



Our Reference: 10624.1 (FNDC)

5 November 2024

Resource Consents Department  
Far North District Council  
JB Centre  
KERIKERI

Dear Sir/Madam

**RE: Proposed Subdivision & Land Use at 18 Station Road, Kawakawa – M & S  
Bradshaw**

I am pleased to submit application on behalf of Mike and Shirley Bradshaw, for a proposed subdivision of their property at Station Road, Kawakawa, zoned Residential. The subdivision results in sewerred lots complying with the controlled activity minimum lot size, however the proposal includes breaches of district wide rules in relation to access and setback, resulting in discretionary activity status.

The application fee of \$5,013 has been paid separately via direct credit (combined subdivision & land use fee).

Regards

Lynley Newport  
**Senior Planner**  
**THOMSON SURVEY LTD**

# Application for resource consent or fast-track resource consent

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

## 1. Pre-Lodgement Meeting

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

## 2. Type of Consent being applied for

*(more than one circle can be ticked):*

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

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

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

Yes  No

## 4. Consultation

Have you consulted with Iwi/Hapū?  Yes  No

If yes, which groups have you consulted with?

Who else have you consulted with?

For any questions or information regarding iwi/hapū consultation, please contact Te Hono at Far North District Council [tehonosupport@fndc.govt.nz](mailto:tehonosupport@fndc.govt.nz)

## 5. Applicant Details

**Name/s:**

Michael & Shirley Bradshaw

**Email:**

**Phone number:**

**Postal address:**

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

## 6. Address for Correspondence

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

**Name/s:**

Lynley Newport

**Email:**

**Phone number:**

**Postal address:**

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

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

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

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

**Name/s:**

as per item 5 above

**Property Address/  
Location:**

_____
_____
_____
_____

Postcode

## 8. Application Site Details

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

<b>Name/s:</b>	as per item 5		
<b>Site Address/ Location:</b>	18 Station Road		
	KAWAKAWA		
	Postcode		
<b>Legal Description:</b>	Lot 1 DP 526023	<b>Val Number:</b>	
<b>Certificate of title:</b>	843409		

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 *Secured*

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

Please contact applicant prior to any site visit.

## 9. Description of the Proposal:

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

Two lot subdivision in the Residential Zone meeting the zone's controlled activity minimum lot size; with breaches of access and waterbody setback resulting in application being a discretionary activity overall.

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

## 10. Would you like to request Public Notification?

Yes  No

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

(more than one circle can be ticked):

Building Consent

Regional Council Consent (ref # if known)

National Environmental Standard consent

Other (please specify)

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

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

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

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

Subdividing land

Disturbing, removing or sampling soil

Changing the use of a piece of land

Removing or replacing a fuel storage system

## 13. Assessment of Environmental Effects:

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

Your AEE is attached to this application  Yes

## 13. Draft Conditions:

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

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

## 14. Billing Details:

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

Name/s: (please write in full)

CHARLES EDWARD MICHAEL BRADSHAW / SHIRLEY JOYCE

Email:

Phone number:

Postal address:

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

### Fees Information

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

### Declaration concerning Payment of Fees

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

Name: (please write in full)

Charles Edward Michael Bradshaw Shirley Joyce Bradshaw

Signature:

(signature of bill payer)

Date 4/11/2024

## 15. Important Information:

### Note to applicant

You must include all information required by this form. The information must be specified in sufficient detail to satisfy the purpose for which it is required.

You may apply for 2 or more resource consents that are needed for the same activity on the same form. You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991.

### Fast-track application

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

### Privacy Information:

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

### 15. Important information continued...

#### Declaration

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

Name: (please write in full)

Charles Edward Michael Bradshaw Shirley Joyce Bradshaw

Signature:

[Redacted Signature]

Date 4/11/2024

#### Checklist (please tick if information is provided)

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

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

**Mike & Shirley Bradshaw**  
**PROPOSED SUBDIVISION**  
**18 Station Road, Kawakawa**  
**PLANNER'S REPORT &**  
**ASSESSMENT OF ENVIRONMENTAL EFFECTS**

Thomson Survey Ltd  
Kerikeri

## **1.0 THE PROPOSAL**

The applicants propose a two lot subdivision (one additional) of their land on Station Road, Kawakawa. The property is a serviced (sewered) site zoned Residential in the Operative District Plan (ODP). All existing built development on the property is to be contained within proposed Lot 2, with the additional proposed Lot 1 being vacant, north facing land, to be accessed via a driveway past the existing dwelling.

A scheme plan is attached in Appendix 1. This shows proposed Lot 1 (vacant) of 1300m<sup>2</sup> and proposed Lot 2 (supporting existing development) of 1387m<sup>2</sup>. Access to both lots is proposed to be via the existing access into the property, with Lot 1 being accessed via right of way easement A over Lot 2. This easement is also for services and water supply. Easement B, located within Lot 1, is to provide for the existing sewer reticulation serving Lot 2.

The site is zoned Residential in the ODP. This provides for up to 50% total site area to be in impermeable surface, and up to 45% of total site area to be in buildings. All existing development is to be in a new Lot 2 of 1387m<sup>2</sup>. As such, 624m<sup>2</sup> of building coverage and 693m<sup>2</sup> impermeable surfaces will be permitted. The current coverage is estimated at 200m<sup>2</sup> buildings and 650m<sup>2</sup> total impermeable, both within permitted activity threshold.

## **1.2 Scope of this Report**

This assessment and report accompanies the Resource Consent Application made by the applicant, and is provided in accordance with Section 88 and Schedule 4 of the Resource Management Act 1991. The application seeks consent to subdivide land in one title to create 2 lots. The information provided in this assessment and report is considered commensurate with the scale and intensity of the activity for which consent is being sought. Applicant details are contained within the Application Form 9.



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## 2.0 PROPERTY DETAILS

Location:	18 Station Road, Kawakawa. Location map attached in Appendix 2.
Legal description:	Lot 1 DP 526023
Record of Title:	843409 with an area of 2687m <sup>2</sup> . A copy is attached in Appendix 3.

## 3.0 SITE DESCRIPTION

### 3.1 Physical & Mapped characteristics

The property is accessed off Station Road on the north western edge of Kawakawa township. It is a serviced residential site, with connection to Council sewage and water systems.

The site supports a dwelling with swimming pool, along with a second residential unit and a workshop (refer to Consent History in section 3.3). There is driveway entrance coming up slope off Station Road, leading to a parking/ turning area adjacent to the two eastern buildings. The area in front of, and beside, the existing buildings is planted with basic landscaping. The land in proposed Lot 1 is predominantly in grass, with a few domestic fruit trees. There is boundary vegetation on western, northern and eastern boundaries of the proposed new Lot 1.

The site features a central ridge, upon which the existing buildings sit. The land slopes to the north and to the south of those buildings. The slope to the north (proposed additional lot) is moderate, leading down to low lying land on the adjacent site, mapped as being susceptible to flooding. The application site itself is not mapped as containing any land subject to a 10 year ARI event flood but the very north west corner, outside of any area proposed for development, is mapped as land subject to a 100 year ARI event flood.

The soils are imperfectly to very poorly drained *Wharekohe sandy loam* overlying thin-bedded carbonaceous sandstone and mudstone with intercalated thin conglomerates and lignite lenses of the Tauranga Group. The site is mapped as being at the extreme northern edge of the Kawakawa Coal Mine Area – refer to map on pg 11.

There is residential development on adjacent properties to west and east. Land to the north is an extensive flood plain area (Kawakawa Flood Plan). Also to the north is the rear of the old County Council offices, now occupied by “Hineamaru”. This land to the north is zoned Commercial reflecting its historic and current use. All other adjacent land is zoned Residential. The rail corridor (no track and currently part of the Twin Coast Cycle Trail (Pou Herenga Tai), runs to the south of the site, between the site and the township before following the old rail corridor embankment over the Kawakawa Floodplain and on to Moerewa.

### 3.2 Legal Interests on Titles

The property is not subject to any interests relevant to the subdivision.

### 3.3 Consent History

The applicants have previously subdivided their land. RC 2180315-RMASUB was issued in 2018, creating two allotments, one of which is the application site.

Building consent history found on the property file is as follows:

BP 5006495, issued in 1986 for a new dwelling and garage / workshop – the latter was fitted out for residential use pending completion of the new dwelling, and remains habitable (permitted activity);

BP 7012360, issued in 1990 for dwelling extensions;

BP 1019044, issued in 1991 for swimming pool and deck;

BC-2010-463, issued in 2009 for a garage / workshop.

## 4.0 SCHEDULE 4 – INFORMATION REQUIRED IN AN APPLICATION

### Clauses 2 & 3: Information required in all applications

<i>(1) An application for a resource consent for an activity must include the following:</i>	
<i>(a) a description of the activity:</i>	Refer Sections 1 and 5 of this Planning Report.
<i>(b) an assessment of the actual or potential effect on the environment of the activity:</i>	Refer to Section 6 of this Planning Report.
<i>(b) a description of the site at which the activity is to occur:</i>	Refer to Section 3 of this Planning Report.
<i>(c) the full name and address of each owner or occupier of the site:</i>	This information is contained in the Form 9 attached to the application.
<i>(d) a description of any other activities that are part of the proposal to which the application relates:</i>	Refer to Sections 3 and 5 of this Planning Report for existing activities within the site. The application is for subdivision only.
<i>(e) a description of any other resource consents required for the proposal to which the application relates:</i>	No other consents are required other than that being applied for pursuant to the Far North Operative District Plan.
<i>(f) an assessment of the activity against the matters set out in Part 2:</i>	Refer to Section 7 of this Planning Report.

<p><i>(g) an assessment of the activity against any relevant provisions of a document referred to in section 104(1)(b), including matters in Clause (2):</i></p> <p><i>(a) any relevant objectives, policies, or rules in a document; and</i>  <i>(b) any relevant requirements, conditions, or permissions in any rules in a document; and</i>  <i>(c) any other relevant requirements in a document (for example, in a national environmental standard or other regulations).</i></p>	<p>Refer to Sections 5 &amp; 7 of this Planning Report.</p>
<p><i>(3) An application must also include any of the following that apply:</i></p>	
<p><i>(a) if any permitted activity is part of the proposal to which the application relates, a description of the permitted activity that demonstrates that it complies with the requirements, conditions, and permissions for the permitted activity (so that a resource consent is not required for that activity under section 87A(1)):</i></p> <p><i>(b) if the application is affected by section 124 or 165ZH(1)(c) (which relate to existing resource consents), an assessment of the value of the investment of the existing consent holder (for the purposes of section 104(2A)):</i></p> <p><i>(c) if the activity is to occur in an area within the scope of a planning document prepared by a customary marine title group under section 85 of the Marine and Coastal Area (Takutai Moana) Act 2011, an assessment of the activity against any resource management matters set out in that planning document (for the purposes of section 104(2B)).</i></p>	<p>Refer sections 3 and 5.</p> <p>There is no existing resource consent. Not applicable.</p> <p>The site is not within an area subject to a customary marine title group. Not applicable.</p>

**Clause 4: Additional information required in application for subdivision consent**

<p><i>(4) An application for a subdivision consent must also include information that adequately defines the following:</i></p>	
<p><i>(a) the position of all new boundaries:</i>  <i>(b) the areas of all new allotments, unless the subdivision involves a cross lease, company lease, or unit plan:</i>  <i>(c) the locations and areas of new reserves to be created, including any</i></p>	<p>Refer to Scheme Plans in Appendix 1.</p>

<p><i>esplanade reserves and esplanade strips:</i>  <i>(d) the locations and areas of any existing esplanade reserves, esplanade strips, and access strips:</i>  <i>(e) the locations and areas of any part of the bed of a river or lake to be vested in a territorial authority under section 237A:</i>  <i>(f) the locations and areas of any land within the coastal marine area (which is to become part of the common marine and coastal area under section 237A):</i>  <i>(g) the locations and areas of land to be set aside as new roads.</i></p>	
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**Clause 5: Additional information required for application for reclamation – not applicable.**

**Clause 6: Information required in assessment of environmental effects**

<p><i>(1) An assessment of the activity's effects on the environment must include the following information:</i></p>	
<p><i>(a) if it is likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity:</i></p>	<p>Refer to Section 6 of this planning report. The activity will not result in any significant adverse effect on the environment.</p>
<p><i>(b) an assessment of the actual or potential effect on the environment of the activity:</i></p>	<p>Refer to Section 6 of this planning report.</p>
<p><i>(c) if the activity includes the use of hazardous installations, an assessment of any risks to the environment that are likely to arise from such use:</i></p>	<p>Not applicable as the application does not involve hazardous installations.</p>
<p><i>(d) if the activity includes the discharge of any contaminant, a description of—</i>  <i>(i) the nature of the discharge and the sensitivity of the receiving environment to adverse effects;</i>  <i>and</i>  <i>(ii) any possible alternative methods of discharge, including discharge into any other receiving environment:</i></p>	<p>The subdivision does not involve any discharge of contaminant.</p>
<p><i>(e) a description of the mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect:</i></p>	<p>Refer to Section 6 of this planning report.</p>
<p><i>(f) identification of the persons affected</i></p>	<p>Refer to Section 8 of this planning report.</p>

<i>by the activity, any consultation undertaken, and any response to the views of any person consulted:</i>	
<i>g) if the scale and significance of the activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved:</i>	No monitoring is required as the scale and significance of effects does not warrant any.
<i>(h) if the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).</i>	No protected customary right is affected.

**Clause 7: Matters that must be addressed by assessment of environmental effects (RMA)**

<i>(1) An assessment of the activity's effects on the environment must address the following matters:</i>	
<i>(a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects:</i>	Refer to Sections 6 and 8 of this planning report and also to the assessment of objectives and policies in Section 7.
<i>(b) any physical effect on the locality, including any landscape and visual effects:</i>	Refer to Section 7. The proposed activity will have no adverse effects on the physical environment and landscape and visual amenity values.
<i>(c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity:</i>	Refer to Section 7. The proposal will result in no adverse effects in regard to habitat and ecosystems.
<i>(d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations:</i>	Refer to Section 7, and above comments
<i>(e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants:</i>	The subdivision will not result in the discharge of contaminants, nor any unreasonable emission of noise.
<i>(f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or hazardous installations.</i>	The subdivision site is not subject to natural hazards and does not involve hazardous installations.

## 5.0 ACTIVITY STATUS

### 5.1 Operative Far North District Plan

The site is zoned Residential, is a sewerred site, and has no resource features.

Subdivision Minimum Lot Sizes:

**Table 13.7.2.1: Minimum Lot Sizes**

(v) RESIDENTIAL ZONE

Controlled Activity Status (Refer also to 13.7.3)	Restricted Discretionary Activity Status (Refer also to 13.8)	Discretionary Activity Status (Refer also to 13.9)
The minimum lot sizes are 3,000m <sup>2</sup> (unsewered) and 600m <sup>2</sup> (sewered).		The minimum lot sizes are 2,000m <sup>2</sup> (unsewered) and 300m <sup>2</sup> (sewered)

Both lots are in excess of 600m<sup>2</sup>. The subdivision is a **controlled** subdivision activity.

Land Use – Zone Rules:

All existing development is to be within Lot 2. The zone provides for up to 50% total site area to be in impermeable surface, and up to 45% of total site area to be in buildings. All existing development is to be in a new Lot 2 of 1387m<sup>2</sup>. As such, 624m<sup>2</sup> of building coverage and 693m<sup>2</sup> impermeable surfaces will be permitted. The current coverage is estimated at 200m<sup>2</sup> buildings and 650m<sup>2</sup> total impermeable, both within permitted activity threshold.

Existing buildings are all less than 8m in height and all are more than 1.2m from side boundaries, and 3m from road boundary. The proposed new boundary has been placed sufficient distance from existing buildings so as not to create any Sunlight breach from existing buildings on Lot 2.

Whilst two buildings are used for residential purposes, this is, and will remain, within the zone's permitted Residential Intensity for sewerred site – one per 600m<sup>2</sup>.

In summary, I have not identified any zone rule breaches resulting from the proposed subdivision.

District Wide Rules:

The site is not subject to rules in Chapter 12.1 (outstanding landscapes and features). No indigenous vegetation clearance is proposed or necessary so Chapter 12.2 is not relevant. On site earthworks related to giving effect to the subdivision are minimal as access already exists to the proposed new lot boundary. Compliance with Chapter 12.3 is assured.

Chapter 12.4 addresses coastal hazard in specific coastal communities, none of which are relevant to the application site. It also contains a rule requiring a 20m buffer setback distance from any residential unit and the dripline of any area of bush or scrubland. Land to the north and west was in vegetation that could conceivably have been regarded as an 'area' from which a 20m setback must be achieved. However, some of the vegetation has been cleared and only boundary planting remains. I believe a new dwelling can be established complying with the rule in question.

The site does not contain any resources to which Chapter 12.5 (Heritage) applies.

The site is immediately adjacent the Kawakawa Flood Plain, described as a "Known Wetland" on the regional council's on-line maps. Rules in Chapter 12.7, as they relate to a wetland, may therefore be relevant. Rule 12.7.6.1.1 Setback from Lakes, Rivers and the Coastal Marine Area does not apply to wetlands and is therefore not relevant. Rule 12.7.6.1.2, however, applies to 'smaller lakes, rivers and wetlands'. In order for the setback requirements in that rule to apply, the wetland must be in excess of 1ha in area, which the Kawakawa Flood Plain clearly is. The rule reads:

*Any building and any impermeable surface must be set back from the boundary of lakes (where the lake bed has an area of less than 8ha) smaller continually flowing rivers (where the average width of the river bed is less than 3m) and wetlands except that this rule does not apply to man-made private water bodies. The setback shall be:*

- (a) 3 x the area (ha) of the lake (e.g. if the lake is 5ha in area, the setback shall be 15m); and/or*
- (b) 10 x the average width of the river where it passes through or past the site; provided that in both cases the minimum setback shall be 10m and the maximum setback shall be no more than the minimum required by Rule 12.7.6.1.1 above;*
- (c) 30m for any wetland of 1ha or more in area.*

Given that the Kawakawa Flood Plain (identified as a wetland) is near the property boundary, and given that the proposed vacant lot is approximately 40m across at its widest point, part (c) of Rule 12.7.6.1.2 cannot be met. **This application therefore includes a breach of Rule 12.7.6.1.2(c).**

Rule 12.7.6.1.3 applies to land use activities *within* an indigenous wetland. No works are proposed *within* a wetland.

Rule 12.7.6.1.4 Land Use Activities Involving Discharges of Human Sewage Effluent, part (a) provides for the effluent discharges to a lawfully established reticulated sewerage system, which in this case the lots will be able to do.

Chapter 15.1.6C addresses traffic, parking and access. Station Road is 20m legal width (and wider in places). It is sealed up to and including the Kawakawa Fire Station. From there the physical formation of 'road' is quite unusual. Whilst all still within road reserve, formed access splits, the lower access used as part of the cycle trail, joining up with rail corridor further west. The upper road provides access to several residential sites, one of which is the application

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site. Station Road is listed on the Council's Roading Database as being maintained by Council. From State Highway 1 intersection for a distance of 104m it is listed as 'low volume' thin surface flexible (sealed) and then from the end of the seal to the entrance to #18 Station Road (the application site's entrance) the road is described as 'low volume' unsealed. The road is not formed to public urban standard (which requires a sealed surface and greater carriageway width than exists currently). As such **Rule 15.1.5C.1.8 Frontage to Existing Roads, part (b) cannot be met.** Refer to section 6.8 of the AEE for further commentary on this aspect.

The crossing into the site is an existing crossing and is considered suitable for serving two residential sites. The proposed shared accessway is not a concrete/sealed driveway and it is preferred not to concrete/seal it. An urban access serving two or more activities is required to be sealed/concreted pursuant to **Rule 15.1.6C.1.2(c).**

The failure to comply with Rules 12.7.6.1.2(c), 15.1.6C.1.2(c) and 15.1.6C.1.8(b) results in discretionary activity status.

**Overall, therefore, the subdivision is a discretionary activity.**

## 5.2 Proposed Far North District Plan

The Proposed District Plan (PDP) was publicly notified on 27<sup>th</sup> July 2022. Although still in hearings stage, legal effect must be given to any rules that the Council has identified in the PDP as having immediate legal effect. Such rules may affect activity status of an application.

In this instance I have examined the PDP, where the application site is proposed to be zoned General Residential, confirming the Council's view that the site is within an area suitable for residential development.

There are no zone rules that have legal effect and therefore rules applying to the General Residential Zone do not have to be considered in regard this application, or its activity status.

In regard to district wide considerations in the PDP, the only rules in the Subdivision chapter that are marked as having immediate legal effect are those pertaining to Environmental Benefit Subdivisions (not applicable in this instance); Subdivision of a site within a heritage area overlay (again not applicable); Subdivision of a site that contains a scheduled heritage resource (again not applicable); Subdivision of a site containing a scheduled site and area of significance to Maori (not applicable); and Subdivision of a site containing a scheduled SNA (not applicable).

There are two earthworks rules and associated standards in the PDP that have legal effect. The requirements of those rules – related to observance of the ADP, and G05 Erosion and Sediment Control standards, can be achieved via conditions of consent.

No rules in the Transportation chapter of the PDP have legal effect.



In summary, I have not identified any rules in the PDP that have immediate legal effect and must therefore be considered in determining activity status for this proposal.

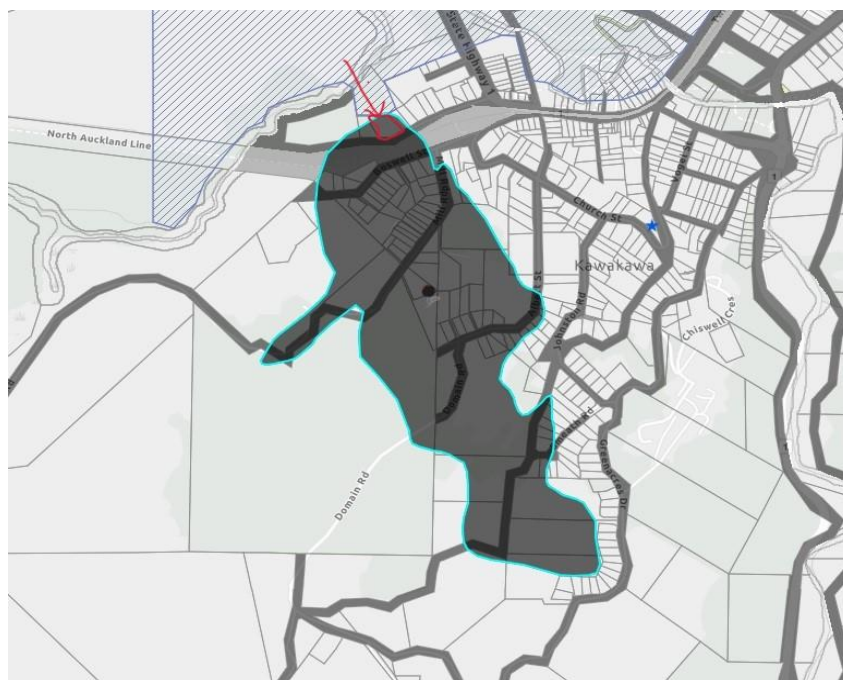
## 6.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS

### 6.1 Allotment Sizes and Dimensions

The property is zoned Residential and is a sewered site. The minimum lot size provided for in the ODP is 600m<sup>2</sup>. In the case of this application, both lots are in excess of 1300m<sup>2</sup> – more than twice the size provided for. This allows plenty of scope within the lots for built environment. All existing development is to be within proposed Lot 2 with the vacant lot 1300m<sup>2</sup> in area and readily able to accommodate a 14m x 14m square building envelope in compliance with the zone's boundary setback requirements (1.2m).

### 6.2 Natural and Other Hazards

The property is within the area mapped as the "Kawakawa coal mine map" – refer to map below. The application site is outlined in red. The potential /risk of hazard as a result of this has been assessed in Section 10.0 of the Subdivision Site Suitability Report supporting this application. This included historical research. No surface workings were undertaken in the vicinity of the application site. The closest shaft was some distance from the site. Records indicate that mining did not extend this far north because of the proximity of the flood plain.



Kawakawa coal mine map – subject site at extreme northern edge

The report concludes that the coal mining has no anticipated effects. In regard to natural hazards more generically, the Subdivision Site Suitability Engineering Report supporting the application (refer Appendix 4) contains a summary assessment in its Section 10.

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The report concludes that in terms of erosion hazard risk, there is 'potential at stormwater outlet and earthworks areas' and that 'mitigation [can be] provided by means of suitable outlet device and ESC controls' such effects are less than minor. The report also acknowledges that overland flowpaths, flooding and inundation may appear to be risk given proximity of low lying and wetland areas, but concludes that there is no indication of flooding hazard within the site boundaries, only downstream. Mitigation can be provided to ensure resultant effects are less than minor.

Risks associated with landslip, rockfall, alluvion, avulsion, unconsolidated fill, soil contamination, subsidence, fire hazard or sea level rise are not considered applicable to the site.

### **6.3 Water Supply**

The site is located within a public water supply area and there is a public 65mm MDPE water supply pipeline outside the eastern boundary. Existing water connection will continue to serve Lot 2, with a new water meter proposed to be installed at the roadside boundary of Lot 2 to service Lot 1. There is a fire hydrant within Station Road approximately 120m from the site, and a second hydrant 270m away (on State Highway1). This meets SNZ PAS 4509:2008 standards.

### **6.4 Energy Supply & Telecommunications**

The application site has power and telecommunications connections and additional connections can be provided.

### **6.5 Stormwater Disposal**

The proposed development does not / will not create any breach of the zone's permitted impermeable surface coverage (50% total site area). The Subdivision Site Suitability Report in Appendix 4 contains a Stormwater Assessment in its Section 7. A stormwater management concept is outlined in 7.2. The Design Storm Event and Concept Stormwater Attenuation are described in sections 7.3 and 7.4, with on lot discharge dispersion for new vacant Lot 1 outlined in 7.4.1.

### **6.6 Sanitary Sewage Disposal**

The site is within the Area of Benefit and has existing connection to Council's system, with an existing 100mm diameter public drain running in a north easterly direction to a public manhole before connecting to a 225mm diameter concrete drain. Easement has been provided over the existing line where this will cross new Lot 1. The application seeks an additional connection to the same line.

The Subdivision Site Suitability Report in Appendix 4 contains a Wastewater Assessment in its Section 6. It is proposed that Lot 1 will connect to the existing 100mm diameter public drain via gravitational flow. The finished floor level of a future dwelling will need to take this into consideration.

### **6.7 Easements for any purpose**

Easements are proposed for access, power, telecommunications and water over A on the scheme plan, and to drain sewage over B on the scheme plan. Refer to Scheme Plans in Appendix 1.

## 6.8 Property Access

Access to the site was addressed in part in Section 5.1 of this report. The Council consented the previous subdivision applied for by the applicants, with no access upgrade requirement other than to upgrade the crossing to the other lot created, and to 'upgrade the existing formation to provide formed and metalled access on the Station Road Legal Road alignment to 3m finished metalled carriageway width. This work was done in order to satisfy the Council's s224(c) condition.

Works have been carried out on the access road serving the application site, reasonably recently. This work involved re-surfacing, drainage and carriageway width widening.



*From site crossing (bottom left hand corner) looking eastwards back towards 'town'.*



*Where sealed Station Road meets unsealed portion providing access to application site, looking west*

The works were carried out by Council. The application includes a breach of Rule 15.1.6C.1.8(b) because, even though a Council road, it is not to the required Urban Type public road and it is well beyond the financial means of the applicants, and indeed any

private parties, to carry out the necessary upgrade works to turn into an urban street. I believe the access road to the application is to a standard suitable for the number of properties it serves and capable of supporting one additional residential unit.

Internal to the site it is proposed that the lots share the accessway. This is not concreted/sealed and utilises low impact stormwater design such that there is very little impact of flow onto Council road reserve. It would have a negative off site effect to concrete / seal the shared accessway. It is not at a gradient of steeper than 1:4 so there is no need to concrete/seal it for traction purposes. The existing crossing and driveway is well formed and surfaced with compacted metal. See below.



*Driveway entrance into site – photo taken June 2024*

## **6.9 Effects of Earthworks**

Very little earthworks, if any, will be required to give effect to the subdivision. The Subdivision Site Suitability Report in Appendix 4 contains a section on Earthworks (Section 9). Only minor cut/fill earthworks (<15m<sup>3</sup>) will be required to create a suitable transition to Lot 1 boundary from Lot 2. However, this is so minor, and access already exists up to that point of transition, that the transition works need not be a condition of subdivision works and can occur at time of building consent, especially given that the area of potential works is also where services lie.

The Report's sections 9.1 and 9.2 address future bulk earthworks at time of development, with general recommendations and erosion and sediment control measures.

## **6.10 Building Locations**

All existing buildings are to be within Lot 2. The vacant lot is up and over the 'ridge' and includes the gently to moderately north facing slope, down the other side. Lot 1 can readily accommodate a dwelling on the moderate slope, well elevated from low lying set areas on adjacent land to the north. The only restrictions on finished floor levels are to ensure they are elevated enough in relation to reticulated wastewater services to enable gravity flow.

The Subdivision Site Suitability assessment found no obvious indications of major deep-seated instability, nor any obvious indications of any shallow instability. The stability analysis undertaken resulted in a 'pass' – refer Table 5 of the Subdivision Site Suitability Report.

It is anticipated that shallow foundations such as timber pole or standard raft/strip footings can be adopted for a future dwelling.

### **6.11 Preservation and enhancement of heritage resources (including cultural), vegetation, fauna and landscape, and land set aside for conservation purposes**

The site is zoned Residential with no resource feature overlays. It contains no features mapped in the Regional Policy Statement as having any high or outstanding landscape or natural values. The NRC's Biodiversity Wetland map layer shows the very edges of one of its "Top 150 Wetlands" (Kawakawa Flood Plain) nestled against, and partially encroaching (to a minor extent) into the property's north western corner. The Flood Plain is also mapped as a PNA (see below). Works carried out on the adjacent site may have affected the outer edge/boundary of the flood plain 'wetland' such that it is now further from the application site. There is certainly no wetland habitat encroaching into the application site.

There is no land set aside for conservation purposes within the application site.

#### Vegetation/habitat

Within the application site itself there are no areas of significant indigenous vegetation or habitat. As stated earlier, adjacent to the site, stretching away to the north, is the mapped Kawakawa Flood Plain – a known (and very large) wetland area. This is mapped "known wetland" (NRC on-line maps) and is also a Protected Natural Area (P05/105 Kawakawa Flood Plain). Care will need to be taken to ensure development of the site (a) remains more than 10m from the edge of the physical wetland feature (readily achievable); and (b) compliance with the National Environmental Standard Freshwater NES F is achieved at time of any future development of the proposed vacant lot, or that the necessary consent is obtained. No subdivision site works (limited to access upgrading only, if required) will require consent under the NES F as any such work will be to a different slope/ catchment and have no impact on the floodplain' hydrology.

Any earthworks required in the creation of a building platform and driveway/parking for a future development on the vacant lot, will need to ensure no drainage or partial drainage of the wetland (highly unlikely given any earthworks will be *upslope* of a massive floodplain; and that any damming or diversion of water similarly does not drain or partially drain the wetland (again highly unlikely given that any works will be *upslope* and the flood plain is so vast that any damming or diversion of water off the application site will have nil / negligible impact on such a feature. The target attenuation for stormwater management on and from Lot 1 is up to and including 80% of the pre-development condition for the 1% AEP storm events.

Consent under the NES F will be required for development within Lot 1 if, and only if, there is a hydrological connection between the diversion of water and the wetland *and* then only if

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any such diversion will change, or is likely to change, the water level range or hydrological function of the wetland. Noting the vastness of the "wetland" which is effectively a flood plain, this is highly unlikely to occur. No works need be carried *within* any area of wetland.

The owners of the site have allowed vegetation growth to re-generate in the north western corner of their site and it is intended to retain that vegetation, albeit the PNA is classified as such because of its 'wetland' characteristics and habitat, not because of indigenous bush.

In short, I do not believe the development of the vacant lot, zoned for residential use, will adversely affect the adjacent wetland, or any indigenous vegetation.

#### Fauna

The site is in town and urban, being less than 300m from the CBD. The site is not mapped as either high density kiwi or kiwi present. No restrictions on the keeping of cats or dogs on the lots is considered necessary.

#### Heritage/Cultural

There are no listed or mapped Sites of Significance to Maori on the application site, nor any historic buildings, sites, notable trees or archaeological sites as mapped and/or listed in the District Plan or Far North Maps.

### **6.12 Soil**

The site has never been used for any kind of productive horticultural purpose and it is highly unlikely it ever will be. The proposal does not adversely impact on the life supporting capacity of soils.

### **6.13 Access to, and protection of, waterbodies**

Refer to section 6.11 above. I believe the proposal can occur without adverse effects on the adjacent Kawakawa Flood Plain. There is no requirement to provide any public access to a wetland / flood plain.

### **6.14 Land use compatibility (reverse sensitivity)**

The site adjoins Commercial zoned land on its northern boundary. However, that land is undeveloped where it bounds the application site, other than storing materials, and is likely to remain undeveloped given the proximity to the Kawakawa Flood Plain. The application site is separated from the adjacent site by boundary plantings such that visual screening is in place between the Residential zoned site and the Commercial zoned site. This is an existing zone interface, with residential development an anticipated use on the Residential zoned application site. I do not believe the proposal results in minor or more than minor reverse sensitivity effects.

### **6.15 Proximity to Airports**

The site is outside of any identified buffer area associated with the Bay of Islands Airport.

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### **6.16 Natural Character of the Coastal Environment**

The site is not within the Coastal Environment.

### **6.17 Energy Efficiency and renewable Energy Development/Use**

Individual future lot owners may take the opportunity to install energy efficiency devices when they build.

### **6.18 National Grid Corridor**

The National Grid does not run through the application site.

### **6.19 Effects on Character and Amenity**

The zoning of the site encourages residential development. The properties to the west and east of the application site are of areas (size) less than the application site and both contain residential development. The application site is the one remaining site in this area that remains relatively large. Its subdivision into two smaller sites will result in a density level in keeping with the character and amenity of the area. Being 'over the back' of the site, new development will look northwards and be in a different visual catchment to some of the other dwellings on Station Road – which are south orientated.

The existing development to be in Lot 2 will overlook future development within Lot 1. However, it is likely, given the orientation of the slope, that the outdoor living portion of new Lot 1 will be on the far (northern) side of any buildings constructed on the lot. The applicants have already commenced some landscape plantings along the northern side of the existing dwelling.

### **6.20 Other Matters**

#### Cumulative Effect:

Comment has already been made in regard the site's zoning and the existing character and amenity of the immediate area. The subdivision will not create adverse cumulative effects.

#### Precedent Effect:

Precedent effects are not amongst those effects to be considered when determining the level of effects on the wider environment for the purposes of assessing whether notification is required. They are instead a matter for consideration when a consent authority is considering whether or not to grant a consent. Precedent effects are generally a consideration for non complying activities, which this is not.

A subdivision creating lots complying with the controlled activity minimum lot size, does not create a precedent that would threaten the integrity of the ODP in terms of density levels and future residential intensity

## **7.0 STATUTORY ASSESSMENT**

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## 7.1 Far North District Plan Objectives and Policies

Objectives and policies relevant to this proposal are considered to be primarily those listed in Chapters 7.6 (Residential Zone); and 13 (Subdivision), of the District Plan. These are listed and discussed below where relevant to this proposal.

### Subdivision Objectives & Policies

#### Objectives

*13.3.1 To provide for the subdivision of land in such a way as will be consistent with the purpose of the various zones in the Plan, and will promote the sustainable management of the natural and physical resources of the District, including airports and roads and the social, economic and cultural well being of people and communities*

This is an enabling objective. The Residential Zone “enables the development of residential areas where the effects of activities permitted in the zone are compatible with sustainable development and with the existing character and amenity which is typically medium density residential living”.

I consider the proposal to be consistent with the purpose of the zone and one that will promote sustainable development consistent with the existing character and amenity.

*13.3.2 To ensure that subdivision of land is appropriate and is carried out in a manner that does not compromise the life-supporting capacity of air, water, soil or ecosystems, and that any actual or potential adverse effects on the environment which result directly from subdivision, including reverse sensitivity effects and the creation or acceleration of natural hazards, are avoided, remedied or mitigated.*

The Assessment of Environmental Effects, and supporting reports, concludes that the proposed subdivision is appropriate for the site and that any actual or potential adverse effects can be avoided, remedied or mitigated. The proposal will not compromise the life-supporting capacity of air, water, soil or ecosystems.

The site is not adversely affected by historic coal mining in the more general area south of the site.

Objectives 13.3.3 and 13.3.4 refer to outstanding landscapes or natural features; and scheduled heritage resources; and to land in the coastal environment. By proposing development on residential zoned land that is none of these things, the proposal is consistent with these objectives as it will not create any adverse effects on the values and character outlined in the two objectives.

*13.3.5 To ensure that all new subdivisions provide a reticulated water supply and/or on-site water storage and include storm water management sufficient to meet the needs of the activities that will establish all year round.*

The site is connected to the Council's reticulated water supply. Stormwater Management has been addressed in supporting reports and can be designed to ensure no off site adverse effects. Attenuation measures are recommended.



Subdivision

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13.3.6 To encourage innovative development and integrated management of effects between subdivision and land use which results in superior outcomes to more traditional forms of subdivision, use and development, for example the protection, enhancement and restoration of areas and features which have particular value or may have been compromised by past land management practices.

This objective is likely intended to encourage Management Plan applications, and does not have a lot of relevance to this proposal.

13.3.7 To ensure the relationship between Maori and their ancestral lands, water, sites, wahi tapu and other taonga is recognised and provided for.

And related Policy

13.4.11 That subdivision recognises and provides for the relationship of Maori and their culture and traditions, with their ancestral lands, water, sites, waahi tapu and other taonga and shall take into account the principles of the Treaty of Waitangi.

The site is not known to contain any sites of cultural significance to Maori, or wahi tapu. The site is adjacent to the Kawakawa Flood Plain, however, I believe the vacant lot can be developed in such a way as to mitigate any adverse effects on that flood plain. The site is connected to Council sewage reticulation system. I do not believe that the proposal adversely impacts on the ability of Maori to maintain their relationship with ancestral lands, water, sites, wahi tapu and other taonga.

13.3.8 To ensure that all new subdivision provides an electricity supply sufficient to meet the needs of the activities that will establish on the new lots created.

Top Energy has confirmed to the applicant that electricity can be provided to the vacant lot.

13.3.9 To ensure, to the greatest extent possible, that all new subdivision supports energy efficient design through appropriate site layout and orientation in order to maximise the ability to provide light, heating, ventilation and cooling through passive design strategies for any buildings developed on the site(s).

13.3.10 To ensure that the design of all new subdivision promotes efficient provision of infrastructure, including access to alternative transport options, communications and local services.

A future lot owner will have sufficient scope without the site to include energy efficiencies within their individual home designs, via active means such as solar panels, or passive design strategies such as sky lights and orientation.

The subdivision is close to the Kawakawa township and highway network.

Objective 13.3.11 is not discussed further as there is no National Grid on or near the subject site.

Policies

13.4.1 That the sizes, dimensions and distribution of allotments created through the subdivision process be determined with regard to the potential effects including cumulative effects, of the use of those allotments on:

Subdivision

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- (a) natural character, particularly of the coastal environment;
- (b) ecological values;
- (c) landscape values;
- (d) amenity values;
- (e) cultural values;
- (f) heritage values; and
- (g) existing land uses.

The values outlined above, along with existing uses, have been discussed earlier in this report. I believe regard has been had to items (a) through (g) in the design of the subdivision.

*13.4.2 That standards be imposed upon the subdivision of land to require safe and effective vehicular and pedestrian access to new properties. And*

*13.4.5 That access to, and servicing of, the new allotments be provided for in such a way as will avoid, remedy or mitigate any adverse effects on neighbouring property, public roads (including State Highways), and the natural and physical resources of the site caused by silt runoff, traffic, excavation and filling and removal of vegetation.*

Access to the site is off existing public roads and a crossing into the site is already in place. No vegetation clearance or significant earthworks is required to give effect to the subdivision.

*13.4.3 That natural and other hazards be taken into account in the design and location of any subdivision.*

The site is not subject to any significant hazard.

*13.4.4 That in any subdivision where provision is made for connection to utility services, the potential adverse visual impacts of these services are avoided.*

It is envisaged that internal to the site, utility services will be underground.

*13.4.6 That any subdivision proposal provides for the protection, restoration and enhancement of heritage resources, areas of significant indigenous vegetation and significant habitats of indigenous fauna, threatened species, the natural character of the coastal environment and riparian margins, and outstanding landscapes and natural features where appropriate.*

The site is not known to contain any heritage resources and is not in the coastal environment. It does not contain any outstanding landscape or natural features. It is adjacent to the Kawakawa Flood Plain, regarded as a wetland, however development on the vacant lot can remain clear of that wetland. Given that the site is already fenced off from the wetland, I do not believe any further protection can be required (outside of the property boundary).

Policy 13.4.7 is not discussed as this relates to carparking associated with non residential activities (not relevant) or esplanade areas, none of which are required or considered necessary.

*13.4.8 That the provision of water storage be taken into account in the design of any subdivision.*

This is discussed earlier. The property is connected to Council's reticulated water supply.

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Policies 13.4.9 and 13.4.10 are not discussed further. The former relates to bonus development donor and recipient areas, which are not contemplated in this proposal; whilst the latter only applies to subdivision in the Conservation Zone.

13.4.12 *That more intensive, innovative development and subdivision which recognises specific site characteristics is provided for through the management plan rule where this will result in superior environmental outcomes.*

The application is not lodged as a Management Plan application.

13.4.13 *Subdivision, use and development shall preserve and where possible enhance, restore and rehabilitate the character of the applicable zone in regards to **s6 matters**. In addition subdivision, use and development shall avoid adverse effects as far as practicable by using techniques including:*

*(a) clustering or grouping development within areas where there is the least impact on natural character and its elements such as indigenous vegetation, landforms, rivers, streams and wetlands, and coherent natural patterns;*

*(b) minimising the visual impact of buildings, development, and associated vegetation clearance and earthworks, particularly as seen from public land and the coastal marine area;*

*(c) providing for, through siting of buildings and development and design of subdivisions, legal public right of access to and use of the foreshore and any esplanade areas;*

*(d) through siting of buildings and development, design of subdivisions, and provision of access that recognise and provide for the relationship of Maori with their culture, traditions and taonga including concepts of mauri, tapu, mana, wehi and karakia and the important contribution Maori culture makes to the character of the District (refer Chapter 2 and in particular Section 2.5 and Council's "Tangata Whenua Values and Perspectives" (2004);*

*(e) providing planting of indigenous vegetation in a way that links existing habitats of indigenous fauna and provides the opportunity for the extension, enhancement or creation of habitats for indigenous fauna, including mechanisms to exclude pests;*

*(f) protecting historic heritage through the siting of buildings and development and design of subdivisions.*

*(g) achieving hydraulic neutrality and ensuring that natural hazards will not be exacerbated or induced through the siting and design of buildings and development.*

S6 matters (National Importance) are addressed later in this report.

In addition:

- (a) The proposal will provide for additional urban development within an area zoned for residential use, and with an existing "urban residential" character, in a manner that has little or no impact on natural character, indigenous vegetation, landforms, rivers, streams or wetlands.
- (b) The site is not in the coastal environment. The proposed additional building site is internalised and screened from view from most directions;
- (c) The site does not adjoin any stream or river and no public access is required;
- (d) The proposal is not believed to negatively impact on the relationship of Maori with their culture;
- (e) There are no significant habitat or areas of significant indigenous vegetation within the site;
- (f) There are no identified heritage values; and
- (g) An acceptable stormwater management design forms part of the application.

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I consider the proposal to be consistent with Policy 13.4.13.

*13.4.14 That the objectives and policies of the applicable environment and zone and relevant parts of Part 3 of the Plan will be taken into account when considering the intensity, design and layout of any subdivision.*

The subdivision has had regard to the underlying zone's objectives and policies, where relevant.

*13.4.15 That conditions be imposed upon the design of subdivision of land to require that the layout and orientation of all new lots and building platforms created include, as appropriate, provisions for achieving the following: (a) development of energy efficient buildings and structures; (b) reduced travel distances and private car usage; (c) encouragement of pedestrian and cycle use; (d) access to alternative transport facilities; (e) domestic or community renewable electricity generation and renewable energy use*

The additional vacant lot can readily provide for a house site with good access to sunlight and the ability to utilise energy efficiency measures. The site is close to transport networks.

Policy 13.4.16 is not considered relevant as it only relates to the National Grid.

In summary, I believe the proposal to be consistent with the above Objectives and Policies.

#### Residential Zone Objectives and Policies

##### *Objectives:*

*7.6.3.1 To achieve the development of new residential areas at similar densities to those prevailing at present.*

*7.6.3.2 To enable development of a wide range of activities within residential areas where the effects are compatible with the effects of residential activity*

*Objective 7.6.3.3 relates to specific properties, none of which include the application site.*

Objective 7.6.3.1 is not overly relevant as the proposed subdivision is within an established residential area. The subdivision is of a type, scale and intensity in keeping with the character and amenity of the area.

##### *And policies*

*7.6.4.1 That the Residential Zone be applied to those parts of the District that are currently predominantly residential in form and character.*

*7.6.4.2 That the Residential Zone be applied to areas which are currently residential but where there is scope for new residential development.*

*7.6.4.3 That the Residential Zone be applied to areas where expansion would be sustainable in terms of its effects on the environment.*

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7.6.4.4 That the Residential Zone provide for a range of housing types and forms of accommodation.

7.6.4.5 That non-residential activities only be allowed to establish within residential areas where they will not detract from the existing residential environment.

7.6.4.6 That activities with net effects that exceed those of a typical single residential unit, be required to avoid, remedy or mitigate those effects with respect to the ecological and amenity values and general peaceful enjoyment of adjacent residential activities.

7.6.4.7 That residential activities have sufficient land associated with each household unit to provide for outdoor space, planting, parking and manoeuvring.

7.6.4.8 That the portion of a site or of a development that is covered in buildings and other impermeable surfaces be limited so as to provide open space around buildings to enable planting, and to reduce adverse hydrological, ecological and amenity effects.

7.6.4.9 That sites have adequate access to sunlight and daylight.

7.6.4.10 That provision be made to ensure a reasonable level of privacy for inhabitants of buildings on a site

Policy 7.6.4.11 relates to specific properties, none of which include the application site.

The first three policies are not property specific or the responsibility of an individual lot owner. They direct the consent authority to zone appropriate land for residential use. Similarly Policy 7.6.4.4 directs the consent authority, via the zoning, to "provide for a range", not an individual property owner.

Policies 7.6.4.5 and 7.6.4.6 are relevant to land uses other than residential. The subdivision does not dictate future use of the site and the policies are therefore not relevant to the subdivision.

Policy 7.6.4.7 requires sufficient land to be available for a household unit and that unit's outdoor space, planting, parking and manoeuvring. I believe the proposed vacant lot can provide for all these things.

Policy 7.6.4.8 requires that building and other impermeable surfaces only take up a limited portion of the site so as to provide for open space around buildings, and to provide for planting and to reduce adverse hydrological, ecological and amenity effects. Development on both lots comply, or will comply, with the zone's permitted impermeable and building coverage rules. Consistency with this policy is therefore achieved.

Policy 7.6.4.9 requires adequate access to sunlight and daylight. The proposed vacant lot is north facing with abundant access to sunlight and daylight. Policy 7.6.4.10 requires that provision be made to ensure a reasonable level of privacy for inhabitants of buildings. This can be achieved.

Given the proximity of a wetland (flood plain) and potential inability to achieve a 30m setback from the edge of that feature, objectives and policies relating to Lakes, Rivers, Wetlands and the Coastline also have relevance:

Subdivision

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Objectives (relevant to wetlands)

12.7.3.1 To avoid, remedy or mitigate the adverse effects of subdivision, use and development on riparian margins.

12.7.3.2 To protect the natural, cultural, heritage and landscape values and to promote the protection of the amenity and spiritual values associated with the margins of lakes, rivers and indigenous wetlands and the coastal environment, from the adverse effects of land use activities, through proactive restoration/rehabilitation/revegetation.

12.7.3.5 To avoid the adverse effects from inappropriate use and development of the margins of lakes, rivers, indigenous wetlands and the coastline.

12.7.3.6 To protect areas of indigenous riparian vegetation:

(a) physically, by fencing, planting and pest and weed control; and

(b) legally, as esplanade reserves/strips.

12.7.3.7 To create, enhance and restore riparian margins

Policies (relevant to wetlands)

12.7.4.2 That land use activities improve or enhance water quality, for example by separating land use activities from lakes, rivers, indigenous wetlands and the coastline, and retaining riparian vegetation as buffer strips.

12.7.4.3 That adverse effects of land use activities on the natural character and functioning of riparian margins and indigenous wetlands be avoided.

12.7.4.11 That the extent of impervious surfaces be limited so as to restore, enhance and protect the natural character, and water quantity and quality of lakes, rivers, wetlands and the coastline.

12.7.4.15 To encourage the integrated protection and enhancement of riparian and coastal margins through: (a) planting and/or regeneration of indigenous vegetation; (b) pest and weed control; (c) control (including, where appropriate, exclusion) of vehicles, pets and stock.

The subdivision will not create any adverse effects on riparian margins. Future development within the new lot will be designed / managed so as to ensure that site development and stormwater runoff is effectively managed in such a way to remedy and/or mitigate any adverse effects. There is no actual wetland area within the property boundaries. The boundary is fenced. There is no requirement for esplanade.

Future development within Lot 1 will not adversely affect the natural character and functioning of the wetland/flood plain. Development can comply with permitted impermeable surfaces coverage within the lot.

The access to the application site, and other residential properties, is slightly unusual for an urban zone. Traffic, parking and access objectives and policies of relevance are assessed below:

Objectives

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15.1.3.1 To minimise the adverse effects of traffic on the natural and physical environment.

15.1.3.5 To promote safe and efficient movement and circulation of vehicular, cycle and pedestrian traffic, including for those with disabilities.

The access serves a row of residential properties and has been in place for some time. It is a low speed, low intensity traffic environment. I consider the status quo access to be to a standard that will continue to enable safe and efficient movement of traffic.

All other objectives relate to parking and loading spaces, matters not relevant to the proposal, or where compliance is readily achieved (parking).

#### Policies

15.1.4.1 That the traffic effects of activities be evaluated in making decisions on resource consent applications.

15.1.4.6 That the number, size, gradient and placement of vehicle access points be regulated to assist traffic safety and control, taking into consideration the requirements of both the New Zealand Transport Agency and the Far North District Council.

15.1.4.7 That the needs and effects of cycle and pedestrian traffic be taken into account in assessing development proposals.

The existing shared accessway readily copes with traffic movements associated with the properties it serves. Crossing into the site is existing and accepted as satisfying access conditions of the previous subdivision. Visibility is good and enables users exiting and entering their sites to readily accommodate other vehicles that may be on the accessway at the same time. The site does not gain access off State Highway.

Policies 15.1.4.2 to 15.1.4.5 & 15.1.4.8 relate to carparking and loading spaces only.

In summary, whilst the proposed subdivision cannot comply fully with permitted activity access rules, and wetland setback requirements, it is not contrary to the objectives and policies in the ODP related to these aspects. In all other aspects, the subdivision meets controlled activity requirements and is consistent with the ODP's objectives and policies related to the zoning and subdivision.

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## 7.2 Proposed District Plan (PDP)

An assessment against the relevant objectives and policies in the Subdivision section of the Proposed District Plan (PDP) follows:

### *SUB-O1*

*Subdivision results in the efficient use of land, which:*

- a. achieves the objectives of each relevant zone, overlays and district wide provisions;*
- b. contributes to the local character and sense of place;*
- c. avoids reverse sensitivity issues that would prevent or adversely affect activities already established on land from continuing to operate;*
- d. avoids land use patterns which would prevent land from achieving the objectives and policies of the zone in which it is located;*
- e. does not increase risk from natural hazards or risks are mitigated and existing risks reduced; and*
- f. manages adverse effects on the environment.*

The subdivision achieves the objectives of the Residential Zone, overlays (of which there are none) and district wide provisions. It contributes to the local character and sense of place. No additional reverse sensitivity effects arise and the proposal will not prevent land from achieving the objectives and policies of the zone in which it is located. The proposal does not increase risk from natural hazards or risks and manages adverse effects such that are avoided, remedied or mitigated.

### *SUB-O2*

*Subdivision provides for the:*

- a. Protection of highly productive land; and*
- b. Protection, restoration or enhancement of Outstanding Natural Features, Outstanding Natural Landscapes, Natural Character of the Coastal Environment, Areas of High Natural Character, Outstanding Natural Character, wetland, lake and river margins, Significant Natural Areas, Sites and Areas of Significance to Māori, and Historic Heritage.*

The subdivision site contains none of the above other than being adjacent to the Kawakawa Flood Plain, also mapped as a wetland and as such an area of 'natural character' as defined in the PDP. Future development on the proposed vacant lot can occur without adversely affecting the flood plain, or being affected by the flood plain.

### *SUB-O3*

*Infrastructure is planned to service the proposed subdivision and development where:*

- a. there is existing infrastructure connection, infrastructure should be provided in an integrated, efficient coordinated and future-proofed manner at the time of subdivision; and*
- b. where no existing connection is available infrastructure should be planned and consideration be given to connections with the wider infrastructure network.*

The additional lot can be connected to Council systems and infrastructure.

### *SUB-O4*

*Subdivision is accessible, connected, and integrated with the surrounding environment and provides for:*



- 
- a. *public open spaces;*
  - b. *esplanade where land adjoins the coastal marine area; and*
  - c. *esplanade where land adjoins other qualifying water bodies*

There are no qualifying water bodies.

#### *SUB-P1*

*Enable boundary adjustments ....*

N/A.

#### *SUB-P2*

*Enable subdivision for the purpose of public works, infrastructure, reserves or access.*

N/A.

#### *SUB-P3*

*Provide for subdivision where it results in allotments that:*

- a. *are consistent with the purpose, characteristics and qualities of the zone;*
- b. *comply with the minimum allotment sizes for each zone;*
- c. *have an adequate size and appropriate shape to contain a building platform; and*
- d. *have legal and physical access.*

The proposal is considered to be consistent with the purpose, characteristics and qualities of the zone, in the immediate environs; the lots are of an appropriate shape and size to contain building platforms; and meet the proposed minimum lot size for the zone. The lots have legal and physical access.

#### *SUB-P4*

*Manage subdivision of land as detailed in the district wide, natural environment values, historical and cultural values and hazard and risks sections of the plan.*

The subdivision has had regard to all the matters listed, where relevant.

#### *SUB-P5*

*Manage subdivision design and layout in the General Residential, Mixed Use and Settlement zone to provide for safe, connected and accessible environments by:*

- a. *minimising vehicle crossings that could affect the safety and efficiency of the current and future transport network;*
- b. *avoid cul-de-sac development unless the site or the topography prevents future public access and connections;*
- c. *providing for development that encourages social interaction, neighbourhood cohesion, a sense of place and is well connected to public spaces;*
- d. *contributing to a well connected transport network that safeguards future roading connections;*  
*and*
- e. *maximising accessibility, connectivity by creating walkways, cycleways and an interconnected transport network.*

Subdivision

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No additional vehicle crossings are required. The development is not cul-de-sac development. The proposal is for in-fill residential use in a residential area. The property has good access to the road and cycleway networks, as well as pedestrian linkage into town.

**SUB-P6**

*Require infrastructure to be provided in an integrated and comprehensive manner by:*

- a. demonstrating that the subdivision will be appropriately serviced and integrated with existing and planned infrastructure if available; and*
- b. ensuring that the infrastructure is provided in accordance the purpose, characteristics and qualities of the zone.*

The lots can connect to Council reticulated services, as well as power and telecommunications.

**SUB- P7**

*Require the vesting of esplanade reserves when subdividing land adjoining the coast or other qualifying water bodies.*

No Esplanade Reserve is required.

**SUB-P8**

*Avoid rural lifestyle subdivision in the Rural Production zone unless the subdivision: will protect a qualifying SNA in perpetuity and result in the SNA being added to the District Plan SNA schedule; and will not result in the loss of versatile soils for primary production activities.*

N/A.

**SUB-P9**

*Avoid subdivision [sic] rural lifestyle subdivision in the Rural Production zone and Rural residential subdivision in the Rural Lifestyle zone unless the development achieves the environmental outcomes required in the management plan subdivision rule.*

N/A.

**SUB-P10**

*To protect amenity and character by avoiding the subdivision of minor residential units from principal residential units where resultant allotments do not comply with minimum allotment size and residential density.*

N/A. No subdivision around any minor residential unit is proposed.

**SUB-P11**

*Manage subdivision to address the effects of the activity requiring resource consent including ( but not limited to) consideration of the following matters where relevant to the application:*

- a. consistency with the scale, density, design and character of the environment and purpose of the zone;*
- b. the location, scale and design of buildings and structures;*
- c. the adequacy and capacity of available or programmed development infrastructure to*

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*accommodate the proposed activity; or the capacity of the site to cater for on-site infrastructure associated with the proposed activity;*

*d. managing natural hazards;*

*e. Any adverse effects on areas with historic heritage and cultural values, natural features and landscapes, natural character or indigenous biodiversity values; and*

*f. any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.*

The above policy is of little relevance as the activity does not require resource consent under the PDP. Notwithstanding that, all of the above have been considered, to the extent considered necessary, in the layout and number of lots being proposed.

In summary I believe the proposed subdivision to be consistent with the PDP's objectives and policies in regard to subdivision.

The site is zoned General Residential in the Proposed District Plan.

### **Objectives**

#### **GRZ-O1**

*The General Residential zone provides a variety of densities, housing types and lot sizes that respond to:*

*a. housing needs and demand;*

*b. the adequacy and capacity of available or programmed development infrastructure;*

*c. the amenity and character of the receiving residential environment; and*

*d. historic heritage.*

#### **GRZ-O2**

*The General Residential zone consolidates urban residential development around available or programmed development infrastructure to improve the function and resilience of the receiving residential environment while reducing urban sprawl.*

#### **GRZ-O3**

*Non-residential activities contribute to the well-being of the community while complementing the scale, character and amenity of the General Residential zone.*

#### **GRZ-O4**

*Land use and subdivision in the General Residential zone is supported where there is adequacy and capacity of available or programmed development infrastructure.*

#### **GRZ-O5**

*Land use and subdivision in the General Residential zone provides communities with functional and high amenity living environments.*

#### **GRZ-O6**

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*Residential communities are resilient to changes in climate and are responsive to changes in sustainable development techniques.*

The subdivision is effectively an 'in-fill' development, enabling residential use of a site within a residential area. It consolidates urban residential development within a serviced residential area. The site can be developed without risk of hazard.

### **Policies**

#### **GRZ-P1**

*Enable land use and subdivision in the General Residential zone where:*

- a. there is adequacy and capacity of available or programmed development infrastructure to support it; and*
- b. it is consistent with the scale, character and amenity anticipated in the residential environment.*

The proposed subdivision is within a serviced area in terms of water, wastewater and road access. The proposal is consistent with the scale, character and amenity anticipated in the residential environment.

#### **GRZ-P2**

*Require all subdivision in the General Residential zone to provide the following reticulated services to the boundary of each lot:*

- a. telecommunications:*
  - i. fibre where it is available; or*
  - ii. copper where fibre is not available;*
- b. local electricity distribution network; and*
- c. wastewater, potable water and stormwater where they are available.*

Telecommunications and power providers have confirmed connections are available. The site is within the Area of Benefit for reticulated wastewater and water.

#### **GRZ-P3**

*Enable multi-unit developments within the General Residential zone, including terraced housing and apartments, where there is adequacy and capacity of available or programmed development infrastructure.*

Not relevant.

#### **GRZ-P4**

*Enable non-residential activities that:*

- a. do not detract from the vitality and viability of the Mixed Use zone;*
- b. support the social and economic well-being of the community;*
- c. are of a residential scale; and*

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*d. are consistent with the scale, character and amenity of the General Residential zone.*

Not relevant.

*GRZ-P5*

*Provide for retirement villages where they:*

- a. compliment the character and amenity values of the surrounding area;*
- b. contribute to the diverse needs of the community;*
- c. do not adversely affect road safety or the efficiency of the transport network; and*
- d. can be serviced by adequate development infrastructure.*

Not relevant.

*GRZ-P6*

*Encourage and support the use of on-site water storage to enable sustainable and efficient use of water resources.*

The property can connect to council reticulated water supply, but is also able to provide for on site collection and storage should a lot owner choose to.

*GRZ-P7*

*Encourage energy efficient design and the use of small-scale renewable electricity generation in the construction of residential development.*

The proposed additional lot is on a north facing slope, with good access to sunlight.

*GRZ-P8*

*Manage land use and subdivision to address the effects of the activity requiring resource consent, Including*

*(but not limited to) consideration of the following matters where relevant to the application:*

- a. consistency with the scale, design, amenity and character of the residential environment;*
- b. the location, scale and design of buildings or structures, potential for shadowing and visual dominance;*
- c. for residential activities:*
  - i. provision for outdoor living space;*
  - ii. privacy for adjoining sites;*
  - iii. access to sunlight;*
- d. for non-residential activities:*
  - i. scale and compatibility with residential activities*
  - ii. hours of operation*
- e. at zone interfaces, any setbacks, fencing, screening or landscaping required to address potential conflicts;*

- 
- f. the adequacy and capacity of available or programmed development infrastructure to accommodate the proposed activity, including:*
- i. opportunities for low impact design principles*
  - ii. ability of the site to address stormwater and soakage;*
  - g. managing natural hazards; and*
  - h. any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.*

The development does not require consent pursuant to the PDP so the above policy is of limited relevance. Notwithstanding that, the proposal has had regard to the matters listed above, where relevant.

Given the presence of the wetland known as the Kawakawa Flood Plain, the PDP's Natural Character section is relevant. In the PDP, a 'wetland, lake and river margin' is defined as:

*In the General Residential, Russell Township, Quail Ridge or Mixed Use zones means the area of land within 26 metres of a:*

- a. wetland;*
- b. lake; or*
- c. river greater than 3m average width*

It may not be possible to restrict all parts of future development within the proposed additional lot to outside of the above defined wetland margin. However, rules relating to natural character do not have legal effect. The actual physical wetland does not come right to the boundary. Notwithstanding this, there are objectives and policies in the PDP relevant to wetland margins, as listed and assessed below.

### **Objectives**

*NATC-O1 The natural character of wetland, lake and river margins are managed to ensure their long-term preservation and protection for future generations.*

*NATC-O2 Land use and subdivision is consistent with and does not compromise the characteristics and qualities of the natural character of wetland, lake and river margins.*

The site is within an urban zone. As such 'natural character' is somewhat lacking. The proposal does not impact on the natural character of the wetland given that any natural character in the vicinity of the site is already compromised by way of existing development in proximity to it, including a current Commercial Zoning, and proposed Mixed Use Zoning.

### **Policies**

*NATC-P1*

*Avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of land use and subdivision on the natural character of wetland, lake and river margins.*

The proposal will not have adverse effects on the natural character of the wetland, for the reasons outlined above. In addition, development can occur on the proposed new lot in compliance with the zone's impermeable and building coverage rules.

**NATC-P2**

*Identify or assess the natural character of wetland, lake and river margins in accordance with the natural character assessment criteria in APP1- Mapping methods and criteria.*

Refer to above commentary in regard to the existing character of the area immediately adjacent to the wetland (flood plain).

**NATC-P3**

*Enable indigenous vegetation removal and/or earthworks within wetland, lake and river margins where:*

- a. it is for the repair or maintenance of lawfully established activities;*
- b. it is for safe and reasonable clearance for existing overhead powerlines;*
- c. it is for health and safety of the public;*
- d. it is for biosecurity reasons; and*
- e. it is for the sustainable non-commercial harvest for rongoā Māori.*

No indigenous vegetation removal is proposed or necessary within the wetland margin.

**NATC-P4**

*Provide for buildings or structures, and extensions to existing buildings or structures on wetland, lake and river margins where:*

- a. there is a functional or operational need for a building or structures location;*
- b. public access, customary access and recreational use can be protected or enhanced;*
- c. the protection of natural character is preserved; and*
- d. natural hazard risk will not be increased, taking into account the likely long term effects of climate change.*

Development can occur on the proposed new lot without adversely impacting on the natural character of the wetland margin and without increasing natural hazard risk.

**NATC-P5**

*Encourage the restoration and enhancement of wetland, lake and river margins where it will achieve improvement in natural character values.*

There is no wetland within the property boundary. Boundary plantings along the north boundary of the site will remain.

**NATC-P6**

*Manage land use and subdivision to preserve and protect the natural character of wetland, lake and*

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rivermargins, and address the effects of the activity requiring resource consent, including (but not limited to) consideration of the following matters where relevant to the application:

- a. the presence or absence of buildings, structures or infrastructure;
- b. the temporary or permanent nature of any adverse effects;
- c. the location, scale and design of any proposed development;
- d. any means of integrating the building, structure or activity;
- e. the ability of the environment to absorb change;
- f. the need for and location of earthworks or vegetation clearance;
- g. the operational or functional need of any regionally significant infrastructure to be sited in the particular location;
- h. any viable alternative locations for the activity or development;
- i. any historical, spiritual or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6;
- j. the likelihood of the activity exacerbating natural hazards;
- k. the opportunity to enhance public access and recreation;
- l. the ability to improve the overall water quality; and
- m. any positive contribution the development has on the characteristics and qualities.

The proposal does not require any consent pursuant to the PDP. Notwithstanding that, relevant matters within the above policy have been had regard to.

### **7.3 Part 2 Matters**

#### 5 Purpose

- (1) The purpose of this Act is to promote the sustainable management of natural and physical resources.
- (2) In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—
  - (a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
  - (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
  - (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The proposal provides for peoples' social and economic well being, and for their health and safety, while sustaining the potential of natural and physical resources, safeguarding the life-supporting capacity of air, water, soil and the ecosystems; and avoiding, remedying or mitigating adverse effects on the environment.

#### 6 Matters of national importance

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:



Subdivision

- 
- (a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:
  - (b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:
  - (c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:
  - (d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:
  - (e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:
  - (f) the protection of historic heritage from inappropriate subdivision, use, and development:
  - (g) the protection of protected customary rights:
  - (h) the management of significant risks from natural hazards.

Of the above matters within s6, part (a) has relevance. However, the property is in an urban settlement, with Commercial zoned property adjacent. The area is developed meaning that the wetland 'margins' are already compromised in terms of 'natural character' values. The wetland itself is a flood plain and 'natural character' values are confined to being within the actual wetland portions of the flood plain as opposed to within the urban periphery. Part (c) is also relevant insofar as the wetland/flood plain contains a substantial area of indigenous vegetation, none of which is affected by the proposal. In regard part (h), whilst the flood plain is in proximity to the application site, the latter is elevated and a building site can be established well above flood levels.

7 Other matters

*In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to—*

- (a) *kaitiakitanga:*
  - (aa) *the ethic of stewardship:*
  - (b) *the efficient use and development of natural and physical resources:*
  - (ba) *the efficiency of the end use of energy:*
  - (c) *the maintenance and enhancement of amenity values:*
  - (d) *intrinsic values of ecosystems:*
  - (e) *[Repealed]*
  - (f) *maintenance and enhancement of the quality of the environment:*
  - (g) *any finite characteristics of natural and physical resources:*
  - (h) *the protection of the habitat of trout and salmon:*
  - (i) *the effects of climate change:*
  - (j) *the benefits to be derived from the use and development of renewable energy.*

Regard has been had to any relevant parts of Section 7 of the RMA, "Other Matters". These include 7(b), (c), (d) and (f). It is considered that the proposal represents efficient use and

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development of a site. The proposal will maintain amenity values and the quality of the environment. The proposal has had regard to the values of ecosystems.

#### 8 Treaty of Waitangi

*In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).*

The principles of the Treaty of Waitangi have been considered and it is believed that this proposed subdivision does not offend any of those principles.

In summary, it is considered that all matters under s5-8 inclusive have been adequately taken into account.

### 7.4 National and Regional Policy Statements & Environmental Standards

The National Environmental Standard – Freshwater (NES-F) contains provisions protecting 'natural inland wetlands' from drainage or partial drainage, or similar activity that may alter the hydrologic functioning of the wetland ecosystem. Provisions within the NES-F include consent requirements for works within 10m of a wetland. Future development within the proposed additional lot can occur outside of that 10m buffer. Other provisions require consent for works within 100m of a wetland, but only when those works are on land with a hydrological connection to the wetland, and where the works may affect water levels or drain / partly drain the wetland. The wetland in question is an extensive flood plain and it is highly unlikely that anything done on one small site could have any impact whatsoever on the hydrological functioning and water levels of that flood plain.

As reported in the Subdivision Site Suitability Report, the attenuation to be provided ensures overall neutrality of post development peak flows from the site, so as to negate effects on the wetland that lies beyond the northern boundary.

The Regional Policy Statement for Northland contains objectives and policies related to infrastructure and regional form and economic development. These are enabling in promoting sustainable management in a way that is attractive for business and investment. The proposal is consistent with these objectives and policies.

#### 3.11 Regional Form

*Northland has sustainable built environments that effectively integrate infrastructure with subdivision, use and development, and have a sense of place, identity and a range of lifestyle, employment and transport choices.*

This objective seeks development that is visually compatible with surrounding uses. The site is fully serviced and the proposed level and type of development makes use of existing infrastructure. The site has good road access.

#### **Policy 5.1.1 – Planned and coordinated development.**

Subdivision

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Subdivision, use and development should be located, designed and built in a planned and co-ordinated manner which:

- (a) is guided by the 'Regional Form and Development Guidelines' in Appendix 2;
- (b) Is guided by the 'Regional Urban Design Guidelines' in Appendix 2 when urban in nature;
- (c) Recognises and addresses potential cumulative effects of subdivision, use, and development, and is based on sufficient information to allow assessment of the potential long-term effects;
- (d) Is integrated with the development, funding, implementation, and operation of transport, energy, water, waste, and other infrastructure;
- (e) Should not result in incompatible land uses in close proximity and avoids the potential for reverse sensitivity;
- (f) Ensures that plan changes and subdivision to / in a primary production zone, do not materially reduce the potential for soil-based primary production on land with highly versatile soils, or if they do, the net public benefit exceeds the reduced potential for soil-based primary production activities; and
- (g) Maintains or enhances the sense of place and character of the surrounding environment except where changes are anticipated by approved regional or district council growth strategies and /or district or regional plan provisions;
- (h) Is or will be serviced by necessary infrastructure.

The Regional Form and Development Guidelines referred to in part (a) above, require new subdivision, use and development to:

- have appropriate infrastructure;
- be located away from significant regional infrastructure and resources;
- be directed away from areas of risk from natural hazards and areas with significant values;
- avoid adverse effects on hydrological characteristics and processes;
- adopt suitable design technologies;
- consider effects on tangata whenua values;
- take account of relevant growth strategies; and
- encourage housing noise and business opportunities in urban areas.

I believe the creation of additional residential lots in an area already predominantly residential in character, to be consistent with the above. In fill development such as that proposed has positive effects in that a future lot owner can utilise existing infrastructure already in place to support the area.

## **8.0 CONSULTATION & S95 ASSESSMENT**

### **8.1 S95A Public Notification Assessment**

A consent authority must follow the steps set out in s95A to determine whether to publicly notify an application for a resource consent. Step 1 specifies when public notification is mandatory in certain circumstances. None of these circumstances exist. Step 2 of s95A specifies the circumstances that preclude public notification. No such circumstance exists. Step 3 of s95A must therefore be considered. This specifies that public notification is required in certain circumstances. These include:

- (a) *the application is for a resource consent for 1 or more activities, and any of those activities is subject to a rule or national environmental standard that requires public notification:*
- (b) *the consent authority decides, in accordance with section 95D, that the activity will have or is likely to have adverse effects on the environment that are more than minor.*

The application is not subject to a rule or national environmental standard that requires public notification. This report and AEE concludes that the activity will not have, nor is it likely to have, adverse effects on the environment that are more than minor. In summary public notification is not required pursuant to Step 3 of s95A.

Step 4 of s95A states that the consent authority is to determine if there are any special circumstances under which public notification may be warranted. Such circumstances are not defined. I do not consider any such circumstances exist.

## **8.2 S95B Limited Notification Assessment**

A consent authority must follow the steps set out in s95B to determine whether to give limited notification of an application for a resource consent, if the application is not publicly notified pursuant to s95A. Step 1 identifies certain affected groups and affected persons that must be notified. No affected group of persons as listed in s95B exist in this instance.

Step 2 of s95B specifies the circumstances that preclude limited notification. Neither circumstance exists and Step 3 of s95B must be considered. This specifies that certain other affected persons must be notified, specifically:

- (7) *In the case of a boundary activity, determine in accordance with section 95E whether an owner of an allotment with an infringed boundary is an affected person.*
- (8) *In the case of any other activity, determine whether a person is an affected person in accordance with section 95E.*

The application is not for a boundary activity. The s95E assessment below concludes that there are no affected persons to be notified.

Step 4 of s95B states that the consent authority is to determine if there are any special circumstances under which limited notification may be warranted. Such circumstances are not defined. I do not consider any such circumstances exist.

## **8.3 S95D Level of Adverse Effects**

The AEE in this report assesses effects on the environment and concludes that these will be no more than minor.

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## 8.4 S95E Affected Persons

A person is an 'affected person' if the consent authority decides that the activity's adverse effects on the person are minor or more than minor (but are not less than minor). A person is not an affected person if they have provided written approval for the proposed activity. No Written Approvals have been obtained from any adjacent property owner.

The proposed subdivision will see one additional residential development, on a north facing slope, of a size provided for by the ODP's subdivision minimum lot size requirements, and permitted residential intensity. The location of built development within the proposed additional lot is such that there will be minimal adverse effect on the adjacent properties in terms of visual and amenity effects. I have not identified any adjacent property as being adversely affected in regard to amenity effects or reverse sensitivity.

The adjacent residential lots gain site access over the same metal carriageway the application site does. This is already serving over five lots and has a good surface. I do not believe the addition of one more lot adversely impacts on the other users of the shared accessway.

The site does not contain any heritage or cultural sites or values and there is no significant indigenous vegetation or habitat within the property itself. The site is urban and not kiwi habitat. The site is not accessed off state highway. No pre lodgement consultation has been considered necessary with tangata whenua, Heritage NZ, Department of Conservation or Waka Kotahi.

## 9.0 CONCLUSION

The site is considered suitable for the proposed subdivision. Effects on the wider environment are, I believe, capable of remedy and mitigation through conditions of consent, such that they will be no more than minor. The proposal is considered more consistent than not with the relevant objectives and policies of the District Plan, and relevant objectives and policies of the National and Regional Policy Statements, and consistent with Part 2 of the Resource Management. There is no District Plan rule or national environmental standard that requires the proposal to be publicly notified. I have not identified any affected persons.

It is requested that the Council give favourable consideration to this application and grant consent.



Signed  
**Lynley Newport,**  
**Senior Planner**  
**Thomson Survey Ltd**

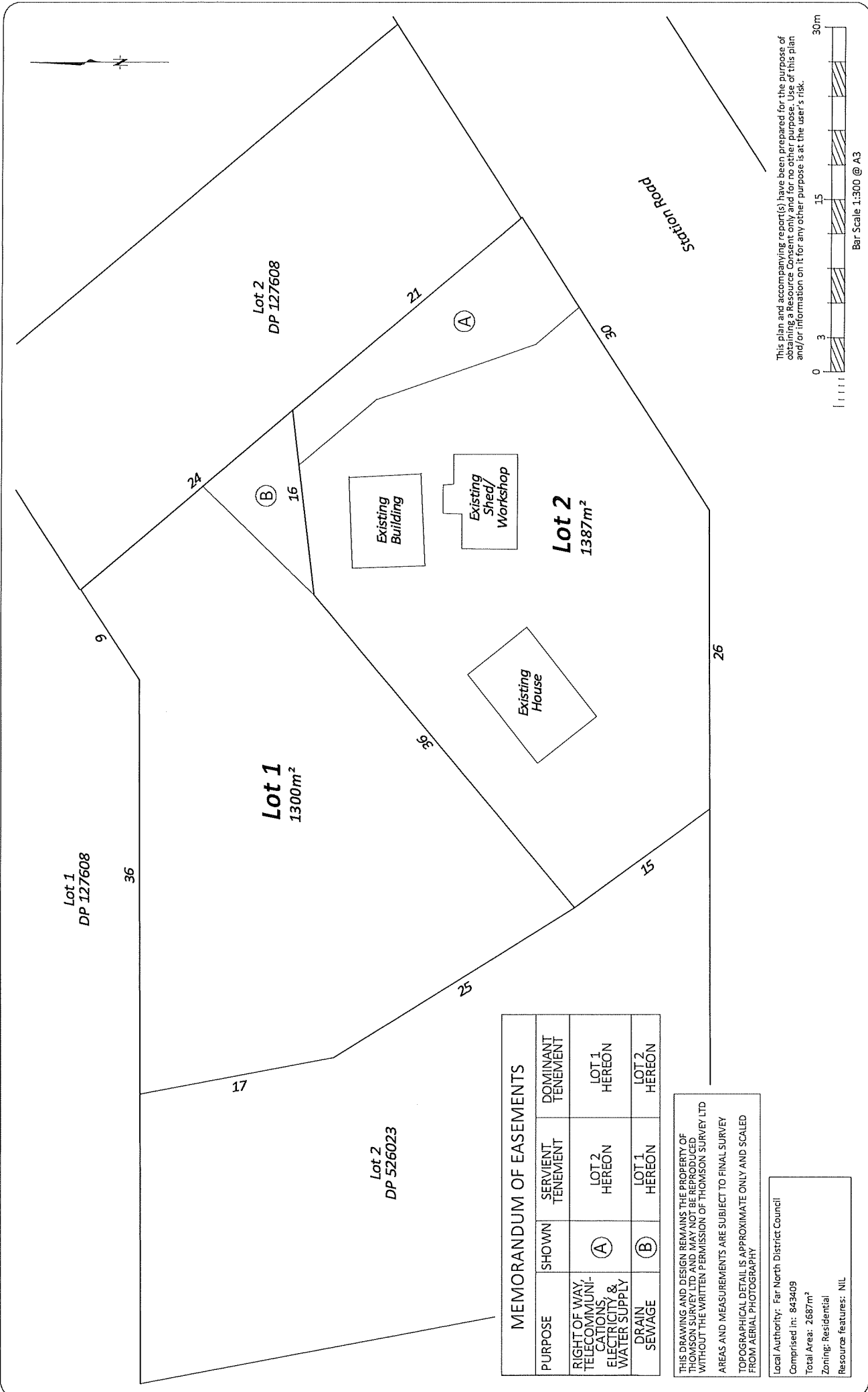
Dated 5<sup>th</sup> November 2024

## **10.0 LIST OF APPENDICES**

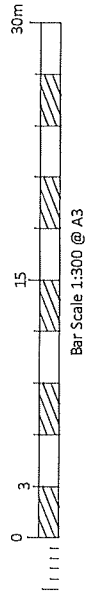
- Appendix 1** Scheme Plan(s)
- Appendix 2** Location Plan
- Appendix 3** Record of Title & Relevant Instruments
- Appendix 4** Consultation with Top Energy and Chorus
- Appendix 5** Subdivision Suitability Report

# **Appendix 1**

## Scheme Plan(s)



This plan and accompanying report(s) have been prepared for the purpose of obtaining a Resource Consent only and for no other purpose. Use of this plan and/or information on it for any other purpose is at the user's risk.



MEMORANDUM OF EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS, ELECTRICITY & WATER SUPPLY	(A)	LOT 2 HEREON	LOT 1 HEREON
DRAIN SEWAGE	(B)	LOT 1 HEREON	LOT 2 HEREON

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF THOMSON SURVEY LTD AND MAY NOT BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF THOMSON SURVEY LTD  
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 TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY AND SCALED FROM AERIAL PHOTOGRAPHY

Local Authority: Far North District Council  
 Comprised in: 843409  
 Total Area: 2687m<sup>2</sup>  
 Zoning: Residential  
 Resource features: NIL

**PROPOSED SUBDIVISION OF  
 LOT 1 DP 526023  
 18 STATION ROAD, KAWAKAWA**

PREPARED FOR: S. BRADSHAW

**THOMSON SURVEY**  
 LIMITED  
 315 Kenikeri Rd  
 P.O. Box 372, Kenikeri  
 Email: kenikeri@survey.co.nz  
 Ph: (09) 4079380  
 www.survey.co.nz

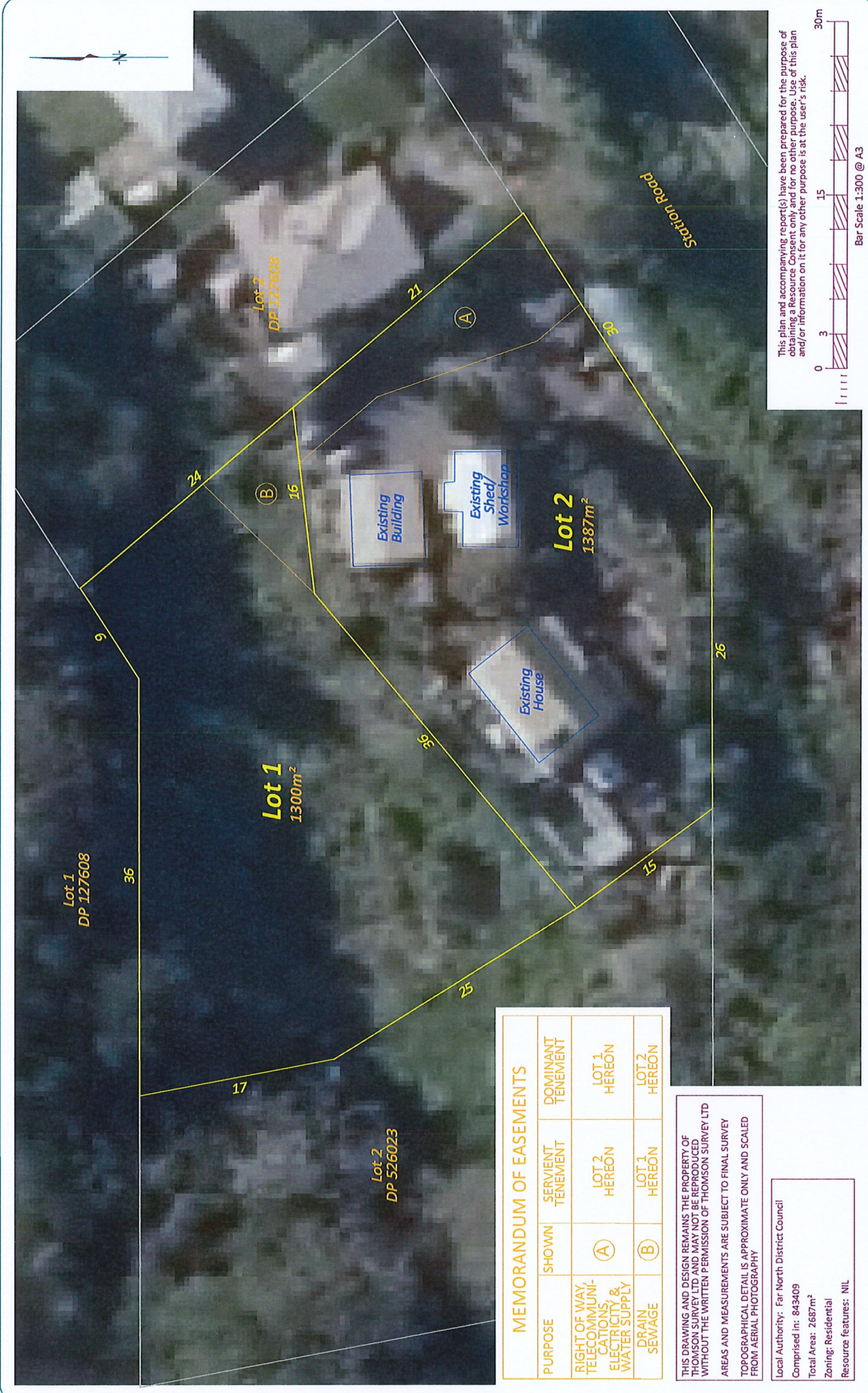
Registered Land Surveyors, Planners & Land Development Consultants

Survey	Name	Date	ORIGINAL SCALE	SHEET SIZE
Design	KY	04.04.24	1:300	A3
Approved	KY	05.11.24		

Surveyors Ref. No: **10624**  
 Sheet 1 of 1

10624 Scheme 20241105





This plan and accompanying report(s) have been prepared for the purpose of obtaining a Resource Consent only and for no other purpose. Use of this plan and/or information on it for any other purpose is at the user's risk.



Surveyors Ref. No: 10624  
Sheet 1 of 1

Survey	Name	Date	ORIGINAL SCALE	SHEET SIZE
Design				
Drawn	KY	04.04.24	1:300	A3
Approved				
Rev	KY	05.11.24		

10624 Scheme 20241105

**PROPOSED SUBDIVISION OF LOT 1 DP 526023**  
18 STATION ROAD, KAWAKAWA

PREPARED FOR: S. BRADSHAW

MEMORANDUM OF EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY TELECOMMUNICATIONS & WATER SUPPLY	(A)	LOT 2 HEREON	LOT 1 HEREON
DRAIN SEWAGE	(B)	LOT 1 HEREON	LOT 2 HEREON

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Local Authority: Far North District Council  
Comprised in: 843409  
Total Area: 2687m²  
Zoning: Residential  
Resource Features: NIL

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315 Kerikeri Rd  
P.O. Box 372 Kerikeri  
Email: kerikeri@surveys.co.nz  
Ph: (09) 4073366  
www.surveys.co.nz

Registered Land Surveyors, Planners & Land Development Consultants

# **Appendix 2**

## Location Plan

Crown Land Survey Office Pl...

DP  
0.  
NA

Crown Land

Lot 1  
DP 53785  
0.7401  
NA102D/454

Lot 1  
DP 127608  
0.7856  
NA86D/195

L  
DP  
0.  
NA1

Lot 1  
DP 49268  
0.1502  
NA1997/2

Lot 1  
DP 47521  
0.1012  
NA1807/42

Lot 2  
DP 127608  
0.1004  
NA74B/919

Lot 2  
DP 526023  
0.1502  
843410

Lot 1  
DP 526023  
0.2687  
843409

Station Road

Lot 1  
DP 139941  
0.1642  
NA83A/703

Lot 8  
DP 38604  
0.0833  
NA58B/834

Lot 2  
DP 53504  
0.1034  
NA95C/107  
Education Purposes NZGZ 199...



# **Appendix 3**

## Record of Title & Relevant Instruments



**RECORD OF TITLE  
UNDER LAND TRANSFER ACT 2017  
FREEHOLD  
Search Copy**



  
R. W. Muir  
Registrar-General  
of Land

**Identifier** 843409  
**Land Registration District** North Auckland  
**Date Issued** 15 February 2021

**Prior References**

NA18D/1419

---

**Estate** Fee Simple  
**Area** 2687 square metres more or less  
**Legal Description** Lot 1 Deposited Plan 526023

**Registered Owners**

Shirley Joyce Bradshaw and Charles Edward Michael Bradshaw

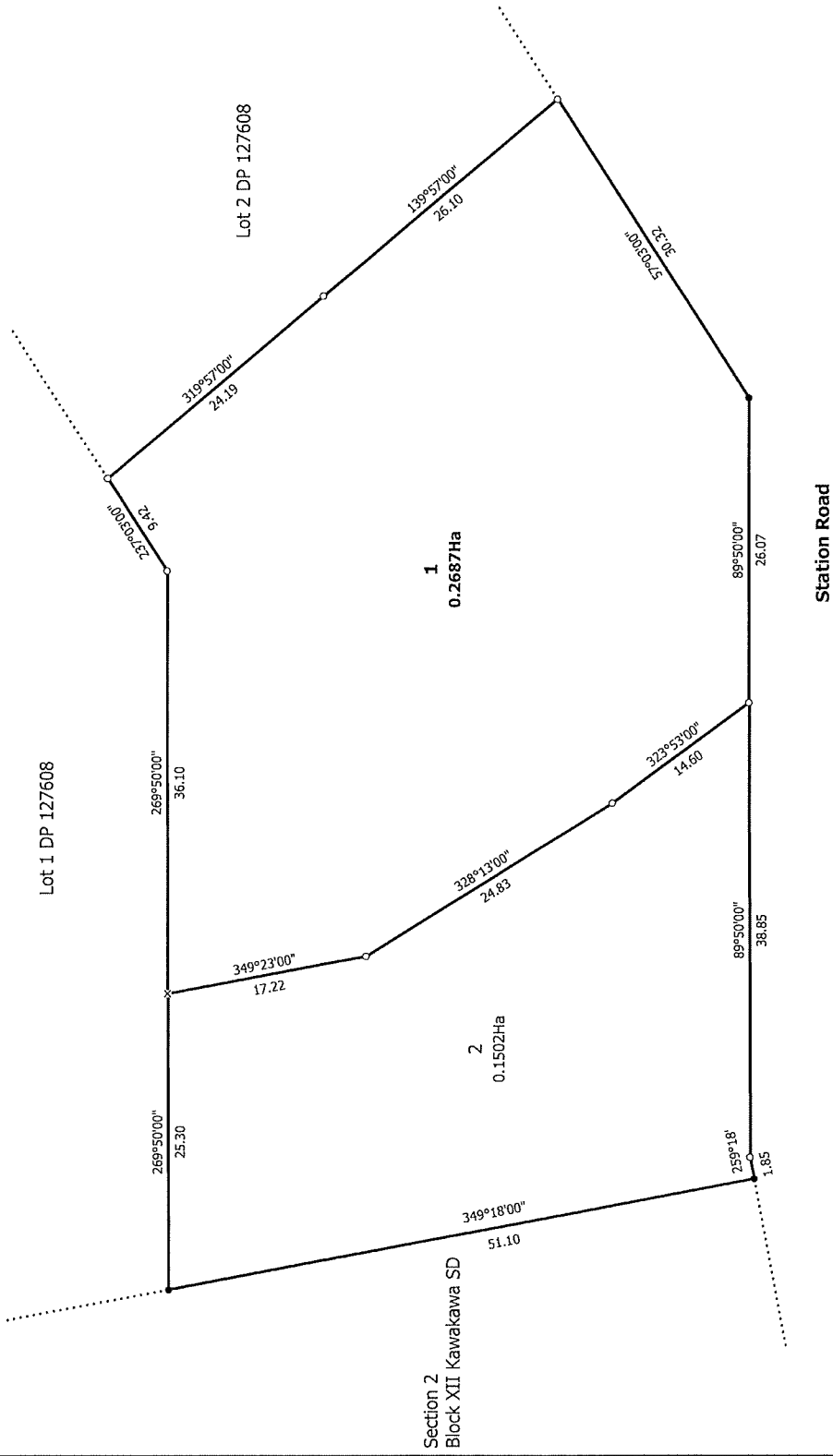
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**Interests**

8227644.3 Mortgage to ANZ National Bank Limited - 22.7.2009 at 2:43 pm



Diag. A



T 1/1

Surveyors Ref: 9137 Bradshaw

Surveyor: Denis McGregor Thomson  
 Firm: Thomson Survey Limited

Title Plan  
 DP 526023  
 Deposited on: 15/02/2021

Lots 1 and 2 being a Subdivision of Lot 1 DP 62162

Land District: North Auckland

Digitally Generated Plan  
 Generated on: 23/02/2021 11:00am Page 2 of 2

# **Appendix 4**

## Consultation with Top Energy and Chorus

# Chorus New Zealand Limited

20 August 2024

Chorus reference: 10885599

**Attention:** Lynley Newport

**Quote:** New Property Development

**1 connections at 18 Station Road , Kawakawa, Far North District, 0210**

**Your project reference:** N/A

Thank you for your enquiry about having Chorus network provided for the above development.

Chorus is pleased to advise that, as at the date of this letter, we are able to provide reticulation for this property development based upon the information that has been provided:

Fibre network	\$0.00
Pre-built fibre	\$0.00

The total contribution we would require from you is **\$0.00 (including GST)**. This fee is a contribution towards the overall cost that Chorus incurs to link your development to our network. This quote is valid for 90 days from 20 August 2024. This quote is conditional on you accepting a New Property Development Contract with us for the above development.

If you choose to have Chorus provide reticulation for your property development, please log back into your account and finalise your details. If there are any changes to the information you have supplied, please amend them online and a new quote will be generated. This quote is based on information given by you and any errors or omissions are your responsibility. We reserve the right to withdraw this quote and requote should we become aware of additional information that would impact the scope of this letter.

Once you would like to proceed with this quote and have confirmed all your details, we will provide you with the full New Property Development Contract, and upon confirmation you have accepted the terms and paid the required contribution, we will start on the design and then build.

For more information on what's involved in getting your development connected, visit our website [www.chorus.co.nz/develop-with-chorus](http://www.chorus.co.nz/develop-with-chorus)

Kind Regards

Chorus New Property Development Team







19 June 2024

Lynley Newport  
Thomson Survey  
PO Box 372  
KERIKERI 0245

Email: [lynley@tsurvey.co.nz](mailto:lynley@tsurvey.co.nz)

*Top Energy Limited*

Level 2, John Butler Centre  
60 Kerikeri Road  
P O Box 43  
Kerikeri 0245  
New Zealand  
PH +64 (0)9 401 5440  
FAX +64 (0)9 407 0611

To Whom It May Concern:

**RE: PROPOSED SUBDIVISION**

**Shirley & Mike Bradshaw, 18 Station Road, Kawakawa. Lot 1 DP 526023.**

Thank you for your recent correspondence with attached subdivision scheme plans.

Top Energy's requirement is that power be made available for the additional lot. Top Energy advises that proposed Lot 2 has an existing power supply. Costs to make power available to proposed Lot 1 would be provided after application and an on-site survey have been completed.

Link to application: [Top Energy | Top Energy](#)

In order to get a letter from Top Energy upon completion of your subdivision, a copy of the resource consent decision must be provided.

If you have any further queries, please do not hesitate to contact the writer.

Yours sincerely

**Aaron Birt**  
Planning and Design  
T: 09 407 0685  
E: [aaron.birt@topenergy.co.nz](mailto:aaron.birt@topenergy.co.nz)

# **Appendix 5**

## Subdivision Suitability Report



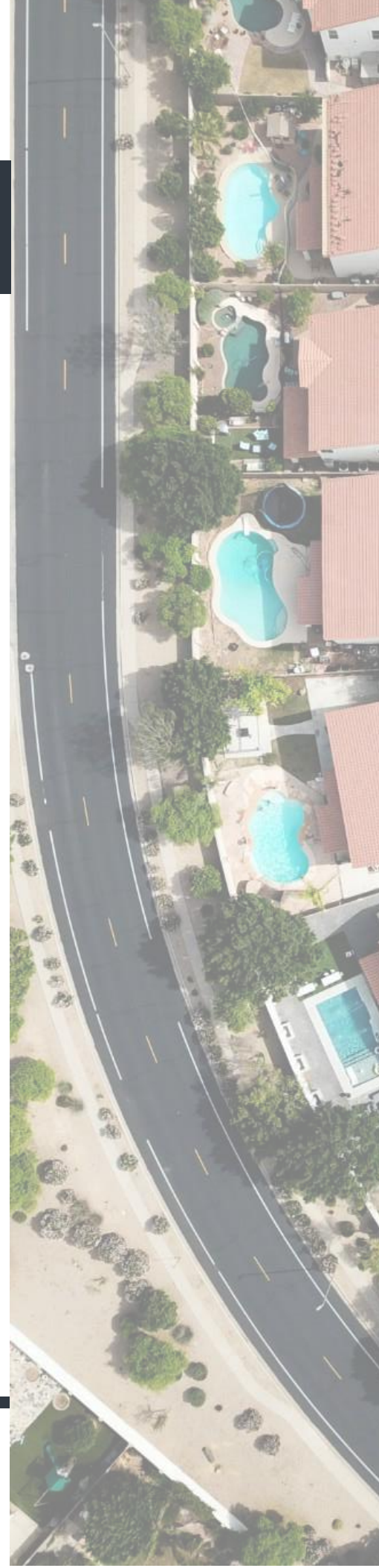
**geologix**  
consulting engineers

# SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

18 STATION ROAD,  
KAWAKAWA

CEM & SJ BRADSHAW

**C0506-S-01-R02  
OCTOBER 2024  
REVISION 2**





## DOCUMENT MANAGEMENT

<b>Document Title</b>	Subdivision Site Suitability Engineering Report
<b>Site Reference</b>	18 Station Road, Kawakawa
<b>Client</b>	CEM & SJ Bradshaw
<b>Geologix Reference</b>	C0506-S-01-R01
<b>Issue Date</b>	31 October 2024
<b>Revision</b>	02
<b>Prepared by</b>	Sander Derks Graduate Civil Engineer, Dip. Eng
<b>Prepared by</b>	Dominic Betcher-Tatnell Geotechnical Engineer, BE(Civil), <i>D Betcher Tatnell</i>
<b>Reviewed by</b>	Sebastian Hicks Principal Civil Engineer, CPEng Reg. 1168062, IntPE(NZ) /APEC Engineer, CMEngNZ
<b>Approved by</b>	Edward Collings Managing Director, CEnvP Reg. 0861, CPEng Reg. 1033153, CMEngNZ
<b>File Reference</b>	<i>Z:\Projects\C0500-C0599\C0506 - 18 Station Road, Kawakawa\06 - Reports\C0506-S-01-R02.docx</i>

## REVISION HISTORY

Date	Issue	Prepared	Reviewed	Approved
October 2024	First Issue	SD, DBT	SH	EC
October 2024	Minor Revision	DBT	SH	EC



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## 1 INTRODUCTION

This Site Suitability Engineering Report has been prepared by Geologix Consulting Engineers Ltd (Geologix) for CEM and SJ Bradshaw as our Client in accordance with our standard short form agreement and general terms and conditions of engagement.

The purpose of this report is to assist with Resource Consent application in relation to the proposed subdivision of an urban residential lot at 18 Station Road, Kawakawa, the ‘site’ to create one new residential lot. Specifically, this assessment addresses engineering elements of geotechnical assessment, natural hazards, wastewater, stormwater, internal roading and associated earthwork requirements to provide safe and stable building platforms with less than minor effects on the environment as a result of the proposed activities outlined in Section 1.1.

### 1.1 Proposal

It is understood that the Client proposes to subdivide the site into two lots as outlined in Table 1 below.

This understanding has been established from a proposed scheme plan by Thomson Survey<sup>1</sup> supplied to Geologix at the time of writing and discussions with the client. Amendments to the referenced scheme plan may require an update to the recommendations of this report which are based on conservative, typical urban residential development concepts.

*Table 1: Summary of Proposed Scheme*

Proposed Lot	Size	Purpose
1	0.1300 ha	New Residential Lot
2	0.1387 ha	Existing Residential

## 2 DESKTOP APPRAISAL

The site is accessed at its south-eastern corner boundary from the western end of Station Road. The site is legally described as Lot 1 DP 526023 and designated as a “Residential” zone. Topographically, the site is located on a ridge, with the Proposed Lot 2 situated on top of the ridge accessed via the south-facing slope. The Proposed Lot 1 is situated on the north-facing slope. The northern slope flattens toward the site’s northern boundary, where a mapped flood hazard intersects the northern corner of the site.

Existing structures are present on-site within Proposed Lot 2 including two single-storey dwellings and a shed located on the southern half of the site as presented in the above-referenced Thomson Survey Scheme Plan.

The site setting is presented in Figure 1 below.

<sup>1</sup> Thomson Survey Ltd, Proposed Subdivision of Lot 1 DP 526023, Ref No. 10624, dated 04/04/2024.



Figure 1: Site Setting<sup>2</sup>



## 2.1 Existing Reticulated Networks

Available information for existing infrastructure is provided by Far North District Council (FNDC) Far North Maps GIS system. The GIS mapping indicates that the site is currently connected to reticulated wastewater and water supply.

The subdivision proposal within this report aims to utilise the existing water and wastewater infrastructure to support the servicing to the proposed developments, with stormwater being disposed of on site.

## 2.2 Geological Setting

Available geological mapping<sup>3</sup> indicates the site to be underlain by Neogene River Deposits. The unit typically consists of thin-bedded, carbonaceous sandstone and carbonaceous mudstone with intercalated conglomerate and lignite. The site is within a historic coal mining area of the underlying basement geology and the closest quarry was 1.4km to the northwest.

A stream is located approximately 120m northwest of the site. It should not be discounted that some weaker alluvial soils may be present.

---

<sup>2</sup> Source: <https://app.grip.co.nz/>

<sup>3</sup> Edbrooke, S.E, 2001. *Geology of the Auckland area. Institute of Geological & Nuclear Sciences 1:250 000 geological map 3.*





### 3 SURFACE WATER FEATURES AND OVERLAND FLOWPATHS

During our site walkover and desktop appraisal of the available FNDC GIS data, Geologix have developed an understanding of surface water features and overland flow paths within the vicinity to the site.

#### 3.1 Surface Water Features

According to available FNDC GIS data, there are no evident surface water features such as ponds or streams within the site boundaries.

There are no clearly defined overland flow paths evident within the site boundaries.

#### 3.2 Sensitive Receptors

Based on available GIS data and information provided by the Planner (Thomson Survey), the Kawakawa Flood Plain comprises a wetland that is near to the northern boundary of proposed Lot 1. The proposal considers that the proximity of the proposed Lot 1 building footprint (impervious area) to the wetland is less than 30m, which is the setback specified in the FNDC ODP Rule 12.7.6.1.2(c). The achievable setback to the boundary (and wetland) is rather between 9 and 23m, the variance is due to the angle to the proposed footprint relative to the boundary.

The proposal does ensure that hydraulic neutrality is achieved for the site so as to avoid any effect from the proposed subdivision onto the wetland. This is explained further in Section 7.2.

#### 3.3 Flood Hazard

Northland Regional Council Natural Hazard Maps indicates that the site has a river flood hazard of the 10%, 2% and 1% Annual Exceedance Probability (AEP) or 1-in-10/50/100 rain events, with the 1% AEP extent encroaching approximately 8 metres within the northern boundary (corner) and to an elevation of approximately 6.5m AMSL. This flood plain has no effect on the conceptual building envelope or infrastructure proposed for Lot 1 or 2.

This flood plain forms around the Kawakawa River which is located approximately 60m north of the site boundary.



Figure 2: 10yr, 50yr and 100yr Flood Level Graphic from Northland Regional Council



## 4 GROUND INVESTIGATION

A site-specific walkover survey and intrusive ground investigation was undertaken by Geologix on 7 June 2024. The ground investigation was scoped to confirm the findings of the above desktop observations where possible and to provide parameters for geotechnical assessment. The ground investigation comprised:

- One hand augered borehole designated BH01, was drilled within lot 1 with a target depth of 5.0 m below ground level (bgl). The hand auger refused at 2.1m bgl due to encountering a hard stratum.
- Dynamic Cone Penetration (DCP) testing was carried out from the base of BH01 until final refusal i.e. 20 blows per 100 mm penetration. Refusals were encountered at 4.8m bgl.
- No groundwater was encountered on the day of drilling.

### 4.1 Site Walkover Survey

A visual walkover survey of the property confirmed:

- The topographical understanding of the site developed from our desktop study, as outlined in Section 2, is in general accordance with that observed on site.



- Suitable building envelopes<sup>5</sup> can be formed on gently to moderately sloping land <20°.
- The easements to be used for services is located upslope of the area likely to be the location of future development.
- Currently, no horticulture activities were observed on the proposed subdivision.
- No overland flow paths are present in the southern part of the proposed lot 1 area. The northern vegetated part of the site has a flow path which is captured in the stream northwest of the site.
- The ground profile is generally smooth and there are no ground features that indicate instability.

## 4.2 Ground Conditions

Arisings recovered from the exploratory boreholes were logged by a suitably qualified geotechnical engineering professional in general accordance with New Zealand Geotechnical Society guidelines<sup>6</sup>. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 200 within Appendix A. Strata identified during the ground investigation can be summarised as follows:

- **Topsoil encountered to 0.3 m bgl.** Described as organic silt, dark brown, very stiff, moist.
- **Neogene River Deposits to a depth of >4.8m bgl.** The alluvial residual soil encountered is silt with traces of clay becoming silt with traces of sand with depth, low plasticity and high permeability. Colour of the soil is brown to light brown. The soil below 0.8 m bgl has white and orange mottles and becomes clayey.

In-situ field vane tests was taken at 0.3 m intervals to determine soil strength within this layer. The in-situ tests recorded vane shear strengths ranging from 154 kPa to Unable to Penetrate (UTP). Characteristic unit vane shear strength has been determined to be 180kPa at 95% confidence, indicative of very stiff soils.

DCP testing indicates the soil is loose to medium dense from 2.1m to 3.2m then dense until 4.8m bgl where very dense material and refusal was encountered.

A summary of the above information is presented as Table 2 below.

Table 2: Summary of Ground Investigation

Hole ID	Proposed Lot	Hole Depth <sup>1</sup>	Topsoil Depth	Depth to Dense Soil	Very Dense Soil/Refusal Depth	Groundwater <sup>2</sup>
BH01	1	2.1 m	0.3 m	3.2 m	4.8 m	NE <sup>3</sup>

1. All depths recorded in m bgl unless stated otherwise.

2. Groundwater measurements taken on day of drilling.

<sup>5</sup> Measuring 14 m x 14 m according to FNDC District Plan Rule 13.7.2.2.

<sup>6</sup> New Zealand Geotechnical Society, Field Description of Soil and Rock, 2005.

## 5 GEOTECHNICAL ASSESSMENT

Geotechnical design parameters are presented in Table 3 below. They have been developed based on our ground investigation, the results of in-situ testing and experience with similar materials.

Table 3: Geotechnical Effective Stress Parameters

Geological Unit	Unit Weight, kN/m <sup>3</sup>	Effective Friction Angle, °	Effective Cohesion, kPa	Undrained shear strength, kPa
Neogene River Deposits	17	30	5	144*

\* Adopting correction factor of 0.8 from the characteristic vane shear strength.

### 5.1 Seismic Hazard

New Zealand Standard NZS1170.5:2004 Clause 2.1.4 specifies that to meet the requirements of the New Zealand Building Code, design of structures is to allow for two earthquake scenarios:

1. *Ultimate Limit State (ULS) shall provide for... “avoidance of collapse of the structural system...or loss of support to parts... damage to non-structural systems necessary for emergency building evacuation that renders them inoperable”.*
2. *Serviceability Limit State (SLS) are to avoid damage to... “the structure and non-structural components that would prevent the structure from being used as originally intended without repair after the SLS earthquake...”.*

The seismic hazard in terms of Peak Ground Acceleration (PGA) has been assessed based on the NZGS Module 1<sup>7</sup>. Table 4 presents the return periods for earthquakes with ULS and SLS ‘unweighted’ PGAs and design earthquake loads for the corresponding magnitude. The PGAs were determined using building Importance Level (IL) 2, defined by NZS1170.5:2004. Reference should be made to the structural designer’s assessment for the final determination of building importance level.

Table 4: Summary of Seismic Hazard Parameters

Limit State	Effective Magnitude	Return Period (years)	Unweighted PGA
ULS	6.5	500	0.19 g
SLS	5.8	25	0.03 g

<sup>7</sup> New Zealand Geotechnical Society, *Earthquake Geotechnical Engineering Practice, Module 1, November 2021, Appendix A, Table A1.*

## 5.2 Site Stability

At the time of writing, no obvious indications of major deep-seated instability were identified at the site, and the risk of such deep-seated instability developing as a result of the development proposal is low.

In addition, no obvious indications of shallow instability including relic, or more recent evidence was noted during the Geologix ground investigation. The southern half of the property where the new dwelling is expected to be built is moderately sloping at an angle of approximately 20 °.

Within the scope of this ground investigation Geologix have undertaken a digitally modelled slope stability analysis through the critical section of the site topography as shown on drawing 200 in Appendix A. At this preliminary stage, this represents the area with the steepest slope.

The slope was analysed within propriety software Slide 2 Version 9.02, developed by RocScience Inc. The purpose of the stability assessment was to:

- Ensure development on the proposed site is feasible.
- Provide a working, accurate ground model in relation to site stability refined according to observed conditions and the results of this ground investigation.
- Inform the requirements of Consent, developed architectural design and further engineering works.

The stability analysis process was undertaken by calibrating the model to observed conditions by refining the ground investigation data to develop the effective stress parameters presented in Table 3 and applying them to the proposed condition.

Limit equilibrium stability analysis was adopted in the analysis to express the results as a Factor of Safety (FS). When FS = 1.0, the represented mechanism is in equilibrium with the disturbing, active forces equal to the resisting, stabilising forces. A lower FS indicates that instability could occur under the modelled scenario whereas a higher FS demonstrates a margin of safety in respect of stability. Minimum FS criteria have been developed for use in residential development by Auckland Council<sup>9</sup> which are widely adopted in the Far North region. Modelling three separate event scenarios the accepted minimum FS are summarised as follows:

- Minimum FS = 1.5 for static, normal groundwater conditions.
- Minimum FS = 1.3 for elevated groundwater conditions (storm events).

---

<sup>9</sup> Auckland Council, *The Auckland Code of Practice for Land Development and Subdivision, Chapter 2: Earthworks and Geotechnical*, May 2023.

- Minimum FS = 1.0 for dynamic, seismic events.

### 5.2.1 Stability Analysis Results

Slope stability analysis results are presented in full as Appendix F and summarised below as Table 5.

Table 5: Summary of Stability Analysis Results

Profile	Scenario	Global Min.	Development Footprint (min FS)	Result
Existing Conditions	Static	2.125	>1.5	Pass
	Elevated GW	1.726	>1.3	
	Seismic	1.194	>1.0	
Proposed Conditions	Static	2.226	>1.5	Pass
	Elevated GW	1.834	>1.3	
	Seismic	1.255	>1.0	

*Static, normal groundwater minimum FS = 1.5*  
*Static, elevated groundwater minimum FS = 1.3*  
*Dynamic, seismic conditions minimum FS = 1.0*

### 5.2.2 Stability Analysis Conclusions

The developed slope stability model is considered to be a reasonable representation of the observed conditions on site. The dense to very dense layers encountered on site were conservatively ignored for the slope stability model. No detailed architectural plans or earthworks plan is available during the preparation of this report. Slope stability analyses may subject to be revised once earthworks extents are known.

From the current modelled slope stability analysis computation, FS are satisfactory and meet the minimum requirements for residential development according to the above parameters. Models are presented in full as Appendix D. It is concluded that development of the proposed building site does not accelerate and/ or worsen a natural hazard and specific geotechnical stability control is not required at this time. However, this should be further considered at the Building Consent stage once final development plans are available. The geotechnical review shall be undertaken by a Chartered Professional Geotechnical Engineer.

### 5.3 Soil Expansivity

Clay soil may undergo appreciable volume change in response to changes in moisture content and be classed as expansive. The reactivity and the typical range of movement that can be expected from potentially expansive soils underlying any given building site depends on the amount of clay present, the clay mineral type, and the proportion, depth, and distribution of clay throughout the soil profile. Clay soils typically have a high porosity and low permeability causing moisture changes to occur slowly and produce swelling upon wetting and shrinkage upon drying. Apart from seasonal moisture changes (wet winters and dry summers) other factors that can influence soil moisture content include:

- Influence of garden watering and site drainage.



- The presence of mature vegetation.
- Initial soil moisture conditions at the time of construction.

Prior to a quantitative analysis of the soil, the underlying Neogene River Deposits is conservatively expected to meet the requirements of a highly expansive or Class H soil type. In accordance with AS2870:2011<sup>10</sup> and New Zealand Building Code<sup>11</sup>, Class H or Highly Expansive soils typically have a soil stability index ( $I_{ss}$ ) range of 3.8 to 6.5% and a 500-year design characteristic surface movement return ( $y_s$ ) of 78 mm.

It is recommended that a quantification of the soil expansivity are made by a geotechnical laboratory analysis at the Building Consent stage.

## 5.4 Liquefaction Potential

Liquefaction occurs when excess pore pressures are generated within loose, saturated, and generally cohesionless soils (typically sands and silty sands with <30 % fines content) during earthquake shaking. The resulting high pore pressures can cause the soils to undergo a partial to complete loss of strength. This can result in settlement and/ or horizontal movement (lateral spread) of the soil mass.

The Geologix ground investigation indicates the site to be predominantly underlain by silt and clayey silt with no groundwater and traces of sand. Based on the materials strength and consistency, and our experience with these materials, there is no liquefaction potential/ risk in a design level earthquake event.

## 5.5 Conceptual Foundations

### 5.5.1 Concept Shallow Foundation

The Neogene River Deposits have an average undrained shear strength exceeding 100 kPa, it is expected that shallow foundations such as timber pole foundations or standard raft/ strip footings can be adopted for the future dwelling, the latter on a fully supported earthworks platform. Such foundations may be designed by a professional structural engineer adopting an Ultimate Bearing Capacity of 300kPa for a highly expansive soil type and a geotechnical reduction factor of 0.5.

Where shallow standard raft and/ or strip footing foundations are proposed, it is recommended that any non-engineered fill, underlying soft spots ( $S_u < 60$  kPa) and any other unsuitable or deleterious materials (such as relic foundations, driveway hardstanding etc.) are sub-excavated and replaced with suitably selected and compacted materials such as GAP65 hard fill.

If piled foundations are proposed, it is recommended that all piled foundations are taken down to a minimum of 1.0 m bgl and designed by a professional structural engineer to take

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<sup>10</sup> AS2870, *Residential Slabs and Footings*, 2011.

<sup>11</sup> New Zealand Building Code, *Structure B1/AS1 (Amendment 19, November 2019)*, Clause 7.5.13.1.2.

into account a highly expansive soil type and the locally deepened within moderately steep sloping terrain.

If groundwater is encountered within the pile holes, tremie concrete pour methodology will most likely be required to displace groundwater and an allowance should be made for this by the Contractor.

If filling is required within proposed dwelling footprint, the retaining of placed materials may be required, which could comprise of concrete block walls. It is recommended that all retaining walls are designed by a suitably qualified professional engineer familiar with the findings of this report. Blockwork retaining walls can be designed for an ultimate bearing capacity of 300 kPa for a highly expansive soil class and a geotechnical reduction factor of 0.5.

## 5.6 Conceptual Earthworks and Methodology

It is recommended that all proposed excavations and fills at the site are retained by specifically engineered retaining walls subject to design at the Building Consent stage. Any permanent earthworks and batter slopes shall be subject to specific engineering assessment at Building Consent stage. Preliminary earthworks assessments please also refer to Section 9 of the report.

### 5.6.1 Temporary Works

To reduce the risk of temporary excavation instability, it is recommended that temporary unsupported excavations have a maximum vertical height of 1.0 m. Temporary unsupported excavations above this height shall be battered at 1V:1H or 45°. It is expected that the above temporary works can be undertaken within the property boundaries.

Temporary excavations should not be left unsupported for a long period of time. Poles must be installed and backfilled against the excavated face immediately to ensure the slopes are not left unsupported.

Temporary batters should be covered with polythene sheets secured to the surface with pins or batons to prevent saturation. All works within proximity to excavations should be undertaken in accordance with Occupational Health and Safety regulations. In addition, it is recommended that all earthworks are conducted in periods of fine weather within the typical October to April earthwork season. Consent conditions commonly prescribe working restrictions.

### 5.6.2 Fills

Due to the moderately steep slope beneath the proposed preliminary building footprint, fill should be kept to a minimum. Earthwork fills will require support by fully engineered retaining walls.

It is recommended that proposed fills are subject to a specific engineering specification including compaction standards and construction monitoring at regular lift intervals (maximum 0.5 m).



In addition, any unsuitable and/ or deleterious materials such as organic pockets, nonengineered fill, relic foundations and/ or concrete hard standing and locally weaker spots ( $S_u < 60$  kPa) shall be cut to waste and not adopted for filling.

## 6 WASTEWATER ASSESSMENT

The scope of this wastewater assessment comprised an assessment of anticipated wastewater flows from proposed lots and the suitability of connecting to the existing reticulated network. Relevant design guideline documents adopted include:

- Watercare, Water and Wastewater Code of Practice for Land Development and Subdivision, Version 1.5, dated May 2015.
- FNDC Engineering Standards, Version 0.6, Date Issued: May 2023.

### 6.1 Existing On-site Wastewater Systems

According to the current site condition, there is no evidence of any existing on-site wastewater systems.

### 6.2 Existing Wastewater Reticulated Network

As described on the Far North Maps 3 Waters map and shown in Figure 3 below, there is an existing 100mm dia. uPVC public drain (ID: SS600001) running in a north-easterly direction towards a public manhole (ID: SP3050), before connecting to a 225mm dia. concrete drain (ID SL3293\_3235).



Figure 3: FNDC 3Waters Maps GIS Image of Existing Services



### 6.3 Existing Wastewater Connection

Based on the site walkover and FNDC 3 Waters GIS, there is an existing wastewater connection in place that serves the site. This connection services the existing dwelling in proposed Lot 2 and will remain in place.

### 6.4 Proposed Wastewater Connection

It is proposed that the future dwelling in proposed Lot 1 connect to the existing 100mm dia. uPVC public drain (ID: SS600001) within the boundary of proposed Lot 1. A 100mm dia. uPVC connection is proposed to be installed to service the dwelling via gravitational flow.

When determining the finished floor level (FFL) of proposed dwelling, the depth of the existing wastewater pipeline should be confirmed to ensure there is sufficient fall in the connecting pipe. It is anticipated that the required building FFL will need to be > 11.75m in order to have sufficient fall to the proposed connection point, and with reasonable cover to the pipe. If a lower building floor level is adopted, then it is likely that a pumped sewerage system from the dwelling will be required. Proprietary systems for such situations are commonplace, and would need to be detailed further at the building consent stage.

The location and details of the proposed wastewater connection are shown on Drawing No. 100 within Appendix A.

### 6.5 Wastewater Generation Volume

The wastewater generation volume has been determined in accordance with FNDC Engineering Standards.

According to the FNDC Engineering Standards, Section 5.2.2.2, residential design flows have been taken as follows.

*Table 6: Residential Wastewater Design Flows*

Design Item	Criteria
Average dry weather flow	200 litres/ day/ person
Dry weather diurnal Peaking Factor	2.5
Wet weather diurnal Peaking Factor	5
Peak wet weather flow (PWWF)	1000 litres/ day/ person
No. of people per dwelling	4

The design criteria and potential wastewater flow is outlined by Table 6 above. This considers an existing wastewater network catchment above the point of analysis of **6** upstream households, increasing to **7** as a result of the application. Calculations are presented in full as Appendix D to this report and the results summarised below as Table 7.

*Table 7: Summary of Wastewater Flow Calculations*

Item	Calculated Wastewater Flow, l/s
Existing catchment, PWWF	0.23
Proposed catchment, PWWF	0.28
Increase PWWF from application	+0.05

## 6.6 Wastewater Network Capacity Assessment

Our analysis has established that the proposed application within the scope of this report provides only a minor, 0.05 litre/ second increase in discharge to the reticulated wastewater network.

No invert information is available on the FNDC 3 Waters GIS to undertake a capacity check of the existing public network, however, with only four residential lots (one additional proposed) connected to the 100mm pipe and the downstream pipe being a 225mm pipe, it is reasonably assumed that there is ample capacity in the existing network to service one additional dwelling.

## 7 STORMWATER ASSESSMENT

Considering the nature of urban subdivision and residential development, increased storm water runoff occurs as pervious surfaces such as lawns are converted to impervious features such as internal roading or future on-lot building and driveway.

### 7.1 Impervious Surfaces and Activity Status

A summary of the impervious areas of the proposed lots is provided as Table 8 below which has been developed from our observations and the provided Scheme Plan. For the proposed undeveloped lot, this has been taken as conceptual maximum probable development of typical urban residential scenario. Refer Section 7.2.

In our design concept for future development of proposed Lot 1, we have considered a typical urban residential roof of 200 m<sup>2</sup> and associated driveways/ car parking area of 100 m<sup>2</sup>, resulting in a total impervious area of 300 m<sup>2</sup>. This represents a 23.08 % total impervious area of the gross Lot 1 site and is therefore considered as **Permitted Activity**, according to FNDC Operative District Plan Rule 7.6.5.1.6.

Within proposed Lot 2 with an impervious area of 430 m<sup>2</sup>, existing parking area/ driveway and buildings, it is calculated that the total impervious area under post-development conditions will remain the same given the RoW access to Lot 1 is in currently in impervious condition. Thereby this activity remains and also falls under the category of **Permitted Activity**, according to FNDC Operative District Plan Rule 7.6.5.1.6.

Furthermore, the subdivision stormwater proposal has been assessed in accordance with the Operative FNDC Plan Section 13.10.4 on the basis that the overall subdivision is determined to be a **Discretionary Activity**.

Table 8: Summary of Impervious Surfaces

Surface	Proposed Lot 1		Proposed Lot 2	
<b>Existing Condition</b>			<b>(2,687 m<sup>2</sup>)</b>	
Roof	0 m <sup>2</sup>	0 %	182 m <sup>2</sup>	6.81 %
Driveway	0 m <sup>2</sup>	0 %	248 m <sup>2</sup>	9.23 %
Total impervious	0 m <sup>2</sup>	0 %	430 m <sup>2</sup>	16.00 %
<b>Proposed Condition</b>	<b>(1,300 m<sup>2</sup>)</b>		<b>(1,387 m<sup>2</sup>)</b>	
Roof	200 m <sup>2</sup> (Concept)	15.38 %	182 m <sup>2</sup>	13.12 %
Driveway	100 m <sup>2</sup> (Concept)	7.69 %	165.5 m <sup>2</sup>	11.93 %
RoW (Lot 1)	0 m <sup>2</sup>	0 %	82.5 m <sup>2</sup>	5.95 %
Total impervious	300 m <sup>2</sup>	23.08 %	430 m <sup>2</sup>	31.00 %
<b>Activity Status</b>	<b>Permitted</b>		<b>Permitted</b>	

## 7.2 Stormwater Management Concept

The stormwater management concept considered in this report has been prepared to meet the requirements of the local and regional consent authorities considering the design storm event as follows:

- **Probable Future Development (Proposed Lot 1).** The proposed application includes subdivision development only and not lot specific residential development. A conceptual future on-lot development has been developed as presented in Table 9.
- **Existing On-site Development (Proposed Lot 2).** There is no proposed increase in impervious area to this lot. As indicated in Table 8, existing impervious areas remain



within the permitted activity threshold. Drainage will be managed as per the status quo which is effective.

- **Subdivision Development.** Access to the new proposed Lot 1 will be via the existing metal driveway within the proposed Lot 2 area and within associated easement A. The proposed conceptual driveway will not create additional impervious area; therefore, no attenuation of the driveway is required. Stormwater runoff from the RoW surface will be managed as per the existing scenario, discharged into an existing swale drain sited on the southern boundary edge. From there, stormwater is conveyed through an existing 350 mm HDPE culvert pipe beneath Station Road.

### 7.3 Design Storm Event

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model<sup>13</sup>. The NIWA HIRDS rainfall data is presented in full within Appendix D. Provision for climate change has been adopted by means of applying a factor of 20 % to rainfall intensities used in the post-development condition only, in accordance with FNDC Engineering Standards 2023.

Noting the risk of downstream flooding within the receiving Kawakawa River, and the presence of the wetland, this assessment has been modelled to provide stormwater attenuation up to and including 80 % of the pre-development condition for the 1 % AEP storm events which is recommended for the site including any future activities to comply with FNDC Engineering Standard Table 4-1.

This provides additional conservatism over the 10 % AEP pre-development requirement to comply with NRP Rule C6.4.2(2) and also with the Operative District Plan 13.7.3.4 (a). Attenuation modelling under this scenario avoids exacerbating downstream flooding and provides for sufficient flood control as presented in the FNDC Engineering Standards.

Furthermore, the attention provide ensures overall neutrality of post-development peak flows from the site, so as negate effects on the wetland that lies beyond the northern boundary.

FNDC Engineering Standard Table 4-1 also stipulates that flow attenuation controls reduce the post-development peak discharge to 80 % of the pre-development condition for the 50 % and 20 % AEP storm event. To be compliant with the above rules, the attenuation modelling within this report has been undertaken for all of the above storm events. The results are summarised in Table 9 and provided in full in Appendix C.

Outlet dispersion devices have been designed to manage the 20 % AEP event to reduce scour and erosion at discharge locations. These are detailed further in Section 7.4.1 of this report.

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<sup>13</sup> NIWA High Intensity Rainfall Data System, <https://hirds.niwa.co.nz>.

## 7.4 Concept Stormwater Attenuation

Based on the design storm events indicated above and the corresponding modelling results Appendix C, an attenuation concept to suit the maximum storage requirement has been provided. In this case the concept limits the post-development peak discharge to 80 % of the pre-development condition for the 1 % AEP storm event. This is achievable by installing specifically sized low-flow orifices into the roof runoff tanks which comprise a detention volume and a retention volume. A typical schematic retention/ detention tank arrangement detail is presented as Drawing No. 401 within Appendix A.

The concept design presented in this report for the purposes of providing the above attenuation requirements should be subject to verification and an updated design at Building Consent stage once final development plans are available. This is typically applied as a consent notice to the applicable titles. We note that the detailed design will be required to provide appropriate orifices to ensure the 50 % and 20 % AEP events.

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards<sup>14</sup> to provide a suitable attenuation design to limit post-development peak flows to 80 % of pre-development conditions.

*Table 9: Summary of Probable Future Development Concept*

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
<b>Proposed Lot 1 Future Concept Development</b>			
Potential Buildings	0 m <sup>2</sup>	200 m <sup>2</sup>	Detention within roof water tank.
Potential Driveway	0 m <sup>2</sup>	100 m <sup>2</sup>	Off-set detention in roof water tanks.
<b>Total</b>	<b>0 m<sup>2</sup></b>	<b>300 m<sup>2</sup></b>	
<b>Proposed Lot 2</b>			
Existing Buildings	182 m <sup>2</sup>	182 m <sup>2</sup>	Not Required, impervious area < permitted activity.
Existing Driveway	248 m <sup>2</sup>	165.5 m <sup>2</sup>	Not Required, impervious area < permitted activity.
RoW for Lot 1	0 m <sup>2</sup>	82.5 m <sup>2</sup>	Not Required, impervious area < permitted activity.
<b>Total</b>	<b>430 m<sup>2</sup></b>	<b>430 m<sup>2</sup></b>	

Calculations to support the concept design are presented as Appendix C to this report. A summary of the concept on-lot stormwater attenuation design is presented in Table 10. As mentioned above, it is recommended that this concept design is refined at the Building Consent stage once final development plans are available.

<sup>14</sup> FNDC Engineering Standards 2021, Version 0.6, Issued May 2023.



Table 10: Probable Future Development Attenuation Concept

Design Parameter	Flow Attenuation: 50 % AEP (80% of pre dev)	Flow Attenuation: 20 % AEP (80% of pre dev)	Flood Control: 10 % AEP	Flood Control: 1 % AEP (80% of pre dev)
<b>Proposed Lot 1</b>				
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan Rule C6.4.2(2)	FNDC Engineering Standards Table 4-1
Pre-development peak flow	2.89 l/s	3.75 l/s	4.40 l/s	6.52 l/s
80 % pre-development peak flow	2.31 l/s	3.00 l/s	NA	5.22 l/s
Post-development peak flow	6.56 l/s	8.50 l/s	9.97 l/s	14.78 l/s
Total Storage Volume Required	6,762 litres	8,840 litres	5,295 litres	16,197 litres
Concept Summary:	<ul style="list-style-type: none"> <li>- Attenuation storage calculation accounts for offset flow from driveway (not indicated explicitly in summary above. Refer Appendix C for calcs in full)</li> <li>- Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage.</li> <li>- 1 x 25,000 litre tank is sufficient for attenuation (16,197l) + domestic water storage (balance)</li> <li>- 1 % AEP attenuation in isolation requires a 21 mm orifice 1.54 m below overflow. However regulatory requirements are to consider an additional orifice/s to control the 50 %, 20 % and 1 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.</li> </ul>			

#### 7.4.1 On-Lot Discharge Dispersion

The direct discharge of rainwater tank overflow in a concentrated manner can cause scour and erosion in addition to saturation of shallow soils. It is recommended that overflow from rainwater detention tanks is conveyed in sealed pipes to a designated discharge point with suitable dispersion devices downslope of proposed building footprints. A concept design accommodating this is presented within Appendix A on Drawing Nos. 401 and 402.

It is recommended that the conceptually sized dispersion devices are subject to specific assessment at the Building Consent stage to limit scour and erosion from tank overflows.

Typical urban/ rural residential developments construct either above or below ground discharge dispersion pipes. Feeding pipes can be either buried or pinned to the surface as desired. It is recommended that all pipes are designed to accommodate the design storm event peak flows from the attenuation tank and including minimum 100 mm dia. PVC piping. A concept dispersion pipe or trench length is presented in Table 11. Calculations to derive this are presented within Appendix C, based on the NIWA HIRDS Depth-Duration data and TR2013/018 document. Typical details of these options are presented within Appendix A as drawing No. 402.



Table 11: Summary of Concept Dispersion Devices

Concept Impervious Area to Tank	Tank Outlet Velocity (at spreader orifices)	Tank outlet pipe diameter	Spreader pipe diameter	Dispersion Pipe/ Trench Length	Spreader orifice size	Concept
<b>Proposed Lot 1</b>						
300 m <sup>2</sup>	0.87 m/s	0.1 m	0.20 m	7.6 m	20 mm	Above ground dispersion device or in-ground dispersion trench.

## 7.5 Stormwater Quality

The proposed application is for a rural residential subdivision and future development. The key contaminant risks in this setting include:

- Sediments and minor contaminants washed from impervious surfaces.
- Leaf matter, grass, and other organic debris.

Stormwater treatment requirements are minor to maintain good quality stormwater discharge. Stormwater quality will be provided by:

- Leaf guards on roof guttering/ first flush devices on roof guttering and downpipes.
- Rainwater tank for potable use onsite only to be filled by roof runoff.
- Room for sedimentation (minimum 150 mm recommended as per Auckland Council GD01) within the base of the stormwater attenuation roof runoff tanks as dead storage volume.
- Stormwater discharges directed towards roading swale drains where possible.
- Grassed swale drains from rainwater inception (road surfaces) to discharge points.

The risk of other contaminants being discharged out of the site boundaries (hydrocarbons, metals etc.) as a result of the proposed activities once stormwater has been processed through the above measures that will affect the downstream water quality is considered low.

## 8 POTABLE WATER & FIRE FIGHTING

### 8.1 Potable Water Reticulation

The site is located within a well-established public water supply area and is currently located adjacent to a public 65 mm MDPE water supply pipeline outside the eastern boundary. The existing water connection will be reused for serving proposed lot 2 and a new water meter





will be installed at the roadside boundary of lot 2 within Station Road berm area to service lot 1.

## 8.2 Fire Fighting

There is one fire hydrant within Station Road southeast of the site approximately 120 m and a second hydrant located 270 m northeast from site on State Highway 1. These are indicated as Figure 4 below.

The fire-fighting requirements for the proposed development are determined to be FW2 in accordance with the SNZ PAS 4509:2008, New Zealand Fire Service Firefighting Water Supplies Code of Practice. The standard requires a minimum of two fire hydrants – one within 135 m, and the second within 270m to the entrance of the furthest property.

According to above assumption, the proposed developments comply with the SNZ PAS 4509:2008, New Zealand Fire Service Firefighting Water Supply Code of Practice.

Figure 4: Fire Hydrant Mapping



## 8.3 Considerations for Consenting of Water Works

The proposed water infrastructure associated to the establishment of the subdivision includes a new water meter and connection to the pressure main in the road reserve, as well as a new private water pipeline to service Lot 1 via Easement A. These works will require a building consent application prior to construction, as well as a connection request to FNDC for a new water meter.

## 9 EARTHWORKS

As part of the subdivision application, earthworks are required as follows:

- **Potential modification of top portion (3 – 5m) of accessway within Easement A.** Cut/ fill earthworks may be required to create a suitable transition to Lot 1 within the bounds of



easement A subject to future Lot 1 driveway construction (and Building Consent design). It is suggested that such minor earthworks would be appropriate to be completed with the Lot 1 driveway construction, rather than at subdivision formation.

- **There is no other earthworks to be undertaken for subdivision formation**

*Table 12: Summary of Proposed Earthworks Volumes*

Activity	Proposed Volume	Net	Max. Height
<b>Modify RoW Accessway</b>			
Cut	10.0 m <sup>3</sup>		0.4 m
Fill (imported layer works)	5.0 m <sup>3</sup>		0.4 m
Sub-total	15.0 m <sup>3</sup>	5.0 m <sup>3</sup>	

According to the above Table 12, proposed earthwork volumes are well within the 200 m<sup>3</sup> Permitted Activity volume limit outlined by FNDC District Plan Rule 12.3.6.1.3(a) and the maximum cut and fill height is <3 m to comply with 12.3.6.1.3(b).

Rule C.8.3.1, Table 15 of the Proposed Regional Plan outlines a Permitted Activity as 5,000 m<sup>2</sup> of exposed earth at any time for ‘other areas’. Proposed earthwork areas to form the subdivision, comply with the Permitted Activity standard for other areas. A full assessment according to the criteria is presented within Appendix E.

## 9.1 General Recommendations

Bulk fill with site-won earth can be moderately sensitive to disturbance when exposed to rain or runoff which may cause saturation or vehicle movements and trafficking during earthworks. Accordingly, care should be taken during construction, including probable future developments to minimise degradation of any earth fill due to construction traffic and to minimise machinery on site.

Any areas of proposed bulk fill which are required to meet specific subgrade requirements within should be subject to a specific earthwork specification prepared by a professional Engineer such as Geologix.

Temporary batters should be covered with polythene sheets secured to the surface with pins or batons to prevent saturation. All works within close proximity to excavations should be undertaken in accordance with Occupational Safety and Health regulations.

All earthworks should be carried out in periods of fine weather within the typical October to April earthwork season. Consent conditions commonly prescribe working restrictions.

It is expected that there will be retaining walls, with a maximum height of 1.0 m to the north and 0.6 m to the south, to support the proposed accessway in terms of geotechnical aspects. It is proposed that a qualified geotechnical engineer undertake the detailed retaining wall design during the building consent stage, taking into account geotechnical stability control requirements.

## 9.2 Erosion and Sediment Control

Erosion and sediment control measures are required to control sediment runoff from areas of proposed earthworks within the scope of this application. Erosion and sediment control measures to form the subdivision are summarised as follows:

- Silt fences around the downslope face of any trenching for proposed pipework that is open or not suitably stabilised within a single day's work.
- Stabilised entrance to be put in place at proposed Lot 1 site entrance.

## 10 NATURAL HAZARD ASSESSMENT

To satisfy the Resource Management Act, 1991 the proposed subdivision must plan for and manage the risk from natural hazards to reduce the potential adverse effects to less than minor. Regulatory assessment of natural hazards at the site location are managed under the jurisdiction of the FNDC District Plan<sup>15</sup>, Northland Regional Council (NRC) Proposed Regional Plan for Northland<sup>16</sup> and Regional Water and Soil Plan for Northland. Following our ground investigation and considering the measures presented in this report, a summary of the proposed activities against defined natural hazards is presented as Table 13.

Table 13: Summary of Natural Hazards

Natural Hazard	Applicability	Mitigation & Effect on Environment
Erosion	Yes	Erosion potential at stormwater outlet and earthworks areas. Mitigation provided by means of suitable outlet device and ESC controls. Resultant effects are less than minor.
Overland flow paths, flooding, inundation	Yes	There is indication of flooding hazard within site boundaries albeit at the lower reaches of the site. Proposed development is >15m setback from the 1%AEP flood plain. Mitigation against effects of the development to the floodplain (to downstream properties) provided to suit FNDC standards. Resultant effects are less than minor.
Landslip	NA	No anticipated effects, less than minor.
Rockfall	NA	No anticipated effects, less than minor.
Alluvion	NA	No anticipated effects, less than minor.
Avulsion	NA	No anticipated effects, less than minor.
Unconsolidated fill	NA	No anticipated effects, less than minor.
Soil contamination	NA	No anticipated effects, less than minor.
Subsidence	Yes	Refer to Section 10.1 for assessment of coal mining. No anticipated effects, less than minor.
Fire hazard	NA	No anticipated effects, less than minor.

<sup>15</sup> Operative District Plan Rule 13.7.3.2.

<sup>16</sup> Proposed Regional Plan for Northland June 2023 – Appeals Version, Chapter D.6.

Sea level rise	NA	No anticipated effects, less than minor.
<i>NA – Not Applicable.</i>		

## 10.1 Mining Effects Potential

The site is situated within an area which was historically mined for coal within the regional basement geology which underlies the near surface alluvial deposits. Our scope of works includes a desktop appraisal of the potential for mine workings to cause an adverse environmental effect on the application. No intrusive ground investigation such as rotary open holing has been undertaken to determine the physical presence of mine workings below the site.

### 10.1.1 General

Historical mine workings have the potential to effect development at the surface principally when excavated coal seams collapse due to loading if they are situated within influencing distance of the surface. However, effects can also be observed from near surface working of coal outcrops such as bell pits/ chambers and open cast mining. The near surface methods were generally undertaken on a local or community scale to acquire coal whereas conventional shafts and seam workings were undertaken by private and/ or government entities.

Coal mining in New Zealand occurred during the 1800s to 1900s and was of relatively small scale compared to the operations undertaken within Australia and the United Kingdom. In preparing this desktop assessment, the following sources of information and guideline documents have been reviewed.

- CIRIA C758, Abandoned Mine Workings.
- CIRIA SP32, Construction over Abandoned Mine Workings.
- New Zealand National Library Records.
- MBIE New Zealand Petroleum & Minerals Geodata Catalogue.
- UK Coal Authority, Risk based approach to development management, Guidance for Developers, 2017 Version 4.

Guideline documents listed above provide minimum offset requirements from varying types of mine workings which is designated as ‘high risk’ zones. The offsetting requirements are summarised as follows:

*Table 14: Summary of High Risk Coal Mining Zones*

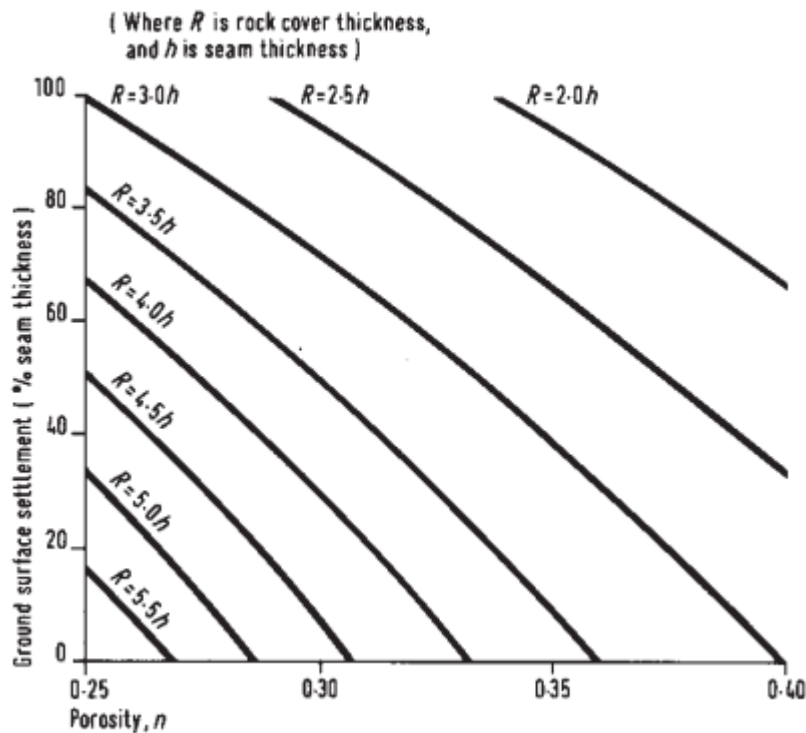
Type of Working	High Risk Zone Offset
Mine entries including shafts.	20 m
Shallow Workings, i.e. depth < 30 m	No buffer
Coal seam outcrops	10 m
Mine gas site	No buffer
Surface mining sites, i.e. opencast	No buffer
Geological features, i.e. faults	5 m



UK guideline documents presented by CIRIA provide minimum competent rock thicknesses above mine workings to mitigate against damage potential at the surface from additional loading. The cover of competent rock is commonly taken as 5 – 10x coal seam thickness to avoid an adverse effect on the surface.

Additionally, the use of lightweight timber clad dwellings must also be considered that at typical coal seam depths within competent rock that no additional loading will occur. Conservatively considering a UK dwelling comprising a heavier, double skin brick or concrete structure, CIRIA SP32 provides the following rock cover requirements based upon seam thickness and porosity of collapsed material to estimate ground subsidence potential.

Figure 5: Ground Subsidence Assessment using Prismatic Theory, CIRIA SP32



### 10.1.2 Desktop Site Assessment

Information regarding the Kawakawa-Waiomio coal field is available by Gazettes and information published by the MBIE geodata catalogue. The relevant Gazette record<sup>17</sup> indicates that the Kawakawa field was mined between c. 1865 – 1913, and later in 1922 and 1924 – 1926 by the Bay of Islands Consolidated Coal Prospecting Syndicate.

Prospecting was undertaken in the early years with boreholes and shafts taken down depths ranging from 12 m to 42 m below ground level (bg). Coal seams were locally identified in the

<sup>17</sup> Ministry of Economic Development Coal Report Series CR999 Report 4C, Coal at Kawakawa, 1957.



deeper bores at a depth of approximately 27 m bgl with a seam thickness of approximately 1.2 to 1.5 m. Rock head was recorded at 18 m bgl.

Coal was mined from 1865 following discovery in 1861 and was worked until 1899 with an annual yield of approximately 25,000 to 50,000 tons. During this period the mine was worked by 'pillaring', a process where the mine roof is supported by leaving pillars of coal intact as supporting members. Pillaring was a commonplace method of working coal seams over widespread areas and surface deformations and failures are generally localised, rather than widespread where the coal pillars are compressed by the overburden pressure or completely removed within the later mine working stages.

Multiple gazette records indicate that by 1899, much of the Kawakawa coal seam had been completely worked and thereafter the annual yield reduced significantly to approximately 4,000 tons by working the mine pillars only. Later in c. 1908 the seam outcrops were worked by open cast methods in the east of the field, where the unit outcrops to the Greywacke boundary.

To the north, another Gazette<sup>18</sup> indicates that to the north of the coal field, where the site is located, the coal was suddenly cut off by an inrush of water and gravel which is consistent with the shallow geology type at the site and swamp land beyond. This flooding was one of the primary reasons for closure of the mine in addition to roof faults. The later 1920s pillar removal is indicated by this Gazette to have occurred to the east of the coal field, most likely away from the flooded areas. The total mine working area was approximately 52.6 hectares and the nearest shaft was recorded approximately 250 m to the southwest of the site, within a bush/ vegetation clad area on today's aerials.

Later boreholes to the north of the worked areas in approximately the 1940s indicated no coal was found, supporting the indication of a sharp halt to the coal seam.

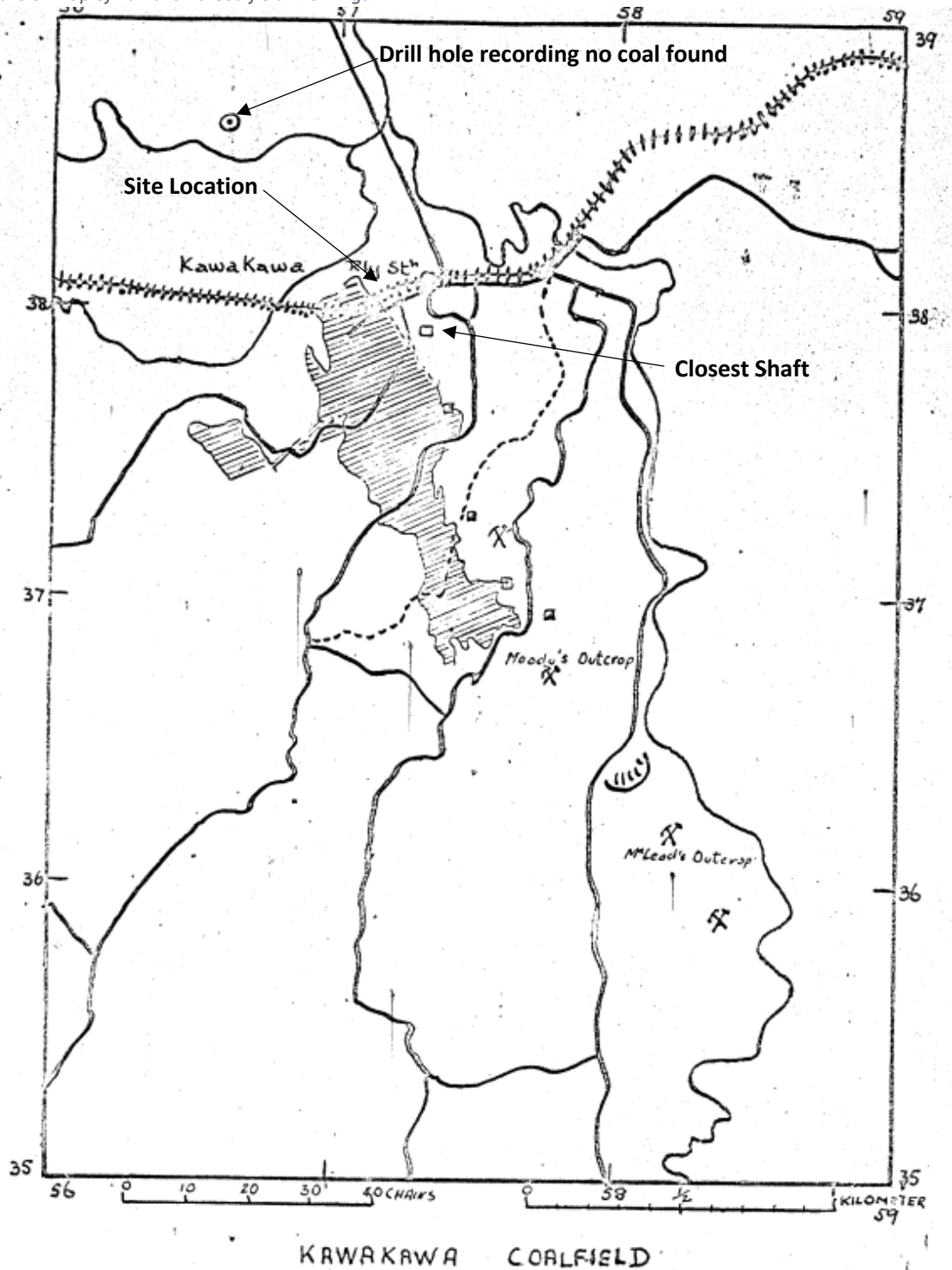
A map from the MBIE Gazette CR195 of the Kawakawa coalfield is presented below as Figure 6 which indicates the site is marginally outside of the worked area. The map also indicates that surface workings such as open cast or bell pits/ chambers was not undertaken within the vicinity of the site, as supported by our walkover assessment.





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<sup>18</sup> Ministry of Economic Development Coal Report Series CR195 Northland Coal Region, Kawakawa-Waiomio Coalfield, 1974.



Figure 6: Map of Kawakawa Coalfield Workings



- KAWAKAWA COALFIELD**
-  Pillared area
  -  Drillhole
  -  Surface workings
  -  Shaft

### 10.1.3 Risk Assessment (Desktop)

Based on the desktop assessment only, a risk assessment of coal mine working potential effecting the site based on the Coal Authority and CIRIA guideline documents is presented below as Table 15.

Table 15: Mine Working Risk Assessment

Type of Working	Min. Offset	Site Assessment
Mine entries including shafts.	20 m	>20 m (approx. 250 m from records)
Shallow Workings, i.e. depth < 30 m	No buffer	Workings could potentially be classed as shallow with the coal seam encountered at approximately 27 m bgl within the coalfield.
Coal seam outcrops	10 m	>10 m, none recorded within the northern part of the coalfield. Seam outcrop workings are indicated to have occurred in the east of the field.
Mine gas site	No buffer	None recorded within the gazettes. Flooding of the mine is expected to have mitigated gassing potential.
Surface mining sites, i.e. opencast	No buffer	None recorded, opencast workings expected to east of field.
Geological features, i.e. faults	5 m	No faults recorded within the vicinity of the site. GNS Science mapping places the Kawakawa fault to the north, close to the base of the hilly terrain, trending east-west through Moerewa.
Rock cover	5 – 10x seam thickness	Based on a maximum coal seam thickness of 1.5 m, a rock cover requirement of 15 m is required to mitigate against deformation and subsidence effects at the surface. Records indicate a 9m rock cover above the seam based on historic drill records.  A 9 m cover provides a cover of approximately 6x seam thickness. This complies with the prismatic theory outlined by Figure 5 which indicated that at 5.5x rock cover, surface manifestation of ~17 % of the seam thickness could be expected.

Based on the desktop appraisal and risk assessment presented within this report, there is expected to be a **low risk** with a less than minor effect on the proposed subdivision from historic coal mine working due to the following reasons:

- The site is marginally outside of the mapped working area.
- The coal seam to the northern extent of the coal field is expected to end sharply with a thinner seam thickness.
- Supporting mine pillars are not expected to have been removed from the site area.
- A rock cover of 6x seam thickness minimises surface manifestation potential. This could be confirmed by intrusive investigation.
- No shafts, open cast workings and/ or faults are recorded within influencing distance of the site which determine ‘high risk zones’.



## 11 ACCESS AND INTERNAL ROADING

It should be noted that we are not traffic engineers, and no specific Traffic Impact Assessment is included within the scope of these works.

### 11.1 Vehicle Crossings

An existing vehicle crossing will provide access to proposed Lot 1 and 2 from Station Road. The existing consented vehicle crossing will remain and function in its current condition as it is deemed to be in reasonable accordance with the FNDC standards in terms of dimensions and surfacing.

### 11.2 Right of Ways (RoW)

Currently formed driveway within Lot 2 will provide internal access to the proposed Lot 1 via a Right of Way (Easement A). In its existing form, it meets the 3 m minimum width carriageway requirement in accordance with the standards specified in Appendix 3B-1 of the Operative District Plan and in accordance with Drawing Sheet No. 7 of the FNDC Engineering Standards, as summarised in Table 16.

RoW gradient is approximately 10 %. However, a reduction of the breakover angle to create a suitable transition onto Lot 1, may be required depending on the Lot 1 accessway design. It is recommended that this relatively minor works be incorporated with and constructed at building consent stage for Lot 1 development.

*Table 16 Summary of Proposed RoW specification*

Location	Servicing Lot	Standard	Future H.E	Min. Legal Width	Min. Carriageway Width
Right of Way (Easement A)	1 & 2	Category A	2	-	3.0 m.

## 12 LIMITATIONS

This report has been prepared for CEM & SJ Bradshaw. It may be relied upon by our Client and their appointed Consultants, Contractors and for the purpose of Consent as outlined by the specific objectives in this report. This report and associated recommendations, conclusions or intellectual property is not to be relied upon by any other party for any purpose unless agreed in writing by Geologix Consulting Engineers Ltd and our Client. In any case the reliance by any other party for any other purpose shall be at such parties' sole risk and no reliability is provided by Geologix Consulting Engineers Ltd.

The opinions and recommendations of this report are based on plans, specifications and reports provided to us at the time of writing, as referenced. Any changes, additions or amendments to the project scope and referenced documents may require an amendment to this report and Geologix Consulting Engineers should be consulted. Geologix Consulting Engineers Ltd reserve the right to review this report and accompanying plans.



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The recommendations and opinions in this report are based on arisings extracted from exploratory boreholes at discrete locations and any available existing borehole records. The nature and continuity of subsurface conditions, interpretation of ground condition and models away from these specific ground investigation locations are inferred. It must be appreciated that the actual conditions may vary from the assumed ground model. Differences from the encountered ground conditions during subdivision construction may require an amendment to the recommendations of this report.



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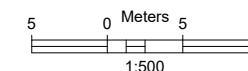
## APPENDIX A

### Drawings

# GENERAL NOTES

- DRAWING REPRODUCED FROM THOMSON SURVEY LTD REF.10624, DATED APRIL 2024.
- TOPOGRAPHIC SURVEY DATA IS CAPTURED FROM LINZ.
- HORIZONTAL CO ORDINATE SYSTEM = NZGD2000.
- VERTICAL DATUM = NZVD2016.
- MAJOR INTERVALS 5.0 m.
- MINOR INTERVALS 1.0 m.
- FOR INDICATION ONLY, NOT FOR CONSTRUCTION. DO NOT SCALE FROM THIS DRAWING.

- GEOLOGIX HAND AUGER LOCATION - JUNE 2024
- PROPOSED BUILDING SHAPE FACTOR
- EXISTING IMPERVIOUS DRIVEWAY
- PROPOSED LOT BOUNDARY
- PROPOSED EASEMENT BOUNDARY
- EXISTING STORMWATER PIPE
- UNLINED OPEN CHANNEL
- PROPOSED WASTEWATER PIPE
- EXISTING WASTEWATER PIPE
- EXISTING WATER SUPPLY PIPE
- PROPOSED WATER SUPPLY PIPE
- FIRE HYDRANT
- WATER METER
- EXISTING STORMWATER/ WASTEWATER MANHOLE
- CONCEPT 25,000 LITRE WATER TANK ATTENUATING TO DISPERSION DEVICE TO CONTROL 300 m² AREA
- DIRECTION OF WATER FLOW



1	CONSENT	03/10/2024
Revision	Issue	Date



AUCKLAND | NORTHLAND

Project Name and Address  
**18 STATION ROAD**  
**KAWAKAWA**  
**LOT 1 DP 526023**

Project <b>C0506</b>	Drawn By <b>SD</b>
-------------------------	-----------------------

Client  
**CEM & SJ BRADSHAW**

Sheet Title  
**ENGINEERING PLAN**

Sheet  
**100**




FILE PATH: Z:\Projects\C0506-C0999\C0506-18 Station Road, Kawakawa\07 - Technical & Drawings\Drawings\C0506-01-R01.dwg


PLOTED: 03/04/2022



## GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY LTD REF.10624, DATED APRIL 2024.
2. TOPOGRAPHIC SURVEY DATA IS CAPTURED FROM LINZ.
3. HORIZONTAL CO ORDINATE SYSTEM = NZGD2000.
4. VERTICAL DATUM = NZVD2016.
5. MAJOR INTERVALS 5.0 m.
6. MINOR INTERVALS 1.0 m.
7. FOR INDICATION ONLY, NOT FOR CONSTRUCTION. DO NOT SCALE FROM THIS DRAWING.

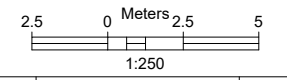
 GEOLOGIX HAND AUGER & DYNAMIC CONE PENETROMETER - JUNE 2024

 PROPOSED BUILDING SHAPE FACTOR

 EXISTING BUILDINGS

 PROPOSED LOT BOUNDARY

 PROPOSED EASEMENT BOUNDARY



Revision	Issue	Date
1	CONSENT	03/10/2024



AUCKLAND | NORTHLAND

Project Name and Address  
**18 STATION ROAD  
 KAWAKAWA  
 LOT 1 DP 526023**

Project **C0506** Drawn By **SD**

Client  
**CEM & SJ BRADSHAW**

Sheet Title  
**GEOTECHNICAL PLAN**

Sheet  
**200**

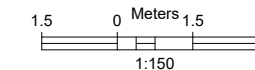
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PLOTED: 03/05/2024

# GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY LTD REF.10624, DATED APRIL 2024.
2. TOPOGRAPHIC SURVEY DATA IS CAPTURED FROM LINZ.
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4. VERTICAL DATUM = NZVD2016.
5. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
6. DO NOT SCALE FROM THIS DRAWING.

- VERY STIFF NEOGENE RIVER DEPOSITS
- DENSE TO VERY DENSE NEOGENE RIVER DEPOSITS
- ? - STRATA BOUNDARY



1	CONSENT	18/10/2024
Revision	Issue	Date



AUCKLAND | NORTHLAND

Project Name and Address

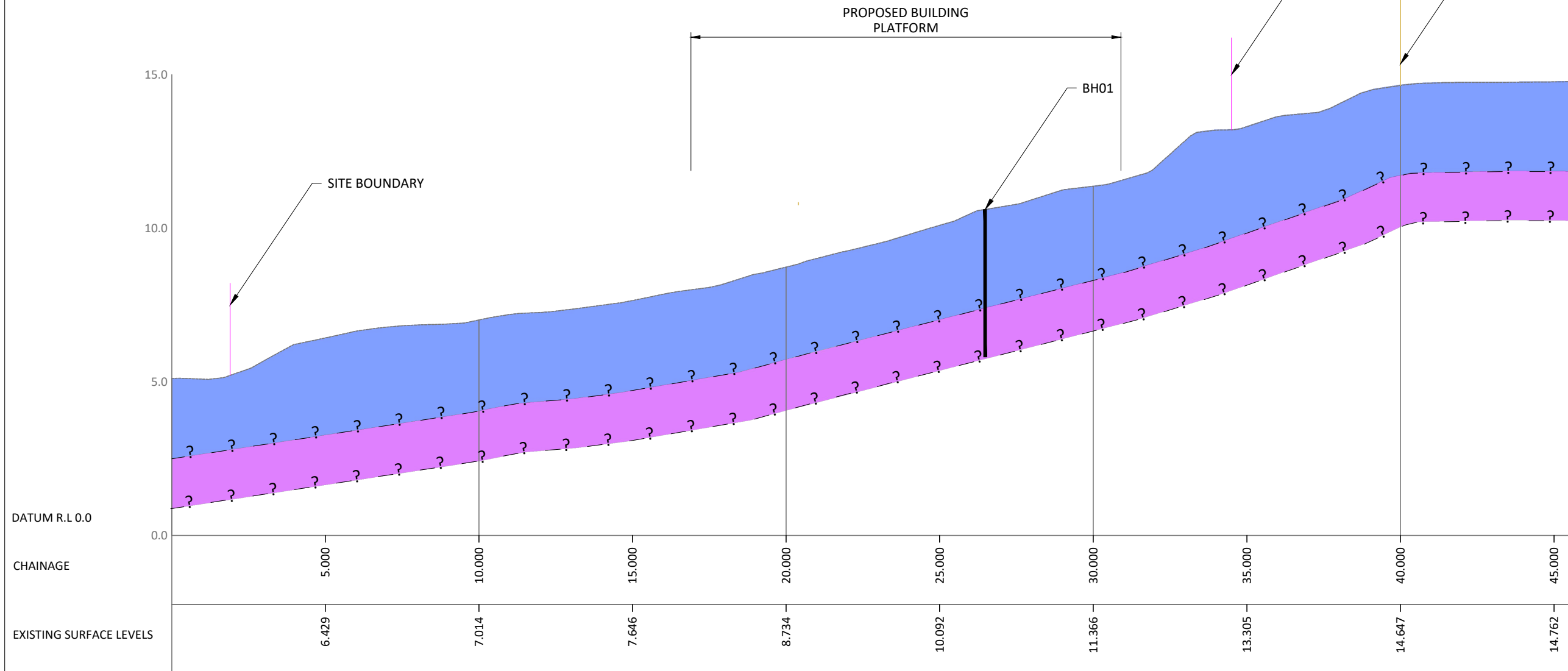
**18 STATION ROAD  
KAWAKAWA  
LOT 1 DP 526023**

Project <b>C0506</b>	Drawn By <b>SD</b>
-------------------------	-----------------------

Client  
**CEM & SJ BRADSHAW**

Sheet Title  
**GEOTECHNICAL CROSS SECTION - A**

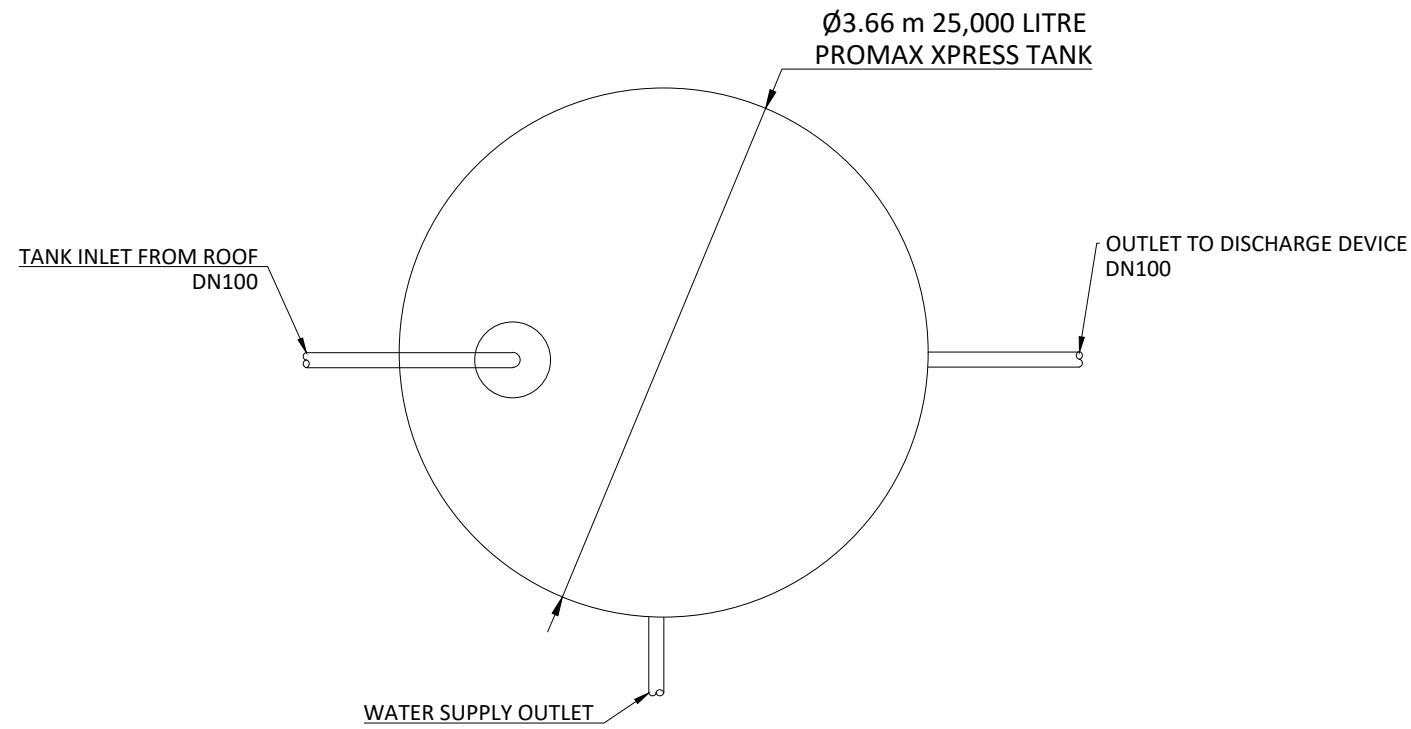
Sheet  
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**GEOTECHNICAL CROSS SECTION - A**  
SCALE - HORIZ 1:150.0, VERT. 1:150.0

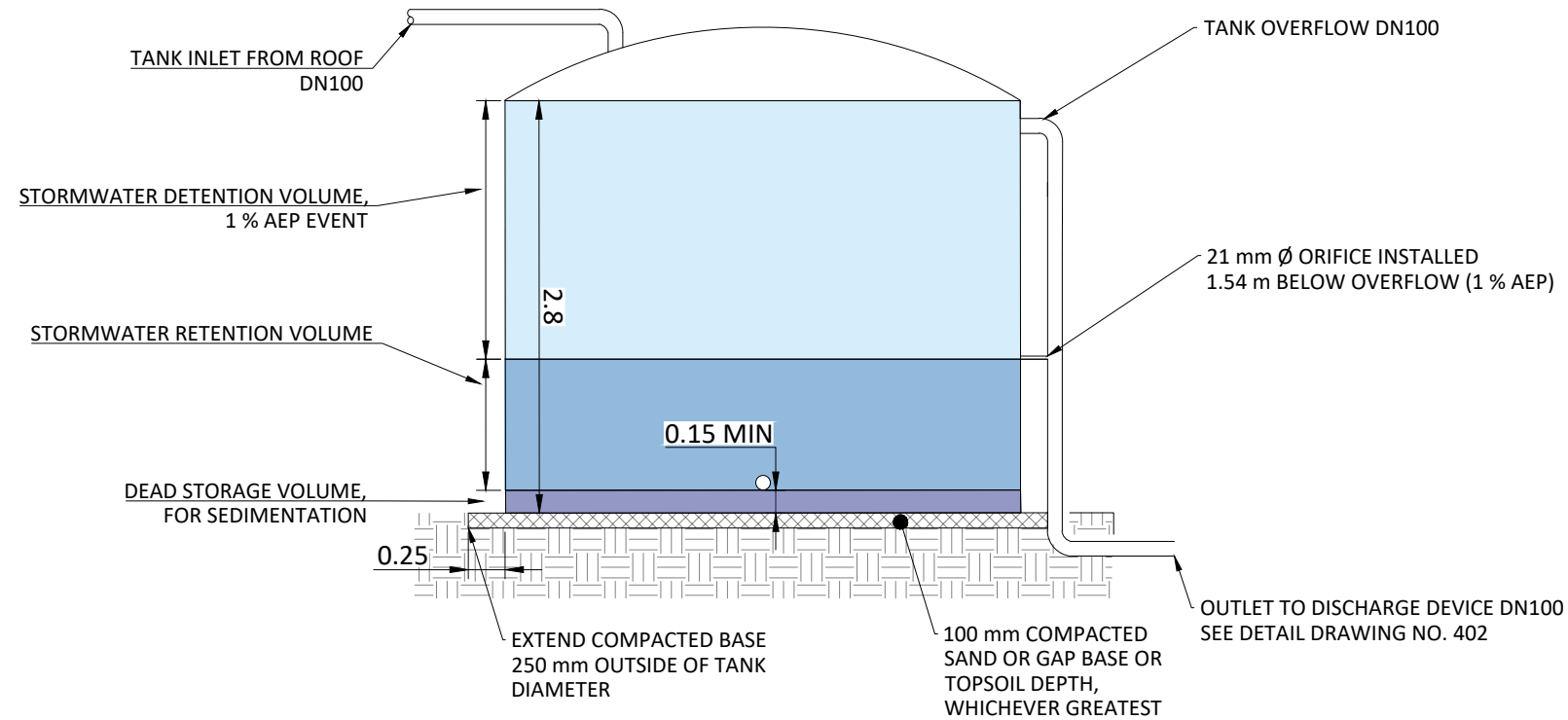
**PROPOSED TANK PLAN VIEW**

1:50, A3



**PROPOSED TANK SIDE VIEW**

1:50, A3



**GENERAL NOTES**

1. TANK, PIPING AND FITTINGS TO BE INSTALLED AS PER MANUFACTURERS RECOMMENDATIONS AND IN ACCORDANCE WITH NZBC E1, UNLESS SPECIFICALLY STATED OTHERWISE.
2. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 ACCEPTABLE SOLUTIONS, RELEVANT STANDARDS AND GUIDELINES.
3. DO NOT SCALE FROM THIS DRAWING.
4. CONTRACTOR IS TO ORGANISE ALL SET OUT, INSPECTIONS AND MONITORING AS REQUIRED TO MEET CONSENT CONDITIONS.

Revision	Issue	Date
1	CONSENT	18/07/2024



AUCKLAND | NORTHLAND

Project Name and Address  
**18 STATION ROAD**  
**KAWAKAWA**  
**LOT 1 DP 526023**

Project  
**C0506**

Drawn By  
**SD**

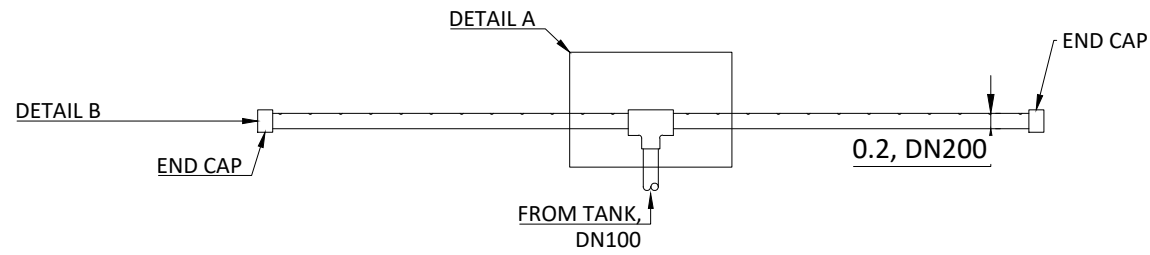
Client  
**CEM & SJ BRADSHAW**

Sheet Title  
**TYPICAL TANK DETAIL**

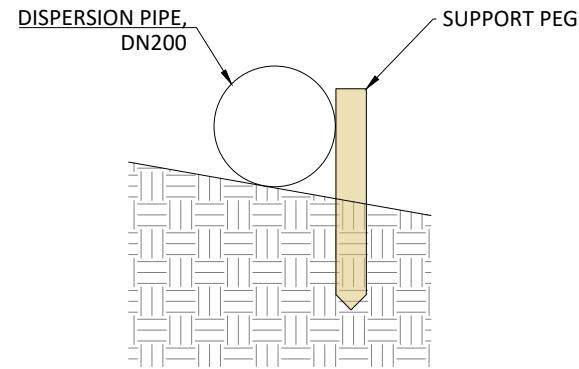
Sheet  
**401**

**OPTION 1: DISPERSION VIA ABOVE GROUND PIPE**

NOT TO SCALE

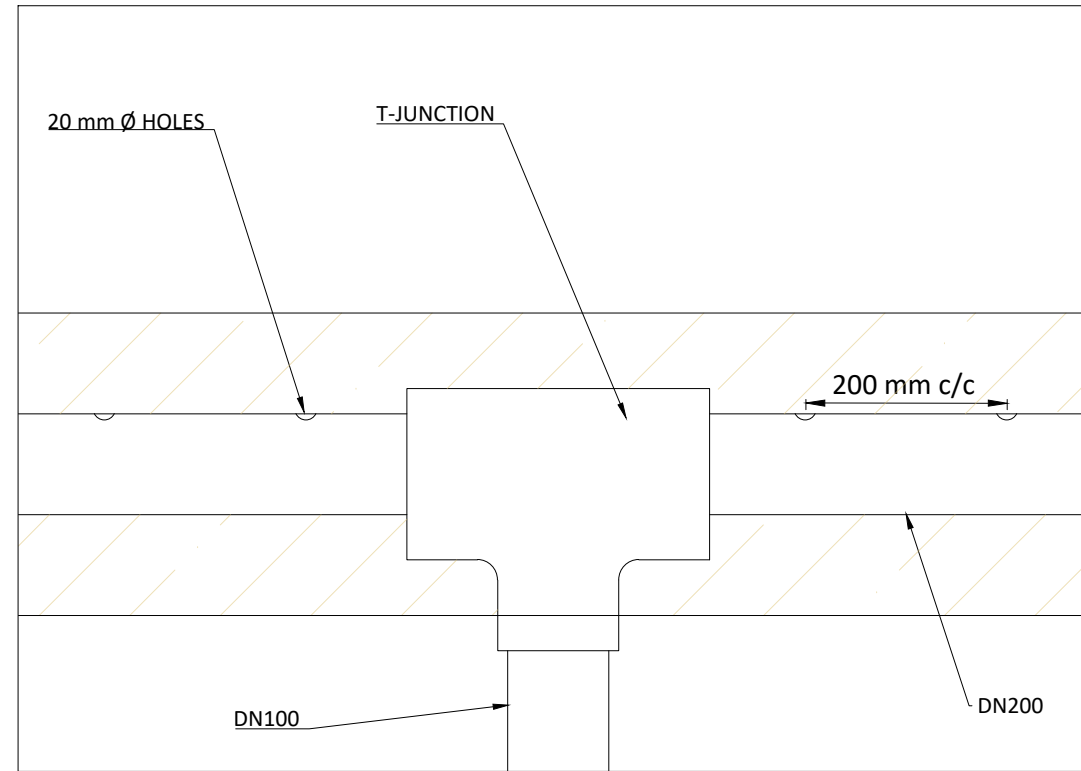


**DETAIL B - SIDE VIEW**  
NOT TO SCALE



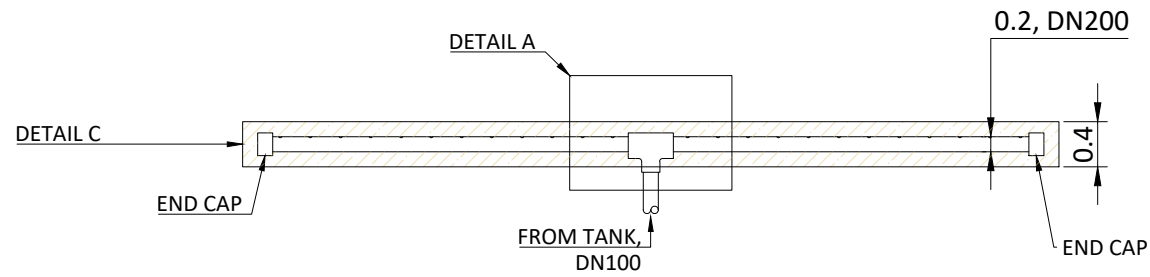
**DETAIL A - T JUNCTION AND PERFORATIONS**

NOT TO SCALE



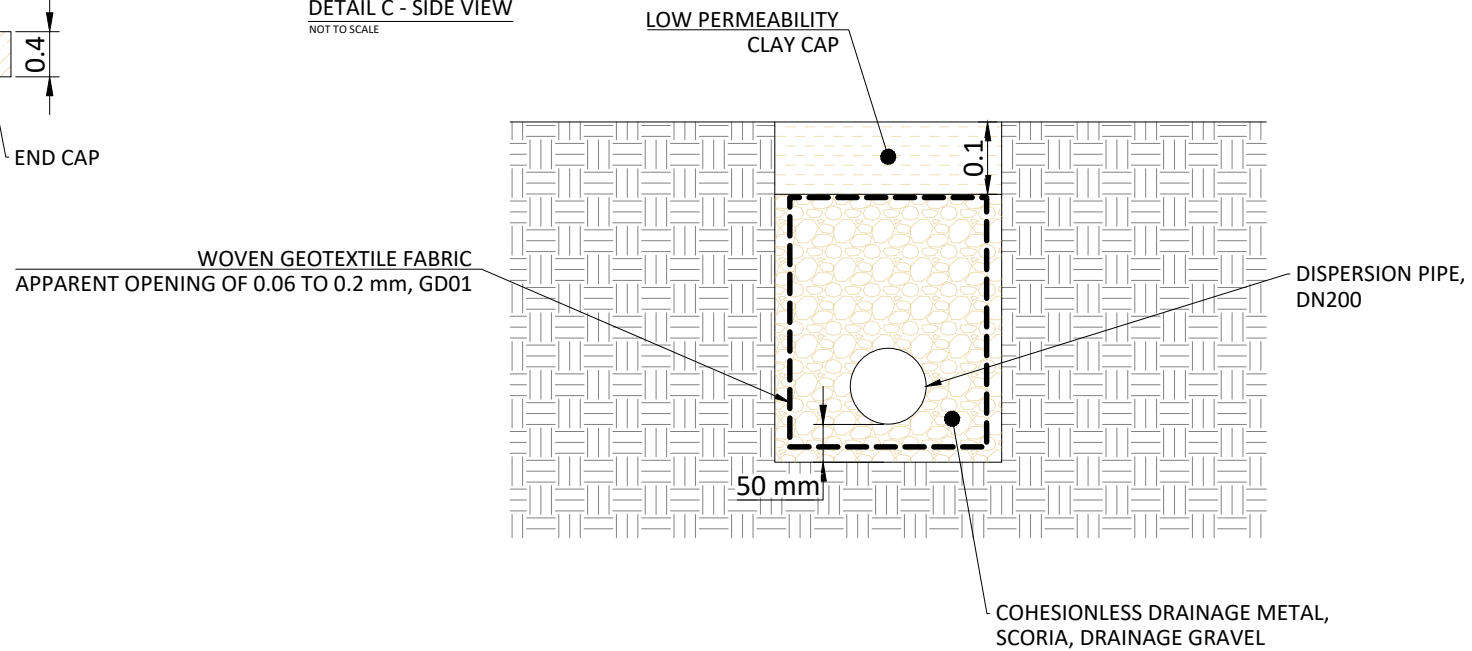
**OPTION 2: DISPERSION VIA BELOW GROUND TRENCH**

NOT TO SCALE



**DETAIL C - SIDE VIEW**

NOT TO SCALE



**GENERAL NOTES**

1. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 ACCEPTABLE SOLUTIONS, RELEVANT STANDARDS AND GUIDELINES INCLUDING AUCKLAND COUNCIL GD01, WHERE APPLICABLE.
2. DO NOT SCALE FROM THIS DRAWING.
3. CONTRACTOR IS TO ORGANISE ALL SET OUT, INSPECTIONS AND MONITORING AS REQUIRED TO MEET CONSENT CONDITIONS.

1	CONSENT	18/07/2024
Revision	Issue	Date



Project Name and Address  
**18 STATION ROAD  
 KAWAKAWA  
 LOT 1 DP 526023**

Project **C0506** Drawn By **SD**

Client  
**CEM & SJ BRADSHAW**

Sheet Title  
**TYPICAL DISPERSION PIPE DETAIL**

Sheet  
**402**





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## APPENDIX B

### Engineering Borehole Logs

# INVESTIGATION LOG

HOLE NO.:  
**BH01**

CLIENT: CEM & SJ Bradshaw  
PROJECT: 18 Station Road

JOB NO.:  
**C0506**

SITE LOCATION: 18 Station Road, Kawakawa

START DATE: 07/06/2024

CO-ORDINATES:

ELEVATION: Ground

END DATE: 07/06/2024

CONTRACTOR: Internal

RIG: 50mm auger

DRILLER: TW

LOGGED BY: TW

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)							VANE SHEAR STRENGTH (kPa) Vane: 3282				WATER		
				2	4	6	8	10	12	14	16	18	50	100		150	200
TOPSOIL comprising of organic silt; dark brown; moist; low plasticity.		0.2	TS														
SILT, with some clay, with trace sand; brown. Hard; moist; low plasticity; sand, fine; [Neogene River Deposite].		0.4	TS														UTP
Clayey SILT, with trace sand; light brown with white and orange mottles. Very stiff to hard; moist; low plasticity; sand, fine; [Neogene River Deposits].		0.6	TS														UTP
		0.8	TS														154
		1.0	TS														36
		1.2	TS														UTP
		1.4	TS														UTP
		1.6	TS														-
1.9m - 2.1m: Trace dark orange inclusions.		1.8	TS													195+	
End Of Hole: 2.10m		2.0	TS													UTP	
		2.2															-
		2.4															-
		2.6															-
		2.8															-
		3.0															-
		3.2															-
		3.4															-
		3.6															-
		3.8															-
		4.0															-
		4.2															-
		4.4															-
		4.6															-
		4.8															-

**PHOTO(S)**



**REMARKS**

- Hand auger refused at 2.1 m bgl due to hard strata encountered.
- Groundwater not encountered during drilling.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**


- Hand Auger
- Test Pit



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## APPENDIX C

### Stormwater Attenuation Design

Project Ref:	C0506	<b>STORMWATER ATTENUATION TANK DESIGN</b>	
Project Address:	18 STATION ROAD, KAWAKAWA		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	4 October 2024 REV 1	<b>50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT</b>	

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).  
 PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS  
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

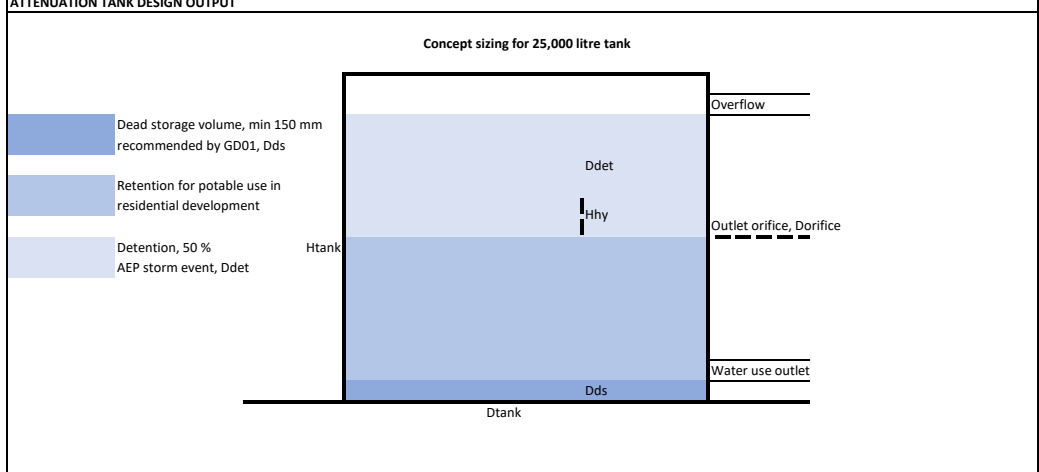
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A				TO TANK	200	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	100	0.80	DRIVEWAY - METAL
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	300	0.48	GRASS & BUSH	EX. CONSENTED	0	0	
<b>TOTAL</b>	<b>300</b>	<b>TYPE C</b>		<b>TOTAL</b>	<b>300</b>	<b>TYPE C</b>	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION			
50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	72.3	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN %	20	%	
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	86.76	mm/hr	


PRE AND POST-DEVELOPMENT RUNOFF, 50%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Q <sub>post</sub> , l/s	PRE DEV RUNOFF, Q <sub>pre</sub> , l/s	80% of PRE DEV RUNOFF, Q <sub>pre(80%)</sub> , l/s	COMMENTS
10	72.30	1.2	86.76	6.56	2.89	2.31	Critical duration (time of concentration) for the catchments is 10min  Pre-dev calculated on Intensity without CC factor
20	52.10	1.2	62.52	4.72	2.50	2.00	
30	42.80	1.2	51.36	3.88	2.05	1.64	
60	30.10	1.2	36.12	2.73	1.44	1.16	
120	20.70	1.2	24.84	1.88	0.99	0.79	
360	10.90	1.2	13.08	0.99	0.52	0.42	
720	6.98	1.2	8.38	0.63	0.34	0.27	
1440	4.31	1.2	5.17	0.39	0.21	0.17	
2880	2.57	1.2	3.08	0.23	0.12	0.10	
4320	1.86	1.2	2.23	0.17	0.09	0.07	

ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Q <sub>off</sub> , l/s	TANK INFLOW, Q <sub>in</sub> , l/s	ALLOWABLE TANK OUTFLOW, Q <sub>pre(80%) - Q<sub>off</sub>, l/s</sub>	SELECTED TANK OUTFLOW, Q <sub>out</sub> , l/s	DIFFERENCE (Q <sub>in</sub> - Q <sub>out</sub> ), l/s	Required Storage, litres	COMMENTS
10	1.93	4.63	0.39	0.39	4.24	2545	select largest required storage, regardless of duration, to avoid overflow
20	1.39	3.33	0.61	0.39	2.95	3539	
30	1.14	2.74	0.50	0.39	2.35	4236	
60	0.80	1.93	0.35	0.39	1.54	5547	
120	0.55	1.32	0.24	0.39	0.94	6762	
360	0.29	0.70	0.13	0.39	0.31	6739	
720	0.19	0.45	0.08	0.39	0.06	2640	
1440	0.11	0.28	0.05	0.39	No Att. Req.	0	
2880	0.07	0.16	0.03	0.39	No Att. Req.	0	
4320	0.05	0.12	0.02	0.39	No Att. Req.	0	

**ATTENUATION TANK DESIGN OUTPUT**



SPECIFICATION		
TOTAL STORAGE REQUIRED	6.762 m <sup>3</sup>	Select largest storage as per analysis
TANK HEIGHT, H <sub>tank</sub>	2.6 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, D <sub>tank</sub>	3.66 m	No. of Tanks 1
TANK AREA, A <sub>tank</sub>	10.52 m <sup>2</sup>	Area of ONE tank
TANK MAX STORAGE VOLUME, V <sub>tank</sub>	27354 litres	
REQUIRED STORAGE HEIGHT, D <sub>det</sub>	0.64 m	Below overflow
DEAD STORAGE VOLUME, D <sub>ds</sub>	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.79 m	
SELECTED TANK OUTFLOW, Q <sub>out</sub> , l/s	0.00039 m <sup>3</sup> /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H <sub>hy</sub>	0.32 m	
AREA OF ORIFICE, A <sub>orifice</sub>	2.48E-04 m <sup>2</sup>	
ORIFICE DIAMETER, D <sub>orifice</sub>	18 mm	
VELOCITY AT ORIFICE	3.55 m/s	At max. head level

Project Ref:	C0506	<b>STORMWATER ATTENUATION TANK DESIGN</b>	
Project Address:	18 STATION ROAD, KAWAKAWA		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	4 October 2024 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).  
 PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS  
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

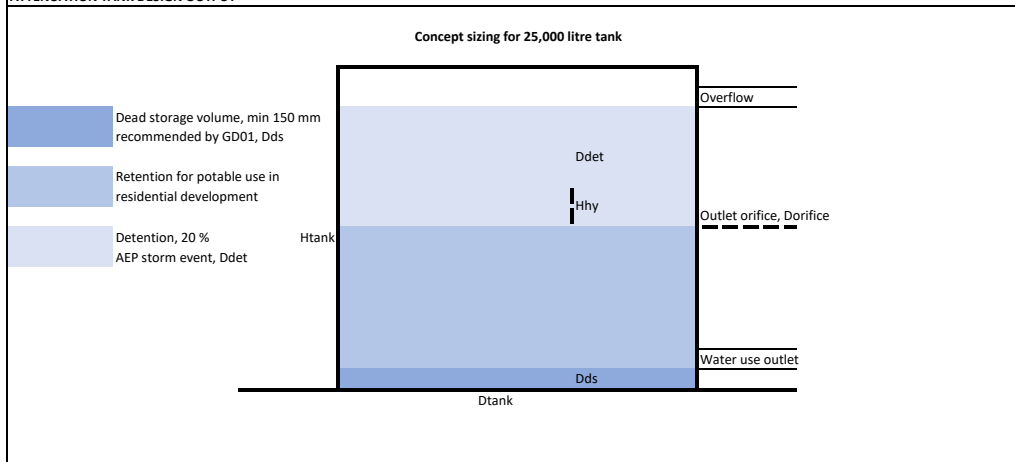
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	200	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	100	0.8	DRIVEWAY - METAL
IMPERVIOUS C	0	0	GRASS & BUSH	PERVIOUS	0	0	
EX. PERVIOUS	300	0.48		EX. CONSENTED	0	0	
					0	0	
<b>TOTAL</b>	<b>300</b>		<b>TYPE C</b>	<b>TOTAL</b>	<b>300</b>		<b>TYPE C</b>

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION			
20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	93.8	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	112.6	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% OF PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	93.80	1.2	112.56	8.50	3.75	3.00	<i>Critical duration (time of concentration) for the catchments is 10min</i>
20	67.70	1.2	81.24	6.14	3.25	2.60	
30	55.60	1.2	66.72	5.04	2.67	2.14	
60	39.20	1.2	47.04	3.55	1.88	1.51	
120	27.00	1.2	32.40	2.45	1.30	1.04	
360	14.20	1.2	17.04	1.29	0.68	0.55	
720	9.14	1.2	10.97	0.83	0.44	0.35	
1440	5.67	1.2	6.80	0.51	0.27	0.22	
2880	3.38	1.2	4.06	0.31	0.16	0.13	
4320	2.44	1.2	2.93	0.22	0.12	0.09	


ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	2.50	6.00	0.50	0.50	5.50	3302	<i>select largest required storage, regardless of duration, to avoid overflow</i>
20	1.81	4.33	1.44	0.50	3.83	4599	
30	1.48	3.56	1.19	0.50	3.06	5505	
60	1.05	2.51	0.84	0.50	2.01	7231	
120	0.72	1.73	0.58	0.50	1.23	8840	
360	0.38	0.91	0.30	0.50	0.41	8824	
720	0.24	0.58	0.19	0.50	0.08	3659	
1440	0.15	0.36	0.12	0.50	No Att. Req.	0	
2880	0.09	0.22	0.07	0.50	No Att. Req.	0	
4320	0.07	0.16	0.05	0.50	No Att. Req.	0	

**ATTENUATION TANK DESIGN OUTPUT**



**SPECIFICATION**

TOTAL STORAGE REQUIRED	8.840 m <sup>3</sup>	Select largest storage as per analysis
TANK HEIGHT, Htank	2.6 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66 m	No. of Tanks 1
TANK AREA, Atank	10.52 m <sup>2</sup>	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	27354 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.84 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.99 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00050 m <sup>3</sup> /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.42 m	
AREA OF ORIFICE, Aorifice	2.81E-04 m <sup>2</sup>	
ORIFICE DIAMETER, Dorifice	19 mm	
VELOCITY AT ORIFICE	4.06 m/s	At max. head level

Project Ref:	C0506	<b>STORMWATER ATTENUATION TANK DESIGN</b>	
Project Address:	18 STATION ROAD, KAWAKAWA		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	4 October 2024 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).  
 THE 10% AEP SCENARIO IS PROVIDED TO SATISFY FNDC DISTRICT PLAN RULE 13.7.3.4. PRE-DEVELOPMENT RUNOFF REMAINS UNFACTORED IN THIS SCENARIO.  
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

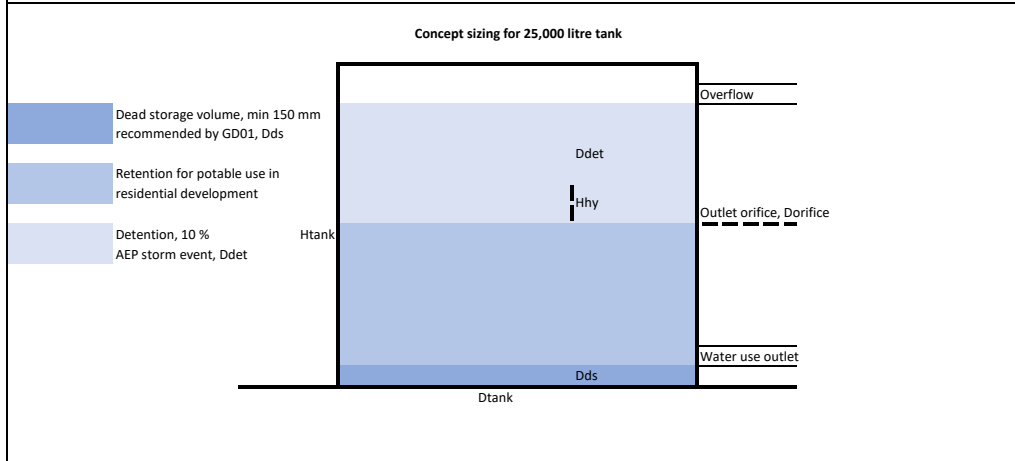
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	200	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	100	0.8	DRIVEWAY - METAL
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	300	0.48	GRASS & BUSH	EX. CONSENTED	0	0	
	0	0			0	0	
<b>TOTAL</b>	<b>300</b>		<b>TYPE C</b>	<b>TOTAL</b>	<b>300</b>		<b>TYPE C</b>

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION			
10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	110.0	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	132.0	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 10%AEP WITH CC, VARIOUS DURATIONS						
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	COMMENTS
10	110.00	1.2	132.00	9.97	4.40	<i>Critical duration (time of concentration) for the catchments is 10min</i>
20	79.20	1.2	95.04	7.18	3.80	
30	65.10	1.2	78.12	5.90	3.12	
60	45.90	1.2	55.08	4.16	2.20	
120	31.70	1.2	38.04	2.87	1.52	
360	16.70	1.2	20.04	1.51	0.80	
720	10.80	1.2	12.96	0.98	0.52	
1440	6.67	1.2	8.00	0.60	0.32	
2880	3.98	1.2	4.78	0.36	0.19	
4320	2.88	1.2	3.46	0.26	0.14	


ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	2.93	7.04	1.47	1.47	5.57	3344	<i>select largest required storage, regardless of duration, to avoid overflow</i>
20	2.11	5.07	1.69	1.47	3.60	4323	
30	1.74	4.17	1.39	1.47	2.70	4860	
60	1.22	2.94	0.98	1.47	1.47	5295	
120	0.85	2.03	0.68	1.47	0.56	4047	
360	0.45	1.07	0.36	1.47	No Att. Req.	0	
720	0.29	0.69	0.23	1.47	No Att. Req.	0	
1440	0.18	0.43	0.14	1.47	No Att. Req.	0	
2880	0.11	0.25	0.08	1.47	No Att. Req.	0	
4320	0.08	0.18	0.06	1.47	No Att. Req.	0	

**ATTENUATION TANK DESIGN OUTPUT**



**SPECIFICATION**

TOTAL STORAGE REQUIRED	5.295 m <sup>3</sup>	Select largest storage as per analysis
TANK HEIGHT, Htank	2.6 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66 m	No. of Tanks 1
TANK AREA, Atank	10.52 m <sup>2</sup>	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	27354 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.50 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.65 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00147 m <sup>3</sup> /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.25 m	
AREA OF ORIFICE, Aorifice	1.06E-03 m <sup>2</sup>	
ORIFICE DIAMETER, Dorifice	37 mm	
VELOCITY AT ORIFICE	3.14 m/s	At max. head level

Project Ref:	C0506	<b>STORMWATER ATTENUATION TANK DESIGN</b>	
Project Address:	18 STATION ROAD, KAWAKAWA		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	4 October 2024 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).  
 PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS  
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

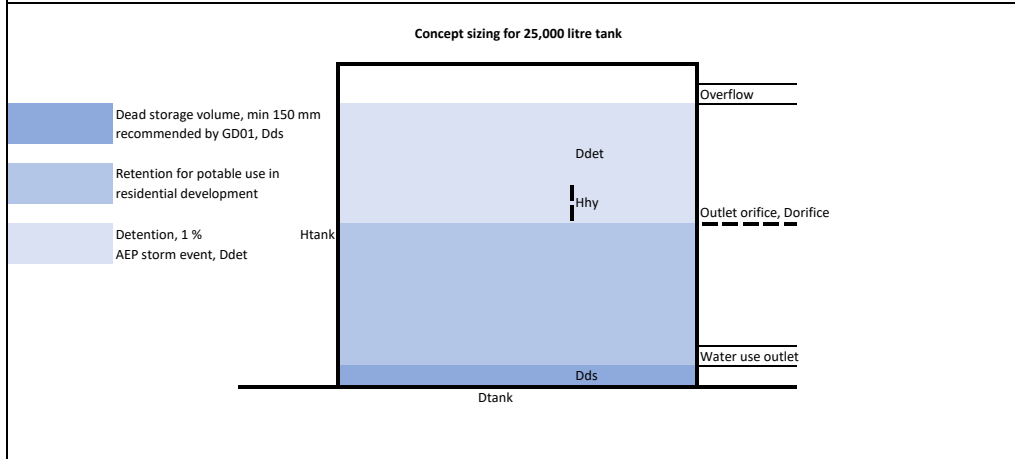
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	200	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	100	0.8	DRIVEWAY - METAL
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	300	0.48	GRASS & BUSH	EX. CONSENTED	0	0	
	0	0			0	0	
<b>TOTAL</b>	<b>300</b>		<b>TYPE C</b>	<b>TOTAL</b>	<b>300</b>		<b>TYPE C</b>

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION			
1% AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	163.0	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
1% AEP RAINFALL INTENSITY, 10 MIN WITH CC	195.6	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 1%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% OF PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	163.00	1.2	195.60	14.78	6.52	5.22	Critical duration (time of concentration) for the catchments is 10min
20	118.00	1.2	141.60	10.70	5.66	4.53	
30	97.20	1.2	116.64	8.81	4.67	3.73	
60	68.80	1.2	82.56	6.24	3.30	2.64	
120	47.70	1.2	57.24	4.32	2.29	1.83	
360	25.30	1.2	30.36	2.29	1.21	0.97	
720	16.30	1.2	19.56	1.48	0.78	0.63	
1440	10.20	1.2	12.24	0.92	0.49	0.39	
2880	6.08	1.2	7.30	0.55	0.29	0.23	
4320	4.42	1.2	5.30	0.40	0.21	0.17	

ATTENUATION ANALYSIS, VARIOUS DURATIONS								
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	COMMENTS	
10	4.35	10.43	0.87	0.87	9.56	5738	Selected Tank Outflow is selected for critical duration (time of concentration). In this case = 10min	
20	3.15	7.55	1.38	0.87	6.68	8019		
30	2.59	6.22	1.14	0.87	5.35	9633		
60	1.83	4.40	0.81	0.87	3.53	12722		
120	1.27	3.05	0.56	0.87	2.18	15721		select largest required storage, regardless of duration, to avoid overflow for event of any duration
360	0.67	1.62	0.30	0.87	0.75	16197		
720	0.43	1.04	0.19	0.87	0.17	7511		
1440	0.27	0.65	0.12	0.87	No Att. Req.	0		
2880	0.16	0.39	0.07	0.87	No Att. Req.	0		
4320	0.12	0.28	0.05	0.87	No Att. Req.	0		

**ATTENUATION TANK DESIGN OUTPUT**



**SPECIFICATION**

TOTAL STORAGE REQUIRED	16.197 m <sup>3</sup>	Select largest storage as per analysis
TANK HEIGHT, Htank	2.6 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66 m	No. of Tanks 1
TANK AREA, Atank	10.52 m <sup>2</sup>	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	27354 litres	
REQUIRED STORAGE HEIGHT, Ddet	1.54 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.69 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00087 m <sup>3</sup> /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.77 m	
AREA OF ORIFICE, Aorifice	3.61E-04 m <sup>2</sup>	
ORIFICE DIAMETER, Dorifice	21 mm	
VELOCITY AT ORIFICE	5.50 m/s	At max. head level

Project Ref:	CD506	<b>STORMWATER DISPERSION PIPE/ TRENCH</b>	
Project Address:	18 STATION ROAD, KAWAKAWA		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	4 October 2024		
		DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH	

DESIGN BASED ON REFERENCED DEVELOPMENT PLANS TO PROVIDE A MINIMUM LENGTH OF ABOVE OR BELOW GROUND STORMWATER TANK OVERFLOW DISCHARGE DISPERSION DEVICE. IN GENERAL ACCORDANCE WITH MODIFIED RATIONAL METHOD AND AUCKLAND COUNCIL TR2013/018.

DESIGN STORM EVENT      **1%**      AEP EVENT

**SLOPE BETWEEN SOURCE & DISPERSION DEVICE**

ELEVATION	h	CHAINAGE, x	Δ x	h bar	Δ A
m	m	m	m	m	m <sup>2</sup>
9	0	0	0	0	0
7.7	1.3	6	6	0.65	3.9
TOTALS		6	6		3.9
SLOPE, Sc		0.217	m/m		

**MANNINGS PIPE FLOW - INCOMING PIPE**

Dia, m	d/D	α, rad	P, m	A, m <sup>2</sup>	R	1:S	n	V, m/s	Q, m <sup>3</sup> /s	Q, l/s	
0.1	0.000	6.283	0.0000	0.0000	0.000	4.61538462	0.009	0.000	0.0000	0.000	0 % full
0.100	0.050	5.381	0.0451	0.0001	0.003	4.615384615	0.0090	1.136	0.0002	0.167	
0.100	0.100	4.996	0.0644	0.0004	0.006	4.615384615	0.0090	1.774	0.0007	0.725	
0.100	0.150	4.692	0.0795	0.0007	0.009	4.615384615	0.0090	2.285	0.0017	1.688	
0.100	0.200	4.429	0.0927	0.0011	0.012	4.615384615	0.0090	2.720	0.0030	3.041	
0.100	0.250	4.189	0.1047	0.0015	0.015	4.615384615	0.0090	3.098	0.0048	4.757	
0.100	0.300	3.965	0.1159	0.0020	0.017	4.615384615	0.0090	3.432	0.0068	6.801	
0.100	0.350	3.751	0.1266	0.0024	0.019	4.615384615	0.0090	3.728	0.0091	9.132	
0.100	0.400	3.544	0.1369	0.0029	0.021	4.615384615	0.0090	3.989	0.0117	11.704	
0.100	0.450	3.342	0.1471	0.0034	0.023	4.615384615	0.0090	4.220	0.0145	14.466	
0.100	0.500	3.142	0.1571	0.0039	0.025	4.615384615	0.0090	4.422	0.0174	17.365	
0.100	0.550	2.941	0.1671	0.0044	0.026	4.615384615	0.0090	4.596	0.0203	20.342	
0.100	0.600	2.739	0.1772	0.0049	0.028	4.615384615	0.0090	4.742	0.0233	23.333	
0.100	0.650	2.532	0.1875	0.0054	0.029	4.615384615	0.0090	4.861	0.0263	26.270	
0.100	0.700	2.319	0.1982	0.0059	0.030	4.615384615	0.0090	4.952	0.0291	29.077	
0.100	0.750	2.094	0.2094	0.0063	0.030	4.615384615	0.0090	5.012	0.0317	31.669	
0.100	0.800	1.855	0.2214	0.0067	0.030	4.615384615	0.0090	5.040	0.0339	33.947	
0.100	0.850	1.591	0.2346	0.0071	0.030	4.615384615	0.0090	5.030	0.0358	35.787	
0.100	0.900	1.287	0.2498	0.0074	0.030	4.615384615	0.0090	4.972	0.0370	37.015	
0.100	0.950	0.902	0.2691	0.0077	0.029	4.615384615	0.0090	4.842	0.0373	37.318	
0.100	1.000	0.000	0.3142	0.0079	0.025	4.615384615	0.0090	4.422	0.0347	34.730	Flowing full

**DISPERSION SPECIFICATION**

**INCOMING PIPE PROPERTIES:**

TANK OUTFLOW, 1 % AEP	10.43 l/s
MAXIMUM PIPE FLOW	37.32 l/s
SUFFICIENT CAPACITY IN PIPE	YES
LONGITUDINAL SLOPE	0.217 m/m
DESIGN VELOCITY, Dv	5.040 m/s

**LEVEL SPREADER SPECIFICATIONS:**

PIPE DIAMETER, m	0.20 m
MANNINGS PIPE ROUGHNESS	0.009
NUMBER OF ORIFICES	39 No.
DIA. OF ORIFICE, D	20 mm
ORIFICE INTERVALS, C/C	200 mm
DISPERSION PIPE LENGTH, L	7.6 m

**ORIFICE DESIGN FLOW CHECK:**

AREA OF SINGLE ORIFICE, A	0.00031 m <sup>2</sup>			
FLOW OUT OF 1 ORIFICE	0.000272829 m <sup>3</sup> /s	0.27 l/s		
FLOW OUT OF ALL ORIFICES	0.01064034 m <sup>3</sup> /s	10.64 l/s	DESIGN OK	
VELOCITY FROM SINGLE ORIFICE	0.87 m/s			

**BROAD CRESTED WEIR DESIGN FLOW CHECK:**

FLOW DEPTH, h	0.1 m			
BASE WIDTH = L	7.6 m			
FLOW AREA	0.76 m <sup>2</sup>			
WEIR FLOW	0.01418 m <sup>3</sup> /s	14.18 l/s	DESIGN OK	
WEIR VELOCITY	0.019 m/s			

**INCOMING PIPE & SPREADER SUMMARY:**

<b>LOT 1</b>	
INCOMING PIPE DIAMETER, m	0.100 m
SPREADER PIPE DIAMETER, m	0.200 m
MANNINGS PIPE ROUGHNESS	0.009
NUMBER OF ORIFICES	39 No.
DIA. OF ORIFICE, D	20 mm
ORIFICE INTERVALS, C/C	200 mm
DISPERSION PIPE LENGTH, L	7.6 m



HIRDS V4 Intensity-Duration-Frequency Results

Sitename: Custom Location  
 Coordinate system: WGS84  
 Longitude: 174.062  
 Latitude: -35.3805  
 DDF Model

Parameters: c d e f g h i  
 Values: 0.00221238 0.4773044 -0.0216117 -0.00202221 0.25633256 -0.0122614 3.3113602  
 Example: Duration (hrs) ARI (yrs) x v Rainfall Rate (mm/hr) 10.16611663

Rainfall Intensities (mm/hr) :: Historical Data

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	65	47.5	39	27.4	18.9	8.91	6.34	3.9	2.3	1.7	1.3	1.1
2	0.5	72.5	52.1	42.8	30.1	20.7	10.9	6.96	4.3	2.6	1.9	1.5	1.21
5	0.2	93.8	67.7	55.6	39.2	27	14.2	9.14	5.7	3.4	2.4	1.9	1.59
10	0.1	110	79.2	65.1	45.9	31.7	16.7	10.8	6.7	4	2.9	2.3	1.88
20	0.05	125	90.8	74.6	52.7	36.4	19.3	12.4	7.7	4.6	3.3	2.6	2.17
30	0.033	135	97.6	80.3	56.7	39.3	20.8	13.4	8.3	5	3.6	2.8	2.35
40	0.025	141	103	84.3	59.6	41.3	21.9	14.1	8.8	5.2	3.8	3	2.48
50	0.02	147	106	87.5	61.9	42.8	22.7	14.6	9.1	5.4	4	3.1	2.58
60	0.017	151	109	90	63.7	44.1	23.4	15.1	9.4	5.6	4.1	3.2	2.66
80	0.013	158	114	94.1	66.6	46.1	24.5	15.8	9.8	5.9	4.3	3.4	2.79
100	0.01	163	118	97.2	68.8	47.7	25.3	16.3	10	6.1	4.4	3.5	2.89
250	0.004	183	133	110	77.7	53.9	28.7	18.5	12	6.9	5	4	3.29

Intensity standard error (mm/hr) :: Historical Data

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	7.3	4.8	3.6	2.6	1.8	1.1	0.76	0.6	0.4	0.3	0.2	0.19
2	0.5	8	5.3	3.9	2.9	2	1.2	0.85	0.7	0.4	0.3	0.3	0.21
5	0.2	11	7.7	5.7	4.1	2.8	1.7	1.2	0.9	0.6	0.4	0.3	0.29
10	0.1	15	10	7.5	5.5	3.5	2.2	1.5	1.1	0.7	0.5	0.4	0.34
20	0.05	19	13	9.9	7.2	4.6	2.9	1.9	1.3	0.8	0.6	0.5	0.41
30	0.033	22	16	12	8.5	5.4	3.4	2.3	1.5	0.9	0.7	0.5	0.45
40	0.025	24	18	13	9.6	6	3.8	2.5	1.6	1	0.7	0.6	0.48
50	0.02	26	19	14	11	6.5	4.1	2.7	1.6	1	0.8	0.6	0.5
60	0.017	28	20	15	11	7	4.4	2.9	1.7	1.1	0.8	0.6	0.52
80	0.013	31	23	17	13	7.8	5	3.3	1.8	1.1	0.8	0.6	0.56
100	0.01	33	25	18	14	8.4	5.4	3.6	1.9	1.2	0.9	0.7	0.59
250	0.004	45	34	25	20	12	7.8	5	2.4	1.5	1.1	0.8	0.73

Rainfall Intensities (mm/hr) :: RCP2.6 for the period 2031-2050

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	70.6	50.9	41.7	29.3	20.1	10.5	6.64	4.1	2.4	1.7	1.4	1.12
2	0.5	77.5	55.9	45.8	32.2	22.1	11.5	7.32	4.5	2.7	1.9	1.5	1.24
5	0.2	101	72.8	58.8	42.1	29	15.1	9.64	5.9	3.5	2.5	2	1.64
10	0.1	118	85.3	70.1	49.4	34.1	17.8	11.4	7	4.1	3	2.4	1.94
20	0.05	135	97.9	80.5	56.8	39.2	20.5	13.1	8.1	4.8	3.5	2.7	2.25
30	0.033	145	105	86.7	61.2	42.3	22.2	14.2	8.7	5.2	3.7	3	2.43
40	0.025	153	111	91	64.3	44.4	23.3	14.9	9.2	5.5	4	3.1	2.57
50	0.02	158	115	94.5	66.8	46.1	24.2	15.5	9.6	5.7	4.1	3.2	2.67
60	0.017	163	118	97.2	68.8	47.5	25	16	9.9	5.9	4.2	3.3	2.75
80	0.013	170	123	102	71.9	49.7	26.1	16.7	10	6.1	4.4	3.5	2.89
100	0.01	176	127	105	74.3	51.4	27	17.3	11	6.4	4.6	3.6	2.99
250	0.004	198	144	118	83.9	58.1	30.6	19.6	12	7.2	5.2	4.1	3.41

Rainfall Intensities (mm/hr) :: RCP2.6 for the period 2081-2100

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	70.6	50.9	41.7	29.3	20.1	10.5	6.64	4.1	2.4	1.7	1.4	1.12
2	0.5	77.5	55.9	45.8	32.2	22.1	11.5	7.32	4.5	2.7	1.9	1.5	1.24
5	0.2	101	72.8	58.8	42.1	29	15.1	9.64	5.9	3.5	2.5	2	1.64
10	0.1	118	85.3	70.1	49.4	34.1	17.8	11.4	7	4.1	3	2.4	1.94
20	0.05	135	97.9	80.5	56.8	39.2	20.5	13.1	8.1	4.8	3.5	2.7	2.25
30	0.033	145	105	86.7	61.2	42.3	22.2	14.2	8.7	5.2	3.7	3	2.43
40	0.025	153	111	91	64.3	44.4	23.3	14.9	9.2	5.5	4	3.1	2.57
50	0.02	158	115	94.5	66.8	46.1	24.2	15.5	9.6	5.7	4.1	3.2	2.67
60	0.017	163	118	97.2	68.8	47.5	25	16	9.9	5.9	4.2	3.3	2.75
80	0.013	170	123	102	71.9	49.7	26.1	16.7	10	6.1	4.4	3.5	2.89
100	0.01	176	127	105	74.3	51.4	27	17.3	11	6.4	4.6	3.6	2.99
250	0.004	198	144	118	83.9	58.1	30.6	19.6	12	7.2	5.2	4.1	3.41

Rainfall Intensities (mm/hr) :: RCP4.5 for the period 2031-2050

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	71.8	51.7	42.4	29.8	20.4	10.6	6.72	4.1	2.4	1.8	1.4	1.13
2	0.5	78.8	56.8	46.6	32.8	22.5	11.7	7.41	4.5	2.7	1.9	1.5	1.25
5	0.2	103	74.1	60.9	42.9	29.5	15.4	9.77	6	3.5	2.6	2	1.65
10	0.1	120	86.8	71.4	50.3	34.7	18.1	11.5	7.1	4.2	3	2.4	1.96
20	0.05	138	99.7	82	57.9	39.9	20.9	13.3	8.2	4.8	3.5	2.8	2.27
30	0.033	148	107	88.3	62.4	43	22.5	14.3	8.8	5.2	3.8	3	2.45
40	0.025	156	113	92.7	65.5	45.2	23.7	15.1	9.3	5.5	4	3.1	2.59
50	0.02	161	117	96.2	68	47	24.6	15.7	9.7	5.7	4.2	3.3	2.69
60	0.017	166	120	99	70.1	48.4	25.4	16.2	10	5.9	4.3	3.4	2.78
80	0.013	173	126	104	73.3	50.6	26.5	17	10	6.2	4.5	3.5	2.91
100	0.01	179	130	107	75.7	52.3	27.5	17.6	11	6.4	4.6	3.7	3.02
250	0.004	201	146	121	85.5	59.2	31.1	19.9	12	7.3	5.3	4.2	3.44

Rainfall Intensities (mm/hr) :: RCP4.5 for the period 2081-2100

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	75.5	54.4	44.6	31.4	21.4	11	6.96	4.3	2.5	1.8	1.4	1.16
2	0.5	83	59.8	49.1	34.5	23.6	12.2	7.69	4.7	2.8	2	1.6	1.28
5	0.2	108	78.2	64.2	45.3	31.1	16.1	10.2	6.2	3.7	2.6	2.1	1.7
10	0.1	127	91.7	75.4	53.2	36.5	18.9	12	7.3	4.3	3.1	2.4	2.01
20	0.05	146	105	86.6	61.2	42.1	21.9	13.9	8.5	5	3.6	2.8	2.33
30	0.033	156	113	89.3	65.9	45.4	23.6	15	9.2	5.4	3.9	3	2.47
40	0.025	164	119	98	69.3	47.7	24.9	15.8	9.6	5.7	4.1	3.2	2.66
50	0.02	171	124	102	72	49.6	25.8	16.4	10	5.9	4.3	3.4	2.76
60	0.017	176	127	105	74.1	51.1	26.6	16.9	10	6.1	4.4	3.5	2.85
80	0.013	183	133	110	77.5	53.4	27.9	17.7	11	6.4	4.6	3.6	2.99
100	0.01	189	137	113	80.5	55.3	28.8	18.3	11	6.6	4.8	3.8	3.13
250	0.004	213	155	128	90.5	62.5	32.7	20.8	13	7.6	5.5	4.3	3.53

Rainfall Intensities (mm/hr) :: RCP6.0 for the period 2031-2050

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	71.3	51.4	42.1	29.6	20.3	10.5	6.69	4.1	2.4	1.7	1.4	1.13
2	0.5	78.3	56.4	46.3	32.6	22.4	11.6	7.38	4.5	2.7	1.9	1.5	1.25
5	0.2	102	73.6	60.5	42.6	29.3	15.3	9.72	6	3.5	2.6	2	1.65
10	0.1	119	86.2	70.9	50	34.4	18	11.4	7	4.2	3	2.4	1.95
20	0.05	137	99	81.4	57.5	39.6	20.7	13.2	8.1	4.8	3.5	2.7	2.26
30	0.033	147	107	87.6	61.9	42.7	22.4	14.3	8.8	5.2	3.8	3	2.44
40	0.025	154	112	92	65.1	45.4	23.5	15	9.3	5.4	4	3.1	2.54
50	0.02	160	116	95.5	67.5	46.6	24.5	15.6	9.6	5.7	4.1	3.3	2.68
60	0.017	165	119	98.3	69.5	48	25.2	16.1	9.9	5.9	4.3	3.4	2.77
80	0.013	172	125	103	72.7	50.2	26.4	16.9	10	6.2	4.5	3.5	2.9
100	0.01	178	129	106	75.2	51.9	27.3	17.5	11	6.4	4.6	3.6	3.01
250	0.004	200	145	120	84.9	58.7	30.9	19.8	12	7.3	5.3	4.2	3.43

Rainfall Intensities (mm/hr) :: RCP6.0 for the period 2081-2100

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	78.8	56.8	46.6	32.7	22.3	11.4	7.17				

HIRDS V4 Depth-Duration-Frequency Results

Site name: Custom Location

Coordinate system: WGS84

Longitude: 174.062

Latitude: -35.3805

DDF Model

Parameters: c d e f g h i  
Values: 0.00221238 0.4773044 -0.0216117 -0.00202221 0.25632256 -0.0122614 3.31136  
Example: Duration (hrs) ARI (yrs) x V Rainfall Depth (mm)  
24 100 3.17805383 4.60014923 243.9867992

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11	15.8	19.5	19.5	27.4	37.7	59.4	76.1	94	112	121	127
2	0.5	12.1	17.4	21.4	21.4	30.1	41.4	65.3	83.7	104	123	134	140
5	0.2	15.6	22.6	27.8	27.8	39.2	54.1	85.5	110	136	162	176	185
10	0.1	18.3	26.4	32.5	32.5	45.9	63.4	100	129	160	191	208	218
20	0.05	20.9	30.3	37.3	37.3	52.7	72.9	116	149	185	221	240	252
30	0.033	22.5	32.5	40.2	40.2	56.7	78.5	125	161	200	238	259	273
40	0.025	23.6	34.2	42.2	42.2	59.6	82.6	131	169	210	251	273	287
50	0.02	24.4	35.4	43.7	43.7	61.9	85.7	136	176	218	261	284	299
60	0.017	25.1	36.5	45	45	63.7	88.2	140	181	225	269	293	308
80	0.013	26.3	38.1	47	47	66.6	92.3	147	189	236	282	307	323
100	0.01	27.1	39.3	48.6	48.6	68.8	95.4	152	196	244	292	318	335
250	0.004	30.5	44.3	54.8	54.8	77.7	108	172	227	277	332	362	382

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	1.3	1.6	1.7	2.6	3.5	6.5	8.9	14	18	21	22	23
2	0.5	1.4	1.7	1.9	2.8	3.8	7.2	9.8	16	21	25	25	26
5	0.2	2	2.4	2.8	4	5.4	10	14	22	28	31	33	35
10	0.1	2.6	3.2	3.8	5.3	7	13	18	26	33	37	39	41
20	0.05	3.3	4.3	5.1	7	9.2	17	23	31	39	44	46	49
30	0.033	3.8	5	6.1	8.2	11	20	27	35	43	49	51	54
40	0.025	4.3	5.6	6.8	9.2	12	22	30	37	46	52	54	58
50	0.02	4.6	6.1	7.5	10	13	24	32	39	49	55	57	61
60	0.017	4.9	6.6	8	11	14	26	35	41	51	57	59	63
80	0.013	5.4	7.3	9	12	16	29	39	44	55	62	63	68
100	0.01	5.8	8	9.8	13	17	32	43	46	58	65	67	71
250	0.004	8	11	14	19	24	45	61	58	71	80	82	88

Rainfall depths (mm) :: RCP2.6 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.8	17	20.9	29.3	40.2	62.7	79.7	98	116	125	131	135
2	0.5	12.9	18.6	22.9	32.2	44.3	69.1	87.9	108	128	144	149	154
5	0.2	16.8	24.3	29.9	42.1	58	90.8	118	147	180	191	197	203
10	0.1	19.7	28.4	35	49.4	68.1	107	136	168	199	215	226	233
20	0.05	22.5	32.6	40.2	56.8	78.4	123	157	194	230	249	262	270
30	0.033	24.2	35.1	43.3	61.2	84.5	133	170	209	249	270	283	292
40	0.025	25.4	36.9	45.5	64.3	88.8	140	179	221	262	284	298	308
50	0.02	26.4	38.3	47.2	66.8	92.3	145	186	229	272	296	310	320
60	0.017	27.2	39.4	48.6	68.8	95	150	192	236	281	305	320	330
80	0.013	28.4	41.1	50.8	71.9	99.4	157	201	248	295	320	335	346
100	0.01	29.3	42.5	52.5	74.3	103	162	208	256	305	331	348	359
250	0.004	32.9	47.9	59.2	83.9	116	184	236	291	347	377	396	409

Rainfall depths (mm) :: RCP2.6 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.8	17	20.9	29.3	40.2	62.7	79.7	98	116	125	131	135
2	0.5	12.9	18.6	22.9	32.2	44.3	69.1	87.9	108	128	144	149	154
5	0.2	16.8	24.3	29.9	42.1	58	90.8	118	147	180	191	197	203
10	0.1	19.7	28.4	35	49.4	68.1	107	136	168	199	215	226	233
20	0.05	22.5	32.6	40.2	56.8	78.4	123	157	194	230	249	262	270
30	0.033	24.2	35.1	43.3	61.2	84.5	133	170	209	249	270	283	292
40	0.025	25.4	36.9	45.5	64.3	88.8	140	179	221	262	284	298	308
50	0.02	26.4	38.3	47.2	66.8	92.3	145	186	229	272	296	310	320
60	0.017	27.2	39.4	48.6	68.8	95	150	192	236	281	305	320	330
80	0.013	28.4	41.1	50.8	71.9	99.4	157	201	248	295	320	335	346
100	0.01	29.3	42.5	52.5	74.3	103	162	208	256	305	331	348	359
250	0.004	32.9	47.9	59.2	83.9	116	184	236	291	347	377	396	409

Rainfall depths (mm) :: RCP4.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	12	17.2	21.2	29.8	40.9	63.6	80.6	99	117	126	132	136
2	0.5	13.1	18.9	23.3	32.8	45	70.1	89	109	129	139	146	150
5	0.2	17.1	24.7	30.4	42.9	59	92.1	117	144	170	184	193	199
10	0.1	20	28.9	35.7	50.3	69.3	108	138	170	201	218	228	235
20	0.05	23	33.2	41	57.9	79	125	159	196	231	252	264	272
30	0.033	24.7	35.8	44.1	62.4	86	135	172	212	251	272	285	294
40	0.025	25.9	37.6	46.4	65.5	90.4	142	181	223	265	287	301	311
50	0.02	26.9	39	48.1	68	93.9	148	188	232	275	298	313	323
60	0.017	27.7	40.1	49.5	70.1	96.7	152	194	239	284	308	323	333
80	0.013	28.9	41.9	51.8	73.3	101	159	203	251	293	318	333	343
100	0.01	29.8	43.3	53.5	75.7	105	165	211	260	308	334	351	362
250	0.004	33.6	48.8	60.3	85.5	118	187	239	295	351	381	400	413

Rainfall depths (mm) :: RCP4.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	12.6	18.1	22.3	31.4	42.8	66.2	83.5	102	120	129	135	139
2	0.5	13.8	19.9	24.5	34.5	47.3	71.1	92.3	113	132	143	149	153
5	0.2	18.1	26.1	32.1	45.3	62.1	96.4	122	149	175	189	198	203
10	0.1	21.1	30.6	37.7	53.2	73.1	114	144	176	207	224	234	241
20	0.05	24.3	35.1	43.3	61.2	84.2	131	166	203	240	259	271	279
30	0.033	26.1	37.8	46.7	65.9	90.8	142	180	220	259	280	292	302
40	0.025	27.4	39.7	49	69.3	95.4	149	189	231	273	296	309	319
50	0.02	28.4	41.2	50.9	72	99.2	155	197	241	284	308	322	332
60	0.017	29.3	42.4	52.4	74.1	102	160	203	248	293	318	332	342
80	0.013	30.6	44.4	54.8	77.5	107	167	212	260	308	333	348	359
100	0.01	31.6	45.8	56.6	80.5	111	173	220	269	319	345	361	372
250	0.004	35.5	51.6	63.8	90.5	125	196	250	306	363	393	412	424

Rainfall depths (mm) :: RCP6.0 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.9	17.1	21.1	29.6	40.6	63.2	80.3	99	116	126	131	135
2	0.5	13.1	18.8	23.2	32.6	44.7	69.7	88.5	109	129	139	145	150
5	0.2	17	24.5	30.2	42.6	58.6	91.6	117	143	169	183	192	198
10	0.1	19.9	28.7	35.4	50	68.8	108	137	169	200	217	227	234
20	0.05	22.8	33	40.7	57.5	79.2	124	159	195	231	251	263	271
30	0.033	24.5	35.5	43.8	61.9	85.4	134	171	211	250	271	284	293
40	0.025	25.7	37.3	46	65.1	89.8	141	180	222	264	286	300	309
50	0.02	26.7	38.7	47.8	67.5	93.3	147	187	231	274	297	312	322
60	0.017	27.5	39.8	49.2	69.5	96	151	193	238	283	307	322	332
80	0.013	28.7	41.6	51.4	72.7	100	158	202	249	296	322	337	348
100	0.01	29.6	43	53.1	75.2	104	164	209	258	307	333	350	361
250	0.004	33.3	48.4	59.9	84.9	117	186	238	294	349	379	398	411

Rainfall depths (mm) :: RCP6.0 for the period 2081-2100

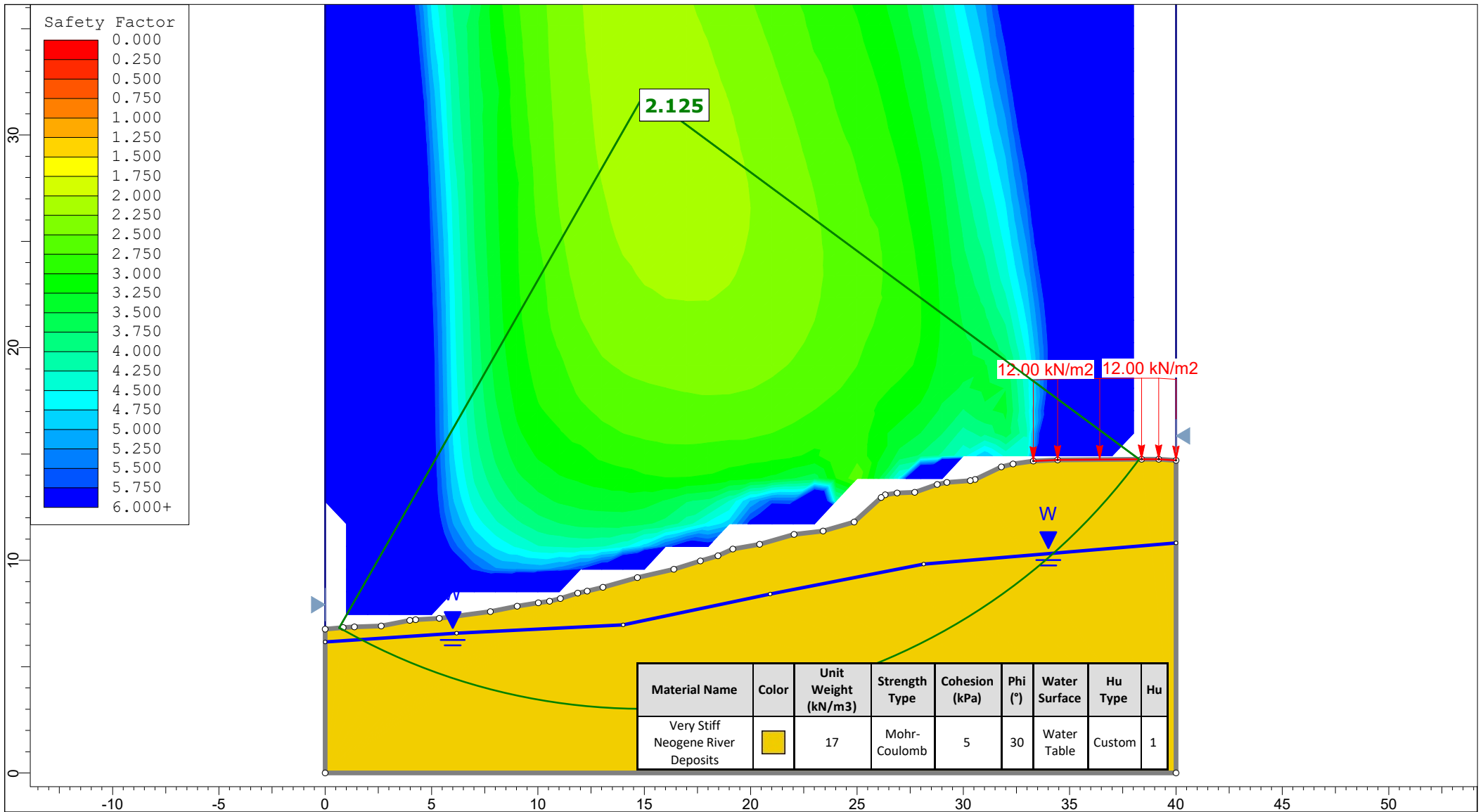
ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	13.1	18.9	23.3	32.7	44.6	68.5	86.1	105	122	131	137	141
2	0.5	14.4	20.8	25.6	36.1	49.3	75.8	95.3	116	135	146	152	156
5	0.2	18.9	27.3	33.6	47.4	64.9	100	126	153	180			



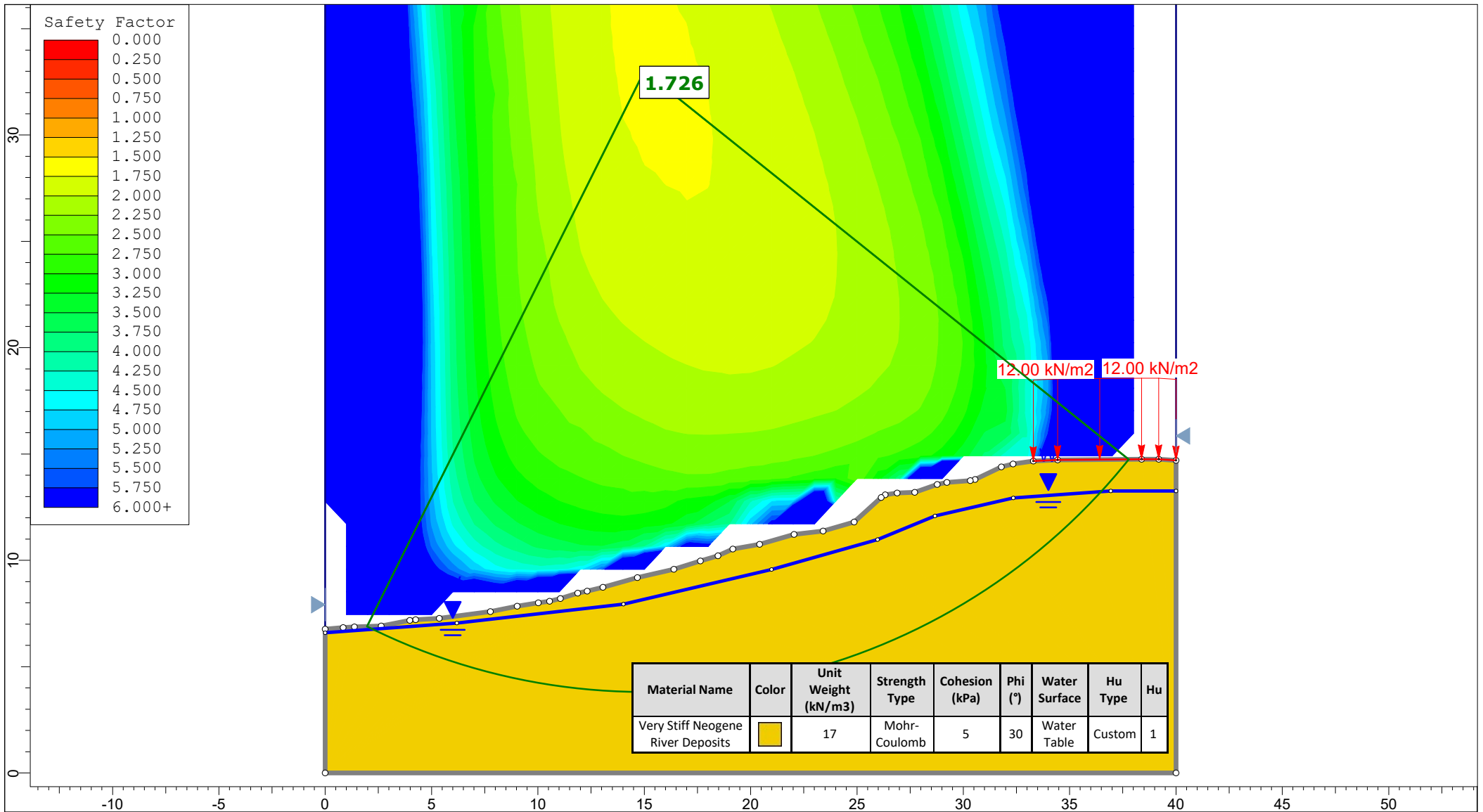
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## APPENDIX D

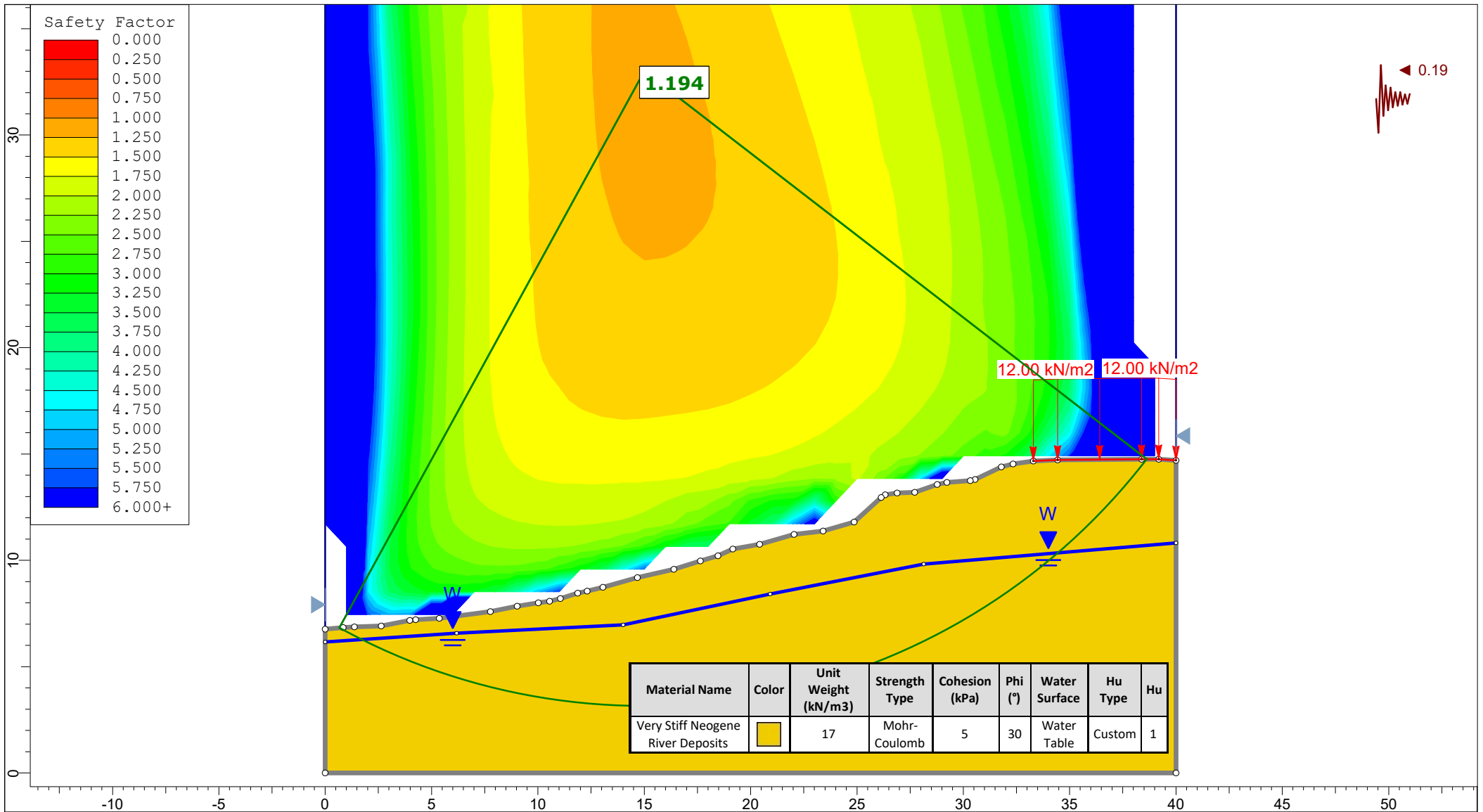
### Slope Stability Analysis



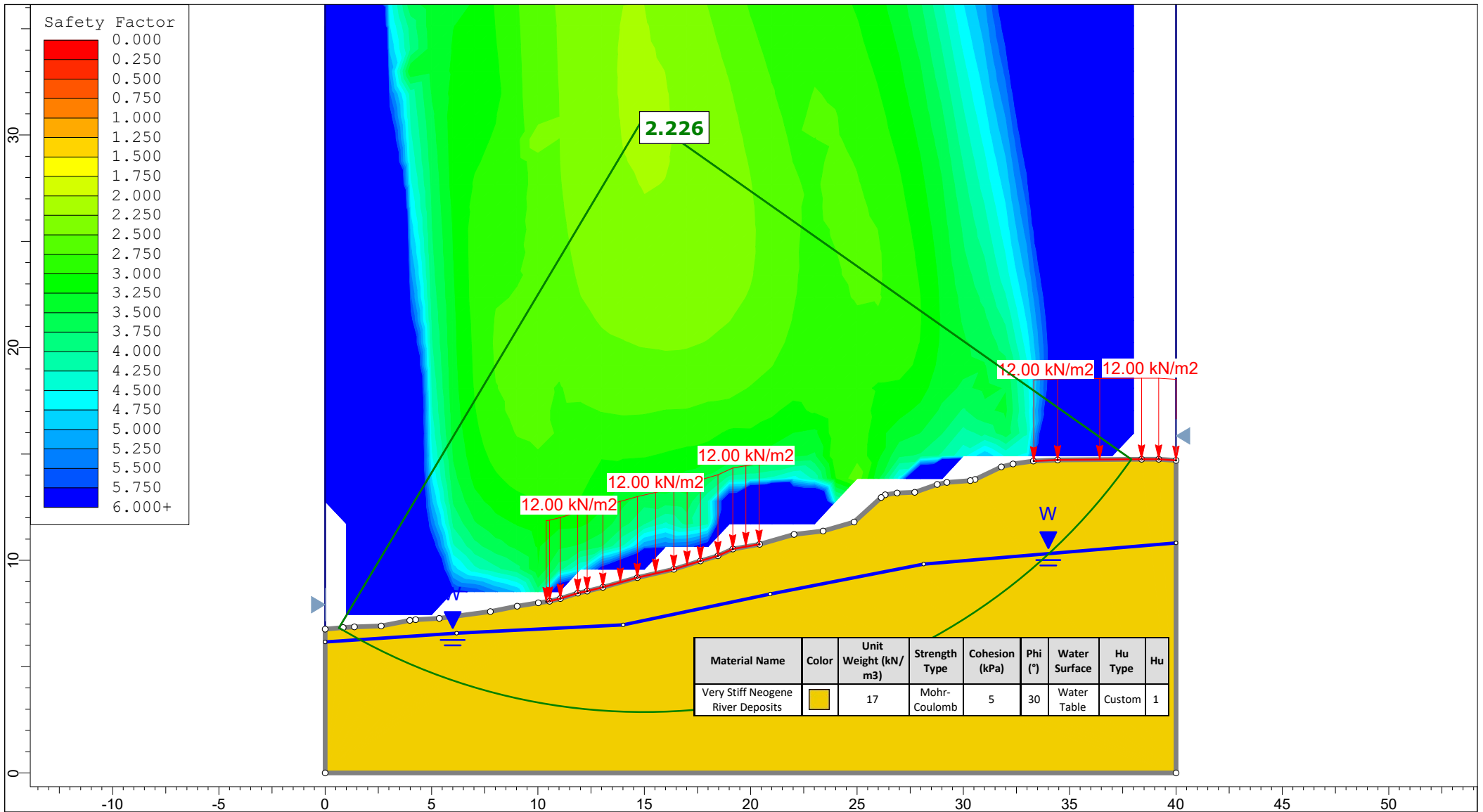
<p><b>geologix</b> consulting engineers</p> <p>SLIDEINTERPRET 9.034</p>	Project	18 Station Road, Kawakawa	
	Group	Existing Condition	Scenario: Normal GW
	Drawn By	DBT	Company: Geologix
	Date	16/07/2024, 11:33:39 am	File Name: Section A.sldm




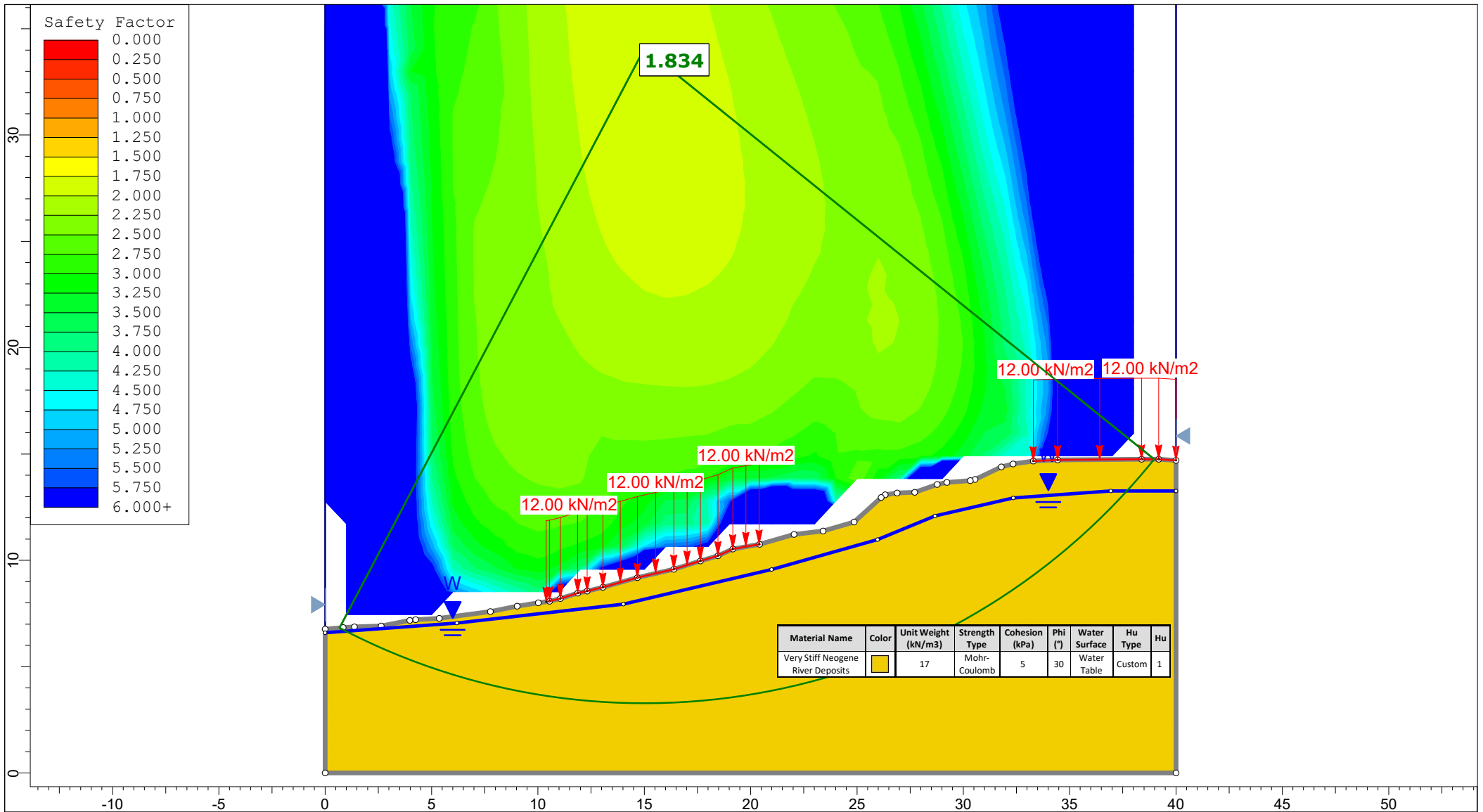
 <p><b>geologix</b> consulting engineers</p> <p>SLIDEINTERPRET 9.034</p>	Project		18 Station Road, Kawakawa		
	Group		Existing Condition	Scenario	Elevated GW
	Drawn By		DBT	Company	Geologix
	Date		16/07/2024, 11:33:39 am	File Name	Section A.slm




<p><b>geologix</b> consulting engineers</p> <p>SLIDEINTERPRET 9.034</p>	Project		18 Station Road, Kawakawa		
	Group		Existing Condition	Scenario	Seismic
	Drawn By		DBT	Company	Geologix
	Date		16/07/2024, 11:33:39 am	File Name	Section A.slm

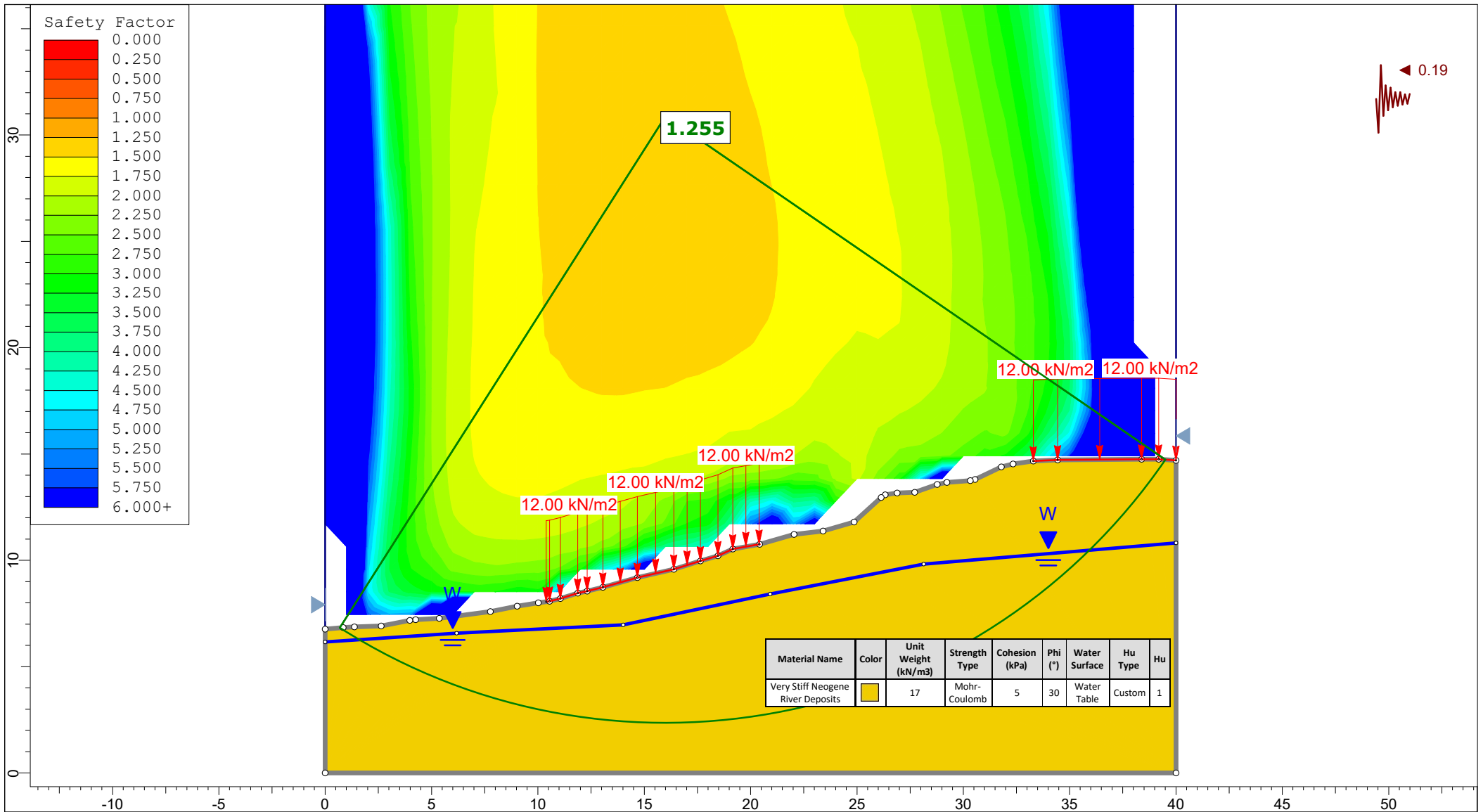



 <b>geologix</b> consulting engineers	Project		18 Station Road, Kawakawa		
	Group		Proposed Condition	Scenario	Normal GW
	Drawn By		DBT	Company	Geologix
	Date		16/07/2024, 11:33:39 am	File Name	Section A.slmd



 <b>geologix</b> consulting engineers	Project		18 Station Road, Kawakawa	
	Group	Proposed Condition	Scenario	Elevated GW
	Drawn By	DBT	Company	Geologix
	Date	16/07/2024, 11:33:39 am	File Name	Section A.slmd





 <p><b>geologix</b> consulting engineers</p> <p>SLIDEINTERPRET 9.034</p>	Project		18 Station Road, Kawakawa		
	Group		Proposed Condition	Scenario	Seismic
	Drawn By		DBT	Company	Geologix
	Date		16/07/2024, 11:33:39 am	File Name	Section A.slmd



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## APPENDIX E

### Assessment of Environmental Effects and Assessment Criteria



Table 17: Operative FNDC Subdivision Stormwater Assessment Criteria, to rule 13.10.4

Assessment Criteria	Comments
(a) Whether the application complies with any regional rules relating to any water or discharge permits required under the Act, and with any resource consent issued to the District Council in relation to any urban drainage area stormwater management plan or similar plan.	Complies.
(b) Whether the application complies with the provisions of the Council's "Engineering Standards and Guidelines" (2004) - Revised March 2009 (to be used in conjunction with NZS 4404:2004).	Concept design complies and has adopted latest FNDC engineering standards (2023) for runoff curves and proposed area within all undeveloped lots will be attenuated to 80 % of pre-development levels for specified design storms by FNDC standards and NRP. Existing development Lot 2 runoff below permitted activity threshold.
(c) Whether the application complies with the Far North District Council Strategic Plan - Drainage.	Complies.
(d) The degree to which Low Impact Design principles have been used to reduce site impermeability and to retain natural permeable areas.	Proposed impervious areas within subdivision proposal are limited to necessity only. RoW Access to new lot 1 is formed on existing impervious surface area.. All impervious areas within new lot are to be attenuated by on site storage devices and dispersed to the environment in controlled non-concentrated manner.
(e) The adequacy of the proposed means of disposing of collected stormwater from the roof of all potential or existing buildings and from all impervious surfaces.	Low impact design adopted – attenuation within on-site tanks for undeveloped proposed lot 1. Efficient and controlled discharge outlets. Current stormwater management devices on lot 2 are in good condition with no additional impervious surfaces proposed.
(f) The adequacy of any proposed means for screening out litter, the capture of chemical spillages, the containment of contamination from roads and paved areas, and of siltation.	Stormwater quality treatment measures are included within rainwater tanks. New driveway for Lot 1 is limited in length and surface area posing very little effect to water quality.
(g) The practicality of retaining open natural waterway systems for stormwater disposal in preference to piped or canal systems and adverse effects on existing waterways.	Surface drainage preferred and adopted where practical and safe. The only pipeline adopted is the connection from roof to rainwater tanks, and 6m length to a dispersion (level spreader) device for good control of discharge.
(h) Whether there is sufficient capacity available in the Council's outfall stormwater system to cater for increased run-off from the proposed allotments.	No connection to public stormwater proposed.
(i) Where an existing outfall is not capable of accepting increased run-off, the adequacy of proposals and solutions for disposing of run-off.	NA.
(j) The necessity to provide on-site retention basins to contain surface run-off where the capacity of the outfall is incapable of accepting flows, and where the outfall has limited capacity, any need to restrict	Attenuation provided through storage tanks to ensure hydraulic neutrality from new impervious



the rate of discharge from the subdivision to the same rate of discharge that existed on the land before the subdivision takes place.	area. Receiving catchment, which includes a wetland, will bear no effect and remains the same.
(k) Any adverse effects of the proposed subdivision on drainage to, or from, adjoining properties and mitigation measures proposed to control any adverse effects.	No adverse effects anticipated on neighbouring properties or downstream environment.
(l) In accordance with sustainable management practices, the importance of disposing of stormwater by way of gravity pipelines. However, where topography dictates that this is not possible, the adequacy of proposed pumping stations put forward as a satisfactory alternative.	All devices adopt and are designed for gravity flows.
(m) The extent to which it is proposed to fill contrary to the natural fall of the country to obtain gravity outfall; the practicality of obtaining easements through adjoining owners' land to other outfall systems; and whether filling or pumping may constitute a satisfactory alternative.	No fill is required for the stormwater management purpose.
(n) For stormwater pipes and open waterway systems, the provision of appropriate easements in favour of either the registered user or in the case of the Council, easements in gross, to be shown on the survey plan for the subdivision, including private connections passing over other land protected by easements in favour of the user.	All new stormwater pipes are contained in the owner lot. No easements required for right to drain.
(o) Where an easement is defined as a line, being the centre line of a pipe already laid, the effect of any alteration of its size and the need to create a new easement.	NA.
(p) For any stormwater outfall pipeline through a reserve, the prior consent of the Council, and the need for an appropriate easement.	NA.
(q) The need for and extent of any financial contributions to achieve the above matters.	TBC.
(r) The need for a local purpose reserve to be set aside and vested in the Council as a site for any public utility required to be provided.	NA.