THOMSON SURVEY LIMITED

SURVEYORS AND RESOURCE PLANNERS

Our Reference: 9724.1 (FNDC)

21 December 2020

Resource Consents Department
Far North District Council
JB Centre
KERIKERI

Dear Sir/Madam

RE: Northland Regional Council (applicant) - Proposed flood flow improvement works and stopbanks – Whiriwhiritoa Stream and at Waitotara Drive, Waipapa

I am pleased to submit application for Northland Regional Council, to carry out flood flow improvement works along the Whiriwhiritoa Stream at Waipapa, breaching Excavation/Filling rules in the District Plan. This application is lodged concurrently with an application lodged to the Northland Regional Council for the same works, and for the creation of stop banks on properties at Waitotara Drive. The applications to both the District and Regional Councils are discretionary activity applications. The works are located on 15 titles, as listed in application documents.

The application fee of $1,891 is to be invoiced to Northland Regional Council on receipt of Purchase Order information – to be provided by applicant.

Regards

Lynley Newport
Senior Planner
THOMSON SURVEY LTD

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P.O. Box 372, Kerikeri 0245, New Zealand.
Email: Kerikeri@tsurvey.co.nz
denis@tsurvey.co.nz, sam@tsurvey.co.nz

Telephone: **09 4077360**
Facsimile: **09 4077322**
After Hours: Director: Denis Thomson 09 4071372
After Hours: Office Manager: Sam Lee 021 1370060

Far North District Council

Private Bag 752, Memorial Ave
Kaikohe 0440, New Zealand
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Phone: (09) 401 5200
Fax: (09) 401 2137
Email: ask.us@fndc.govt.nz
Website: www.fndc.govt.nz

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 Form 9)

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 O Fast Track Land Use* O Subdivision O Discharge

O Extension of time (s.125) O Change of conditions (s.127) O Change of Consent Notice (s.221(3))

☑ Consent under National Environmental Standard (e.g. Assessing and Managing Contaminants in Soil)

O Other (please specify) _____

***The fast track for simple land use consents is restricted to consents with a controlled activity status and requires you provide an electronic address for service.**

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

Yes / ~~No~~

4. Applicant Details:

Name/s: ***Northland Regional Council***
Joe Camuso, Rivers and Natural Hazards Department

Electronic Address for Service (E-mail): ***josephc@nrc.govt.nz***

Phone Numbers: Work: ***09 470 1200*** Home: 0274384639

Postal Address: (*or* alternative method of service under section 352 of the Act)
Northland Regional Council
Private Bag 9021 Whangarei Mail Centre
Whangarei Post Code: ***0148***

5. Address for Correspondence: *Name and address for service and correspondence (if using an Agent write their details here).*

Name/s: ***Lynley Newport; Thomson Survey Ltd***

Electronic Address for Service (E-mail): ***lynley@tsurvey.co.nz***

Phone Numbers: ***Work: 4077360*** Home: _____

Postal Address: (*or* alternative method of service under section 352 of the Act)
P O Box 372
KERIKERI Post Code: ***0245***

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

6. 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: ***As contained in the attached planning report, Part 1.***

Property Address/:
Location

7. Application Site Details:

Location and/or Property Street Address of the proposed activity:

Site Address/
Location: *15 Titles involved in the application as listed in the planning report, Part 1, Repeated below.*

Record of Title	Legal Description
NA40D/1005	Lot 2 DP 84469
296354	Lot 2 DP 373362
708319	Lot 1 DP 490482
708320	Lot 2 DP 490482
574944	Section 3 SO 438821
557914	Section 4 SO 438821
154049	Lot 14 DP 337517
137900	Lot 17 DP 333643
137899	Lot 16 DP 333643
137897	Lot 14 DP 333643
137895	Lot 12 DP 333643
137894	Lot 11 DP 333643
177998	Lot 26 DP 333643
NA104D/476	Lot 3 DP 171508
NA104D/475	Lot 2 DP 171508

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.

Schedule of site visit shall be arranged with the applicant please.

8. Description of the Proposal:

Please enter a brief description of the proposal here. Attach a detailed description of the proposed activity and drawings (to a recognized scale, e.g. 1:100) to illustrate your proposal. Please refer to Chapter 4 of the District Plan, and Guidance Notes, for further details of information requirements.

Whiriwhiritoa Stream flood flow improvements and Waitotara Drive Stopbanks, requiring consent for breaches of Excavation/Filling rules relating to land zoned Industrial (Whiriwhiritoa Stream works). Consent also required under the National Environmental Standard for Assessing and Managing Contaminants in Soil – controlled activity status.

If this is an application for an Extension of Time (s.125); Change of Consent Conditions (s.127) or 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) or extension being sought, with reasons for requesting them.

9. Would you like to request Public Notification? ~~Yes~~/No

10. Other Consent required/being applied for under different legislation (more than one circle can be ticked):

O Building Consent (BC ref # if known)

☑ Regional Council Consent (ref # if known)
APP.042368.01.01 – (pre application file number)

O National Environmental Standard consent

O Other (please specify)

11. 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 (further information in regard to this NES is available on the Council's planning web pages):

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) – ***only on limited number of subject titles (3)*** ☑ yes O no O don't know

Is the proposed activity an activity covered by the NES? (If the activity is any of the activities listed below, then you need to tick the 'yes' circle). ☑ yes O no O don't know

O Subdividing land

O Changing the use of a piece of land

☑ Disturbing, removing or sampling soil

O Removing or replacing a fuel storage system

12. 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.

See attached.

13. 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 all names in full) ***Environmental Services, Northland Regional Council (c/- Joe Camuso)***
Payment via invoice, Purchase Order number to be provided

Email: _____

Postal Address: ***Private Bag 9021***
Whangarei Mail Centre
Whangarei 0148

Phone Numbers: Work: ***0800 504 639*** Home: _____ Fax: _____

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: ***Joe Camuso*** (please print)

Signature: _____ (signature of bill payer – **mandatory**) Date: 20 Dec 2020

14. 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.

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

Name: Lynley Newport (please print)

Signature: _____ (signature) Date: 21-12-2020

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

Checklist (please tick if information is provided)

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

Digital Applications may be submitted via E- mail to: Planning.Support@fndc.govt.nz

Only one copy of an application is required, but please note for copying and scanning purposes, documentation should be:

UNBOUND **SINGLE SIDED** **NO LARGER THAN A3 in SIZE**

PLANNING REPORT TO SUPPORT:

RESOURCE CONSENT APPLICATIONS TO:

NORTHLAND REGIONAL COUNCIL for breaches of rules in the Operative Regional Water & Soil Plan & Proposed Regional Plan (Appeals Version) – ***Refer Part 2***

FAR NORTH DISTRICT COUNCIL for breaches of rules in the Operative Far North District Plan and for breaches under the National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health – ***Refer Part 3***

APPLICANT: **Northland Regional Council**

PROPOSAL: **Whiriwhiritoa Stream Flood Flow Improvements & Waitotara Drive Stopbanks**

LOCATION: **Whiriwhiritoa Stream, between Maritime Lane Bridge and State Highway 10 (streamflow works) & Waitotara Drive / Waipapa Road (stopbanks)**

Prepared by
Thomson Survey Ltd
Kerikeri

For
Haigh Workman Civil & Structural Engineers

PART 1 – Generic to both applications (to NRC & FNDC)

1.0 INTRODUCTION

The application is broken into three parts – Part 1 is generic to both applications, and contains site and locality details and description of activities proposed. Part 2 addresses consent requirements under Regional Plans. Part 3 addresses consent requirements under the Far North District Plan, and under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS) which is administered by the FNDC, hence its inclusion in Part 3.

2.0 BACKGROUND & DESCRIPTION OF WORKS

A flood mitigation scheme is proposed for the Waipapa township. This comprises two areas of works, as described below.

The Northland Regional Council is seeking consents for works designed to improve flood flow conveyance of the Whiriwhiritoa Stream between Maritime Lane Bridge and State Highway 10; and also for stopbank works adjacent to the left bank of the Kerikeri River near Waitotara Drive and Waipapa Road. Construction drawings form part of the Stormwater Design Report attached to the application as *Appendix 1*.

It is proposed to improve channel capacity of the Whiriwhiritoa Stream by way of earthworks cut along a section of bank, and to construct a levee on one property. The Proposed Earthworks Plan (drawing no. P2, sheet 2 of 2 in the attached Haigh Workman Stormwater Report) shows total cut volume (across all subject properties) of 2765m^3; total fill of 140m^3; and total area of works as 4127m^2. This drawing / sheet also breaks the earthworks volumes and areas down by individual property.

The earth mound levee (to be on Section 3 SO 438821) is proposed to restrict floodwaters from spilling south over the true-right bank over currently vacant land and towards buildings near Klinac Lane.

Stopbanks are proposed to be constructed in different strategic sections of the left bank of the Kerikeri River so as to reduce overflow of that bank. These stopbanks are located on several properties on Waitotara Drive. It is also proposed to top up existing stopbanks on a property on Waipapa Road (Culinary Institute site).

The stopbank work has been designed previously and the NRC has previously obtained resource consent for the work, but that consent has been forfeited. The stopbanks are designed to significantly decrease the risk of the river overtopping the left bank and flooding over land and into the Waipapa catchment.

Areas of works, and design details are attached in the Haigh Workman report entitled "Whiriwhiritoa Stream & Kerikeri River Flood Reduction Stormwater Design Report for Northland Regional Council", dated July 2020 – refer *Appendix 1,* with construction drawings forming Appendix A of that report. An Erosion and Sediment Control Plan in support of the applications is attached as *Appendix 2*.

As part of investigatory and design work it was ascertained that HAIL activities have been undertaken on Lots 1 & 2 DP 490482 and Section 4 SO 438821, all properties involved in the Whiriwhiritoa Stream works. A Detailed Site Investigation was carried out, the report for which is attached as *Appendix 3*.

3.0 SITES & LOCALITY

Copies of Records of Title for land upon which works are to be carried out, are attached in *Appendix 4*, along with instruments registered on the titles and which are relevant to the proposed works. Titles affected are listed in the table below, along with type of works.

District Plan zoning differs across properties. This has been colour coded as below:

Rural Production	Industrial	Rural Living

Record of Title	**Legal Description**	**Owner**	**Proposed Works**
Whiriwhiritoa Stream			
NA40D/1005	Lot 2 DP 84469	Keripapa Ltd	Steam works
296354	Lot 2 DP 373362	B J Parrish	Stream works
708319	Lot 1 DP 490482	Elsdon Properties	Stream works
708320	Lot 2 DP 490482	Waipapa Storage Ltd	Stream works
574944	Section 3 SO 438821	WBC Developers Ltd	Stream works – including construction of a levee
557914	Section 4 SO 438821	Auld and Gibson	Stream works
154049	Lot 14 DP 337517	Northland Regional Council	Stream works
Stopbanks at Waitotara Drive and Waipapa Rd			
137900	Lot 17 DP 333643	Far North District Council	Stopbank
137899	Lot 16 DP 333643	D R Lambert	Stopbank
137897	Lot 14 DP 333643	D H & J M Harrison	Stopbank
137895	Lot 12 DP 333643	E Mehta & S S Mehta	Stopbank
137894	Lot 11 DP 333643	D J & T E Myburgh	Stopbank
177998	Lot 26 DP 333643	FNDC Reserve	Stopbank
NA104D/476	Lot 3 DP 171508	S Boonma and J J Laan	Stopbank (Waipapa Rd site)
NA104D/475	Lot 2 DP 171508	C D Schaasberg	Stopbank (Waipapa Rd site)

Refer to the Haigh Workman Reports in *Appendices 1 & 2* for further details in regard to site(s) descriptions.

Legal Interests on Titles of relevance:

Several of the above referenced properties have easements/ encumbrances/consent notices registered on them that are relevant to the application.

Record of Title	Legal Description	Instrument
Whiriwhiritoa Stream		
296254	Lot 2 DP 373362	Subject to easement including right to drain stormwater and sewage – not located near area of proposed work.
708319	Lot 1 DP 490482	Historic Building Line Restrictions in favour of BOI County Council – B021182.1 and B06365.5. These preclude buildings within certain distance of stream. The proposed works do not involve buildings and do not conflict with these instruments. Easement in Gross in favour of Top Energy which does not appear to be near the area of proposed works. Easements D543390.5, D623520.5 and 10332184.2, including right to drain – do not appear to be affected by proposed works. Consent Notices 9177711.5 and 10332184.4 both of which require that any 'development' within defined areas on the survey plans must have Council approval. The proposed works are within such areas, but are not regarded as 'development'. In any event, seeking resource consent from the Council is considered to constitute the necessary Council approval.
708320	Lot 2 DP 490482	Subject to the same instruments as above. Plus Consent Notice 6076987.2 and a subsequent partial cancellation. This Consent Notice is along similar lines to 9177711.5 and 10332184.2
574944	Section 3 SO 438821	WBC Developers Ltd Subject to CN 6076987.2 (listed above). Also subject to an encumbrance in favour of the FNDC in 11260659.12, requiring ongoing compliance with a discharge consent applying to the property. This same discharge consent incorporates EI 11260659.9, a right to discharge sewage within a specified area. The proposed works avoid this area. Land Covenant in EI 6167615.1 – requiring compliance with an NRC Stormwater Discharge consent – expiry date in 2039.
557914	Section 4 SO 438821	Historic Building Line Restrictions in favour of BOI County Council – B021182.1 and B06365.5. Referred t above. Easements D498632.4, D543390.5, D623520.5 and 6827132.1, including right to drain – none of which appear to be affected by proposed works. Consent Notice D623520.2 related to buildings only.

Stopbanks at Waitotara Drive and Waipapa Rd		
137894	Lot 11 DP 333643	Subject to an easement to enable the establishment and ongoing maintenance of a stopbank with area defined on SO 483459*
177998	Lot 26 DP 333643	FNDC Reserve

**The NRC had an SO Plan prepared to accommodate all stopbanks – SO 483459, attached in Appendix 5. This SO Plan has not deposited and only one property has had an Easement Instrument to provide for the stopbanks registered on it, as listed above.*

The FNDC Reserve will accommodate stopbanks work. I do not believe any separate or additional process is required in regard to this application given that the works do not include buildings, nor 'occupation' of reserve land.

4.0 CONSULTATION

Because Written Approvals are across both applications, the record of consultation is included in this Part 1. The applicant has consulted with all potentially affected land owners – i.e. owners of land within which works will take place, or which are adjacent to works taking place. The results of this consultation are attached in *Appendix 6* and summarised in the following Table:

Record of Title	Legal Description	Owner	Written Approval Received
Whiriwhiritoa Stream			
NA40D/1005	Lot 2 DP 84469	Keripapa Farms Ltd (Mike Booth)	☑
296254	Lot 2 DP 373362	B J Parrish	☑
708319	Lot 1 DP 490482	Elsdon Properties (Craig Partridge)	☑
708320	Lot 2 DP 490482	Waipapa Storage Ltd (Craig Partrideg)	☑
574944	Section 3 SO 438821	WBC Developers Ltd (Peter Hendl)	☑
557914	Section 4 SO 438821	Auld and Gibson	☑
154049	Lot 14 DP 337517	Northland Regional Council (Phil Heatley)	☑
Stopbanks at Waitotara Drive and Waipapa Rd			
137900	Lot 17 DP 333643	Far North District Council	
137899	Lot 16 DP 333643	D R Lambert	☑
137897	Lot 14 DP 333643	D H & J M Harrison	☑
137897	Lot 12 DP 333643	E Mehta & S S Mehta	☑
137894	Lot 11 DP 333643	D J & T E Myburgh	☑
177998	Lot 26 DP 333643	FNDC Reserve	
NA104D/476	Lot 3 DP 171508	S Boonma and J J Laan	☑
NA104D/475	Lot 2 DP 171508	C D Schaasberg	☑

The applicant, NRC, has initiated consultation with Ngati Rehia. A copy of email correspondence send to Ngati Rehia is included within *Appendix* 6. The applicant (and agent) have also discussed the proposal briefly with the FNDC's District Facilities' Asset Manager (Jeanette England) in regard to the FNDC Reserve and Lot 17 DP 333643 properties at Waitotara Drive and the fact that they are proposed to accommodate stopbanks work. They have confirmed that they will wait until the application(s) is/are lodged before discussing the proposal more fully with consenting staff and applicant.

PART 2 – Application to NRC for breaches of rules in the Operative Regional Water & Soil Plan, and Proposed Regional Plan (Appeals Version)

5.0 ACTIVITY STATUS – CONSENT REQUIREMENTS

5.1 Operative Regional Water & Soil Plan

The volume of earthworks at the two areas of work is within the permitted 5,000m^3 within a 12 month period and is therefore a permitted activity under Rule 33.1 of the Operative Regional Water and Soil Plan. Some of the works will be undertaken within a Riparian Management one (RMZ) and as such, a **discretionary** activity consent is required according to Rule 34.3.1 of the Operative Regional Water and Soil Plan.

The construction of new stopbanks (or levees) for river control activities is a **discretionary** activity under Rule 27.3.1 of the Operative Regional Water and Soil Plan.

5.2 Proposed Regional Plan (Appeals Version)

The proposed works are within a Flood Hazard area as identified on the NRC's on-line hazard maps. Relevant rules include:

C.2.1.2 Excavation of material from rivers – permitted activity
The excavation of sand, gravel or rock from a river for private use is a permitted activity, provided: .....

Not considered to be applicable as the proposal is not excavating sand, gravel or rock for private use.

C.2.1.3 Maintenance of the free flow of water in rivers and mitigating bank erosion – permitted activity

Any works in the bed of the stream is not for the 'maintenance of the free flow of water', but rather the improved flow of water to mitigate flood hazard. I do not believe this rule is applicable. The works is not for the mitigation of bank erosion.

C.2.1.5 Maintenance or repair of authorised flood defence – permitted activity

The definition of Flood Defence includes stopbanks. Only the Waipapa Road site has existing flood defence, which is/are being topped up. Other stopbanks are new, so are not permitted by this rule.

The following rule therefore applies to any works within the bed of the stream:

C.2.1.11 Activities in the beds of lakes and rivers – discretionary activity
The following activities that are not the subject of any other rule in this Plan are discretionary activities:
1) use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed of a lake or river, or
2) disturb the bed of a lake or river, or
3) introduce or plant any plant or any part of any plant (whether exotic or indigenous) in, on, or under the bed of a lake or river, or
4) deposit any substance in, on, or under the bed of a lake or river, or 5) reclaim or drain the bed of a lake or river

Except that in this case, the proposed works are also covered by other rules – see below.

C.2.1.12 New flood defence – discretionary activity
The: 1) use, erection or placement of a new flood defence structure in, on, under, or over the bed of a lake or river, or 2) deposition of a flood defence in, on, or under the bed of a lake or river, or 3) alteration or extension of an existing flood defence, and 4) any associated disturbance of the bed, reclamation or drainage of the bed or damming or diversion of water, are discretionary activities...

Flood defence definition includes stopbanks but none are within the bed of a stream or river, so not clear that this rule actually applies. Conservative assumption that it does.

C.8.3.1 Earthworks – permitted activity
Earthworks outside the bed of a river, lake, wetland and the coastal marine area, and any associated damming and diversion of stormwater and discharge of stormwater onto or into land where it may enter water, are permitted activities provided:
1) the area and volume of earthworks at a particular location or associated with a project complies with the thresholds in Table 13:

The threshold applying to flood hazard areas is 100 cubic metres of moved or placed earth in any 12- month period.

The proposed works breach this and consent is required.

C.8.3.2 Earthworks – controlled activity
Earthworks outside the bed of a river or lake, wetland and the coastal marine area that exceed 5000 square metres of exposed earth at any time at a particular location or associated with a project area, and any associated damming and diversion of stormwater and discharge of stormwater onto or into land where it may enter water, are controlled activities, provided the earthworks are not located: .....
or 4) in a flood hazard or high-risk flood hazard area, or .....

Because the proposed works is in a flood hazard, this rule is also breached and consent is required.

C.8.3.3 Earthworks in a flood hazard area – controlled activity
Earthworks in a flood hazard area that involve more than 50 cubic metres, but not more than 1000 cubic metres, of earth being moved or placed in any 12-month period, and any associated damming and diversion of stormwater and discharge of stormwater onto or into land where it may enter water, are controlled activities.

The area of cut for the stream conveyance works is estimated at 4120m^2. The total cut volume of earthworks associated with the stream conveyance is estimated at 2650m^3, and fill of 140m^3 (the levee). The estimated earthworks fill volume associated with the stopbanks also exceeds 1000m^3.

As such the proposed activities are a **discretionary activity** under C.8.3.4, which states:

C.8.3.4 Earthworks – discretionary activity
Earthworks outside the bed of a river or lake, a wetland, or the coastal marine area, and any associated damming and diversion of stormwater and discharge of stormwater onto or into land where it may enter water, that are not a permitted or controlled activity under another rule in section C.8.3 of this Plan.

Existing authorised stopbanks are a permitted activity under the Appeals Version of the Regional Plan, as is the repair and maintenance of a stopbank. New stopbanks, however, are a **discretionary activity** pursuant to Rule C.4.1.7:

C.4.1.7 Other land drainage and flood control activities – discretionary activity
Land drainage or flood control work (including new land drainage or flood control schemes and new structures within schemes), including:
1) the use, erection, reconstruction, placement, alteration and extension of a structure for land drainage or flood control work in, on, under, or over the bed of a lake or river, and
2) any associated disturbance of the bed, and
3) any associated deposition of a substance in, on or under the bed, and
4) any associated taking, damming or diversion of water, that are not a permitted activity, controlled activity or a discretionary activity in Section C.4.1 of this Plan are discretionary activities.

It is assumed that levees are regarded as land drainage and flood control works just as stopbanks are, and that the works will also be subject to *Rule C.4.1.9 Land Drainage and Flood Control General Conditions*.

In summary, the proposed works require consent under the Regional Plans as a **discretionary activity**.

6.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS

Positive effects

The positive effects of the completed works will be the mitigation of flood risk for a substantial area in and around Waipapa. Stream flow along Whiriwhiritoa Stream will be improved to reduce flood depths in the areas immediately adjacent to the proposed culvert. The works are proposed to reduce the encroachment of flood waters on lots adjacent to Whiriwhiritoa Stream. The proposed stopbanks at Waitotara Drive will decrease the risk of the river overtopping its left bank.

Effects on any Buildings
And/or infrastructure

The works are not considered to have any adverse effect on buildings or infrastructure. The Written Approvals of affected property owners have been obtained and are attached in *Appendix 6*. Some of these properties support existing buildings and/or infrastructure, others are vacant.

The works have been designed to avoid an existing on site wastewater system located within Section 3 SO 438821. The works avoid any Top Energy infrastructure and are not located within Road Reserve.

Effects on water quality and sediment control

The works will be subject to an Erosion and Sediment Control Plan – refer *Appendix 2,* specifically "Erosion and Sediment Control, Project 8667, Drawing EP2, EP3, EP4 and EP5, Sheets 2, 3, 4 and 5. In terms of effects, as the disturbed areas are very small, the actual sediment picked up by water (rain) falling on the site(s) will be minimal for both the Whiriwhiritoa Stream works and stopbanks.

In regard to the stream works, it should be noted that some deposition of sediment – the opposite of erosion – is expected after completion of the works. Accretion usually occurs on the inside of bends where water velocities drop.

In regard to the stopbanks, rain water is to soak away from disturbed areas. There is to be no sediment discharge from the stopbanks.

Effects on Heritage, Archaeological and Cultural Values

There are no known Sites of Significance to Maori affected (Far North District Plan Schedules), nor any recorded archaeological sites (NZAA database). At time of writing this report consultation with Ngati Rehia had not identified any concerns.

Summary of Effects

Overall the effects of earthworks are considered no more than minor. The flood risk is to be less than in the existing condition and provide considerable improvement to adjoining properties. The effects on ecology are considered to be no more than minor.

7.0 STATUTORY ASSESSMENT

7.1 Relevant Regional Plan Objectives and Policies

The activity is a discretionary activity under Regional Planning instruments. Whilst not yet Operative, the Proposed Regional Plan Appeals Version has legal effect and the objectives and policies in this planning document are addressed below as being of most relevance.

Policy D.1.1 When an analysis of effects on tangāta whenua and their taonga is required
A resource consent application must include in its assessment of environmental effects an analysis of the effects of an activity on tangāta whenua and their taonga if one or more of the following is likely:
1) adverse effects on mahinga kai or access to mahinga kai, or
2) any damage, destruction or loss of access to wāhi tapu, sites of customary value and other ancestral sites and taonga with which Māori have a special relationship, or
3) adverse effects on indigenous biodiversity in the beds of waterbodies or the coastal marine area where it impacts on the ability of tangāta whenua to carry out cultural and traditional activities, or
4) the use of genetic engineering and the release of genetically modified organisms to the environment, or
5) adverse effects on tāiapure, mataitai or Māori non-commercial fisheries, or
6) adverse effects on protected customary rights, or
7) adverse effects on sites and areas of significance to tangāta whenua mapped in the Regional Plan (refer I Maps |Ngā mahere matawhenua).

I am not aware of the Whiriwhiritoa Stream being a source of mahinga kai. None of the stop bank works at Waitotara Drive is within the water body. I have not identified any listed or scheduled wahi tapu, sites of customary value or ancestral site within the area subject to teh application. I do not believe the works will cause any adverse effects on indigenous biodiversity in the ned of any water body. The proposal does not involve genetic engineering or the release of genetically modified organisms. The proposed works to adversely affect fisheries and is not within an area subject to protected customary rights. The sites of works are not within a site or area of significance as mapped in the Regional Plan.

Consultation has been initiated with Ngati Rehia.

Policy D.2.2 Social, cultural and economic benefits of activities
Regard must be had to the social, cultural and economic benefits of a proposed activity, recognising significant benefits to local communities,...

The works will have positive effects insofar as the flood risk will be less than in the existing condition and provide considerable improvement to adjoining properties.

Land and Water
Policy D.4.26 Land preparation, earthworks and vegetation clearance
When assessing an application for a resource consent for an earthworks, vegetation clearance or land preparation activity and any associated discharge of a contaminant, ensure that the activity:
1) will be done in accordance with established good management practices, and
2) avoids significant adverse effects, and avoids, remedies or mitigates other adverse effects on:
a) drinking water supplies, and
b) areas of high recreational use, and
c) aquatic ecosystem health, indigenous biodiversity in water bodies and coastal water and receiving environments that are sensitive to sediment or phosphorus accumulation.

The works will be carried out in accordance with established good management practices and will have no more than minor effects.

Natural Hazards
Policy D.6.4 Flood hazard management – flood defences
Recognise the significant benefits that flood defences can play in reducing flood hazard risk to people, property and the environment.

The works will result in significant benefits and reduce flood hazard risk to people, property and the environment.

Objective F.1.9 Natural hazard risk
The risks and impacts of natural hazard events (including the influence of climate change) on people, communities, property, natural systems, infrastructure and the regional economy are minimised by:
1) increasing the understanding of natural hazards, including the potential influence of climate change on natural hazard events and the potential impacts on coastal biodiversity values, and
2) becoming better prepared for the consequences of natural hazard events, and
3) avoiding inappropriate new development in 100-year flood hazard areas and coastal hazard areas, and
4) not compromising the effectiveness of existing natural and man-made defences against natural hazards, and
5) enabling appropriate hazard mitigation measures to be implemented to protect existing vulnerable development, and
6) promoting long-term strategies that reduce the risk of natural hazards impacting on people, communities and natural systems, and
7) recognising that in justified circumstances, critical infrastructure may have to be located in natural hazard-prone areas, and
8) anticipating and providing for, where practicable, landward migration of coastal biodiversity values affected by sea-level rise and natural hazard events.

The works proposed in this application are consistent with the above objective. They are appropriate hazard mitigation measures and are part of a long term strategy to reduce the risk of natural hazards (flooding) impacting on people, communities and natural systems.

In summary I consider the works to be consistent with the relevant objectives and policies in the Proposed Regional Plan (Appeals Version).

7.2 Part 2 Matters

The activities are consistent with the purpose and principles of the Act. They will help sustain the potential of natural and physical resources whilst avoiding, remedying or mitigating any adverse effects (s5).

The area of works are not in the coastal environment but are along side or within the bed of streams/rivers (s6(a)). The works are not, however, regarded as a subdivision, use or development and instead is works designed to reduce the risk of flooding. There are no outstanding natural features or landscapes (s6(b)), nor any areas of significant indigenous vegetation or significant habitat of indigenous fauna (s6(c)). The works in question do not trigger any requirement to provide public access (s6(d)) and do not, in my opinion, adversely impact on the relationship of Maori and their culture and traditions, nor any protected customary rights (s6(e) & (g)). There are no recorded archaeological sites (s6(f)). The works are consistent with s6(h), the management of significant risks from natural hazards.

In summary the works are consistent with relevant matters under s6 Matters of National Importance.

Similarly I consider the works are consistent with relevant matters under s7, and do not offend the principles of the Treaty of Waitangi (s8).

7.3 Other National & Regional Planning Instruments

There are no National Policy Statements relevant to the proposal.

The NES-CS has been considered given that three of the titles subject to earthworks for the Whiriwhiritoa Stream works are identified as HAIL sites. However, administration of the NES-CS is a District Council responsibility, not Regional Council. Having discussed the matter with the author of the DSI, I am of the view that C.6.8 of the Proposed Regional Plan – which covers 'contaminated land' as defined under the Resource Management Act (not the NES-CS) – is not relevant as the results of the DSI did not identify anything that would constitute a "contaminant" as defined in the Proposed Regional Plan.

The Proposed Regional Plan defines "contaminants" as "*contaminants that may be present in contaminated land, at concentrations that pose a potential human health risk or environmental risk, that have been identified through site investigation*".

Part 3 of this application – related to District Council consenting requirements, contains more detailed information in regard to the NES-CS and DSI provided with the application.

Relevant objectives and policies in the Regional Policy Statement for Northland include Objectives 3.5 (Enabling Economic Wellbeing) and 3.6 (Economic Activities and Reverse Sensitivity and Sterilisation); along with the related Policy 5.1.3 addressing the need to protect the viability of land and activities important to the economy. The Regional Policy Statement also contains sections relating to natural hazards. I consider the proposed works to be consistent with these objectives and policies.

8.0 CONCLUSION

It is considered that the proposed activity does not create adverse effects on the wider environment that are more than minor. There are no special circumstances, nor any National Environmental Standard requiring public notification. I am therefore of the opinion that public notification is not required.

Whilst there will be temporary and short term minor effects whilst works are being carried out, the longer term effects are all positive, with flood hazard reduced on the properties within which the works are taking place.

On behalf of the applicant, I request that consent be granted to this application, subject to conditions.

PART 3 – Application to FNDC for breaches of rules in the Operative Far North District Plan, and under the National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS)

Refer to Part 1 for Introduction, Background and details of sites involved and the proposal.

9.0 ACTIVITY STATUS – CONSENT REQUIREMENTS

9.1 Far North District Plan

The proposed Whiriwhiritoa Stream works affect several properties, all but one of which are zoned Industrial in the Far North District Plan. The property furthest west is zoned Rural Production. Refer back to the Table in Part 1 of this report. The amount and type of works being carried out on the Rural Production zoned land is not believed to breach any District Plan rule (which provides for up to 5000m^3 of excavation and/or filling on a site and where the average height of a cut/fill face combined is no greater than 3m).

However, the Industrial Zone is subject to a more stringent permitted threshold of 200m^3 of excavation and/or filling per site in any 12 month period, along with a cut/fill face height limit of 1.5m.

A breach of Rule 12.3.6.1.3 (permitted threshold applying in the Industrial Zone) results in restricted discretionary activity status so long as the cut/fill face height remains 1.5m or less. The height of cut face on the stream bank exceeds 1.5m in some locations and as such the proposed activity is a **discretionary activity** pursuant to 12.3.6.3.

Most of the 'sites' upon which the stopbanks are to be located are zoned Rural Production (Waitotara Drive properties). Volume of earthworks meet the permitted activity standard (less than 5000m^3). Rule 12.3.6.1.1 provides for averaging the cut/fill face height along the entire length of the face. This enables compliance with Rule 12.3.6.1.1 to be achieved in regard to all stopbanks – refer to Section 5.2, Table 5 in the Stormwater Report attached as *Appendix 1*.

In addition it is proposed to top up two sections of stopbanks on land zoned Rural Living, where the volume threshold is lower, at 300m^3. The works within this zone are 'bank top up' works only and will not exceed 300m^3, nor will cut/fill face height exceed 1.5m.

The works do not involve any impermeable surfaces or buildings and as such there are no breaches of setback from waterbody. In some instances the stopbanks may cross property boundaries but as the works are not defined as 'buildings' this does not result in any breaches of boundary setback, sunlight, impermeable surface, or building coverage rules.

9.2 NES-CS

Under clause 8(3) of the NES-CS, Disturbing Soil:

8(3)(c) The volume of the disturbance of the soil of the piece of land must be no more than 25m3 per 500m2 (of the piece of land);

8(3)(d)(ii) Soil must not be taken away in the course of the activity, except that for all other purposes combined, a maximum of 5m3 per 500m2 of soil may be taken away per year.

The 'piece of land' is conservatively assessed as 4,120m^2, allowing for 206m^3 of soil disturbance and 41.2m^2 of soil removal. The proposal exceeds these thresholds and a DSI exists and is supplied to the Council. Consent under the NES-CS, clause 9(1) is required, as a **controlled** activity:

.....the activity is a controlled activity while the following requirements are met:

(a) A detailed site investigation of the piece of land must exist;
(b) The report on the detailed site investigation must state that the soil contamination does not exceed the applicable standard in regulation 7;
(c) The consent authority must have the report.

Haigh Workman undertook a DSI for the proposed flood mitigation works at Whiriwhiritoa Stream – Refer *Appendix 3*. For the purposes of this work, the 'piece of land' being investigated was regarded as 4,120m^2 in area. The three titles identified as being HAIL are:

Lots 1 and 2 DP 490482 (30 & 34 Maritime Lane, 24B Klinac Lane); and

Section 4 SO Plan 438821 (27 Maritime Lane).

An investigation carried out under NES-CS regulations (not under any Regional Plan requirements) identified asbestos in two surface samples at 30 & 34 Maritime Lane/ 24B Klinac Lane, recording <0.001 % w/w (weight for weight) of loose fibres. This is the default limit for detection. BRANZ SCS allows for 0.001% w/w for friable asbestos. The allowable human health limit has <u>not</u> been breached.

An Assessment in accordance with guidance in BRANZ was undertaken by a competent person (as defined in BRANZ) to determine risk from the proposed work. This Assessment was undertaken by Forensic Building Specialists (FBS); Class A Asbestos Specialists. FBS reported to Haigh Workman the following:

- There is no risk to human health from the proposed works;
- The site has been explored extensively and the soil does not contain significant asbestos fibres;
- The soil can be treated as normal without additional controls;
- To ensure protection to human health, should unexpected contamination (i.e. large debris) be encountered onsite during the proposed works, a Contingency Plan is to be in place for the duration of the works.

The DSI's Executive Summary on pg 2 outlines the Requirements of a Contingency Plan and this should form part of conditions of consent applying to the Whiriwhiritoa Stream works. There are no HAIL sites at the Waitotara Drive stopbanks sites.

Following in depth review of the results and overall site findings, the Haigh Workman DSI concludes that it is highly unlikely that there will be a risk to human health if the activity (proposed earthworks) is done to the piece of land and that proposed works can proceed with the incorporation of a Contingency Plan.

10.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS

In considering an application under its District Plan, the consent authority may disregard any effect on the environment if the plan permits an activity with that effect. The matters considered relevant to assessing effects on the environment, for the proposed activity, are outlined below:

Stormwater and sediment and erosion control

The works will be subject to an Erosion and Sediment Control Plan – refer *Appendix 2,* specifically "Erosion and Sediment Control, Project 8667, Drawing EP2, EP3, EP4 and EP5, Sheets 2, 3, 4 and 5. In terms of effects, as the disturbed areas are very small, the actual sediment picked up by water (rain) falling on the site(s) will be minimal for both the Whiriwhiritoa Stream works and stopbanks.

In regard to the stream works, it should be noted that some deposition of sediment – the opposite of erosion – is expected after completion of the works. Accretion usually occurs on the inside of bends where water velocities drop. In regard to the stopbanks, rain water is to soak away from disturbed areas. There is to be no sediment discharge from the stopbanks.

Indigenous Vegetation & Fauna

There may be minor clearance of indigenous vegetation related to Stopbank 4 at Waitotara Drive, with every effort made to retain indigenous plants wherever possible. There are no areas that are identified as significant indigenous vegetation, nor any significant habitat of indigenous fauna affected by any of the works.

Any Effects on heritage and cultural values

There are no known Sites of Significance to Maori affected (Far North District Plan Schedules), nor any recorded archaeological sites (NZAA database). Consultation with Ngati Rehia has been initiated – refer commentary in Part 1 and *Appendix 6*.

Visual Effects (including landscape values)

There are no areas identified as having any high or outstanding landscape values. The works is being carried in Industrial; Rural Living and Rural Production zones, none of which have any rules relating to visual amenity relevant to the type of works being proposed. Adverse visual

effects resulting from any bare earth will be temporary only, during the construction works phase.

Land use incompatibility Effects

The works involve earthworks only and are not regarded as causing any adverse land use incompatibility effects. The works are associated with flood protection and improve the flow of water, therefore better ensuring ongoing usage of the application site land.

Construction Works Effects (including traffic)

The works can be subject to a construction management plan, to be provided for Council approval prior to any works commencing.

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

Refer to the DSI attached in *Appendix 3*.

11.0 STATUTORY ASSESSMENT

11.1 Far North District Plan Objectives and Policies

The relevant objectives and policies are considered to be those in Chapters 7.8 (Industrial Zone), 8.6 Rural Production Zone; and those in Chapter 12.3 related to excavation/filling works, and Chapter 12.4 Natural Hazards.

The Rural Production Zone objectives and policies have limited relevance given the nature of the proposal. It is not a subdivision, nor a use or a development. It is works required to reduce (mitigate) flood risk. This promotes sustainable management of natural and physical resources (8.6.3.1) and enables efficient use and development of the land (8.6.3.2). The works is not detrimental to amenity values and is not on land that has any significant natural values (8.6.3.3 and 8.6.3.4).

Neither does the works adversely affect the productive use of the land (given that the zoning in question is currently applying to large lot residential development in any event) and creates no reverse sensitivity effects (Objectives 8.6.3.6 – 8.6.3.8; and Policies 8.6.4.7 - 8.6.4.9).

The work will be carried out under standard good practice for earthworks, minimising / mitigating adverse effects (8.6.4.3)

Industrial Zone Objectives and Policies are relevant only in regard to the Whiriwhiritoa Stream works. The works being done are not a 'new industrial activity' and as such Objective 7.8.3.1 is not relevant. The work will be carried out under good practice and standards such that adverse effects are minimised / mitigated (Policy 7.8.4.2 & 7.8.4.4 & 7.8.4.5). The works are not detrimental to amenity values in any adjacent zones (7.8.4.3).

Soils and Minerals Objectives and Policies (Chapter 12.3)

12.3.3.1 To achieve an integrated approach to the responsibilities of the Northland Regional Council and Far North District Council in respect to the management of adverse effects arising from soil excavation and filling, and minerals extraction.

By preparing documentation applicable to consent applications lodged under both Regional and District planning instruments, the above objective is being given effect to.

12.3.3.2 To maintain the life supporting capacity of the soils of the District.

12.3.3.3 To avoid, remedy or mitigate adverse effects associated with soil excavation or filling; and Policy 12.3.4.1 That the adverse effects of soil erosion are avoided, remedied or mitigated; and 12.3.4.4 That soil excavation and filling, and mineral extraction activities be designed, constructed and operated to avoid, remedy or mitigate adverse effects on people and the environment..

Works will be carried out subject to sediment and erosion control measures and consistent with standard earthworks practice. Adverse effects will be avoided, remedied or mitigated.

Natural Hazards Objectives and Policies (Chapter 12.4)

12.4.3.1 To reduce the threat of natural hazards to life, property and the environment, thereby to promote the well being of the community.
12.4.3.3 To ensure that natural hazard protection works do not have adverse effects on the environment.
12.4.3.6 To take into account reasonably foreseeable changes in the nature and location of natural hazards.

The proposed works reduces the threat of flooding (Objective 12.4.3.1). The works will not have adverse effects on the environment of more than a short term and minor effect.

12.4.4.1 That earthworks and the erection of structures not be undertaken in areas where there is a significant potential for natural hazards unless they can be carried out in such a way so as to avoid being adversely affected by the natural hazards, and can avoid exacerbating natural hazards.
12.4.4.3 That protection works for existing development be allowed only where they are the best practicable option compatible with sustainable management of the environment.
12.4.4.9 That the role of riparian margins in the mitigation of the effects of natural hazards is recognised and that the continuing ability of riparian margins to perform this role be assured.

The proposed works enhances the stream flow of an existing stream to reduce flooding. Earthworks are related solely to flood protection works and will not exacerbate natural hazards. The works are low impact and considered the best practicable option for flood protection works in this location.

11.2 Relevant Regional Objectives and Policies

The activity is a discretionary activity under Regional Planning instruments and relevant objectives and policies are addressed in Part 2 of this report.

11.3 Part 2 Matters

The activities are consistent with the purpose and principles of the Act.

11.4 Other National Policy Statement; Standards; Regional Policy Statement & Regional Plans

There are no National Policy Statements pertinent to the proposal. The Regional Policy Statement and Regional Plans are addressed in Part 2. The NES-CS is addressed earlier in Part 3 of this application.

12.0 CONCLUSION

It is considered that the proposed activity does not create adverse effects on the wider environment that are more than minor. There are no special circumstances nor any National Environmental Standard requiring public notification. I am therefore of the opinion that public notification is not required.

There will be positive effects as a result of the proposed works.

On behalf of the applicant, I request that consent be granted to this application, subject to conditions.

This report has been prepared by the under signed,

Signed Dated 21st December 2020

Lynley Newport, Senior Planner
Thomson Survey Ltd

13.0 LIST OF APPENDICES (GENERIC TO BOTH NRC & FNDC APPLICATIONS)

Appendix 1	Stormwater Design Report
Appendix 2	Erosion and Sediment Control Plan
Appendix 3	Detailed Site Investigation
Appendix 4	Records of Title & Relevant Instruments
Appendix 5	SO 483459
Appendix 6	Record of Consultation

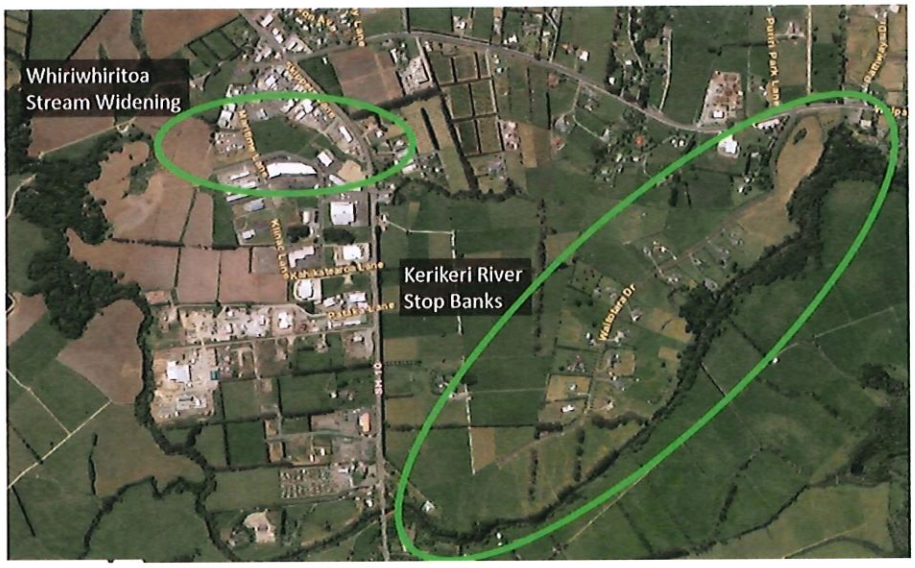
Appendix 1

Stormwater Design Report

Whiriwhiritoa Stream & Kerikeri River Flood Reduction Stormwater Design Report For Northland Regional Council

Prepared by Haigh Workman

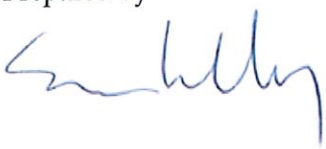
July 2020



Revision History

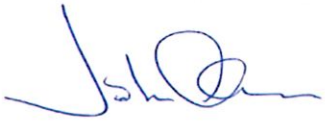
Revision N°	Prepared By	Description	Date
A	Sean Kelly	to Client/Planner	29 July 2020
B	John McLaren	For consent	25 November 2020

Prepared by



Sean Kelly

Reviewed By



John McLaren

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1 Executive Summary

Haigh Workman Ltd has been engaged by Northland Regional Council (NRC) to provide a design solution to improve channel capacity of the Whiriwhiritoa Stream between Maritime Lane Bridge and State Highway 10. The Stormwater Design Report is to provide an explanation of the problem, and assess the effects of the proposed design solution.

The existing Whiriwhiritoa Stream channel capacity is as low as 9.4 m^3/s before flooding into adjacent properties. The new channel capacity recommended is 43 m^3/s. The improved channel conveyance will reduce flooding into adjoining properties. Calculations of the existing major culvert in Whiriwhiritoa Stream at State Highway 10 indicates a flow restriction of 43 m^3/s. The design flow of Whiriwhiritoa Stream also matches the capacity of the culvert beneath State Highway 10.

Detailed drawings are appended as 'Appendix A - Construction Drawings'.

The conveyance beneath the proposed bridge over Whiriwhiritoa Stream off Maritime Lane has been designed to ensure 43 m^3/s flow capacity, (to be achieved with some channel widening, and modification of base-gradient of the stream).

The design within this report recommends improvement, where necessary (widening varies) of the subject section of Whiriwhiritoa Stream to convey a design flow rate of 43 m^3/s.

The following earthworks is required:

- Widening the Whiriwhiritoa Stream comprising 2,650 m^3 bulk excavation. This to be to predominantly be a cut of the true-right (south bank) of the stream.
- Construction of a small levee to defend Section 3 SO438821 (140 m^3 fill)
- It is proposed consent be granted for suitable surplus cut volume (2,510 m^3) to be used as fill for stopbank construction along Kerikeri River near Waitotara Drive.
- Contaminated soil is to be disposed of as per the Detailed Site Investigation Report (July 2020), and Remediation Action Plan (not yet published).

The exposed earth is to be grass seeded.

An Erosion and Sediment Control Plan is to be prepared for the works.

In addition, NRC requires preparation of resource consent application for the Kerikeri River stopbank works near Waitotara Drive.

The Stormwater Design Report goes on to assess the effects of a proposed construction of:

- Whiriwhiritoa Stream Widening
- Kerikeri River Stopbanks (design by others)

2 Introduction

2.1 Description of the Proposal

A flood mitigation scheme is proposed for the Waipapa township. This comprises of two areas of works, outlined in Figure 1 below, and as described in the following subsections.

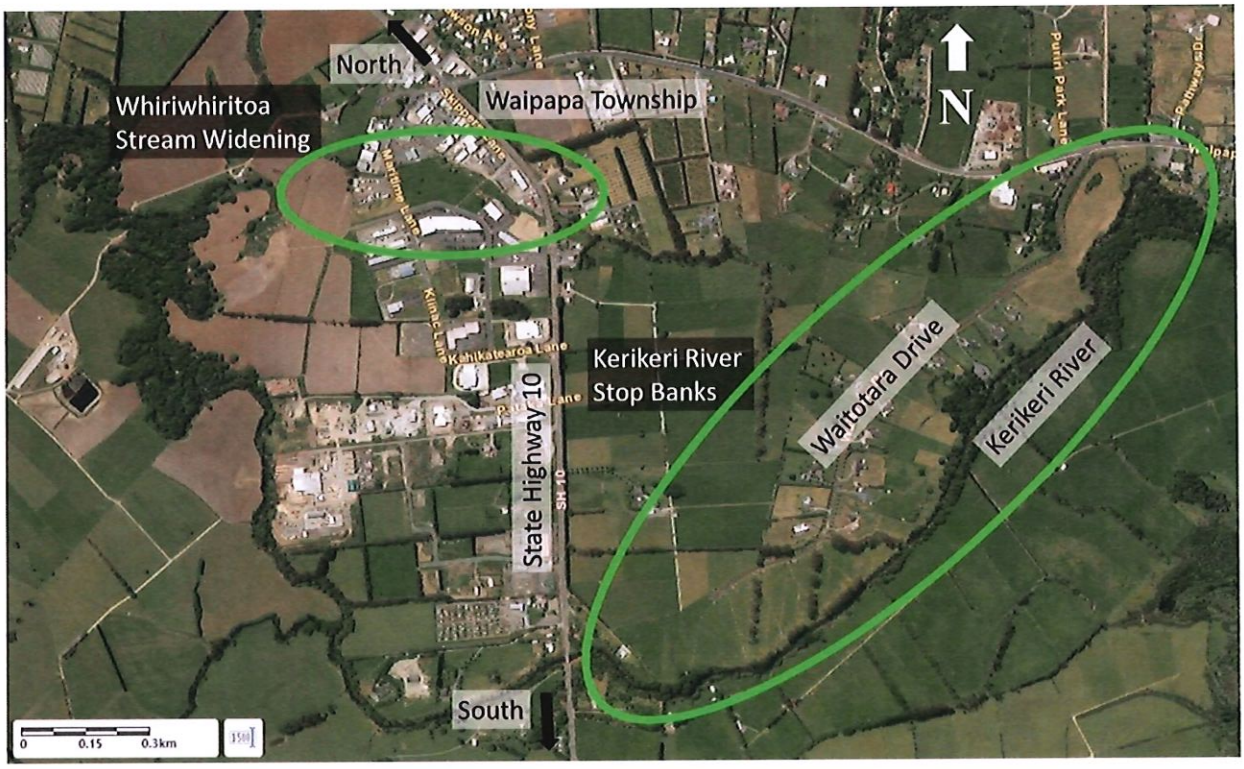


Figure 1 – Areas of Proposed Works

2.1.1 *General*

Northland Regional Council (NRC) requires detailed design for improving flood flow conveyance of the Whiriwhiritoa Stream between Maritime Lane Bridge and State Highway 10.

In addition, NRC requires preparation of resource consent* application for the implementation of the Whiriwhiritoa flood flow improvement works and stopbank works adjacent to the left bank of the Kerikeri River near Waitotara Drive.

* NRC has obtained a Resource Consent for the Waitotara Drive Stopbanks works, however this consent has been forfeited.

2.1.2 *Background Whiriwhiritoa Stream:*

It is proposed to improve channel capacity of the Whiriwhiritoa Stream between Maritime Lane Bridge and State Highway 10.

This reach has three significant crossing structures:

a) Private bridge with 2mh x 5ml x 4.5mw culvert. *

b) Skipper Lane foot path bridge with 2mh x 5ml x 1.5mw culvert

c) State Highway 10 with 3m x 3m culvert

* New Zealand Transport Agency (NZTA) is proposing to upgrade this bridge with a new bridge within the road reserve.

Calculations of the existing major culvert in Whiriwhiritoa Stream at State Highway 10 indicates a flow restriction of 43 m^3/s.

The existing channel capacity is as low as 9.4 m^3/s before flooding into adjacent properties. The new channel capacity recommended is 43 m^3/s. The improved channel conveyance is to reduce flooding into adjoining properties. The design flow of 43 m^3/s also matches the capacity of the culvert beneath State Highway 10.

The conveyance beneath the bridge over Whiriwhiritoa Stream at Maritime Lane is to be designed to ensure 43 m^3/s flow conveyance, (to be achieved with some channel widening, and modification of base-gradient of the stream).

The design within this report recommends improvement, where necessary (widening varies) of the subject section of Whiriwhiritoa Stream to convey a design flow rate of 43 m^3/s.

Detailed drawings are appended as 'Appendix A - Construction Drawings'.

The area of works for Whiriwhiritoa Stream Widening are shown in Figure 2 on the following page.

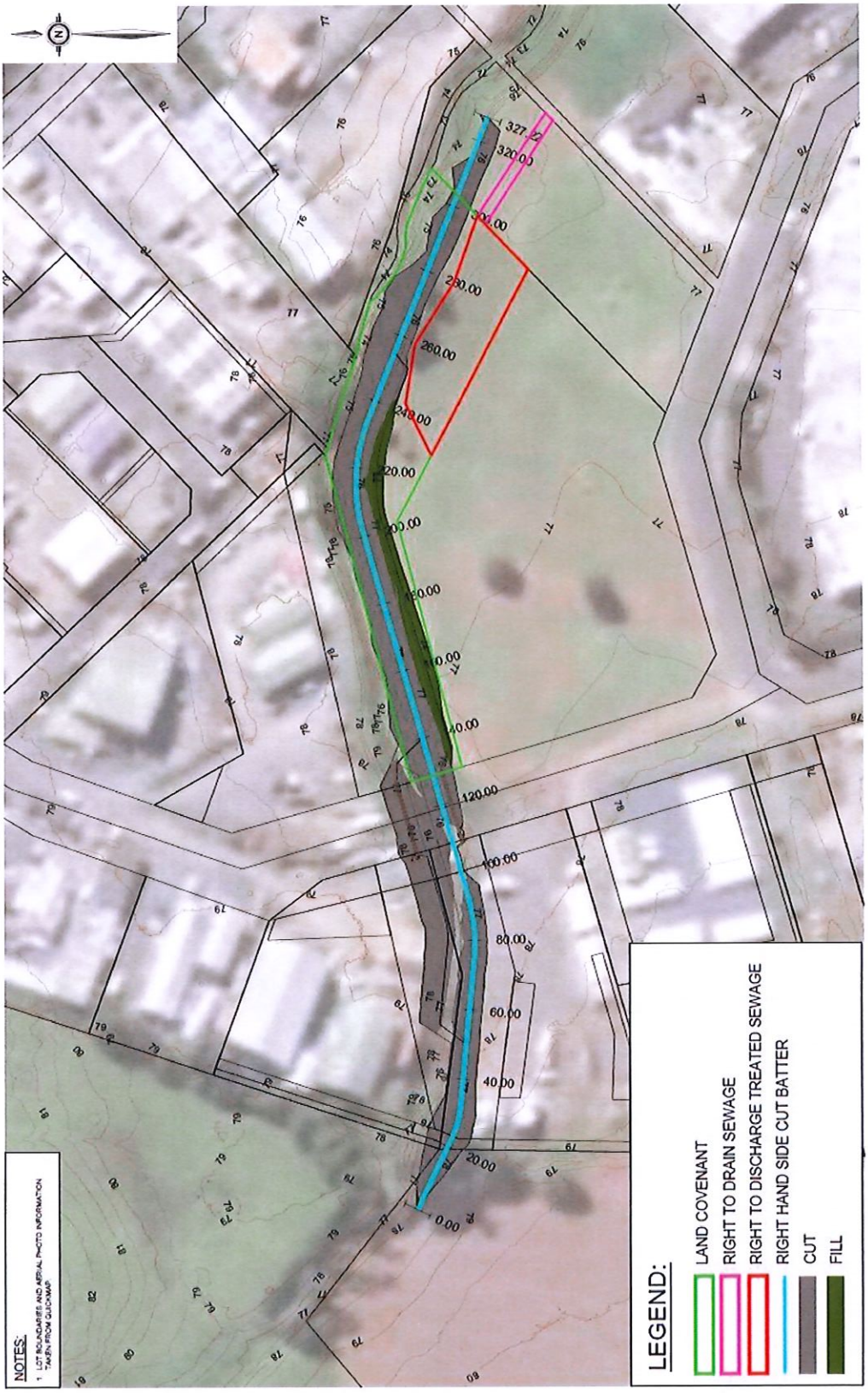


Figure 2 – Proposed Whiriwhiritoa Stream Widening

2.1.3 *Background Waitotara Drive Stopbanks:*

A significant storm event creates overland flow both from the right bank and left bank of Kerikeri River. The overland flow from right bank drains towards Rainbow Falls and the overland flow from left bank floods parts of the land near Waitotara Drive. Stopbanks are proposed to be constructed in different strategic sections of the left bank of the river so as to reduce overflow of the left bank of the river.

NRC has completed the detailed design (by others) of the stopbanks, see Appendix A. NRC has also obtained a Resource Consent for these works however this consent has been forfeited.

The area of works for the proposed Kerikeri River Stopbanks are shown in Figure 3 below.

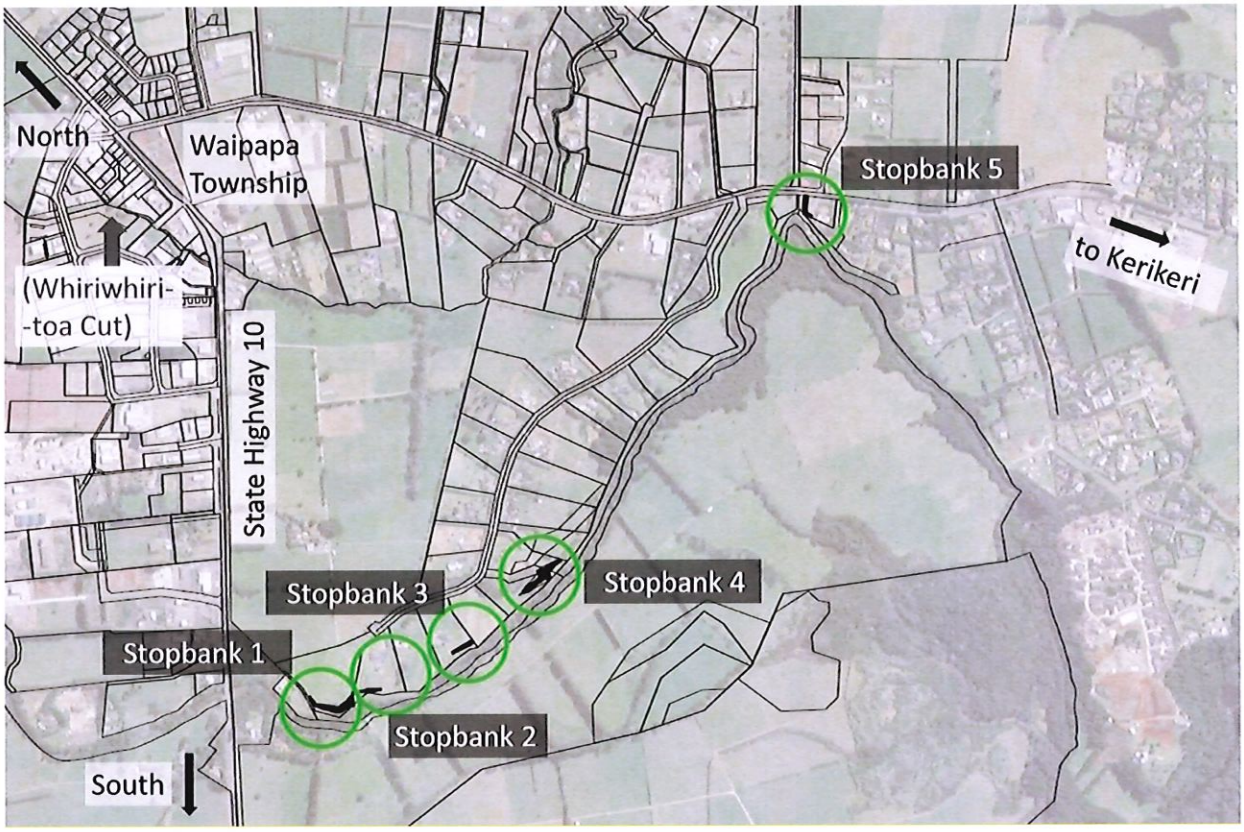


Figure 3 – Proposed Kerikeri River Stopbanks

2.2 Purpose of the Stormwater Design Report

The Stormwater Design Report provides:

- an assessment of the recommended capacity improvement in the Whiriwhiritoa Stream channel
- an outline of proposed Kerikeri River stopbanks near Waitotara Drive
- a summary of proposed earthworks
- an assessment of effects of the proposal
- a drawing set for the proposed works

2.3 Statutory Basis

It is expected that the provisions within this Stormwater Design Report will be required to be complied with as a condition of both the FNDC and NRC resource consents. Compliance with the conditions of consent is to be a term of the relevant contracts.

3 Existing Condition

3.1 Flow Restrictions

There are three existing structures within the section of Whiriwhiritoa Stream that is under assessment.

These are:

1. Existing Private Bridge (a Foot Bridge)
2. Existing Skippers Lane Bridge (a Foot Bridge)
3. State Highway 10 Road Bridge

Photographs of stream restrictions are shown below:

Figure 4 – Existing Private Bridge / Box Culvert

Figure 5 –Typical Stream Obstructions of Boulders, Banks and Occasional Vegetation

Figure 6 – Existing Skippers Lane Bridge (a Foot Bridge)

Figure 7 – State Highway 10 Road Bridge (Inlet)

Figure 8 – State Highway 10 Road Bridge (Outlet)

3.2 Flooding – Existing

The area is known to flood. Refer to NRC flood model mapping on Figure 9 below.

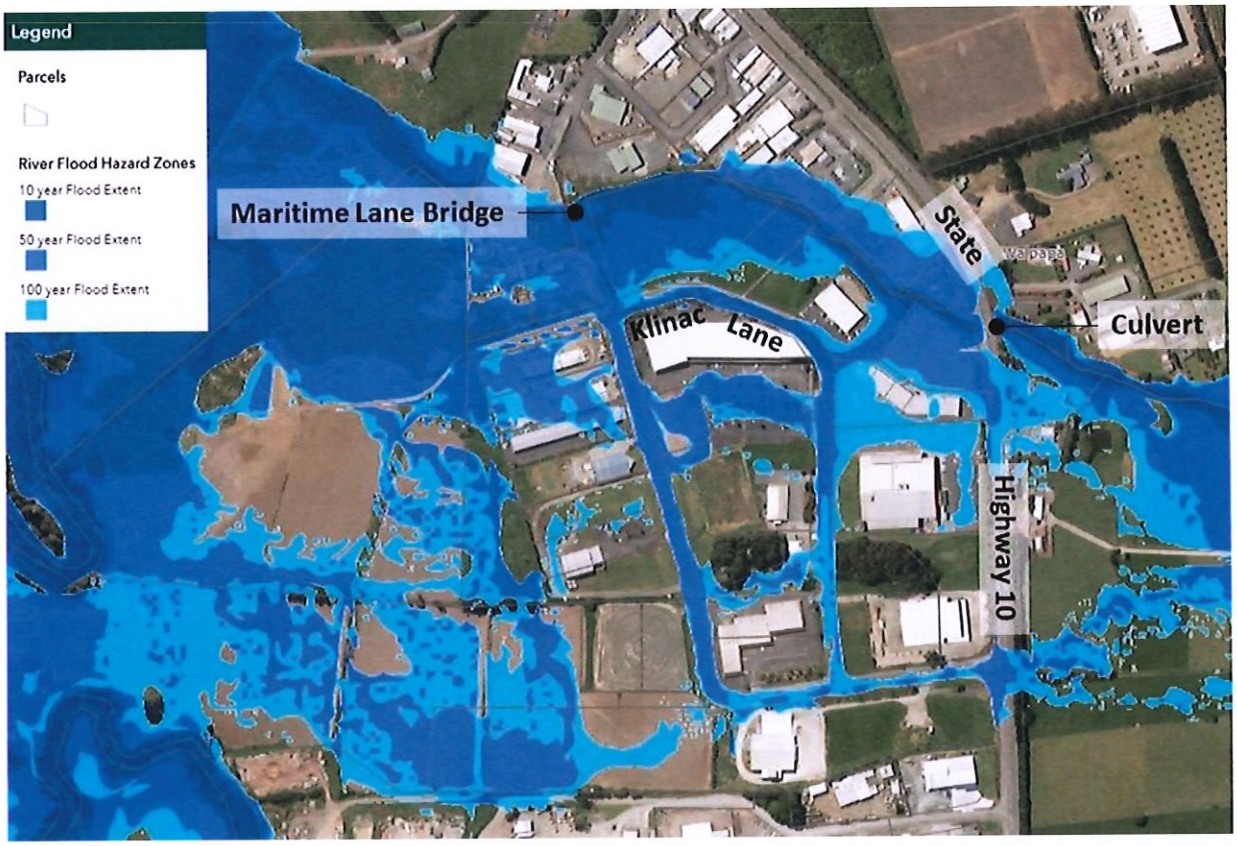


Figure 9 – Flooding – Existing Condition (10, 50, & 100-year Flood Extents)

3.3 Representative Cross-Sections Sampled from Model

A number of sections were sampled for illustration of current condition (and future design condition) modelled flooding and flow rates. These sections are shown in Figure 10 on the next page.

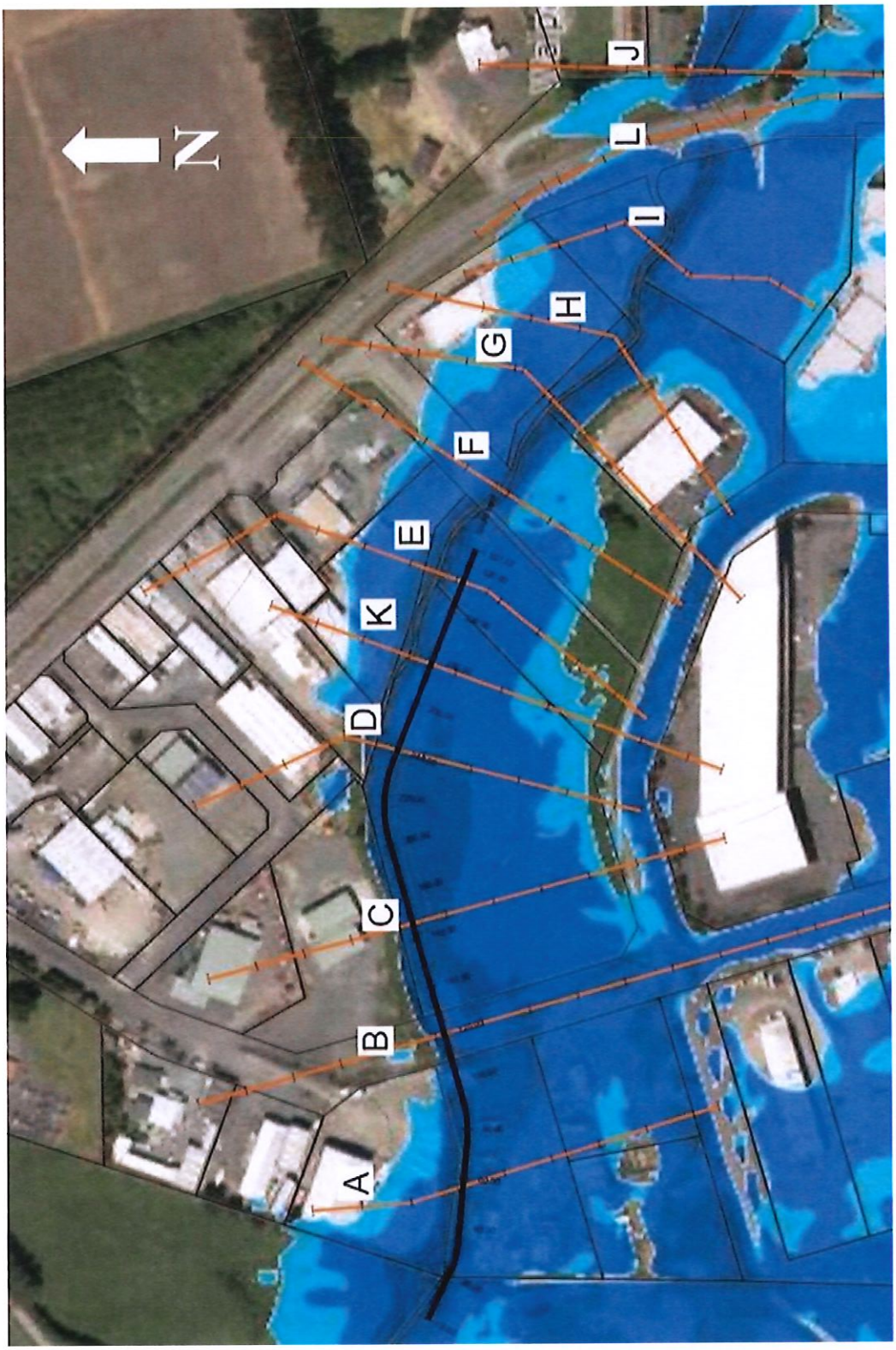


Figure 10 – Sampled Cross-Sections

3.4 Flow Rate Capacity

Flow Rates of the existing cross-sections are shown in Table 1 below.

Table 1 – Flow Rate Capacity without Widening

Cross-Section	Assessed Flow Rate Capacity of Land Cross-Section
(Refer Drawing Set – Appendix A)	**(m^3/s)**
Sample Cross-Section A	17.8
Existing Maritime Lane Foot Bridge (B)	9.4 Note 1
Sample Cross-Section C	10.5
Sample Cross-Section D	19.2
Sample Cross-Section K	62.3 (exceeds 43.0 as-is)
Sample Cross-Section E	51.7 (exceeds 43.0 as-is)
Existing Skippers Lane Bridge (a Foot Bridge)	53.6 (exceeds 43.0 as-is) Note 2
Sample Cross-Section F	55.5 (exceeds 43.0 as-is)
Sample Cross-Section G	61.5 (exceeds 43.0 as-is)
Sample Cross-Section H	98.6 (exceeds 43.0 as-is)
Sample Cross-Section I	65.9 (exceeds 43.0 as-is)
State Highway 10 Road Bridge (L)	43.0
State Highway 10 Road Bridge Tailwater (J)	> 43.0

Note 1 This box culvert on private property is to be replaced with a public road bridge connecting Maritime Lane with Klinac Lane - the capacity of the section with land only is assessed.

Note 2 It is considered that the existing Skippers Lane bridge foot bridge does not restrict the flow; therefore, the flow rate of the land cross-section is shown (53.6 m^3/s).

Calculations are appended as 'Appendix B – Calculations'.

The table shows the existing channel capacity to be as low as 9.4 m^3/s before flooding into adjacent properties.

4 Proposed Design – Whiriwhiritoa Stream

4.1 Design Philosophy

It is proposed to improve channel capacity of the Whiriwhiritoa Stream between Maritime Lane Bridge and State Highway 10.

The new channel capacity recommended is 43 m^3/s. The improved channel conveyance will reduce flooding into adjoining properties. The design flow of 43 m^3/s also matches the capacity of the culvert beneath State Highway 10.

The proposed bridge over Whiriwhiritoa Stream off Maritime Lane is to be designed to ensure 43 m^3/s flow conveyance, (to be achieved with some channel widening, and modification of base-gradient of the stream).

The design within this report recommends improvement, where necessary (widening varies) of the subject section of Whiriwhiritoa Stream to convey a design flow rate of 43 m^3/s.

Detailed drawings are appended as 'Appendix A - Construction Drawings'.

4.2 Proposed New Maritime Lane Bridge

The existing box culvert on private property is to be replaced with a public road bridge connecting Maritime Lane with Klinac Lane. This bridge is being designed by others.

As part of this design, modifications of the existing stream is proposed to meet the design objective of 43 m^3/s flow conveyance.

Calculations are appended within 'B – Calculations'.

The modification includes:

- Excavation beneath the bridge
- Stream base gradient steepening (as-is, there is very little fall in this section of stream)

A cross-section of the bridge is shown in Figure 11 below:

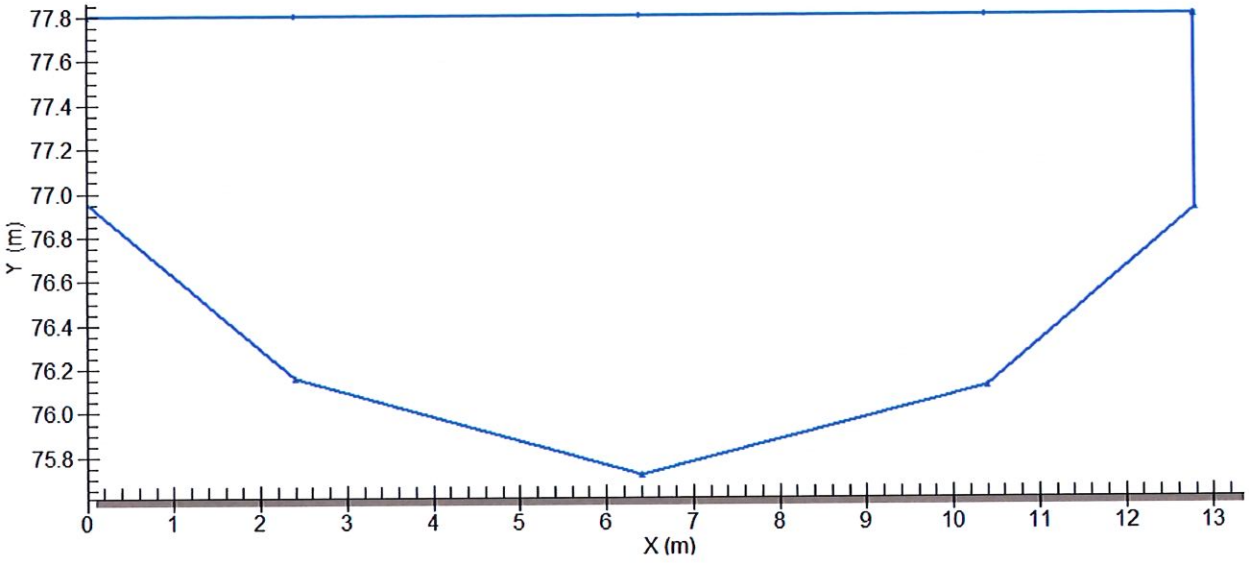


Figure 11 – Cross-Section Beneath Proposed Bridge (Used to Calculate Channel Capacity)

Hydraulic Parameters used in flow capacity assessment are shown in Table 2 below.

Table 2 – Bridge Hydraulic Parameters

Parameter	Design
Stream Invert Level RL	75.721 m
Bridge Underside Level	77.798 m Mid Span (80mm variation between ends)
Entrance Shape	Square Edge with Headwall
Mannings Roughness Top & Sides	0.015
Mannings Roughness Bottom	0.035
Road Crest Low Point RL	78.0 m
Tailwater Base Gradient	1.04 %

The proposed design conveys 43 m^3/s with 350 - 400 mm clearance beneath bridge underside.

The tailwater morphology is a constraining component of the bridge crossing. A 60.0 m^3/s flow can be conveyed however, with headwater of 160 mm up the side of the bridge (500 mm depth of spill over the roadway at Klinac Lane).

4.3 Levee

An earth mound levee is proposed to restrict floodwaters from spilling south over the true-right bank over currently vacant land and towards buildings near Klinac Lane. The entire levee is to be contained within one parcel (SO 438821, under ownership of WBC Developers Limited).

The levee is to have parameters shown in Table 3 below.

Table 3 – Levee Construction Details

Parameter	Design
Maximum Depth of earth Fill	1,000 mm (tapered to zero at east end)
2D Plan Area	< 400 m^2
Earth Fill Volume	140 m^3
Earth Batter Slopes	1V:3H
West (Upstream) End top RL	78.0 m (starts at 1.0 m depth)
East (downstream) End top RL	76.5 m (tapered to zero depth)

The levee confines 100-year ARI stream flood waters to a maximum width of 12 m.

The levee could extend a further 10 m (to provide improved flood protection), but terminates slightly early due to a consented wastewater designation. The landowner may like to amend their discharge consent to accommodate flood protection.

4.4 Proposed Improved Flow Rates

Flow Rates of the proposed cross-sections are shown in Table 1 on the next page.

Table 4 – Flow Rate Capacity with Proposed Works

Cross-Section	Assessed Flow Rate Capacity of Land Cross-Section
(Refer Drawing Set – Appendix A)	**(m^3/s)**
Sample Cross-Section A	43.4 (now exceeds 43.0)
Proposed Maritime Lane Road Bridge (B)	43.4 (with freeboard of 450 mm) *
Sample Cross-Section C	50.9 (now exceeds 43.0)
Sample Cross-Section D	43.3 (now exceeds 43.0)

* Note that the flow capacity with proposed new bridge is shown.

Calculations are appended as 'Appendix B – Calculations'.

4.5 Flood Waters – with Improvements

The flood waters with 43.0 m³/s flow conveyance are contained within a 12 m width. This is ensured with the combination of the excavations and the proposed levee.

The design flood water extent is shown in Figure 12 below:

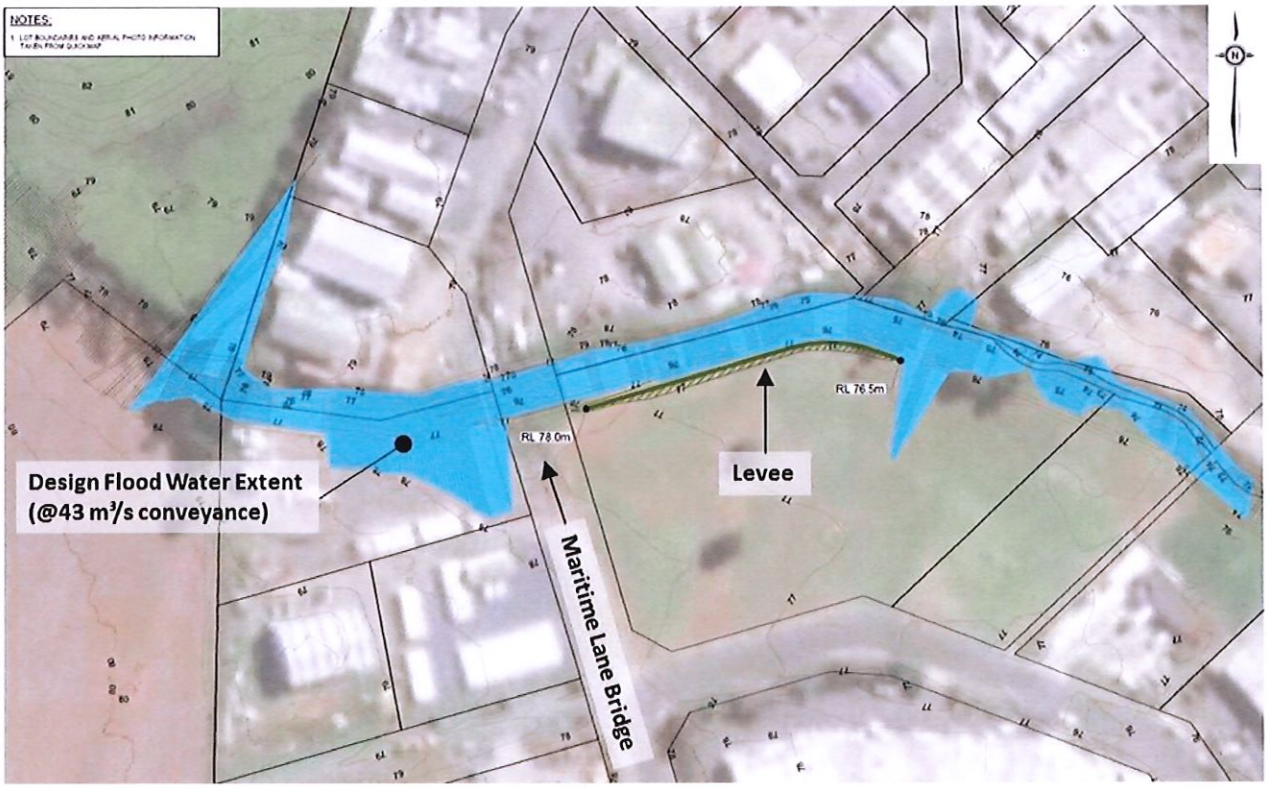


Figure 12 – Design Flood Water Extent

5 Proposed Design – Kerikeri River Stop Banks

5.1 Design Philosophy

The purpose and the objectives of the proposed scheme is to reduce the overall extent of Kerikeri River's 1:100-year Average Return (ARI) flood plain via the redirection of flood flows through the proposed spillway.

Detailed drawings are appended as 'Appendix A - Construction Drawings'.

5.2 Stop Banks Proposed

The proposed stop banks are outlined in Table 5 below.

Table 5 – Outline of Proposed Kerikeri River Stopbanks

Stop Bank No.	Maximum Height *	Average Height *	Fill Quantity	Plan Area	Legal Descriptions
#1	2.0 m	1.3 m	1,240 m^3	1370 m^2	Lot 17 DP 333643
#2	1.0 m	< 1.0 m	150 m^3	290 m^2	Lot 16 DP 333643
#3	0.8 m	< 0.8 m	200 m^3	300 m^2	Lot 14 DP 333643
#4	4.5 m	1.1 m	1,400 m^3	1800 m^2	Lot 12 DP 333643
#5	1.5m	< 1.5 m	150 m^3	500 m^2	Lot 3 DP 171508

* Heights are from toe of stopbanks

6 Assessment of Improvements

6.1 Flow Rates

6.1.1 *Whiriwhiritoa Stream Widening*

The proposed design flow capacity of 43 m^3/s can be achieved with the proposed works.

Whiriwhiritoa 100 % ARI (~ 1% AEP) is around 5.7 m^3/s. The conveyance of 43 m^3/s equates to the 100-year ARI flows from the Whiriwhiritoa Catchment, with approximately 37 m^3/s extra capacity for conveyance of spillover from the Kerikeri River.

The improved capacity will reduce flooding depths in the areas immediately adjacent to the proposed culvert.

6.2 Flooding

6.2.1 *Whiriwhiritoa Stream Widening*

Flood water reduction is a result of both the excavation of earth, and the strategic placement of a minimal earth levee. These works are proposed to reduce the encroachment of flood waters on lots adjacent to Whiriwhiritoa Stream, effectively containing the design flow rate.

The proposed design flow of the new Maritime Lane bridge, is to be improved from 9.4 m^3/s to 43 m^3/s.

6.2.2 *Kerikeri River Stopbanks (Assessment by Others)*

The proposed stopbanks constructed on the left bank of the Kerikeri River, significantly decreases the risk of the river overtopping the left bank and flooding over land and into the Waipapa Catchment.

The changes to the extent of the floodplain reduce flood risks in a 1:100-year ARI event for 41 buildings within the study area and some 90 properties. The majority of the benefits are provided to properties along Waipapa Road and Waitotara Drive. The design provides flood protection to these properties to the current level of 1:10 year ARI event that would otherwise be considered a 1:100-year ARI event. While this provides the direct benefit of reducing the intensity of floods across these properties, secondary benefits associated with the scheme could potentially facilitate increased potential for future development within the area.

The scheme does not increase the number of properties within the extent of the floodplain, but will slightly increase flood levels where flooding does already occur. The lower catchment downstream of the first stopbank will experience some minor increases in flood levels for limited durations; however, no new structures will be subject to flooding in a 1:100-year event.

There are a number of structures already affected minor flooding during 1:100-year ARI events and as a result of the proposed scheme, flood levels will increase on these structures. However, the increase in flood level is generally less than 0.1 metre.

The objective is to undertake flood control works in a way that does not result in additional downstream buildings being flooded in 1:100-year ARI event.[1]

6.3 [2]Summary of Effects

6.3.1 *Whiriwhiritoa Stream Widening*

Overall, the effects of earthworks are considered no more than minor. The flood risk is to be less than in the existing condition and provide considerable improvement to adjoining properties. The effects on ecology are considered to be no more than minor.

6.3.2 *Kerikeri River Stopbanks*

Overall, the effects of earthworks are considered no more than minor. The flood risk is to be less than in the existing condition and provide considerable improvement. The effects on ecology are considered to be no more than minor source.

---

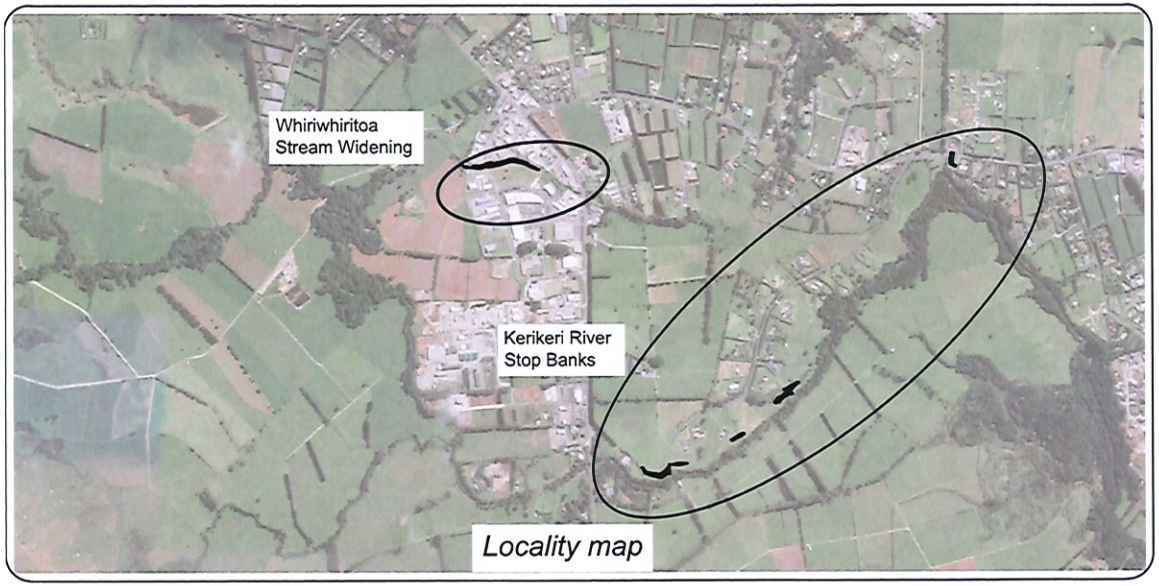
[1] FNDC Resource Consents Planner, Liz Searl, REF 2150173-RMADES

Appendix A – Construction Drawings

CONTRACT 20/19

WHIRIWHIRITOA STREAM CUT and WAITOTARA DRIVE STOPBANKS

for NORTHLAND REGIONAL COUNCIL



Locality map

Index

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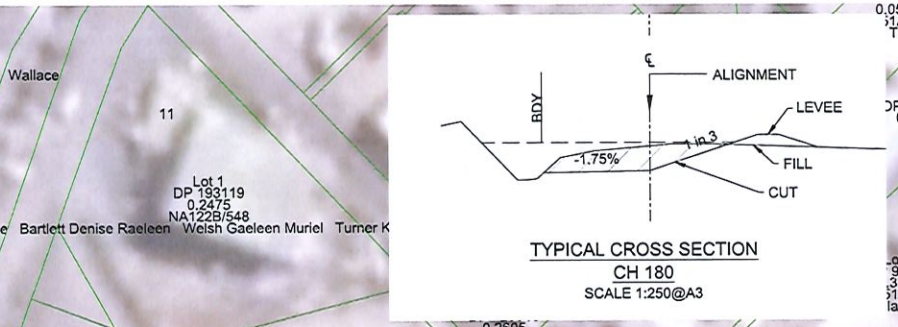
Job No. 8667

For Approval

24 November 2020

NOTES:

1. LOT BOUNDARIES AND AERIAL PHOTO INFORMATION TAKEN FROM QUICKMAP.



TYPICAL CROSS SECTION
CH 180
SCALE 1:250@A3

Lot 1 DP 203534 0.2418 NA131A/591 Adrian Richard Manning Richard Patrick Wallace

Lot 1 DP 208329 0.1782 NA135D/408 R & A Rentals Limited

Lot 1 DP 193119 0.2475 NA122B/548 Deborah Elaine Bartlett Denise Raeleen Welsh Gaeleen Muriel Turner K

Lot 1 DP 131830 0.0938 Tracy Kristina George

Lot 9 DP 95010 0.0896 NA51A/701 Stratford Lynette Joy Stratford

Wiroa Properties Limited Wiroa Properties Limited Section 4 SO 438821 0.4349 557914 David Robert Gibson Judith Ann Auld Ross Anthony Auld Fee Simple Residue Parcel NZGZ 2011 p 1815

Wiroa Properties Limited Wiroa Properties Limited Wiroa Properties Limited , Wiroa Properties Limited , Wiroa Properties Limited ,

Maritime Lane

Lot 1 DP 490482 0.4034 708319 Elsdon Properties Limited

Lot 1 DP 11049 0.2580 NA62B/37 David Robert Gibson Kathl Trustee Services (19

Lot 2 DP 110493 0.2910 NA62B/377 Carole Anne Parrish Peter Neville Parrish Spicers Trustee Company (2005) Limited

Lot 9 DP 110493 0.0435 Local Purpose Reserve (Drainage)

Section 3 SO 438821 1.2148 574944 WBC Developers Limited Fee Simple Residue Parcel NZGZ 2011 p 5748

Lot 14 DP 337517 0.3290 154049 WBC Developers Limited

Lot 13 DP 337517 0.3630 154048 WBC Developers Limited

Lot 3 DP 490482 0.3002 708321 Roger Allan Nixon Shaun Roger Nixon

Lot 4 DP 490482 0.3004 708322 Maria Ann Vlug Smith & Partners Trustee Co. Limited

Lot 2 DP 490482 0.4532 708320 Waipapa Storage Limited

Klinac Lane

0.00 20.00 40.00 60.00 80.00 100.00 120.00 140.00 160.00 180.00 200.00 220.00 240.00 260.00 280.00 300.00 320.00 328.92

ALIGNMENT FOR WIDENING

LEGEND:

- LAND EASEMENT
- LAND COVENANT
- RIGHT TO DRAIN SEWAGE
- RIGHT TO DISCHARGE TREATED SEWAGE
- RIGHT HAND SIDE CUT BATTER

Issue	Date	Revision
A	21/07/2020	FIRST ISSUE
B	18/09/2020	FOR CONSULTATION
C	23/11/2020	FOR TENDER

DWG Site Features Plan

Scale 1:1000 @A3 (10 5 0 10 20 30 m) Date 21/07/2020

Drawn YZ Checked SK Approved JM

File S:\8000-8999\8600 - 8699\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\WWAUTOCAD\8667 - V21 NEW WHIRIWHIRITOA VOL NS.DWG

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Project Whiriwhiritoa Stream
Maritime Lane Bridge & State Highway 10

Client Northland Regional Council

Project No. 8667 RC no. rc no

DWG No. P1

Sheet No. 1 of 2

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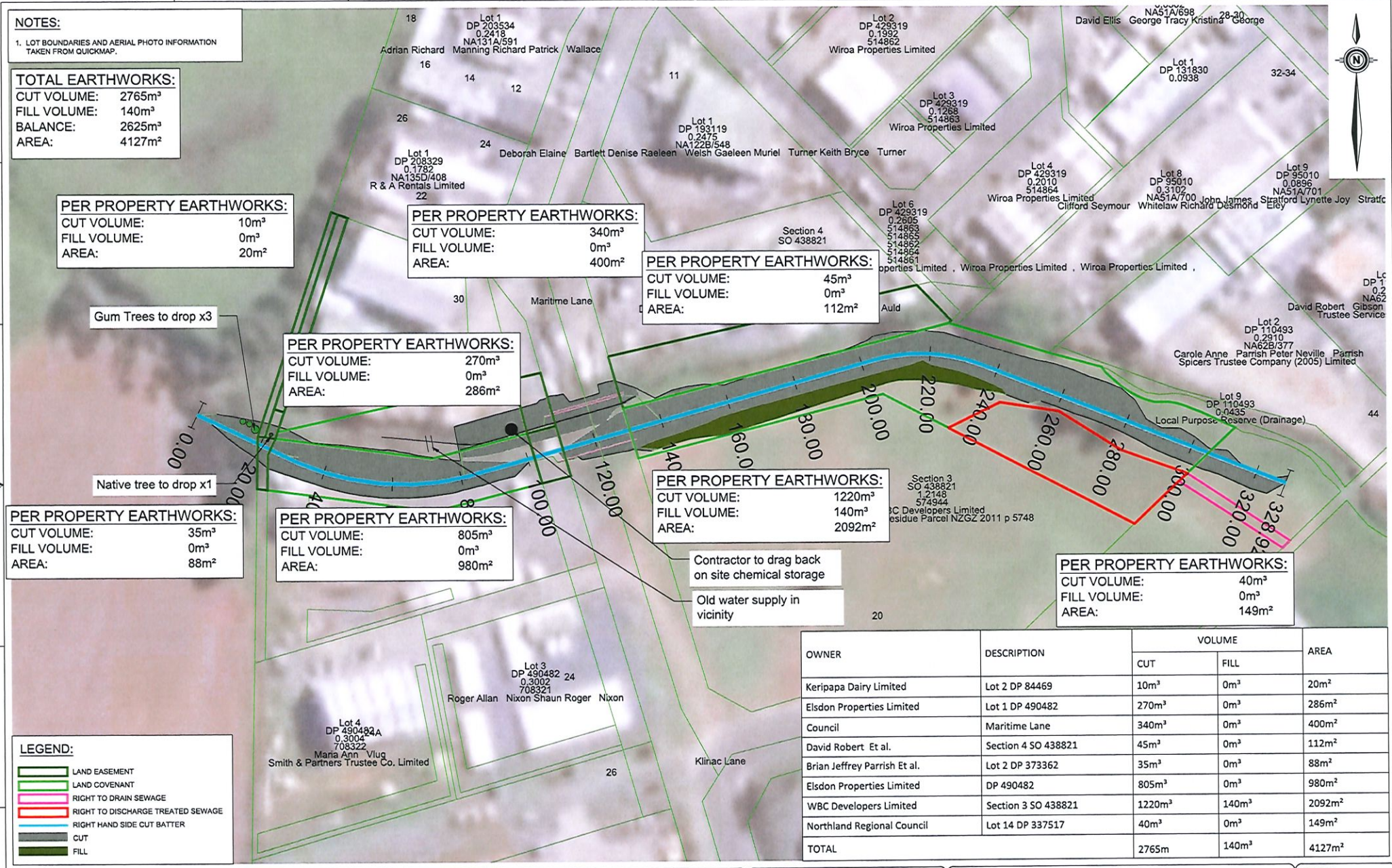

OWNER	DESCRIPTION	VOLUME		AREA
		CUT	FILL	
Keripapa Dairy Limited	Lot 2 DP 84469	10m³	0m³	20m²
Elsdon Properties Limited	Lot 1 DP 490482	270m³	0m³	286m²
Council	Maritime Lane	340m³	0m³	400m²
David Robert Et al.	Section 4 SO 438821	45m³	0m³	112m²
Brian Jeffrey Parrish Et al.	Lot 2 DP 373362	35m³	0m³	88m²
Elsdon Properties Limited	DP 490482	805m³	0m³	980m²
WBC Developers Limited	Section 3 SO 438821	1220m³	140m³	2092m²
Northland Regional Council	Lot 14 DP 337517	40m³	0m³	149m²
TOTAL		2765m	140m³	4127m²

Issue	Date	Revision
A	21/07/2020	FIRST ISSUE
B	18/09/2020	FOR CONSULTATION
C	23/11/2020	FOR TENDER

DWG Proposed Earthworks Plan

Scale 1:1000 @A3 | Date 21/07/2020

Drawn YZ | Checked SK | Approved JM

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Project: Whiriwhiritoa Stream
Maritime Lane Bridge & State Highway 10

Client: Northland Regional Council

Project No. 8667 | RC no. rc no

DWG No. P2

Sheet No. 2 of 2

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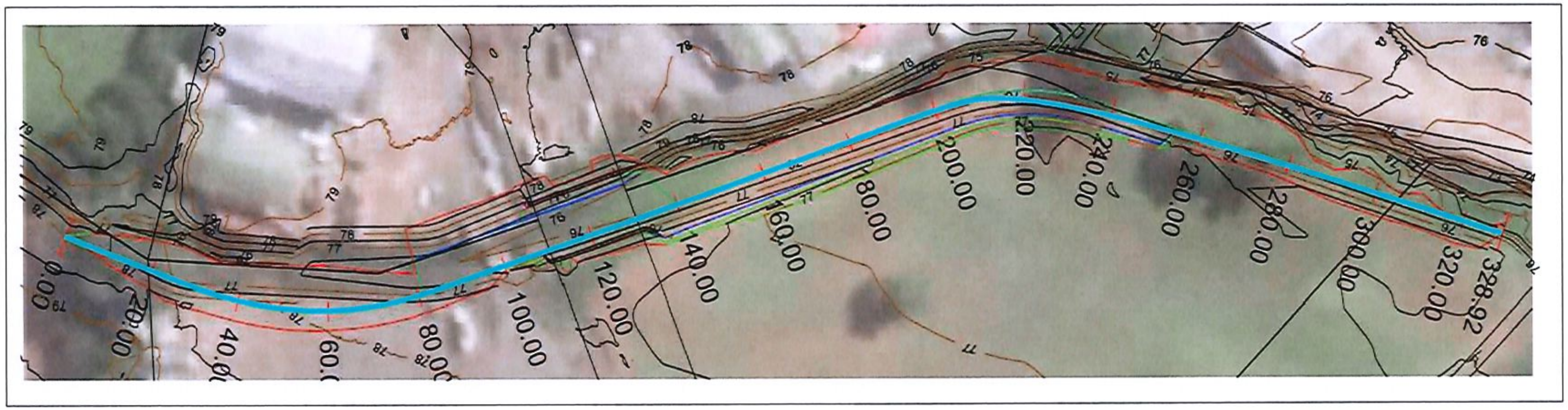

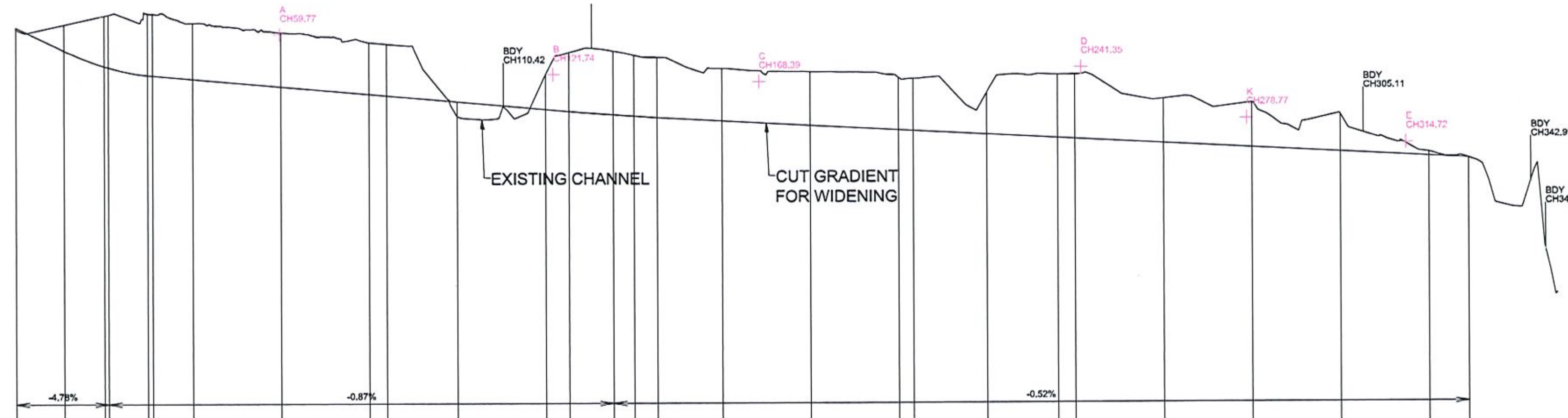

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CUT/FILL (-/+)	0.04	-0.59	-1.14	-1.19	-1.39	-1.40	-1.27	-1.22	-1.17	-1.17	0.34	-0.78	-1.33	-1.44
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DESIGN LEVEL	75.98	75.95	75.87	75.77	75.67	75.65	75.56	75.48	75.46	75.36	75.25	75.15	75.05	75.00
EXISTING SURFACE	77.35	77.31	77.06	76.97	76.85	76.82	76.43	76.91	76.91	76.35	76.26	75.99	75.14	75.00
CUT/FILL (-/+)	-1.38	-1.36	-1.19	-1.21	-1.19	-1.17	-0.92	-1.43	-1.45	-0.99	-1.01	-0.84	-0.10	0.00
CHAINAGE	140.00	145.29	160.00	180.00	200.00	203.32	220.00	238.07	240.00	260.00	280.00	300.00	320.00	328.92

Issue	Date	Revision
A	21/07/2020	FIRST ISSUE
B	18/09/2020	FOR CONSULTATION
C	23/11/2020	FOR TENDER

DWG Longitudinal Section Whiriwhiritoa Cut

Scale 1:1000 @A3 (10 5 0 10 20 30 m) Date 21/07/2020

Drawn YZ Checked SK Approved JM

File S:\8000-8999\8600 - 8699\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HW\AUTOCAD\8667 - V21 NEW WHIRIWHIRITOA VOL NS.DWG

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Project Whiriwhiritoa Stream
8 Taumata Close, Paihia

Client Northland Regional Council

Project No. 8667 RC no. rc no

DWG No. LS1

Sheet No. 1 of 1

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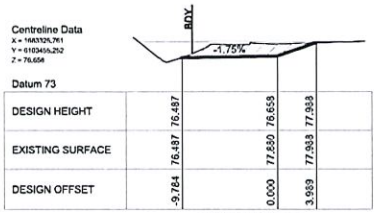

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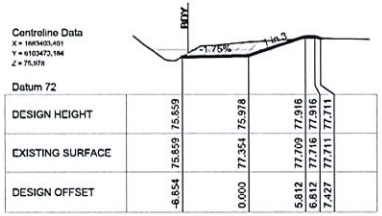

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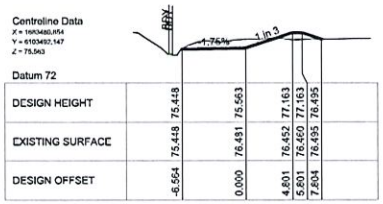

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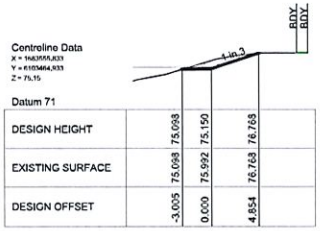

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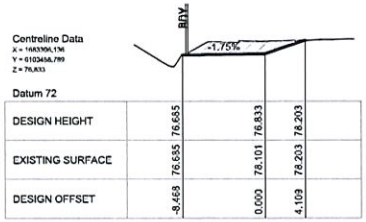

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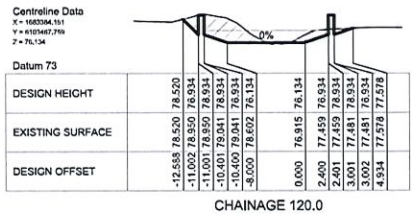

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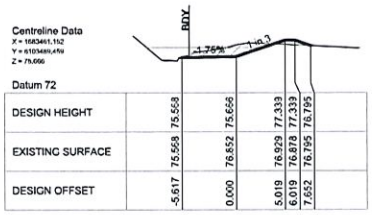

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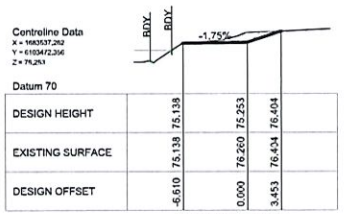

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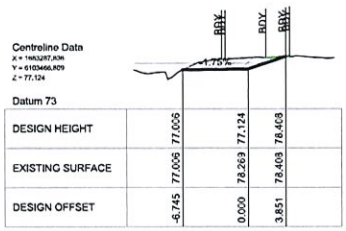

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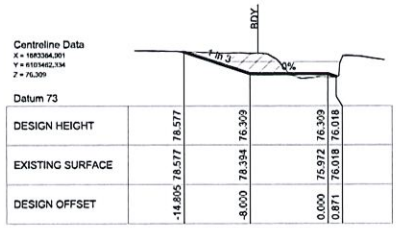

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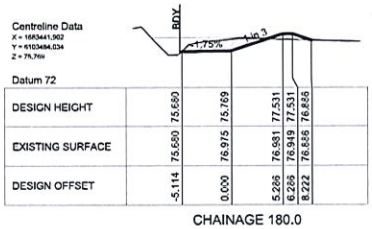

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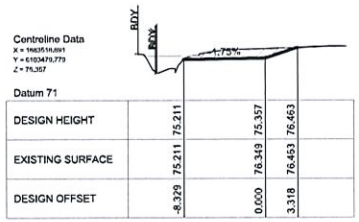

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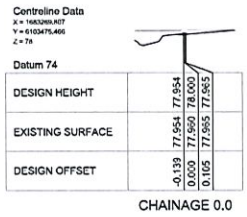

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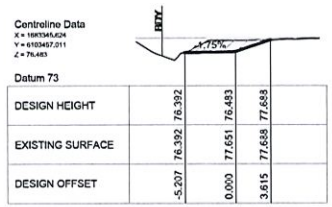

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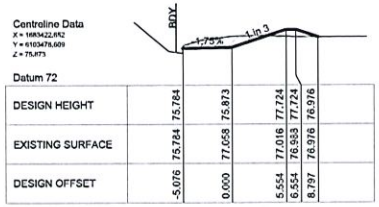
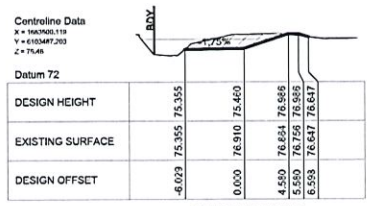


CHAINAGE 160.0



CHAINAGE 240.0

Issue	Date	Revision
A	21/07/2020	FIRST ISSUE
B	18/09/2020	FOR CONSULTATION
C	23/11/2020	FOR TENDER

DWG Cross Sections of Whiriwhiritoa Cut

Scale 1:500 @A3 (5 2.5 0 5 10 15 m) Date 21/07/2020

Drawn YZ Checked SK Approved JM

File S:\8000-8999\8600 - 8699\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HW\AUTOCAD\8667 - V21 NEW WHIRIWHIRITOA VOL NS.DWG

HAIGH WORKMAN Ltd
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Project Whiriwhiritoa Stream
8 Taumata Close, Paihia

Client Northland Regional Council

Project No. 8667 RC no. rc no

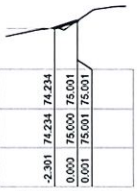
DWG No. CS1

Sheet No. 1 of 2

Plotted By Nandini Sharma at 23/11/2020 1:42:40 PM

Centreline Data
X = 1983842.69
Y = 6103454.198
Z = 75.001

Datum 70



DESIGN HEIGHT	74.234	75.001	75.001
EXISTING SURFACE	74.234	75.000	75.001
DESIGN OFFSET	-2.301	0.000	0.001

CHAINAGE 328.9

Centreline Data
X = 1983974.405
Y = 6103457.509
Z = 75.047

Datum 70

DESIGN HEIGHT	75.044	75.047	76.797
EXISTING SURFACE	75.044	75.124	76.797
DESIGN OFFSET	-0.167	0.000	5.249

CHAINAGE 320.0

Issue	Date	Revision
A	21/07/2020	FIRST ISSUE
B	18/09/2020	FOR CONSULTATION
C	23/11/2020	FOR TENDER

DWG Cross Sections of Whiriwhiritoa Cut

Scale 1:500 @A3 | 5 2.5 0 5 10 15 m | Date 21/07/2020

Drawn YZ | Checked SK | Approved JM

File S:\R000-R999\R600 - R699\R667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HW\AUTOCAD\R667 - V21 NEW WHIRIWHIRITOA VOL NS.DWG

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Project: Whiriwhiritoa Stream
8 Taumata Close, Paihia

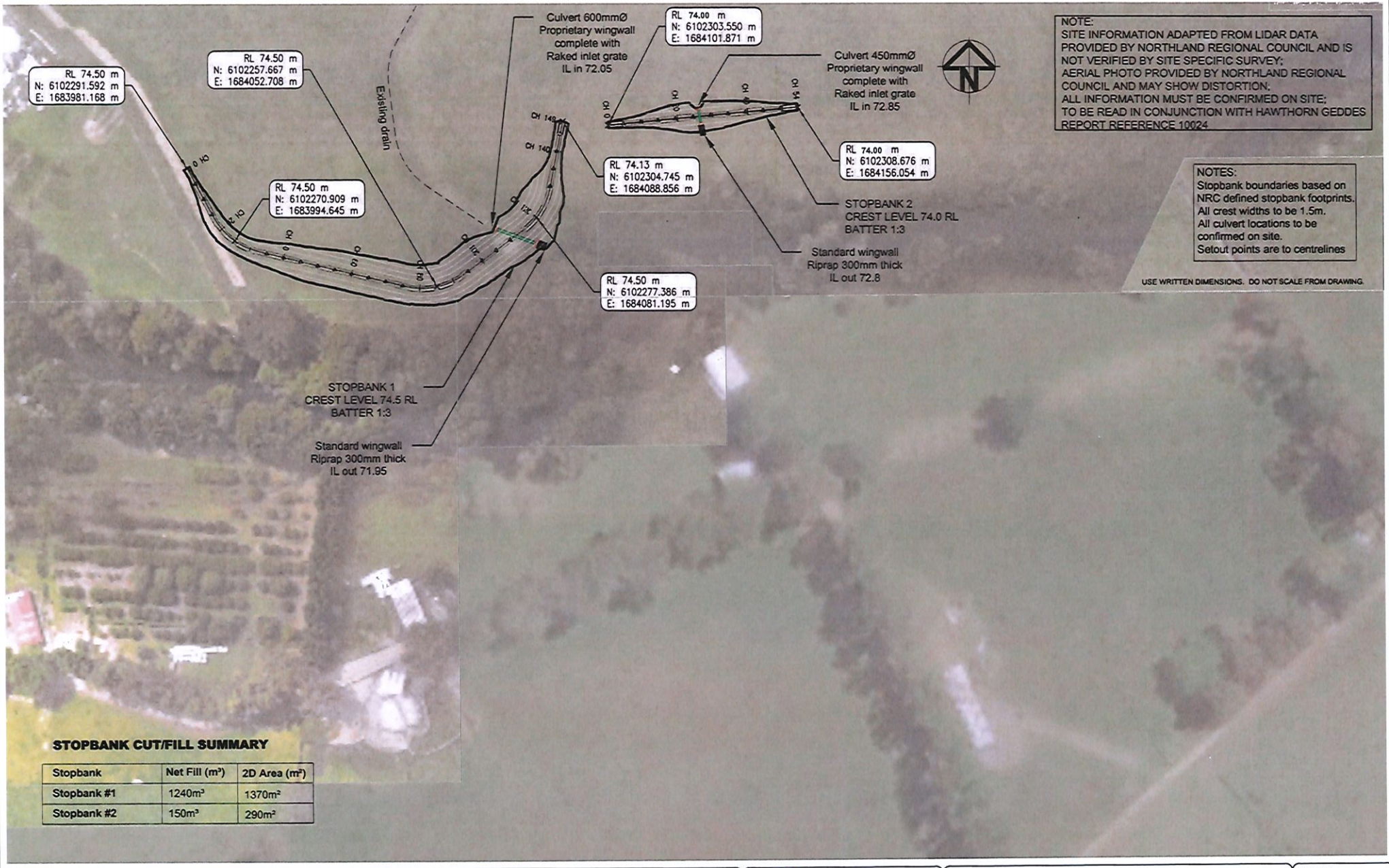
Client: Northland Regional Council

Project No. 8667 | RC no. rc no

DWG No. CS2

Sheet No. 2 of 2

Plotted By Nandini Sharma at 23/11/2020 1:42:09 PM



STOPBANK CUT/FILL SUMMARY

Stopbank	Net Fill (m³)	2D Area (m²)
Stopbank #1	1240m³	1370m²
Stopbank #2	150m³	290m²

Issue	Date	Revision
A	24/07/2020	STOPBANK 1 & 2 HAWTHORN GEDDES CONSENT DRAWINGS REMAIN UNCHANGED
B	18/09/2020	FOR TENDER

DWG Stopbank Plan - Stopbank 1 & 2

Scale 1: @A3 | Date 24/07/2020

Drawn YZ | Checked SK | Approved JM

File S:\8000-8999\8600 - 8699\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HWAUTOCAD\8667 - V20 NS (WHIRIWHIRITOA FINAL).DWG

HAIGH WORKMAN Ltd
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Project: Whiriwhiritoa Stream
8 Taumata Close, Paihia

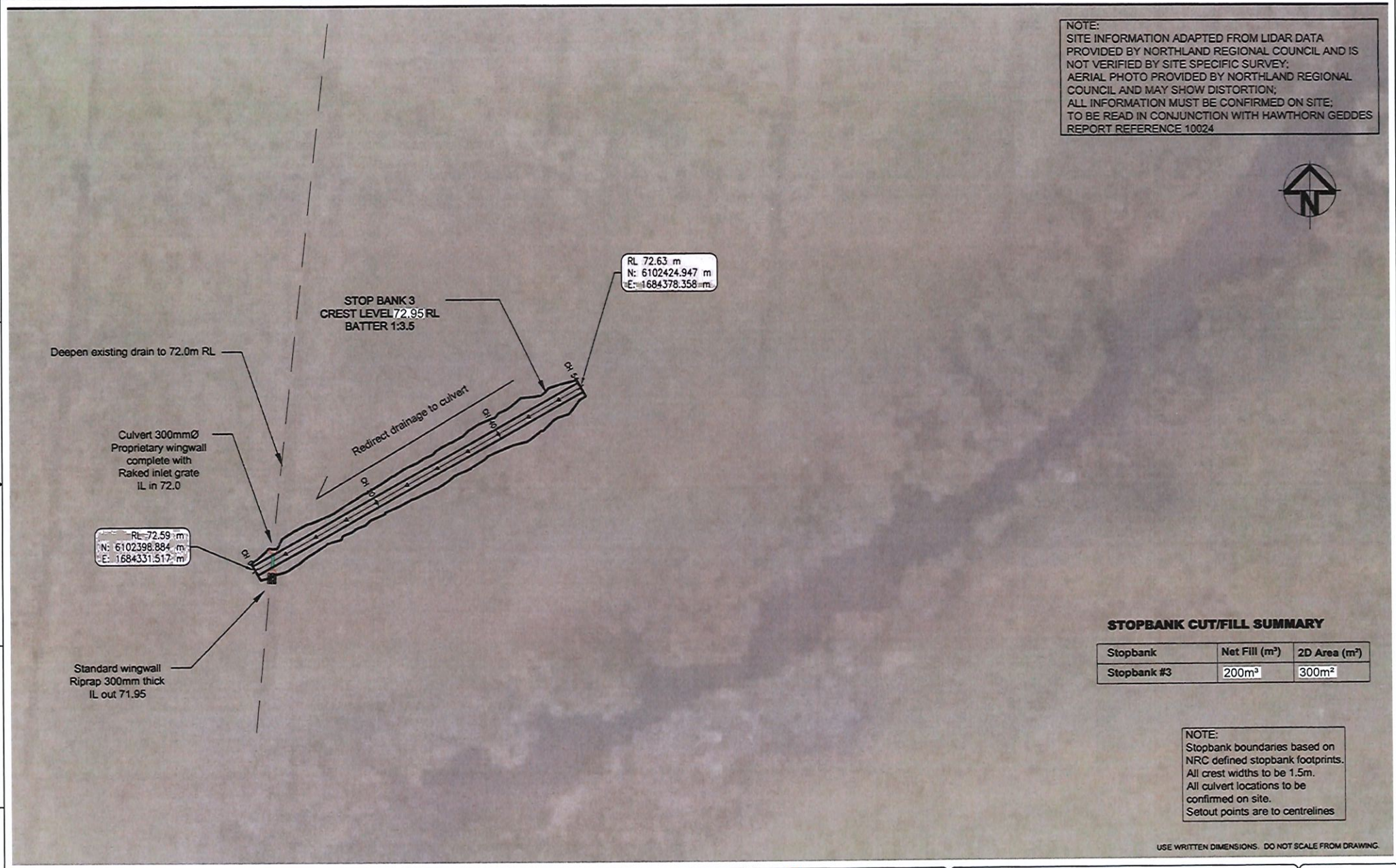
Client: Northland Regional Council

Project No. 8667 | RC no. rc no

DWG No. SP 1

Sheet No. 1 of 4

Plotted By Nandini Sharma at 24/11/2020 8:50:15 AM



NOTE:
SITE INFORMATION ADAPTED FROM LIDAR DATA PROVIDED BY NORTHLAND REGIONAL COUNCIL AND IS NOT VERIFIED BY SITE SPECIFIC SURVEY;
AERIAL PHOTO PROVIDED BY NORTHLAND REGIONAL COUNCIL AND MAY SHOW DISTORTION;
ALL INFORMATION MUST BE CONFIRMED ON SITE;
TO BE READ IN CONJUNCTION WITH HAWTHORN GEDDES REPORT REFERENCE 10024

STOPBANK CUT/FILL SUMMARY

Stopbank	Net Fill (m³)	2D Area (m²)
Stopbank #3	200m³	300m²

NOTE:
Stopbank boundaries based on NRC defined stopbank footprints.
All crest widths to be 1.5m.
All culvert locations to be confirmed on site.
Setout points are to centrelines

USE WRITTEN DIMENSIONS. DO NOT SCALE FROM DRAWING.

Issue	Date	Revision
A	24/07/2020	STOPBANK 3 LEVELS AMENDED
B	18/09/2020	FOR TENDER

DWG Stopbank Plan - Stopbank 3

Scale 1:500 @A3 | Date 24/07/2020
Drawn YZ | Checked SK | Approved JM
File S:\8000-8999\8600 - 8699\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HWAUTOCAD\8667 - V20 NS (WHIRIWHIRITOA FINAL).DWG

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Project: Whiriwhiritoa Stream
8 Taumata Close, Paihia

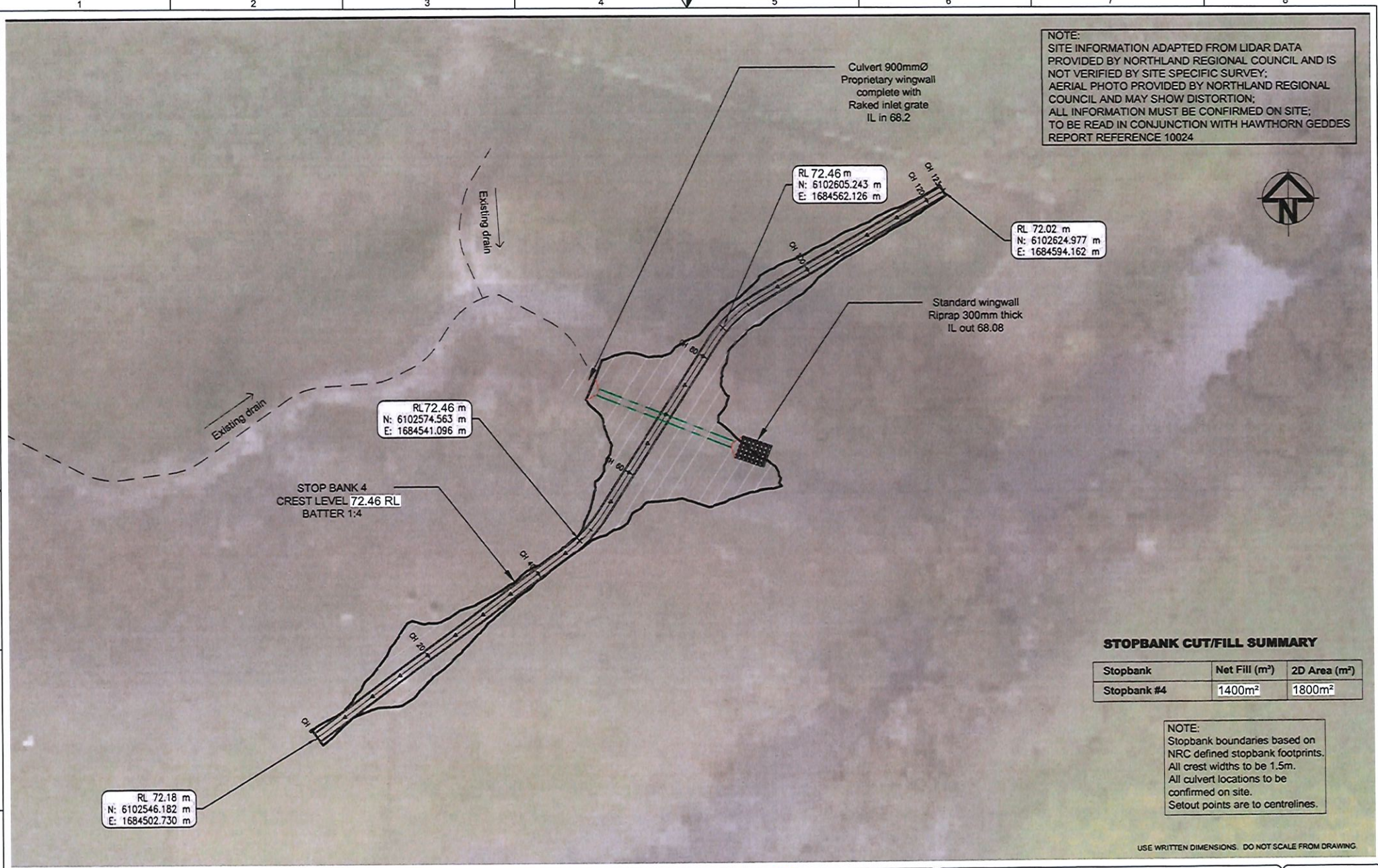
Client: Northland Regional Council

Project No. 8667 | RC no. rc no

DWG No. SP2

Sheet No. 2 of 4

Plotted By Nandini Sharma at 18/09/2020 9:37:17 AM



STOPBANK CUT/FILL SUMMARY

Stopbank	Net Fill (m³)	2D Area (m²)
Stopbank #4	1400m²	1800m²

NOTE:
Stopbank boundaries based on NRC defined stopbank footprints.
All crest widths to be 1.5m.
All culvert locations to be confirmed on site.
Setout points are to centrelines.

USE WRITTEN DIMENSIONS. DO NOT SCALE FROM DRAWING.

Issue	Date	Revision
A	24/07/2020	STOPBANK 4 LEVELS AMENDED
B	18/09/2020	FOR TENDER

DWG Stopbank Plan - Stopbank 4

Scale 1:500 @A3 (5 2.5 0 5 10 15 m) Date 24/07/2020

Drawn YZ Checked SK Approved JM

File S:\8000-8999\8600 - 8699\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\WA\AUTOCAD\8667 - V20 NS (WHIRIWHIRITOA FINAL).DWG

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Project Whiriwhiritoa Stream
8 Taumata Close, Paihia

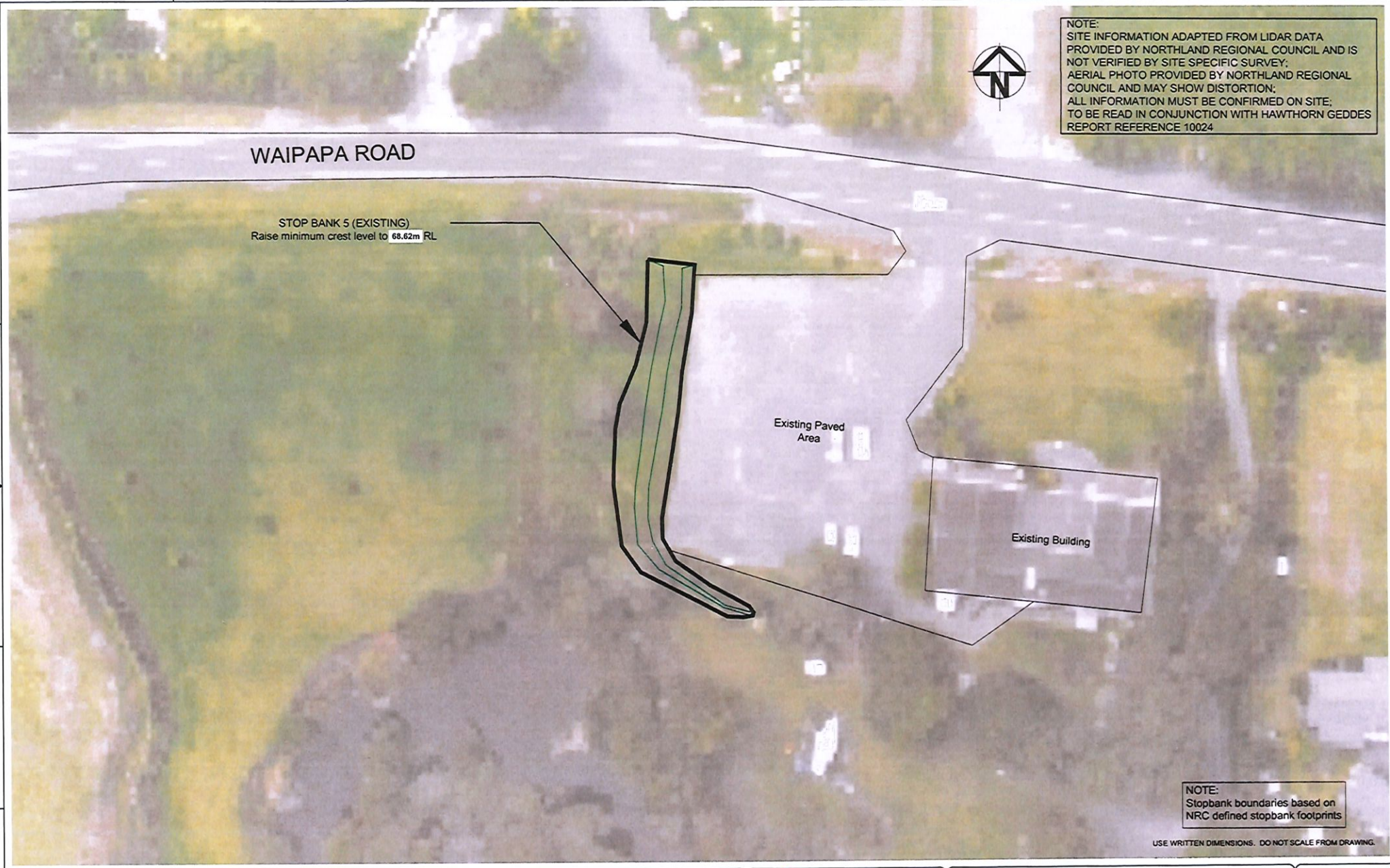
Client Northland Regional Council

Project No. 8667 RC no. rc no

DWG No. SP3

Sheet No. 3 of 4

Plotted By Nandini Sharma at 18/09/2020 9:37:40 AM



Issue	Date	Revision
A	24/07/2020	STOPBANK 5 HAWTHORN GEDDES CONSENT DRAWINGS REMAIN UNCHANGED
B	18//09/2020	FOR TENDER

DWG Stopbank Plan - Stopbank 5

Scale 1:500 @A3 (5 2.5 0 5 10 15 m) Date 24/07/2020

Drawn YZ | Checked SK | Approved JM

File S:\8000-8999\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HWAUTOCAD\8667 - V20 NS (WHIRIWHIRITOA FINAL).DWG

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Project: Whiriwhiritoa Stream
8 Taumata Close, Paihia

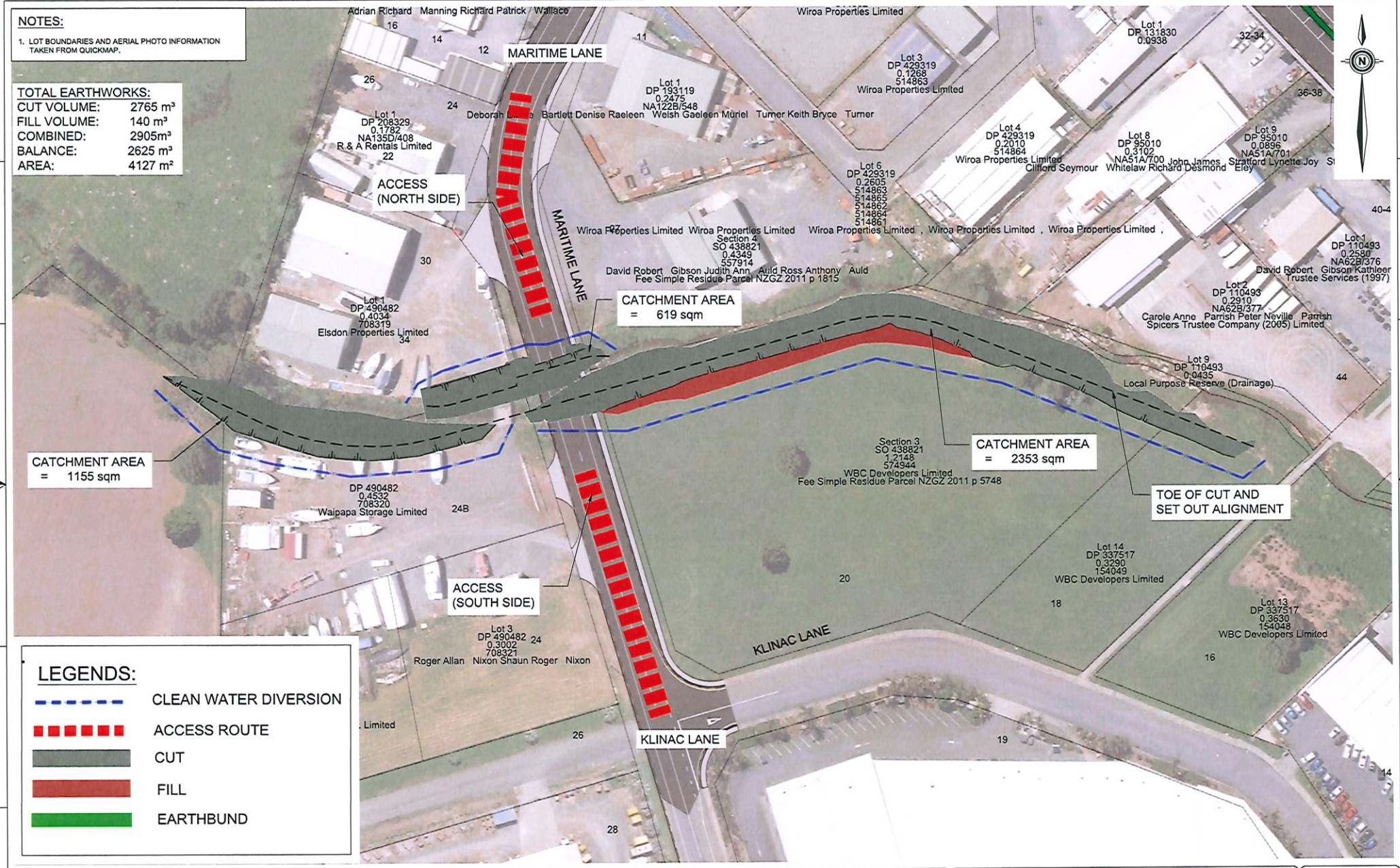
Client: Northland Regional Council

Project No. 8667 | RC no. rc no

DWG No. SP4

Sheet No. 4 of 4

Plotted By Nandini Sharma at 24/11/2020 8:47:05 AM



Issue	Date	Revision
A	09/09/2020	FIRST ISSUE
B	18/09/2020	FOR CONSULTATION
C	23/11/2020	FOR TENDER

DWG Erosion and Sediment Control Whiriwhiritoa Stream

Scale 1:1000 @A3 (10 5 0 10 20 30 m) Date 09/09/2020

Drawn NS Checked JM Approved JM

File S:\8000-8999\8600 - 8699\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HW\AUTOCAD\8667 - V19 NS ESCP.DWG

HAIGH WORKMAN Ltd
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Project: Whiriwhiritoa Stream
Maritime Lane Bridge & State Highway 10

Client: Northland Regional Council

Project No. 8667 RC no. rc no

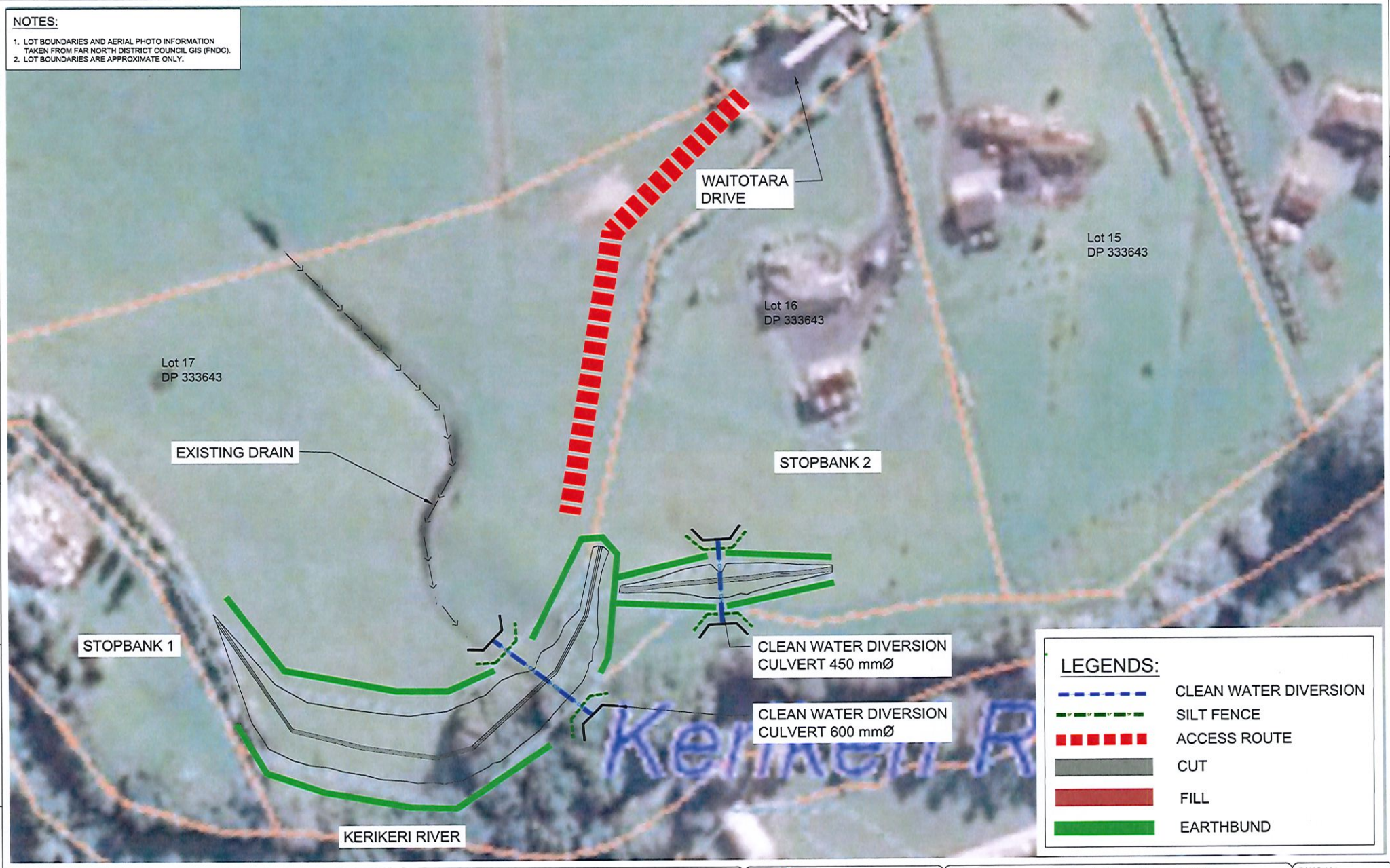
DWG No. EP1

Sheet No. 1 of 6

Plotted By Nandini Sharma at 25/11/2020 2:19:35 PM

NOTES:

1. LOT BOUNDARIES AND AERIAL PHOTO INFORMATION TAKEN FROM FAR NORTH DISTRICT COUNCIL GIS (FNDC).
2. LOT BOUNDARIES ARE APPROXIMATE ONLY.



Issue	Date	Revision
A	09/09/2020	FIRST ISSUE
B	18/09/2020	FOR TENDER

DWG Erosion & Sediment Control Plan
Stopbanks 1 & 2

Scale 1:1000 @A3 (10 5 0 10 20 30 m) Date 09/09/2020

Drawn NS | Checked JM | Approved JM

File S:\8000-8999\8667 - NRC WHIRWHIRITOA\05 - DRAWINGS\HW\AUTOCAD\8667 - V19 NS.DWG

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Project: Kerikeri River Stop Banks
Waitotara Drive

Client: Northland Regional Council

Project No. 8667 | RC no. rc no

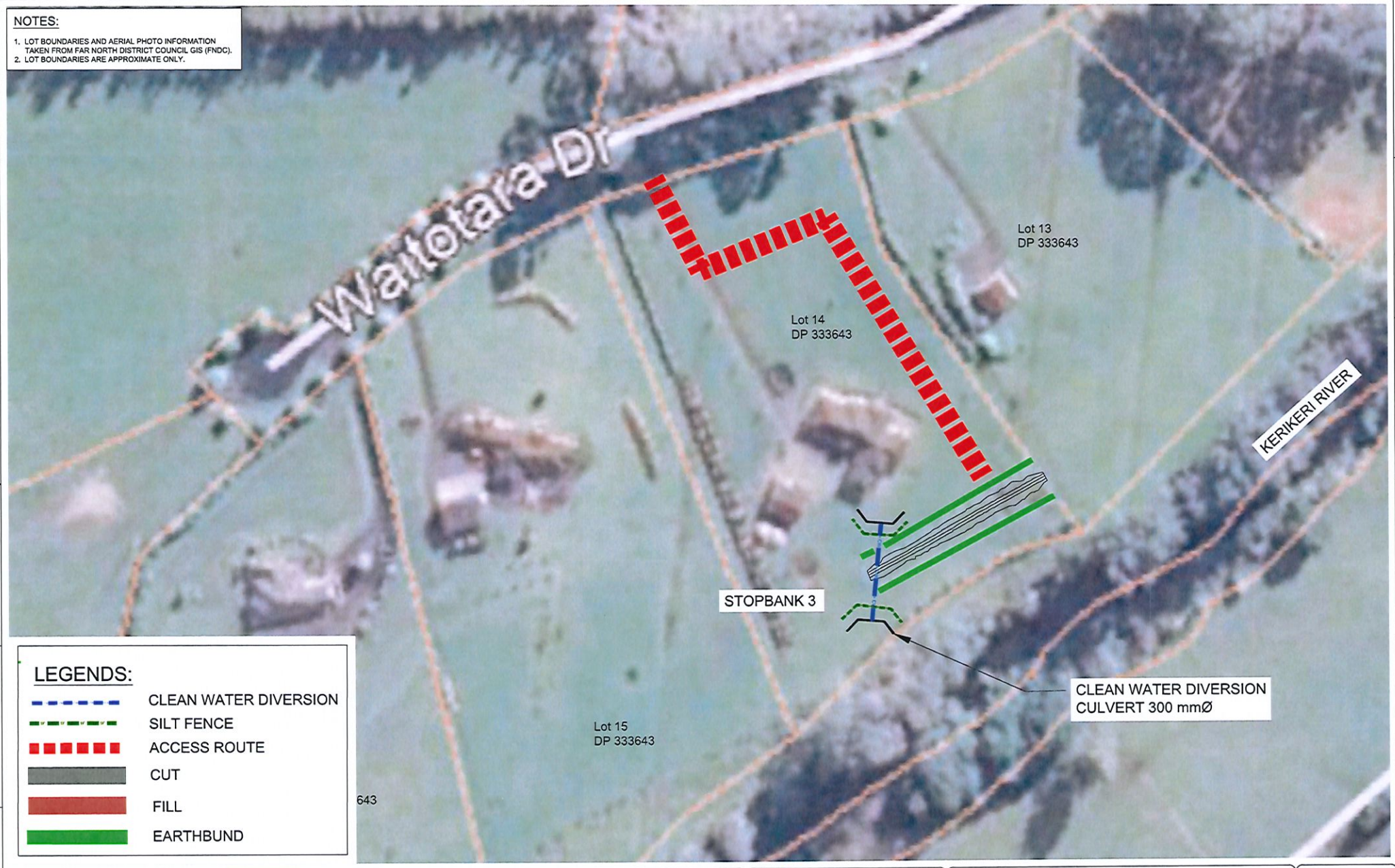
DWG No. EP2

Sheet No. 2 of 6

Plotted By Nandini Sharma at 18/09/2020 9:47:15 AM

NOTES:

1. LOT BOUNDARIES AND AERIAL PHOTO INFORMATION TAKEN FROM FAR NORTH DISTRICT COUNCIL GIS (FNDC).
2. LOT BOUNDARIES ARE APPROXIMATE ONLY.



LEGENDS:

- CLEAN WATER DIVERSION
- SILT FENCE
- ACCESS ROUTE
- CUT
- FILL
- EARTHBUND

Issue	Date	Revision
A	09/09/2020	FIRST ISSUE
B	18/09/2020	FOR TENDER

DWG: Erosion & Sediment Control Plan
Stopbank 3

Scale 1:1000 @A3 (10 5 0 10 20 30 m) Date 09/09/2020

Drawn NS | Checked JM | Approved JM

File S:\8000-8999\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HW\AUTOCAD\8667 - V19 NS.DWG

HAIGH WORKMAN Civil & Structural Engineers
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Project: Kerikeri River Stop Banks
Waitotara Drive

Client: Northland Regional Council

Project No. 8667 | RC no. rc no

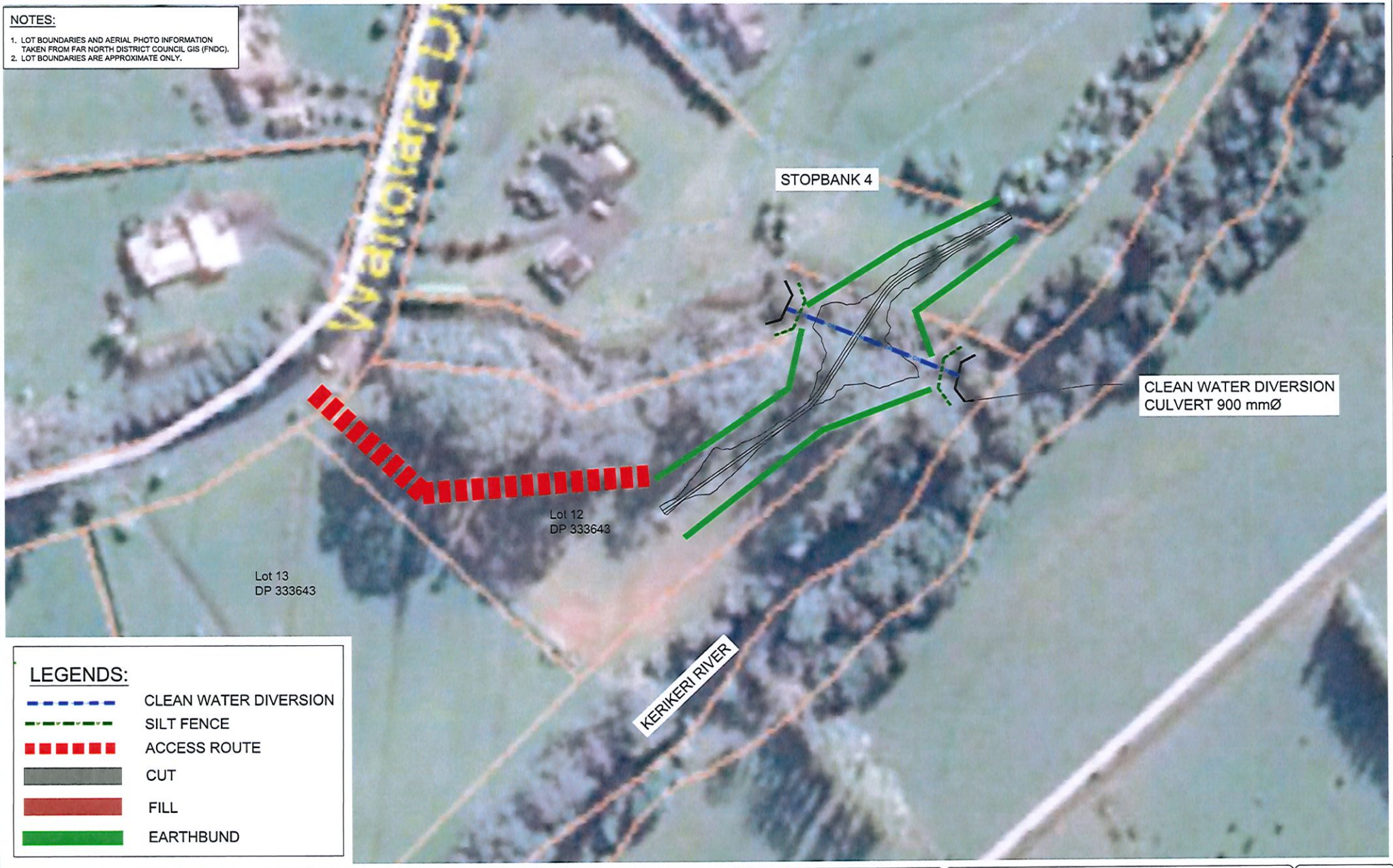
DWG No. EP3

Sheet No. 3 of 6

Plotted By Nandini Sharma at 18/09/2020 9:47:35 AM

NOTES:

1. LOT BOUNDARIES AND AERIAL PHOTO INFORMATION TAKEN FROM FAR NORTH DISTRICT COUNCIL GIS (FNDC).
2. LOT BOUNDARIES ARE APPROXIMATE ONLY.



LEGENDS:

- CLEAN WATER DIVERSION
- SILT FENCE
- ACCESS ROUTE
- CUT
- FILL
- EARTHBUND

Issue	Date	Revision
A	07/09/2020	FIRST ISSUE
B	18/09/2020	FOR TENDER

DWG Erosion & Sediment Control Plan
Stopbank 4

Scale 1:1000 @A3 (10 5 0 10 20 30 m) Date 07/09/2020

Drawn NS Checked JM Approved JM

File S:\8000-8999\8600 - 8699\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HWAUTOCAD\8667 - V19 NS.DWG

HAIGH WORKMAN Ltd
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Project Kerikeri River Stop Banks
Waitotara Drive

Client Northland Regional Council

Project No. 8667 RC no. rc no

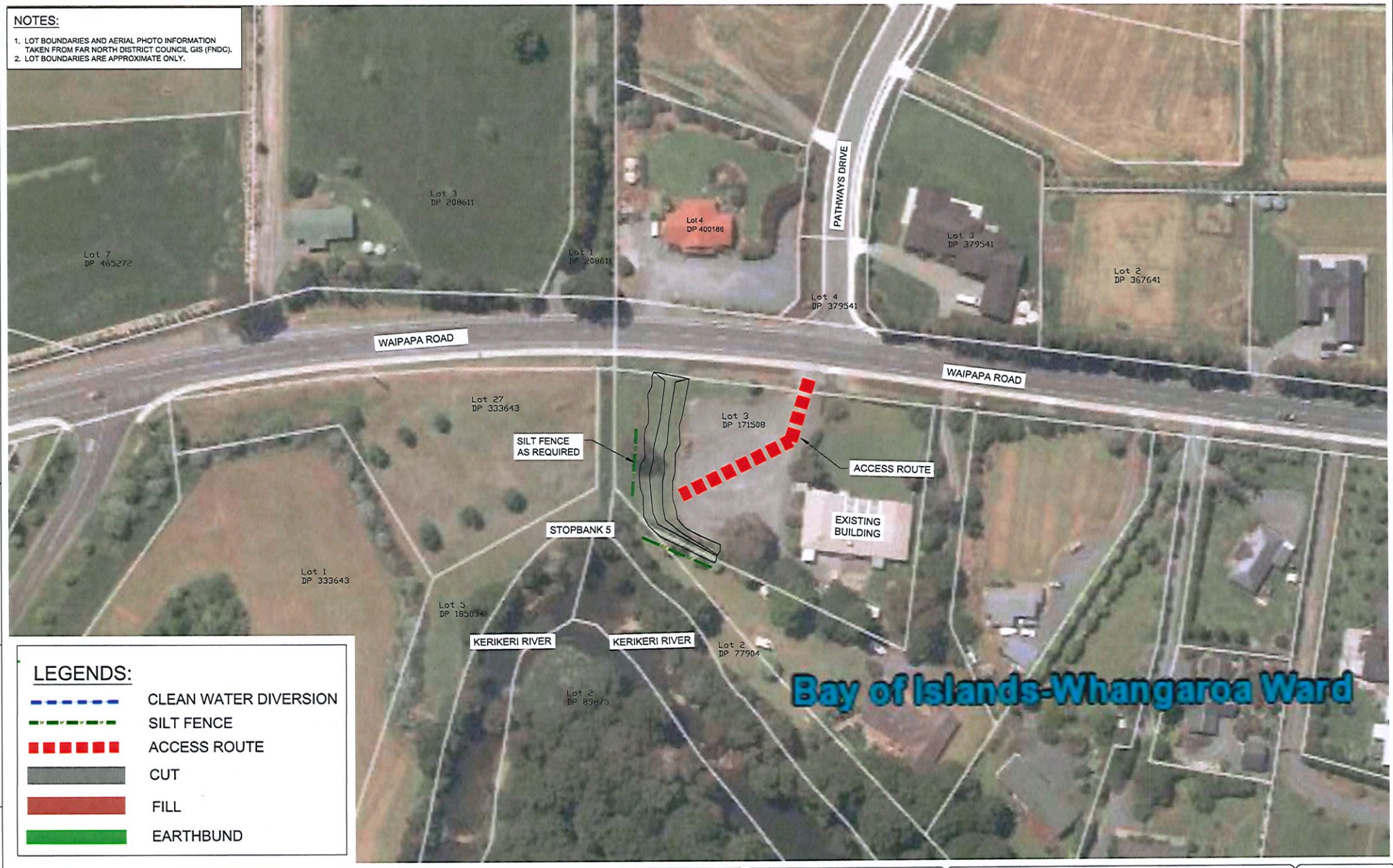
DWG No. EP4

Sheet No. 4 of 6

Plotted By Nandini Sharma at 18/09/2020 9:47:48 AM

NOTES:

1. LOT BOUNDARIES AND AERIAL PHOTO INFORMATION TAKEN FROM FAR NORTH DISTRICT COUNCIL GIS (FNDC).
2. LOT BOUNDARIES ARE APPROXIMATE ONLY.



LEGENDS:

- CLEAN WATER DIVERSION
- SILT FENCE
- ACCESS ROUTE
- CUT
- FILL
- EARTHBUND

Issue	Date	Revision
A	07/09/2020	FIRST ISSUE
B	18/09/2020	FOR TENDER

DWG Erosion & Sediment Control Plan
Stopbank 5

Scale 1:1000 @A3 (10 5 0 10 20 30 m) Date 07/09/2020

Drawn NS | Checked JM | Approved JM

File S:\8000-8999\8600 - 8699\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HWAUTOCAD\8667 - V19 NS.DWG

HAIGH WORKMAN Ltd
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Project: Kerikeri River Stop Banks
Waitotara Drive

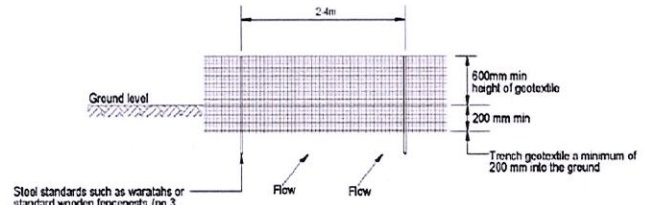
Client: Northland Regional Council

Project No. 8667 | RC no. rc no

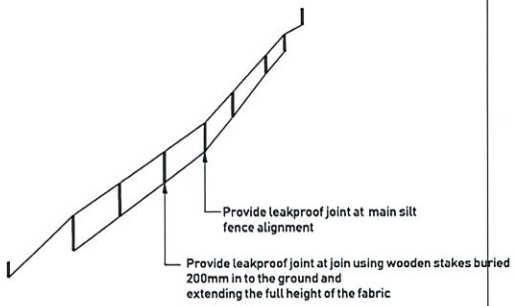
DWG No. EP5

Sheet No. 5 of 6

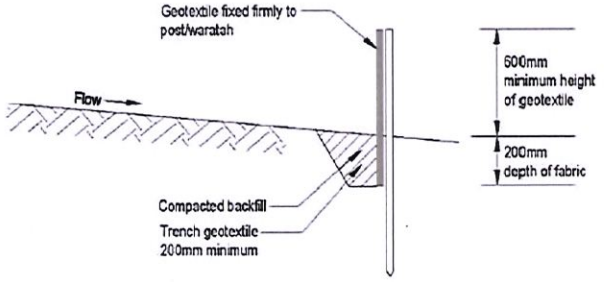
Plotted By Nandini Sharma at 18/09/2020 9:48:01 AM



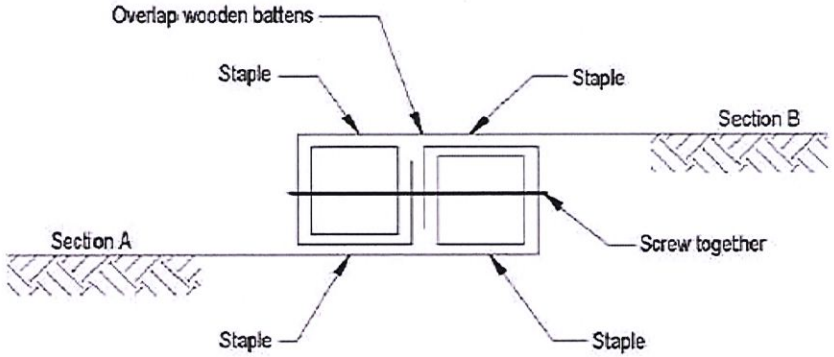
Elevation



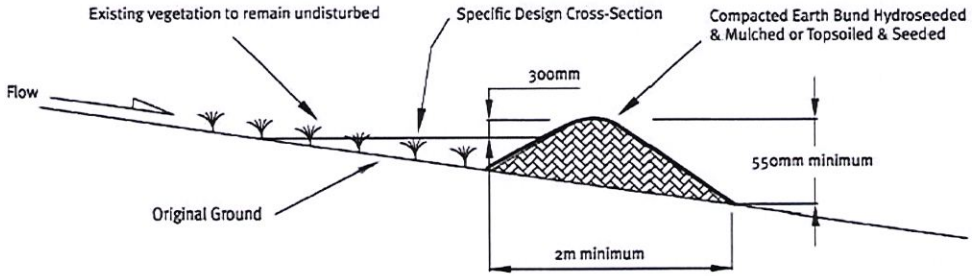
Silt fence with support wire



Cross-section



Standard fabric joint



Cross Section

'CLEAN WATER' DIVERGING CHANNEL & BUND (REFER TO GD05 SECTION E 2.1)
N.T.S

Issue	Date	Revision
A	09/09/2020	FIRST ISSUE
B	18/09/2020	FOR TENDER

DWG: Erosion and Sediment Control Typical Details

Scale: N.T.S | Date: 09/09/2020
Drawn: NS | Checked: JM | Approved: JM
File: S:\8000-8999\8600 - 8699\8667 - NRC WHIRIWHIRITOA\05 - DRAWINGS\HWA\AUTOCAD\8667 - V19 NS.DWG

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Project: Whiriwhiritoa Stream
Maritime Lane Bridge & State Highway 10
Client: Northland Regional Council
Project No.: 8667 | RC no.: rc no

DWG No.: EP6
Sheet No.: 6 of 6

Plotted By Nandini Sharma at 18/09/2020 9:48:14 AM

Appendix B – Calculations

With Improvements - Sample Cross-Section - Checks with Mannings Formula

	CS-	**A**						
			Ch	253	m			
A	19.31	m2				A	19.31	
			R	0.760835	m	R^2/3	0.833413	
P	25.38	m						
S				0.008900	m/m	S^1/2	0.09434	
n				0.035	unitless	n^-1	28.57143	
							43.4	m3/s
	CS-	**B**						
			Ch	318	m			
A	15.18	m2				A	15.18	
			R	1.091301	m	R^2/3	1.059977	
P	13.91	m						
S				0.008900	m/m	S^1/2	0.09434	
n				0.035	unitless	n^-1	28.57143	
							43.4	m3/s
	CS-	**C**						
			Ch	367	m			
A	16.18	m2				A	16.18	
			R	1.124392	m	R^2/3	1.081297	
P	14.39	m						
S				0.010360	m/m	S^1/2	0.101784	
n				0.035	unitless	n^-1	28.57143	
							50.9	m3/s
	CS-	**D**						
			Ch	443	m			
A	13.63	m2				A	13.63	
			R	0.933562	m	R^2/3	0.955202	
P	14.60	m						
S				0.013550	m/m	S^1/2	0.116404	
n				0.035	unitless	n^-1	28.57143	
							43.3	m3/s

Existing - Sample Cross-Section - Checks with Mannings Formula

	CS-	**K**						
			Ch	482	m			
A	22.17	m2				A	22.17	
			R	0.892153	m	R^2/3	0.926743	
P	24.85	m						
S				0.011270	m/m	S^1/2	0.10616	
n				0.035	unitless	n^-1	28.57143	
							62.3	m3/s
	CS-	**E**						
			Ch	520	m			
A	19.09	m2				A	19.09	
			R	0.84357	m	R^2/3	0.892786	
P	22.63	m						
S				0.011270	m/m	S^1/2	0.10616	
n				0.035	unitless	n^-1	28.57143	
							51.7	m3/s
	CS-	**E**						
			Ch	520	m			
A	19.09	m2				A	19.09	
			R	0.84357	m	R^2/3	0.892786	
P	22.63	m						
S				0.011270	m/m	S^1/2	0.10616	
n				0.035	unitless	n^-1	28.57143	
							51.7	m3/s
	CS-	**F**						
			Ch	520	m			
A	19.09	m2				A	19.09	
			R	0.84357	m	R^2/3	0.892786	
P	22.63	m						
S				0.011270	m/m	S^1/2	0.10616	
n				0.035	unitless	n^-1	28.57143	
							51.7	m3/s

Continued

	CS-	**G**						
			Ch	605	m			
A	18.11	m2				A	18.11	
			R	1.184434	m	R^2/3	1.119457	
P	15.29	m						
S				0.011270	m/m	S^1/2	0.10616	
n				0.035	unitless	n^-1	28.57143	
							61.5	m3/s
	CS-	**H**						
			Ch	640	m			
A	26.12	m2				A	26.12	
			R	1.387885	m	R^2/3	1.244235	
P	18.82	m						
S				0.011270	m/m	S^1/2	0.10616	
n				0.035	unitless	n^-1	28.57143	
							98.6	m3/s
	CS-	**I**						
			Ch	688	m			
A	22.04	m2				A	22.04	
			R	1.617021	m	R^2/3	1.377666	
P	13.63	m						
S				0.005770	m/m	S^1/2	0.075961	
n				0.035	unitless	n^-1	28.57143	
							65.9	m3/s