THOMSON SURVEY LIMITED

SURVEYORS AND RESOURCE PLANNERS

Our Reference: 10646.1 (FNDC)

18 February 2026

Resource Consents Department
Far North District Council
JB Centre
KERIKERI

Dear Sir/Madam

RE: Proposed subdivision at Pokapu Road, Moerewa – Stephen Herries

I am pleased to submit application on behalf of Stephen Herries, for a proposed subdivision of land at Pokapu Road, zoned Rural Production. The subdivision will create 3 additional lots, all in excess of 4ha, and is a discretionary activity.

The application fee of $3,044 has been paid separately via direct credit.

Regards

Lynley Newport
Senior Planner
THOMSON SURVEY LTD

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

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

Background picture represents a New Zealand surveying trig station, used to beacon control survey marks

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

Office Use Only
Application Number:

Application for resource consent or fast-track resource consent

(Or Associated Consent Pursuant to the Resource Management Act 1991 (RMA)) (If applying for a Resource Consent pursuant to Section 87AAC or 88 of the RMA, this form can be used to satisfy the requirements of Form 9). Prior to, and during, completion of this application form, please refer to Resource Consent Guidance Notes and Schedule of Fees and Charges — both available on the Council's web page.

1. Pre-Lodgement Meeting

Have you met with a council Resource Covnsent representative to discuss this application prior to lodgement?

◯ **Yes** ☑ **No**

2. Type of consent being applied for

(more than one circle can be ticked):

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

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

3. Would you like to opt out of the fast track process?

☑ **Yes** ◯ **No**

4. Consultation

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

If yes, which groups have you consulted with?

Who else have you consulted with? KiwiRail

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

5. Applicant details

Name/s: Stephen Herries

Email:

Phone number:

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

Postcode 245

Have you been the subject of abatement notices, enforcement orders, infringement notices and/or convictions under the Resource Management Act 1991? ◯ **Yes** ◯ **No**

If yes, please provide details.

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: Stephen Herries; Nicholas Herries; Matthew Herries & Kate Herries

Property address/
location:

Postcode

8. Application site details

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

Name/s: S Herries

Site address/ location: Pokapu Road
Moerewa
Postcode 0281.

Legal description: Lot 1 DP 561372 & others **Val Number:**

Certificate of title: 993105

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

Site visit requirements:

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

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

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

Could you please notify me when entering my property ph

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.

Four lot subdivision of land in the Rural Production Zone (three additional) as a discretionary activity.

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

10. Would you like to request public notification?

◯ **Yes** ☑ **No**

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

(more than one circle can be ticked):

◯ **Building Consent** Enter BC ref # here (if known)

◯ **Regional Council Consent (ref # if known)** Ref # here (if known)

◯ **National Environmental Standard Consent** Consent here (if known)

◯ **Other (please specify)** Specify 'other' here

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

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

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

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

☑ **Subdividing land**

◯ **Changing the use of a piece of land**

◯ **Disturbing, removing or sampling soil**

◯ **Removing or replacing a fuel storage system**

13. Assessment of environmental effects:

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

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

14. Draft conditions:

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

If yes, please be advised that the timeframe will be suspended for 5 working days as per s107G of the RMA to enable consideration for the draft conditions.

15. 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) STEPHEN HERRIES

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.

15. *Billing details* continued...

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) STEPHEN HERRIES

Signature:
(signature of bill payer)

Date 17-02-2026

MANDATORY

16. Important Information:

Note to applicant

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

You may apply for 2 or more resource consents that are needed for the same activity on the same form.

You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991.

Fast-track application

Under the fast-track resource consent process, notice of the decision must be given within 10 working days after the date the application was first lodged with the authority, unless the applicant opts out of that process at the time of lodgement.

A fast-track application may cease to be a fast-track application under section 87AAC(2) of the RMA.

Privacy Information:

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

17. Declaration

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

Name (please write in full) STEPHEN HERRIES

Signature

Date 17-02-2026

See overleaf for a checklist of your information...

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.

S Herries

PROPOSED SUBDIVISION PURSUANT TO FNDC OPERATIVE DISTRICT PLAN

Pokapu Road, Moerewa

PLANNER'S REPORT & ASSESSMENT OF ENVIRONMENTAL EFFECTS

Thomson Survey Ltd
Kerikeri

1.0 INTRODUCTION

1.1 The Proposal

The applicant proposes to subdivide their property at Pokapu Road to create four (three additional) lots of minimum area of 4ha. Three of the lots are to be in the 4-4.2ha range, with the fourth lot being 113.6ha in area and to remain amalgamated with Part Motatau 2Sec3 Blk & Part Motatau 2Sec5 Blk (just as the current title is).

The application site has two site frontages. The proposal is to see the three additional 4-4.2ha lots utilise an existing crossing off Pokapu Road. The balance 'title', when created, will continue to enjoy access at two road frontages, Pokapu and Davis Roads (the latter being metal surface).

The scheme plan(s) is/are attached in Appendix 1. The requested Amalgamation condition wording is on the face of the plan:

"That Lot 4 hereon, Part Motatau 2Sec3 Blk & Part Motatau 2Sec5 Blk are to be held in the same Certificate of Title".

A feature of the access off Pokapu Road is that the existing formed driveway then crosses rail corridor under the administration of KiwiRail. Whilst there is an actual line within the corridor it is currently non operational with the line only visible above ground and vegetation infrequently along the corridor where it runs along the site's northern access point. Consultation has been carried out with KiwiRail – refer to section 6.8. The applicant has agreed to reverse sensitivity consent notice clauses.

The proposed lots will not have access to any Council 3 waters reticulated services and will be reliant on on-site water supply; wastewater treatment and disposal; and stormwater management. A Site Suitability Report supports this application. Also supporting the application is a Geotechnical Report.

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 an existing title to create a total of four lots (three additional), as a discretionary activity.

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.

2.0 PROPERTY DETAILS

Location:	Pokopu Road, Moerewa. Location Map attached in Appendix 2.
Legal description & RT's:	Lot 1 DP 561372 and Part Motatau 2Sec3 Blk & Part Motatau 2Sec5 Blk; held in Record of Title 993105, copy attached in Appendix 3.

3.0 SITE DESCRIPTION

3.1 Site Characteristics

The site is zoned Rural Production in both the Operative District Plan (ODP) and Proposed District Plan (PDP). No resource features apply in the ODP.

The site is located on the east side of Pokapu Road.

The site is currently in grazing with the elevated knoll/hillock on which new lots 2 & 3 are proposed, being in mixed species (both exotic and indigenous) and mixed aged vegetation.

Looking south across Lot 1 towards vegetation covered proposed Lot 2

There is no built development within that part of the application site proposed to support the additional lots. The large balance farming property, which also includes other adjacent titles, supports a network of farm races and a few isolated farm buildings.

Large portions of the overall application site are mapped as being subject to both the 10 and 100 year ARI Event flood hazard. This notation applies over all the flat portions of the property. The three proposed 4ha lots are all on elevated land above and away from areas mapped as being flood prone with the exception that Lot 3's lower lying southern portion is within the flood hazard area.

Once off the knoll/hillock where it is proposed to locate the smaller lots, the land drops to road level, and Regional Online maps indicate a strip of land, running parallel to road and rail corridor (and within the latter) as being a "known wetland" (swamp) and a "biodiversity wetland" (swamp). This is outside of any area proposed for development or access.

Looking north across balance Lot 4 near Davis Road, towards the hilltop/knoll where proposed smaller lots are to be located

LUC maps show no LUC class 1-3 soils *(Far North Maps, Soil layer)*. The land is mapped on the Regional Plan's maps as being erosion prone over the bulk of the land proposed for the smaller lots.

There is a single Protected Natural Area within the application site, corresponding to the Regional Council's wetland feature referenced on the previous page. This is identified as the Pokapu Road Wetland and is actually within the railway corridor as opposed to the application site. The site is not in a high density or kiwi present area.

The Far North Maps' Historic Site layer does not show any heritage or cultural features present on the site.

3.2 Legal Interests

The property is subject to, and has appurtenant, right of way, right to convey electricity, telecommunications and water over Part Lot 1 DP 561372, pursuant to Easement Instrument 12197377.4. The property is also subject to a Consent Notice 12197377.5. Copies of both instruments form part of Appendix 3. The consent notice is solely in regard to the formation of a right of way prior to its use for harvesting of forestry. It is not relevant to any future development within the proposed 4ha lots.

3.3 Consent History

The property file shows the following consents:

3000160 – s348 Right of Way issued in 2021;

RC 2200608-RMASUB and subsequent 2200608-RMAVAR, issued in August 2020 and June 2021 respectively. This subdivision created the application site.

4.0 SCHEDULE 4 – INFORMATION REQUIRED IN AN APPLICATION

Clauses 2 & 3: Information required in all applications

(1) An application for a resource consent for an activity must include the following:	
(a) a description of the activity: .	Refer Sections 1 and 5 of this Planning Report.
(b) an assessment of the actual or potential effect on the environment of the activity:	Refer to Section 6 of this Planning Report.
(b) a description of the site at which the activity is to occur:	Refer to Section 3 of this Planning Report.
(c) the full name and address of each owner or occupier of the site:	This information is contained in the Form 9 attached to the application.
(d) a description of any other activities that are part of the proposal to which the application relates:	No other activities are part of the proposal. The application is for subdivision pursuant to the FNDC's ODP.
(e) a description of any other resource consents required for the proposal to which the application relates:	None are required.
(f) an assessment of the activity against the matters set out in Part 2:	Refer to Section 7 of this Planning Report.
(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): (*a) any relevant objectives, policies, or rules in a document; and* *(b) any relevant requirements, conditions, or permissions in any rules in a document; and* *(c) any other relevant requirements in a document (for example, in a national environmental standard or other regulations).*	Refer to Sections 5 and 7 of this Planning Report.
(3) An application must also include any of the following that apply:	
(a) if any permitted activity is part of the	Refer to section 5.

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)):	
(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)):	There is no existing resource consent. Not applicable.
(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)).	The site is not within an area subject to a customary marine title group. Not applicable.
(4) An application for a subdivision consent must also include information that adequately defines the following:	
(a) the position of all new boundaries: *(b) the areas of all new allotments, unless the subdivision involves a cross lease, company lease, or unit plan:* *(c) the locations and areas of new reserves to be created, including any esplanade reserves and esplanade strips:* *(d) the locations and areas of any existing esplanade reserves, esplanade strips, and access strips:* *(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:* *(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):* *(g) the locations and areas of land to be set aside as new roads.*	Refer to Scheme Plans in Appendix 1.

Clause 6: Information required in assessment of environmental effects

(1) An assessment of the activity's effects on the environment must include the following information:	
(a) if it is likely that the activity will	Refer to Section 6 of this planning report. The activity will not

result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity:	result in any significant adverse effect on the environment.
(b) an assessment of the actual or potential effect on the environment of the activity:	Refer to Section 6 of this planning report.
(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:	Not applicable as the application does not involve hazardous installations.
(d) if the activity includes the discharge of any contaminant, a description of— *(i) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and* *(ii) any possible alternative methods of discharge, including discharge into any other receiving environment:*	The subdivision does not involve any discharge of contaminant.
(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:	Refer to Section 6 of this planning report.
(f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted:	Refer to Section 8 of this planning report. No affected persons have been identified.
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:	No monitoring is required as the scale and significance of the effects do not warrant it.
(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).	No protected customary right is affected.

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

(1) An assessment of the activity's effects on the environment must address the following matters:

(a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects:	Refer to Sections 6 and 8 of this planning report and also to the assessment of objectives and policies in Section 7.
(b) any physical effect on the locality, including any landscape and visual effects:	Refer to Section 6. The site has no high or outstanding landscape or natural character values.
(c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity:	Refer to Section 6. The subdivision has no effect on ecosystems or habitat.
(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:	Refer to Section 6. The site has no aesthetic, recreational, scientific, historical, spiritual or cultural values that I am aware of, that will be adversely affected by the act of subdividing.
(e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants:	The subdivision will not result in the discharge of contaminants, nor any unreasonable emission of noise.
(f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or hazardous installations.	The subdivision site is not subject to hazard. The proposal does not involve hazardous installations.

5.0 ACTIVITY STATUS

5.1 Operative District Plan

The site is zoned Rural Production and has no resource features.

Table 13.7.2.1: Minimum Lot Sizes

(i) RURAL PRODUCTION 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 size is 20ha.	1. The minimum lot size is 12ha; or 2. The minimum lot size is 12ha; or 3. A maximum of 3 lots in any subdivision, provided that the minimum lot size is 4,000m2 and there is at least 1 lot in the subdivision with a minimum size of 4ha, and provided further that the subdivision is of sites which existed at or prior to 28 April 2000, or which are amalgamated from titles existing at or prior to 28 April 2000; or	**1. The minimum lot size is 4ha**; or 2. A maximum of 3 lots in any subdivision, provided that the minimum lot size is 2,000m² and there is at least 1 lot in the subdivision with a minimum size of 4ha, and provided further that the subdivision is of sites which existed at or prior to 28 April 2000, or which are amalgamated from titles existing at or prior to 28 April 2000; or 3. A subdivision in terms of a management plan as per Rule 13.9.2 may be approved.

	4. A maximum of 5 lots in a subdivision (including the parent lot) where the minimum size of the lots is 2ha, and where the subdivision is created from a site that existed at or prior to 28 April 2000; Option 5. N/A as the proposal does not utilise remaining rights.	Option 4 N/A

The Title is younger than April 2000 and lots are 4ha in area or greater. The subdivision is therefore a **discretionary** subdivision activity.

Other Rules:

Zone Rules:

The proposal does not result in any breaches of Rural Production Zone rules. The land is vacant.

District Wide Rules:

Chapter 12.1 Landscapes and Natural Features does not apply as there is no landscape or natural feature overlay applying to the site.

Chapter 12.2 Indigenous Flora and Fauna does not apply as no clearance of indigenous vegetation is proposed.

Chapter 12.3 Soils and Minerals is applicable insofar as the subdivision site works will include the creation of right of way access A, B and G on the scheme plan (access off Pokapu Road). The total volume of excavation/filling has been estimated to marginally exceed the 5,000m^3 permitted combined volume – 5,128m^3 estimated. The writer of the Site Suitability Report also considers that there may be continuous cut or fill faces that exceed an average of 1.5m in height. This results in a breach of Rule 12.3.6.1.1 (a) and (b), defaulting to the restricted discretionary Rule 12.3.6.2.3, with which the excavation/filling complies. As provided for in Rule 13.6.8 of the ODP, it is requested that this breach of excavation/filling be included in the subdivision consent. Rule 13.6.8 states:

When the subdivision consent is granted, provided all the necessary calculations and assessment of effects is provided with the application, the subdivision consent application shall be deemed to include consent to excavate or fill land, and clear vegetation to the extent authorised by the consent and subject to any conditions in the consent.

The Subdivision Site Suitability Report attached in Appendix 5 addresses earthworks in its Section 7, including recommendations around erosion and sediment control, and earthworks plans.

Chapter 12.4 Natural Hazards does not apply as the site is not subject to any coastal hazard as currently mapped in the Operative District Plan (the only hazards with rules). Whilst there are areas of scrub and bush within the site, a future owner will be able to ensure a minimum 20m buffer between a future residential unit and the drip line, by way of clearance of what is largely exotic species vegetation.

Rules in Chapters 12.5, 5A and 5B Heritage do not apply as the site contains no heritage values or sites, no notable trees, no Sites of Cultural Significance to Maori and no registered archaeological sites. The site is not within any Heritage Precinct.

Chapter 12.7 Waterbodies does not apply as the subdivision provides for building / development area well away from any water courses.

Chapter 12.8 Hazardous Substances does not apply as the activity being applied for is not a hazardous substances facility.

Chapter 12.9 does not apply as the activity does not involve renewable energy.

Chapter 14 Financial Contributions (esplanade reserve) is not relevant as there is no qualifying water body.

Chapter 15.1 Traffic, Parking and Access

Rules in Chapter 15.1.6A are not considered relevant to the proposal. This is because the traffic intensity rules apply to land use activities, not subdivisions. Similarly rules in Chapter 15.1.6B (parking requirements) also relate to proposed land use activities, not subdivisions. Notwithstanding this, no breaches of either traffic intensity, or parking, rules have been identified.

Chapter 15.1.6C (access) is the only part of Chapter 15.1 relevant to a subdivision. I have not identified any breaches. Access to the balance farm is existing, off a well formed extra width crossing from Davis Road. The crossing off Pokapu Road is a concrete, double width splayed crossing with no upgrade required and excellent visibility in both directions. Internal to the site, shared right of way will be formed to the appropriate standard – effectively 3m metal carriageway with passing where required.

In summary, I have not identified any land use breaches, and the subdivision remains a discretionary subdivision activity.

5.2 Proposed District Plan

The FNDC publicly notified its PDP on 27th July 2022. Whilst the majority of rules in the PDP will not have legal effect until such time as the FNDC publicly notifies its decisions on submissions, there are certain rules that have been identified in the PDP as having immediate legal effect and that may therefore need to be addressed in this application and may affect the category of activity under the Act. These include:

Rules HS-R2, R5, R6 and R9 in regard to hazardous substances on scheduled sites or areas of significance to Maori, significant natural areas or a scheduled heritage resource.

There are no scheduled sites or areas of significance to Maori, significant natural areas or any scheduled heritage resource on the site, therefore these rules are not relevant to the proposal.

Heritage Area Overlays – N/A as none apply to the application site.

Historic Heritage rules and Schedule 2 – N/A as the site does not have any identified (scheduled) historic heritage values.

Notable Trees – N/A – no notable trees on the site.

Sites and Areas of Significance to Maori – N/A – the site does not contain any site or area of significance to Maori.

Ecosystems and Indigenous Biodiversity – Rules IB-R1 to R5 inclusive.

No indigenous vegetation clearance is proposed as part of this application.

Subdivision (specific parts) – only subdivision provisions relating to land containing Significant Natural Area or Heritage Resources have immediate legal effect. The site contains no scheduled or mapped Significant Natural Areas or Heritage Resources.

Activities on the surface of water – N/A as no such activities are proposed.

Earthworks – Only some rules and standards have legal effect. These are Rules EW-R12 and R13 and related standards EW-S3 and ES-S5 respectively. EW-R12 and associated EW-S3 relate to the requirement to abide by Accidental Discovery Protocol if carrying out earthworks and artefacts are discovered. EW-R13 and associated EW-S5 refer to operating under appropriate Erosion and Sediment Control measures. Earthworks will be required to give effect to the subdivision is related to access. The works can be subject to conditions to ensure compliance with the above referenced standards.

Signs – N/A – signage does not form part of this application.

Orongo Bay Zone – N/A as the site is not in Oronga Bay Zone.

There are no zone rules in the PDP with immediate legal effect that affect the proposal's activity status.

6.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS

6.1 Allotment Sizes and Dimensions

The proposed lots are large and can easily accommodate 30m x 30m square building envelopes. They are suitable for residential development associated with rural residential activities.

The Site Suitability Report in Appendix 5 and Geotechnical Assessment in Appendix 6 both confirm that the proposed lots are all suitable for their intended use in regard to civil engineering matters and ground conditions.

6.2 Natural and Other Hazards

The application site is largely flood prone. Flooding occurs over the expansive flats contained within the overall title, on both sides of Pokapu Road. However, the additional lots being proposed are not on the flats, all being on elevated land, with house sites well above and away from flood prone areas.

The land proposed for the smaller lots is mapped in the Regional Plan as being Erosion Prone.

These two hazard aspects, as well as other hazards, are addressed in the Subdivision Site Suitability Report attached in Appendix 5, specifically section 8. This finds that the risk of erosion is not applicable, based on their ground investigations. The risk of landslip is also less than minor with no mitigation required other than provision for localised retaining, subject to specific engineering design.

The risk of overland flow paths, flooding and inundation exists, particularly in regard to overland flow paths. The report recommends mitigation in the form of on lot stormwater detention tanks and stormwater pond for the right of way, up to the 1% AEP event.

The site is not subject to any hazard associated with rockrall; alluvion; avulsion; unconsolidated fill; soil contamination; subsidence; fire hazard or sea level rise.

6.3 Water Supply

There is no Council reticulated water supply available to the property and the Council can impose its standard requirement in regard to potable and fire fighting water supply for the lots.

6.4 Energy Supply & Telecommunications

Power and phone is not a requirement for rural subdivision. Council can impose a consent notice advising future lot owners that the provision of power and telecoms to the lot

boundaries was not a requirement of the subdivision and remains the responsibility of the lot owner.

6.5 Stormwater Disposal

Refer to the Subdivision Site Suitability Report in Appendix 5, specifically Section 5 of that report. This confirms that impermeable coverage on each lot will readily comply with the zone's permitted activity threshold, with future on lot development likely to be in the vicinity of being only 1% of total lot area (permitted threshold being 15%). Stormwater management concepts are discussed both for subdivision development works and for future on-lot development.

Concept stormwater attenuation is discussed, for both future development within the lots and the right of way. The Subdivision Site Suitability Report contains an assessment against the Regional Plan's Stormwater Rule C.6.4.2, showing no consent is required – refer to Appendix C, Table 11.

6.6 Sanitary Sewage Disposal

Refer to Section 5 of the Report in Appendix 5. For the purposes of feasibility the report considered a five bedroom / 8 occupant scenario for each lot. The report verifies that onsite wastewater treatment to secondary aerated treatment level is definitely possible on all lots in compliance with the Regional Plan's permitted standard, and also states that at time of building consent a primary treatment solution may also be considered for lot development, provided that the system complies with the Regional Plan's requirements in regard to discharge to slopes; sufficient reserve disposal area and compliance with exclusion areas and setback distances.

The Subdivision Site Suitability Report contains a Wastewater Assessment of Environmental Effects in its Appendix C, Table 10.

6.7 Easements for any purpose

The property will remain subject to existing easements as shown on the scheme plan. New easements for right of way and various services, A, B & G, are listed in the Memorandum of Easements on the face of the Scheme – refer Appendix 1. These easements will be formed as part of subdivision works, pursuant to s224c – refer to 6.8 below. The memorandum also shows 'E' and 'F' over the large balance Lot 4 coming in from the south. This was at the request of Kiwi Rail who required assurance than an alternative access route was protected in the unlikely event that for some reason the rail crossing was no longer available.

6.8 Property Access

Property access into the lots will be off Pokapu Road over railway corridor to property boundary at ROW A. Consultation has been carried out with Kiwi Rail in regard to additional lots utilising the existing 'level crossing' (property already does so, along with one adjacent title). KiwiRail's conditional approval was still pending at time of lodging this application, with email confirmation received already, confirming that it will be sent shortly (to be Appendix 4).

KiwiRail has provided its approval on the basis that the applicant accepts the reverse sensitivity consent notice clauses Kiwi Rail is seeking to have applied. These are:

Noise attenuation - To apply when the North Auckland Line at this location is operational

A consent notice pursuant to Section 221 of the Resource Management Act 1991 be entered on the Computer Freehold Register of Lot [insert here] being a subdivision of Lot [insert here] to require noise attenuation as follows:

New buildings or alterations to existing buildings containing noise sensitive activities, in or partly within 100 metres from the railway must be designed, constructed and maintained to ensure that the following internal design levels are not exceeded:

1. *35 dB LAeq(1 hour) inside bedrooms*
2. *40 dB LAeq(1 hour) inside other habitable rooms*

Where the internal noise level in noise sensitive spaces in the proposed building can only comply with the internal noise standard when doors or windows to these spaces are closed, these rooms must be mechanically ventilated.

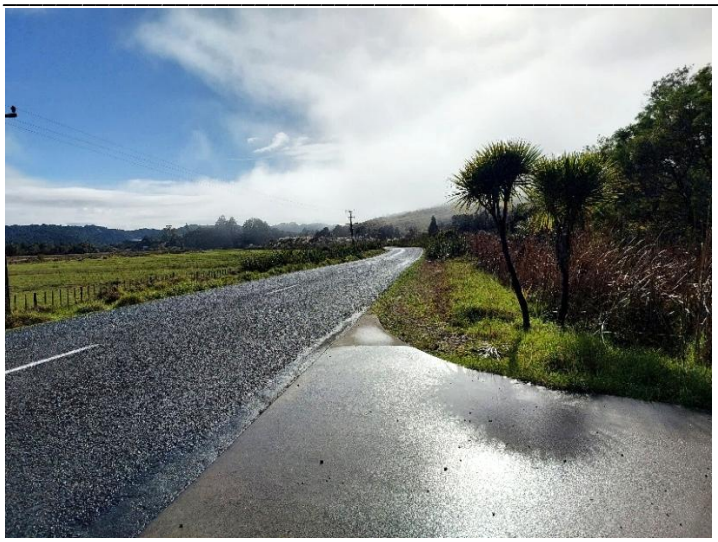
No complaints agreement

A consent notice pursuant to Section 221 of the Resource Management Act 1991 be entered on the Computer Freehold Register of Lot [insert here] being a subdivision of [insert here] to advise future owners/occupiers that the said lots are located adjacent to a designated railway corridor, the owners/occupiers of Lot [insert here] must accept the effects of the railway use permitted by the designation of the adjacent corridor without complaint.

Setback requirement

A consent notice pursuant to Section 221 of the Resource Management Act 1991 be entered on the Computer Freehold Register of Lot [insert here] being a subdivision of [insert here] to advise future owners/occupiers that all buildings or structures to be setback 5 metres or more from the property boundary shared with the North Auckland Line rail corridor.

In terms of the road crossing, there is a well formed double width crossing at Pokapu Road, with excellent sight lines in both directions – see pictures on following page.



View looking north from crossing

Looking south

Internal to the site, Plans contained in the Subdivision Site Suitability Report show the proposed alignment of shared rights of way A, B & G as well as likely alignment of driveway access to potential house sites within the Lots 1-3. Cut/fill earthworks are required to form the proposed right of way within site boundaries. The proposed disturbance activities have been modelled with 3d design by Geologix.

Access can be provided to the boundary to each lot, to the required standard – 3m metal carriageway with passing bays where required. Access within ROW A at the application site's existing entry point, will need to be of sufficient width to provide for vehicles to turn right into Right of Way B and continue around the contour to the boundaries of Lots 2 & 3.

The Scheme Plan, at Kiwi Rail's request also shows right of way easements C (existing), E and F across Lot 4 coming into the additional lots from the south as an alternative in the unlikely

event the level crossing can no longer be used. It is requested that it is not a requirement of subdivision consent to form rights of way E and F at s224c stage, and instead utilise a consent notice approach that will require their formation only if and when the level crossing access off Pokapu is no longer able to used.

6.9 Earthworks

The Subdivision Site Suitability Report addresses earthworks in its section 7. It is expected that earthworks volumes for creation of access will slightly exceed the 5,000m^3 permitted volume specified in the Operative District Plan; and also the average cut/fill face height. Consent for a breach of the ODP's permitted activity excavation/filling rule is included in this subdivision application.

The Subdivision Site Suitability Report identifies a potential breach of the Regional Plan's earthworks rules which restrict the area of exposed earth at any one time to 5,000m^2 (other areas). The land within which earthworks associated with the subdivision will take place is also mapped as erosion prone by the NRC. This places a further restriction on the area of exposed earth to 2,500m^2 for land mapped as erosion prone. I have been advised that some works has commenced in 'upgrading' the existing farm track in preparation for subdivision works. By staging further works, and re-vegetation /covering exposed earth progressively, it is possible that the permitted threshold will not be breached. If such construction staging is not achievable, however, then consent will be required from the Regional Council.

The Subdivision Site Suitability Report contains some general recommendations, and Erosion and Sediment Control measures. It also contains earthworks plans in its Appendices, along with some long sections.

6.10 Building Locations

The application is supported by a Geotechnical Assessment because of mapped constraints in regard to ground stability, i.e. potential for instability and slippage – refer to Appendix 6. This assessment looked at potential building sites on all three 4ha lots. The assessment has taken a conservative approach in showing feasibility for building on all lots. For Lots 1 & 3, prior to building it may be necessary to construct palisade walls to stabilise a building platform. The degree of stabilisation will differ depending on where on the site a future lot owner may choose to build. It will be possible to build on all three lots.

The report recommends specifically designed retaining walls for proposed driveways; construction monitoring during dwelling construction; and a building line restriction within Lot 1 whereby any dwelling constructed below it will require palisade wall stabilisation.

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

Vegetation, fauna and landscape

The site has no resource feature overlays as mapped in the ODP. It contains no features mapped in the Regional Policy Statement (or PDP) as having any high or outstanding landscape or natural values. There is a single mapped biodiversity wetland, also a Protected Natural Area, running along the boundary with Pokapu Road, at the southern end of Lot 3 and along the balance lot. Map data indicates this it is actually within the rail corridor as opposed to the application site. In any event, it is not affected by the proposal.

The site contains areas of mixed species indigenous & exotic scrubland and mature trees. Amongst the mature vegetation and out into the pasture there are areas of gorse. There is tobacco plant in Lots 2 & 3, along with totara and gum trees.

None of the above mentioned vegetative cover is identified as a protected natural area or as having any particular value.

The property is not mapped as either a 'high density' or 'kiwi present' area. No ban or restriction on the keeping dogs and cats is considered necessary or reasonable.

Heritage/Cultural

The site does not contain any historic sites, nor any archaeological sites. Neither does the site contain any Sites of Cultural Significance to Maori (as scheduled in the ODP or PDP).

6.12 Soil

The soils on the property are predominantly mapped as being LUC 4 or 6, and because of this and wetness there are constraints in terms of productivity. The proposed 4ha lots do not exhibit good soils. The proposal does not adversely affect the life supporting capacity of soil.

6.13 Access to, and protection of, waterbodies

There is no qualifying water body along which, or around which, public access is required to be provided. Water quality will not be adversely impacted by the act of subdivision. On site wastewater treatment and disposal systems can be established in compliance with permitted activity standards in the Regional Plan.

6.14 Land use compatibility (reverse sensitivity)

The proposal is consistent with rural character where residential living is interspersed with larger holdings. I do not believe this subdivision unduly increases any risk of reverse sensitivity effects arising.

6.15 Proximity to Airports

The site is outside of any identified buffer area associated with any airport.

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

The proposal has not considered energy efficiency. This is an option for future lot owners

6.18 National Grid Corridor

The National Grid does not run through the application site.

6.19 Effects on Rural Character and Amenity

The lots are rural in nature/character. The size of the lots means that rural amenity will be maintained. In my opinion, the proposal will have no adverse effects on rural character.

6.20 Cumulative and Precedent Effects

Cumulative Effect:

The proposal will create three additional lots easily able to internalise potential effects of any future built development. The proposal does not create an adverse cumulative effect.

Precedent Effect:

Precedent effects are a matter for consideration when a consent authority is considering whether or not to grant a consent. Determining whether there is an adverse precedent effect is, however, generally reserved for non complying activities, which this is not. In any event, the proposed subdivision does not set an adverse precedent effect and does not threaten the integrity of the ODP or those parts of the PDP with legal effect.

7.0 STATUTORY ASSESSMENT

7.1 Operative District Plan Objectives and Policies

Objectives and policies relevant to this proposal are considered to be those listed in Chapter 8.6 (Rural Production 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 Rural Production Zone is predominantly, but not exclusively, a working productive rural zone. The application site is one title, combined with others, to make up a large productive grazing unit, that also previously contained forestry. The more arable parts of the site will remain in grazing, whilst the proposed lots are located on the less arable, steeper portions. The proposal is, I believe, a sustainable and sensible use of the land.

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 conclude that the proposed subdivision is appropriate for the site and that the subdivision can avoid, remedy or mitigate any potential adverse effects.

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. The site exhibits none of these features.

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.

All lots will be required to be self sufficient in terms of on-site water storage and appropriate stormwater management. The supporting Site Suitability Report confirms this is achievable.

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 subdivision will have minimal, if any, impact on water quality. 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.

The provision of power is not a requirement for rural allotments.

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.

The subdivision has not considered energy efficiency, however, all lots can provide building sites with abundant access to sunlight. The subdivision has access off Council road.

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:
(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, where relevant to the proposal, have been discussed earlier in this report. I believe regard has been had to items (a) through (g), where relevant, 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 all lots is off Pokapu Road via a shared crossing. This is already to the required standard with excellent visibility in both directions. Access then crosses KiwiRail administered land prior to property boundary. Internal access will be formed to Council standard. Subdivision earthworks will not require any vegetation clearance and will be carried out subject to the ADP applying and with Erosion and Sediment controls in place.

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

The application site is identified as have large areas that are subject to flood hazard. However, no development is proposed in such areas, with the new lots all located to the north and on elevated land, well clear of flood hazard areas.

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.

Power and telecommunications are not a requirement for rural allotments.

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 does not contain any heritage resources. There are no areas of indigenous vegetation affected by the proposal. The site is not in the coastal environment and there are no riparian margins. The site contains no outstanding landscape or natural features.

Policy 13.4.7 is not relevant as there is no qualifying water body to which esplanade requirements apply.

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

This is discussed earlier. Each lot will require on-site water supply and storage.

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 creates rural lots of 4ha or larger, and provides for an appropriate type and scale of activity for the zone;
(b) The proposal is in an area not displaying high or outstanding natural values;
(c) The site contains no significant indigenous vegetation;
(d) The site is not within the coastal environment;
(e) The proposal enables the maintenance of amenity and rural character values;
(f) The proposal is not believed to negatively impact on the relationship of Maori with their culture;
(g) There are no identified heritage values within the site; and
(h) The site of the additional lots is not subject to any natural hazards that would limit future built development.

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 – see below.

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 subdivision layout has taken the above matters into account.

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

In summary, I believe the proposal to be more consistent than not with the above Objectives and Policies.

Rural Production Zone Objectives and Policies

Objectives:

8.6.3.1 To promote the sustainable management of natural and physical resources in the Rural Production Zone.

8.6.3.2 To enable the efficient use and development of the Rural Production Zone in a way that enables people and communities to provide for their social, economic, and cultural well being and for their health and safety.

8.6.3.3 To promote the maintenance and enhancement of the amenity values of the Rural Production Zone to a level that is consistent with the productive intent of the zone.

8.6.3.4 To promote the protection of significant natural values of the Rural Production Zone.

8.6.3.6 To avoid, remedy or mitigate the actual and potential conflicts between new land use activities and existing lawfully established activities (reverse sensitivity) within the Rural Production Zone and on land use activities in neighbouring zones.

8.6.3.7 To avoid remedy or mitigate the adverse effects of incompatible use or development on natural and physical resources.

8.6.3.8 To enable the efficient establishment and operation of activities and services that have a functional need to be located in rural environments.

8.6.3.9 To enable rural production activities to be undertaken in the zone.

And policies

8.6.4.1 That a wide range of activities be allowed in the Rural Production Zone, subject to the need to ensure that any adverse effects on the environment, including any reverse sensitivity effects, on the environment resulting from these activities are avoided, remedied or mitigated and are not to the detriment of rural productivity.

8.6.4.2 That standards be imposed to ensure that the off site effects of activities in the Rural Production Zone are avoided, remedied or mitigated.

8.6.4.3 That land management practices that avoid, remedy or mitigate adverse effects on natural and physical resources be encouraged.

8.6.4.4 That the type, scale and intensity of development allowed shall have regard to the maintenance and enhancement of the amenity values of the Rural Production Zone to a level that is consistent with the productive intent of the zone.

8.6.4.5 That the efficient use and development of physical and natural resources be taken into account in the implementation of the Plan.

8.6.4.7 That although a wide range of activities that promote rural productivity are appropriate in the Rural Production Zone, an underlying goal is to avoid the actual and potential adverse effects of conflicting land use activities.

8.6.4.8 That activities whose adverse effects, including reverse sensitivity effects cannot be avoided remedied or mitigated are given separation from other activities

8.6.4.9 That activities be discouraged from locating where they are sensitive to the effects of or may compromise the continued operation of lawfully established existing activities in the Rural production zone and in neighbouring zones.

Objective 8.6.3.5 and Policy 8.6.4.6 are not considered relevant as they are solely related to Kerikeri Road.

The proposed subdivision promotes an efficient use and development of the land (Objective 8.6.3.2). Amenity values can be maintained (8.6.3.3). Reverse sensitivity effects are not considered to be a significant risk (Objectives 8.6.3.6-8.6.3.9 inclusive and Policies 8.6.4.8 and 8.6.4.9).

Policy 8.6.4.7 anticipates a wide range of activities that promote rural productivity, and the underlying goal is to avoid any actual and potential adverse effects of conflicting land use activities. I believe in the case of this proposal, given the site's location, and the existing and proposed land uses around it, that additional adverse reverse sensitivity effects are unlikely. The site contains no highly versatile soils.

The proposal provides for sustainable management of natural and physical resources (8.2.4.1). Off site effects can be avoided, remedied or mitigated (8.6.4.2 and 8.6.4.3). Amenity values can be maintained and enhanced (8.6.4.4). The proposal enables the efficient use and development of natural and physical resources (8.6.4.5).

In summary, I believe the proposal to be consistent with the objectives and policies as cited above.

7.2 Proposed District Plan Objectives and Policies

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 mitigates and existing risks reduced; and
f. manages adverse effects on the environment.

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.

SUB-O3 *Infrastructure is planned to service the proposed subdivision and development where:*
a. there is existing infrastructure connection, infrastructure should 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 give n to connections with the wider infrastructure network.

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

I consider the subdivision to achieve the objectives of the relevant zone, and district wide provisions. Local character is not affected; significant additional reverse sensitivity issues will not result; risk from natural hazards will not be increased. Adverse effects on the environment are considered to be less than minor and not requiring mitigation (SUB-O1).

The site contains no 'highly productive land'. The site contains no ONF's or ONL's, nor any areas of high or outstanding natural character. There are no wetlands affected by the proposal and no lakes or rivers, nor Sites and Areas of Significance to Maori and no Historic Heritage areas. There are no areas of significant indigenous vegetation (SUB-O2).

The proposal is consistent with SUB-O3 and SUB-O4 does not apply.

SUB-P1
Enable boundary adjustments that:

Not relevant – application is not a boundary adjustment.

SUB-P2
Enable subdivision for the purpose of public works, infrastructure, reserves or access.

Not relevant – application does not involve public works, infrastructure, reserves or access lots.

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 subdivision results in lots that are smaller than the proposed discretionary lot size applying in the PDP. However, these minimum lot sizes are yet to have legal effect with a large number of submissions received in regard to changing them. The allotments will be of a size that remains consistent with the purpose, characteristics and qualities of the zone, in this location and with a site with these characteristics. The expectation in the Rural Production is for low density residential use amongst productive holdings (in this case grazing). The lots can accommodate building platforms and 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 zoneto provide for safe, connected and accessible environments by.....:

Not relevant. The site is not zoned any of the zones referred to.

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 is in accordance the purpose, characteristics and qualities of the zone.

The subdivision is rural with no nearby Council administered or operated infrastructure except for the road.

SUB- P7
Require the vesting of esplanade reserves when subdividing land adjoining the coast or other qualifying water bodies.

No qualifying water body and no lot less than 4ha in area.

SUB-P8 *Avoid rural lifestyle subdivision in the Rural Production zone unless the subdivision:*
- *a. will protect a qualifying SNA in perpetuity and result in the SNA being added to the District Plan SNA schedule; and*
- *b. will not result in the loss of versatile soils for primary production activities.*

It is not possible to be entirely consistent with the above policy because SNA's and any reference to them, are proposed to be removed from the PDP in their entirety. As such there is no 'qualifying SNA' to be protected, and no District Plan SNA Schedule to add anything to. Preliminary staff recommendations on submissions suggest replacing any reference to SNA with indigenous vegetation. This may well be challenged further as only a portion of indigenous vegetation in the district would meet the parameters proposed for defining an SNA. In any event, whilst the proposal cannot be consistent with (a), it is, however, entirely consistent with part (b) in that there will be no loss of versatile soils for primary production activities. On balance, in the circumstances, I consider the proposal to be more consistent than not with the above policy.

SUB-P9
Avoid subdivision [sic] rural lifestyle subdivision in the Rural Production zone and Rural residential subdivision inthe Rural Lifestyle zone unless the development achieves the environmental outcomes required in the management plan subdivision rule.

Not relevant as the application is not a Management Plan.

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.

Not relevant. No minor residential units exist.

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 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 subdivision does not require resource consent under the PDP. Notwithstanding that, the subdivision has considered the above matters, where relevant.

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 Rural Production in the Proposed District Plan.

RPROZ-O1
The Rural Production zone is managed to ensure its availability for primary production activities and its long-term protection for current and future generations.

The proposal does not impact unduly on the availability of land for primary production. Only a very small part of the area to be subject to subdivision is in grazed pastures, the rest in rank vegetation and not grazed.

RPROZ-O2
The Rural Production zone is used for primary production activities, ancillary activities that support primary production and other compatible activities that have a functional need to be in a rural environment.

This objective is in a zone chapter, not subdivision, and is aimed at 'activities'. The application is for a subdivision that does not pre-determine the activities to take place within each lot.

RPROZ-O3
Land use and subdivision in the Rural Production zone:

a. *protects highly productive land from sterilisation and enables it to be used for more productive forms of primary production;*
b. *protects primary production activities from reverse sensitivity effects that may constrain their effective and efficient operation;*
c. *does not compromise the use of land for farming activities, particularly on highly productive land;*
d. *does not exacerbate any natural hazards; and*
e. *is able to be serviced by on-site infrastructure.*

There is no highly productive land within the site. Any primary production activity within the site or on adjacent sites will not be constrained as a result of the proposal. The part of the site proposed for development is not subject to any hazard that precludes future residential use. Sites will be fully serviced on-site.

RPROZ-O4
The rural character and amenity associated with a rural working environment is maintained.

The subdivision will not adversely impact on rural character and amenity.

RPROZ-P1
Enable primary production activities, provided they internalise adverse effects onsite where practicable, while recognising that typical adverse effects associated with primary production should be anticipated and accepted within the Rural Production zone.

The proposal is not for a primary production activity. It is a subdivision.

RPROZ-P2
Ensure the Rural Production zone provides for activities that require a rural location by:

a. *enabling primary production activities as the predominant land use;*
b. *enabling a range of compatible activities that support primary production activities, including ancillary activities, rural produce manufacturing, rural produce retail, visitor accommodation and home businesses.*

Refer to earlier comments in regard to Objectives.

RPROZ-P3
Manage the establishment, design and location of new sensitive activities and other non-productive activities in the Rural Production Zone to avoid where possible, or otherwise mitigate, reverse sensitivity effects on primary production activities.

Refer to earlier comments in regard to reverse sensitivity.

RPROZ-P4
Land use and subdivision activities are undertaken in a manner that maintains or enhances the rural character and amenity of the Rural Production zone, which includes:

a. *a predominance of primary production activities;*
b. *low density development with generally low site coverage of buildings or structures;*
c. *typical adverse effects such as odour, noise and dust associated with a rural working environment; and*
d. *a diverse range of rural environments, rural character and amenity values throughout the District.*

The subdivision is a low-density development, consistent with the level of density provided for by the ODP. The area is not dominated by high intensity agriculture or horticultural use – which are the type of uses that can generate reverse sensitivity issues if not managed. I believe the proposal will maintain the rural character and amenity of the area.

RPROZ-P5
Avoid land use that: ….
N/A. Activity is not a land use.

RPROZ-P6
Avoid subdivision that:

- *a. results in the loss of highly productive land for use by farming activities;*
- *b. fragments land into parcel sizes that are no longer able to support farming activities, taking into account:*
  - *1. the type of farming proposed; and*
  - *2. whether smaller land parcels can support more productive forms of farming due to the presence of highly productive land.*
- *c. provides for rural lifestyle living unless there is an environmental benefit.*

The subdivision will not result in the loss of highly productive land. The proposed smaller lots do not form an integral part of the overall property's grazing pattern. A part of Lot 3 (southern) is low lying flat land with one/two paddocks, however forms only a small part of the total grazing. That land would remain available for grazing, if required or desired. Lot 2 is not utilised for grazing at all currently. Proposed Lot 1 is in grass, but is poor quality grazing with limited capacity and will not be missed from the overall property's total grazing. The proposal will not be detrimental to the environment. Strictly speaking, however, the proposal cannot be consistent with part (c) of RPROZ-P6, as no specific environmental 'benefit' is proposed.

RPROZ-P7
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. whether the proposal will increase production potential in the zone;*
- *b. whether the activity relies on the productive nature of the soil;*
- *c. consistency with the scale and character of the rural environment;*
- *d. location, scale and design of buildings or structures;*
- *e. for subdivision or non-primary production activities:*
  - *i. scale and compatibility with rural activities;*
  - *ii. potential reverse sensitivity effects on primary production activities and existing infrastructure;*
  - *iii. the potential for loss of highly productive land, land sterilisation or fragmentation*
- *f. at zone interfaces:*
  - *i. any setbacks, fencing, screening or landscaping required to address potential conflicts;*
  - *ii. the extent to which adverse effects on adjoining or surrounding sites are mitigated and internalised within the site as far as practicable;*
- *g. the capacity of the site to cater for on-site infrastructure associated with the proposed activity, including whether the site has access to a water source such as an irrigation network supply, dam or aquifer;*
- *h. the adequacy of roading infrastructure to service the proposed activity;*
- *i. Any adverse effects on historic heritage and cultural values, natural features and landscapes or indigenous biodiversity;*
- j. *Any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.*

The subdivision does not require consent under the PDP so the policy is of limited relevance. Relevant matters within RPROZ-P7 have, however, been taken into account.

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:

(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.

The site does not exhibit the features listed above. Whilst a large proportion of the balance land is subject to flooding, the area to be subdivided is not and the proposal is not subject to significant risks from natural hazards.

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), (f) and (g). Proposed layout and lot size, along with appropriate waste water and stormwater management, will ensure the maintenance of amenity values and the quality of the environment. The proposal has had regard to the values of ecosystems. The subdivision does not materially affect the productive capacity of any rural zoned land.

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 Policy Statements and National Environmental Standards

The National Policy Statement for Highly Productive Land is not relevant given the absence of any LUC Class 1, 2 or 3 soils on the application site.

NES Freshwater

The site is mapped as having one biodiversity wetland running lengthwise along its boundary with railway corridor. This wetland is unaffected by the proposed development, with no future works likely to be within 100m of it.

There is another area of wetland swamp to the north, partly within rail corridor and partly within proposed Lot 2. The wet area is fenced off. It will not be affected by any future works within Lot 2. The proposed right of way, to be formed during subdivision works, is to follow the alignment of an historic track that follows the contour around the western boundary of proposed Lot 1. Earthworks will be at least 10m clear of the edges of the wet area (not identified on regional council maps). Hydraulic neutrality will be achieved in regard to any diversion of water resulting from the earthworks to upgrade the track. The works will not impact on the hydraulic functioning of the wetland.

NES Assessing and Management Contaminants in Soil to Protect Human Health

To my knowledge the land has not historically supported any activity to which the NES CS applies.

NPS Indigenous Biodiversity

The site contains a limited amount of indigenous vegetation, none of which is mapped as having any significance, and all of which is mixed in with exotic species and weed plants (gorse and tobacco plant). No clearance is required for subdivision site works. I consider the proposal is consistent with the NPS IB.

7.5 Regional Policy Statement

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.

Objective 3.6 Economic activities – reverse sensitivity and sterilisation

The viability of land and activities important for Northland's economy is protected from the negative impacts of new subdivision, use and development, with particular emphasis on either:

(a) Reverse sensitivity for existing:

(i) Primary production activities; .....

The associated Policy to the above Objective is ***Policy 5.1.1 – Planned and coordinated development***.

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

(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; ...

(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 ...

Policy 5.1.1 seeks to ensure that subdivision in a primary production zone does 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*".

This has been discussed at length elsewhere in this planning report. The subdivision does not "*materially reduce the potential for soil-based primary production on land with highly versatile soils*". The site contains no highly productive land.

5.1.3 Policy – Avoiding the adverse effects of new use(s) and development

Avoid the adverse effects, including reverse sensitivity effects of new subdivision, use and development, particularly residential development on the following:

(a) Primary production activities in primary production zones (including within the coastal marine area);.....

In regard to this subdivision, it is considered that no additional adverse reverse sensitivity issues are likely to arise as a result.

The application site, as a whole, has large areas subject to flood hazard. However, the area proposed for subdivision is not within such an area. Future built development (and its access) can occur well clear of, and elevated from, any areas prone to flooding. This is consistent with the RPS' objectives and policies in regard to natural hazards.

8.0 s95A-E ASSESSMENT & CONSULTATION

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. No such circumstances exist. Step 2 of s95A specifies the circumstances that preclude public notification. No such circumstance exists and Step 3 of s95A must be considered. This specifies that public notification is required in certain circumstances. No such circumstance exists. In summary public notification is not required pursuant to Step 3 of s95A.

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. None exist in this instance. Step 2 of s95B specifies the circumstances that preclude limited notification. No such circumstance exists and Step 3 of s95B must be considered. This specifies that certain other affected persons must be notified. The application is not for a boundary activity and the s95E assessment below concludes that there are no affected persons to be notified. There is no requirement to limited notify the application pursuant to Step 3.

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.

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.

The activity is a discretionary activity and within the expected outcomes of subdivision and development of the Rural Production Zone. Built development can occur within the proposed new lots in compliance with all bulk and location rules applying to the zone. The proposal does not unduly increase reverse sensitivity effects. No dispensation is being sought in terms of access standards and supporting reports indicate that development can occur on the lots with no off-site adverse effects. The area proposed for subdivision is bounded on all boundaries by property owned and operated by the applicant, except for the small adjacent title Lot 3 DP 561372 created at time of the subdivision creating the application site. The house within that title is located on a knoll well internal to its site boundaries, with screening vegetation in its southern portion, which is the boundary with the application site. There is no direct line of sight between the proposed Lots 1-3 and the house on Lot 3 DP 561372. Whilst the crossing off Pokapu Road will be shared with that adjacent property, it is already formed to double width concrete standard (a requirement of the prior subdivision) and is within road reserve.

I have reached the conclusion that the proposal will not have any minor or more than minor effects on adjacent properties.

The site does not contain any heritage or cultural sites or values and no areas of significant indigenous vegetation. 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.

Access crosses KiwiRail administered rail corridor. Property access across that corridor already exists. The line is currently non operational. Consultation with KiwiRail's Level Crossings and RMA team has resulted in conditional approval, a final copy of which was still pending at time of lodging this application. The applicant accepts the conditions specified by KiwiRail.

9.0 CONCLUSION

The site is considered suitable for the proposed subdivision. Effects on the wider environment are no more than minor. The proposal is not considered contrary to the relevant objectives and policies of the Operative and Proposed District Plans, and is considered to be consistent

with relevant objectives and policies of National and Regional Policy Statements. Part 2 of the Resource Management Act has been had regard to. There is no District Plan rule or national environmental standard that requires the proposal to be publicly notified. No affected persons have been identified.

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

Signed Dated 18th February 2026
Lynley Newport,
Senior Planner
Thomson Survey Ltd

10.0 LIST OF APPENDICES

Appendix 1 Scheme Plan(s)

Appendix 2 Location Plan

Appendix 3 Records of Title & Relevant Instruments

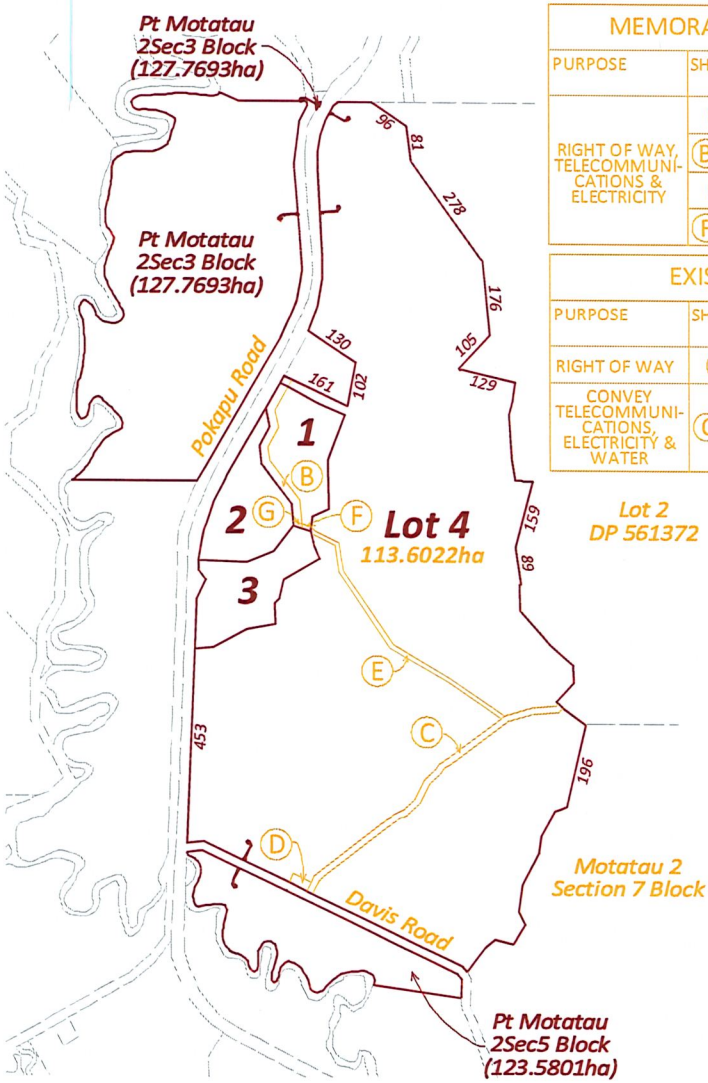
Appendix 4 Consultation with KiwiRail

Appendix 5 Subdivision Site Suitability Report

Appendix 6 Geotechnical Assessment

Appendix 1

Scheme Plan(s)

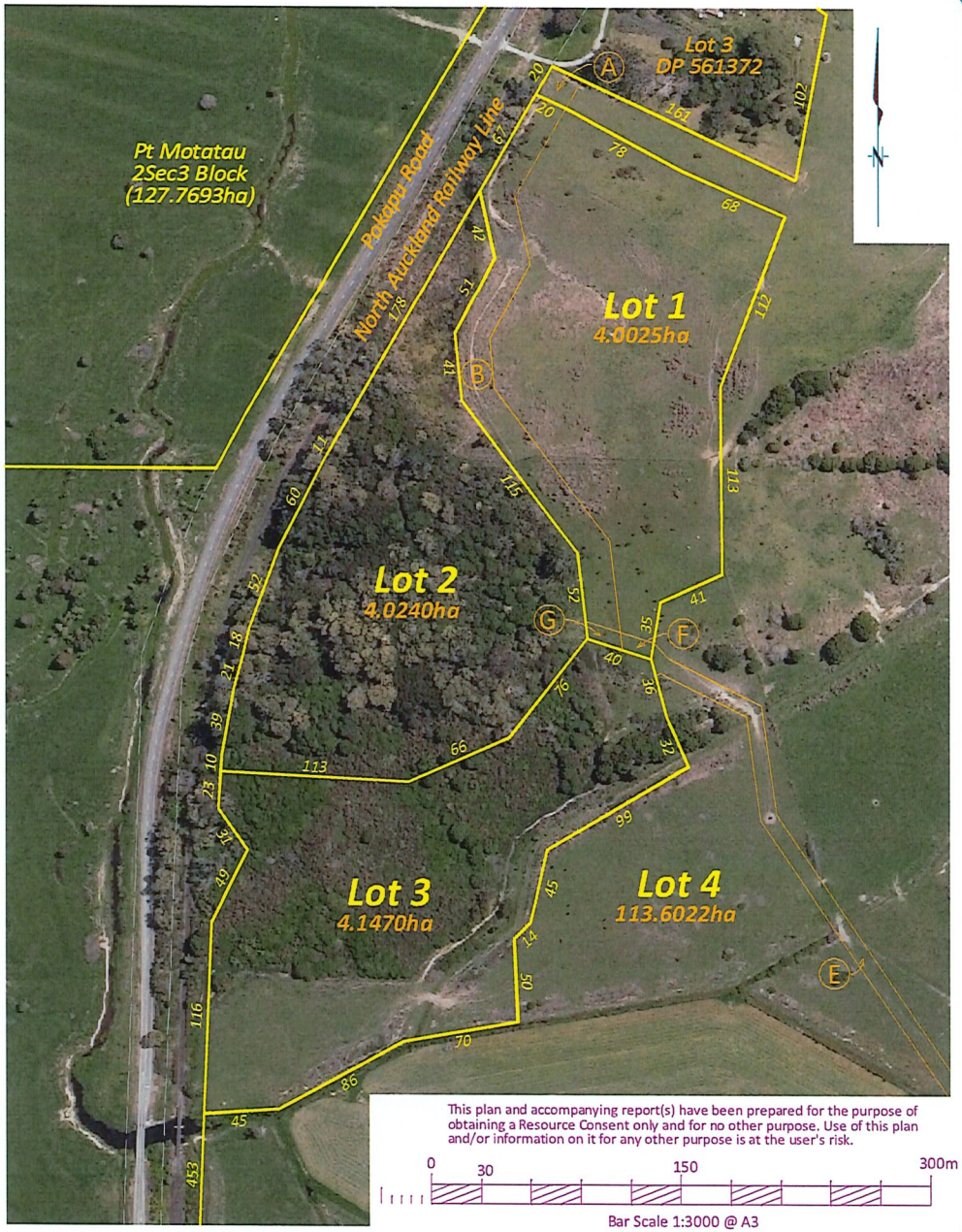


MEMORANDUM OF EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS & ELECTRICITY	A	LOT 4 HEREON	LOTS 1 - 3 HEREON
	B G	LOT 1 HEREON	LOTS 2 & 3 HEREON
	E	LOT 4 HEREON	LOTS 1 - 3 HEREON
	F G	LOT 1 HEREON	LOT 2 HEREON

EXISTING EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
RIGHT OF WAY	C	LOT 4 HEREON	E.I. 12197377.4
CONVEY TELECOMMUNICATIONS, ELECTRICITY & WATER	C D	LOT 4 HEREON	



Local Authority:	Far North District Council
Comprised in:	993105
Total Area:	156.0977ha
Zoning:	Rural Production
Resource features:	NIL

AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY AND SCALED FROM AERIAL PHOTOGRAPHY

AMALGAMATION CONDITION:
THAT LOT 4 HEREON, PART MOTATAU 2SEC3 BLOCK & PART MOTATAU 2SEC5 BLOCK ARE TO BE HELD IN THE SAME CERTIFICATE OF TITLE.

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.

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Bar Scale 1:3000 @ A3

THOMSON SURVEY LIMITED
315 Kerikeri Rd
P.O. Box 372 Kerikeri
Email: kerikeri@tsurvey.co.nz
Ph: (09) 4077360
www.tsurvey.co.nz
Registered Land Surveyors, Planners & Land Development Consultants

PROPOSED SUBDIVISION OF LOT 1 DP 561372 & PART MOTATAU 2SEC3 BLOCK & PART MOTATAU 2SEC5 BLOCK

POKAPU ROAD, MOEREWA

PREPARED FOR: HARRIES

	Name	Date
Survey		
Design		
Drawn	KY	05.08.24
Approved		
Rev	KY	12.01.26

ORIGINAL
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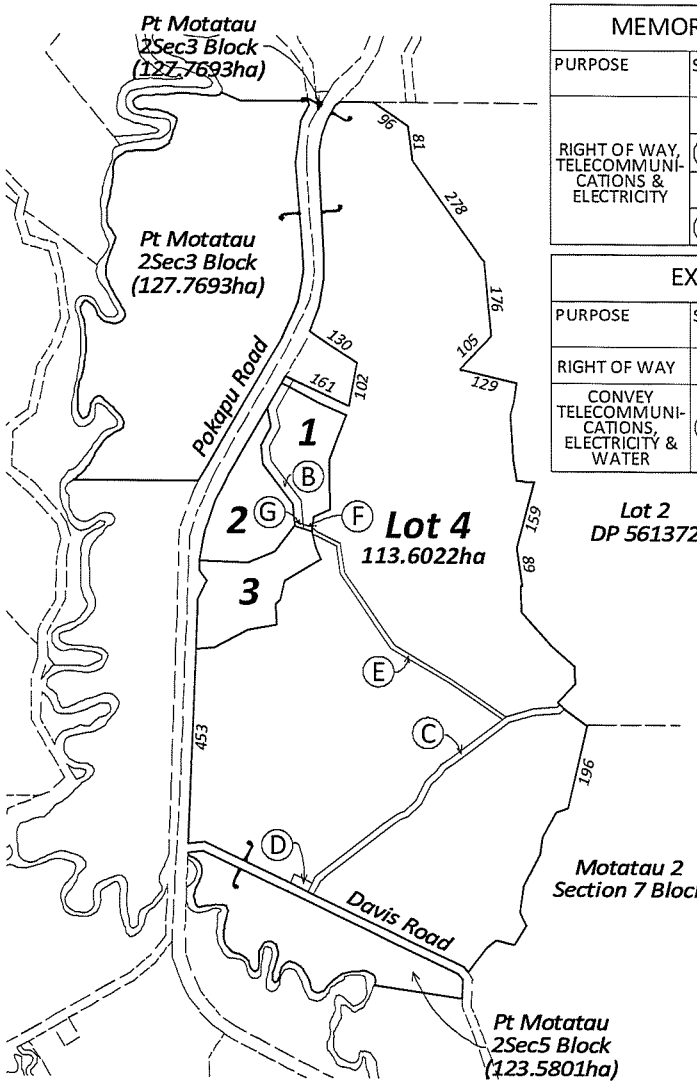
SHEET SIZE A3
10646 Scheme 20260112

Surveyors Ref. No: 10646

Sheet 1 of 1

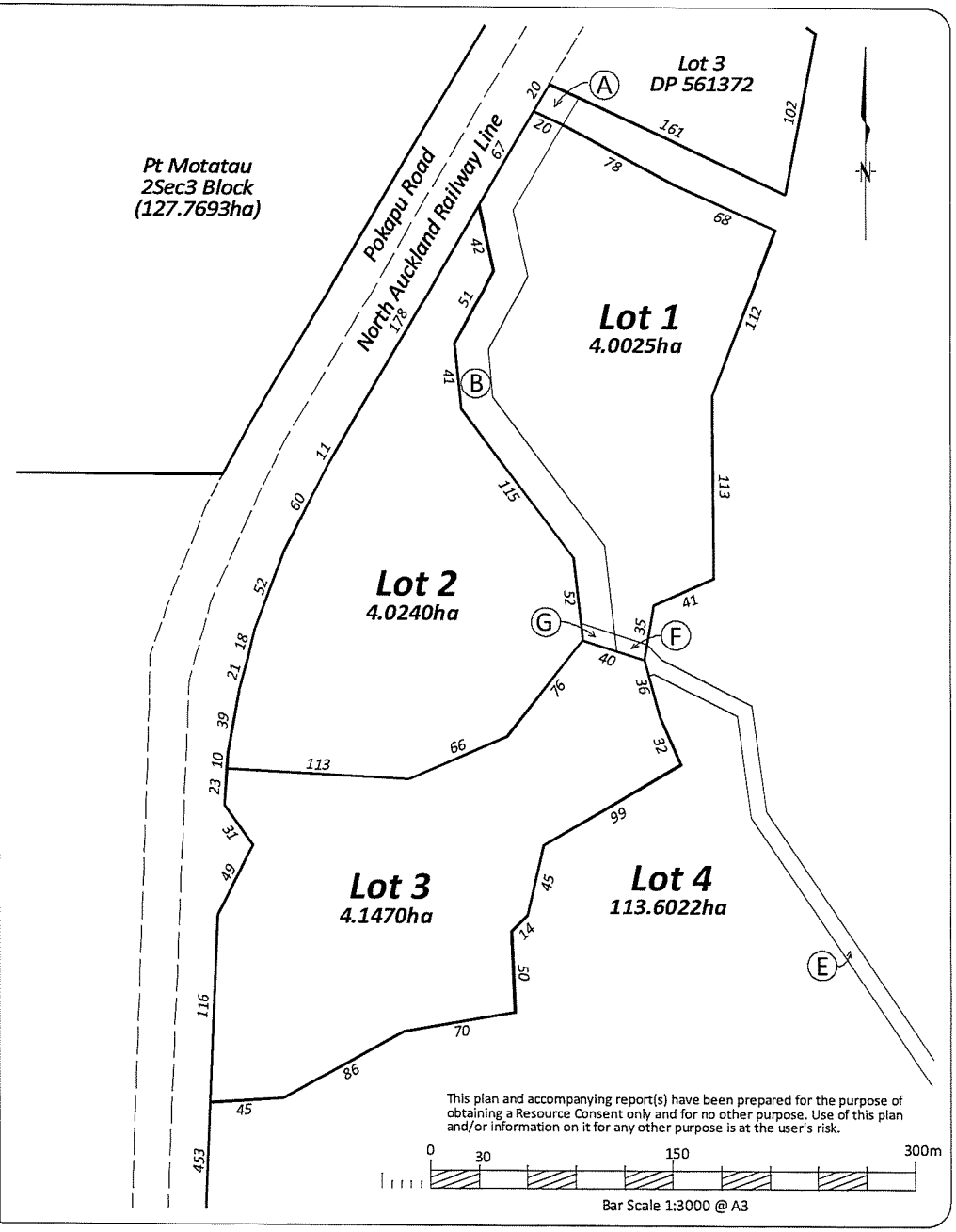


MEMORANDUM OF EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS & ELECTRICITY	A	LOT 4 HEREON	LOTS 1 - 3 HEREON
	B G	LOT 1 HEREON	LOTS 2 & 3 HEREON
	E	LOT 4 HEREON	LOTS 1 - 3 HEREON
	F G	LOT 1 HEREON	LOT 2 HEREON

EXISTING EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
RIGHT OF WAY	C	LOT 4 HEREON	E.I. 12197377.4
CONVEY TELECOMMUNICATIONS, ELECTRICITY & WATER	C D	LOT 4 HEREON	



Bar Scale 1:3000 @ A3

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Local Authority: Far North District Council
Comprised in: 993105
Total Area: 156.0977ha
Zoning: Rural Production
Resource features: NIL

AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY AND SCALED FROM AERIAL PHOTOGRAPHY

AMALGAMATION CONDITION:
THAT LOT 4 HEREON, PART MOTATAU 2SEC3 BLOCK & PART MOTATAU 2SEC5 BLOCK ARE TO BE HELD IN THE SAME CERTIFICATE OF TITLE.

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315 Kerikeri Rd
P.O. Box 372 Kerikeri
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PROPOSED SUBDIVISION OF LOT 1 DP 561372 & PART MOTATAU 2SEC3 BLOCK & PART MOTATAU 2SEC5 BLOCK

POKAPU ROAD, MOEREWA

PREPARED FOR: HARRIES

	Name	Date
Survey		
Design		
Drawn	KY	05.08.24
Approved		
Rev	KY	12.01.26

10646 Scheme 20260112

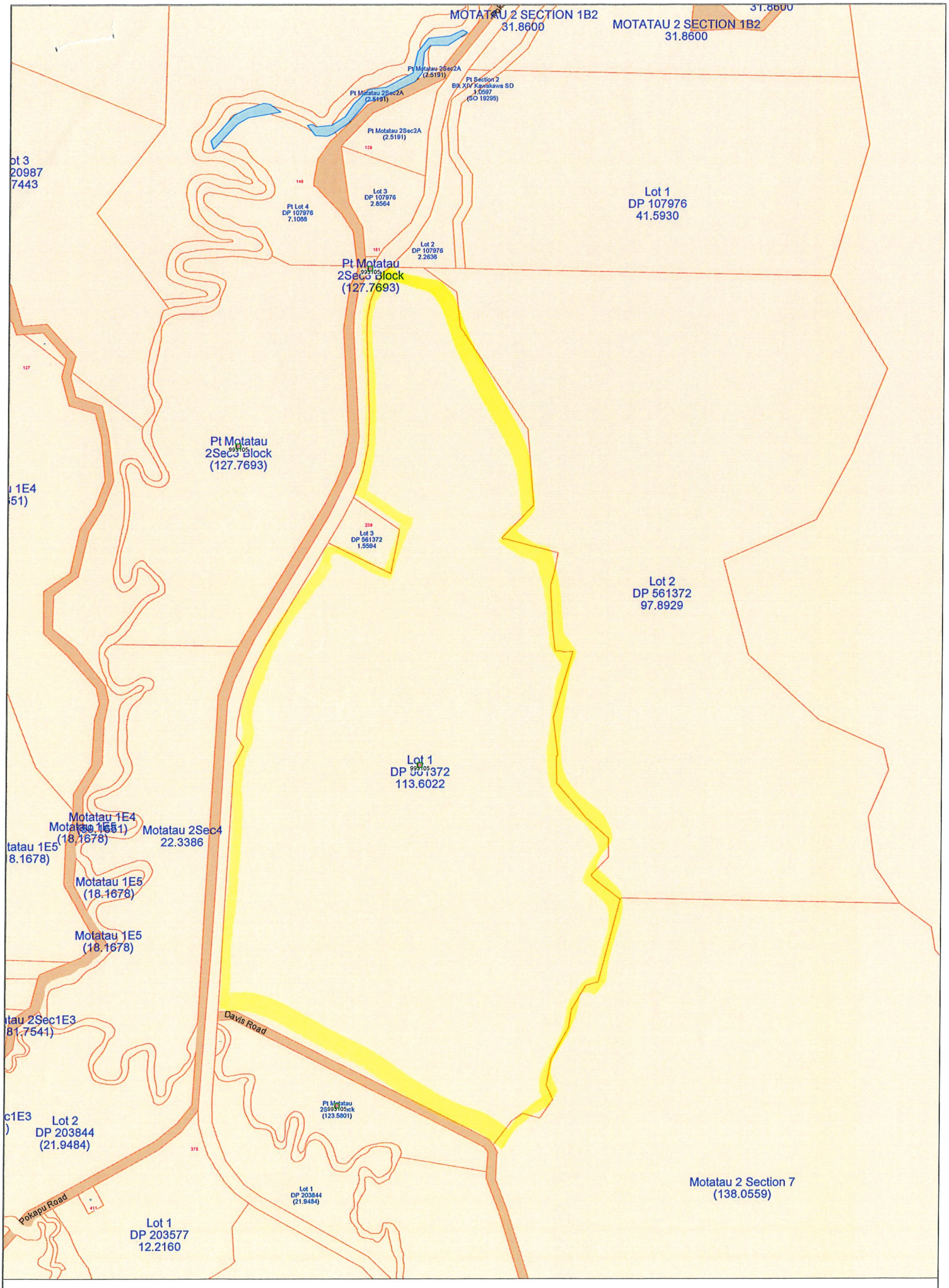
ORIGINAL
SCALE 1:3000
SHEET SIZE A3

Surveyors Ref. No: 10646

Sheet 1 of 1

Appendix 2

Location Plan



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QuickMap
Custom Software Ltd

Any person wishing to rely on the information shown on this map must independently verify the information

Scale 1:11064 Topographical and Cadastral map derived from LINZ data. Printed: 23-May-2024 01:20.

Appendix 3

Records of Title & Relevant Instruments

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**993105**
Land Registration District	**North Auckland**
Date Issued	10 August 2021

Prior References

NA1504/74 NA1999/44

Estate	Fee Simple
Area	156.0977 hectares more or less
Legal Description	Lot 1 Deposited Plan 561372 and Part Motatau 2Sec3 Block and Part Motatau 2Sec5 Block

Registered Owners

Stephen Stewart Herries, Nicholas Andrew Herries, Matthew Benjamin Herries and Kate Ashley Herries

Interests

Subject to Section 241(2) Resource Management Act 1991 (affects DP 561372)

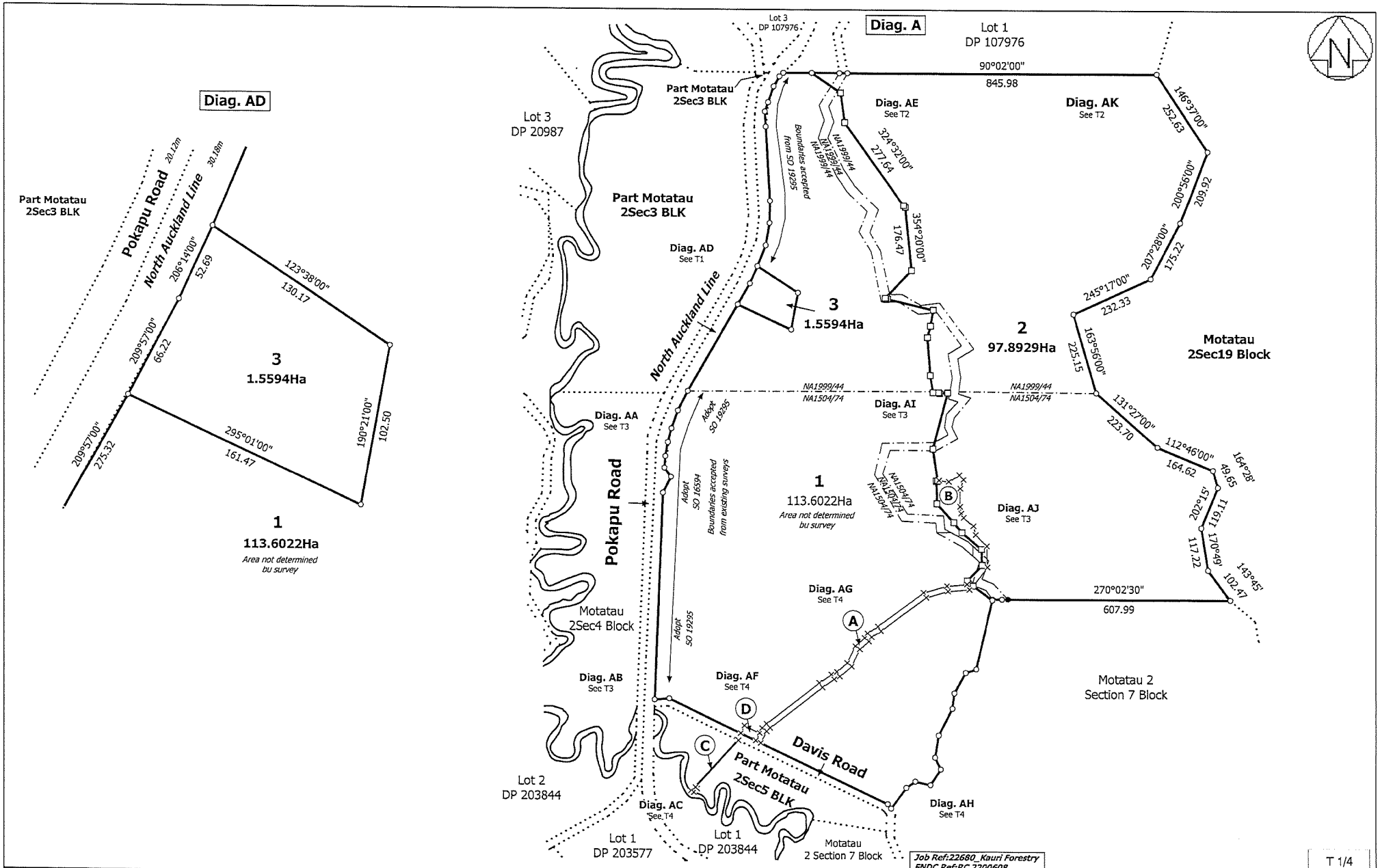
Subject to a right of way over part marked A, a right to convey electricity, telecommunications and water over part Lot 1 DP 561372 marked A and D, and a right to convey electricity, telecommunications and water over part Part Motatau 2Sec5 Block marked C, all on DP 561372 created by Easement Instrument 12197377.4 - 10.8.2021 at 5:11 pm

Appurtenant to Lot 1 DP 561372 is a right of way, a right to convey electricity, telecommunications and water created by Easement Instrument 12197377.4 - 10.8.2021 at 5:11 pm

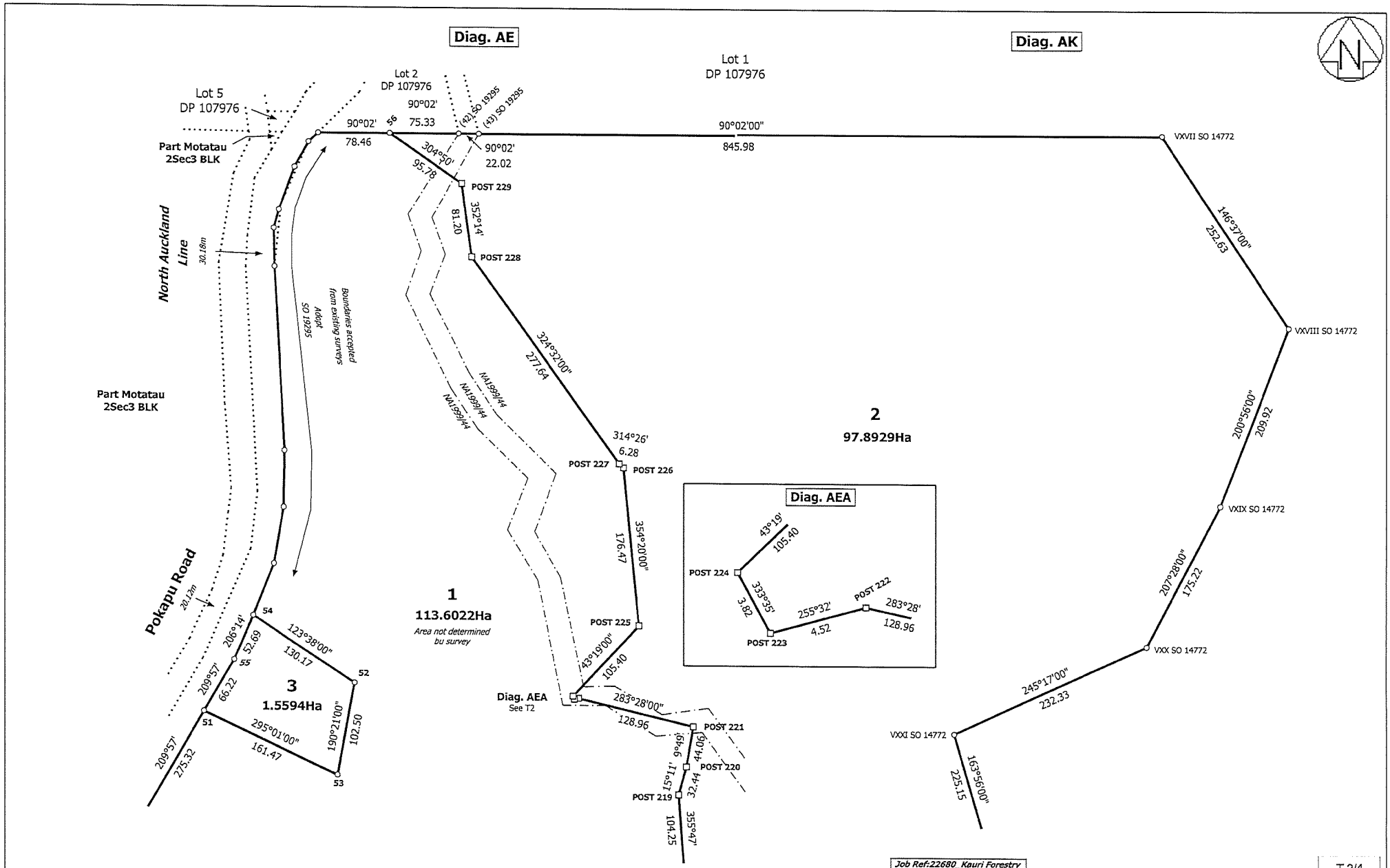
The easements created by Easement Instrument 12197377.4 are subject to Section 243 (a) Resource Management Act 1991

12197377.5 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 10.8.2021 at 5:11 pm (affects Lot 1 DP 561372)

12233150.2 Mortgage to ANZ Bank New Zealand Limited - 15.12.2021 at 4:28 pm



Land District: North Auckland Digitally Generated Plan Generated on: 01/09/2021 10:51 am Page 24 of 27	LOTS 1 - 3 BEING A SUBDIVISION OF PTS SECS I BLK II & III MOTATAU SD, PT SEC 2 BLK XIV KAWAKAWA SD, PTS MOTATAU 2SEC5 Blk, PTS MOTATAU 2SEC3 Blk & EASEMENT OVER PT MOTATAU 2SEC5 Blk	Surveyor: Boon Leong Kam Firm: Survey & Planning Solutions (2010) L Survey Date: 25/01/2021	CSD Plan DP 561372 Deposited on: 10/08/2021



Job Ref:22680_Kauri Forestry
FNDC Ref:RC 2200608

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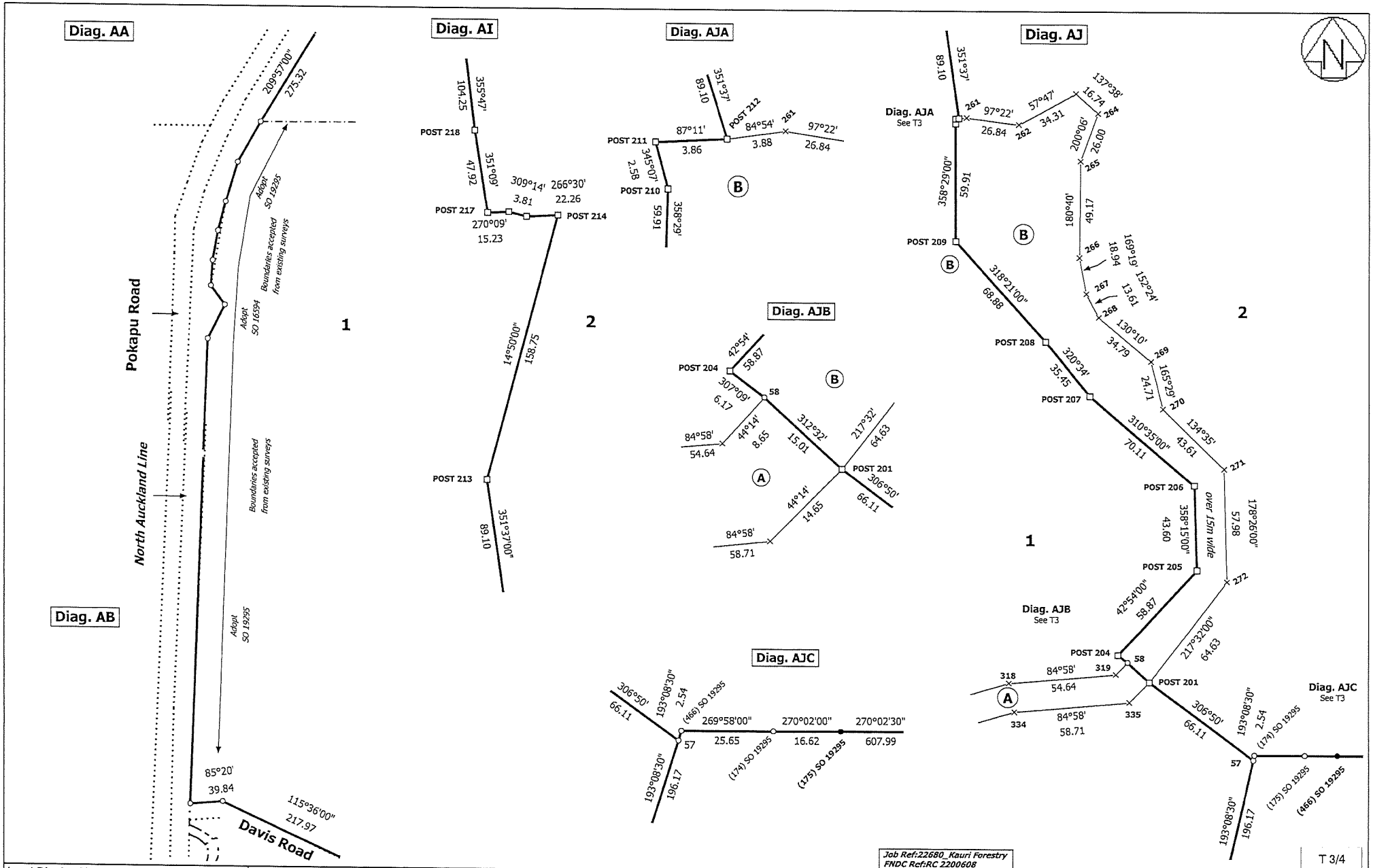
Land District: North Auckland Digitally Generated Plan Generated on: 01/09/2021 10:51 am Page 25 of 27	LOTS 1 - 3 BEING A SUBDIVISION OF PTS SECS I BLK II & III MOTATAU SD, PT SEC 2 BLK XIV KAWAKAWA SD, PTS MOTATAU 2SEC5 Blk, PTS MOTATAU 2SEC3 Blk & EASEMENT OVER PT MOTATAU 2SEC5 Blk	Surveyor: Boon Leong Kam Firm: Survey & Planning Solutions (2010) L Survey Date: 25/01/2021	CSD Plan DP 561372 Deposited on: 10/08/2021



Job Ref:22680_Kauri Forestry
FNDC Ref:RC 2200608

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Land District: North Auckland

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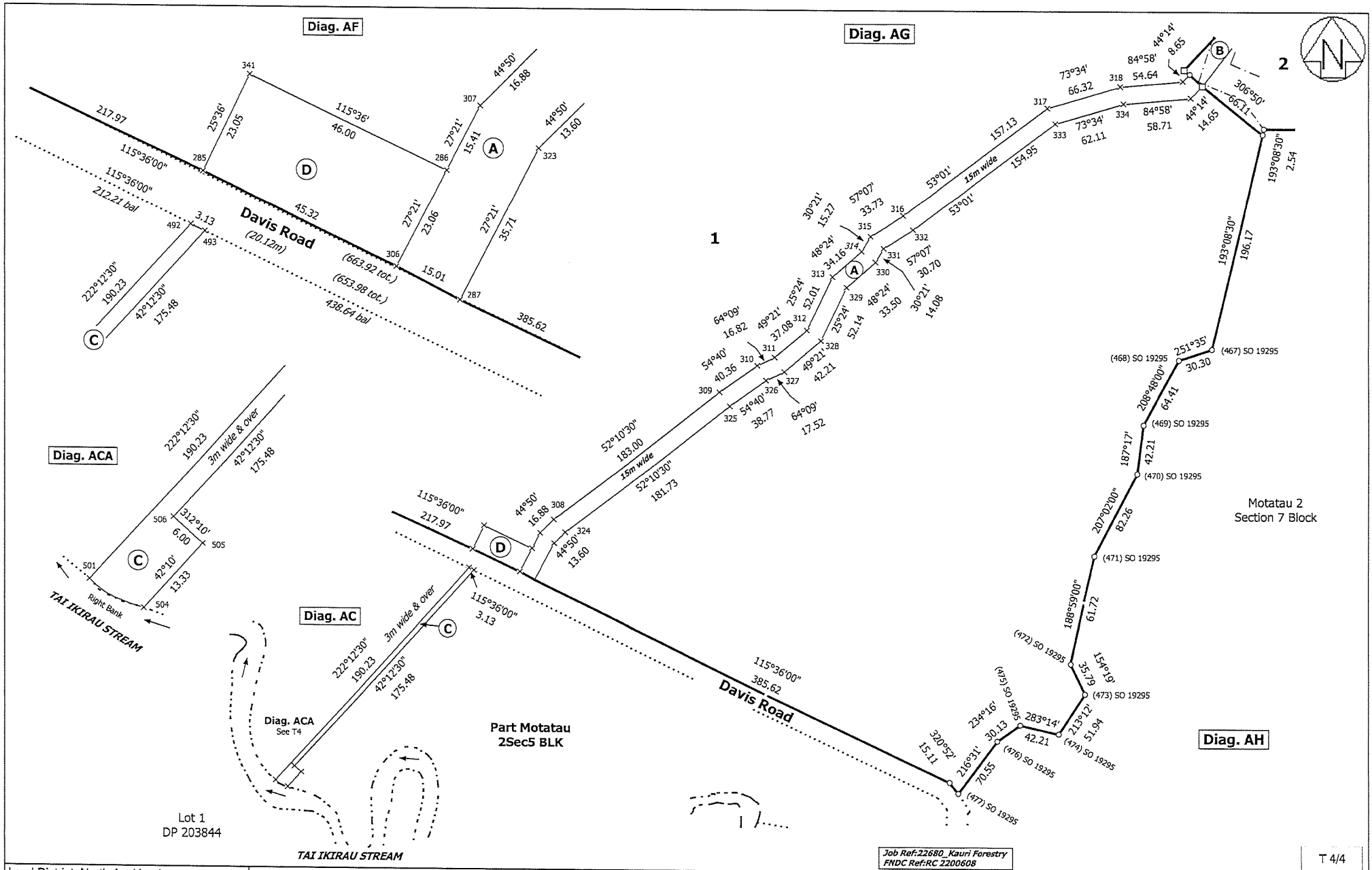
LOTS 1 - 3 BEING A SUBDIVISION OF PTS SECS I BLK II & III MOTATAU SD, PT SEC 2 BLK XIV KAWAKAWA SD, PTS MOTATAU 2SEC5 Blk, PTS MOTATAU 2SEC3 Blk & EASEMENT OVER PT MOTATAU 2SEC5 Blk

Surveyor: Boon Leong Kam
Firm: Survey & Planning Solutions (2010) L
Survey Date: 25/01/2021

CSD Plan
DP 561372

Deposited on: 10/08/2021



Land District: North Auckland

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LOTS 1 - 3 BEING A SUBDIVISION OF PTS SECS I BLK II & III MOTATAU SD, PT SEC 2 BLK XIV KAWAKAWA SD, PTS MOTATAU 2SEC5 Blk, PTS MOTATAU 2SEC3 Blk & EASEMENT OVER PT MOTATAU 2SEC5 Blk

Surveyor: Boon Leong Kam
Firm: Survey & Planning Solutions (2010) L
Survey Date: 25/01/2021

CSD Plan
DP 561372

Deposited on: 10/08/2021

Job Ref:22680_Kauri Forestry
FNDC Ref:RC 2200608

T 4/4

View Instrument Details

Instrument No.	12197377.5
Status	Registered
Date & Time Lodged	10 Aug 2021 17:11
Lodged By	Bertacco, Kelsie Anne
Instrument Type	Consent Notice under s221(4)(a) Resource Management Act 1991

Affected Records of Title	Land District
993105	Nelson

Annexure Schedule Contains 1 Pages.

Signature

Signed by James Eamon Murphy as Territorial Authority Representative on 10/08/2021 05:00 PM

***** End of Report *****

Far North District Council

[illegible]

Te Kaunihera o Tai Tokerau Ki Te Raki

THE RESOURCE MANAGEMENT ACT 1991

SECTION 221: CONSENT NOTICE

REGARDING **RC-2200608-VAR/A**
Being the Subdivision of
Part Motatau 2Sec5 Block;
Part Motatau 2Sec 3 Block; and
Lots 3 and Lot 4 Deposited Plan 107976
North Auckland Registry

PURSUANT to Section 221 and for the purpose of Section 224 (c) (ii) of the Resource Management Act 1991, this Consent Notice is issued by the **FAR NORTH DISTRICT COUNCIL** to the effect that conditions described in the schedule below are to be complied with on a continuing basis by the subdividing owner and the subsequent owners after the deposit of the survey plan, and these are to be registered on the titles of the allotments specified below.

SCHEDULE

(i) Prior to the use of Right of Way easement, A over Lot 1 for harvesting of forestry, the access carriageway over Right of Way easement A shall be upgraded in accordance with the NZ Forest Road Engineering Manual requirements or any other subsequent replacement standard. Prior to the use of Right of Way easement A for forestry purposes the consent holder must provide to the Team Leader Resource Consents or Duly delegated officer written confirmation from a suitably qualified person that the access carriageway upgrade complies with the requirements of the NZ Forest Road Engineering Manual. Should a land use other than forestry be proposed that uses Right of Way easement A, the benefiting party shall provide an access formation in accordance with the appropriate district planning standards at the time of development.

SIGNED: PJ Killalea

Mr Patrick John Killalea - Authorised Officer
By the FAR NORTH DISTRICT COUNCIL
Under delegated authority:
PRINCIPAL PLANNER – RESOURCE MANAGEMENT

DATED at **KERIKERI** this 5th day of August 2021

Appendix 4

Consultation with KiwiRail

Appendix 5

Subdivision Site Suitability Report

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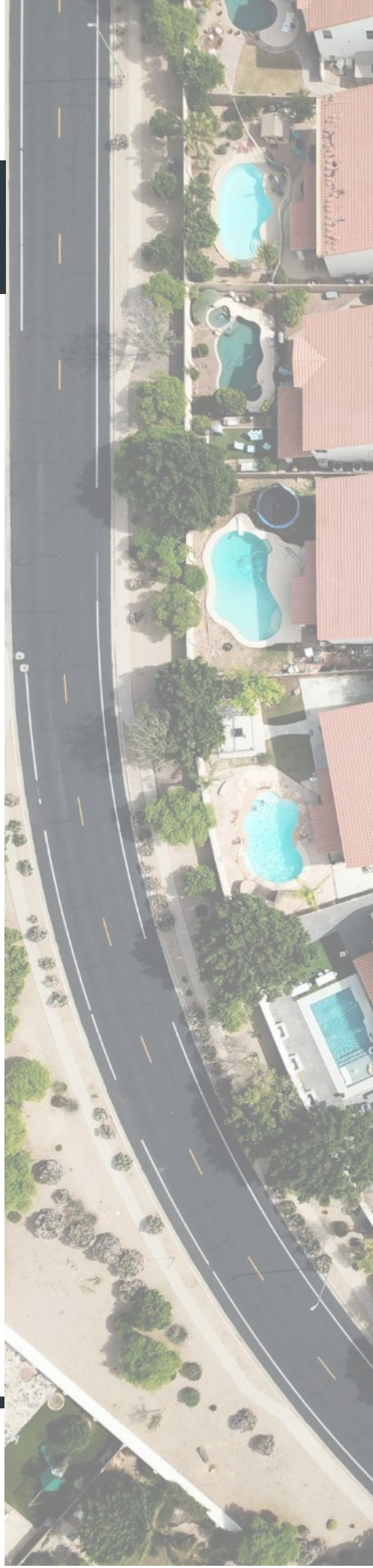
SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

POKAPU ROAD, MOEREWA

STEPHEN HERRIES FAMILY TRUST



C0656N-S-02-R01
NOVEMBER 2025
REVISION 1

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DOCUMENT MANAGEMENT

Document Title	Subdivision Site Suitability Engineering Report
Site Reference	Land off Pokapu Road, Moerewa
Client	Stephen Herries Family Trust
Geologix Reference	C0656N-S-02-R01
Issue Date	November 2025
Revision	01
Prepared	Gerard McHardy Civil Design Engineer, BEng Civil, MEngNZ
Reviewed	 Sebastian Hicks Principal Civil Engineer, CPEng Reg. 1168062, CMEngNZ, IntPE(NZ) /APEC Engineer
Approved	 Edward Collings Managing Director, CEnvP Reg. 0861, CPEng Reg. 1033153, CMEngNZ
File Reference	*Z:\Projects\C0600-C0699\C0656N - Pokapu Road, Moerewa\06 - Reports*

REVISION HISTORY

Date	Issue	Prepared	Reviewed	Approved
November 2025	First Issue	GM	SH	EC

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TABLES

1 INTRODUCTION

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

Our scope of works has been undertaken to assist with Resource Consent application in relation to the proposed subdivision of a rural property (Lot 1 DP 561372) off Pokapu Road, Moerewa, the 'site'. Specifically, this assessment addresses engineering elements of 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.

Refer Figure 1 and 2 for images of the proposed site layout.

1.1 Proposal

A proposed scheme plan was presented to Geologix at the time of writing, prepared by Thomson Survey Ltd[1] and reproduced within Appendix A as Drawing No. 110. It is understood the Client proposes to subdivide the site to create three new lots for future residential use and a rural lot over the balance of the site with a Right of Way (RoW) to facilitate access.

The above is outlined in Table 1. Amendments to the referenced scheme plan may require an update to the recommendations of this report which are based on conservative, typical rural residential development concepts.

Table 1: Summary of Proposed Scheme

Proposed Lots	Size	Purpose
1	4.0025 Ha	New residential
2	4.0240 Ha	New residential
3	4.1470 Ha	New residential
4	113.6022 HA	Balance Lot

Site access will be provided from Pokapu Road at the northwestern corner of the site.

A specific Traffic Impact Assessment (TIA) is outside the scope of this report. Input by a suitably qualified traffic engineer may be required as part of Resource Consent application.

This report is to be read in conjunction with a separately titled Geotechnical Investigation Report, prepared by Geologix, reference C0656N-G-01 revision 1, dated November 2025.

[1] *Thomson Survey Ltd, Scheme Plan Ref.10646, dated August 2024.*

Figure 1: Aerial Image

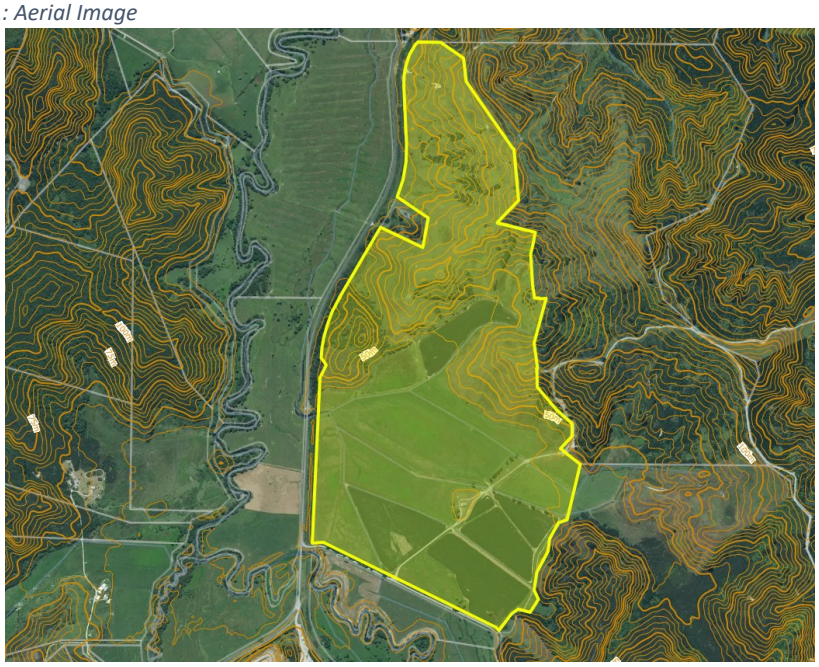
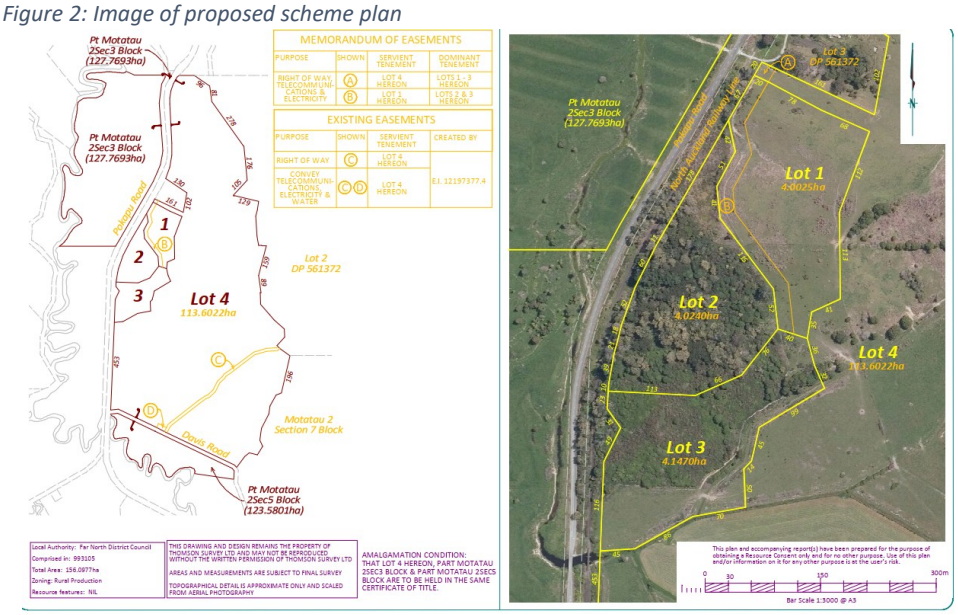


Figure 2: Image of proposed scheme plan



2 DESKTOP APPRAISAL

The site is located to the eastern side of Pokapu Road which has a straight alignment at the position of the vehicle crossing. The North Auckland railway line runs parallel to Pokapu Road on the eastern side. Topographically the site has a moderate to steep-sided hill within the Lot 2-3 area and the Lot 1 area is formed over a moderate to steep west facing slope. The Lot 4 area is moderately to steeply sloping over the northern half of the Lot and generally flat and level over the southern half.

The site is currently mostly in pasture with dense bush and mature trees over the Lot 2 and 3 area. No existing structures or infrastructure are present within the site boundaries. A detailed review of existing watercourses and overland flow paths is presented as Section 3. In brief, the low lying areas of the site are intersected by multiple small ditches, draining westward towards the Kawakawa River on the western side of Pokapu road.

Some existing farm tracks and culvert crossings are present within the site boundaries, roughly in the location of the proposed RoW alignment.

2.1 Existing Reticulated Networks

Far North District Council (FNDC) GIS mapping indicates that no existing 3 water infrastructure or reticulated networks are present within Pokapu Road or the site boundaries. This report has been prepared with the goal of the subdivision being self-sufficient for the purpose of wastewater, stormwater, and potable water management.

2.2 Geological Setting

Available geological mapping[2] indicates the site to be underlain by Whangai Formation in Northland Allochthon parent rock described as Massive to thinly bedded, siliceous mudstone, locally with thin glauconitic sandstone interbeds.

2.3 Existing Geotechnical Information

Existing subdivision and/ or Building Consent ground investigations were not made available to Geologix at the time of writing. Additionally, a review of available GIS databases, including the New Zealand Geotechnical Database[3] did not indicate borehole records within 500 m of the site.

3 SURFACE WATER FEATURES AND OVERLAND FLOWPATHS

During our site walkover and desktop appraisal of the supplied topographic data, Geologix have developed an understanding of the surface water features and overland flow paths influencing the site. The developed understanding summarised in the following sections.

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[2] *Edbrooke, S.E, 2001. Geology of the Auckland area. Institute of Geological & Nuclear Sciences 1:250 000 geological map 3.*

[3] https://www.nzgd.org.nz/

3.1 Surface Water Features

The Kawakawa River lies approximately 200m to the west of Pokapu Road and flows in a northerly direction. Within the site, a series of drainage channels, mostly within the flat low-lying southern half of the proposed Lot 4 and along the southern boundary of Lot 3, flow westwards towards a smaller tributary adjacent to Pokapu Road which connects to the Kawakawa River approximately 1.5km to the north. During our site visit in July, a few days following a period of heavy rain, it was noted that there were areas of ponding within the fields within the flat low-lying southern half of the proposed Lot 4.

Approximately 150m to the south of the existing vehicle crossing, adjacent to Pokapu Road, there is a wetland with some surface water visible during our site visit.

3.2 Sensitive Receptors

Based on GIS data, national topographic maps and confirmed during our site visits, there is an environmentally sensitive wetland within the site, adjacent to Pokapu Road. The approximate wetland extent is shown on our drawings within Appendix A.

3.3 Overland Flow Paths

Within the proposed Lots 1 and 2, there are two broad flow paths formed within wide erosion gullies, flowing westwards towards the wetland adjacent to Pokapu Road.

Elsewhere on the site, across the slopes, similar overland flowpaths are formed within broad erosion gullies, generally flowing westwards towards Pokapu Road.

Our walkover survey was undertaken in a wet period in July and no flow was observed through the overland flow paths.

3.4 Mapped Flood Hazard

The Northland Regional Council GIS indicates mapped river flood hazard zones (regionwide model) within the site, around the Kawakawa River. The extent of the river flood hazard is extensive, covering low-lying land either side of the river.

Refer to Figure 3 below showing the flood extent.

Figure 3: NRC Mapped River Flood Hazard Extents

The proposed building envelopes will be positioned at a sufficient distance (more than 10m) from any stream and overland flow path (OLFP) channel. This placement of the subdivision's structures and impervious areas and the provided stormwater attenuation measures (refer Section 5.4) are such that the proposed development is unlikely to significantly impact or exacerbate flooding risks for properties located downstream.

4 WASTEWATER ASSESSMENT

The scope of this wastewater assessment comprised a ground investigation to ascertain a lot-specific wastewater disposal classification for concept design of suitable systems for a probable future rural residential development. Relevant design guideline documents adopted include:

- Auckland Council, Technical Publication 58, On-site Wastewater Systems: Design and Management Manual, 2004.
- NZS1547:2012, On-site Domestic Wastewater Management.

The concept rural residential developments within this report assumes that the proposed new lot may comprise up to a five-bedroom dwelling with a peak occupancy of eight people[4]. This considers the uncertainty of potential future Building Consent designs. The number of usable bedrooms within a residential dwelling must consider that proposed

[4] *TP58 Table 6.1.*

offices, studies, gyms or other similar spaces maybe considered a potential bedroom by the Consent Authority.

4.1 Existing Wastewater Systems

No existing wastewater treatment or disposal systems have been identified or surveyed within the site boundaries.

4.2 Wastewater Generation Volume

In lieu of potable water infrastructure servicing the site, roof rainwater collection within on-lot tanks has been assumed for this assessment. The design water volume for roof water tank supply is estimated at 160 litres/ person/ day[5]. This assumes standard water saving fixtures[6] being installed within the proposed future developments. This should be reviewed for each proposed lot at the Building Consent stage.

For the concept wastewater design this provides a total daily wastewater generation of 1,280litres/ day per proposed lot.

4.3 Treatment System

Selection of a wastewater treatment system will be provided by future developers at Building Consent stage. This will be a function of a refined design peak occupancy.

It is recommended within the concept solution provided that to meet suitable minimum treated effluent output, secondary treatment systems are accounted for across the site. The concept solution is detailed further in the following sections.

In the Building Consent design phase, a higher treated effluent output standard such as UV disinfection to tertiary quality may be required should specifically controlled zones such as the prescribed offsets of this report are encroached upon. Moreover, a primary treatment solution may also be considered for the Lot development, provided that the system complies with the proposed Northland Regional Plan. Specifically, controlling rules include:

- Rule C.6.1.3 (6), discharge of wastewater from primary systems is to slopes less than 10°.
- Rule C.6.1.3 (9.a), 100 % reserve disposal area where the wastewater has received primary treatment.
- Table 9, exclusion areas and setback distances for primary treated domestic type wastewater.

No specific treatment system design restrictions and manufacturers are currently in place. However, the developer will be required to specify the treatment system proposed at Building Consent.

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[5] TP58 Table 6.2, AS/ NZS 1547:2012 Table H3.

[6] Low water consumption dishwashers and no garbage grinders.

4.4 Land Disposal System

To provide even distribution, evapotranspiration assistance and to minimise effluent runoff it is recommended that treated effluent is conveyed to land disposal via Pressure Compensating Dripper Irrigation (PCDI) systems, a commonplace method of wastewater disposal.

The proposed PCDI systems may be surface laid and covered with minimum 150 mm mulch and planted with specific evapotranspiration species with a minimum of 80 % species canopy cover or subsurface laid to topsoil with minimum 200 mm thickness and planted with lawn grass. Site-won topsoil during development from building and/ or driveways footprints may be used in the area of land disposal systems to increase minimum thicknesses. Specific requirements of the land disposal system include the following which have been complied with for this report.

Table 2: Disposal Field Design Criteria

Design Criteria	Site Conditions
Topography at the disposal areas shall not exceed 25°. Exceedances will require a Discharge Consent.	Concept design complies
On shallower slopes >10 ° compliance with Northland Regional Plan (NRP) rule C.6.1.3(6) is required.	Concept design does not comply, disposal fields sited on slopes >10 °. Provide cut-off drains above field
On all terrain irrigation lines should be laid along contours.	Concept design complies
Disposal system situated no closer than 600 mm (vertically) from the winter groundwater table (secondary treated effluent).	Concept design complies
Separation from surface water features such as stormwater flow paths (including road and kerb channels), rivers, lakes, ponds, dams, and natural wetlands according to Table 9, Appendix B of the NRP.	Concept design complies

4.4.1 Soil Loading Rate

Based on the results of the ground investigation, conservatively the shallow soils are inferred to meet the drainage characteristics of TP58 Category 6, sandy clay, non-swelling clay and silty clay – slowly draining. This correlates to NZS1547 Category 5, poorly drained described as light clays. For a typical PCDI system, a Soil Loading Rate (SLR) of 2-3 mm/ day is recommended within NZS1547 Table 5.2 and TP58 Table 9.2.

To achieve the above SLR, technical guidance documents require the following compliance within the final design.

- 100 to 150 mm minimum depth of good quality topsoil (NZS1547 Table M1, note 1) to slow the soakage and assist with nutrient reduction.
- Minimum 50 % reserve disposal field area (TP58 Table 9.2, note 3) to adopt 3 mm/day, rather than 2mm/day SLR.

The proposed concept design adopts 3.0mm /day SLR, utilising a 50% reserve disposal field area.

4.4.2 *Disposal Areas*

The sizing of wastewater system disposal areas is a function of soil drainage, the loading rate and topographic relief. For each proposed lot, a primary and reserve disposal field is required as follows. The recommendations below are presented on Drawing No. 100.

- **Primary Disposal Field.** A minimum PCDI primary disposal field of 427 m^2 laid parallel to the natural contours.
- **Reserve Disposal Field.** NRP rule C.6.1.3(9)(b) requires a minimum reserve disposal field equivalent to 30 % of the primary disposal field for secondary or tertiary treatment systems. As discussed above in Section 4.4.1, the proposed concept design presents a 50% reserve disposal field area. Therefore, each proposed lot provides a 214 m^2 reserve disposal area to be laid parallel to the natural contours.
- Disposal fields discharging secondary treated effluent are to be set at the 20-year ARI (5 % AEP) flood inundation height to comply with the above NRP rule. Flood hazard potential has been identified within the site boundaries. The proposed disposal fields are elevated well above any flood hazard and as such site can provide freeboard above the 1% AEP flood height to comply with this rule.

4.5 Summary of Concept Wastewater Design

Based on the above design assumptions a concept wastewater design is presented as Table 3 and presented schematically upon Drawing Nos. 131 and 132. It is recommended that each lot is subject to Building Consent specific review and design amendment according to final development plans.

Table 3: Concept Wastewater Design Summary

Design Element	Specification
Concept development	Five-bedroom, peak occupancy of 8 (per lot)
Design generation volume	160 litres/ person/ day
Water saving measures	Standard. Combined use of 11 litre flush cisterns, automatic washing machine & dishwasher, no garbage grinder[1]
Water meter required?	No
Min. Treatment Quality	Secondary
Soil Drainage Category	TP58 Category 7, NZS1547 Category 6
Soil Loading Rate	3 mm/ day
Primary disposal field	Surface/ subsurface laid PCDI, min. 427 m^2
Reserve disposal field	Surface/ subsurface laid PCDI, min. 50 % or 214 m^2
Dosing Method	Pump with high water level visual and audible alarm. Minimum 24-hour emergency storage volume.
Stormwater Control	Divert surface/ stormwater drains away from disposal fields. Cut off drains are required. Stormwater management discharges away from all disposal fields.

1. *Unless further water saving measures are included.*

4.6 Assessment of Environmental Effects

An Assessment of Environmental Effects (AEE) is required to address two aspects of wastewater disposal. These include the effect of treated wastewater disposal for an

individual lot and the cumulative or combined effect of multiple lots discharging treated wastewater to land as a result of subdivision.

The scale of final development is unknown at the time of writing and building areas, impervious areas including driveways, ancillary buildings, landscaped gardens, and swimming pools may reduce the overall area for on-site wastewater disposal. For the purpose of this report the above features are likely to be included within a designated 30 x 30 m square building site area as required by FNDC District Plan Rule 13.7.2.2.

It is recommended that the AEE is reviewed at the time of Building Consent once specific development plans, final disposal field locations and treatment systems are established. The TP58 guideline document provides a detailed AEE for Building Consent application. Based on the proposed scheme, ground investigation and walkover inspection, a site-specific AEE is presented as Appendix C to demonstrate the proposed wastewater disposal concept will have a less than minor effect on the environment.

5 STORMWATER ASSESSMENT

Considering the nature of rural subdivision and residential development, increased storm water runoff occurs as pervious surfaces such as pasture are converted to impervious features such as roads or future on-lot buildings and driveways.

5.1 Impervious Surfaces and Activity Status

The site is within the Rural Production Zone, the relevant permitted activity rule for impermeable surfaces is as follows:

8.6.5.1.3 STORMWATER MANAGEMENT

The maximum proportion of the gross site area covered by buildings and other impermeable surfaces shall be 15%.

The permitted activity rules of the Far North District Plan allow for up to 15% impermeable surfaces in the Rural Production Zone. Whilst built development within the new rural lots following subdivision will result in an increase in impermeable surfaces from the existing coverage, it is highly unlikely to exceed the 15% permitted activity threshold, which would equate to approximately 6,000 m^2 per site, even taking into account ROW coverage within specific lots.

It is anticipated that houses when they are built, a typical lot without a right of way (ROW) may have 300m^2 of roof area and 200m^2 of impervious driveway area once the site is developed.

Overall, each lot impermeable surfaces (including rights of way) on the rural-residential lots is estimated to be around 1% of the lot area.

Regional Plan rules require the avoidance or mitigation of any adverse effects of stormwater runoff on receiving environments, including downstream properties. To achieve this objective, it is proposed to attenuate stormwater runoff from the site to pre-development levels.

5.2 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.** The proposed application includes subdivision formation only and not lot-specific residential development at this stage. However, a conservative model of probable future on-lot development has been developed for this assessment considering variation of scale in typical rural residential development. The probable future on-lot development concept includes up to 300 m^2 potential roof area and up to 200 m^2 potential driveway or parking areas. The latter has been modelled as an offset within lot-specific attenuation devices.
- **Subdivision Development.** The new RoW will be an unsealed metal roadway. Runoff from this new impervious area will be collected in lined channels parallel to the road edge. The channels will convey runoff to a proposed stormwater attenuation pond then discharge to the wetland adjacent to Pokapu Road, with suitable energy dissipation inlets/outlets to mitigate against erosion and scour. Areas of RoW which cannot be directed to the proposed stormwater pond are accounted for as an offset within the stormwater pond.

  Due to the receiving sensitive wetland water feature, stormwater quality improvement devices have been accounted for in accordance with relevant guideline documents, refer details herein.

5.3 Design Storm Event

Noting the risk of flood hazard downstream of the site as discussed in Section 3.4, this assessment has been modelled to provide stormwater attenuation up to and including 80 % of the pre-development condition for the 1 % AEP storm event which is recommended for the site including any future activities to comply with FNDC Engineering Standard Table 4-1.

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model[7]. 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, in accordance with FNDC Engineering Standards 2023[8].

5.4 Probable Future Development Management

The proposed impermeable surfaces will increase peak stormwater runoff from the lots. It is proposed to provide stormwater detention tanks for up to 500 m^2 impermeable surfaces (excluding any right of way) in each lot.

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[7] NIWA High Intensity Rainfall Data System, https://hirds.niwa.co.nz.

[8] FNDC Engineering Standards 2021, Version 0.6, Issued May 2023.

The conceptual proposed tanks are above-ground and these tanks will receive the runoff from the roof only. The driveway runoff is not proposed to flow into the tanks. Instead, the tanks will over-attenuate the roof runoff to offset the driveway runoff. In this manner, the attenuation capacity of the tanks will be sufficient to mitigate the proposed on-lot impermeable surfaces (roof and driveway) such that post-development peak discharge is limited to 80 % of the pre-development condition for the 20 %, 50 % and 1% AEP storm event. This is achievable by installing specifically sized low-flow orifices into the attenuation devices. The balance of the tank storage will be used as retention for water supply.

A summary of the probable future lot development concept design is presented as Table 4, with a specific summary of the roof tanks concept provided in Table 5. The attenuation modelling within this report has been undertaken and provided in full in Appendix D.

Table 4: Summary of Probable Future Development Concept

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
Future Concept Development – Lot 1-3, excluding Lot 4			
Potential buildings	0 m^2	300 m^2	Detention within roof water tanks
Potential driveways	0 m^2	200 m^2	Off-set detention in roof water tanks
Total	**0 m^2**	**500 m^2**	

Table 5: Probable Future Development Attenuation Concept – Roof Tanks

Design Parameter	Flow Attenuation: 50 % AEP (80% of pre dev)	Flow Attenuation: 20 % AEP (80% of pre dev)	Flood Attenuation: 1 % AEP (80% of pre dev)
Proposed Development			
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1
Pre-development peak flow	6.50 l/s	8.41 l/s	14.52 l/s
80 % pre-development peak flow	5.20 l/s	6.73 l/s	11.61 l/s
Post-development peak flow	9.67 l/s	12.51 l/s	21.58 l/s
Total Storage Volume Required	3,766 litres	4,956 litres	8,809 litres
Concept Summary:	- Attenuation storage calculation accounts for offset flow from driveway (not indicated explicitly in summary above. Refer Appendix D for calcs in full) - Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage. - 2 x 25,000 litre tank is sufficient for attenuation (8,809 litres) + potable storage (41,191 litres) - 1 % AEP attenuation in isolation requires a 55 mm orifice 0.57 m below overflow. However regulatory requirements are to consider an additional orifices to control the 20% and 50%. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.		

If proposed impermeable surfaces in a future development are greater than the proposed Lot impervious area (500m^2), additional stormwater attenuation will be required for the area of impermeable surfaces in excess of that allowed for.

If a future development has a large area of pavement in comparison to roof area, it may not be possible to attenuate total runoff to 80% of pre-development flows by detaining roof runoff alone. In this case, a combination of stormwater dual purpose tank and underground detention tank/soakage trench might be necessary.

5.4.1 On-Lot Discharge

The direct discharge of water tank overflow in a concentrated manner can cause scour and erosion in addition to excessive saturation of shallow soils. It is recommended that overflow from rainwater detention tanks is conveyed in sealed pipes to a designated discharge point downslope of proposed building footprints and wastewater disposal fields. 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 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 as Table 6. Calculations to derive this are presented within Appendix D, based on the NIWA HIRDS Depth-Duration data. Typical details of these options are presented within Appendix A as Drawing No. 152.

Table 6: Summary of Concept Dispersion Devices

Concept Impervious Area to Tank	Tank Outlet Velocity	Dispersion Pipe/ Trench Length	Concept
500 m^2	0.75 m/s	10 m	Above ground dispersion device or in-ground dispersion trench.

5.5 Stormwater Pond

Stormwater management in rural areas often employs detention basins or ponds to control runoff. Detention ponds are typically dry, except during rainfall events, and quickly increase in depth during storm events.

A detention pond will provide sufficient storage to suit the design storms referred to in Section 5.3. The pond is proposed to collect runoff from common accessway (ROW) impervious area as far as possible. Any runoff that cannot be conveyed to the ponds, will have an equivalent offset provided within the ponds' detention storage.

The concept pond shall have 1V:3H side slopes (minimum), be grass lined only, and have an outlet manhole structure. The outlet structure shall comprise specifically sized orifice inlets to suit the constraints of the design storms, a scruffy dome lid for overflow, and a suitably sized pipe culvert outlet that must not be smaller than the inlet pipe (or any

combination of inlet pipes). Furthermore, the ponds must have an emergency spillway structure.

The concept has presented a suitability sized pond to manage the 1% AEP design storm only. It has not undertaken the detailed analysis to accommodate the lesser design storms, but this shall be required in detailed design. The effect of the multi-storm design will likely increase the overall storage requirement of the pond but not significantly. Similarly, the detailed design process shall aim to provide optimisations of the ponds to suit topographical survey and final design constraints, which may yield alternative parameters from the pond concept, including different shape, footprint and storage capacities.

Considering the above limitations of the concept pond design, the selected pond dimensions are considered to be conservative for feasibility assessment, particularly with respect to hydraulic function and earthworks requirements.

The conceptual design parameters for the pond are summarised in table below.

Table 7: Subdivision Development Attenuation Concept – Ponds

Design Parameter	Pond
Regulatory Compliance	FNDC Engineering Standards Table 4-1
Pre-development peak flow (1% AEP)	81.87 l/s
80 % pre-development peak flow (1% AEP)	65.50 l/s
Post-development peak flow (1% AEP)	121.71 l/s
Total Storage Volume (1% AEP) Required	50.764 m^3
Total Storage Volume (1% AEP) Provided	51.00 m^3 (at m depth)
Orifice Ø (1% AEP)	103 mm
Concept Summary:	- Attenuation storage calculation accounts for offset flows where impervious area runoff cannot be directed to the ponds (not indicated explicitly indicated in summary above. Refer Appendix D for calcs in full) - Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design pond storage. - The pond is to have 0.15m retention depth above base - Pond sized with 1V:1H side slopes - Pond sized with 300mm deep spillway, positioned 100mm above top of outlet manhole

	- 1 % AEP attenuation (in isolation) requires above orifice diameters. 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 approval.

5.6 Subdivision Development Management

All stormwater conveyance devices must be suitably sized to accommodate peak run-off flows from the design storm event. Stormwater conveyance to be constructed at the time of subdivision formation is proposed to include:

- RoWs formed with a 4 % single cross fall towards downslope.
- Grassed swale drains formed along each RoW face with check dams on sloping terrain to improve stormwater quality.
- RCP culverts formed where RoWs cross drainage channels, suitably sized as outlined by this report to accommodate peak run-off flows for the design storm event from the upstream catchment.
- Grassed swale drains shall be constructed along the entire length of the RoW to manage sheet flows and to act as stormwater quality improvement devices. Due to the surrounding sensitive environments, all grassed swale drains shall be installed with specifically sized check dames to reduce flows and improve stormwater output quality.

The above measures are indicated, where applicable on the drawing set included within Appendix A.

5.7 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. However, additional measures of stormwater filtration have been adopted due to the proximity to sensitive surface water receptors. 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 according to Auckland Council GD01) within the base of the stormwater attenuation pond and 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.
- All grassed swales with check dams to increase stormwater quality subject to specific engineering design.
- Measures as recommended by the appointed ecologist or landscape architect for improving sensitive areas.

The above measures have been determined to avoid disturbance of ground within 10 m of identified wetlands on the proposed scheme plan supplied to us.

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.

6 POTABLE WATER & FIRE FIGHTING

In the absence of potable water infrastructure within Pokapu Road or within the site it is recommended that roof runoff water tanks are adopted for potable water supply with appropriate filtration and UV disinfection at point of use. The volume of potable water supply on each lot should consider the required stormwater detention volume identified within Table 5.

Furthermore, the absence of potable water infrastructure and fire hydrants within Pokapu Road require provision of the on-lot roof water supply tanks to be used for firefighting purposes, if required. Specific analysis and calculation for firefighting is outside the scope of this report and may require specialist input. Supply for firefighting should be made in accordance with SNZ PAS4509:2008.

7 EARTHWORKS

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

- **Internal Roading.** Cut/ fill earthworks are required to form the proposed RoW within the site boundaries.

The proposed disturbance activities have been modelled with 3d design by Geologix. Proposed earthwork volumes are summarised below within Table 8and on Drawing No. 130 within Appendix A.

Table 8: Summary of Proposed Earthwork Volumes

Activity	Proposed Volume	Net	Max. Height
Right of Way			
Cut	4,820 m^3	4,512 m^3	3.5 m
Fill	308 m^3		1.5 m
Total	**5,128 m^3**	**4,512 m^3 cut**	

Proposed earthwork volumes exceed the 5,000 m^3 Permitted Activity volume limit outlined by FNDC District Plan Rule 12.3.6.1.1(a). There are continuous cut or fill faces that exceed an average of 1.5m in height, which does not comply with 12.3.6.1.1(b). It is recommended that specific engineering design, as a condition of consent is undertaken of all roading, earthwork batters and filling in regard to geotechnical stability.

Rule C.8.3.1, Table 13 of the Proposed Regional Plan outlines a Permitted Activity as 5,000 m^2 of exposed earth at any time for 'other areas'. Considering the lengths of roads within the proposed subdivision, with a controlled construction staging, compliance is not achievable with this rule.

Proposed earthwork areas to form the subdivision are anticipated to comply with the Controlled Activity standard for other areas as described by Rule C.8.3.2.

7.1 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.

Due to the topography of the site, significant excavations are not anticipated. However, to reduce the risk of instability of excavations during construction, it is recommended that **temporary** unsupported excavations have a maximum vertical height of 1.0 m. Excavations >1.0 m should be battered at 1V:1H or 45 °. Permanent batter slopes may require a shallower angle to maintain long term stability and if proposed these should be assessed at the Building Consent stage within a specific geotechnical investigation report.

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.

7.2 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. Geologix have prepared a site-specific erosion and sediment control plan, presented within Appendix A as Drawing No. 200 with accompanying details. This drawing has been prepared in general accordance with Auckland Council GD05[9] and with additional measures to

[9] *Auckland Council Guideline Document 2016/005, Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016, Incorporating Amendment 2.*

specifically protect sensitive environmental receptors within close proximity to the earthworks area. Preliminary erosion and sediment control measures are summarised as follows which should be confirmed during detailed design:

- Stabilised entrances formed at the proposed RoW intersection with Pokapu Road.
- Super silt fences installed along perimeter faces of earthworks RoW alignments and downslope of culvert crossings to be constructed.
- Clean water diversion above earthwork area to divert the upslope catchment.
- Temporary diversion of existing overland flow paths, i.e. drainage ditches around culvert crossings during the construction period.

8 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[10], Northland Regional Council (NRC) Proposed Regional Plan for Northland[11] 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 9.

Table 9: Summary of Natural Hazards

Natural Hazard	Applicability	Mitigation & Effect on Environment
Erosion	NA	No mitigation required, less than minor.
Overland flow paths, flooding, inundation	YES	Mitigation provided by on-lot SW detention tanks and SW pond for the RoW, up to the 1% AEP event..
Landslip	NA	No mitigation required, less than minor with provision for localised retaining, subject to specific engineering design.
Rockfall	NA	No mitigation required, less than minor.
Alluvion	NA	No mitigation required, less than minor.
Avulsion	NA	No mitigation required, less than minor.
Unconsolidated fill	NA	No mitigation required, less than minor.
Soil contamination	NA	No mitigation required, less than minor.
Subsidence	NA	No mitigation required, less than minor.
Fire hazard	NA	No mitigation required, less than minor.
Sea level rise	NA	No mitigation required, less than minor.

NA – Not Applicable.

9 LIMITATIONS

This report has been prepared for Stephen Herries Family Trust as our Client. 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

[10] *Operative District Plan Rule 13.7.3.2.*
[11] *Proposed Regional Plan for Northland, Appeals Version, July 2021, Chapter D.6.*

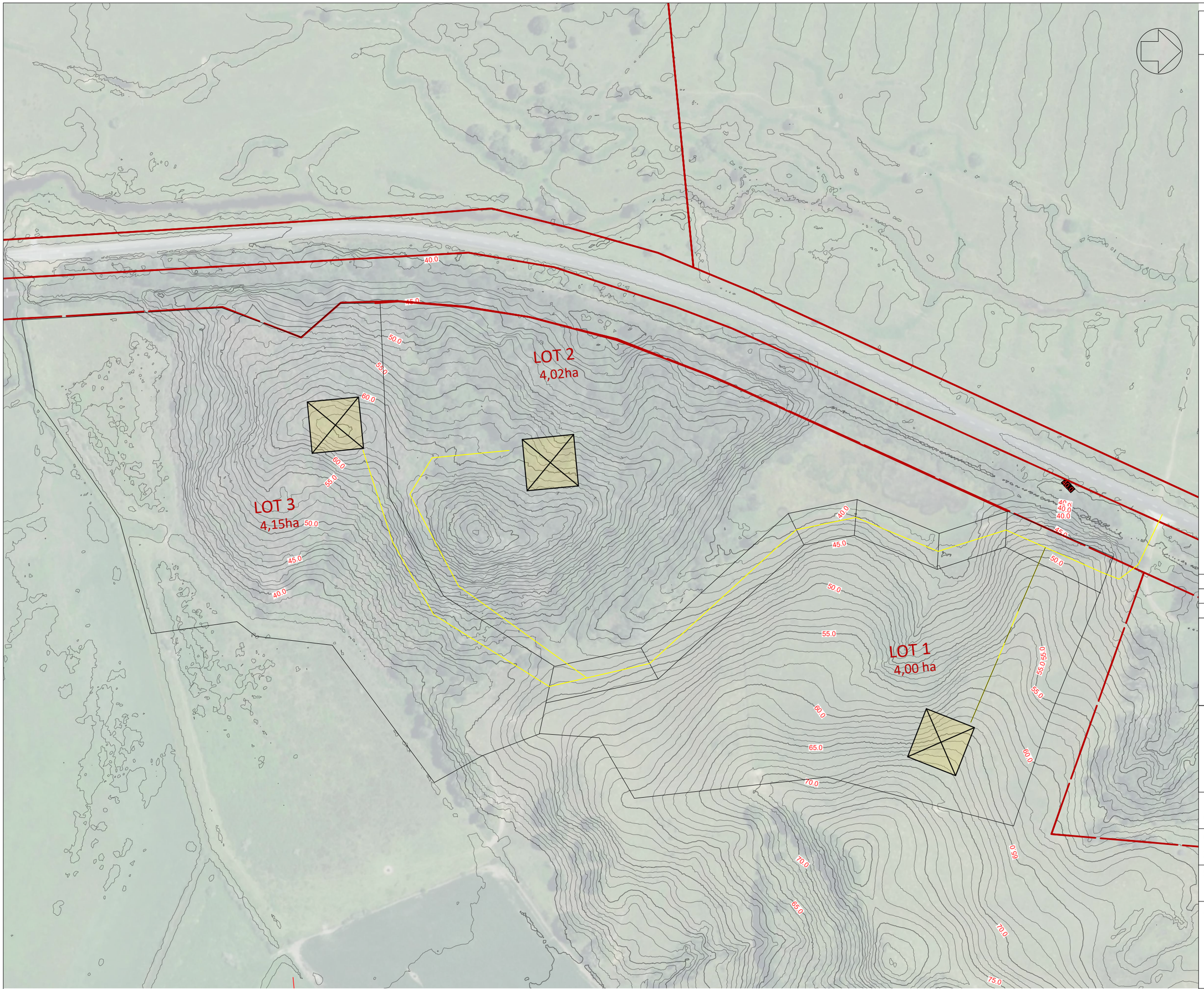
associated recommendations, conclusions or intellectual property is not to be relied upon by any other party for any purpose unless agreed in writing by Geologix Consulting Engineers Ltd and our Client. In any case the reliance by any other party for any other purpose shall be at such parties' sole risk 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.

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.

APPENDIX A

Drawings



GENERAL NOTES

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Sheet Title

PROPOSED SCHEME PLAN

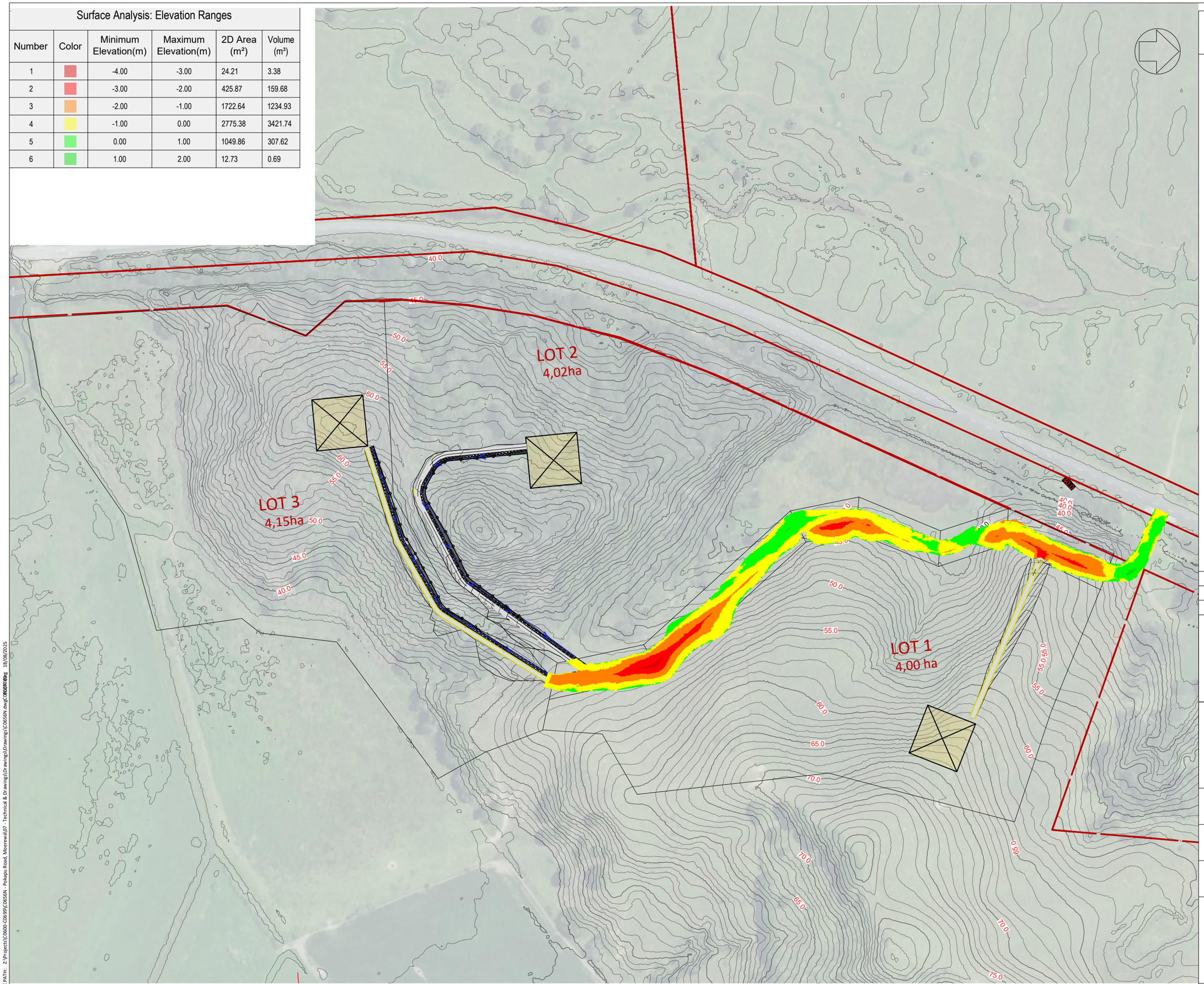
Sheet

110

PLOTTED: 18/08/2025

Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation(m)	Maximum Elevation(m)	2D Area (m²)	Volume (m³)
1		-4.00	-3.00	24.21	3.38
2		-3.00	-2.00	425.87	159.68
3		-2.00	-1.00	1722.64	1234.93
4		-1.00	0.00	2775.38	3421.74
5		0.00	1.00	1049.86	307.62
6		1.00	2.00	12.73	0.69



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EARTHWORK QUANTITIES

SUBGRADE SURFACE COMPARED TO 200mm STRIPPED SOIL

STAGE & ACTIVITY	VOLUME	NET
STAGE 2 CUT	4,820 m³	4,512 m³ FILL
STAGE 2 FILL	308 m³	

TOTAL EARTHWORKS AREA - 6,011 m²

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EARTHWORKS PLAN

Sheet

130

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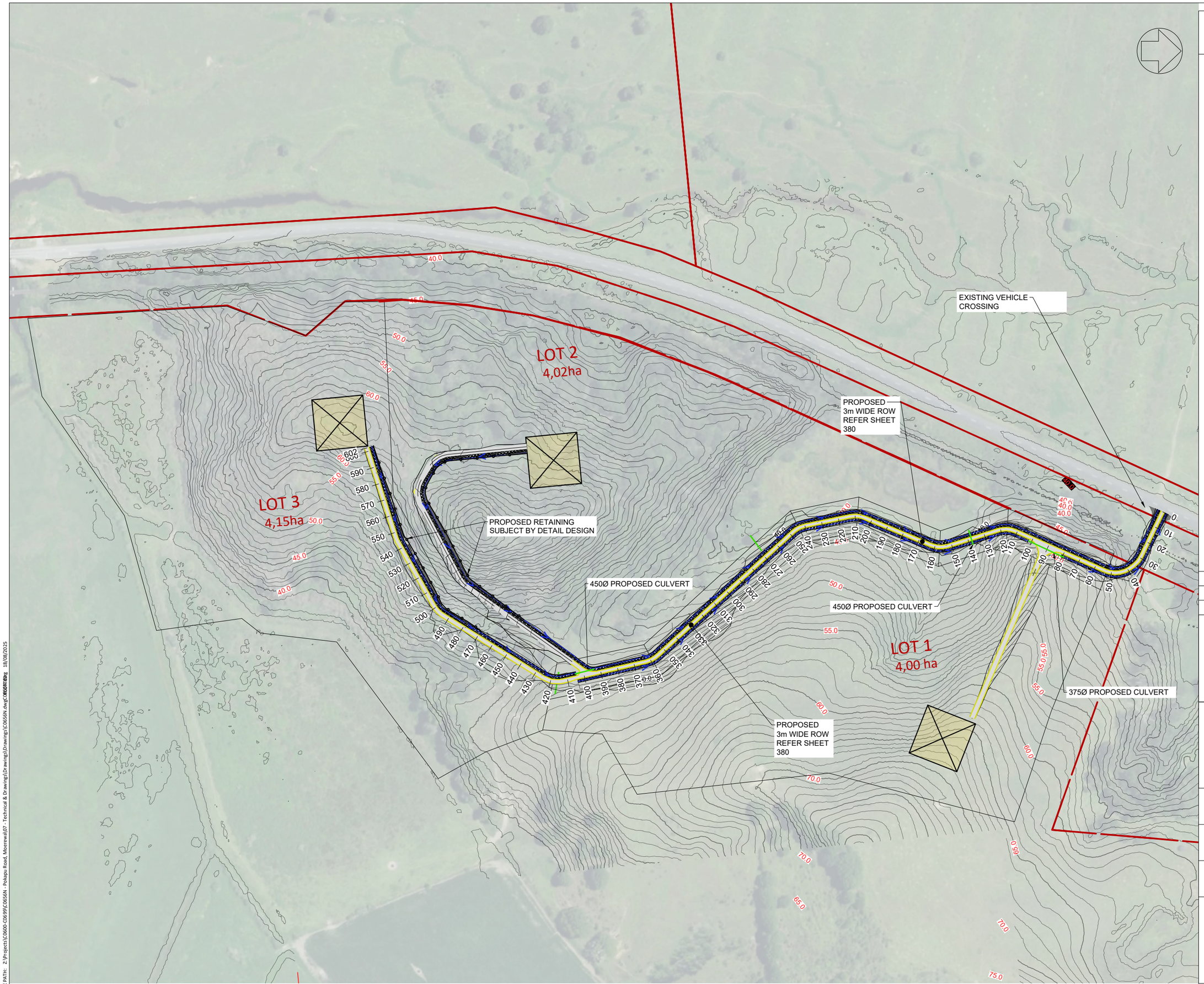

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CULVERT PIPE

SWALE DRAWING

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PROPOSED ROW PLAN

Sheet

300

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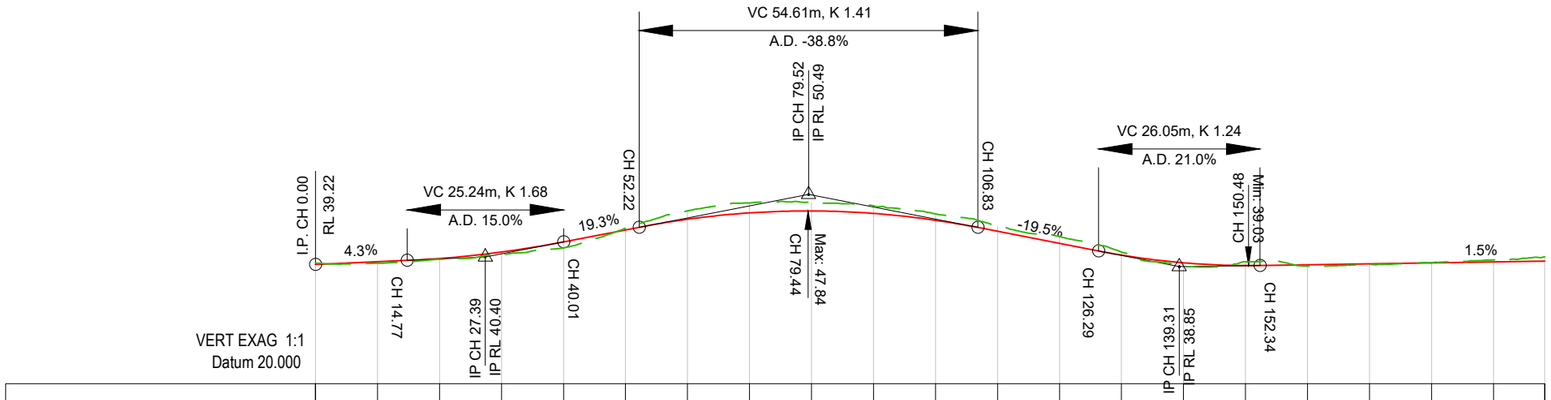
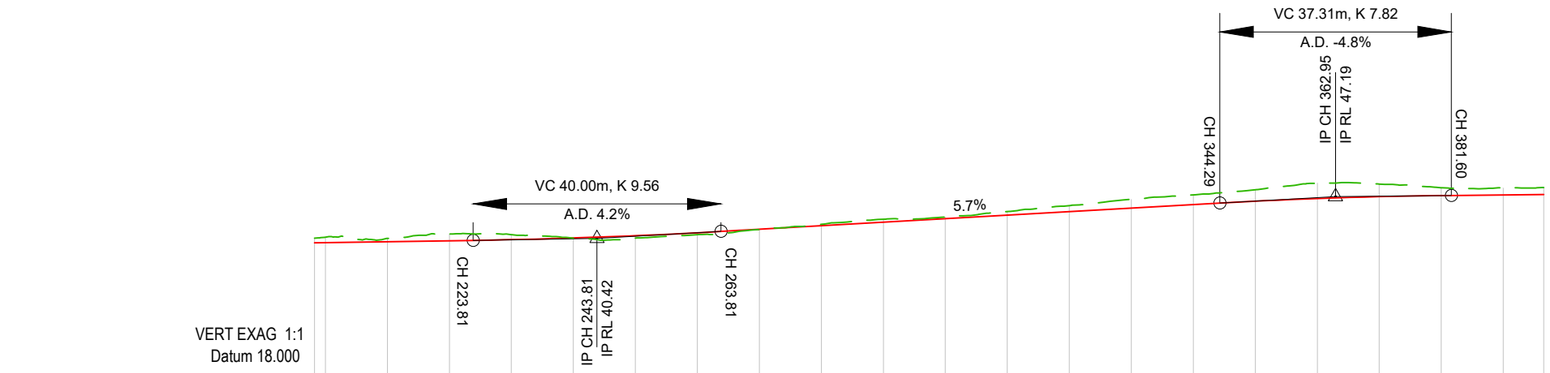


FINISH SURFACE LEVEL	39.215	39.649	40.164	41.206	42.843	44.777	46.496	47.522	47.837	47.442	46.336	44.556	42.610	40.720	39.475	39.034	39.162	39.312	39.462	39.612	39.736
EXISTING LEVELS	39.415	39.416	40.045	40.931	41.888	45.047	47.839	49.129	49.198	48.637	47.356	45.374	43.730	41.197	38.918	39.648	38.950	39.174	39.471	39.949	40.456
DEPTH	-0.200	0.233	0.119	0.275	0.954	-0.270	-1.343	-1.608	-1.361	-1.196	-1.020	-0.818	-1.120	-0.477	0.557	-0.614	0.212	0.138	-0.009	-0.336	-0.720
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	198.260

CL-1 LONG SECTION



FINISH SURFACE LEVEL	39.736	39.762	39.912	40.062	40.232	40.499	40.871	41.347	41.908	42.476	43.044	43.613	44.181	44.749	45.318	45.886	46.433	46.865	47.169	47.344	47.437	47.497
EXISTING LEVELS	40.456	40.618	40.421	41.152	41.034	40.469	40.473	41.035	41.876	42.704	43.520	43.858	44.775	45.727	46.706	47.461	48.260	49.338	49.203	48.603	48.569	48.624
DEPTH	-0.720	-0.856	-0.509	-1.090	-0.801	0.030	0.398	0.312	0.032	-0.228	-0.476	-0.245	-0.594	-0.977	-1.389	-1.575	-1.827	-2.473	-2.034	-1.258	-1.131	-1.127
CHAINAGE	198.260	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000	310.000	320.000	330.000	340.000	350.000	360.000	370.000	380.000	390.000	396.532

CL-1 LONG SECTION

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ROW LONG SECTION

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350

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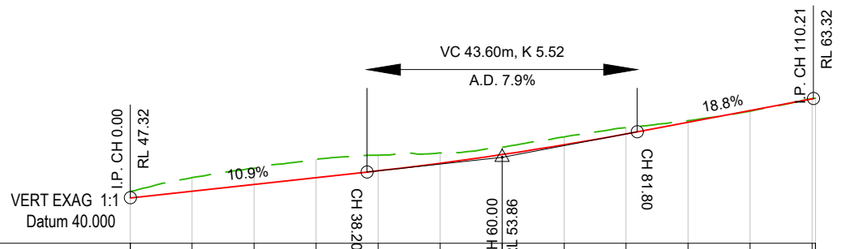

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EXISTING LEVELS	48.350	50.573	52.088	53.510	54.190	54.560	55.471	57.150	58.634	59.740	61.278	63.297	63.383
DEPTH	-1.030	-2.171	-2.594	-2.924	-2.508	-1.663	-1.177	-1.277	-1.002	-0.229	0.116	-0.020	
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	110.528

CL-3 LONG SECTION

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LOT 1 DRIVEWAY LONG SECTION

Sheet

351

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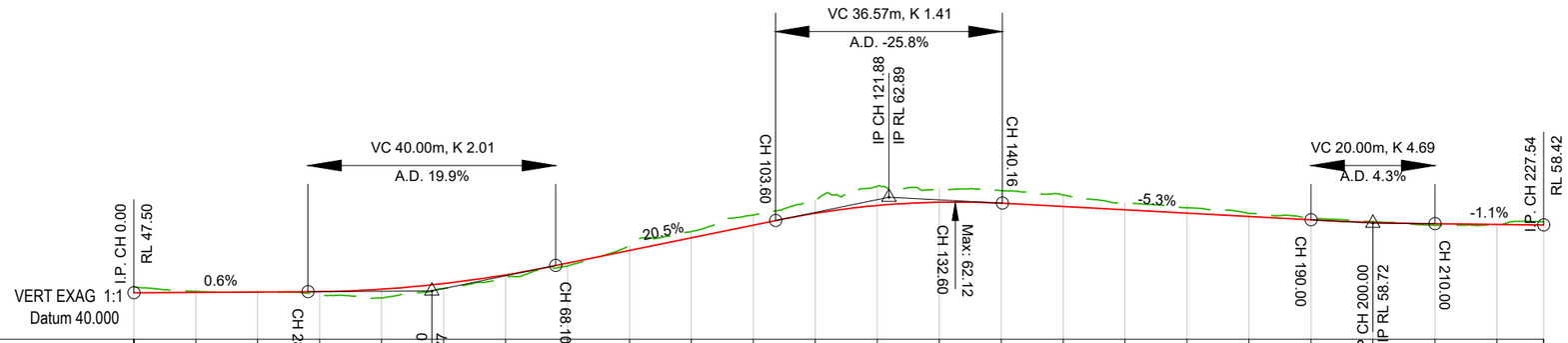

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EXISTING LEVELS	48.424	47.705	47.621	47.216	46.669	48.162		49.990	51.792	55.107	57.352	60.015	62.436	64.659	64.220	63.969	63.268	61.967	61.194	60.311	59.517	58.938	58.353	58.448	58.908
DEPTH	-0.927	-0.152	-0.012	0.458	1.404	0.809		0.378	0.463	-0.802	-0.997	-1.609	-2.125	-3.103	-2.127	-2.046	-1.879	-1.112	-0.874	-0.526	-0.266	-0.115	0.255	0.052	-0.490
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000		60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	227.537

CL-2 LONG SECTION

GENERAL NOTES

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LOT 2 DRIVEWAY LONG SECTION

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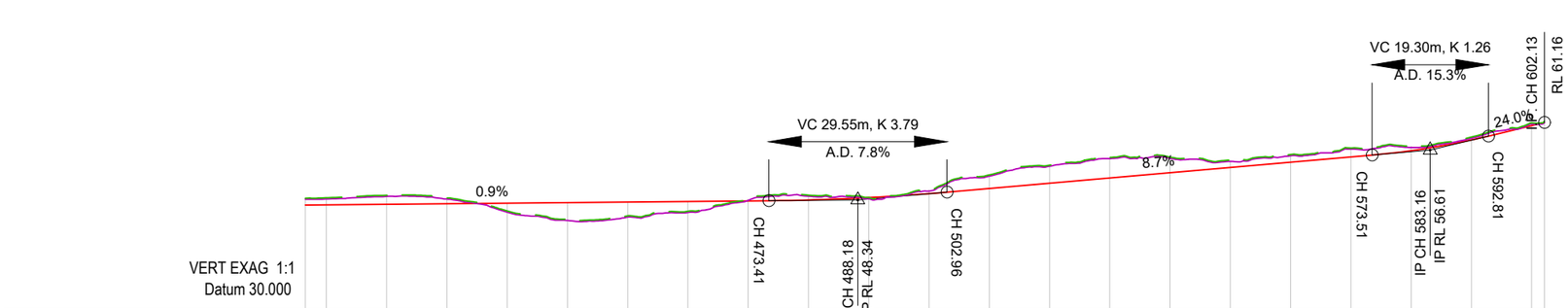

DESIGN LEVELS	47.497	47.529	47.620	47.712	47.803	47.895	47.986	48.077	48.169	48.318	48.715	49.376	50.236	51.107	51.979	52.850	53.721	54.593	55.464	56.502	58.282	60.649	61.160
EXISTING LEVELS	48.624	48.684	49.111	48.668	46.490	45.127	45.694	46.466	48.456	49.129	48.733	49.990	52.472	54.116	55.394	55.440	54.918	55.859	56.956	57.231	58.757	61.114	61.360
DEPTH	-1.127	-1.155	-1.490	-0.956	1.313	2.768	2.292	1.611	-0.287	-0.811	-0.018	-0.614	-2.236	-3.008	-3.415	-2.590	-1.197	-1.266	-1.492	-0.729	-0.475	-0.466	-0.200
CHAINAGE	396.530	400.000	410.000	420.000	430.000	440.000	450.000	460.000	470.000	480.000	490.000	500.000	510.000	520.000	530.000	540.000	550.000	560.000	570.000	580.000	590.000	600.000	602.134

CL-1 LONG SECTION

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LOT 3 DRIVEWAY LONG SECTION

Sheet

353

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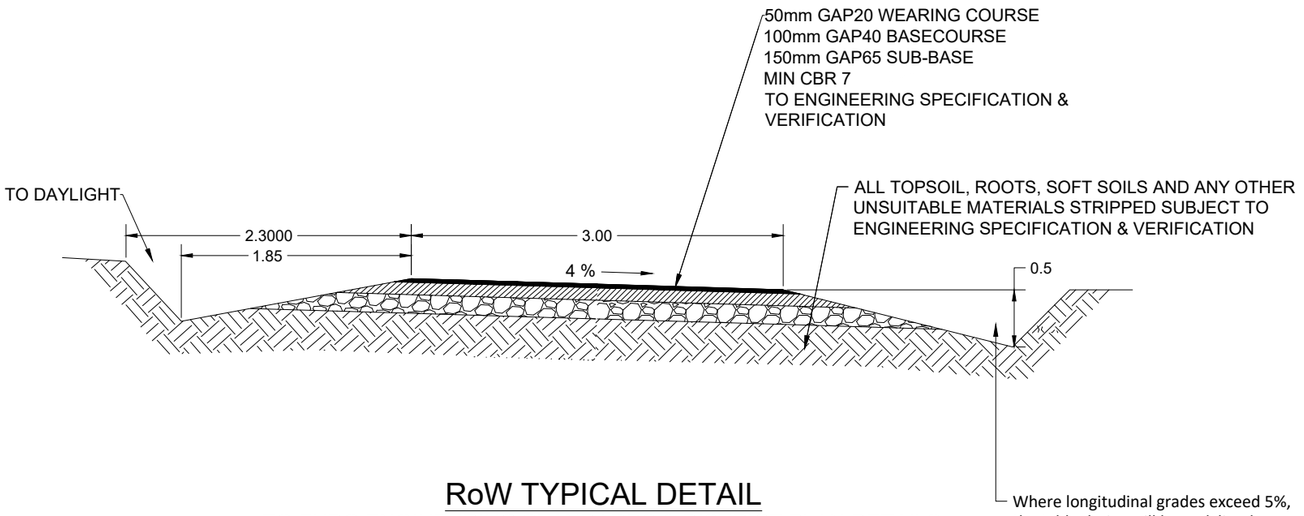

RoW TYPICAL DETAIL

TO FNDC ENGINEERING STANDARDS & DISTRICT PLAN DETAILS

1:50 @ A3

GENERAL NOTES

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TYPICAL CROSS SECTIONS

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380

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NOTES:
- CONTOURS EXTRACTED FROM LINZ
- AERIAL PHOTOGRAPH, EXTRACTED FROM GRIP
- HORIZONTAL DATUM IN MT EDEN CIRCUIT 2000
- VERTICAL DATUM IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016
- EXISTING SITE BOUNDARIES EXTRACTED FROM GRIP.CO.NZ
- PROPOSED BOUNDARIES PROVIDED BY THOMSON SURVEY PLAN 10646 DATED AUGUST 2024

LEGEND:

PROPOSED PRIMARY WASTE DISPOSAL FIELD

PROPOSED SECONDARY WASTE DISPOSAL FIELD

CONCEPT BUILDING ENVELOPE (30m x 30m)

CONCEPT 2 x 25,000 LITRE WATER TANK ATTENUATING TO DISPERSION DEVICE TO CONTROL 500m² AREA

HAXX GEOLOGIX HAND AUGER

PROPOSED STORMWATER POND (5m x 10m x 1m)

LOT 2
4,02ha

LOT 3
4,15ha

LOT 1
4,00 ha

EXISTING VEHICLE CROSSING

PROPOSED 3m WIDE ROW REFER SHEET 380

PROPOSED RETAINING SUBJECT BY DETAIL DESIGN

450Ø PROPOSED CULVERT

450Ø PROPOSED CULVERT

375Ø PROPOSED CULVERT

PROPOSED 3m WIDE ROW REFER SHEET 380

GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY PROPOSED SCHEME PLAN REF. 10646, DATED AUGUST 2024..

CONCEPT WASTEWATER DESIGN

CONCEPT DEVELOPMENT	5 BEDROOM
CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 6
SOIL CATEGORY (NZS1547)	CATEGORY 5
SOIL LOADING RATE	3.0 mm/ DAY
TREATMENT SYSTEM	NO - SUBJECT TO BUILDING CONSENT DESIGN
PRIMARY DISPOSAL AREA	427 m²
RESERVE DISPOSAL AREA	214 m² (50 %)
FINAL DESIGN	NO - SUBJECT TO BUILDING CONSENT DESIGN
CUT OFF DRAINS LOT 1 - 3	YES
DISCHARGE CONSENT	NO

CULVERT PIPE

SWALE DRAWING

15 0 Meters 15 30

1:2000

1	CONSENT	08/2025
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

656N POPAKU ROAD
MOEREWA, RC
NORTH SUBDIVISION

Project	Drawn By
C0656N	TV

Client

STEPHEN HERRIES FAMILY TRUST

Sheet Title

PROPOSED 3 WATERS PLAN

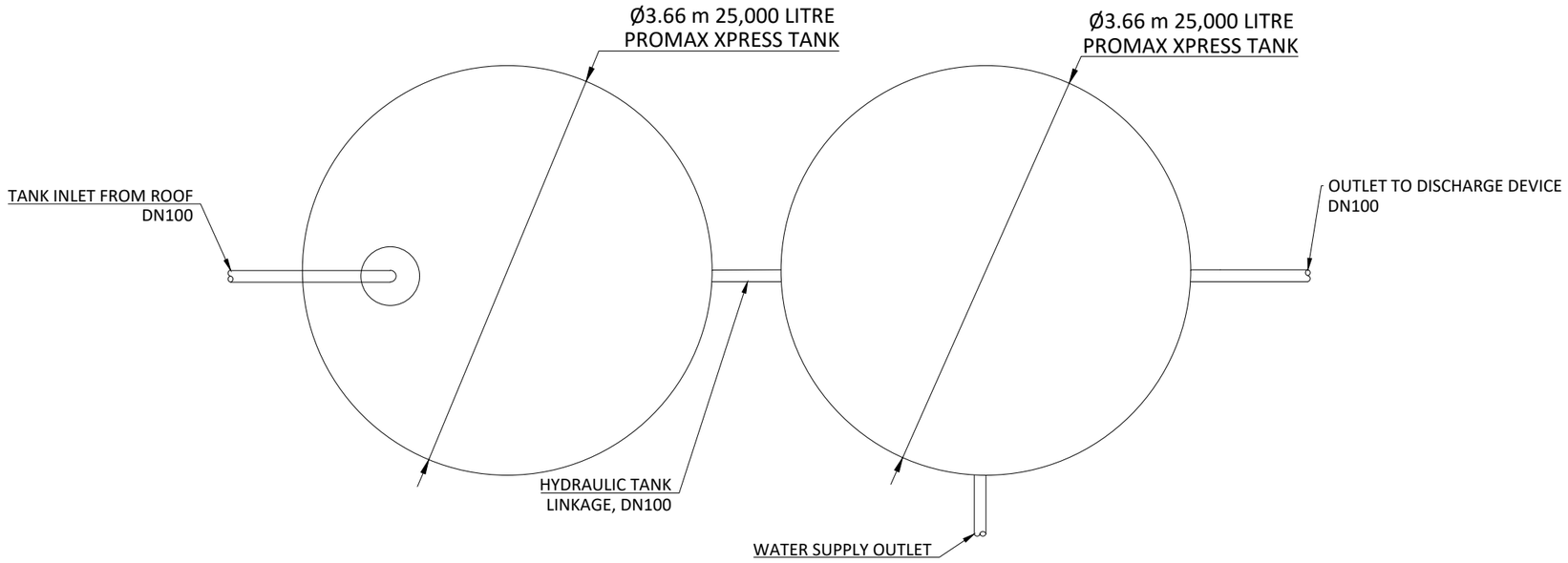
Sheet

400

FILE PATH: Z:\Projects\C0600-C0699\C0656N - Polapu Road, Moerewa\07 - Technical & Drawings\Drawings\C0656N.dwg, 18/08/2025

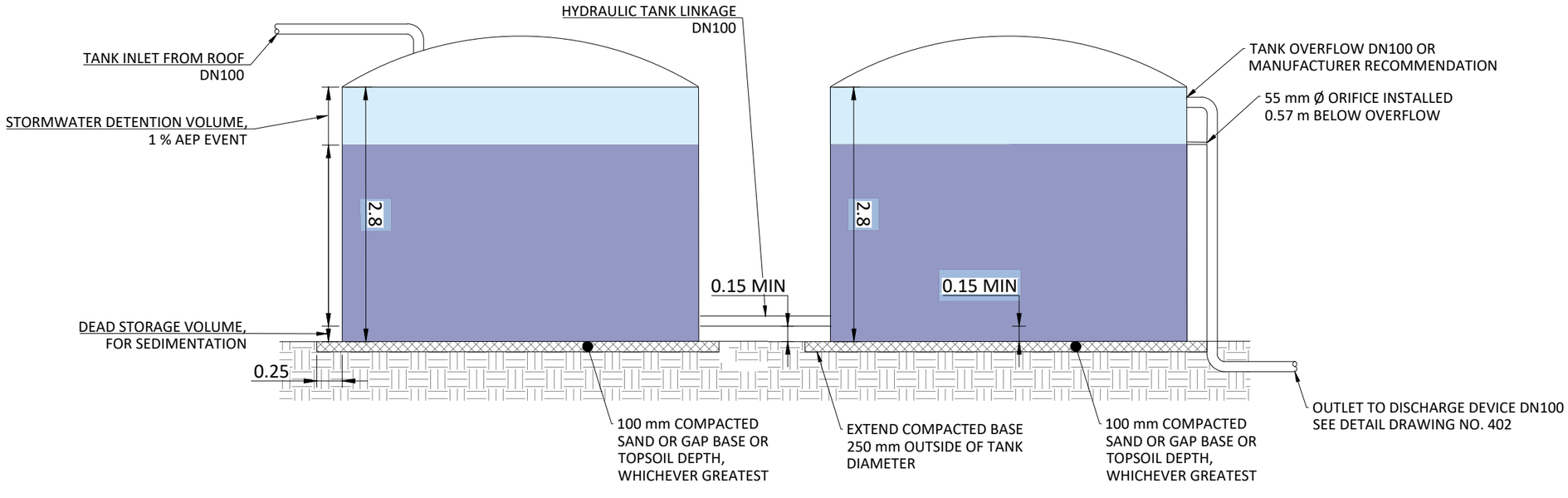
PROPOSED TANK PLAN VIEW

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.

1	CONSENT	08/2025
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

POKAPU ROAD
MOEREWA

Project	Drawn By
C0656N	GM

Client

STEPHEN HERRIES FAMILY TRUST

Sheet Title

C0656N

Sheet

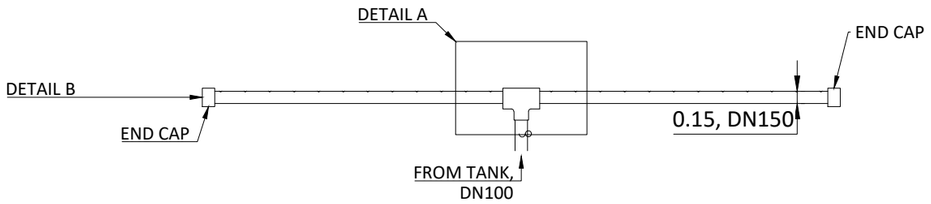
401

FILE PATH: Z:\Projects\C0600-C0699\C0656N - Pokapu Road, Moerewa\07 - Technical & Drawings\Drawings\SW DETAILS-C0656N.dwgSW DETAILS-C0656N.dwg

PLOTTED: 03/09/2025

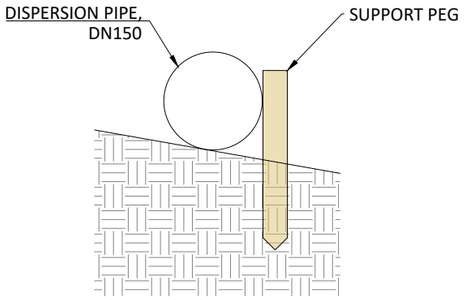
OPTION 1: DISPERSION VIA ABOVE GROUND PIPE

NOT TO SCALE



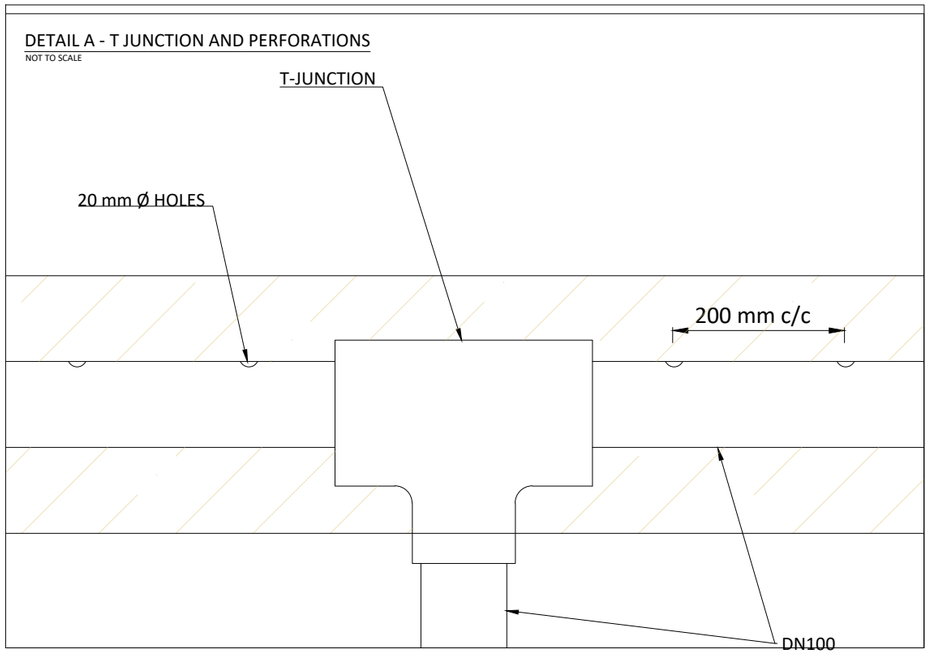
DETAIL B - SIDE VIEW

NOT TO SCALE



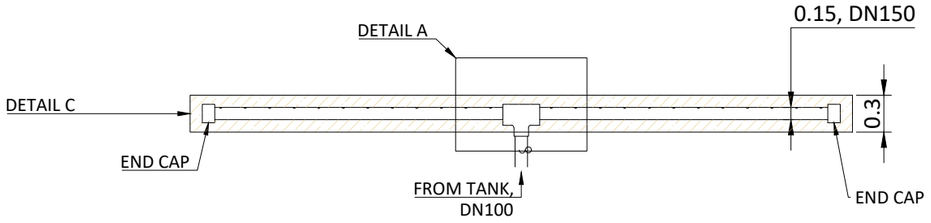
DETAIL A - T JUNCTION AND PERFORATIONS

NOT TO SCALE



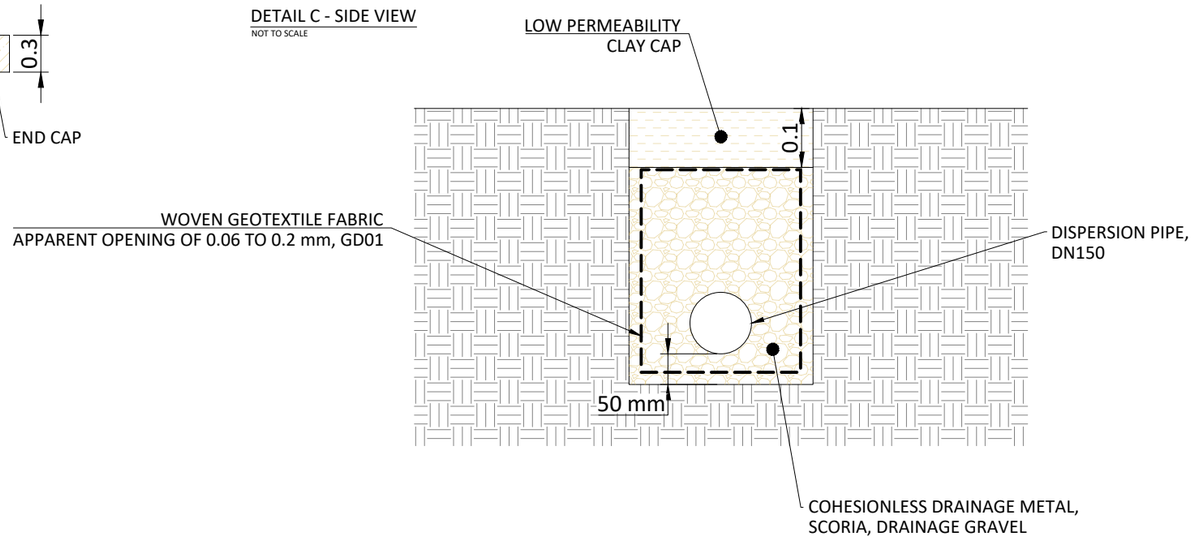
OPTION 2: DISPERSION VIA BELOW GROUND TRENCH

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	08/2025
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

POKAPU ROAD
MOEREWA

Project	Drawn By
C0656N	GM

Client

STEPHEN HERRIES FAMILY TRUST

Sheet Title

C0656N

Sheet

402

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APPENDIX B

Engineering Borehole Records

INVESTIGATION LOG

HOLE NO.: HA13

CLIENT: Stephen Herries
PROJECT: Pokapu Road, Moerewa
JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
START DATE: 21/07/2025
CO-ORDINATES:
ELEVATION: Ground
END DATE: 21/07/2025
CONTRACTOR: Internal
RIG: Hand Auger
DRILLER: GM
LOGGED BY: GM

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm) 2 4 6 8 10 12 14 16 18	VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200 Values	WATER
TOPSOIL; Organic SILT with trace rootlets; dark brown. Moist.		0.2	TS			Groundwater Not Encountered
Silty CLAY; light greyish brown and orange. Wet; high plasticity; [Northland Allochthon - Residual Soils]. 0.6m: Becoming orange; moist.		0.4 0.6 0.8				
SILT; orange. Moist; low plasticity; [Northland Allochthon - Residual Soils].		1.0				
End Of Hole: 1.10m		1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8				

PHOTO(S)

REMARKS

1. Hand auger drilled to target depth of 1.1 m bgl.
2. Groundwater not encountered during drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

INVESTIGATION LOG

HOLE NO.: HA14

CLIENT: Stephen Herries
PROJECT: Pokapu Road, Moerewa
JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
START DATE: 21/07/2025
CO-ORDINATES:
ELEVATION: Ground
END DATE: 21/07/2025
CONTRACTOR: Internal
RIG: Hand Auger
DRILLER: GM
LOGGED BY: GM

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa)	WATER
TOPSOIL; Organic SILT with trace rootlets; dark brown. Moist.		0.0	TS	2 4 6 8 10 12 14 16 18	50 100 150 200 Values	Groundwater Not Encountered
Clayey SILT; dark brownish grey. Moist; low plasticity; [Northland Allochthon - Residual Soils].		0.2				
0.4m: Becoming orange grey with brown streaks; friable.		0.4				
0.7m: Becoming greyish orange with light brown streaks		0.6				
0.9m: Becoming grey.		0.8				
End Of Hole: 1.10m		1.0				
		1.2				
		1.4				
		1.6				
		1.8				
		2.0				
		2.2				
		2.4				
		2.6				
		2.8				

PHOTO(S)

REMARKS

1. Hand auger drilled to target depth of 1.1 m bgl.
2. Groundwater not encountered during drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

INVESTIGATION LOG

HOLE NO.: HA15

CLIENT: Stephen Herries
PROJECT: Pokapu Road, Moerewa
JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
START DATE: 21/07/2025
CO-ORDINATES:
ELEVATION: Ground
END DATE: 21/07/2025
CONTRACTOR: Internal
RIG: Hand Auger
DRILLER: GM
LOGGED BY: GM

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa)	WATER
TOPSOIL; Organic SILT with trace rootlets; dark brown. Moist.		0.0	TS	2 4 6 8 10 12 14 16 18	50 100 150 200 Values	Groundwater Not Encountered
SILT; orange. Moist; low plasticity; [Northland Allochthon - Residual Soils].		0.2				
0.7m: Becoming orange grey with light brown streaks.		0.4				
0.8m: Becoming very silty.		0.6				
End Of Hole: 1.10m		0.8				
		1.0				
		1.2				
		1.4				
		1.6				
		1.8				
		2.0				
		2.2				
		2.4				
		2.6				
		2.8				

PHOTO(S)

REMARKS

1. Hand auger drilled to target depth of 1.1 m bgl.
2. Groundwater not encountered during drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

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APPENDIX C

Assessment of Environmental Effects and Assessment Criteria

Table 10: Wastewater Assessment of Environmental Effects

Item	NRC Separation Requirement[2]	FNDC Separation Requirement	Site Assessment[3]
Individual System Effects			
Flood Plains	Above 5 % AEP	NR	Complies according to available GIS data and visual assessment.
Stormwater Flowpath[4]	5 m	NR	Complies, see annotations on Drawing Nos 131 and 132.
Surface water feature[5]	15 m	15 m (3x feature area in ha)	Complies.
Coastal Marine Area	15 m	30 m	Complies, see annotations on Drawing Nos 131 and 132.
Existing water supply bore.	20 m	NR	Complies. None recorded within or within 20 m of the site boundaries.
Property boundary	1.5 m	1.5	Complies. Including proposed subdivision boundaries.
Winter groundwater table	0.6 m	0.6 m	Complies.
Topography			Ok – chosen disposal areas are flat and level to <5 °.
Cut off drain required?			No.
Discharge Consent Required?			No.
	TP58	**NZS1547**	
Cumulative Effects			
Biological Oxygen Demand	≤20 g/m^3		Complies – secondary treatment.
Total Suspended Solids	≤30 g/m^3		Complies – secondary treatment.
Total Nitrogen	10 – 30 g/m^3	15 – 75 g/m^3	Complies – secondary treatment.
Phosphorous	NR	4 – 10 g/m^3	Complies – secondary treatment.
Ammonia	NR	Negligible	Complies – secondary treatment.
Nitrites/ Nitrates	NR	15 – 45 g/m^3	Complies – secondary treatment.
Conclusion: Effects are less than minor on the environment.			

1. AEE based on proposed secondary treated effluent.
2. Northland Regional Plan Table 9.
3. Based on the recommendations of this report and Drawing No. 130.
4. Including any formed road with kerb and channel, and water-table drain that is down-slope of the disposal area.
5. River, lake, stream, pond, dam, or natural wetland.

AEP Annual Exceedance Probability.
NR No Requirement.

Table 11: Proposed Northland Regional Plan Stormwater Assessment Criteria, to rule C.6.4.2

Assessment Criteria	Comments
1) the discharge or diversion is not from: a) a public stormwater network, or b) a high-risk industrial or trade premises	Complies
2) the diversion and discharge does not cause or increase flooding of land on another property in a storm event of up to and including a 10 percent annual exceedance probability, or flooding of buildings on another property in a storm event of up to and including a one percent annual exceedance probability	Complies, attenuation provided by on-lot detention tanks and stormwater detention pond.
3) where the diversion or discharge is from a hazardous substance storage or handling area: a) the stormwater collection system is designed and operated to prevent hazardous substances stored or used on the site from entering the stormwater system, or b) there is a secondary containment system in place to intercept any spillage of hazardous substances and either discharges that spillage to a trade waste system or stores it for removal and treatment, or c) if the stormwater contains oil contaminants, the stormwater is passed through a stormwater treatment system designed in accordance with the Environmental Guidelines for Water Discharges from Petroleum Industry Sites in New Zealand (Ministry for the Environment, 1998) prior to discharge	N/A. Site is residential.
4) where the diversion or discharge is from an industrial or trade premises: a) the stormwater collection system is designed and operated to prevent any contaminants stored or used on the site, other than those already controlled by condition 3) above, from entering stormwater unless the stormwater is discharged through a stormwater treatment system, and b) any process water or liquid waste stream on the site is bunded, or otherwise contained, within an area of sufficient capacity to provide secondary containment equivalent to 100 percent of the quantity of any process water or liquid waste that has the potential to spill into a stormwater collection system, in order to prevent trade waste entering the stormwater collection system	N/A. Site is residential.
5) the diversion or discharge is not into potentially contaminated land, or onto potentially contaminated land that is not covered by an impervious area	Complies.
6) the diversion and discharge does not cause permanent scouring or erosion of the bed of a water body at the point of discharge	Complies, specifically sized discharge devices are provided from all on-lot devices and RoWs.
7) the discharge does not contain more than 15 milligrams per litre of total petroleum hydrocarbons	Complies. Site is residential.
8) the discharge does not cause any of the following effects in the receiving waters beyond the zone of reasonable mixing: a) the production of conspicuous oil or grease films, scums or foams, of floatable or suspended materials, or b) a conspicuous change in the colour or visual clarity, or c) an emission of objectionable odour, or d) the rendering of fresh water unsuitable for consumption by farm animals, or 163 e) the rendering of fresh water taken from a mapped priority drinking water abstraction point (refer I Maps | Ngā mahere matawhenua) unsuitable for human consumption after existing treatment.	Complies.

Table 12: Proposed Northland Regional Plan Stormwater Assessment Criteria, to rule C.8.3.1

Assessment Criteria		Comments
1)	the area and volume of earthworks at a particular location or associated with a project complies with the thresholds in Table 13.	Complies – classed as 'other areas'.
2)	the discharge is not within 20 metres of a geothermal surface feature.	Complies.
3)	except for coastal dune restoration activities, good management practice erosion and sediment control measures equivalent to those set out in the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016 (Auckland Council Guideline Document GD2016/005), are implemented for the duration of the activity	Complies. See specific erosion and sediment control details, concept plan and typical details.
4)	batters and side castings are stabilised to prevent slumping	Complies.
5)	exposed earth is stabilised upon completion of the earthworks to minimise erosion and avoid slope failure	Complies. Earthworks form road area to be stabilised with a gravelled surface.
6)	earth and debris are not deposited into, or in a position where they can enter, a natural wetland, a continually or intermittently flowing river, a lake, an artificial watercourse, or the coastal marine	Complies. Additional erosion and sediment control measures have been implemented to control this. Refer erosion and sediment control measures, concept plan and typical details.
7)	the earthworks activity does not: a) reduce the height of a dune crest in a coastal riparian and foredune management area, except where dunes are recontoured to remove introduced materials or to remediate dune blow-outs as part of coastal dune restoration work, or b) exacerbate flood or coastal hazard risk on any other property, or c) create or contribute to the instability or subsidence of land on other property, or d) divert flood flow onto other property, and 216	Complies provided recommendations in this report and any accompanying detailed design is adhered to.
8)	any associated damming, diversion and discharge of stormwater does not give rise to any of the following effects in the receiving waters beyond the zone of reasonable mixing: a) any conspicuous change in colour or visual clarity, or b) the rendering of fresh water unsuitable for consumption by farm animals, or c) contamination which may render freshwater taken from a mapped priority drinking water abstraction point (refer I Maps | Ngā mahere matawhenua) unsuitable for human consumption after existing treatment	Complies provided recommendations in this report and any accompanying detailed design is adhered to.
9)	information on the source and composition of any clean fill material and its location within the disposal site are recorded and provided to the Regional Council on request	Can comply. Materials are anticipated to be either site won or imported from a registered quarry facility. Details TBC according to an earthworks specification completed during a detailed design phase.
10)	the Regional Council's Compliance Manager is given at least five working days' notice (in writing or by email) of any earthworks activity being undertaken within a high-risk flood hazard area, flood hazard area, where contaminated land will be exposed, or in sand dunes within a coastal riparian and foredune management area.	Can comply, if required.

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APPENDIX D

Stormwater Calculations

Project Ref:	C0656		**STORMWATER ATTENUATION TANK DESIGN - LOTS 1-3**	geologix consulting engineers
Project Address:	Pokapu Road, Moerewa			
Design Case:	CONCEPT FUTURE LOT DEVELOPMENT		**50 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT**	
Date:	18 August 2025	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 COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A			
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.67	PASTURE
TOTAL	**500**	TYPE D	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.83	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	0.00
EX. CONSENTED	0	0	
TOTAL	**500**	TYPE D	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	69.9	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	83.88	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.

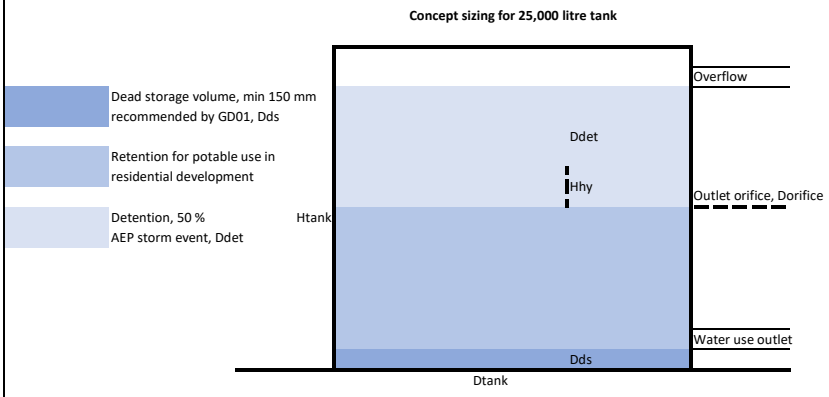
PRE AND POST-DEVELOPMENT RUNOFF, 50%AEP WITH CC, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	69.90	1.2	83.88	9.67	6.50	5.20	*Critical duration (time of concentration) for the catchments is 10min*
20	50.00	1.2	60.00	6.92	4.65	3.72	
30	40.90	1.2	49.08	5.66	3.81	3.04	
60	28.70	1.2	34.44	3.97	2.67	2.14	
120	19.80	1.2	23.76	2.74	1.84	1.47	*Pre-dev calculated on Intensity without CC factor*
360	10.50	1.2	12.60	1.45	0.98	0.78	
720	6.83	1.2	8.20	0.94	0.64	0.51	
1440	4.29	1.2	5.15	0.59	0.40	0.32	
2880	2.60	1.2	3.12	0.36	0.24	0.19	
4320	1.90	1.2	2.28	0.26	0.18	0.14	

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	3.87	5.80	1.34	1.34	4.47	2680	*select largest required storage , regardless of duration, to avoid overflow*
20	2.77	4.15	0.96	1.34	2.81	3377	
30	2.26	3.39	0.78	1.34	2.06	3706	
60	1.59	2.38	0.55	1.34	1.05	3766	
120	1.10	1.64	0.38	1.34	0.31	2214	
360	0.58	0.87	0.20	1.34	No Att. Req.	0	
720	0.38	0.57	0.13	1.34	No Att. Req.	0	
1440	0.24	0.36	0.08	1.34	No Att. Req.	0	
2880	0.14	0.22	0.05	1.34	No Att. Req.	0	
4320	0.11	0.16	0.04	1.34	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	3.766	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 2
TANK AREA, Atank	21.04	m2	Area of TWO tanks
TANK MAX STORAGE VOLUME, Vtank	52604	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.18	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.33	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00134	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.09	m	
AREA OF ORIFICE, Aorifice	1.63E-03	m2	
ORIFICE DIAMETER, Dorifice	45	mm	
VELOCITY AT ORIFICE	1.87	m/s	At max. head level

Project Ref:	C0656		**STORMWATER ATTENUATION TANK DESIGN - LOTS 1-3**	geologix consulting engineers
Project Address:	Pokapu Road, Moerewa			
Design Case:	CONCEPT FUTURE LOT DEVELOPMENT		**20 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT**	
Date:	18 August 2025	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 COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.67	PASTURE
TOTAL	**500**	TYPE D	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.83	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE D	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	90.4	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	108.5	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.

PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS

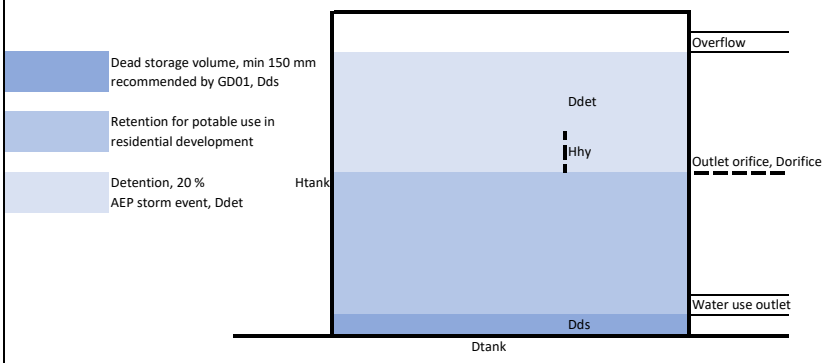
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	90.40	1.2	108.48	12.51	8.41	6.73	*Critical duration (time of concentration) for the catchments is 10min*
20	64.80	1.2	77.76	8.96	6.03	4.82	
30	53.10	1.2	63.72	7.35	4.94	3.95	
60	37.40	1.2	44.88	5.17	3.48	2.78	
120	25.90	1.2	31.08	3.58	2.41	1.93	*Pre-dev calculated on Intensity without CC factor*
360	13.80	1.2	16.56	1.91	1.28	1.03	
720	8.95	1.2	10.74	1.24	0.83	0.67	
1440	5.63	1.2	6.76	0.78	0.52	0.42	
2880	3.42	1.2	4.10	0.47	0.32	0.25	
4320	2.51	1.2	3.01	0.35	0.23	0.19	

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	5.00	7.50	1.73	1.73	5.78	3465	*select largest required storage , regardless of duration, to avoid overflow*
20	3.59	5.38	2.44	1.73	3.65	4381	
30	2.94	4.41	2.00	1.73	2.68	4823	
60	2.07	3.10	1.41	1.73	1.38	4956	
120	1.43	2.15	0.98	1.73	0.42	3039	
360	0.76	1.15	0.52	1.73	No Att. Req.	0	
720	0.50	0.74	0.34	1.73	No Att. Req.	0	
1440	0.31	0.47	0.21	1.73	No Att. Req.	0	
2880	0.19	0.28	0.13	1.73	No Att. Req.	0	
4320	0.14	0.21	0.09	1.73	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	4.956	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 2
TANK AREA, Atank	21.04	m2	Area of TWO tanks
TANK MAX STORAGE VOLUME, Vtank	52604	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.24	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.39	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00173	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.12	m	
AREA OF ORIFICE, Aorifice	1.83E-03	m2	
ORIFICE DIAMETER, Dorifice	48	mm	
VELOCITY AT ORIFICE	2.15	m/s	At max. head level

Project Ref:	C0656		**STORMWATER ATTENUATION TANK DESIGN - LOTS 1-3**	geologix consulting engineers
Project Address:	Pokapu Road, Moerewa			
Design Case:	CONCEPT FUTURE LOT DEVELOPMENT		**1 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT**	
Date:	18 August 2025	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 COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.67	PASTURE
0	0	0	
TOTAL	**500**	TYPE D	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.83	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE D	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	156.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	187.2	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.

PRE AND POST-DEVELOPMENT RUNOFF, 1%AEP WITH CC, VARIOUS DURATIONS

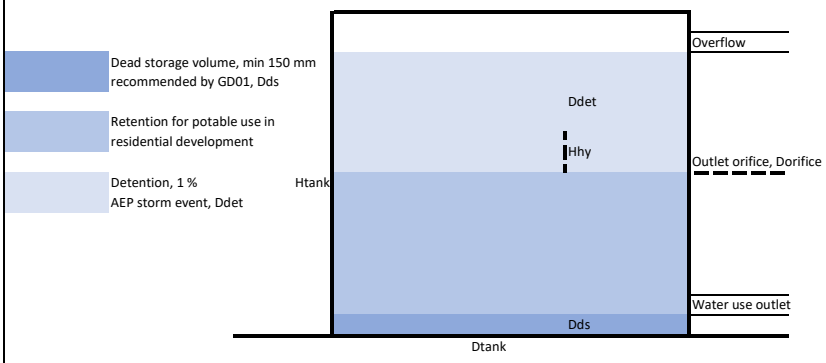
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	156.00	1.2	187.20	21.58	14.52	11.61	*Critical duration (time of concentration) for the catchments is 10min*
20	112.00	1.2	134.40	15.49	10.42	8.34	
30	92.40	1.2	110.88	12.78	8.60	6.88	
60	65.40	1.2	78.48	9.05	6.09	4.87	
120	45.50	1.2	54.60	6.29	4.23	3.39	*Pre-dev calculated on Intensity without CC factor*
360	24.50	1.2	29.40	3.39	2.28	1.82	
720	16.00	1.2	19.20	2.21	1.49	1.19	
1440	10.10	1.2	12.12	1.40	0.94	0.75	
2880	6.17	1.2	7.40	0.85	0.57	0.46	
4320	4.54	1.2	5.45	0.63	0.42	0.34	

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	8.63	12.95	2.98	2.98	9.97	5980	*Selected Tank Outflow is selected for critical duration (time of concentration). In this case = 10min*
20	6.20	9.30	2.14	2.98	6.31	7578	
30	5.11	7.67	1.77	2.98	4.69	8438	
60	3.62	5.43	1.25	2.98	2.45	8809	
120	2.52	3.78	0.87	2.98	0.80	5725	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	1.36	2.03	0.47	2.98	No Att. Req.	0	
720	0.89	1.33	0.31	2.98	No Att. Req.	0	
1440	0.56	0.84	0.19	2.98	No Att. Req.	0	
2880	0.34	0.51	0.12	2.98	No Att. Req.	0	
4320	0.25	0.38	0.09	2.98	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	8.809	m3	Select largest storage as per analysis	
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank	
TANK DIAMETER, Dtank	3.66	m	No. of Tanks	2
TANK AREA, Atank	21.04	m2	Area of TWO tanks	
TANK MAX STORAGE VOLUME, Vtank	52604	litres		
REQUIRED STORAGE HEIGHT, Ddet	0.42	m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	0.57	m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00298	m3/s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	0.21	m		
AREA OF ORIFICE, Aorifice	2.37E-03	m2		
ORIFICE DIAMETER, Dorifice	55	mm		
VELOCITY AT ORIFICE	2.87	m/s	At max. head level	

Project Ref:	C0656	**STORMWATER DISPERSION PIPE/ TRENCH**	geologix consulting engineers
Project Address:	Pokapu Road, Moerewa		
Design Case:	CONCEPT FUTURE LOT DEVELOPMENT	**DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH**	
Date:	18 August 2025 REV 1		

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	m2
0	0	0	0	0	0
1	1	10	10	0.5	5
	TOTALS	10	10		5
	SLOPE, Sc	0.100	m/m		

MANNINGS PIPE FLOW - INCOMING PIPE

Dia, m	d/D	α, rad	P, m	A, m^2	R	1:S	n	V, m/s	Q, m^3/s	Q, l/s	
0.1	0.000	6.283	0.0000	0.0000	0.000	10	0.009	0.000	0.0000	0.000	**0 % full**
0.100	0.050	5.381	0.0451	0.0001	0.003	10	0.0090	0.772	0.0001	0.113	
0.100	0.100	4.996	0.0644	0.0004	0.006	10	0.0090	1.205	0.0005	0.493	
0.100	0.150	4.692	0.0795	0.0007	0.009	10	0.0090	1.552	0.0011	1.147	
0.100	0.200	4.429	0.0927	0.0011	0.012	10	0.0090	1.848	0.0021	2.066	
0.100	0.250	4.189	0.1047	0.0015	0.015	10	0.0090	2.105	0.0032	3.232	
0.100	0.300	3.965	0.1159	0.0020	0.017	10	0.0090	2.332	0.0046	4.621	
0.100	0.350	3.751	0.1266	0.0024	0.019	10	0.0090	2.532	0.0062	6.204	
0.100	0.400	3.544	0.1369	0.0029	0.021	10	0.0090	2.710	0.0080	7.951	
0.100	0.450	3.342	0.1471	0.0034	0.023	10	0.0090	2.867	0.0098	9.828	
0.100	0.500	3.142	0.1571	0.0039	0.025	10	0.0090	3.004	0.0118	11.797	**50 % full**
0.100	0.550	2.941	0.1671	0.0044	0.026	10	0.0090	3.122	0.0138	13.819	
0.100	0.600	2.739	0.1772	0.0049	0.028	10	0.0090	3.222	0.0159	15.852	
0.100	0.650	2.532	0.1875	0.0054	0.029	10	0.0090	3.302	0.0178	17.847	
0.100	0.700	2.319	0.1982	0.0059	0.030	10	0.0090	3.364	0.0198	19.754	
0.100	0.750	2.094	0.2094	0.0063	0.030	10	0.0090	3.405	0.0215	21.515	
0.100	0.800	1.855	0.2214	0.0067	0.030	10	0.0090	3.424	0.0231	23.063	
0.100	0.850	1.591	0.2346	0.0071	0.030	10	0.0090	3.417	0.0243	24.313	
0.100	0.900	1.287	0.2498	0.0074	0.030	10	0.0090	3.378	0.0251	25.147	
0.100	0.950	0.902	0.2691	0.0077	0.029	10	0.0090	3.289	0.0254	25.352	
0.100	1.000	0.000	0.3142	0.0079	0.025	10	0.0090	3.004	0.0236	23.594	**Flowing full**

DISPERSION SPECIFICATION

INCOMING PIPE PROPERTIES:

TANK OUTFLOW, 20 % AEP	7.50	l/s		
MAXIMUM PIPE FLOW	25.35	l/s		
SUFFICIENT CAPACITY IN PIPE	YES			
LONGITUDINAL SLOPE	0.100	m/m		
DESIGN VELOCITY, Dv	3.424	m/s		

LEVEL SPREADER SPECIFICATIONS:

PIPE DIAMETER, m	0.15	m
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	49	No.
DIA. OF ORIFICE, D	20	mm
ORIFICE INTERVALS, C/C	200	mm
DISPERSION PIPE LENGTH, L	**10**	**m**

ORIFICE DESIGN FLOW CHECK:

AREA OF SINGLE ORIFICE, A	0.00031	m2			
FLOW OUT OF 1 ORIFICE	0.000236277	m3/s	0.24	l/s	
FLOW OUT OF ALL ORIFICES	0.01157758	m3/s	11.58	l/s	**DESIGN OK**
VELOCITY FROM SINGLE ORIFICE	0.75	m/s			

BROAD CRESTED WEIR DESIGN FLOW CHECK:

FLOW DEPTH, h	0.075	m			
BASE WIDTH = L	10	m			
FLOW AREA	0.75	m2			
WEIR FLOW	0.00787	m3/s	7.87	l/s	**DESIGN OK**
WEIR VELOCITY	0.010	m/s			

INCOMING PIPE & SPREADER SUMARY:

	LOT 2		LOT 3	
INCOMING PIPE DIAMETER, m	0.100	m	0.100	m
SPREADER PIPE DIAMETER, m	0.150	m	0.150	m
MANNINGS PIPE ROUGHNESS	0.009		0.009	
NUMBER OF ORIFICES	49	No.	49	No.
DIA. OF ORIFICE, D	20	mm	20	mm
ORIFICE INTERVALS, C/C	200	mm	200	mm
DISPERSION PIPE LENGTH, L	**10**	**m**	**10**	**m**

Project Ref:	C0656		**RIGHT OF WAY - STORMWATER POND DESIGN**	geologix consulting engineers
Project Address:	Pokapu Road, Moerewa			
Design Case:	CONCEPT FUTURE LOT DEVELOPMENT		**1 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT**	
Date:	18 August 2025	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 COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	2820	0.67	PASTURE
0	0	0	
TOTAL	**2820**	TYPE D	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	1680	0.83	DRIVEWAY - METAL
OFFSET	1140	0.83	DRIVEWAY - METAL
PERVIOUS	0	0.67	PASTURE
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**2820**	TYPE D	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	156.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	187.2	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.

PRE AND POST-DEVELOPMENT RUNOFF, 1%AEP WITH CC, VARIOUS DURATIONS

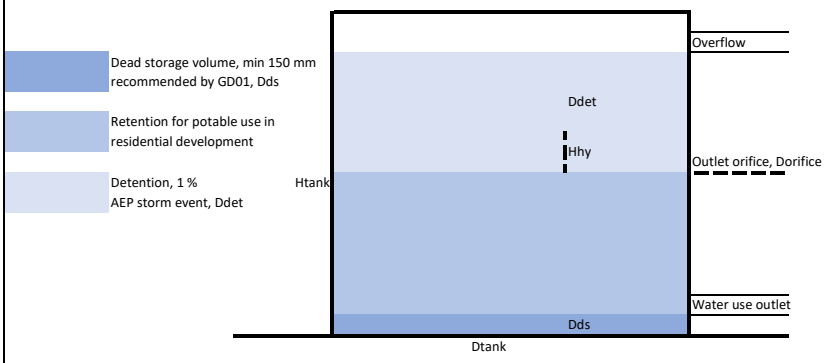
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	156.00	1.2	187.20	121.71	81.87	65.50	*Critical duration (time of concentration) for the catchments is 10min*
20	112.00	1.2	134.40	87.38	58.78	47.03	
30	92.40	1.2	110.88	72.09	48.49	38.80	
60	65.40	1.2	78.48	51.03	34.32	27.46	
120	45.50	1.2	54.60	35.50	23.88	19.10	*Pre-dev calculated on Intensity without CC factor*
360	24.50	1.2	29.40	19.11	12.86	10.29	
720	16.00	1.2	19.20	12.48	8.40	6.72	
1440	10.10	1.2	12.12	7.88	5.30	4.24	
2880	6.17	1.2	7.40	4.81	3.24	2.59	
4320	4.54	1.2	5.45	3.54	2.38	1.91	

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	49.20	72.51	16.30	16.30	56.21	33727	*Selected Tank Outflow is selected for critical duration (time of concentration). In this case = 10min*
20	35.32	52.06	11.70	16.30	35.76	42913	
30	29.14	42.95	9.65	16.30	26.65	47971	
60	20.63	30.40	6.83	16.30	14.10	50764	
120	14.35	21.15	4.75	16.30	4.85	34932	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	7.73	11.39	2.56	16.30	No Att. Req.	0	
720	5.05	7.44	1.67	16.30	No Att. Req.	0	
1440	3.19	4.69	1.06	16.30	No Att. Req.	0	
2880	1.95	2.87	0.64	16.30	No Att. Req.	0	
4320	1.43	2.11	0.47	16.30	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 51,000 litre pond



SPECIFICATION

TOTAL STORAGE REQUIRED	50.764	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	1	m	Concept sizing for 51,000 litre pond
TANK AREA, Atank	51.00	m2	Area of pond
TANK MAX STORAGE VOLUME, Vtank	51000	litres	
REQUIRED STORAGE HEIGHT, Ddet	1.00	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.00	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.00	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.01630	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.50	m	
AREA OF ORIFICE, Aorifice	8.41E-03	m2	
ORIFICE DIAMETER, Dorifice	103	mm	
VELOCITY AT ORIFICE	4.42	m/s	At max. head level

HIRDS V4 Intensity-Duration-Frequency Results
Sitename: Pokapu Road
Coordinate system: WGS84
Longitude: 173.9807
Latitude: -35.4232

DDF Model Parameters:	c	d	e	f	g	h	i
Values:	0.00258	0.47781	-0.01787	-0.00203	0.254596	-0.01219	3.266853

Example:	Duration (h	ARI (yrs)	x	y	Rainfall Rate (mm/hr)
	24	100	3.178054	4.600149	10.1033

Rainfall intensities (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	63.8	45.7	37.4	26.2	18.1	9.6	6.22	3.9	2.36	1.73	1.37	1.14
2	0.5	69.9	50	40.9	28.7	19.8	10.5	6.83	4.29	2.6	1.9	1.51	1.26
5	0.2	90.4	64.8	53.1	37.4	25.9	13.8	8.95	5.63	3.42	2.51	2	1.66
10	0.1	105	75.7	62.1	43.7	30.3	16.2	10.5	6.63	4.03	2.96	2.35	1.96
20	0.05	121	86.7	71.1	50.2	34.8	18.6	12.1	7.65	4.66	3.42	2.72	2.27
30	0.033	129	93.1	76.5	54	37.5	20.1	13.1	8.26	5.03	3.7	2.95	2.46
40	0.025	136	97.8	80.3	56.7	39.4	21.1	13.8	8.7	5.3	3.9	3.11	2.59
50	0.02	141	101	83.2	58.8	40.9	21.9	14.3	9.04	5.51	4.05	3.23	2.69
60	0.017	145	104	85.7	60.6	42.1	22.6	14.7	9.32	5.68	4.18	3.33	2.78
80	0.013	151	109	89.5	63.3	44	23.6	15.4	9.76	5.96	4.38	3.49	2.92
100	0.01	156	112	92.4	65.4	45.5	24.5	16	10.1	6.17	4.54	3.62	3.02
250	0.004	175	126	104	73.8	51.4	27.7	18.1	11.5	7.02	5.17	4.13	3.45

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	7.2	4.4	3.3	2.6	1.6	1	0.77	0.61	0.37	0.29	0.22	0.19
2	0.5	7.8	4.8	3.6	2.8	1.8	1.1	0.85	0.68	0.41	0.33	0.25	0.21
5	0.2	11	7.1	5.4	3.8	2.5	1.5	1.2	0.93	0.55	0.44	0.33	0.29
10	0.1	14	9.5	7.4	4.9	3.3	1.9	1.5	1.1	0.67	0.52	0.4	0.34
20	0.05	18	13	10	6.4	4.4	2.5	1.8	1.3	0.79	0.61	0.47	0.4
30	0.033	21	15	12	7.4	5.2	2.9	2.1	1.5	0.87	0.67	0.52	0.44
40	0.025	23	17	14	8.3	5.8	3.3	2.4	1.6	0.93	0.72	0.55	0.47
50	0.02	25	18	15	9	6.3	3.6	2.6	1.6	0.98	0.75	0.58	0.5
60	0.017	27	19	16	9.7	6.8	3.8	2.8	1.7	1	0.78	0.6	0.52
80	0.013	30	22	18	11	7.6	4.3	3.1	1.8	1.1	0.83	0.64	0.55
100	0.01	32	24	20	12	8.3	4.7	3.3	1.9	1.2	0.87	0.68	0.58
250	0.004	45	33	28	16	12	6.7	4.7	2.4	1.4	1.1	0.83	0.72

Rainfall intensities (mm/hr) :: 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	68.3	48.9	40	28.1	19.3	10.1	6.51	4.06	2.44	1.78	1.41	1.17
2	0.5	74.9	53.6	43.9	30.8	21.2	11.2	7.18	4.47	2.69	1.97	1.56	1.3
5	0.2	97.2	69.7	57.1	40.2	27.7	14.6	9.44	5.89	3.55	2.6	2.06	1.72
10	0.1	114	81.5	66.9	47.1	32.5	17.2	11.1	6.95	4.2	3.07	2.44	2.03
20	0.05	130	93.5	76.7	54.1	37.4	19.8	12.8	8.02	4.86	3.55	2.82	2.35
30	0.033	140	101	82.5	58.3	40.3	21.4	13.8	8.67	5.25	3.84	3.06	2.54
40	0.025	147	105	86.6	61.2	42.4	22.5	14.6	9.13	5.53	4.05	3.22	2.68
50	0.02	152	109	89.9	63.5	44	23.4	15.1	9.49	5.75	4.22	3.35	2.79
60	0.017	156	113	92.5	65.4	45.3	24.1	15.6	9.79	5.93	4.35	3.46	2.88
80	0.013	163	118	96.6	68.4	47.4	25.2	16.3	10.3	6.22	4.56	3.63	3.02
100	0.01	168	121	99.8	70.6	49	26.1	16.9	10.6	6.44	4.72	3.76	3.13
250	0.004	189	137	112	79.7	55.4	29.6	19.2	12.1	7.33	5.38	4.29	3.57

Rainfall intensities (mm/hr) :: 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	68.3	48.9	40	28.1	19.3	10.1	6.51	4.06	2.44	1.78	1.41	1.17
2	0.5	74.9	53.6	43.9	30.8	21.2	11.2	7.18	4.47	2.69	1.97	1.56	1.3
5	0.2	97.2	69.7	57.1	40.2	27.7	14.6	9.44	5.89	3.55	2.6	2.06	1.72
10	0.1	114	81.5	66.9	47.1	32.5	17.2	11.1	6.95	4.2	3.07	2.44	2.03
20	0.05	130	93.5	76.7	54.1	37.4	19.8	12.8	8.02	4.86	3.55	2.82	2.35
30	0.033	140	101	82.5	58.3	40.3	21.4	13.8	8.67	5.25	3.84	3.06	2.54
40	0.025	147	105	86.6	61.2	42.4	22.5	14.6	9.13	5.53	4.05	3.22	2.68
50	0.02	152	109	89.9	63.5	44	23.4	15.1	9.49	5.75	4.22	3.35	2.79
60	0.017	156	113	92.5	65.4	45.3	24.1	15.6	9.79	5.93	4.35	3.46	2.88
80	0.013	163	118	96.6	68.4	47.4	25.2	16.3	10.3	6.22	4.56	3.63	3.02
100	0.01	168	121	99.8	70.6	49	26.1	16.9	10.6	6.44	4.72	3.76	3.13
250	0.004	189	137	112	79.7	55.4	29.6	19.2	12.1	7.33	5.38	4.29	3.57

Rainfall intensities (mm/hr) :: 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	69.5	49.7	40.6	28.5	19.6	10.3	6.59	4.1	2.46	1.79	1.42	1.18
2	0.5	76.2	54.5	44.6	31.3	21.6	11.3	7.26	4.52	2.72	1.98	1.57	1.31
5	0.2	99	71	58.2	40.9	28.2	14.9	9.56	5.96	3.59	2.62	2.08	1.73
10	0.1	116	83	68.1	48	33.1	17.5	11.3	7.03	4.24	3.1	2.46	2.05
20	0.05	132	95.2	78.1	55.1	38.1	20.2	13	8.12	4.91	3.59	2.85	2.37
30	0.033	142	102	84.1	59.4	41.1	21.7	14	8.77	5.3	3.88	3.08	2.56
40	0.025	149	107	88.2	62.3	43.1	22.9	14.8	9.24	5.59	4.09	3.25	2.71
50	0.02	155	111	91.6	64.7	44.8	23.8	15.4	9.6	5.81	4.26	3.38	2.81
60	0.017	159	115	94.2	66.6	46.1	24.5	15.8	9.91	6	4.39	3.49	2.9
80	0.013	166	120	98.5	69.6	48.3	25.6	16.6	10.4	6.29	4.61	3.66	3.05
100	0.01	172	124	102	72	49.9	26.5	17.2	10.7	6.51	4.77	3.79	3.16
250	0.004	193	139	115	81.2	56.4	30.1	19.5	12.2	7.41	5.44	4.33	3.6

Rainfall intensities (mm/hr) :: 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	73	52.2	42.7	30	20.5	10.7	6.82	4.23	2.53	1.84	1.45	1.21
2	0.5	80.2	57.4	47	33	22.7	11.8	7.54	4.66	2.79	2.03	1.61	1.33
5	0.2	104	74.9	61.4	43.2	29.7	15.5	9.95	6.16	3.7	2.7	2.13	1.77
10	0.1	122	87.7	71.9	50.7	34.9	18.3	11.7	7.28	4.37	3.19	2.53	2.1
20	0.05	140	101	82.6	58.3	40.2	21.1	13.6	8.41	5.06	3.69	2.93	2.43
30	0.033	150	108	88.9	62.8	43.3	22.8	14.6	9.09	5.48	4	3.17	2.63
40	0.025	158	114	93.3	65.9	45.5	24	15.4	9.58	5.77	4.22	3.34	2.78
50	0.02	164	118	96.8	68.4	47.3	24.9	16	9.96	6.01	4.39	3.48	2.89
60	0.017	168	121	99.7	70.5	48.7	25.7	16.5	10.3	6.19	4.53	3.59	2.98
80	0.013	176	127	104	73.7	51	26.9	17.3	10.8	6.5	4.75	3.76	3.13
100	0.01	181	131	108	76.1	52.7	27.9	17.9	11.2	6.73	4.92	3.9	3.24
250	0.004	204	147	121	85.9	59.5	31.6	20.3	12.7	7.66	5.6	4.45	3.7

Rainfall intensities (mm/hr) :: 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	69	49.3	40.4	28.3	19.5	10.2	6.56	4.09	2.46	1.79	1.42	1.18
2	0.5	75.7	54.2	44.3	31.1	21.4	11.2	7.23	4.5	2.71	1.98	1.57	1.3
5	0.2	98.3	70.5	57.8	40.6	28	14.8	9.51	5.93	3.58	2.61	2.07	1.72
10	0.1	115	82.4	67.6	47.6	32.9	17.4	11.2	6.99	4.22	3.09	2.45	2.04
20	0.05	131	94.5	77.5	54.7	37.8	20	12.9	8.08	4.89	3.57	2.84	2.36
30	0.033	141	102	83.4	58.9	40.8	21.6	14	8.73	5.28	3.87	3.07	2.56
40	0.025	148	107	87.6	61.9	42.8	22.7	14.7	9.2	5.57	4.08	3.24	2.7
50	0.02	154	111	90.9	64.2	44.5	23.6	15.3	9.56	5.79	4.24	3.37	2.8
60	0.017	158	114	93.5	66.1	45.8	24.4	15.7	9.86	5.97	4.38	3.48	2.89
80	0.013	165	119	97.7	69.1	47.9	25.5	16.5	10.3	6.26	4.59	3.65	3.04
100	0.01	170	123	101	71.4	49.5	26.4	17.1	10.7	6.48	4.75	3.78	3.15
250	0.004	191	138	114	80.6	56	29.9	19.4	12.2	7.38	5.41	4.31	3.59

Rainfall intensities (mm/hr) :: 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	76.2	54.5	44.6	31.3	21.4	11.1	7.03	4.35	2.59	1.87	1.48	1.23
2	0.5	83.8	60	49.1	34.5	23.6	12.2	7.78	4.79	2.86	2.08	1.64	1.36
5	0.2	109	78.4	64.2	45.2	31	16.1	10.3	6.35	3.79	2.76	2.18	1.81
10	0.1	128	91.8	75.3	53.1	36.5	19	12.2	7.5	4.49	3.27	2.58	2.14
20	0.05	147	105	86.5	61.1	42.1	22	14	8.67	5.2	3.79	3	2.49
30	0.033	158	113	93.2	65.8	45.4	23.8	15.2	9.38	5.63	4.1	3.25	2.69
40	0.025	165	119	97.8	69.1	47.7	25	16	9.89	5.93	4.33	3.42	2.84
50	0.02	172	124	102	71.8	49.5	26	16.6	10.3	6.18	4.5	3.57	2.96
60	0.017	177	127	105	73.9	51	26.8	17.1	10.6	6.37	4.65	3.68	3.05
80	0.013	184	133	109	77.3	53.4	28	18	11.1	6.68	4.87	3.86	3.2
100	0.01	190	137	113	79.9	55.2	29	18.6	11.5	6.92	5.05	4	3.32
250	0.004	214	155	127	90.1	62.4	32.9	21.1	13.1	7.88	5.75	4.56	3.79

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	70.3	50.3	41.1	28.9	19.8	10.4	6.64	4.13	2.48	1.8	1.43	1.19
2	0.5	77.1	55.2	45.2	31.7	21.8	11.4	7.33	4.55	2.73	1.99	1.58	1.31
5	0.2	100	71.9	58.9	41.5	28.6	15	9.65	6.01	3.61	2.64	2.09	1.74
10	0.1	117	84.1	69	48.6	33.5	17.7	11.4	7.09	4.27	3.12	2.47	2.06
20	0.05	134	96.5	79.2	55.8	38.6	20.4	13.1	8.18	4.94	3.61	2.87	2.38
30	0.033	144	104	85.2	60.1	41.6	22	14.2	8.84	5.34	3.91	3.1	2.58
40	0.025	151	109	89.4	63.2	43.7	23.2	14.9	9.32	5.63	4.12	3.27	2.72
50	0.02	157	113	92.8	65.6	45.4	24	15.5	9.69	5.86	4.29	3.41	2.83
60	0.017	161	116	95.5	67.5	46.7	24.8	16	9.99	6.04	4.43	3.51	2.92
80	0.013	168	121	99.8	70.6	48.9	25.9	16.7	10.5	6.34	4.64	3.68	3.07
100	0.01	174	125	103	72.9	50.5	26.8	17.3	10.8	6.56	4.8	3.82	3.18
250	0.004	195	141	116	82.3	57.1	30.4	19.7	12.3	7.47	5.48	4.36	3.62

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	83.4	59.7	48.8	34.3	23.3	11.9	7.5	4.61	2.72	1.96	1.54	1.28
2	0.5	91.9	65.8	53.8	37.8	25.8	13.2	8.33	5.09	3.01	2.17	1.71	1.42
5	0.2	120	86.2	70.7	49.7	34.1	17.5	11.1	6.77	4.01	2.91	2.29	1.89
10	0.1	141	101	83	58.5	40.1	20.7	13.1	8.01	4.76	3.45	2.72	2.25
20	0.05	162	116	95.5	67.4	46.3	24	15.2	9.27	5.52	4	3.16	2.61
30	0.033	174	125	103	72.7	50	25.9	16.4	10	5.98	4.34	3.42	2.83
40	0.025	183	132	108	76.3	52.5	27.3	17.3	10.6	6.3	4.58	3.61	2.99
50	0.02	190	137	112	79.3	54.6	28.3	18	11	6.56	4.76	3.76	3.11
60	0.017	195	141	115	81.7	56.2	29.2	18.5	11.4	6.77	4.92	3.88	3.21
80	0.013	204	147	121	85.5	58.9	30.6	19.4	11.9	7.11	5.16	4.07	3.37
100	0.01	211	152	125	88.3	60.8	31.7	20.1	12.3	7.36	5.35	4.23	3.5
250	0.004	237	171	141	99.6	68.8	35.9	22.8	14	8.38	6.09	4.82	3.99

HIRDS V4 Depth-Duration-Frequency Results
Sitename: Pokapu Road
Coordinate system: WGS84
Longitude: 173.9807
Latitude: -35.4232

DDF Model Parameters:	c	d	e	f	g	h	i
Values:	0.00258	0.47781	-0.01787	-0.00203	0.254596	-0.01219	3.266853

Example:	Duration (h	ARI (yrs)	x	y	Rainfall Depth (mm)
	24	100	3.178054	4.600149	242.4791

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.6	15.2	18.7	26.2	36.2	57.6	74.6	93.6	113	125	132	137
2	0.5	11.6	16.7	20.5	28.7	39.7	63.3	82	103	125	137	145	151
5	0.2	15.1	21.6	26.6	37.4	51.7	82.7	107	135	164	181	192	199
10	0.1	17.6	25.2	31	43.7	60.6	97.1	126	159	193	213	226	235
20	0.05	20.1	28.9	35.6	50.2	69.6	112	146	184	224	246	262	273
30	0.033	21.6	31	38.2	54	75	121	157	198	242	266	283	295
40	0.025	22.6	32.6	40.1	56.7	78.8	127	165	209	254	281	298	311
50	0.02	23.5	33.8	41.6	58.8	81.7	132	172	217	265	292	310	323
60	0.017	24.1	34.8	42.8	60.6	84.2	136	177	224	273	301	320	334
80	0.013	25.2	36.3	44.7	63.3	88	142	185	234	286	315	335	350
100	0.01	26	37.5	46.2	65.4	91	147	192	242	296	327	347	362
250	0.004	29.2	42.2	52	73.8	103	166	217	276	337	372	396	414

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	1.2	1.4	1.6	2.5	3.5	6.3	9	14	18	21	21	23
2	0.5	1.3	1.6	1.8	2.8	3.9	6.9	10	16	21	23	24	26
5	0.2	1.9	2.3	2.7	3.9	5.5	9.4	14	21	28	31	32	35
10	0.1	2.4	3.1	3.7	5.2	7.1	12	17	26	33	37	39	41
20	0.05	3.1	4.1	4.9	6.7	9.3	15	22	30	40	43	46	49
30	0.033	3.6	4.8	5.8	7.9	11	18	25	33	43	47	51	53
40	0.025	4	5.4	6.5	8.8	12	20	28	36	47	50	54	57
50	0.02	4.3	5.9	7.1	9.6	13	21	31	38	49	53	57	60
60	0.017	4.6	6.3	7.6	10	14	23	33	39	51	55	59	62
80	0.013	5	7	8.5	11	16	25	36	42	55	59	63	66
100	0.01	5.4	7.6	9.3	13	17	28	40	44	58	62	67	70
250	0.004	7.4	10	13	18	24	39	56	55	71	76	82	86

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	11.4	16.3	20	28.1	38.6	60.8	78.1	97.5	117	128	136	141
2	0.5	12.5	17.9	21.9	30.8	42.4	66.9	86.1	107	129	142	150	156
5	0.2	16.2	23.2	28.6	40.2	55.5	87.8	113	141	171	187	198	206
10	0.1	18.9	27.2	33.4	47.1	65.1	103	133	167	201	221	234	243
20	0.05	21.7	31.2	38.3	54.1	74.9	119	154	193	233	256	271	282
30	0.033	23.3	33.5	41.3	58.3	80.7	128	166	208	252	277	293	305
40	0.025	24.4	35.2	43.3	61.2	84.8	135	175	219	265	292	309	322
50	0.02	25.3	36.5	44.9	63.5	88	140	182	228	276	303	322	335
60	0.017	26	37.5	46.2	65.4	90.6	145	187	235	285	313	332	345
80	0.013	27.2	39.2	48.3	68.4	94.8	151	196	246	299	328	348	362
100	0.01	28.1	40.5	49.9	70.6	98	157	203	255	309	340	361	375
250	0.004	31.5	45.5	56.2	79.7	111	178	230	290	352	388	411	428

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	11.4	16.3	20	28.1	38.6	60.8	78.1	97.5	117	128	136	141
2	0.5	12.5	17.9	21.9	30.8	42.4	66.9	86.1	107	129	142	150	156
5	0.2	16.2	23.2	28.6	40.2	55.5	87.8	113	141	171	187	198	206
10	0.1	18.9	27.2	33.4	47.1	65.1	103	133	167	201	221	234	243
20	0.05	21.7	31.2	38.3	54.1	74.9	119	154	193	233	256	271	282
30	0.033	23.3	33.5	41.3	58.3	80.7	128	166	208	252	277	293	305
40	0.025	24.4	35.2	43.3	61.2	84.8	135	175	219	265	292	309	322
50	0.02	25.3	36.5	44.9	63.5	88	140	182	228	276	303	322	335
60	0.017	26	37.5	46.2	65.4	90.6	145	187	235	285	313	332	345
80	0.013	27.2	39.2	48.3	68.4	94.8	151	196	246	299	328	348	362
100	0.01	28.1	40.5	49.9	70.6	98	157	203	255	309	340	361	375
250	0.004	31.5	45.5	56.2	79.7	111	178	230	290	352	388	411	428

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	11.6	16.6	20.3	28.5	39.2	61.6	79	98.5	118	129	137	142
2	0.5	12.7	18.2	22.3	31.3	43.1	67.9	87.2	108	130	143	151	157
5	0.2	16.5	23.7	29.1	40.9	56.4	89.1	115	143	172	189	200	207
10	0.1	19.3	27.7	34	48	66.2	105	135	169	203	223	236	245
20	0.05	22.1	31.7	39.1	55.1	76.2	121	156	195	235	258	274	284
30	0.033	23.7	34.1	42	59.4	82.1	130	168	210	255	279	296	308
40	0.025	24.9	35.8	44.1	62.3	86.3	137	177	222	268	295	312	325
50	0.02	25.8	37.2	45.8	64.7	89.6	143	184	230	279	306	325	338
60	0.017	26.5	38.2	47.1	66.6	92.3	147	190	238	288	316	335	348
80	0.013	27.7	39.9	49.2	69.6	96.5	154	199	249	302	332	351	366
100	0.01	28.6	41.2	50.8	72	99.8	159	206	258	312	343	364	379
250	0.004	32.1	46.4	57.3	81.2	113	180	234	293	356	391	415	432

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	12.2	17.4	21.4	30	41.1	64.1	81.8	102	121	132	139	145
2	0.5	13.4	19.1	23.5	33	45.3	70.8	90.4	112	134	146	154	160
5	0.2	17.4	25	30.7	43.2	59.4	93.2	119	148	177	194	205	212
10	0.1	20.3	29.2	35.9	50.7	69.8	110	141	175	210	230	242	252
20	0.05	23.3	33.5	41.3	58.3	80.4	127	163	202	243	266	281	292
30	0.033	25.1	36.1	44.4	62.8	86.7	137	176	218	263	288	304	316
40	0.025	26.3	37.9	46.7	65.9	91.1	144	185	230	277	304	321	333
50	0.02	27.3	39.3	48.4	68.4	94.6	150	192	239	288	316	334	347
60	0.017	28.1	40.4	49.8	70.5	97.4	154	198	247	297	326	345	358
80	0.013	29.3	42.3	52.1	73.7	102	161	208	258	312	342	361	376
100	0.01	30.2	43.6	53.8	76.1	105	167	215	268	323	354	375	389
250	0.004	34	49.1	60.6	85.9	119	189	244	304	368	403	427	444

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	11.5	16.4	20.2	28.3	38.9	61.3	78.7	98.1	118	129	136	141
2	0.5	12.6	18.1	22.2	31.1	42.8	67.5	86.7	108	130	142	150	156
5	0.2	16.4	23.5	28.9	40.6	56.1	88.6	114	142	172	188	199	207
10	0.1	19.1	27.5	33.8	47.6	65.8	104	134	168	203	222	235	245
20	0.05	21.9	31.5	38.8	54.7	75.7	120	155	194	234	257	273	283
30	0.033	23.5	33.9	41.7	58.9	81.5	130	168	209	254	278	295	307
40	0.025	24.7	35.6	43.8	61.9	85.7	136	176	221	267	294	311	324
50	0.02	25.6	36.9	45.4	64.2	89	142	183	229	278	305	324	337
60	0.017	26.3	37.9	46.8	66.1	91.6	146	189	237	287	315	334	347
80	0.013	27.5	39.6	48.9	69.1	95.8	153	198	248	301	330	350	364
100	0.01	28.4	40.9	50.5	71.4	99.1	158	205	257	311	342	363	377
250	0.004	31.9	46.1	56.8	80.6	112	179	232	292	354	390	414	431

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	12.7	18.2	22.3	31.3	42.8	66.4	84.3	104	124	135	142	147
2	0.5	14	20	24.5	34.5	47.3	73.4	93.4	115	137	149	157	163
5	0.2	18.2	26.1	32.1	45.2	62.1	96.9	124	152	182	199	209	217
10	0.1	21.3	30.6	37.7	53.1	73	114	146	180	216	236	248	257
20	0.05	24.4	35.1	43.3	61.1	84.1	132	169	208	250	273	288	298
30	0.033	26.3	37.8	46.6	65.8	90.7	143	182	225	270	295	312	323
40	0.025	27.6	39.7	48.9	69.1	95.3	150	192	237	285	312	329	341
50	0.02	28.6	41.2	50.8	71.8	99.1	156	199	247	296	324	342	355
60	0.017	29.4	42.4	52.3	73.9	102	161	206	255	306	335	353	366
80	0.013	30.7	44.3	54.6	77.3	107	168	215	267	321	351	370	385
100	0.01	31.7	45.8	56.4	79.9	110	174	223	276	332	363	384	398
250	0.004	35.6	51.5	63.6	90.1	125	197	253	314	378	414	438	455

Rainfall depths (mm) :: RCP8.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.7	16.8	20.6	28.9	39.6	62.2	79.7	99.2	119	130	137	143
2	0.5	12.9	18.4	22.6	31.7	43.6	68.5	87.9	109	131	144	152	157
5	0.2	16.7	24	29.5	41.5	57.1	90.1	116	144	173	190	201	209
10	0.1	19.5	28	34.5	48.6	67.1	106	136	170	205	225	238	247
20	0.05	22.4	32.2	39.6	55.8	77.2	122	158	196	237	260	275	286
30	0.033	24	34.6	42.6	60.1	83.2	132	170	212	257	281	298	310
40	0.025	25.2	36.3	44.7	63.2	87.4	139	179	224	270	297	314	327
50	0.02	26.1	37.7	46.4	65.6	90.8	144	186	232	281	309	327	340
60	0.017	26.9	38.7	47.7	67.5	93.5	149	192	240	290	319	337	351
80	0.013	28.1	40.5	49.9	70.6	97.8	156	201	251	304	334	354	368
100	0.01	29	41.8	51.5	72.9	101	161	208	260	315	346	367	381
250	0.004	32.6	47	58	82.3	114	182	236	296	359	394	418	435

Rainfall depths (mm) :: RCP8.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	13.9	19.9	24.4	34.3	46.6	71.6	90	111	130	141	148	153
2	0.5	15.3	21.9	26.9	37.8	51.7	79.3	100	122	144	157	164	170
5	0.2	20	28.7	35.3	49.7	68.1	105	133	162	193	209	220	227
10	0.1	23.5	33.8	41.5	58.5	80.3	124	157	192	228	249	261	270
20	0.05	27	38.8	47.8	67.4	92.6	144	182	222	265	288	303	313
30	0.033	29	41.8	51.5	72.7	99.9	155	197	241	287	312	329	340
40	0.025	30.5	43.9	54	76.3	105	164	207	254	302	330	347	359
50	0.02	31.6	45.5	56.1	79.3	109	170	216	264	315	343	361	373
60	0.017	32.5	46.9	57.7	81.7	112	175	223	273	325	355	373	385
80	0.013	34	49	60.4	85.5	118	184	233	286	341	372	391	405
100	0.01	35.1	50.6	62.4	88.3	122	190	242	296	353	385	406	419
250	0.004	39.4	56.9	70.3	99.6	138	216	274	337	402	439	463	479

Appendix 6

Geotechnical Assessment

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GEOTECHNICAL INVESTIGATION REPORT

POKAPU ROAD, MOEREWA

STEPHEN HERRIES FAMILY TRUST

C0656N-G-01
NOVEMBER 2025
REVISION 2

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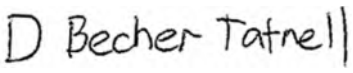
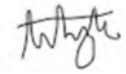
Prepared	Dominic Becher-Tatnell Geotechnical Engineer 
Reviewed	Andre Whyte Principal Geotechnical Engineer, CPEng, CMEngNZ 
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REVISION HISTORY

Date	Issue	Prepared	Reviewed
November 2025	First Issue – For Consent	DBT	AW
November 2025	Second Issue – Minor Amendments	DBT	AW

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FIGURES

TABLES

1 INTRODUCTION

This Geotechnical Investigation Report has been prepared by Geologix Consulting Engineers Ltd (Geologix) for Stephen Herries Family Trust 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 and Building Consent application in relation to the creation of three new lots and will consider the three building sites lots 1 to 3 at the proposed subdivision of a rural property, Pokapu Road, Moerewa, the 'site'.

Specifically, this report provides interpretation of a site-specific ground investigation and geotechnical assessment to provide recommendations and a concept geotechnical assessment for the development of the designated house sites.

1.1 Proposed Development

It is understood that the Client proposes to develop the site to create three new lots to support future residential use. These lots are primarily comprised of the subdivision of Lot 1 DP 561372 and are the proposed designated house sites.

Table 1: Summary of Proposed Subdivision

Proposed Lot No.	Size	Purpose
1	4.0025 Ha	New residential
2	4.0240 Ha	New residential
3	4.1470 Ha	New residential
4	113.6022 HA	Balance Lot

Specific development plans were not provided to Geologix at the time of writing, and as such, we have considered a conservative assessment of potential future residential development earthworks.

The understanding has been established from a scheme plan[1] supplied to Geologix at the time of writing. It is recommended that this report is subject to review and a site-specific geotechnical investigation is undertaken as part of future residential development at the Building Consent stage.

2 SITE DESCRIPTION

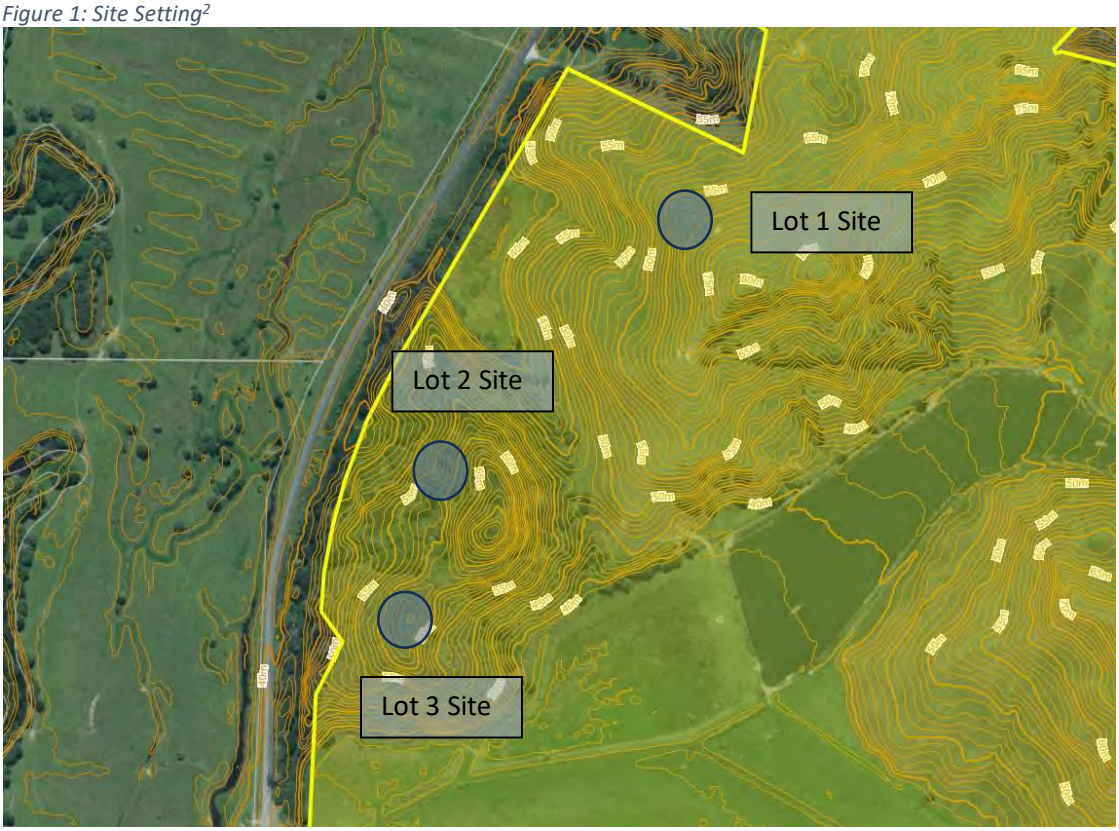
The site is presented within a typical rural area to the east of Pokapu Road and is comprised of pastureland and bush. The site is legally described as Lot DP 561372 & Motatau 2Sec3 & 2Sec5 Block and is irregular in shape with a gross total site area of approximately 156.0977 ha. The proposed development sites are accessed from Pokapu Road at the western boundary.

[1] *Thomson Survey Ltd, Scheme Plan Ref.10646, dated August 2024.*

Topographically the site is moderately to steeply sloping over the northern part of the property where the dwellings are proposed in the elevated areas and mostly flat on the southern side of the site. The ground varies between approximately 24° and 34° in the location of the proposed development sites. The site is mostly pastureland with forest land in the lot 2 & 3 development areas.

The site setting is presented schematically as Figure 1 below.

Figure 1: Site Setting[2]



3 DESKTOP APPRAISAL

To assist with our geotechnical appraisal, we have undertaken a detailed desktop review of available information with a specific focus upon geotechnical influences.

3.1 Infrastructure Review

Available infrastructure information is provided by Far North District Council GIS system. According to the available data, no existing Council infrastructure is present within the site boundaries, and it is understood the site would be serviced by on-site 3 water infrastructure.

Geotechnically, any proposed structure foundations will not be influenced by existing

[2] *Source: https://localmaps.kaipara.govt.nz/localmapsviewer*

pipelines according to available data.

3.2 Overland Flow Path and Flood Plains

Available GIS information indicates flood potential under the 1 % AEP event to influence the lower lying areas of the site.

The risk of encountering low-strength alluvial deposits over the proposed building footprints is considered low.

3.3 Geology

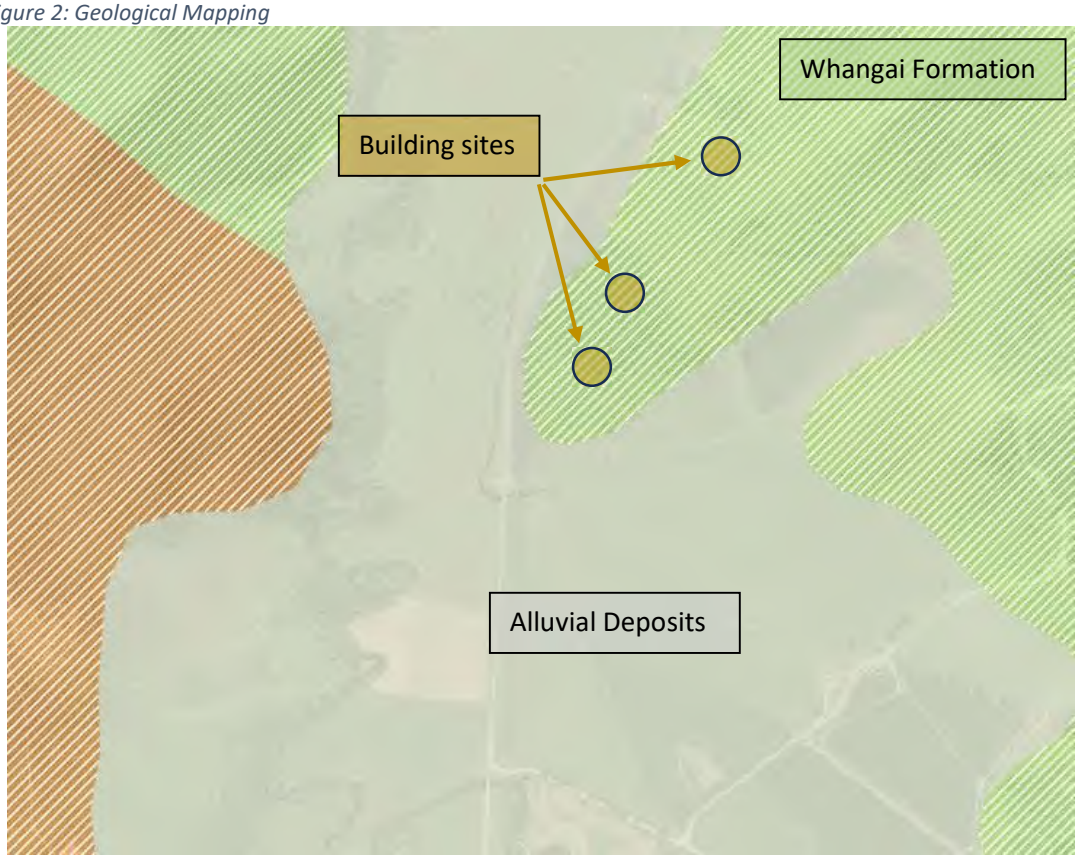
Available geological mapping[3] indicates the site to be underlain by Whangai Formation of Northland Allochthon, described as massive to thinly bedded, siliceous mudstone, locally with thin glauconitic sandstone interbeds.

In the lower lying areas the site is underlain by Holocene river deposits, described as unconsolidated to poorly consolidated mud, sand, gravel and peat deposits of alluvial, colluvial and lacustrine origins.

The geological map of the area is shown on Figure 2: Geological MappingFigure 2.

[3] *Geological & Nuclear Science, 1:250,000 scale Geological Map, Sheet 2, Whangarei, 2009.*

Figure 2: Geological Mapping



3.4 Existing Geotechnical Information

A review of available GIS databases, including the New Zealand Geotechnical Database[4] (NZGD) identified no records within 500 m of the site. To improve the NZGD, exploratory records from our ground investigation were uploaded to the system.

4 GROUND INVESTIGATION

A site-specific walkover survey and intrusive ground investigation was undertaken by Geologix on 8th and 9th October 2025. The ground investigation was scoped to confirm the findings of the above information and to provide site-specific parameters for this geotechnical assessment and ground model. The ground investigation comprised:

- Twelve hand augered boreholes designated HA01 to HA12, formed within the proposed building sites to a target depth of 5.0 m below ground level (bgl). Refusal was encountered in all boreholes at depths varying from 0.3 m to 4.0 m bgl.
- Monitoring of groundwater levels with a groundwater dip meter on the day of drilling. Groundwater measurements were taken at the time of drilling.

[4] https://www.nzgd.org.nz/

- Dynamic Cone Penetration (DCP) testing was carried out at the base of the boreholes until final refusal i.e. 20 blows per 100 mm penetration at depths ranging from 0.4 to 4.9 m bgl.

4.1 Site Walkover Survey

A visual walkover survey of the property confirmed:

- Topography is in general accordance with that outlined in Section 2 and the available GIS contours.
- Hummocky ground and reeds was noted on site and in the neighbouring properties
- No existing retaining walls or supporting structures were noted during our walkover survey.
- The site is presented as mostly pastureland. Land in all directions include similar rural properties.

4.2 Ground Conditions

Arisings recovered from the exploratory boreholes were logged by a qualified geotechnical engineering professional in accordance with New Zealand Geotechnical Society guidelines[5]. 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 to depths between 0.05 to 0.35 m bgl.** Topsoil was locally encountered as a shallow surface veneer of organic silt with trace rootlets. The unit was dark brown or black and moist or moist to wet.
- **Northland Allochthon Residual Soil to encountered depths of 0.3 to 4.2 m bgl.** The residual soils were described as orange, brown, and grey, variable amounts of silt and clay with occasional gravel or sand. The unit was detailed as dry to moist, moist or moist to wet and low to high plasticity.

  The Northland Allochthon was found to be variable in strength. In total seventy-four in-situ field vane tests recorded vane shear strengths ranging from 81 to 199 kPa, indicative of variable stiff to hard soils and a characteristic unit vane shear strength of 155 kPa was determined at 95 % confidence.

- **Dense Northland Allochthon to depths of 0.3 to >5.0 m bgl.** Dense Northland Allochthon was encountered within all boreholes where DCP blow counts consistently returned values above 10 per 100 mm penetration.

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[5] *New Zealand Geotechnical Society, Field Description of Soil and Rock, 2005.*

- **Very Dense Northland Allochthon at depths from >0.4 to >4.9 m bgl.** Very Dense Northland Allochthon was inferred within all boreholes where Scala penetrometer values exceeded 20 blows per 100mm.

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

Table 2: Summary of Ground Investigation

Hole ID	Hole Depth	Depth of Residual Soil	Depth to Dense NA	Refusal Depth	Groundwater[2]
HA01	3.2 m	0.2 – 2.6 m	2.6 m	3.2 m	NE
HA02	3.8 m	0.2 – 3.3 m	3.3 m	3.8 m	NE
HA03	4.9 m	0.2 – 4.2 m	4.2 m	4.9 m	NE
HA04	5.0 m	0.2 – 3.6 m	3.6 m	NE	NE
HA05	2.6 m	0.25 – 2.5 m	2.5 m	2.6 m	NE
HA06	3.3 m	0.35 – 1.65 m	2.9 m	3.3 m	NE
HA07	0.4 m	0.1 – 0.3 m	0.3 m	0.4 m	NE
HA08	1.1 m	0.05 – 0.9 m	0.9 m	1.1 m	NE
HA09	0.7 m	0.2 – 0.5 m	0.5 m	0.7 m	NE
HA09A	1.9 m	0.05 – 1.3 m	1.3 m	1.9 m	NE
HA10	0.9 m	0.1 – 0.5 m	0.5 m	0.9 m	NE
HA11	4.1 m	0.2 – 3.7 m	3.7 m	4.1 m	NE
HA12	3.2 m	0.25 – 2.8 m	2.8 m	3.2 m	NE

4.2.1 Groundwater

The ground investigation was undertaken during spring and formed exploratory boreholes to depths greater than any expected potential excavation to form a typical rural residential building platform. Groundwater levels were monitored utilising a groundwater dip meter on the day of drilling. During our ground investigation, groundwater was not encountered.

Groundwater levels commonly fluctuate according to the season and rainfall events. Therefore, groundwater levels may vary and be identified at higher levels than monitored during this ground investigation. The groundwater shall also be monitored at the ground investigation conducted during the building consent stage.

5 PRELIMINARY GEOTECHNICAL ASSESSMENT

Based on the results of the desktop appraisal, a site walkover survey, and the ground investigation, Geologix have undertaken a site-specific geotechnical assessment relevant to the proposed building sites.

The purpose of the further investigation is to confirm the baseline parameters below, confirm geotechnical properties between the time of this investigation and the time of future development and to develop the preliminary geotechnical information to the level of rigour to satisfy Building Consent requirements.

5.1 Preliminary Geotechnical Design Parameters

Preliminary 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/m³	Effective Friction Angle, °	Effective Cohesion, kPa	Undrained shear strength, kPa
Northland Allochthon Residual Soil	18	29	4	108*
Dense Northland Allochthon	19	32	7	200+
Very Dense Northland Allochthon	20	34	9	200+

**Adopting Bjerrum correction factor of 0.7 from the characteristic vane shear strength.*

5.2 Preliminary Site Subsoil Class

The site has been designated as Site Subsoil Class C - shallow soil sites according to the provisions of NZS1170.5:2004[6].

5.3 Preliminary 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[7]. 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

[6] *NZS1170.5:2004, Structural Design Actions Part 5: Earthquake Actions Clause 3.1.3.4.*

[7] *New Zealand Geotechnical Society, Earthquake Geotechnical Engineering Practice, Module 1, November 2021, Appendix A, Table A1.*

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

5.4 Preliminary Site Stability

Slope stability analysis results are presented in full as Appendix C and summarised below as Table 5. Section locations are shown on drawing 200.

Table 5: Summary of Stability Analysis Results

Profile	Scenario	Global Min.	Development Footprint (min FS)	Result
Section A				
Existing	Static[1]	1.631	>1.5	Pass
	Elevated GW[2]	1.244	>1.3	Pass
	Seismic[3]	1.033	>1.0	Pass
Proposed	Static[1]	1.536	>1.5	Pass
	Elevated GW[2]	1.216	>1.3	Pass
	Seismic[3]	1.038	>1.0	Pass
Restriction Line	Static[1]	1.630	>1.5	Pass
	Elevated GW[2]	1.244	>1.3	Pass
	Seismic[3]	1.033	>1.0	Pass
Section B				
Dwelling Location Existing Condition	Static[1]	2.116	>1.5	Pass
	Elevated GW[2]	1.790	>1.3	Pass
	Seismic[3]	1.582	>1.0	Pass
Dwelling Proposed	Static[1]	2.056	>1.5	Pass
	Elevated GW[2]	1.789	>1.3	Pass
	Seismic[3]	1.595	>1.0	Pass
Road Location Existing Condition	Static[1]	1.172	<1.5	Fail
	Elevated GW[2]	0.877	<1.3	Fail
	Seismic[3]	0.845	<1.0	Fail
Road Proposed	Static[1]	1.409	>1.5	Pass
	Elevated GW[2]	1.085	>1.3	Pass
	Seismic[3]	0.997	>1.0	Pass
Section C				
Existing	Static[1]	1.677	>1.5	Pass
	Elevated GW[2]	1.310	>1.3	Pass
	Seismic[3]	1.102	>1.0	Pass
Proposed	Static[1]	1.542	>1.5	Pass
	Elevated GW[2]	1.229	<1.3	Fail
	Seismic[3]	1.082	>1.0	Pass

Palisade Wall	Static[1]	1.955	>1.5	Pass
	Elevated GW[2]	1.338	>1.3	Pass
	Seismic[3]	1.155	>1.0	Pass

1. *Static, normal groundwater minimum FS = 1.5*
2. *Static, elevated groundwater minimum FS = 1.3*
3. *Dynamic, seismic conditions minimum FS = 1.0*

5.4.1 Preliminary Stability Analysis Conclusions

The developed slope stability model is considered to be a reasonable representation of the observed conditions on site. No detailed architectural plans or earthworks plans are available during the preparation of this report. Slope stability analyses shall be subject to revision and enhancement once final development and earthworks extents are known on each lot and for the proposed driveways.

The model shows translational failure within the area of the driveway cuts and within the development areas for lots 1 & 3 through the residual soils. The failure planes were generally within the shallow northland allochthon residual soil and dense Northland Allochthon which had the lowest soil parameters and are most affected by groundwater.

We recommend specifically designed retaining walls for the proposed driveways as per section 6.5. For lot 1 we recommend a building restriction line as per section 6.2 and for lot 3 we recommend a conceptual palisade wall as per section 6.3

5.5 Preliminary Soil Expansivity Potential

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.

Based on our experience with Northland Allochthon soil, laboratory analysis within the strata on other projects in the local area and site observations, the shallow soils are conservatively expected to meet the requirements of a highly expansive or Class H soil type. In accordance

with AS2870:2011[8] and New Zealand Building Code[9], 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.

A quantification of the expansive soil class assumptions can be made by geotechnical laboratory analysis at the Building Consent stage.

5.6 Preliminary 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 fine-grained Northland Allochthon residual soil. 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.

6 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The following preliminary geotechnical recommendations have been developed based on a typical, conceptual rural residential development formed within the designated development area outlined by the scheme plan. The preliminary recommendations have been developed to satisfy the requirements of Resource Consent to confirm the new residential lots can be formed with a less than minor effect on the environment.

It is recommended these conceptual recommendations are reviewed at the Building Consent stage once final development plans are available and advanced by development specific geotechnical investigation.

6.1 Foundations

The development platform is understood to be formed by a minor topsoil strip to exposure natural northland allochthon soils. 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.

Provided the building site is protected with the stability control measures outlined by this report and based on the natural formation having an average undrained shear strength of 100kPa with 100 – 300mm layer of compacted GAP65 on this formation then it is expected that either shallow standard raft, piles or strip footing foundations can be adopted for a

[8] *AS2870, Residential Slabs and Footings, 2011.*

[9] *New Zealand Building Code, Structure B1/AS1 (Amendment 19, November 2019), Clause 7.5.13.1.2.*

future dwelling. Such foundations may be designed by a professional structural engineer adopting an Ultimate Bearing Capacity of 300 kPa for a highly expansive soil type and a geotechnical reduction factor of 0.5. The use of widespread deep piled foundations is not considered necessary.

Construction monitoring requirements of the above recommendations are detailed in Section 6.8 of this report.

6.2 Building Restriction Line

Due to the steep to moderately steep slope in downslope of the lot 1 building platform, we propose a building restriction line. Any structures downslope of the building restriction line will require a palisade wall detailed at the building consent stage. If the structures are restricted to be only upslope of the line, then no stabilisation is recommended at this stage. The building restriction line location is shown on Drawing No. 200.

6.3 Conceptual Palisade Wall

Due to the moderately to steep slope near the lot 3 development area, it is recommended that the proposed building platform is protected by a palisade wall at least 3x pile diameters deep into Very Dense Northland Allochthon as identified in Table 2 to provide 20kN of stabilizing shear force. These structures shall be detailed in the building consent stage. Should the final building location be outside of the identified slip surfaces, a retaining structure may not be required. However, this should be subject to assessment at the Building Consent stage.

6.4 Concept Earthworks and Methodology

It is presumed that the future building platforms will be formed by mainly cut earthworks with possible fill for the building footprint and/ or landscape areas. As the proposed building sites are located near moderately to steeply sloping ground, it is recommended that all excavations are formed at a permanent batter slope of 1V:4H up to a maximum height of 0.5m. Above this height, it is recommended that cut batters are supported by specifically engineered retaining walls.

6.4.1 Temporary Works

To reduce the risk of temporary excavation instability, it is recommended that unsupported excavations have a maximum vertical height of 0.5 m. Temporary unsupported excavations above this height shall be battered at 1V:1H or 45 °. Temporary unsupported excavations >0.5 m is not anticipated within the proposed development concept. It is expected that the above temporary works can be undertaken within the property boundaries.

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

6.4.2 *Fills*

Due to the moderately to steep slope near the proposed preliminary building footprints, 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.

6.5 Conceptual Driveway Retaining Walls

Currently a conceptual cut of up to 3.4m of cut is proposed for the driveway retaining walls leading to lots 2 & 3. The final earthworks for these driveways and retaining walls is subject to the final driveway design by a civil engineer during the detailed design stage. We recommend the detailed design for the driveway retaining walls are completed and optimised by a geotechnical engineer familiar with this report once the final earthwork plans are completed.

6.6 Other Conceptual Retaining Walls

In general, it is expected that other retaining walls may be required. It is recommended that all proposed retaining walls are subject to specific engineering design.

It is recommended that all proposed retaining walls are designed by a professional engineer familiar with the findings and geotechnical parameters of this report. In addition, any retaining upon sloping ground at the site shall be subject to specific geotechnical stability analysis at the Building Consent stage. Timber pole cantilever retaining walls or soldier pile retaining walls are considered the most feasible solution for the site.

Based on the results of the ground investigation and for a backslope of 0 ° above the retaining structure, preliminary earth pressure parameters for design are presented within Table 6 below.

Table 6: Earth Pressure Parameters.

Strata	At Rest Pressure Coefficient, K_O	Active Pressure Coefficient, K_A	Passive Pressure Coefficient, K_P
Northland Allochthon Residual Soil	0.5	0.297	5.558
Dense Northland Allochthon	0.47	0.275	6.607
Very Dense Northland Allochthon	0.441	0.254	7.570

1. Adopts soil/ wall friction coefficient of 0.67 for timber according to NZBC B1/VM4 Table 2.

	Refinement required for alternative materials.
2.	*Considers 0 ° backslope only. Parameters to be modified by design engineer.*

It is recommended that a 100 mm diameter perforated drain coil and cohesionless backfill (minimum 300 mm wide) is installed behind all retaining walls to control any temporary hydrostatic pressures.

6.7 Concept Driveways and Car Parking

For any proposed future driveway and car parking, it is recommended that all unsuitable materials such as topsoil, vegetation, shallow fill, and localised soft spots are removed from the driveway area prior to filling. By doing so, it is expected that the shallow Northland Allochthon Residual Soil will achieve a typical subgrade CBR value of 4 % or greater according to Austroads Standards.

For the driveway and parking areas it is recommended that carriageways include a minimum total thickness of 250 mm, comprising a minimum 150 mm sub-basecourse, typically AP65 or approved similar and minimum 100 mm basecourse, typically finer AP40 and a thin, 50 mm running course of GAP20.

Alluvial soils may be encountered at the entrance of the site and the low-lying areas for the proposed driveway. The CBR value of these soils shall be determined during site inspection and an allowance should be made for the risk of shallow ground improvements and over excavation and backfill in these areas.

6.8 Concept Construction Monitoring

During construction it is recommended that specific construction monitoring is undertaken by a professional engineer in accordance with the recommendations of this report, consent conditions and subsequent development specific geotechnical assessment at the Building Consent stage. At this stage, is anticipated that a professional Geotechnical Engineer will be required to provide inspection of:

- Foundations to confirm the embedment, construction and bearing capacity in accordance with specific engineering design and geotechnical requirements.
- Subgrade at the base of excavations within the footprint of buildings, driveways and any other areas of structural or vehicle loading.
- Inspection of hard fill compaction where placed >300 mm in thickness and/ or within the footprint of imposed surcharges such as buildings and/ or driveways. Hard fill should be inspected at maximum 300 mm lift intervals.
- Inspection of retaining wall construction, primarily of formed pile holes and select material properties.

The above items are considered to be capable under CM2 level construction monitoring accompanied by appropriate Producer Statements. Monitoring should be undertaken or

supervised by a chartered professional engineer.

6.9 Further Geotechnical Works

This report was written based on the scheme plan supplied to Geologix at the time of writing and a typical, concept rural residential development scenario. It is recommended that this report is reviewed and advanced as required at the Building Consent stage when site specific development plans of the future dwellings and earthworks are available.

7 LIMITATIONS

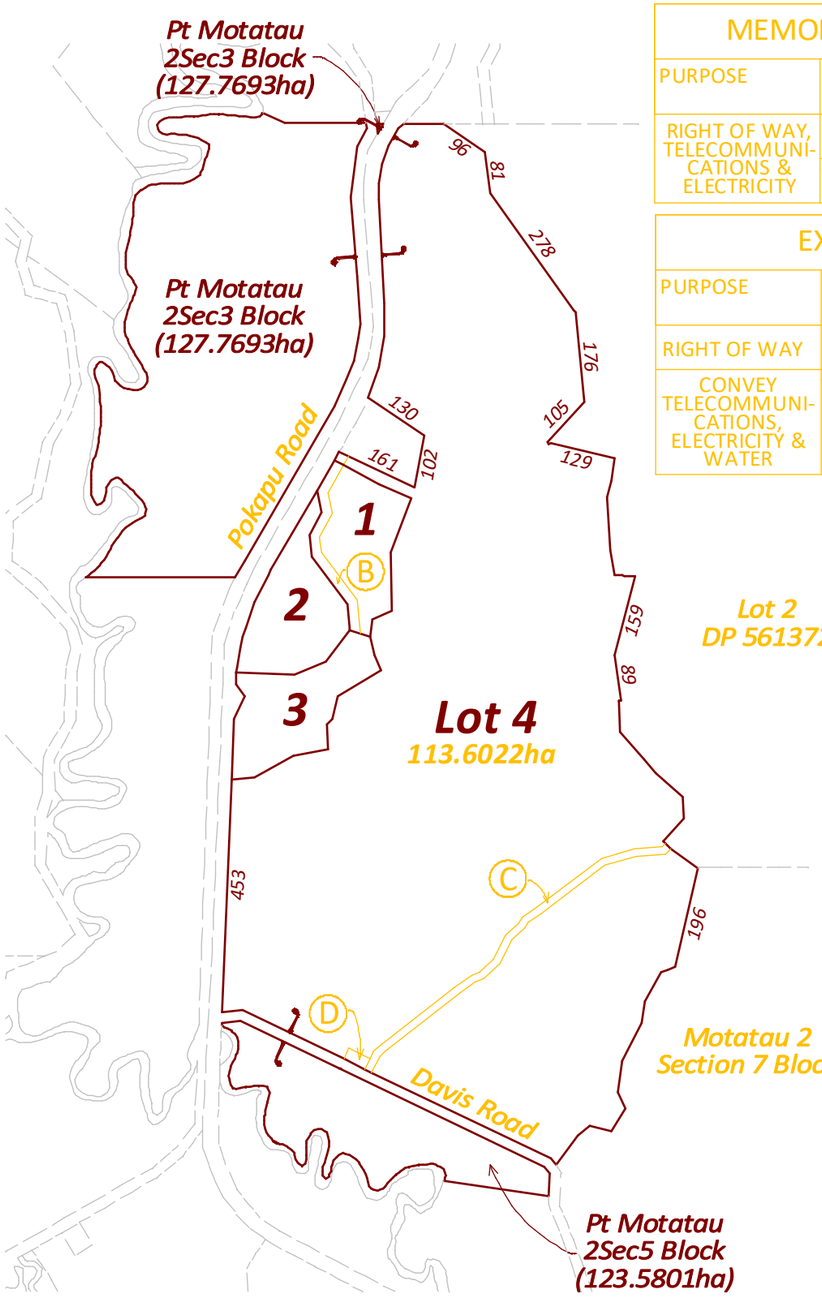
This report has been prepared for Stephen Herries Family Trust as our Client. It may be relied upon by our Client and their appointed Consultants, Contractors and for the purpose of Consent as outlined by the specific objectives in this report. This report and associated recommendations, conclusions 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.

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 ground investigation locations are inferred. It must be appreciated that the actual conditions may vary from the assumed ground model. Difference from the encountered ground conditions during construction may require an amendment to the recommendations of this report.

APPENDIX A

Drawings



MEMORANDUM OF EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNI-CATIONS & ELECTRICITY	A	LOT 4 HEREON	LOTS 1 - 3 HEREON
	B	LOT 1 HEREON	LOTS 2 & 3 HEREON

EXISTING EASEMENTS

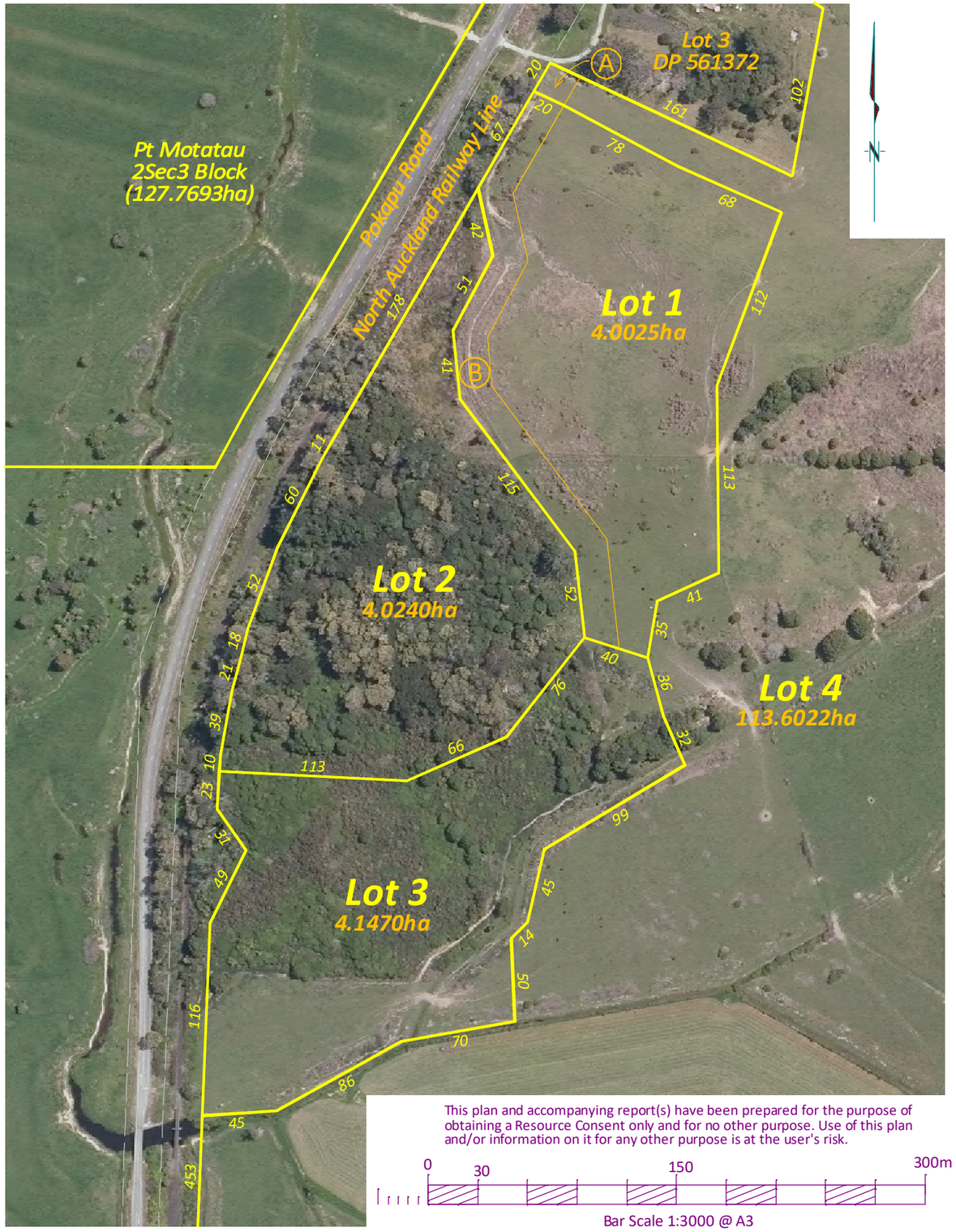
PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
RIGHT OF WAY	C	LOT 4 HEREON	E.I. 12197377.4
CONVEY TELECOMMUNI-CATIONS, ELECTRICITY & WATER	C D	LOT 4 HEREON	

Local Authority: Far North District Council
Comprised in: 993105
Total Area: 156.0977ha
Zoning: Rural Production
Resource features: NIL

AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY AND SCALED FROM AERIAL PHOTOGRAPHY

AMALGAMATION CONDITION:
THAT LOT 4 HEREON, PART MOTATAU 2SEC3 BLOCK & PART MOTATAU 2SEC5 BLOCK ARE TO BE HELD IN THE SAME CERTIFICATE OF TITLE.



0 30 150 300m

Bar Scale 1:3000 @ A3

THOMSON SURVEY LIMITED
315 Kerikeri Rd
P.O. Box 372 Kerikeri
Email: kerikeri@tsurvey.co.nz
Ph: (09) 4077360
www.tsurvey.co.nz
Registered Land Surveyors, Planners & Land Development Consultants

PROPOSED SUBDIVISION OF LOT 1 DP 561372 & PART MOTATAU 2SEC3 BLOCK & PART MOTATAU 2SEC5 BLOCK

POKAPU ROAD, MOEREWA

PREPARED FOR: HARRIES

	Name	Date
Survey		
Design		
Drawn	KY	05.08.24
Approved		
Rev		

ORIGINAL
SCALE 1:3000
SHEET SIZE A3

10646 Scheme 20240805

Surveyors Ref. No: 10646

Sheet 1 of 1

Legend

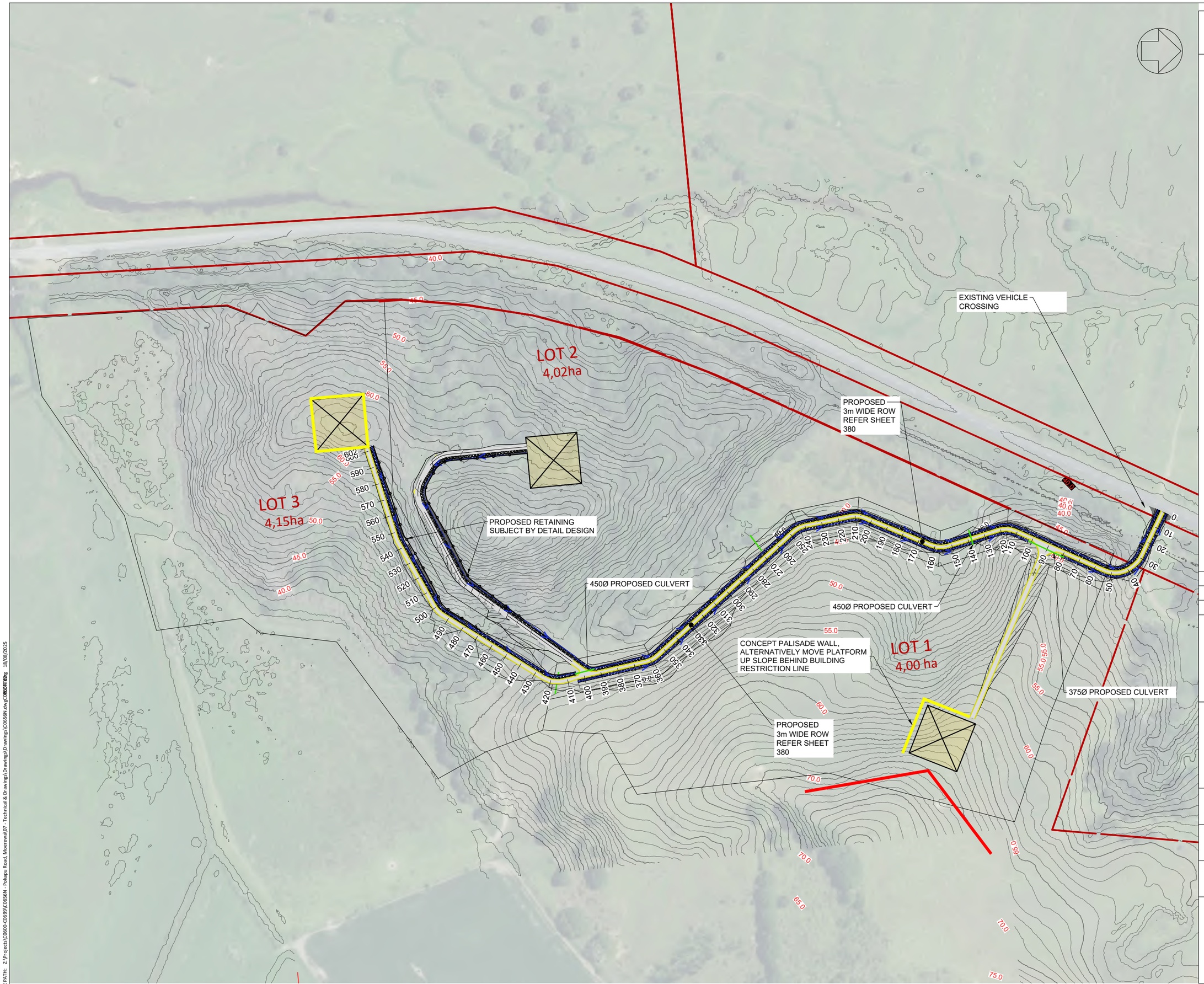
- Section C
- Section B
- Section A
- Site Boundary
- Geologix Hand Auger + Dynamic Cone Penetrometer (October 2025)

0 25 m 50 m

geologix consulting engineers

Produced by **Datanest.earth**

Title: Geotechnical Site Plan		
Client: Stephen Herries Family Trust		Size: A3
Project: 656N Popaku Road, Moerewa	Drawn: DBT	Drawing No.: 200
Date: 22-10-2025	Checked: AW	
Proj No: C0656N	Scale: 1:2000	Version: Final



GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY LTD SCHEME PLAN, REF 10646, DATED 05/08/2025
2. CONTOURS AT 1.0 m INTERVALS.
3. TOPOGRAPHIC SURVEY DATA PROVIDED BY LINZ LIDAR
4. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
5. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
6. DO NOT SCALE FROM THIS DRAWING.

CONCEPT PALISADE WALL

BUILDING RESTRICTION LINE

CULVERT PIPE

SWALE DRAWING

15 0 Meters 15 30

1:2000

1	CONSENT	08/2025
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

656N POPAKU ROAD
MOEREWA, RC
NORTH SUBDIVISION

Project	Drawn By
C0656N	TV/DBT

Client

STEPHEN HERRIES FAMILY TRUST

Sheet Title

PROPOSED ROW PLAN

Sheet

201

FILE PATH: Z:\Projects\C0600-C0699\C0656N - Polapu Road, Moerewa\07 - Technical & Drawings\Drawings\C0656N.dwg, C0656N Proj 18/08/2025

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consulting engineers

APPENDIX B

Exploratory Hole Records

INVESTIGATION LOG

HOLE NO.: HA01

CLIENT: Stephen Herries Family Trust
PROJECT: Pokapu Road, Moerewa
JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
START DATE: 08/10/2025
CO-ORDINATES: 1689159mE, 6079906mN
ELEVATION: Ground
END DATE: 08/10/2025
CONTRACTOR: Internal
RIG: Hand Auger + DCP
DRILLER: CA/GB
LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	Values	WATER
TOPSOIL; Organic SILT with trace rootlets; dark brown. Very stiff, moist,		0.0	TS				
Silty CLAY; brown. Very stiff; moist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.2				125 50	
		0.4				171 97	
		0.6				157 91	
		0.8				182 108	
		1.0				199+ -	
		1.2				199+ -	
CLAY with trace silt; light brown mottled light grey. Very stiff to hard; moist to wet; high plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		1.4				UTP -	
		1.6					
		1.8					
		2.0		2			
End Of Hole: 2.10m		2.2		3			
		2.4		4			
		2.6		5			
		2.8		7			
		3.0		12			
		3.2		12			
		3.4		15			
		3.6		14			
		3.8		15			
		4.0		20			
		4.2					
		4.4					
		4.6					
		4.8					

08/10/2025

PHOTO(S)

REMARKS

1. Hand Auger terminated at 2.10m bgl due to hard strata.
2. Continued with DCP from 2.10m bgl until refusal at 3.20m bgl.
3. Groundwater encountered at 1.20m bgl during drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA02

CLIENT: Stephen Herries Family Trust
PROJECT: Pokapu Road, Moerewa

JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
CO-ORDINATES: 1689193mE, 6079867mN
CONTRACTOR: Internal **RIG:** Hand Auger + DCP
ELEVATION: Ground
DRILLER: CA/GB

START DATE: 09/10/2025
END DATE: 09/10/2025
LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	Values	WATER
TOPSOIL; Organic SILT with trace rootlets; dark brown. Moist.		0.0	TS				
Clayey SILT; light grey mottled light brown. Stiff; moist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.2				88	
Silty CLAY; light brown mottled light grey. Stiff; moist to wet; high plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.4				31	
		0.6				85	
0.9m: Becoming very stiff.		0.8				31	
		1.0				108	
		1.2				43	
		1.4				85	
		1.6				40	
SILT with some clay and minor fine sand; dark orange. Very stiff; moist to wet; low plasticity [NORTHLAND ALLOCHTON - RESIDUAL SOIL]		1.8				83	
		2.0				54	
		2.2				171	
2.4m - 2.6m: Becoming greenish grey, fine Sand.		2.4				60	
2.6m: Becoming hard.		2.6		4		111	
End Of Hole: 2.60m		2.8		9 10		48	
		3.0		4 4		111	
		3.2		10 9		43	
		3.4		10 15		199+	
		3.6		15 18		-	
		3.8		20			
		4.0					
		4.2					
		4.4					
		4.6					
		4.8					

Groundwater Not Encountered

PHOTO(S)

REMARKS

1. Hand Auger terminated at 2.60m bgl due to hard strata.
2. Continued with DCP from 2.60m bgl until refusal at 3.8 m bgl.
3. Groundwater not encountered during drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA03

CLIENT: Stephen Herries Family Trust

PROJECT: Pokapu Road, Moerewa

JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa

START DATE: 09/10/2025

CO-ORDINATES: 1689257mE, 6079866mN

ELEVATION: Ground

END DATE: 09/10/2025

CONTRACTOR: Internal

RIG: Hand Auger + DCP

DRILLER: CA/GB

LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	WATER
TOPSOIL; Organic Clayey SILT with trace rootlets; dark brown. Moist.		0.0	TS		142	Groundwater Not Encountered
Silty CLAY; brown. Very stiff; moist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.2			56	
		0.4			151	
		0.6			66	
		0.8			140	
		1.0			66	
		1.2			160	
SILT with minor clay; light brown. Very stiff; moist to wet; low plasticity [NORTHLAND ALLOCHTON - RESIDUAL SOIL].		1.4			88	
Silty CLAY; brown.Very stiff; moist to wet; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL]		1.6			123	
		1.8			68	
Clayey SILT; light grey mottled orange. Very stiff; moist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		2.0			128	
		2.2			56	
		2.4			131	
		2.6			48	
		2.8			131	
		3.0			48	
		3.2			117	
		3.4			43	
		3.6			100	
SILT with minor clay; brown.Very stiff; moist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		3.8			50	
		4.0		3	120	
End Of Hole: 4.00m		4.2		5 11	56	
		4.4		11 14	171	
		4.6		18 19	77	
		4.8		19 20	199+	

PHOTO(S)

REMARKS

1. Hand Auger terminated at 4.0m bgl due to hard strata.
2. Continued with DCP from 4.0m bgl until refusal at 4.90m bgl.
3. Groundwater not encountered during drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA04

CLIENT: Stephen Herries Family Trust
PROJECT: Pokapu Road, Moerewa
JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
START DATE: 09/10/2025
CO-ORDINATES: 1689279mE, 6079873mN
ELEVATION: Ground
END DATE: 09/10/2025
CONTRACTOR: Internal
RIG: Hand Auger + DCP
DRILLER: CA/GB
LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	Values	WATER
TOPSOIL; Organic Clayey SILT with trace rootlets; dark brown. Moist.		0.0	TS				
Silty CLAY; brown.Very stiff; mopist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.2				197 84	
		0.4				190 84	
		0.6				185 81	
		0.8					
SILT with minor clay; light grey becoming brown. Very stiff; moist to wet; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		1.0				199+ -	
Clayey SILT; light grey mottled orange. Very stiff; moist to wet; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		1.2				199+ -	
1.2m - 1.5m: Becoming hard.		1.4					
		1.6				145 74	
		1.8					
Silty CLAY; brown. Very stiff; moist to wet; high plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		2.0				148 60	
		2.2				172 77	
		2.4					
Clayey SILT; brown. Very stiff; moist to wet; low plasticity [NORTHALAND ALLOCHTHON - RESIDUAL SOIL].		2.6				197 77	
		2.8		3			
End Of Hole: 2.80m		3.0		3, 6			
		3.2		8, 8			
		3.4		9, 8			
		3.6		8, 10			
		3.8		12, 12			
		4.0		13, 14			
		4.2		16, 18			
		4.4		16, 16			
		4.6		12, 16			
		4.8		18, 18			
		5.0		18			

Groundwater Not Encountered

PHOTO(S)

REMARKS

1. Hand Auger terminated 2.80m bgl due to very stiff strata.
2. Continued with DCP from 2.80m bgl to 5.0 m bgl.
3. Groundwater not encountered during drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA05

CLIENT: Stephen Herries Family Trust
PROJECT: Pokapu Road, Moerewa

JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
START DATE: 09/10/2025
CO-ORDINATES: 1689164mE, 6079656mN
ELEVATION: Ground
END DATE: 09/10/2025
CONTRACTOR: Internal
RIG: Hand Auger
DRILLER: CA/GB
LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	Values	WATER
TOPSOIL; Organic SILT with trace rootlets; dark brown. Moist to wet.		0.0	TS				
Clayey SILT; light brown mottled brown. Very stiff; moist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.4			199+	199+	
Clayey SILT; light brown mottled orange. Very stiff; moist to wet; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.6			182	182	
		0.8			123	123	
		1.0			185	185	
		1.2			91	91	
SILT with trace clay; light grey mottled orange. Very stiff; moist to wet; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		1.4			199+	199+	
		1.6			140	140	
		1.8			64	64	
Clayey SILT; light grey mottled orange. Very stiff; moist to wet; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		2.0			174	174	
		2.2			105	105	
Clayey SILT; light grey. Very stiff; moist to wet; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		2.4			177	177	
		2.6		25 >>	111	111	
End Of Hole: 2.50m		2.8			199+	199+	
		3.0			UTP	UTP	
		3.2				-	
		3.4					
		3.6					
		3.8					
		4.0					
		4.2					
		4.4					
		4.6					
		4.8					

Groundwater Not Encountered

PHOTO(S)

REMARKS

1. Hand Auger terminated 2.50m bgl due to hard strata.
2. Continued with DCP from 2.50m bgl until refusal at 2.6m bgl.
3. Groundwater not encountered during drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA06

CLIENT: Stephen Herries Family Trust
PROJECT: Pokapu Road, Moerewa
JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
START DATE: 09/10/2025
CO-ORDINATES: 1689118mE, 6079586mN
ELEVATION: Ground
END DATE: 09/10/2025
CONTRACTOR: Internal
RIG: DCP
DRILLER: CA/GB
LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	WATER
TOPSOIL; Organic SILT with trace rootlets; dark brown. Moist.		0.0	TS		UTP -	Groundwater Not Encountered
Gravelly SILT; light grey mottled orange. Hard; dry to moist; friable; gravel, fine to medium, sub-rounded to sub-angular [NORTHLAND ALLOCHTHON - RESIDUAL SOILS].		0.4			UTP -	
Completely to highly weathered; brown orange mottled light grey; indistinctly bedded SILTSTONE; extremely weak [NORTHLAND ALLOCHTHON - PARENT ROCK].		1.6			UTP -	
End Of Hole: 2.30m		2.3		7, 4, 4, 6, 4, 2, 15, 14, 17, 24 >>		

PHOTO(S)

REMARKS

1. DCP at road cut.
2. Soil logged for exposed cut slope behind the new road alignment.
3. Shear vane testing were carried out on cut slope.

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- Hand Auger
- Test Pit

INVESTIGATION LOG

HOLE NO.: HA07

CLIENT: Stephen Herries Family Trust
PROJECT: Pokapu Road, Moerewa

JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
START DATE: 08/10/2025
CO-ORDINATES: 1689031mE, 6079666mN
ELEVATION: Ground
END DATE: 08/10/2025
CONTRACTOR: Internal
RIG: Hand Auger + DCP
DRILLER: CA/GB
LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	WATER
TOPSOIL; Organic SILT; dark brown. Moist.		0.0	TS	2 4 6 8 10 12 14 16 18	50 100 150 200 Values	ater Not En
SILT with trace clay; dark grey. Hard, dry to moist; friable [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.2		20	UTP -	
End Of Hole: 0.30m		0.4				
		0.6				
		0.8				
		1.0				
		1.2				
		1.4				
		1.6				
		1.8				
		2.0				
		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

1. Hand Auger terminated 0.30m bgl due to hard strata.
2. Continued with DCP from 0.30m bgl until refusal at 0.40m bgl.
3. Groundwater not encountered during drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA08

CLIENT: Stephen Herries Family Trust
PROJECT: Pokapu Road, Moerewa

JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
START DATE: 08/10/2025
CO-ORDINATES: 1689054mE, 6079654mN
ELEVATION: Ground
END DATE: 08/10/2025
CONTRACTOR: Internal
RIG: Hand Auger + DCP
DRILLER: CA/GB
LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	WATER
TOPSOIL; Organic SILT with trace rootlets; dark brown. Moist.		0.0	TS			
SILT with some clay; brownish orange mottled grey. Hard; moist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.4		4, 8, 9, 9, 9, 14, 20	UTP -	Water Not Encountered
End Of Hole: 0.40m		4.8				

PHOTO(S)

REMARKS

1. Hand Auger terminated 0.40m bgl due to hard strata.
2. Continued with DCP from 0.40m bgl until refusal at 1.1m bgl.
3. Groundwater not encountered during drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

INVESTIGATION LOG

HOLE NO.: HA09

CLIENT: Stephen Herries Family Trust

PROJECT: Pokapu Road, Moerewa

JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa

START DATE: 09/10/2025

CO-ORDINATES: 1689055mE, 6079612mN

ELEVATION: Ground

END DATE: 09/10/2025

CONTRACTOR: Internal

RIG: Hand Auger + DCP

DRILLER: CA/GB

LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	WATER
TOPSOIL; Organic Clayey SILT; black. Moist.		0.0	TS	2 4 6 8 10 12 14 16 18	50 100 150 200 Values	dwater Not Encou
Gravelly SILT with minor clay; light grey. Hard; moist; friable [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.2			UTP	
CLAY ; grey. Stiff; wet; high plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.4			-	
Gravelly SILT with minor clay; light grey. Hard; moist; friable [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.6		20		
End Of Hole: 0.50m		0.8		25 >>		
		1.0				
		1.2				
		1.4				
		1.6				
		1.8				
		2.0				
		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

1. Hand Auger terminated 0.50m bgl due to hard strata.
2. Continued with DCP from 0.50m bgl until refusal at 0.7 m bgl.
3. Groundwater not encountered during drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA09A

CLIENT: Stephen Herries Family Trust

PROJECT: Pokapu Road, Moerewa

JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa

START DATE: 09/10/2025

CO-ORDINATES: 1689042mE, 6079620mN

ELEVATION: Ground

END DATE: 09/10/2025

CONTRACTOR: Internal

RIG: Hand Auger + DCP

DRILLER: CA/GB

LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa)	WATER
TOPSOIL; Organic SILT; dark brown. Moist.		0.0				
Gravelly SILT with minor clay; greyish brown.Very stiff; moist; low plasticity; gravel, fine, sub-rounde [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.2		13		
		0.4		8, 7		
SILT with minor gravel; brownish orange mottled light grey. Hard; moist; friable [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.6		5, 5		
		0.8		4, 2		
End Of Hole: 1.00m		1.0		5, 6, 7, 10, 12, 12, 15, 15, 24 >>	UTP -	Groundwater Not Encountered
		1.2				
		1.4				
		1.6				
		1.8				
		2.0				
		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

1. Hand Auger terminated 1.0m bgl due to hard strata.
2. Continued with DCP from 0.2m bgl until refusal at 1.9 m bgl.
3. Groundwater not encountered during drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA10

CLIENT: Stephen Herries Family Trust

PROJECT: Pokapu Road, Moerewa

JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa

START DATE: 09/10/2025

CO-ORDINATES: 1689087mE, 6079609mN

ELEVATION: Ground

END DATE: 09/10/2025

CONTRACTOR: Internal

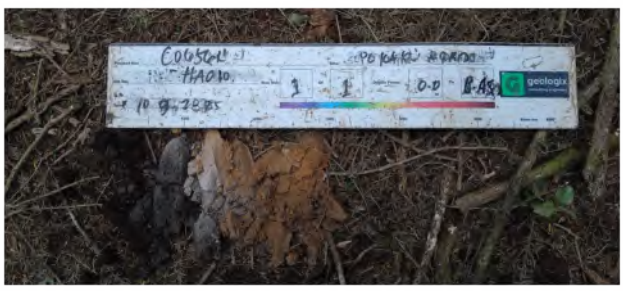
RIG: Hand Auger + DCP

DRILLER: CA/GB

LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	WATER
TOPSOIL; Organic SILT with trace rootlets; greyish brown. Moist.		0.0	TS	3	UTP	Water Not Encountered
SILT with trace gravel; dark grey. Hard; dry to moist; non-plastic; gravel, fine to medium, sub-rounded [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.2		17	-	
SILT with trace gravel; light brown. Hard; dry to moist; non-plastic; gravel, fine to medium, sub-rounded [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.4		14		
End Of Hole: 0.45m		0.6		12		
		0.8		22 >>		
		1.0				
		1.2				
		1.4				
		1.6				
		1.8				
		2.0				
		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

1. Hand Auger terminated 0.45m bgl due to hard strata.
2. Continued with DCP from 0.45m bgl until refusal at 0.9 m bgl.
3. Groundwater not encountered during drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

INVESTIGATION LOG

HOLE NO.: HA11

CLIENT: Stephen Herries Family Trust
PROJECT: Pokapu Road, Moerewa

JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa
CO-ORDINATES: 1689017mE, 6079559mN
CONTRACTOR: Internal **RIG:** Hand Auger + DCP

START DATE: 08/10/2025
END DATE: 08/10/2025
ELEVATION: Ground
DRILLER: CA/GB
LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	Values	WATER
TOPSOIL; Organic Clayey SILT with trace rootlets; black. Moist.		0.2	TS			185	Groundwater Not Encountered
Clayey SILT; brown. Very stiff; moist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		0.4				77	
		0.6				199	
		0.8				-	
		1.0				157	
SILT with minor clay and trace gravel; light reddish brown. Very stiff; moist; low plasticity; gravel, fine, sub-rounded [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		1.2				58	
						130	
CLAY with minor silt; brown. Very stiff; moist; high plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		1.4				74	
		1.6				199+	
						-	
Clayey SILT; light brown mottled orange. Very stiff; moist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		1.8				127	
		2.0				56	
		2.2				81	
		2.4				31	
		2.6				114	
		2.8				44	
						154	
		3.0				48	
SILT with trace clay; brown. Very stiff to hard; moist; low plasticity [NORTHLAND ALLOCHTHON - RESIDUAL SOIL].		3.2				120	
						43	
		3.4				199+	
						-	
End Of Hole: 3.50m		3.6		4		199+	
		3.8		6 10 12 13		-	
		4.0		20			
		4.2					
		4.4					
		4.6					
		4.8					

PHOTO(S)

REMARKS

1. Hand Auger terminated 3.5m bgl due to hard strata.
2. Continued with DCP from 3.5m bgl until refusal at 4.1 m bgl.
3. Groundwater not encountered during drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA12

CLIENT: Stephen Herries Family Trust

PROJECT: Pokapu Road, Moerewa

JOB NO.: C0656N

SITE LOCATION: Pokapu Road, Moerewa

START DATE: 09/10/2025

CO-ORDINATES: 1689039mE, 6079534mN

ELEVATION: Ground

END DATE: 09/10/2025

CONTRACTOR: Internal

RIG: Hand Auger + DCP

DRILLER: CA/GB

LOGGED BY: CA/GB

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3467	Values	WATER
TOPSOIL; Organic SILT with trace rootlets; dark brown. Moist.		0.0	TS				
Clayey SILT with trace gravel; brownish orange mottled light grey and orange. Very stiff; moist; low plasticity; gravel, fine, sub-rounded [NORTHLAND ALLOCHTHON - RESIDUAL SOIL]		0.2 – 1.8				160 51 178 74 174 85 141 70 194 76 123 43	Groundwater Not Encountered
SILT with minor clay, trace fine sand and fine gravel; greyish brown mottled orange. Very stiff; moist; low plasticity [NORTHLAND ALLOCHTHON -RESIDUAL SOIL].		2.0				UTP -	
End Of Hole: 2.20m		2.2		4 5 6 6 7 9 10 10 15 20			

PHOTO(S)

REMARKS

1. Hand Auger terminated 2.2m bgl due to hard strata.
2. Continued with DCP from 2.2m bgl until refusal at 3.2m bgl.
3. Groundwater not encountered during drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

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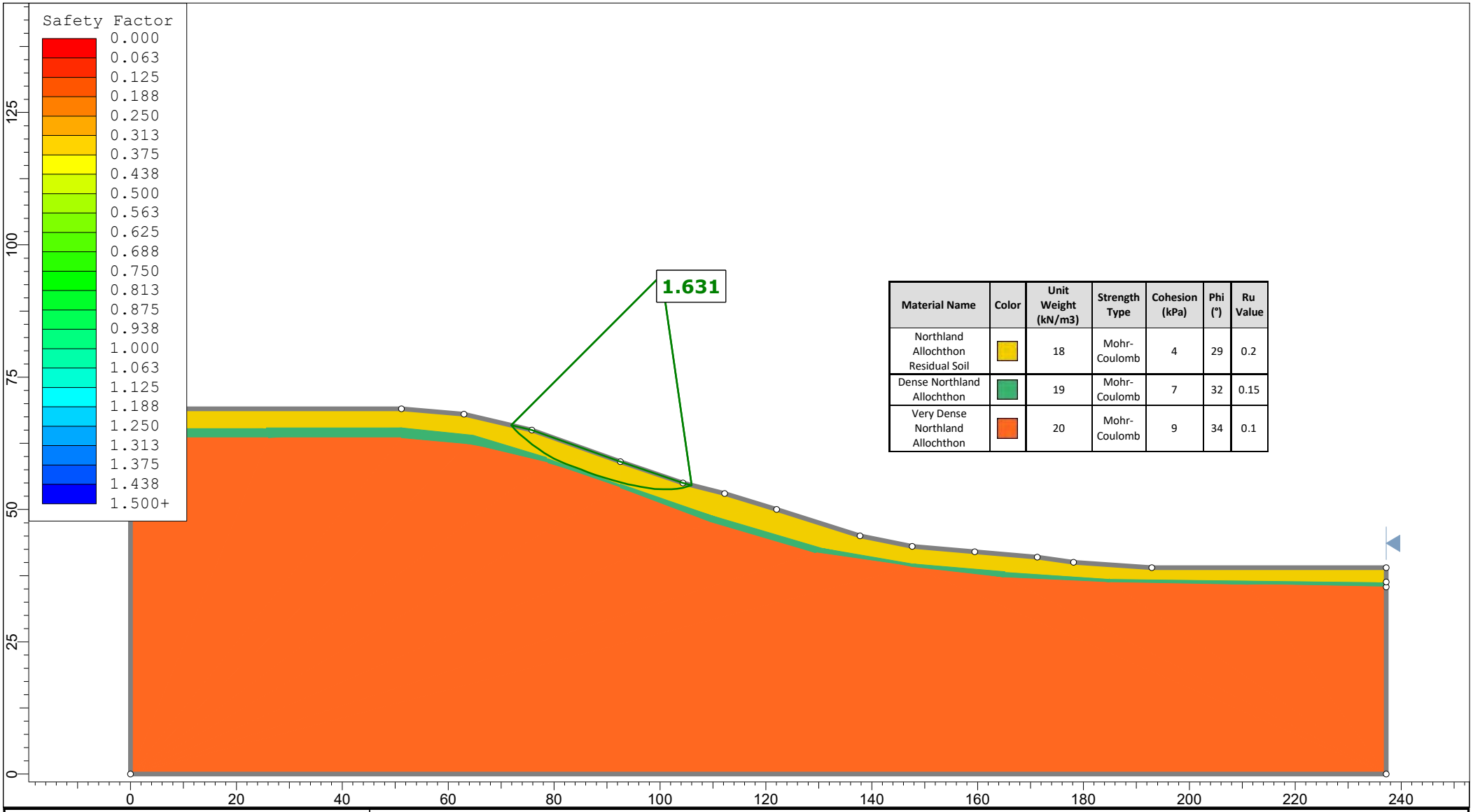
APPENDIX C

Slope Stability Analysis



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Northland Allochthon Residual Soil		18	Mohr-Coulomb	4	29	0.2
Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.15
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

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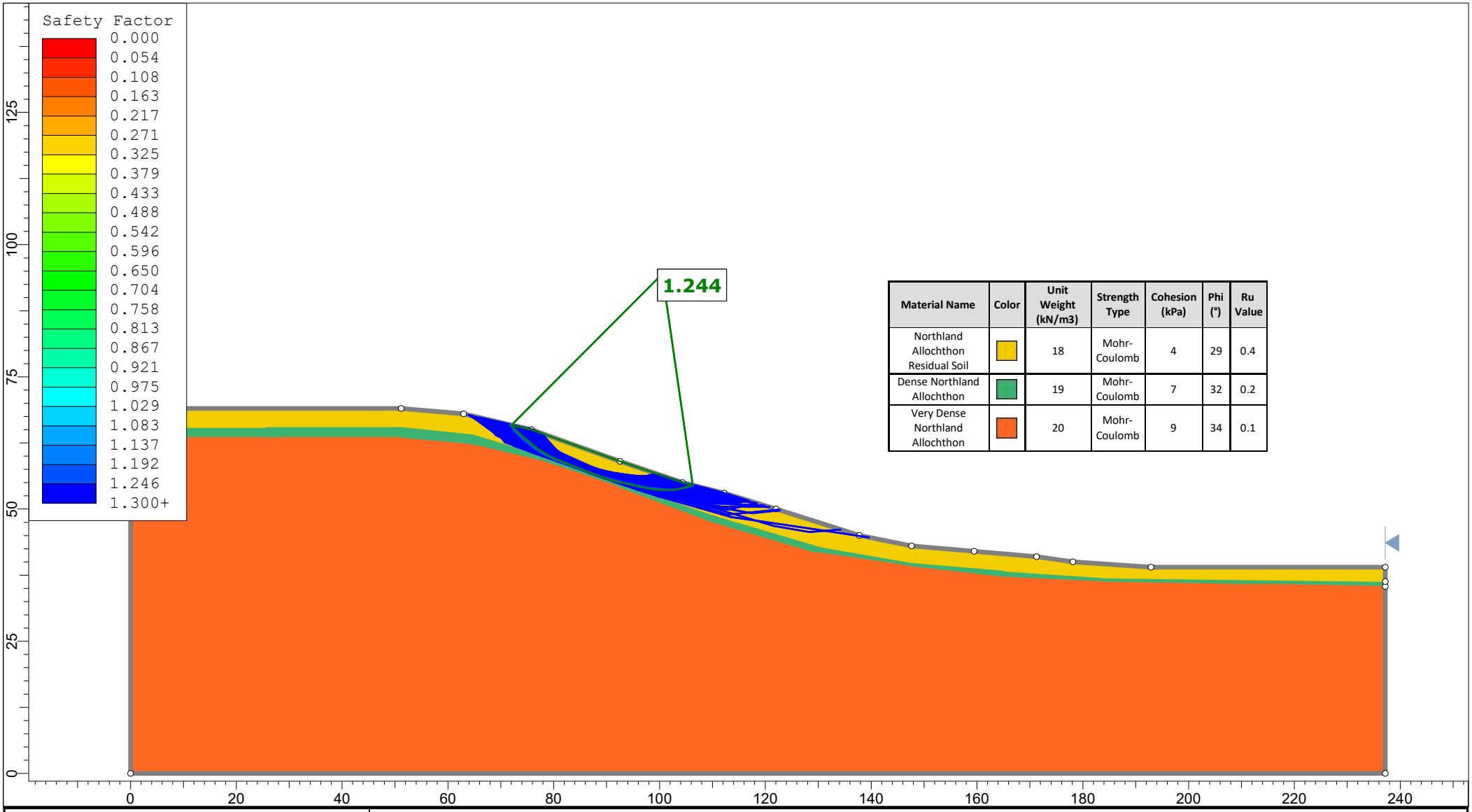
SLIDEINTERPRET 9.034

Project	Pokapu Road, Moerewa Section A		
Group	Existing Condition	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	30/10/2025, 9:55:38 am	*File Name*	Section A.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Northland Allochthon Residual Soil		18	Mohr-Coulomb	4	29	0.4
Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.2
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

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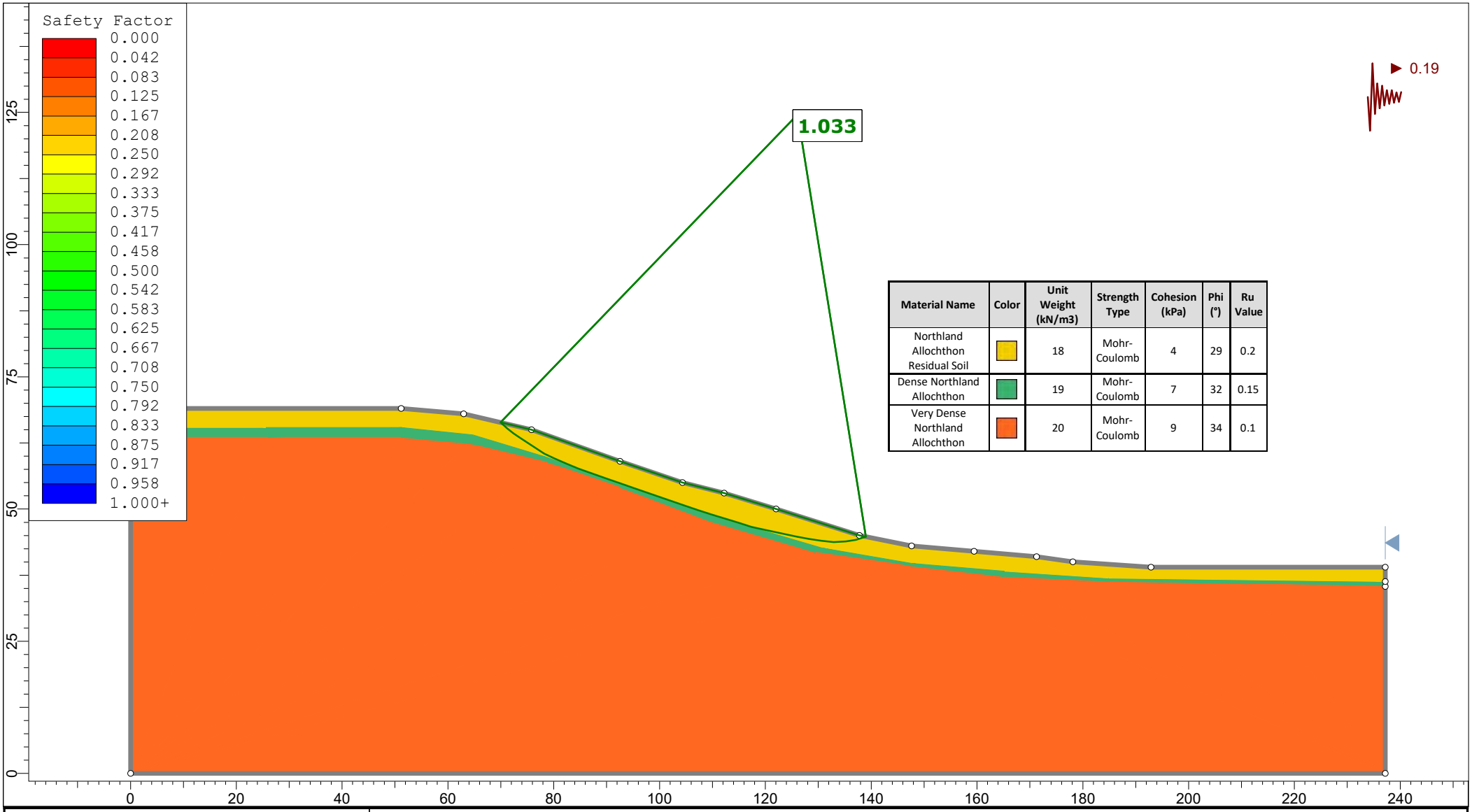
SLIDEINTERPRET 9.034

Project	Pokapu Road, Moerewa Section A		
Group	Existing Condition	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	30/10/2025, 9:55:38 am	*File Name*	Section A.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Northland Allochthon Residual Soil		18	Mohr-Coulomb	4	29	0.2
Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.15
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

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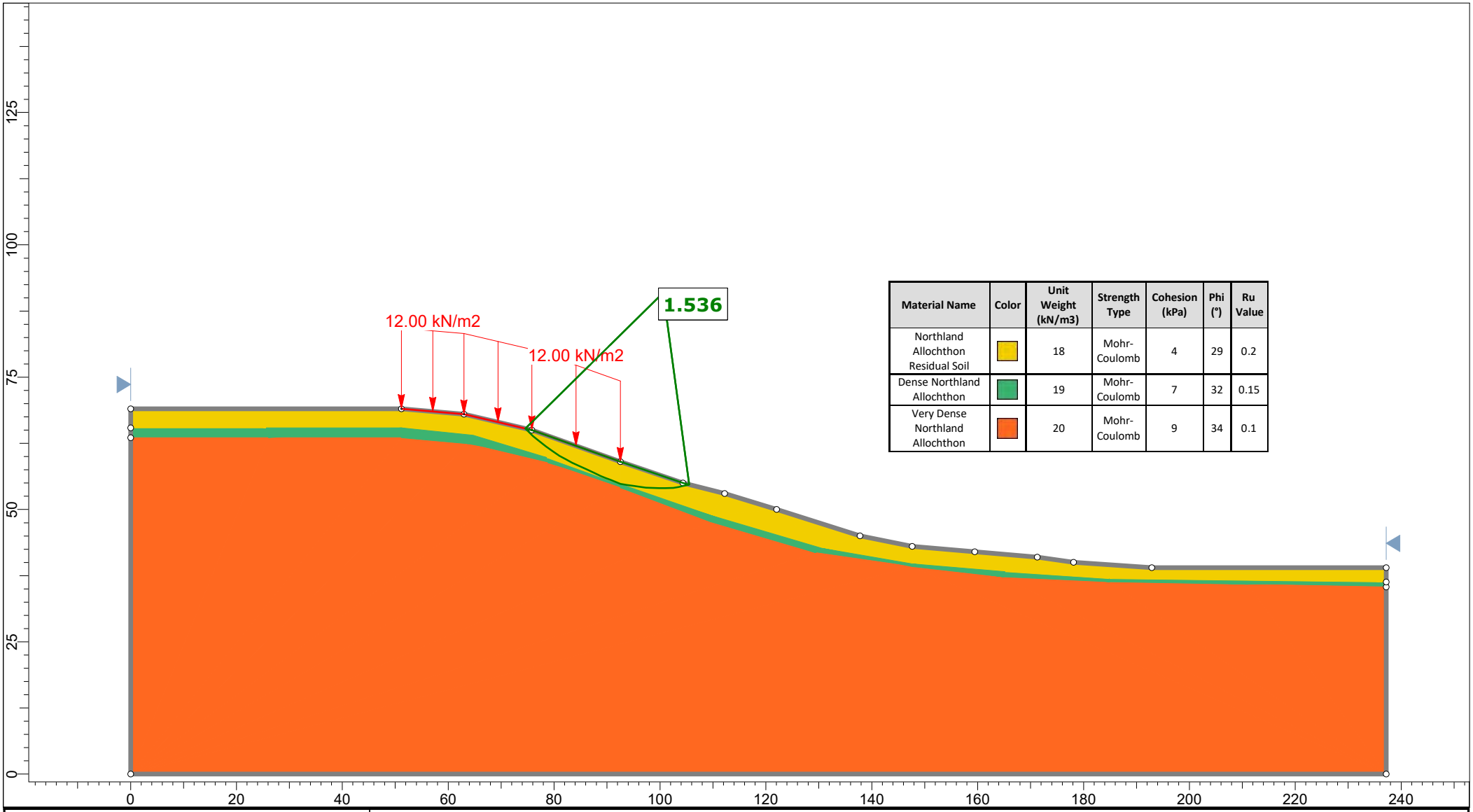
SLIDEINTERPRET 9.034

Project	Pokapu Road, Moerewa Section A		
Group	Existing Condition	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	30/10/2025, 9:55:38 am	*File Name*	Section A.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Northland Allochthon Residual Soil		18	Mohr-Coulomb	4	29	0.2
Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.15
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

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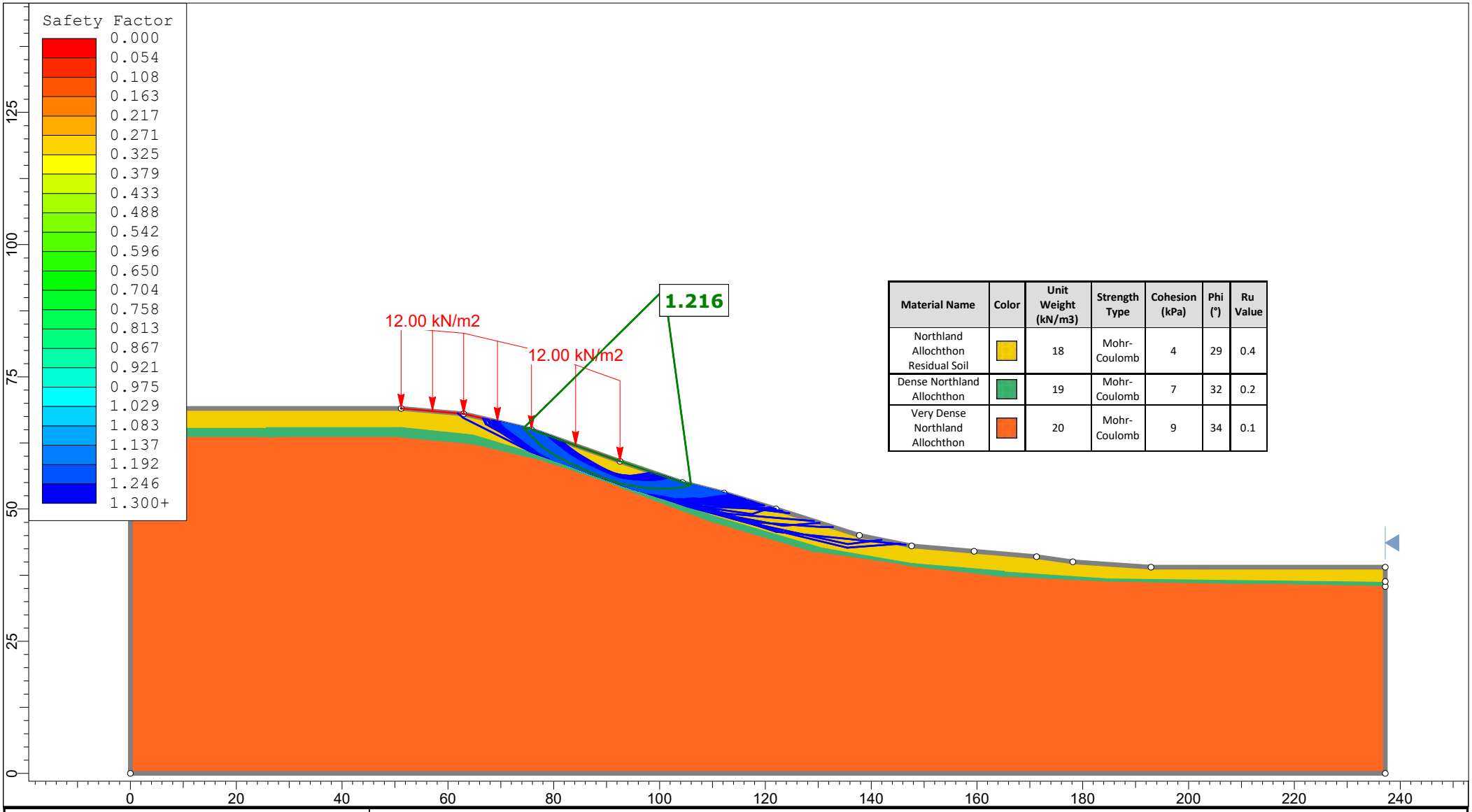
SLIDEINTERPRET 9.034

Project	Pokapu Road, Moerewa Section A		
Group	Proposed Condition	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	30/10/2025, 9:55:38 am	*File Name*	Section A.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Northland Allochthon Residual Soil		18	Mohr-Coulomb	4	29	0.4
Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.2
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

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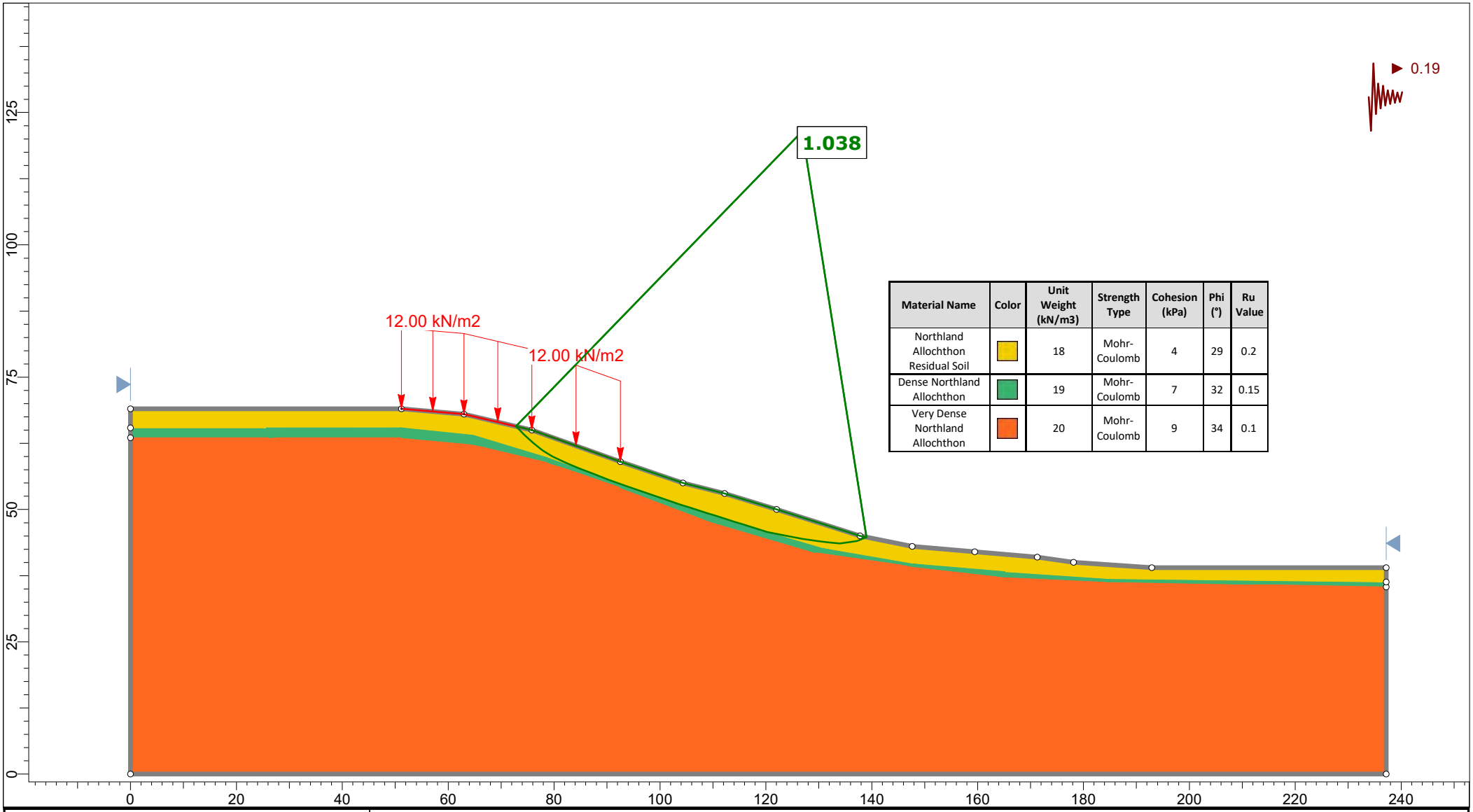
SLIDEINTERPRET 9.034

Project	Pokapu Road, Moerewa Section A		
Group	Proposed Condition	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	30/10/2025, 9:55:38 am	*File Name*	Section A.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Northland Allochthon Residual Soil		18	Mohr-Coulomb	4	29	0.2
Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.15
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

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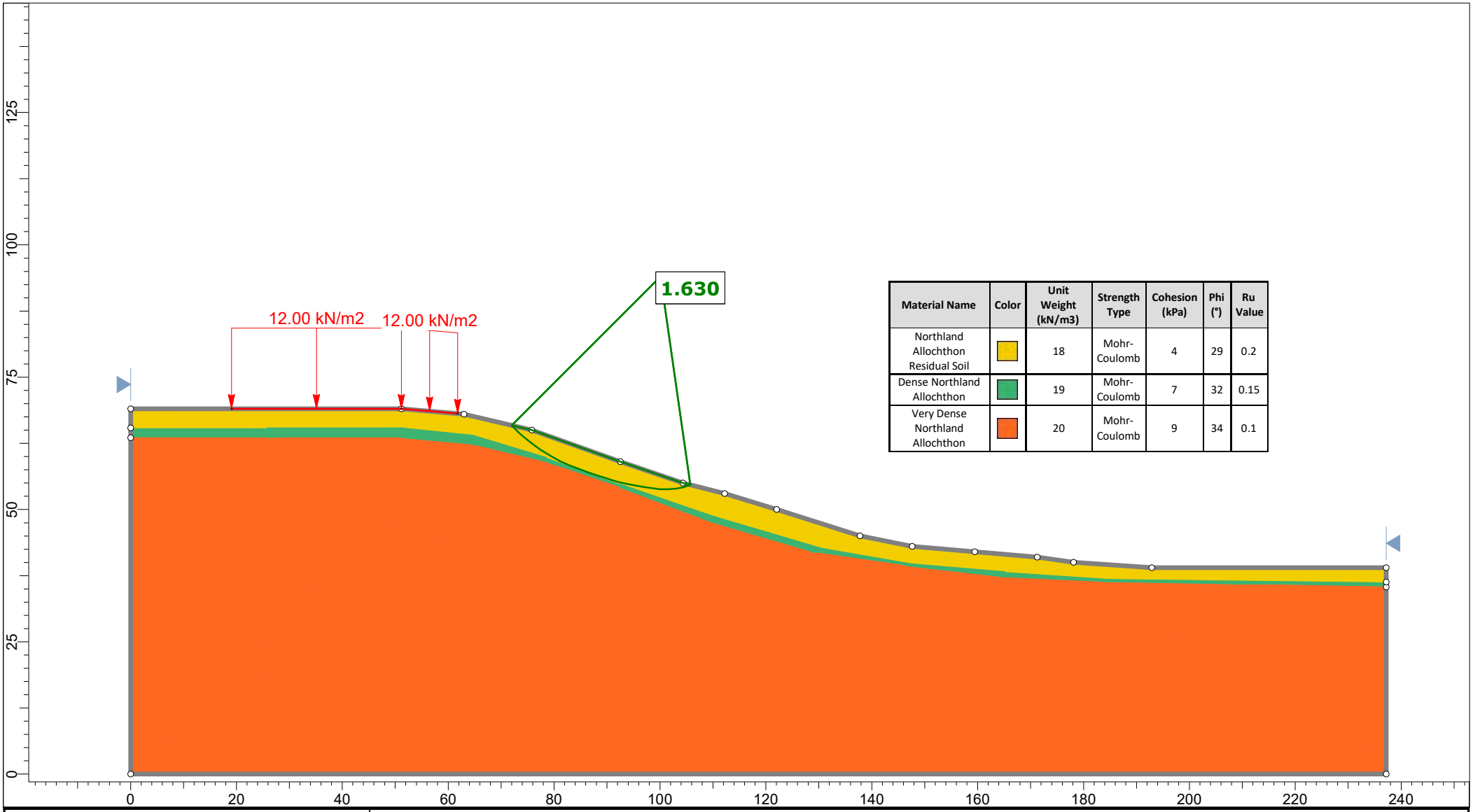
SLIDEINTERPRET 9.034

Project	Pokapu Road, Moerewa Section A		
Group	Proposed Condition	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	30/10/2025, 9:55:38 am	*File Name*	Section A.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Northland Allochthon Residual Soil		18	Mohr-Coulomb	4	29	0.2
Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.15
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

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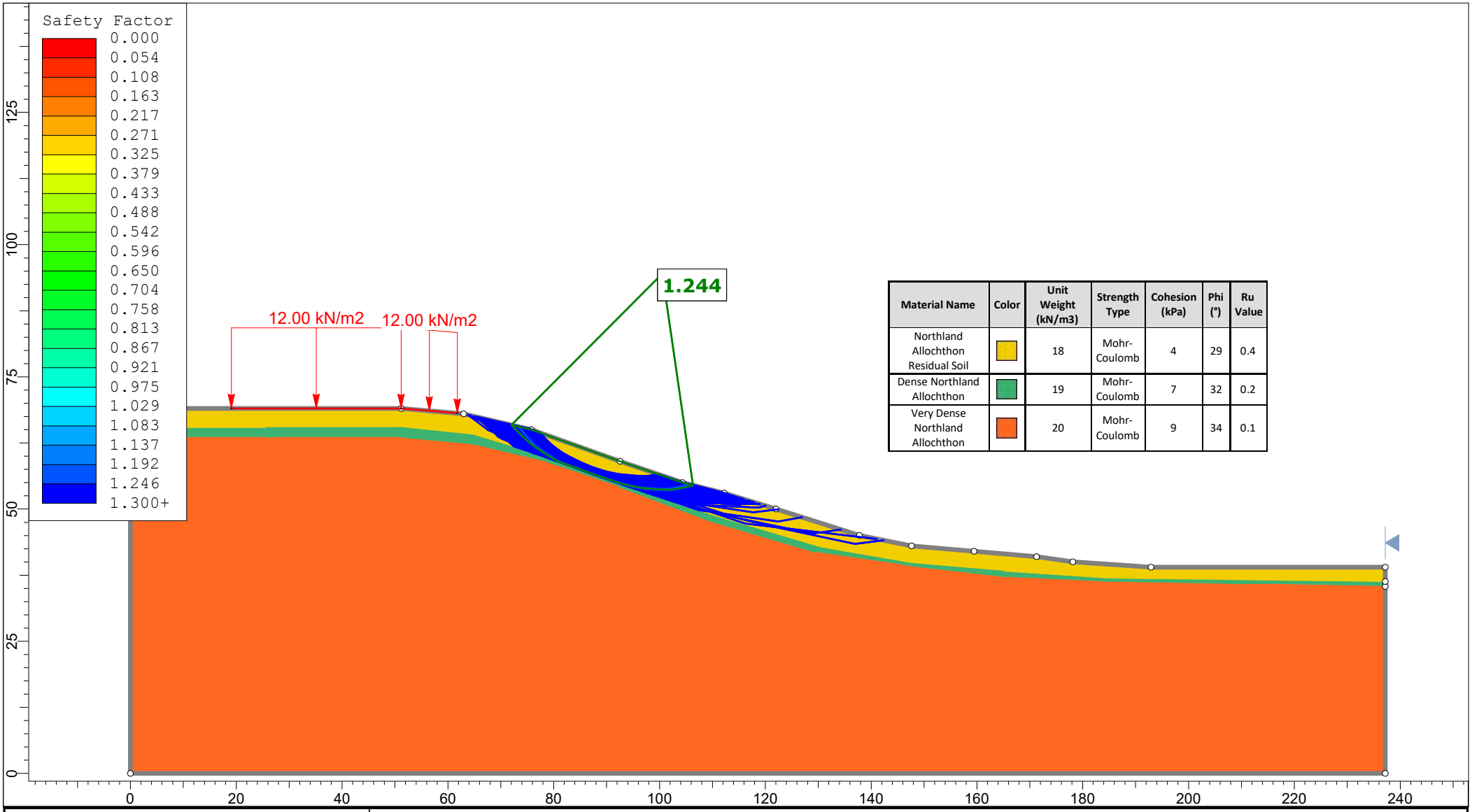
SLIDEINTERPRET 9.034

Project	Pokapu Road, Moerewa Section A		
Group	Restriction Line	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	30/10/2025, 9:55:38 am	*File Name*	Section A.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Northland Allochthon Residual Soil		18	Mohr-Coulomb	4	29	0.4
Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.2
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

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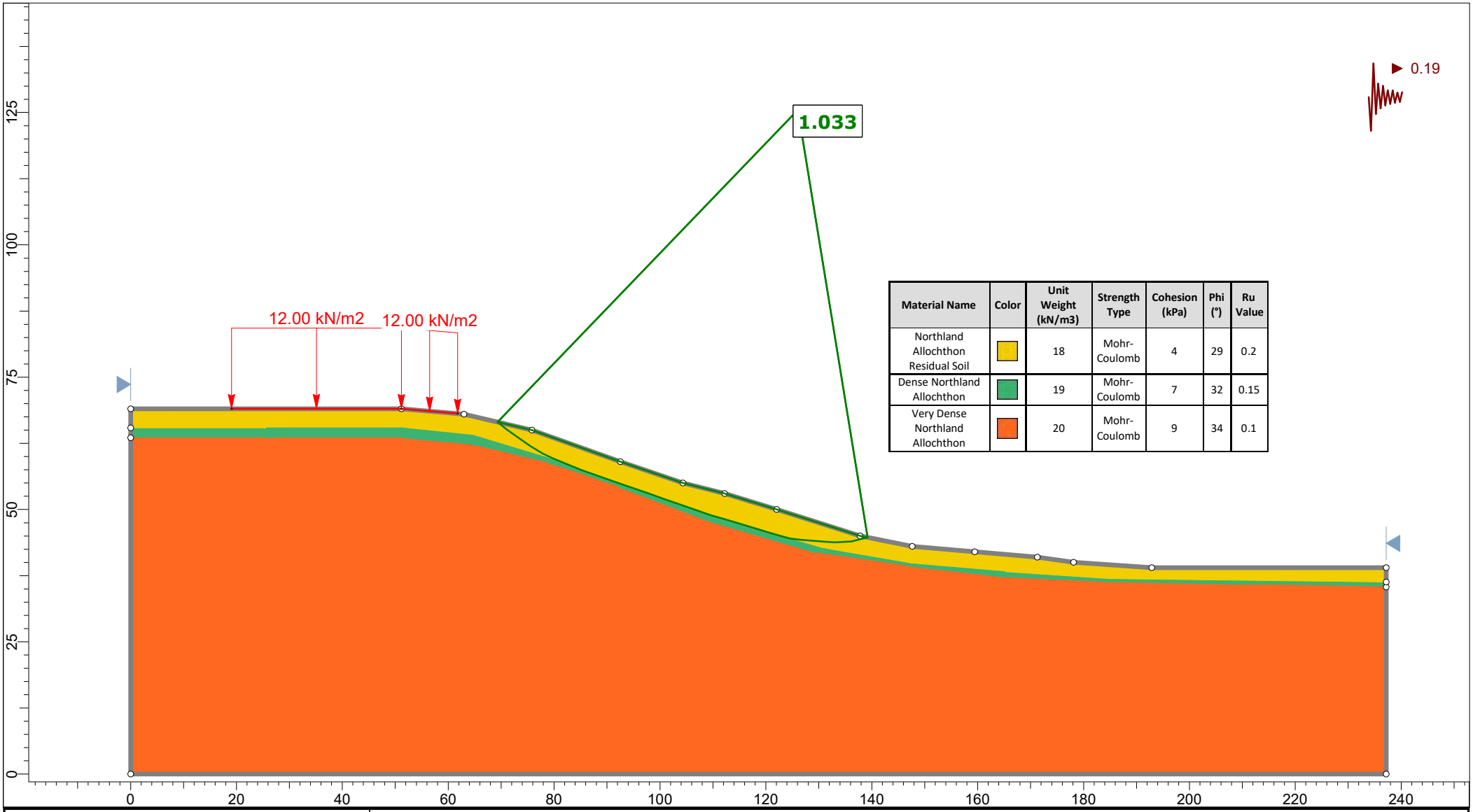
Project	Pokapu Road, Moerewa Section A		
Group	Restriction Line	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	30/10/2025, 9:55:38 am	*File Name*	Section A.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
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Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.15
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

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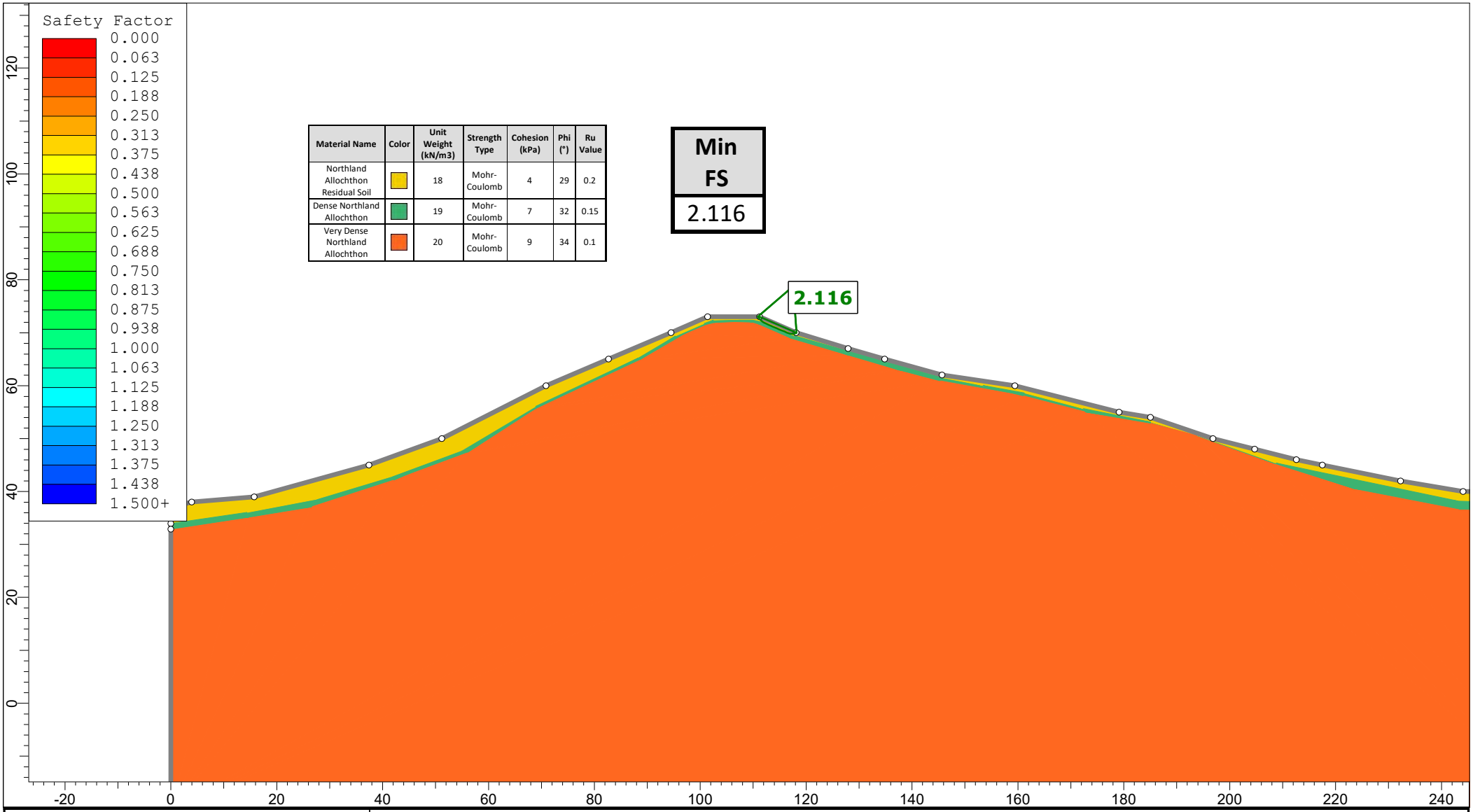
Project	Pokapu Road, Moerewa Section A		
Group	Restriction Line	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	30/10/2025, 9:55:38 am	*File Name*	Section A.slmd



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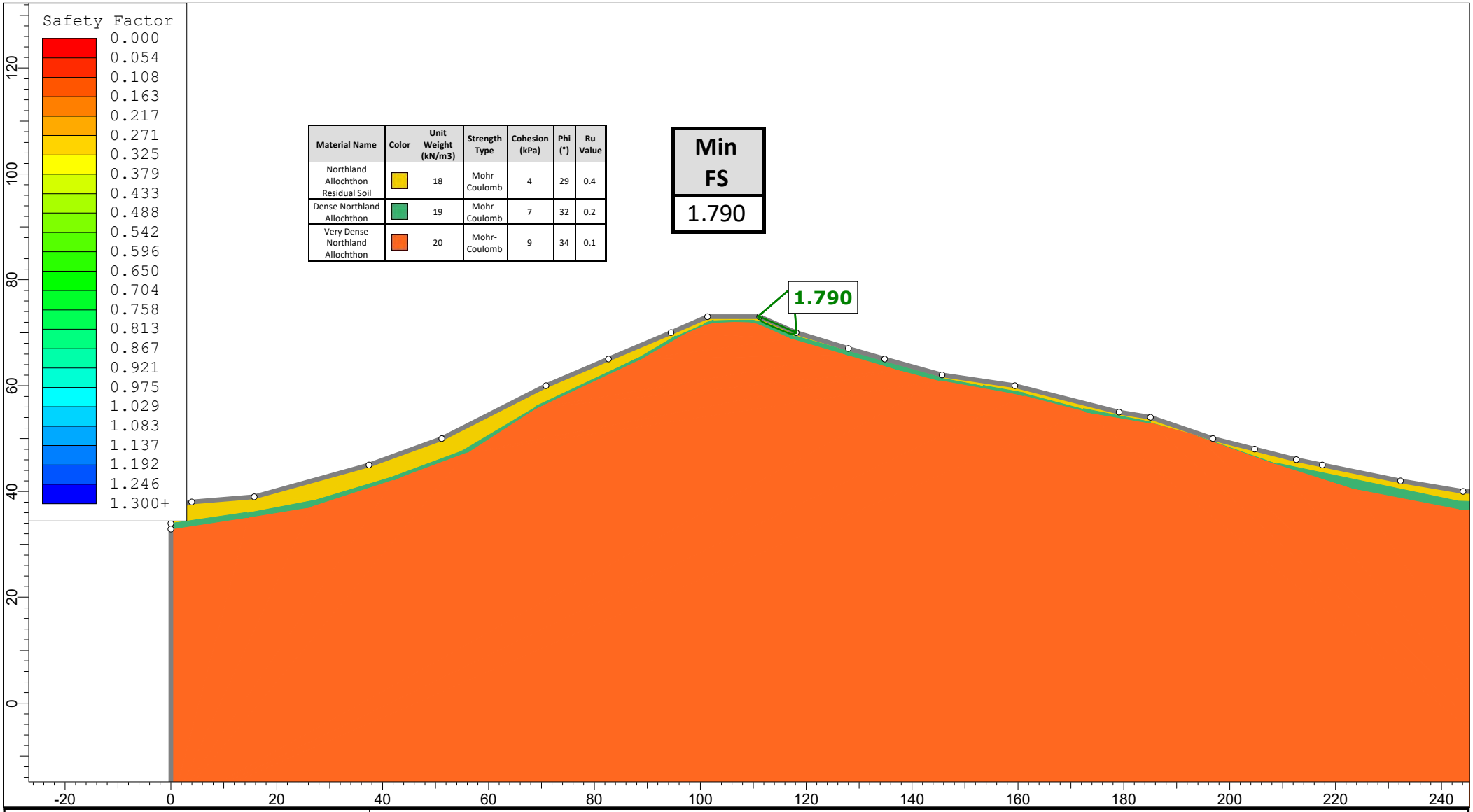
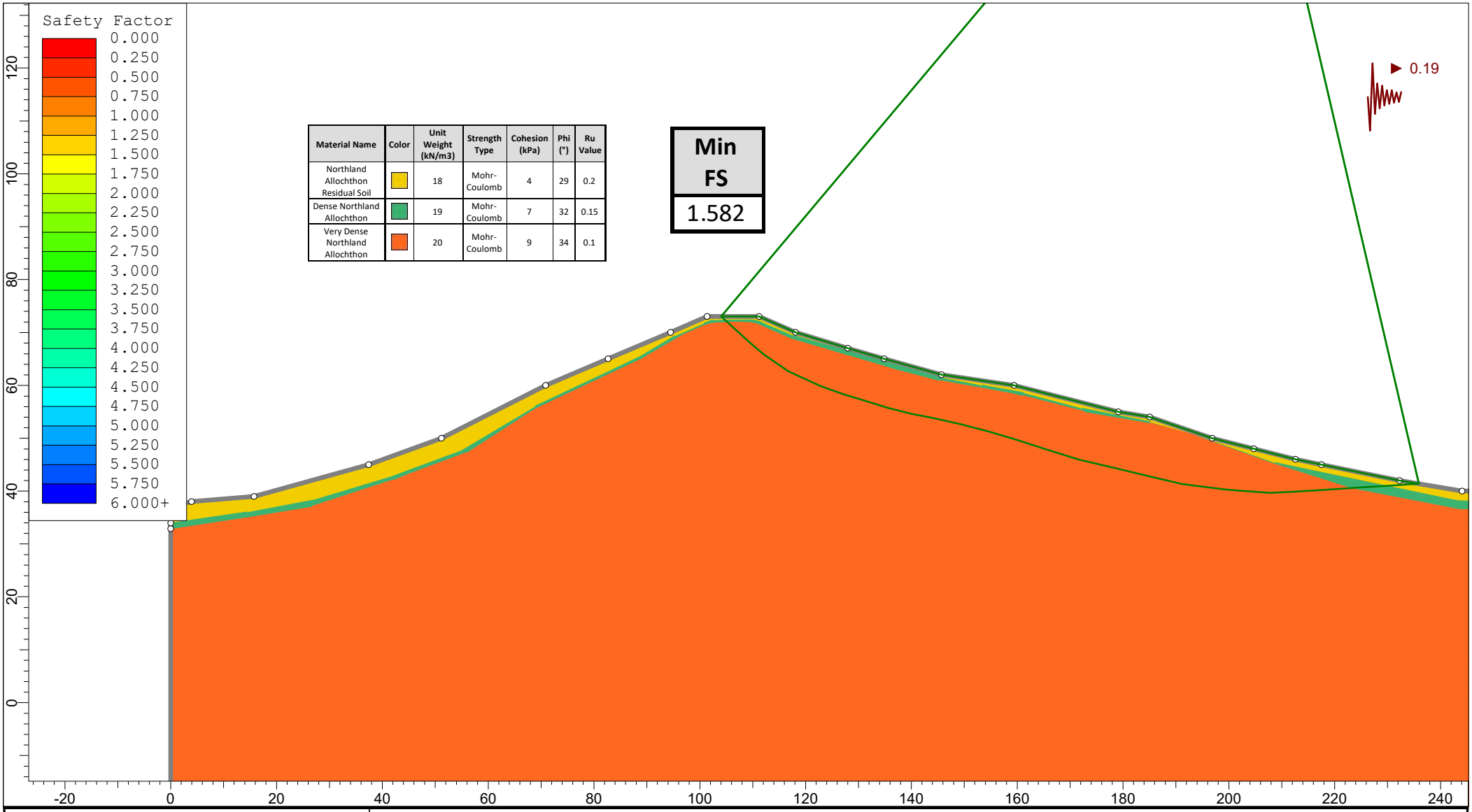
SLIDEINTERPRET 9.034

Project	Pokapu Road, Moerewa		
Group	Existing Condition	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section B dwelling.slmd



	Project	Pokapu Road, Moerewa	
geologix consulting engineers	*Group*	Existing Condition	*Scenario* Elevated GW
	Drawn By	DBT	*Company* Geologix
SLIDEINTERPRET 9.034	*Date*	23/10/2025, 12:13:36 pm	*File Name* Section B dwelling.slmd



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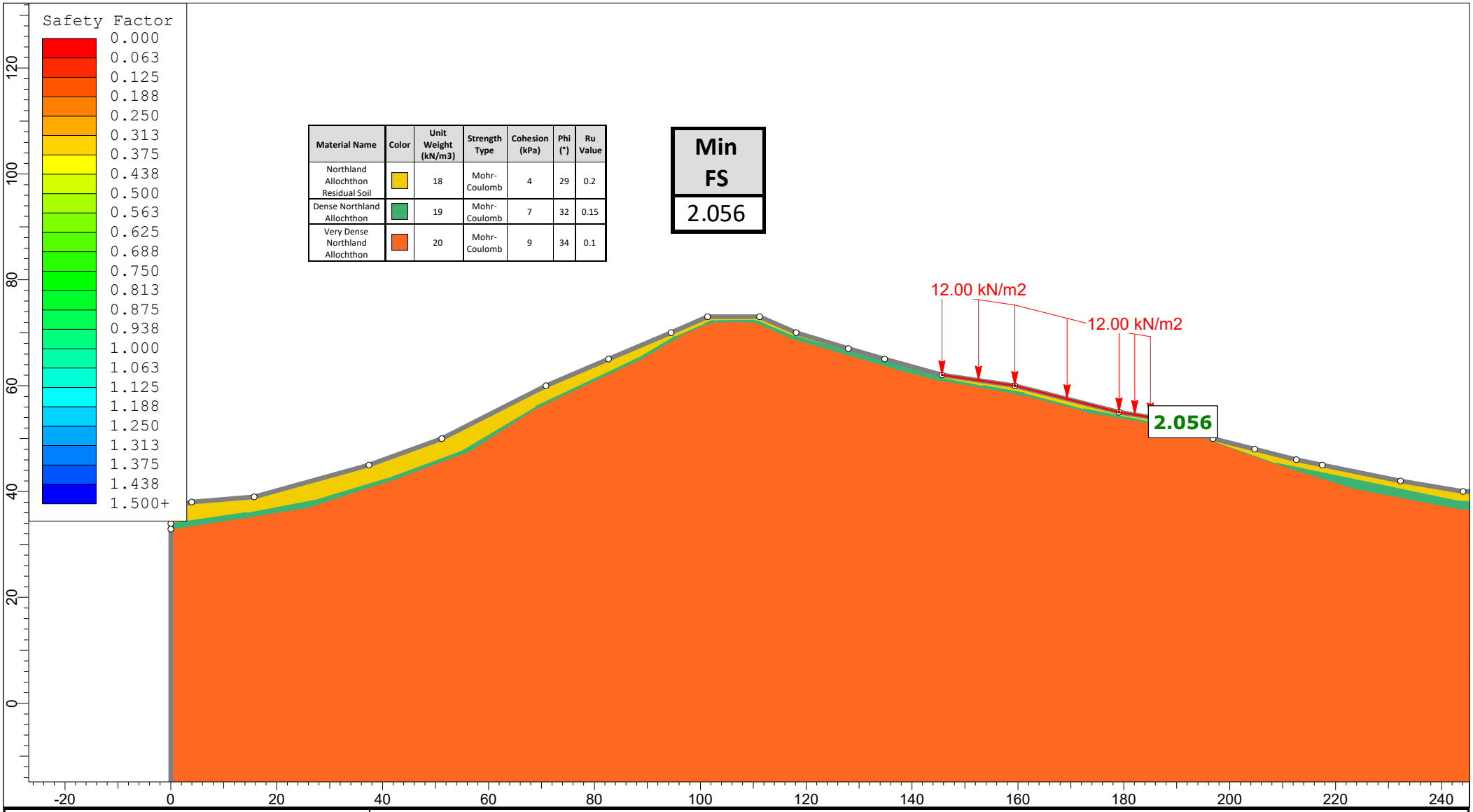
Project	Pokapu Road, Moerewa		
Group	Existing Condition	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section B dwelling.slmd



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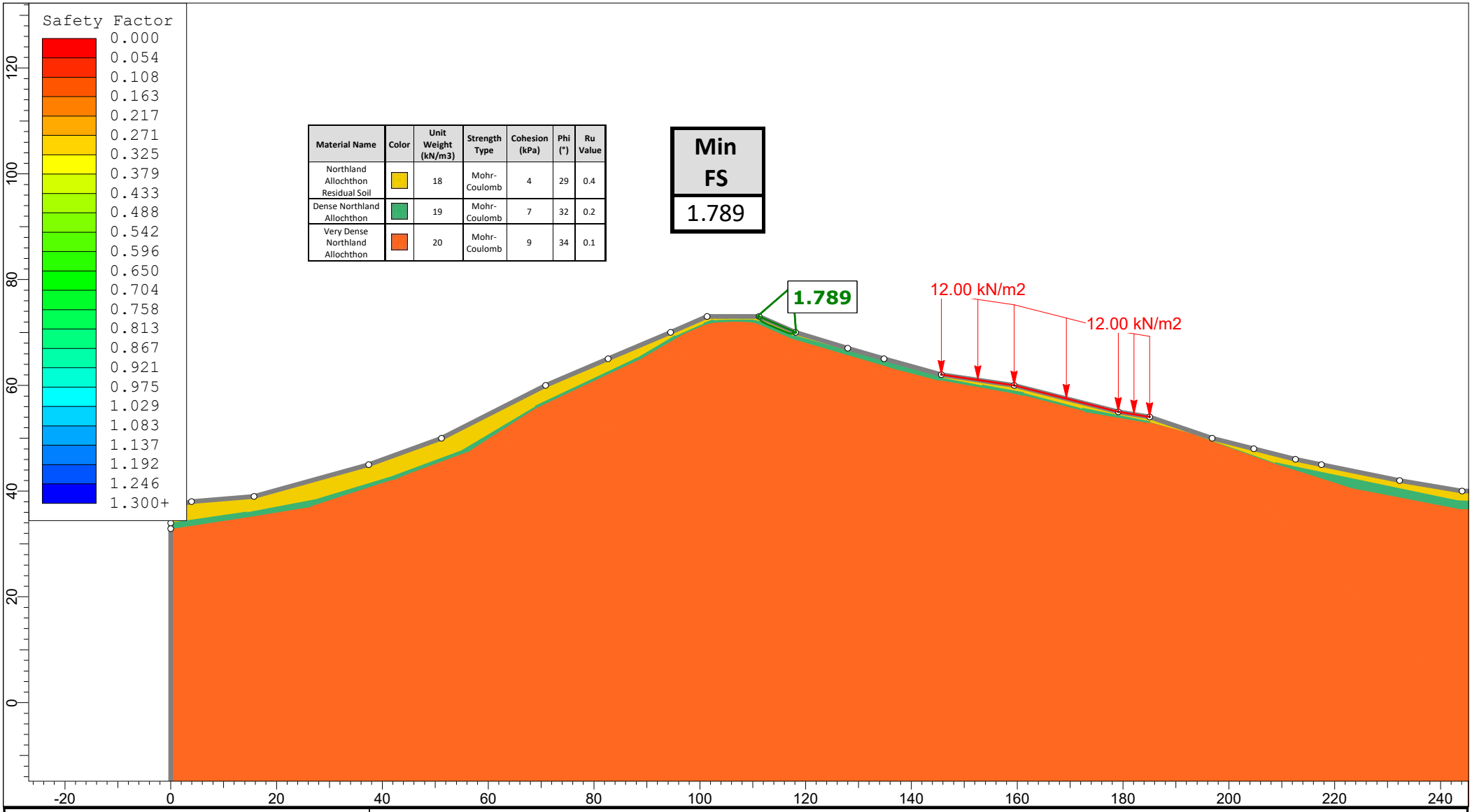
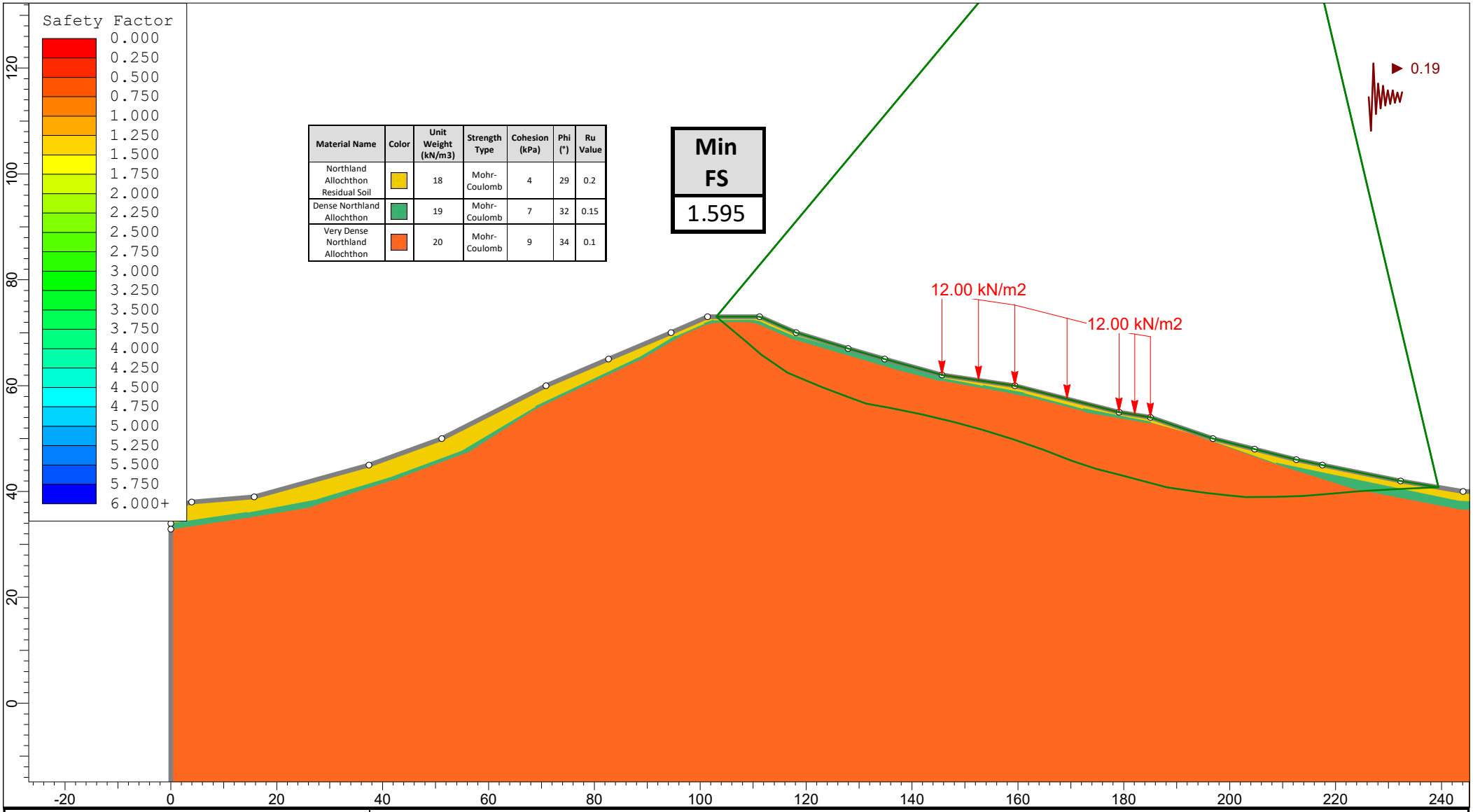
SLIDEINTERPRET 9.034

Project	Pokapu Road, Moerewa		
Group	Proposed Condition	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section B dwelling.slmd



geologix consulting engineers	*Project*	Pokapu Road, Moerewa	
	Group	Proposed Condition	*Scenario* Elevated GW
	Drawn By	DBT	*Company* Geologix
	Date	23/10/2025, 12:13:36 pm	*File Name* Section B dwelling.slmd

SLIDEINTERPRET 9.034



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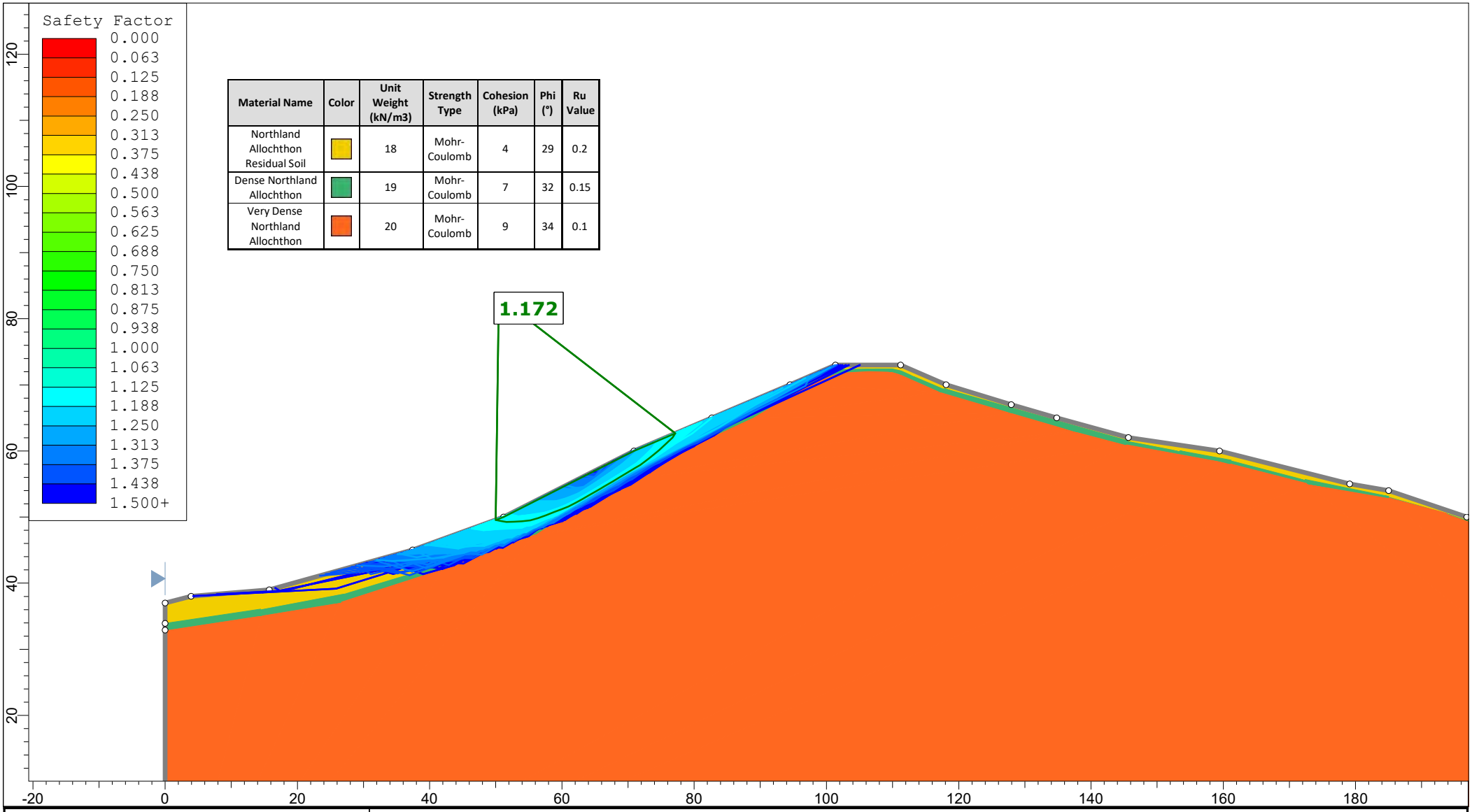
Project	Pokapu Road, Moerewa		
Group	Proposed Condition	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section B dwelling.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Northland Allochthon Residual Soil		18	Mohr-Coulomb	4	29	0.2
Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.15
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

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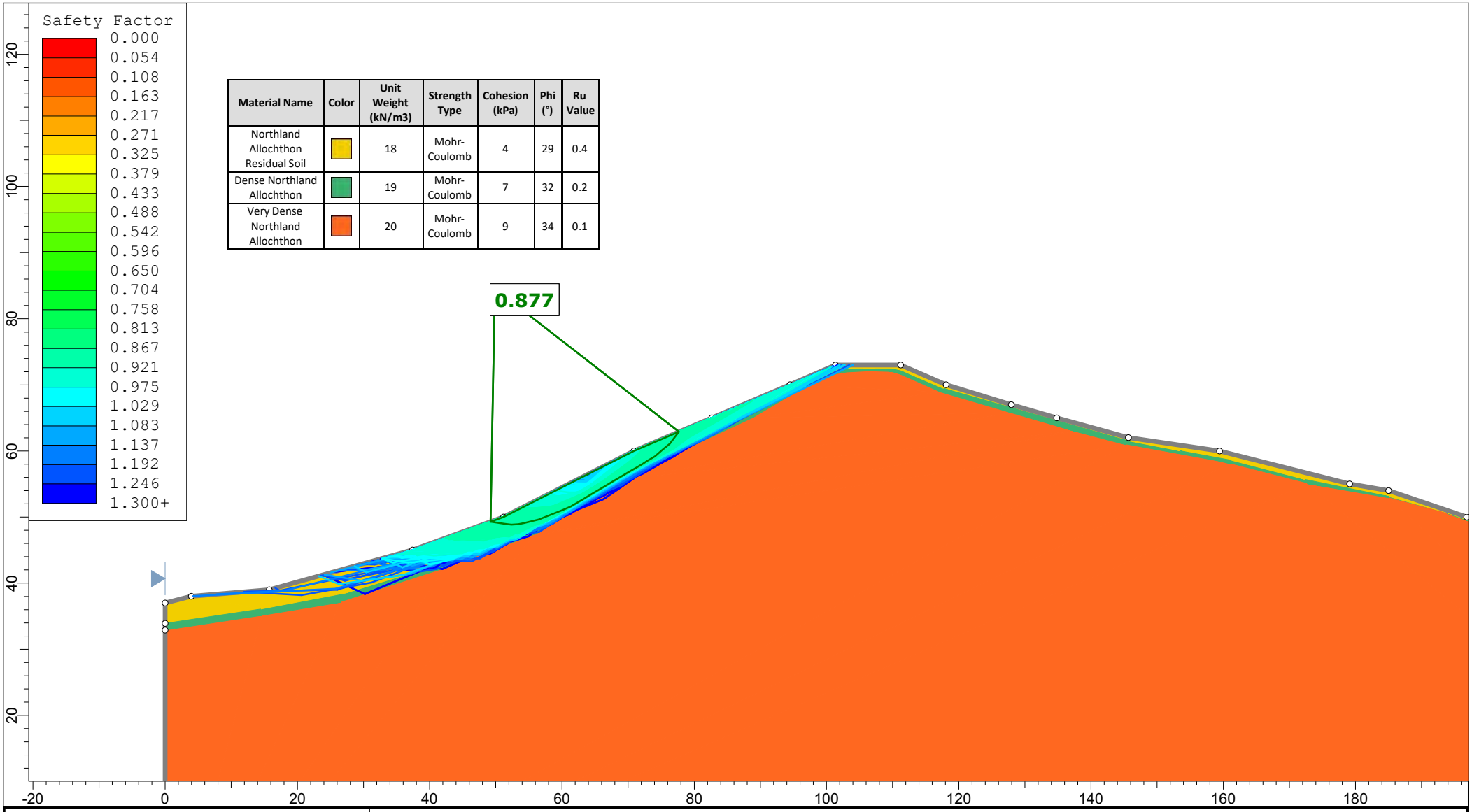
SLIDEINTERPRET 9.034

Project	Pokapu Road, Moerewa		
Group	Existing Condition	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section B road.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
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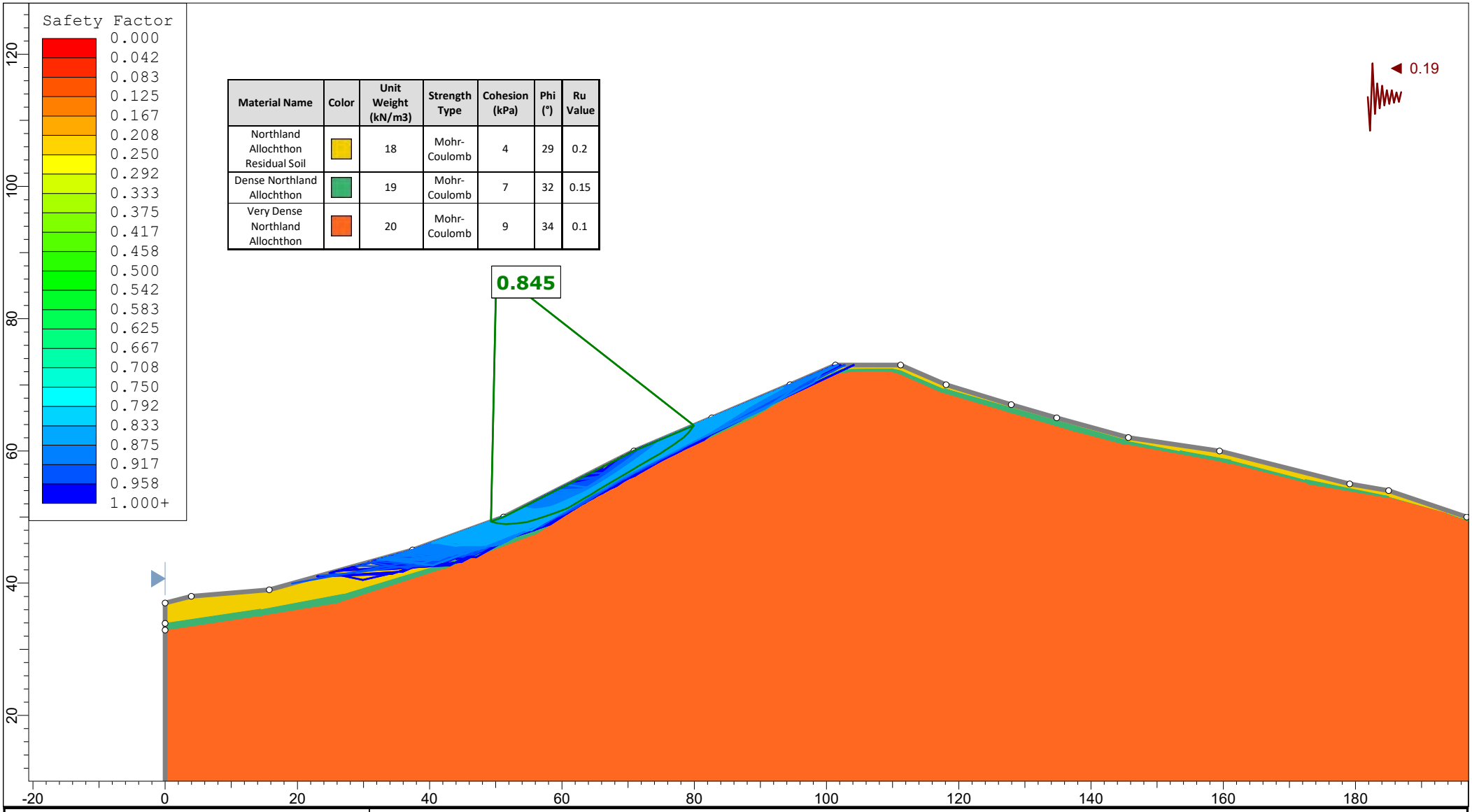
Project	Pokapu Road, Moerewa		
Group	Existing Condition	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section B road.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
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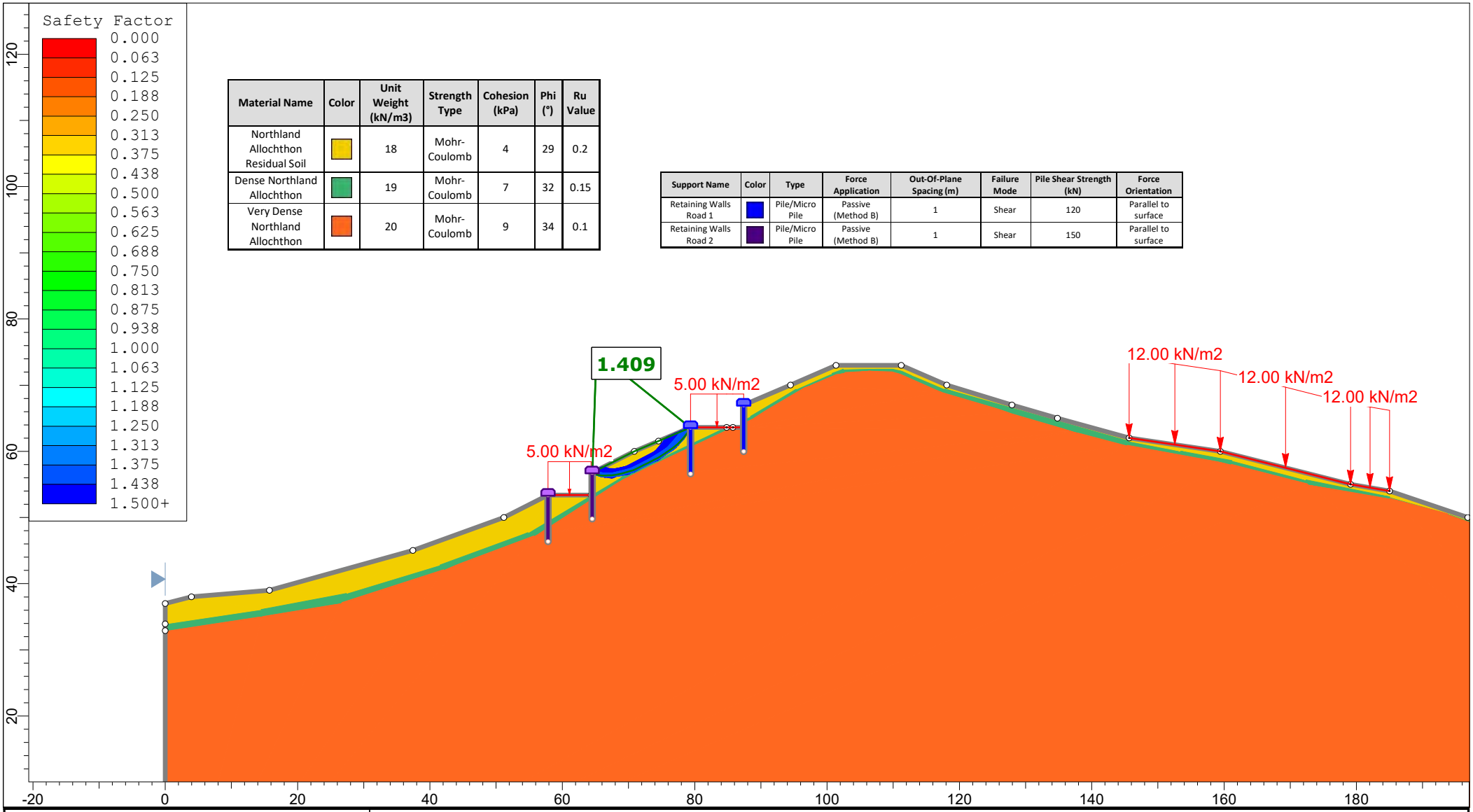
Project	Pokapu Road, Moerewa		
Group	Existing Condition	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section B road.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Northland Allochthon Residual Soil		18	Mohr-Coulomb	4	29	0.2
Dense Northland Allochthon		19	Mohr-Coulomb	7	32	0.15
Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0.1

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
Retaining Walls Road 1		Pile/Micro Pile	Passive (Method B)	1	Shear	120	Parallel to surface
Retaining Walls Road 2		Pile/Micro Pile	Passive (Method B)	1	Shear	150	Parallel to surface



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Project	Pokapu Road, Moerewa		
Group	Proposed Condition	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section B road.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
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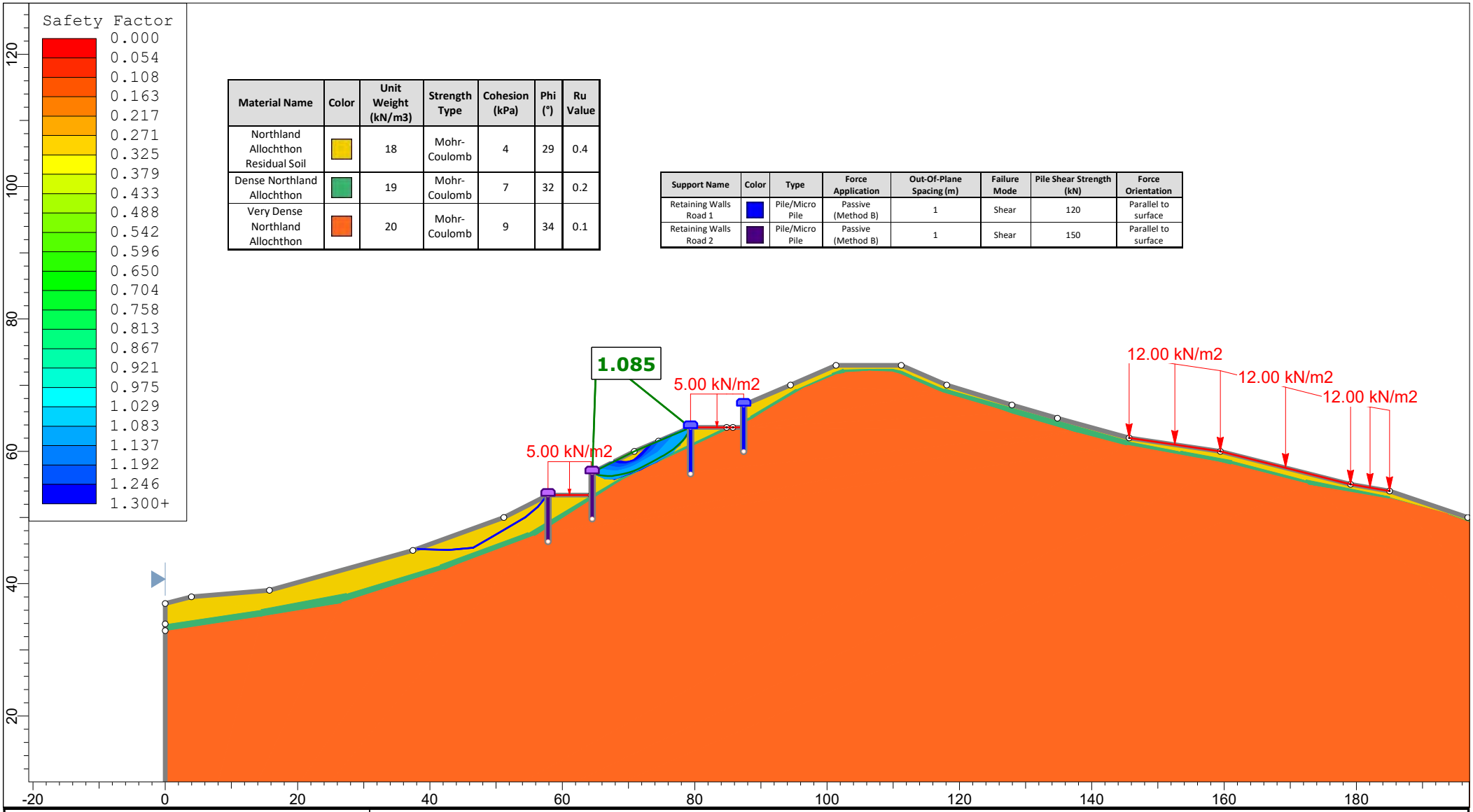
Retaining Walls Road 2		Pile/Micro Pile	Passive (Method B)	1	Shear	150	Parallel to surface



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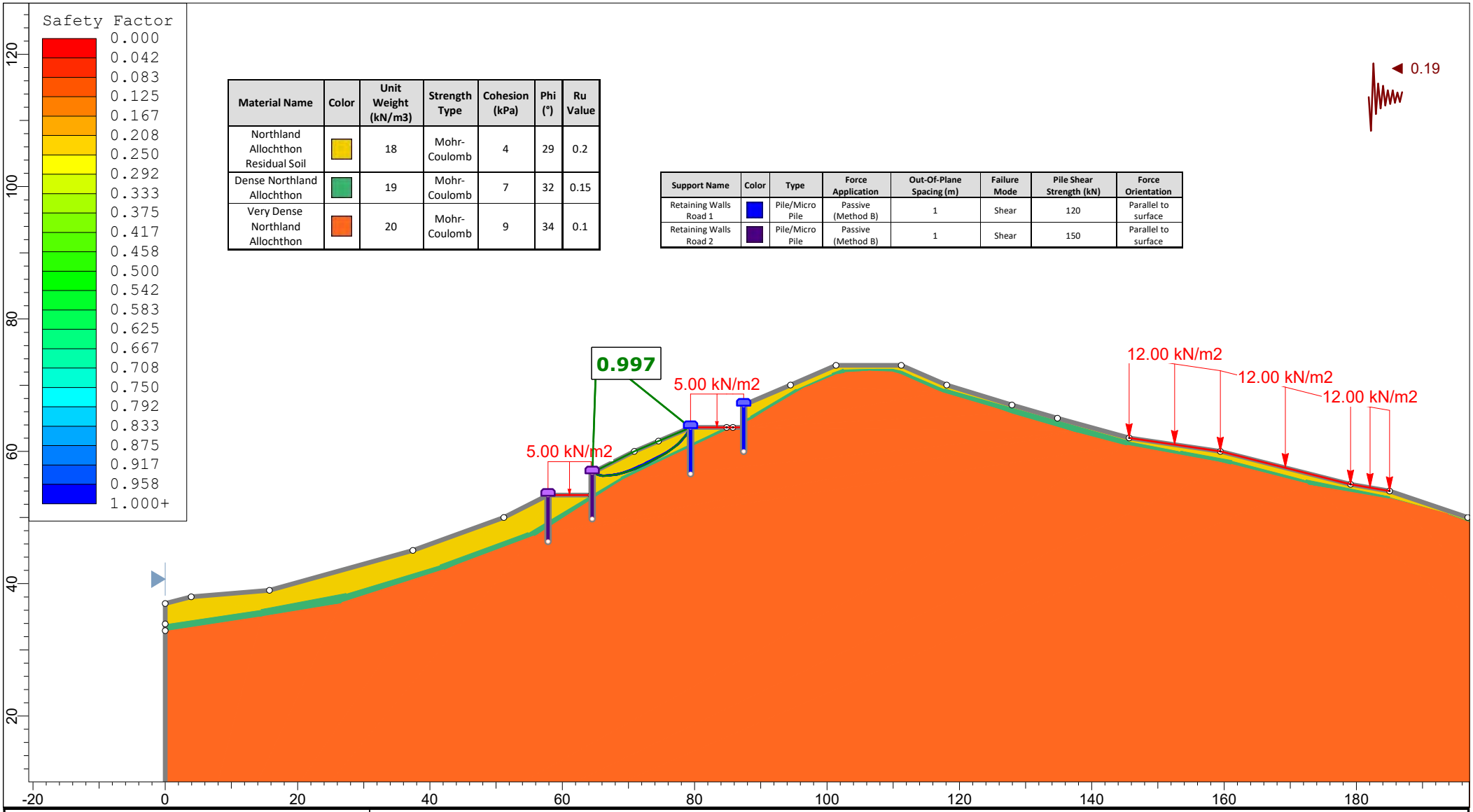
Project	Pokapu Road, Moerewa		
Group	Proposed Condition	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section B road.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
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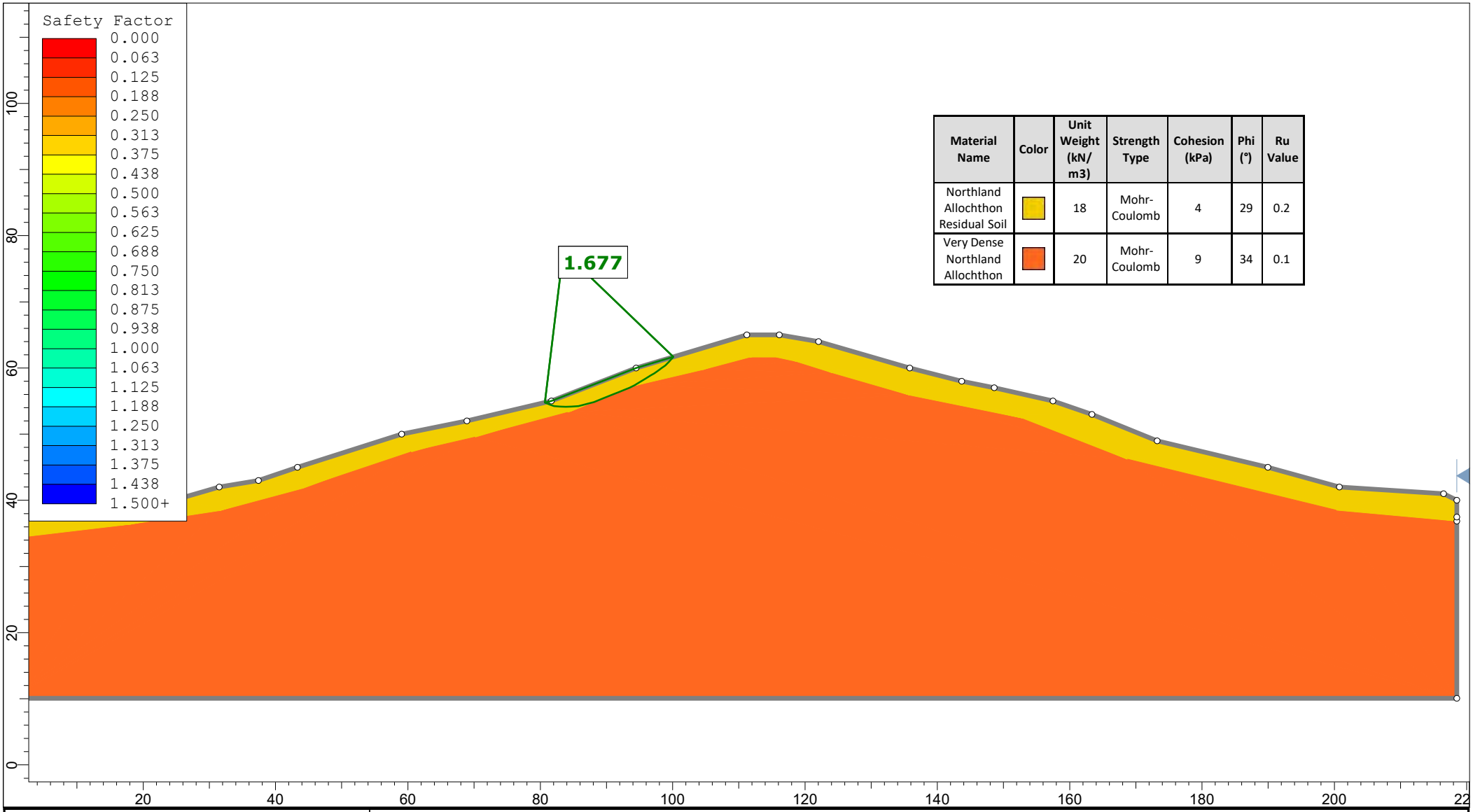
Project	Pokapu Road, Moerewa		
Group	Proposed Condition	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section B road.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
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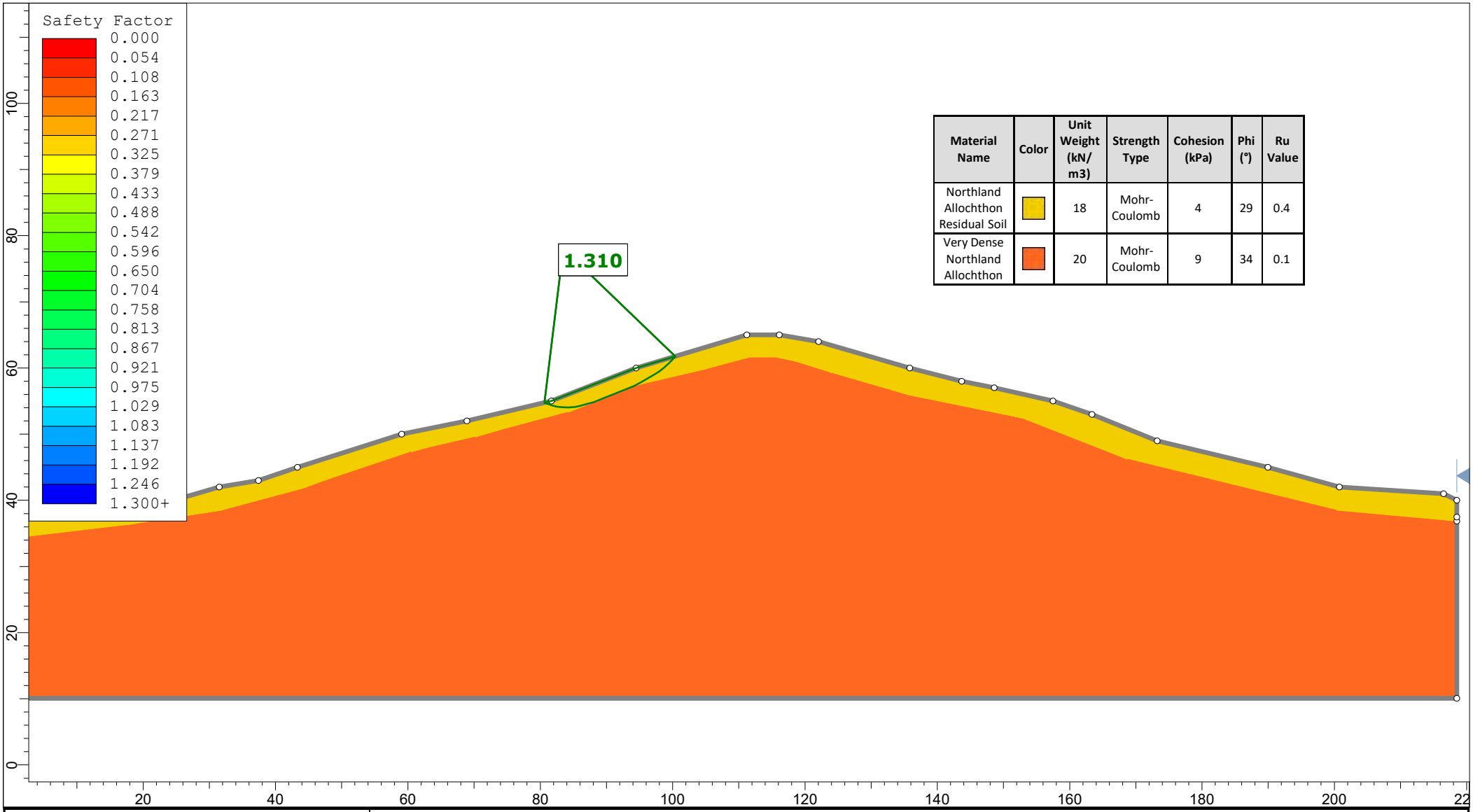
Project	Pokapu Road, Moerewa		
Group	Existing Condition	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section C.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
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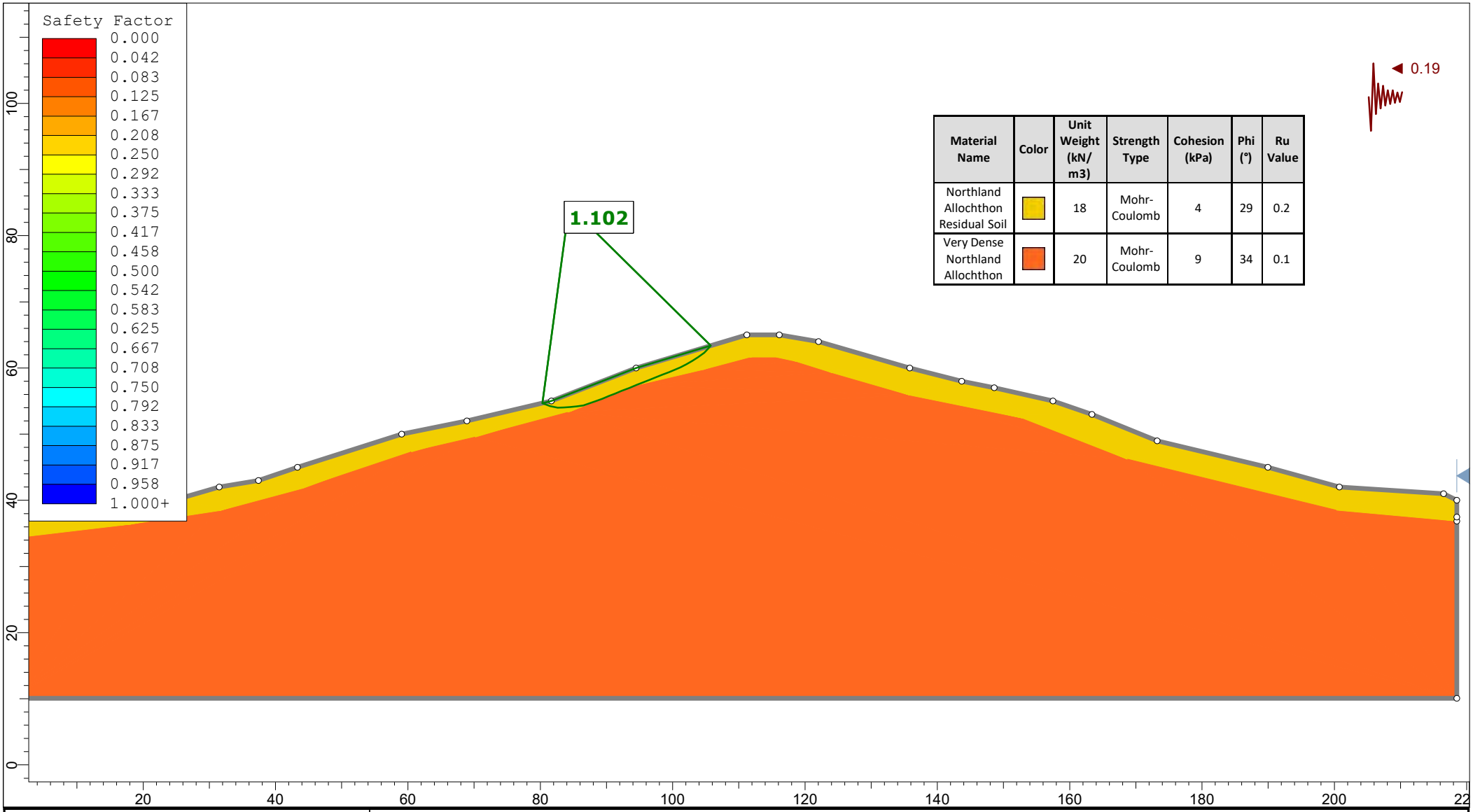
Project	Pokapu Road, Moerewa		
Group	Existing Condition	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section C.slmd



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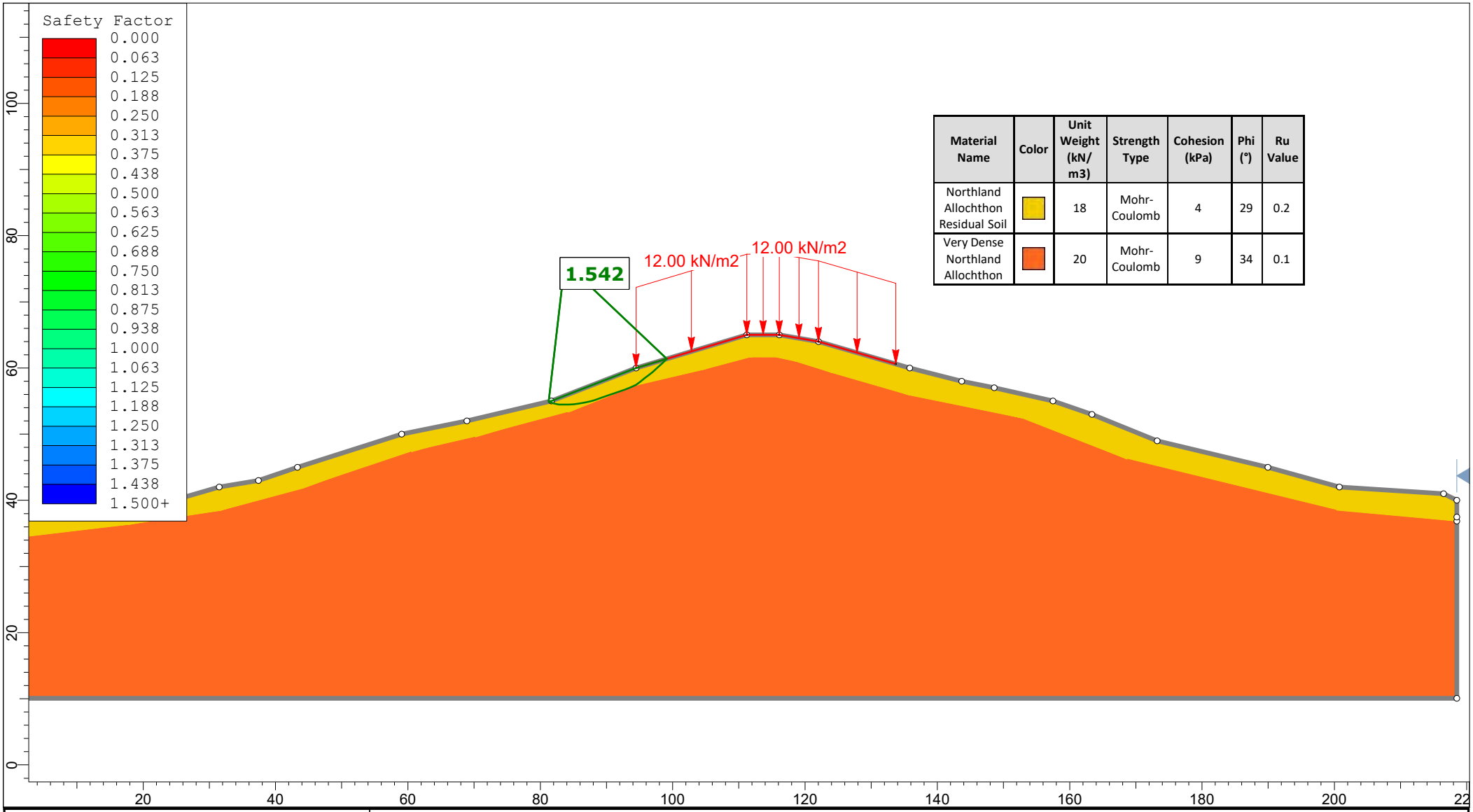
Project	Pokapu Road, Moerewa		
Group	Existing Condition	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section C.slmd



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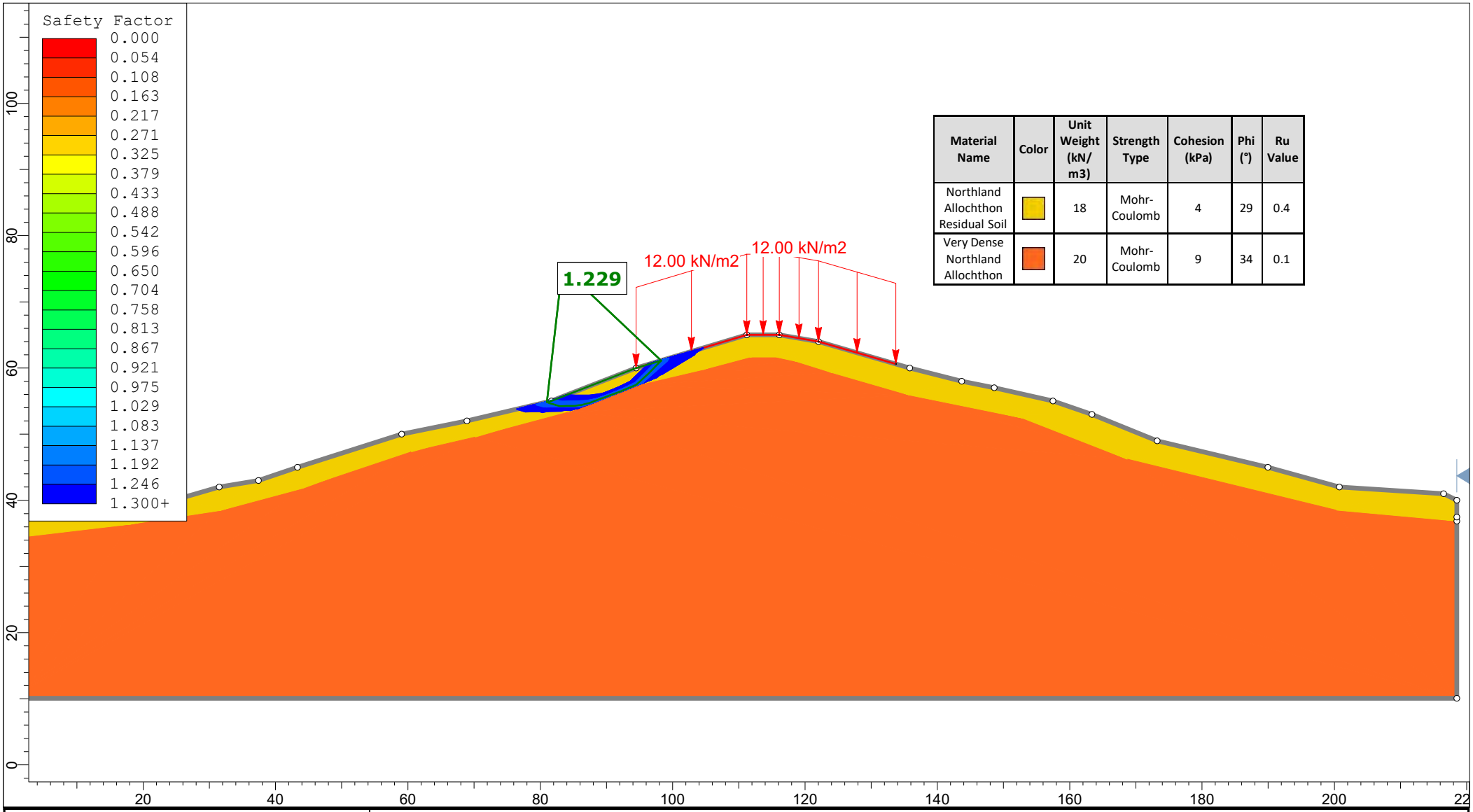
Project	Pokapu Road, Moerewa		
Group	Proposed Condition	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section C.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
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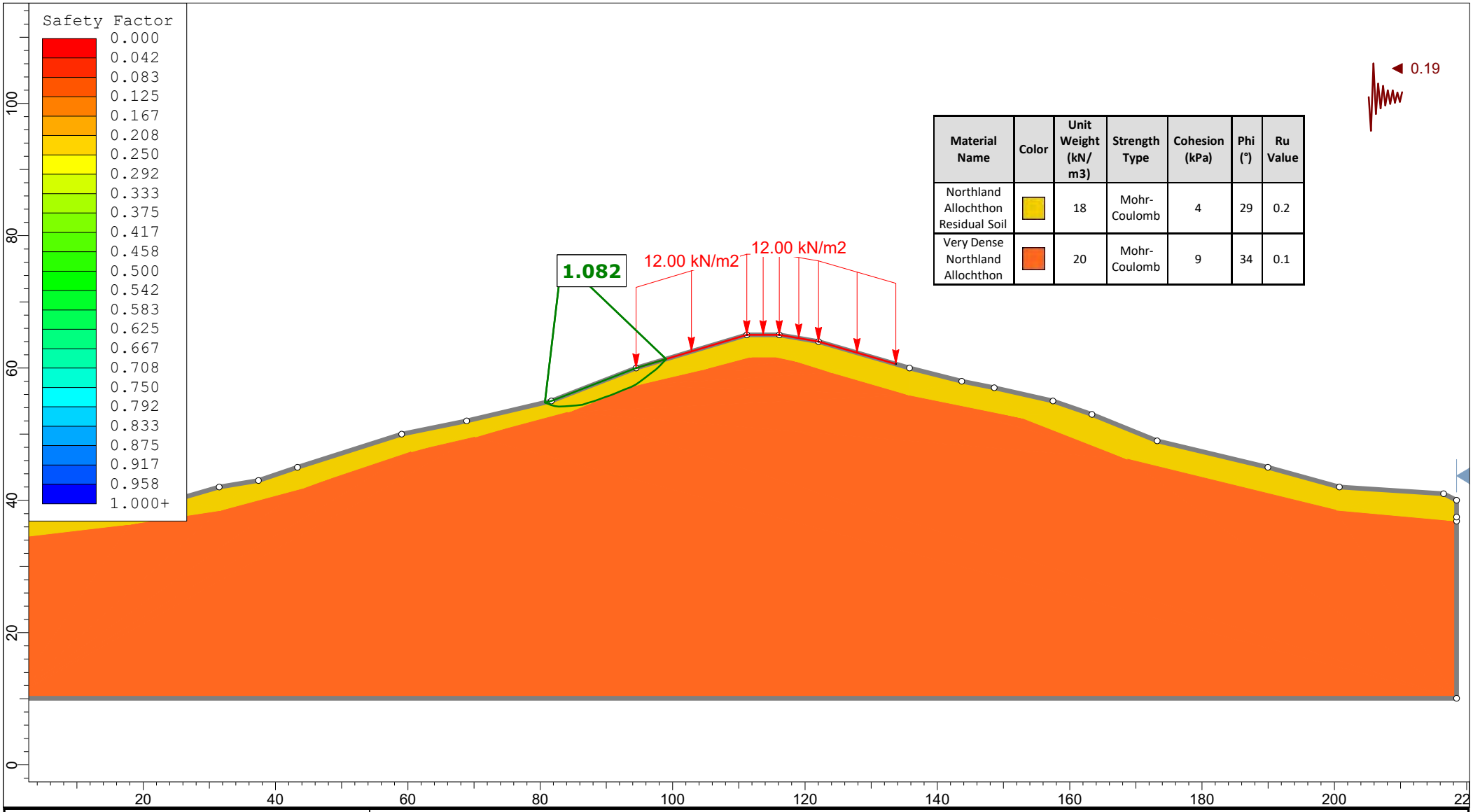
Project	Pokapu Road, Moerewa		
Group	Proposed Condition	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section C.slmd



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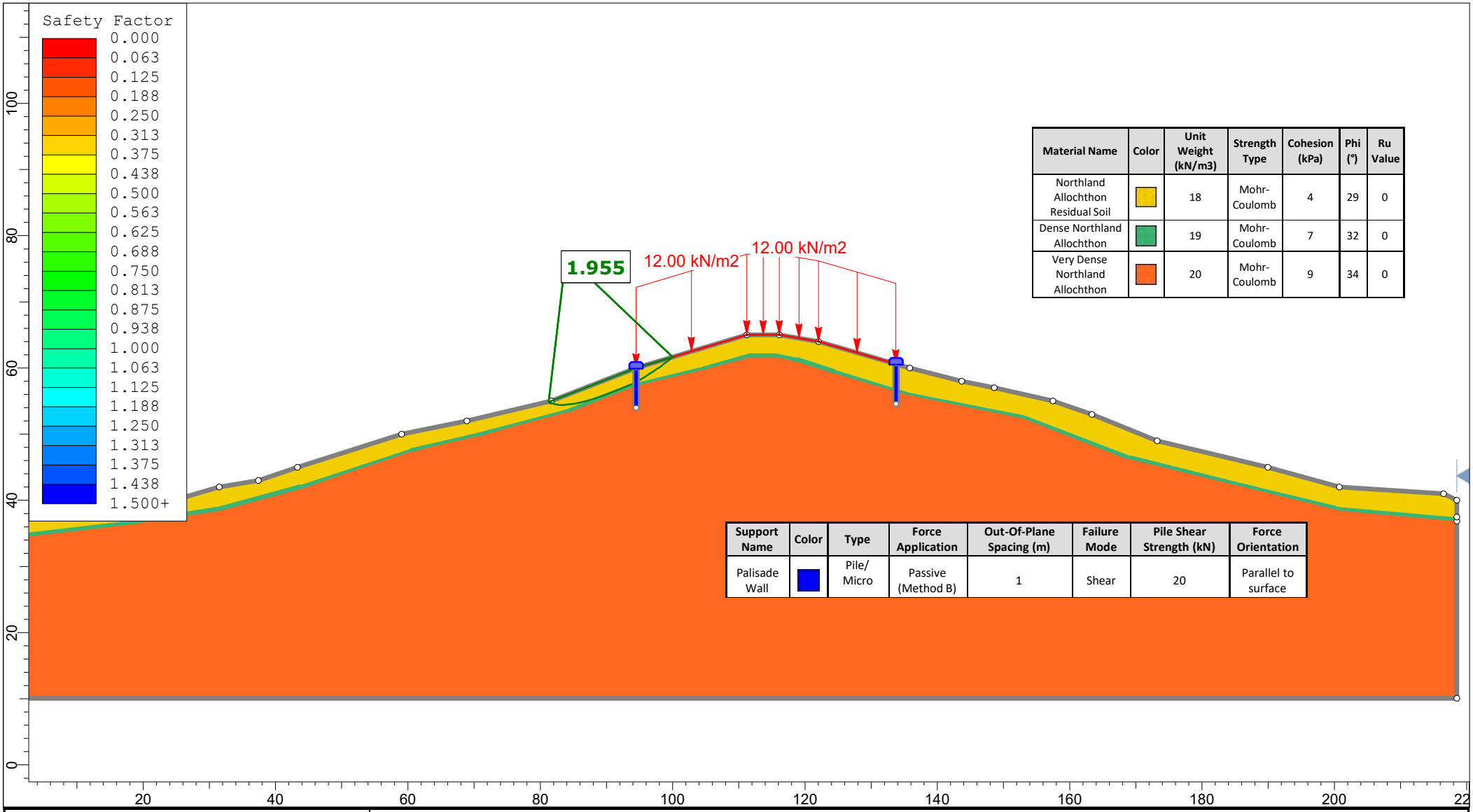
Project	Pokapu Road, Moerewa		
Group	Proposed Condition	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section C.slmd



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Very Dense Northland Allochthon		20	Mohr-Coulomb	9	34	0

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
Palisade Wall		Pile/ Micro	Passive (Method B)	1	Shear	20	Parallel to surface

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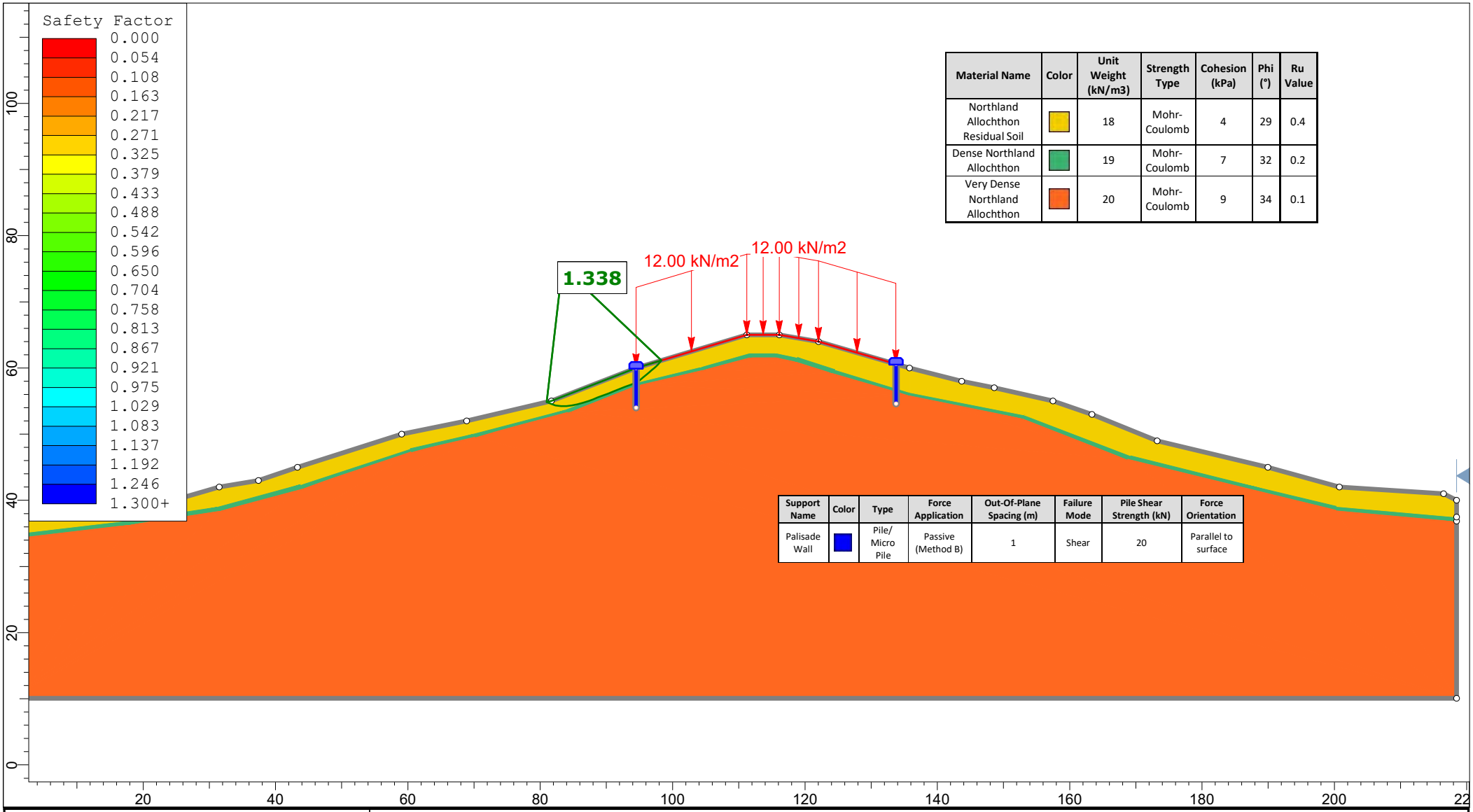
Project	Pokapu Road, Moerewa		
Group	Palisade Wall	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section C.slmd



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Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
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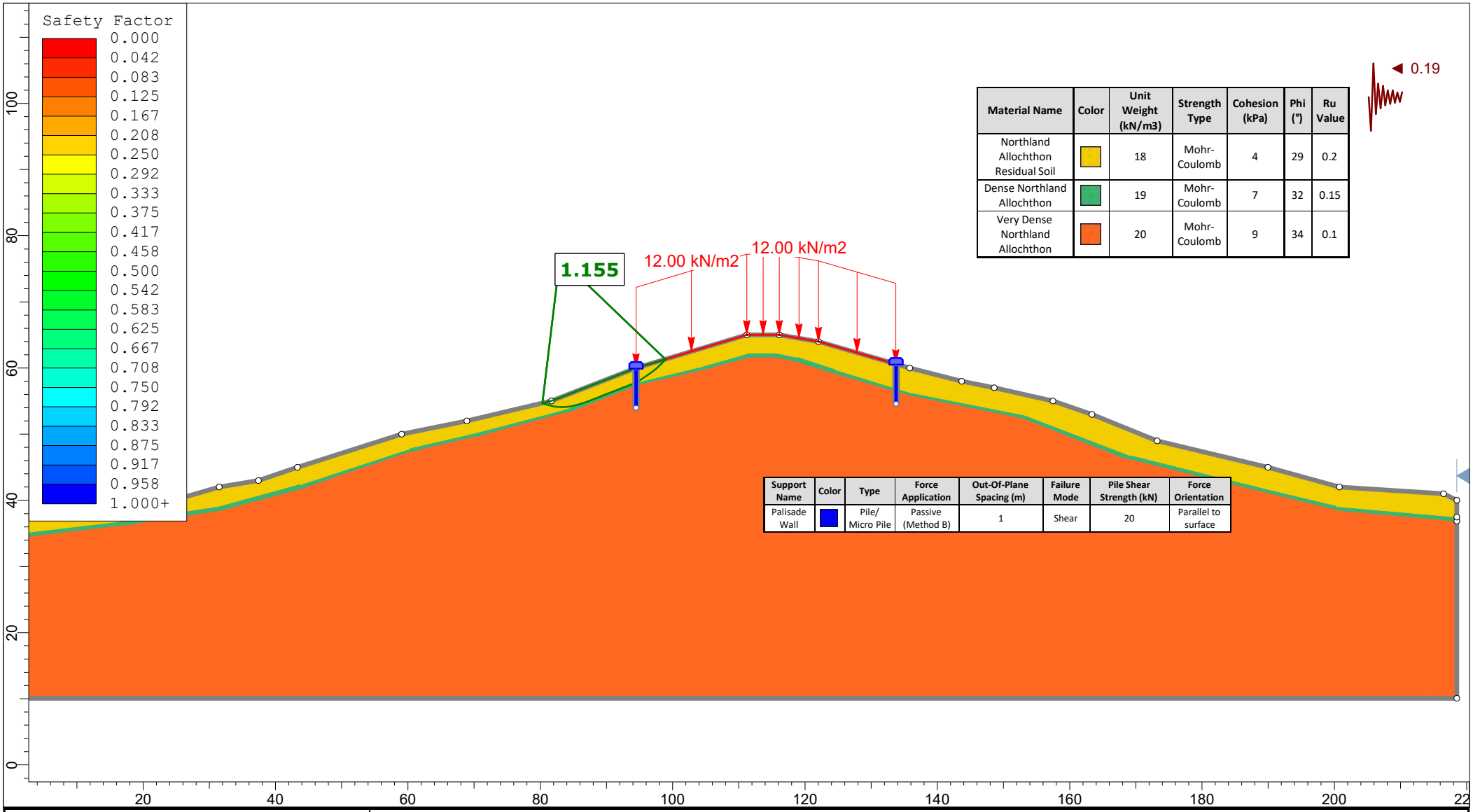
Project	Pokapu Road, Moerewa		
Group	Palisade Wall	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section C.slmd



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Project	Pokapu Road, Moerewa		
Group	Palisade Wall	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	23/10/2025, 12:13:36 pm	*File Name*	Section C.slmd