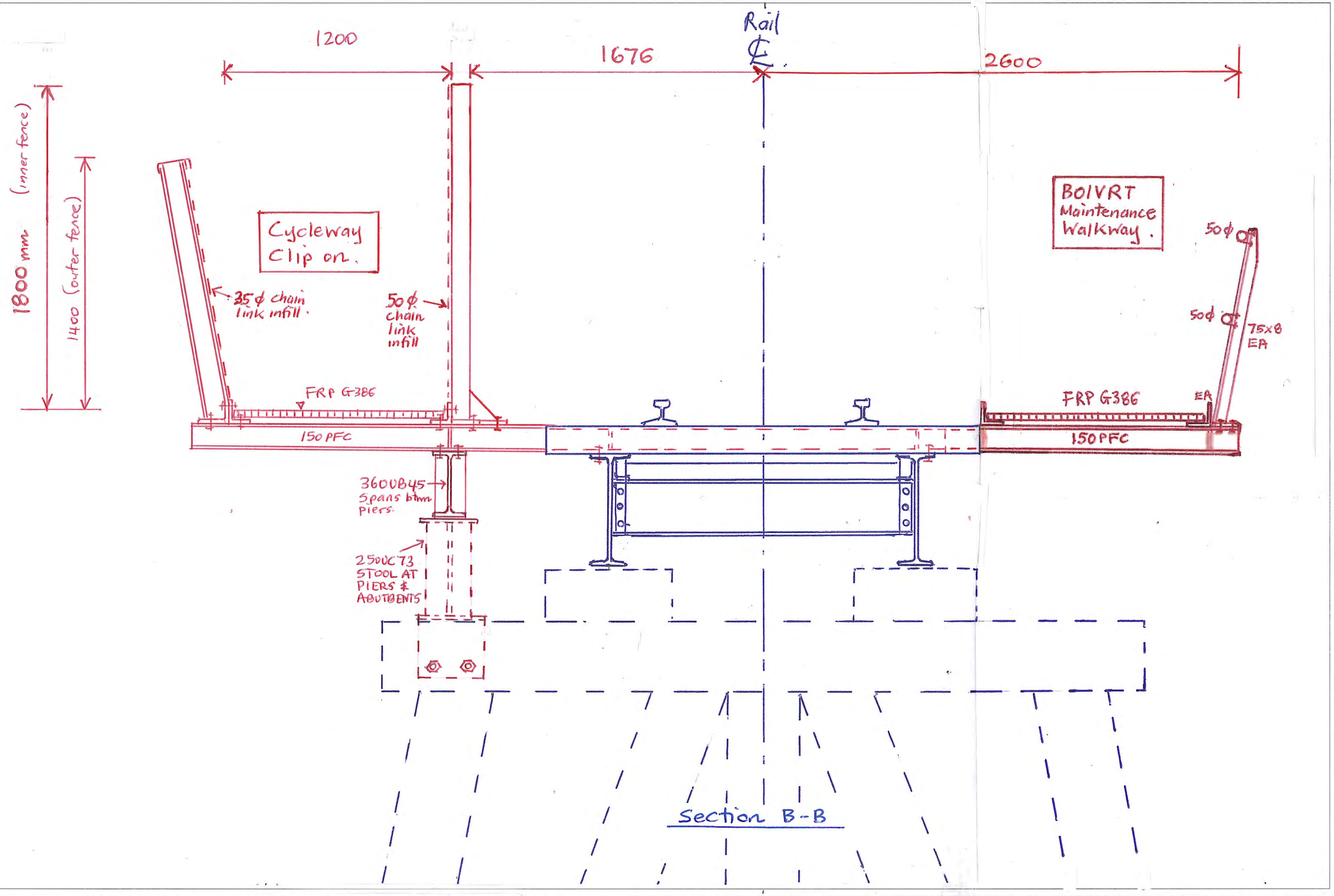


Section A - A

KAKARIKI Structural Engineering kakarikiengineering@gmail.com 09 434 4322 / 021 563 994 167 Te Toiroa Road, RD3, Whangarei 0173	Designed		Project 'Clip on' cycleway to existing SPG spans 1050mm deep.	Date	2024
	Drawn	RJG		Drawing Issue	
	Checked		Drawing Title Spans 2+3 : Clip on to deep railway spans.	Drawing No	01
	Approved			Revision	B



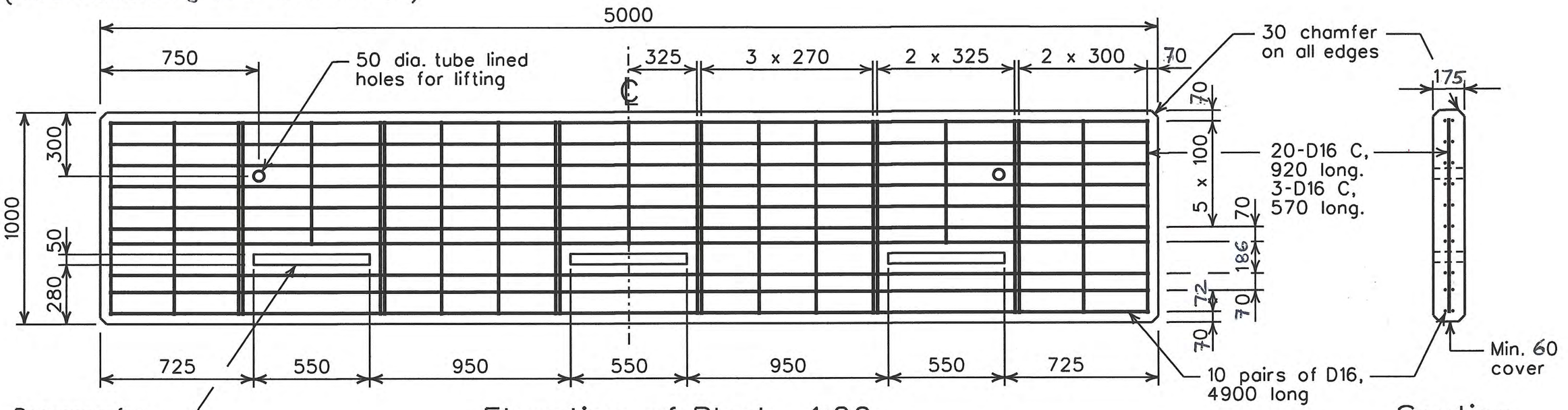
Section B-B

KAKARIKI Structural Engineering kakarikiengineering@gmail.com 09 434 4322 / 021 563 994 167 Te Toiroa Road, RD3, Whangarei 0173	Designed		Project 'Clip On' cycleway to existing SPG spans 610 to 650 deep.	Date	2024
	Drawn	RJG.		Drawing Issue	
	Checked		Drawing Title Spans 1+4: Clip on to shallow railway spans. and new steel beam	Drawing No	02
	Approved			Revision	B

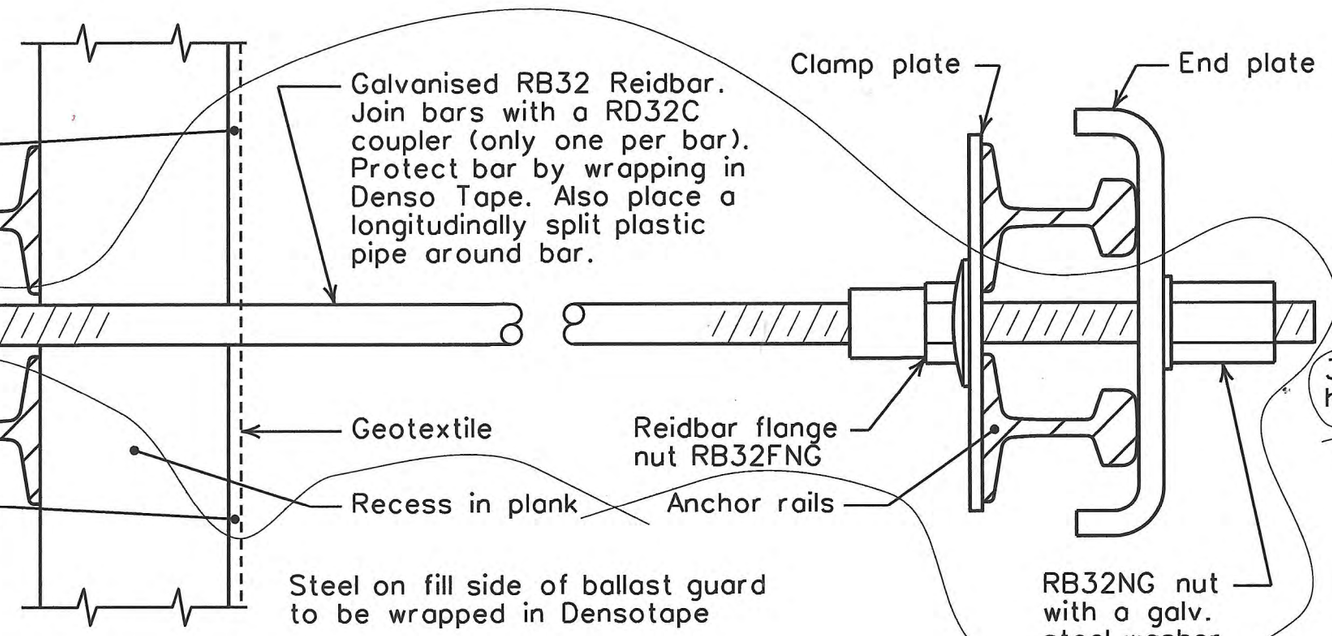
Concrete shall have a minimum compressive strength of 50MPa at 28 days.
(Cure continuously for at least 14 days)

Reinforcing steel shall be Grade 300 and shall comply with AS/NZS 4671:2001

Construction shall comply with NZS 3109:1997

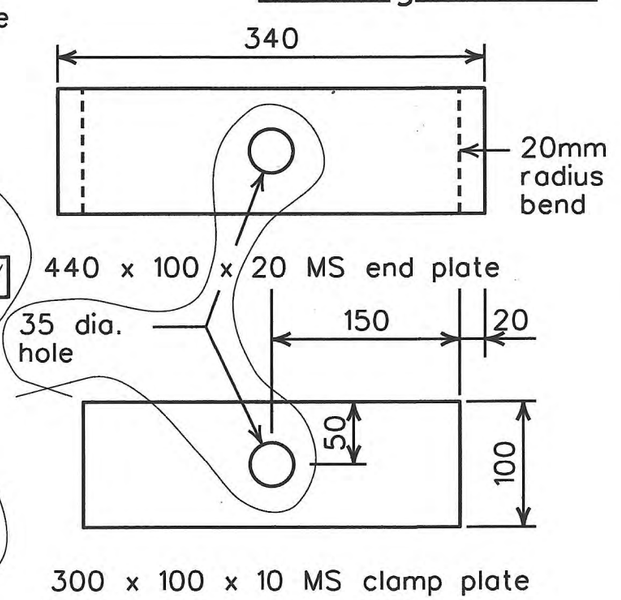


Elevation of Plank 1:20



Section through Plank

Plan of Tie Back 1:5



Plates 1:5

KiwiRail STRUCTURES ENGINEERING WELLINGTON	PRP	CPL	Jun'97	APPROVED S. Grave Amd. C: 24/8/10	SCALES 1:5 1:20	SHEET No. 1B AMD D
	DSN					SHEETS IN SET
	DRN	MCB	Jun'97			CE No. 100 320
	CHK	CPL	Jun'97	FILE		

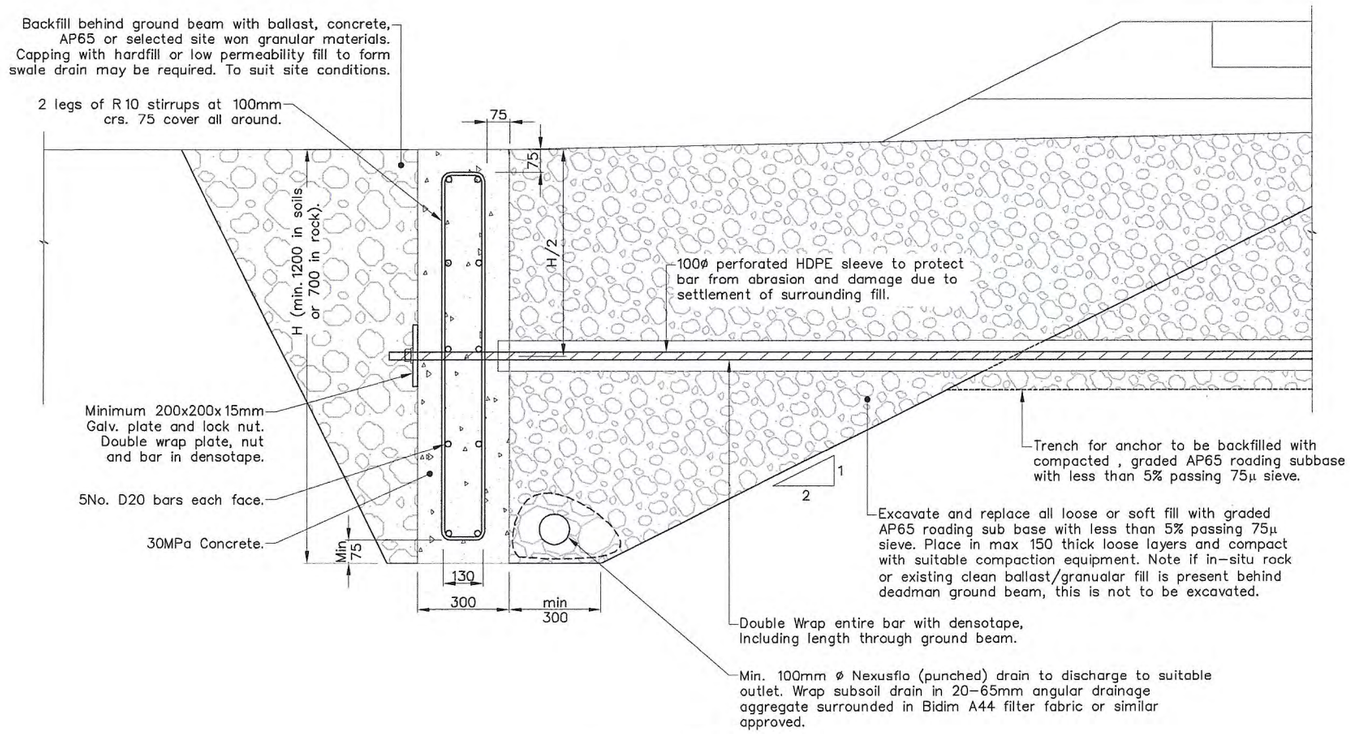
PRECAST CONCRETE – WING WALL

ORIGINAL SIZE mm 150 100 50 20 10 0

100 0 100 200 300 400 500 mm
1:5

200 0 400 800 1200 1600 2000 mm
1:20

A3



DETAIL A 01
SCALE 1:10 : A1
SCALE 1:20 : A3

A3 SCALE 1:20
A1 SCALE 1:10
0 0.1 0.2 0.3 0.4 0.6 0.8 1.0 (m)

A3 SCALE 1:10
A1 SCALE 1:5
0 100 200 300 400 500 (mm)

NOTES CONTINUED:
5. this is a standardised retaining wall design, that must be verified for use by Geotechnical professional (KiwiRail Engineer, or consultant Engineer) in accordance with guidance provided in T+T March 2016 report. Applicability of this standard drawing to be reviewed prior to 30 March 2021.

DRAWING STATUS: CONSTRUCTION ISSUE

REVISION	DESCRIPTION	BY	DATE
B	Construction Issue		
A	Client Review		

DESIGNED :	BHR	Mar. 16
DRAWN :	DSW	Mar. 16
DESIGN CHECKED :		
DRAFTING CHECKED :		

CADFILE : \\85391.001-001.dwg
APPROVED :
This drawing is not to be used for construction purposes unless signed as approved

NOTES :
1. All dimensions are in millimetres unless noted otherwise.
2. Strength of dense granular soil for pile foundations to be verified by subsurface testing, refer T+T's March 2016 report.
3. Any identified seepages to be reported to Structures Engineer prior to construction, refer T+T's March 2016 report.
4. A site specific design is required (i.e. this Standard Design must not be used) where the centre of the rail track is <3m from the retaining wall, or the retained height is >3m.

REFERENCE :

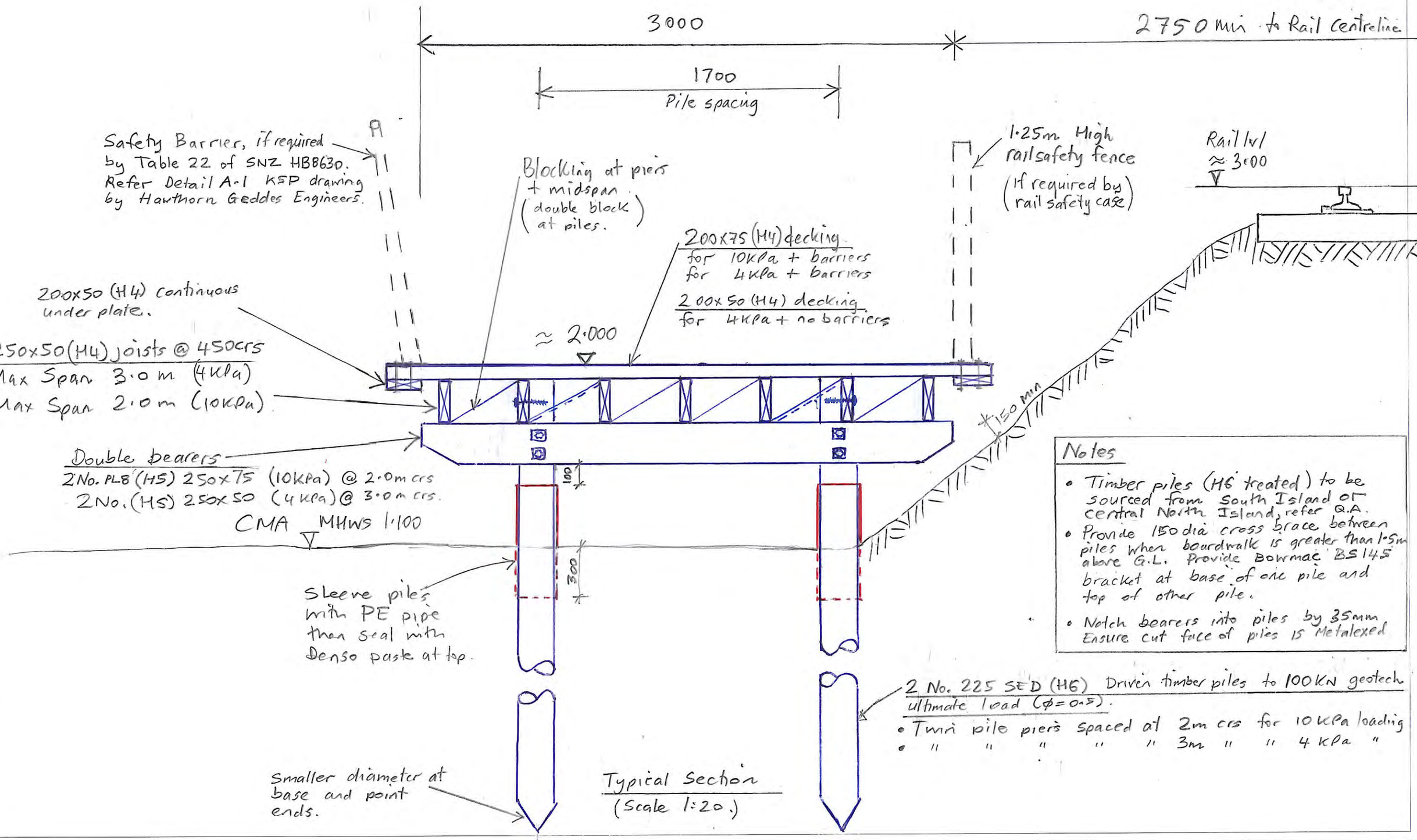
Tonkin+Taylor
Level 4, 2 Hunter St, Wellington
Tel. (04) 381 8560 Fax. (09) 307 0265
www.tonkintaylor.co.nz

CLIENT, PROJECT: KiwiRail

TITLE: STANDARD RAIL IRON RETAINING WALL
Typical Details

SCALES (AT A1 SIZE): AS SHOWN
DWG. No.: CE 120 451 (2 of 2)
REV.: B

Appendix D - Prelim design drawings – Boardwalk_Oct 2024



Typical Section
(Scale 1:20.)

Notes

- Timber piles (H6 treated) to be sourced from South Island or central North Island, refer Q.A.
- Provide 150 dia cross brace between piles when boardwalk is greater than 1.5m above G.L. Provide Bowmac BS145 bracket at base of one pile and top of other pile.
- Notch bearers into piles by 35mm. Ensure cut face of piles is Metalexed

KAKARIKI Structural Engineering kakarikiengineering@gmail.com 09 434 4322 / 021 563 994 167 Te Toiroa Road, RD3, Whangarei 0173	Designed	RG	Project: Kawakawa to Opua Cycle Trail
	Drawn	RG	
	Checked		Drawing Title: Boardwalk - Typical Section
	Approved		

Date	October 2024
Drawing Issue	
Drawing No	08
Revision	A.