THOMSON SURVEY LIMITED

SURVEYORS AND RESOURCE PLANNERS

Our Reference: 10421.1 (FNDC)

2 December 2024

Resource Consents Department
Far North District Council
JB Centre
KERIKERI

Dear Sir/Madam

RE: Proposed Subdivision at Tahanga Road, Kaingaroa – M & J Vinac

I am pleased to submit application on behalf of M & J Vinac, for a proposed subdivision of land zoned Rural Production at Tahanga Road, Kaingaroa. The subdivision utilises the restricted discretionary subdivision option of up to 5 lots of minimum area of 2ha, where the title is dated older than April 2000.

The application fee of $4,910 has been paid separately via direct credit.

Regards

Lynley Newport
Senior Planner
THOMSON SURVEY LTD

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

Office Use Only
Application Number:

Application for resource consent or fast-track resource consent

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

1. Pre-Lodgement Meeting

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

2. Type of Consent being applied for

(more than one circle can be ticked):

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

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

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

✓ **Yes** ◯ **No**

4. Consultation

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

If yes, which groups have you consulted with?	
Who else have you consulted with?	

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

5. Applicant Details

Name/s: Melay and Joyce Vinac

Email: [redacted]

Phone number:

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

6. Address for Correspondence

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

Name/s: Lynley Newport

Email: [redacted]

Phone number:

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

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

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

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

Name/s: as per item 5 above

Property Address/ Location:

Postcode

8. Application Site Details

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

Name/s: as per item 5

Site Address/ Location: 216 Tahanga Road
KAINGAROA

Postcode 0483

Legal Description: Pt Lot 4 DP 73967 & Pt Lot 1 DP... **Val Number:** 00081-53200

Certificate of title: NA64B/773

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.

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.

5 lot subdivision (4 additional) in the Rural Production Zone

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

10. Would you like to request Public Notification?

○ **Yes** ☑ **No**

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

(more than one circle can be ticked):

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

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

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

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

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

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

13. Assessment of Environmental Effects:

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

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

13. Draft Conditions:

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

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

14. Billing Details:

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

Name/s: (please write in full) MV & JP Vinac

Email: [redacted]

Phone number:

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

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

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

Name: (please write in full) Melay Victor Vinac and Joyce Patricia Vinac

Signature: [redacted]
(signature of bill payer

Date 27-Nov-2024

MANDATORY

15. Important Information:

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

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

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

15. Important information continued...

Declaration

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

Name: (please write in full) Melay Victor Vinac and Joyce Patricia Vinac

Signature: Date 27-Nov-2024

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

Checklist (please tick if information is provided)

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

Melay and Joyce Vinac

Far North District Plan

PROPOSED SUBDIVISION

216 Tahanga Road, Kaingaroa

PLANNING REPORT AND ASSESSMENT OF ENVIRONMENTAL EFFECTS

Thomson Survey Ltd
Kerikeri

1.0 INTRODUCTION

1.1 The Proposal

The applicants proposed to carry out a subdivision of their property at 216 Tahanga Road, Kaingaroa to create five lots (four additional). Proposed Lots 1-4, all vacant land, are proposed to be 2ha apiece. The balance Lot 5 and southernmost lot, is proposed to be 26.6ha. It contains a farm shed.

Access to all lots will be via frontage to Tahanga Road (unsealed public road). No new easements are proposed. The property is subject to an existing Right to Convey Water – affecting Lot 2.

Refer to *Appendix 1* for copies of the Scheme Plans. Refer to *Appendix 2* for a copy of the Locality Plan.

1.2 Scope of this Report

This assessment and report accompanies the Resource Consent Application and is provided in accordance with Section 88 and Schedule 4 of the Resource Management Act 1991. The application seeks consent under the District Plan for a subdivision as a discretionary activity – refer to section 5.0 Activity Status. The name and address of the owner of the property is contained in the Form 9 Application form.

2.0 PROPERTY DETAILS

Location:	216 Tahanga Road, Kaingaroa
Legal description:	Pt Lot 4 DP 73967 and PT Lot 1 DP 101253
CT:	NA64B/773, 34.8976ha in area (copy attached in *Appendix 3*).

3.0 SITE DESCRIPTION

3.1 Physical characteristics.

The site is located on Tahanga Road, legal unsealed road, and is approximately 2.4km from SH10, and 5.8km from Kaingaroa.

The property is covered in pasture, and is predominantly used for cattle grazing. There is one farm shed with stock yards. The property is otherwise vacant.

The property is flat in the southeast, and rolling in the northwest. The soils in the top half of the property contain Class 4 LUC soils of two different types - Te Kopuru sand (TEK), and Hukerenui fine sandy loam (HKf). The bottom half of the property is Ruakākā loamy peat (RKd) soils of Class 3 LUC type (Figure 1).

Figure 1. NRC soil mapping for NA64B/773.

Lots 1 - 4 are located over soil types TEK and HKf, with LUC class 4. The southern portion of balance Lot 5 has the LUC 3 classification, however this land remains intact in one lot and is therefore not being 'subdivided'.

The site is not within a kiwi present or high density kiwi area and contains no areas of indigenous vegetation or habitat. It displays no high or outstanding natural character or landscape values and is not in the coastal environment.

The site is not mapped as being subject to any hazard.

3.2 Legal Interests

D534038.1 Notice pursuant to Section 94C Transit New Zealand Act 1989 declaring the adjoining State Highway 19 to be a limited access road, dated 21 August 2000.

D539212.1 Notice pursuant to Section 91 Transit New Zealand Act 1989, dated 7 September 2000.

EI C987139.1 Right of way over Pt Lot 1 DP 106559, dated 29 April 1996.

The references to Transit are on the title because the title has an existing appurtenant ROW over adjacent land to the south to access State Highway. This will remain with the balance Lot 5 but will not apply to Lots 1-4 as there is no connectivity and no frontage to State Highway.

3.3 Consent History

82234-TCPSUB 3-lot subdivision, issued 16 May 1974, creating the site

RC 2230395-RMASUB 3-lot subdivision, issued in June 2023 – no new titles deposited.

Whilst the 2023 consent got to the point of TA approvals (223, 224c and 221) issued, the applicants did not proceed to register new titles and are now proposing a replacement (and different) layout. A copy of RC 2230395-RMACOM is attached in Appendix 4.

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:	Refer to Sections 3 and 5 of this Planning Report for existing activities within the site. The application is for subdivision.

(e) a description of any other resource consents required for the proposal to which the application relates:	No other consents are required other than that being applied for pursuant to the Far North Operative District Plan.
(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 & 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 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)):	Refer sections 3 and 5. The site is vacant.
(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.

Clause 4: Additional information required in application for subdivision consent

(4) An application for a subdivision consent must also include information that adequately defines the following:	
(a) the position of all new boundaries:	Refer to Scheme Plans in Appendix 1.

(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.*	

Clause 5: Additional information required for application for reclamation – not applicable.

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 result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity:	Refer to Section 6 of this planning report. The activity will not 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 are 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 effects does not warrant any.
(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 proposed activity will have no adverse, effects on the physical environment and landscape and visual amenity values.
(c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity:	Refer to Section 6.0. The proposal will not result in adverse effects in regard to habitat and ecosystems.
(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, and above comments
(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 natural hazards and does not involve hazardous installations.

5.0 ACTIVITY STATUS

5.1 Operative District Plan Zoning

The property is zoned Rural Production. No Resource features apply. The subdivision standards applying in the zone are contained in Table 13.7.2.1 as shown below.

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. Subdivision that complies with the controlled activity standard, but is within 100m of the boundary of the Minerals Zone; 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 lot 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 **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;**	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. ....

The creation of five lots of greater than 2ha, where the title is older than April 2000, is a restricted discretionary subdivision activity pursuant to option 4 above (in bold).

Zone Rules:

No consent is being sought for any future breaches of zone rules that may occur through development of the lots. The existing shed is closer than 10m from road boundary, however this is an existing situation and an existing boundary, so no land use consent is required. There are no other buildings or impermeable surfaces for which land use consent is required.

District Wide Rules:

The site is not subject to chapters 12.1 or 12.2 (landscape and indigenous vegetation). In regard to Chapter 12.3, earthworks associated with subdivision site works will be restricted to the construction of crossings from Tahana Road and is unlikely to breach the permitted volume threshold applying to the Rural Production zone. Nor is there likely to be any cut/fill face of more than average height of 1.5m.

Chapter 12.4 (Natural Hazards) is not relevant as the site is not subject to any hazard and the nearest bush/forest is across Tahang Road, therefore easily ensuring a buffer setback of more than 20m for any dwellings constructed on the lots.

The proposal is not subject to Chapter 12.5 (Heritage) as there are no heritage or cultural resources mapped for the site, nor Chapter 12.7 (Waterbodies) as there are no qualifying waterbodies from which setback is required. The stock dam to be within Lot 3 is man made and therefore not subject to the waterbody setback rules in Chapter 12.7.

A brief assessment of the proposal against Chapter 15.1.6C.1.1 to 11 follows:

Rule 15.1.6C.1.1(a) – private accessway can be constructed in accordance with Appendix 3B-1 of the ODP.
(b) – the access into the sites will be at a gradient no steeper than 1:8 for the first 5m.
(c) – no private accessway serves more than 8 household equivalents.
(d) – no private accessway serves 9 or more titles.
(e) – access is not LAR or state highway (other than an existing legal crossing via a leg-in ROW (relating to Lot 5 only); is not within 90m of any intersection with an arterial or collector road; and is not within 30m of any intersection with a local road.

Rule 15.1.6C.1.3 – each lot will have its own crossing except that Lot 4 and balance Lot 5 existing double width crossing will be retained to provide access to both lots. No passing bays are required. Rule 15.1.6C.1.4 does not apply as there is no footpath.

Rule 15.1.6C.1.5(a) – the vehicle crossings will be constructed in accordance with the Council's Engineering Standards and Guidelines, including sight distances.
(b) & (c) are not applicable.

Rule 15.1.6C.1.7(a) – there is no need for vehicles to reverse off the site.
(b) – all bends and corners can be constructed to allow for the passage of a Heavy Rigid Vehicle.
(c) – not applicable;
(d) – runoff from impermeable surfaces will, wherever practicable, be directed to grass swales and/or managed in such a way as will reduce the volume and rate of stormwater runoff.

Rule 15.1.6C.1.8(a) – Tahanga Road is 20m legal width, metal surface.
(b) – In terms of the roading network, Tahanga Road is regarded as a "low volume" unsealed road. The Operative District Plan and Engineering Standards 2004, revised 2009, would require Rural Type A standard for a road such as this. Tahanga Road, where it provides frontage to the application site, is not a uniform 6m carriageway width. It is wide and expansive near the existing barn and where it provides frontage to Lots 2-4, but then narrows slightly the further north one travels.
The Council is encouraging use of its 2023 Engineering Standards and Guidelines more and more and if these are applied, then Tahanga Road readily meets the required standard. Table 3-3 of those standards, Rural Road Design Criteria, specifies that where roads have an Average Daily Traffic (ADT) between 50 and 200, they can be classified as "access" roads.

Furthermore Table 3-4 for unsealed roads prescribes that for "Band 2 Private Use" the required road width need only be 4-5m.
Tahanga Road is at least 4.5m wide along the frontage. This is considered a reasonable and practical determination of the use and character of Tahanga Road and it is proposed that the road remain as is for the purposes of the proposed subdivision.
However, there remains a technical breach of 15.1.6C.1.8(b) because it only refers to the 2004 (revised 2009) standards and to Appendix 3B. This alters the category of activity to full discretionary as opposed to restricted discretionary, even though the road meets Council's 2023 Engineering Standards.
(c) Balance Lot 5 does have two available frontages – to Tahanga Road and to State Highway via an existing ROW over adjacent land. This is an existing situation and would have existing use rights accordingly.
(d) There is a section of Tahanga Road's physical carriageway within the title boundary. Accordingly the Scheme Plan shows Lot 6 Road to Vest. Part (d) is therefore complied with.

No other parts of Chapter 15.1.6C are applicable. No other district wide rules in the ODP are applicable.

The application is a restricted discretionary subdivision activity and because of a technical breach of 15.1.6C.1.8(b) as described above, a discretionary land use activity. The more restrictive category applies overall.

5.2 Proposed District Plan (PDP) Assessment

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.

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. The only earthworks required to give effect to the subdivision is the formation of access to the boundary of the proposed new lots. This can be carried out in compliance with the above referenced rules/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

Proposed Lot 5 of 26.6ha will contain all of the existing built development - a hay shed and stock yards. The vacant lots have ample land for a house site and associated on-site wastewater systems. They can be comfortably clear of any watercourses on the property to comply with existing rules. All lots can accommodate a 30m x 30m square building envelope complying with the zone's boundary setbacks.

Looking south across Lot 2's likely building site.

6.2 Natural and Other Hazards

Small areas of Lot 5 are at risk of flooding.

Flood map for the property. Taken from NRC online maps, on which the PDP's flood hazard maps are also based.

These areas are well away from Lots 1 through 4, and at lower contours. They will have no impact on development of the proposed 2ha lots.

Refer to the Subdivision Site Suitability Engineering Report in Appendix 5. The site is not subject to rockfall, alluvion, avulsion, unconsolidated fill, soil contamination, subsidence, fire hazard, or sea level rise. The preliminary site stability assessment in the Site Suitability Report found no obvious indications of major deep-seated instability and considered the risk to be low. Assessment of landslip potential is a matter to be subject to geotechnical assessment at building consent stage. The risk of erosion, flooding or inundation is assessed as less than minor. Suitable building envelopes can be formed on gently sloping land. Building sites can be established outside of any overland flowpaths.

In summary there is no reason pursuant to s106 of the Act as to why this application should not be granted.

The property is not listed as a HAIL site by Northland Regional Council [*source*: NRC online maps]. Historical imagery from Retrolens shows the land was cleared of scrub and bush in the late 1960s, early 70s. There is no historical evidence from Retrolens or Google Earth that there was ever any horticultural activity on the northern half of the property where Lots 1 through 4 will be located.

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 Lots 1 through 4. In addition there is a stock dam located within Lot 3, available as a fire fighting water supply source, and several ponds within the large Lot 5.

It is recommended that roof runoff water tanks be used for potable water supply, with tank volume determined taking into account the required stormwater detention volume.

6.4 Energy Supply & Telecommunications

Energy supply and telecommunications are not a requirement of rural subdivisions. Nonetheless, correspondence was sent to Top Energy as part of the originally consented three lot subdivision. Their requirements for the subdivision were nil. Mobile coverage is available at the lots. The Council can impose its standard consent notice as follows:

Electricity supply is not a condition of this consent and power has not been reticulated to the boundary of the lot. The lot owner is responsible for the provision of a power supply to operate the on-site aerobic wastewater treatment plant and any other device which requires electrical power to operate.

6.5 Stormwater Disposal

Refer to the Site Suitability Report in Appendix 5, specifically Section 8 of that report. A reasonable level of development on each of the proposed vacant lifestyle lots would see an impermeable surface coverage of around 300m^2 for buildings and 200m^2 for driveways. This equates to only 2.5% of a 2ha lot. Impermeable coverage will easily remain within permitted activity status at time of each lot's development.

The Site Suitability Report provides commentary on stormwater management concept, design storm event, and concept stormwater attenuation. It also addresses stormwater quality.

In summary the proposal, and future development of lots, will not create adverse stormwater runoff effects.

6.6 Sanitary Sewage Disposal

Refer to Section 7 of the Report in Appendix 5. The Report assumed that the proposed new lots may comprise up to a five bedroom dwelling with a peak occupancy of eight people. This would equate to a maximum total daily wastewater generation of 1,280litres/day per proposed lot. The report recommends an appropriate land disposal system, with primary disposal area of 640m^2 land parallel to natural contours, and recommends a 100% reserve disposal field also to be laid parallel to the natural contours of each lot.

The report provides a summary of concept wastewater design and assesses environmental effects. It also assesses proposed future systems against the criteria in the Regional Plan for compliance (Table 14 of Appendix C).

The application for the three lot subdivision consented by the Council, contained an Onsite Wastewater Site Suitability Report by O'Brien Design Consulting. This covered the land within new Lot 2 likely to be developed and therefore this lot has not been re-examined. Neither is the large 26.6ha Lot 5.

6.7 Easements for any purpose

The application site has one appurtenant easement for a right of way (C987139.1) No additional / new easements are proposed or required.

6.8 Property Access

Proposed Lots 1, 2 and 3 will be accessible via new access crossings off Tahanga Road, which runs along the western border of the property. Tahanga Road is a gravel road with a safe operating speed of approximately 50-60km/hr. Entranceways can be formed such that there are good sight lines in either direction.

Tahanga Road on the bend marking the boundary between Lots 1 & 2, looking north

Lots 4 and 5 are to share an existing crossing in excess of double width and already formed, with culvert.

Tahanga Road with extra width crossing to serve Lots 4 & 5 at left of picture

Tahanga Road is an existing metalled public road, maintained by the Council. Appendix 3B-2 of the ODP requires such a road to be Rural Type A. This requires 6m metal carriageway width, not achieved for the entire length of Tahanga Road where it provides frontage to the

site, although some, particularly along Lots 2-4 frontage has a wide carriageway. Technically, however, the proposal breaches 15.1.6C.1.8(b).

However, an applicant is entitled, and encouraged, to refer to the FNDC Engineering Standards 2023 when looking at what would be considered an appropriate public road standard. Table 3-3 of those standards, Rural Road Design Criteria, specifies that where roads have an Average Daily Traffic (ADT) between 50 and 200, they can be classified as "access" roads. Furthermore Table 3-4 for unsealed roads prescribes that for "Band 2 Private Use" the required road width need only be 4-5m.

Tahanga Road is over 4.5m in width. This is considered a reasonable and practical determination of the use and character of Tahanga Road and it is proposed that the road remain as is for the purposes of the proposed subdivision.

6.9 Earthworks & Utilities

Lots 1 through 4 have gentle slopes. Only minor earthworks will be required to create entranceways as part of subdivision works – refer to commentary in Section 10 of the Site Suitability Report. Development by future lot owners will create driveways and building sites on the lots but that is future works and does form part of this subdivision application. As stated earlier, power and telecoms utilities are not a requirement of rural subdivision.

6.10 Building Locations

All lots are capable of providing physically suitable building sites – refer to commentary in Sections 3-6 of the Site Suitability Report in Appendix 5. All lots can accommodate buildings clear of overland flowpaths. The report concludes each lot has a feasible building site. Further site specific investigation should be undertaken at building consent stage by a professional geotechnical engineer.

All lots can provide for a building site that will not be subject to inundation. As such there is no need for minimum floor levels to be specified.

All lots have potential house sites with good access to sunlight.

Looking north across Lot 1's potential building site

Standing in vicinity of Lot 2's building site, looking across Lot 3 and 4's potential building sites, with shed on Lot 5 at centre picture

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

Heritage Resources, including cultural values

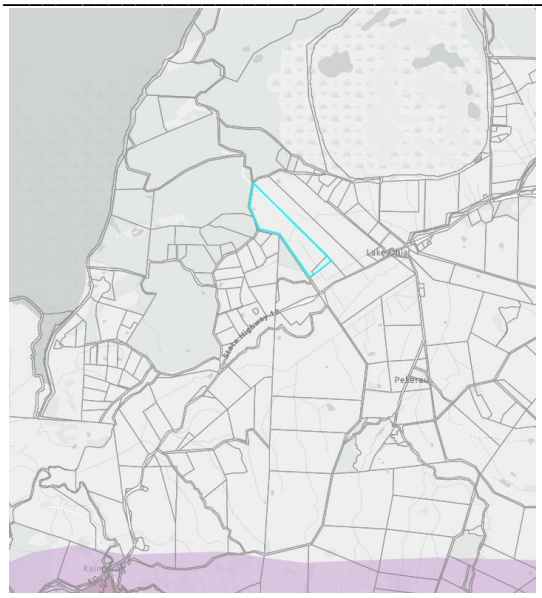
The site contains no historic sites or sites of cultural significance to Māori as recorded on/in the District Plan's Resource Maps or Schedules. There are no NZAA archaeological sites mapped on the site.

Vegetation, Fauna and Landscape

The subdivision will not require the clearance of any indigenous vegetation on the application site.

The property is immediately across the road from a Department of Conservation (DOC) stewardship area, and Protected Natural Area (PNA 2016). This same area across the road is mapped on the NRC's Biodiversity Wetlands on-line maps as a Top 150 wetland and as an outstanding natural landscape (Regional Policy Statement maps). However, the various features described above do not extend across Tahanga Road into the application site. The property is separated by road and two roadside drains. Tahanga Road runs along a ridge. The application property slopes downhill in an easterly direction away from any wetland area across the road. Any wetland area across the road slopes downward in a westerly direction, putting it in a different catchment to the application property, with no hydrological connectivity. The property is therefore unlikely to breach any of the rules within the National Environmental Standards for Freshwater (NES-F).

The application site is not located near a kiwi present, or kiwi high density area. The nearest kiwi present area is approximately 4km to the south.



Species distribution map from FNDC online maps, showing application site outside of kiwi present or high density area.

When consenting the former 3 lot subdivision, the council did not impose any ban or restriction on the keeping of dogs or cats. Refer to Appendix 4.

6.12 Soil

The northern half of the property contains Class 4 LUC soils. The southern half of the property is mapped as Class 3 LUC soils. This land all remains in the large balance lot. The subdivision will not adversely affect the life supporting capacity of soils and will not adversely affect any highly productive soils (LUC Class 1, 2 or 3).

6.13 Access to, and protection of, waterbodies

There are no qualifying waterbodies to which public access is required. The subdivision does not adversely affect waterbodies, including any wetlands (refer to comments under 6.11 above).

6.14 Land use compatibility (reverse sensitivity)

The property is vacant except for a single hay barn with adjacent stockyards. These will be incorporated into Lot 5. The property is currently 34.8976ha in size. All of the proposed 2ha will have at least one boundary with farmland, none of which is intensive dairy. The existing pastoral grazing regime on both the application site and adjacent land to the east is low intensity dry stock grazing. Future dwellings within Lots 1-4 will likely be at the lots more western end, providing good buffer between a dwelling and adjacent grazing land. I do not consider that the proposal will result in adverse 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

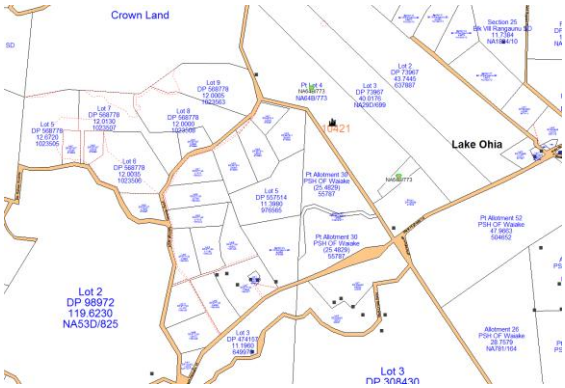
6.18 National Grid Corridor

The National Grid does not run through the application site.

6.19 Effects on Rural Character and Amenity

All proposed 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.

The size of the lots proposed is in keeping with the general settlement pattern that now exists in this area.



View of properties around application site, taken from Quickmap.

The overall area supports rural lifestyle properties amongst larger rural holdings and Crown land.

6.20 Effects on Landscape & Natural Values

The site does not have any high or outstanding landscape or natural values.

6.21 Positive Effects

When carrying out an assessment of effects, an applicant and consent authority are able to, and should, take into account positive effects both on their own merit and as offsetting any potential negative effect. The subdivision allows for future property owners to enjoy a rural lifestyle relatively close to a state highway network and town (Awanui/Kaitaia).

6.22 Cumulative and Precedent Effects

Cumulative Effect:

The proposal will create four additional lots, however, all are large enough to maintain rural character and amenity and the density level does not create an adverse cumulative effect in terms of built development.

Precedent Effect:

Precedent effects are a matter for consideration when a consent authority is considering whether or not to grant 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 District Plan Objectives and Policies

I consider the subdivision to be consistent with the subdivision objectives and policies in Chapter 13. In particular I consider the proposal to be consistent with Objective 13.3.1 which provides for (enables) subdivision in a way that promotes sustainable management of natural and physical resources; and Objective 13.3.2 and associated Policy 13.4.1, which seek to ensure that the subdivision of land is appropriate and carried out in a manner that does not compromise air, water, soil or ecosystems, and that avoids, remedies or mitigates any adverse effects.

The Rural Production zone is an enabling zone, providing for a variety of activities subject to avoiding, remedying or mitigating adverse effects and compatibility with the amenity values of rural areas and rural production activities. I consider the proposed subdivision to be consistent with the zone's objectives and 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.

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 subdivision is consistent with both the above objectives. It promotes sustainable management of the natural and physical resources of the District and provides for the applicants' social and economic well being. It is an appropriate subdivision that does not compromise the life-supporting capacity of air, water, soil or ecosystems, and adverse effects are minimal.

13.3.3 To ensure that the subdivision of land does not jeopardise the protection of outstanding landscapes or natural features in the coastal environment.

13.3.4 To ensure that subdivision does not adversely affect scheduled heritage resources through alienation of the resource from its immediate setting/context.

The property has no outstanding landscape values, and is not within the coastal environment. There are no 'scheduled heritage resources' identified in the District Plan on the property.

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.

On-site water supply and on-site stormwater management can be achieved.

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

Policy 13.4.11 That subdivision recognises and provides for the relationship of Māori 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.

There are no 'scheduled' sites of significance to Māori affecting the property.

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.

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.

Power supply is not a requirement of rural subdivision, albeit can be made available if required (previously confirmed by Top Energy). House sites on future lots can be orientated to maximise access to sunlight. Access is off existing Council maintained road.

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.

I believe the subdivision has less than minor impact on the relevant matters listed in the above policy.

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

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

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.

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 can be adequately provided along Tahanga Road. The site is not subject to hazards. Provision of power and telecoms is not a requirement of rural subdivision.

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.

There is no indigenous bush on the property. The site is not located within a kiwi present or high density kiwi zone. The property is not located within the coastal environment. No known heritage resources exist on or close to the application site. The subdivision will not affect management of nearby outstanding natural landscape.

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

Future lots will be responsible for their own on-site water storage.

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.....

s6 matters are discussed elsewhere in this report. The subdivision does not adversely affect the character of the Rural Production Zone in regard to s6 matters, or any of those matters listed in 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 Objectives and Policies of the Rural Production Zone have been considered in the design and layout of the subdivision and I consider the subdivision to be consistent with those objectives and policies.

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

The proposal creates four rural lifestyle living in the Rural Production Zone, and leaves the majority of the land for existing farm use. There are no areas of indigenous flora on the property that will be affected by the subdivision. I believe that this proposal represents sustainable management for the 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.

The small lots provide for rural lifestyle living in an area that is already a mix of rural lifestyle and rural production lots. The Lot 5 will still be large enough to continue to be utilised as a

grazing unit. I believe that the proposal provides for social, economic and cultural well being, and for 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.

The local area is a mix of rural lifestyle blocks, large productive units, and crown owned land. I believe that the size of Lots 1 through 4 maintains the amenity values of the Rural Production Zone in this local area. Productive capacity will not be significantly diminished and the land to be contained in the smaller lots is not 'highly productive land' in any event.

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

The property does not contain any significant natural areas or indigenous biodiversity.

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.

The proposal is not a land use activity. In terms of future land use, Lots 1 through 4 are being designed for small rural lifestyle blocks in an area that already has a number of other rural lifestyle lot sizes. The lots will be in keeping with the local environment, and will not increase the risk of reverse sensitivity issues.

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

Lots 1 through 4 are being created over land that is in pasture, and has been for a number of years. There are no areas of indigenous bush on the lots, and no suitable habitat for indigenous fauna. The property is not within a kiwi present or high density kiwi area. The soils are Class 4 LUC, and are not highly productive soils. Sediment controls can be used during development to prevent runoff into any receiving environments.

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.

This policy relates to land use activities, not subdivisions. N/A.

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

Rural production activities will continue to be undertaken following the subdivision.

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

Farming will still continue following the subdivision. A large number of lifestyle lots have recently been created in the local area, and this proposal does not increase the risk of reverse sensitivity issues. Any effects can be kept local to the lot boundaries. Any effects to rural productivity on Lot 5 will be less than minor.

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

Again, this policy is directed at land uses, not subdivisions.

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.

The proposed subdivision scale and intensity meets restricted discretionary subdivision standards and is consistent with the requirements and expectations of the District Plan.

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.

I believe the proposal represents efficient use and development of the physical and natural resources.

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.

Refer to earlier comments in regard to reverse sensitivity.

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.

I believe any potential adverse effects can be readily avoided, remedied or mitigated. The proposal is not increasing the risk of reverse sensitivity issues to the local area.

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.

The proposal will not prevent existing lawfully established activities from continuing to operate.

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

The proposal is low density, creating the number of lots provided for as a restricted discretionary activity. By the time one reaches this part of Tahanga Road, traffic numbers are extremely low. The Council lists Tahanga Road as a low volume road. I believe any adverse effects from additional traffic will be less than minor.

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

Entranceways into the lots already are, or can be, formed to Council standard.

7.2 Proposed District Plan Objectives and Policies

The property is zoned Rural Production under the PDP. An assessment of the proposal against the zone's Objectives and Policies follows:

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 will remove 8ha from an existing grazing unit. However, the individual lots will retain abundant space for continued grazing.

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.

Lot 5's future use is unlikely to change as a result of the subdivision, i.e. pastoral grazing. There is sufficient land in each of Lots 1-4 to also support grazing, along with lifestyle living which I believe in this instance, noting low intensity dry stock grazing use as opposed to intensive agriculture or horticulture, to be an activity compatible with the productive use of the land.

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.*

Since the PDP was notified, the National Policy Statement for Highly Productive Land (NPS-HPL) came into effect, and this provides a legal definition of highly productive land – something the PDP does not. The land in the smaller lots does not contain any LUC Class 1, 2 or 3 LUC soils (i.e. does not contain any highly productive land), so the subdivision will not 'sterilise' highly productive land.

As stated elsewhere in this report I do not believe existing production uses in the area will be prevented from continuing and the risk of reverse sensitivity issues arising is low.

The subdivision can be carried out in such a way so as not to exacerbate any natural hazards and the lots are able to provide for on-site infrastructure.

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

The subdivision is located in an area that is a mix of rural living lots and larger rural holdings used for productive use. It is an area that supports a range of land uses and property sizes, and is not solely a rural working environment. I believe that rural character and amenity is maintained.

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 property is primarily used for low intensity dry stock cattle grazing. This use will still be able to function following the subdivision. Any adverse effects can be internalised within the lots.

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

RPROZ-P5
Avoid land use that:
a. *is incompatible with the purpose, character and amenity of the Rural Production zone;*
b. *does not have a functional need to locate in the Rural Production zone and is more appropriately located in another zone;*
c. *would result in the loss of productive capacity of highly productive land;*
d. *would exacerbate natural hazards; and*
e. *cannot provide appropriate on-site infrastructure.*

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 (as defined by NPS-HPL) and the lots will be large enough to support limited grazing. The proposal is not consistent with part (c) of RPROZ-P6 in that the subdivision proposes no habitat enhancement or protection,

noting there are no habitat areas on the site. However, noting the Rural Production Zone has been heavily submitted on and decisions not yet made, I find it difficult to afford this particular policy a lot of weight.

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. The area set aside for the smaller lots does not contain highly productive land. The proposal is consistent with the character of the surrounding rural environment. There is no zone interface. Lots can provide for onsite services (wastewater/stormwater management). The lots are accessed via maintained Council road. The site has no known heritage or cultural values and contains no natural features or landscapes or areas of indigenous biodiversity.

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.*

I believe that the proposed subdivision will achieve the efficient use of land and contribute to local character. I do not foresee reverse sensitivity becoming an issue and the subdivsion will not prevent the continued use of adjacent land for grazing. Risk from natural hazards will not be increased and adverse effects can be adequately managed.

SUB-O2
Subdivision provides for the:

- *a. Protection of highly productive land; and*

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

The only part of the site that contains 'highly productive land' remains within the large balance Lot 5, so is 'protected' insofar as it has not been fragmented or sterilised. There are no Outstanding Natural Features, Outstanding Natural Landscapes, Areas of High Natural Character, Outstanding Natural Character, Significant Natural Areas, Sites and Areas of Significance to Māori, and Historic Heritage. The property is not within the Coastal Environment.

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 given to connections with the wider infrastructure network.*

On-site infrastructure can be utilised for wastewater, stormwater and potable water supply.

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 waterbodies.*

The site is rural. There is Crown Land across the road and the subdivision does not adversely impact on that land. There are no areas requiring public access. There are no waterbodies requiring esplanade. The property is not within the coastal marine area.

SUB-P1
Enable boundary adjustments that:

a. *do not alter:*
    i. *the degree of non compliance with District Plan rules and standards;*
    ii. *the number and location of any access; and*
    iii. *the number of certificates of title; and*
b. *are in accordance with the minimum lot sizes of the zone and comply with access, infrastructure and esplanade provisions.*

Not applicable. The application is not a boundary adjustment.

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

Not applicable.

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 is not entirely consistent with this policy (parts (a) and (b)). However, it is consistent with parts (c) and (d) and the policy is one of many subdivision policies that has attracted submissions, decisions on which have yet to be made.

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 can be managed in a way that is consistent with the PDP's natural environment values (there are none), historical and cultural values (there are none) and hazards and risks (refer to Subdivision Site Suitability Engineering Report).

SUB-P5
Manage subdivision design and layout in the General Residential, Mixed Use and Settlement zone to .....

Not applicable.

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.*

As this is a rural area, the future lot owners will be responsible for on-site infrastructure of wastewater, stormwater and potable water. I believe the subdivision can be appropriately serviced.

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

Not applicable. There are no waterbodies that require esplanade reserves.

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.*

The subdivision is consistent with part (b) of the above policy, in that there will be no loss of highly productive land. However, it will not meet part (a) because there are no areas of SNA to begin with. This is another policy subject to submissions, decisions on which have yet to be reached.

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

The subdivision is not a management plan subdivision and so cannot be consistent with this policy. However, as with other subdivision objectives, policies and rules, submissions have yet to be decided on, so I do not place a lot of weighting on this policy.

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 applicable. We are not subdividing off minor residential units.

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 consent under the PDP so the above policy is of limited relevance. Notwithstanding this, relevant matters in SUB-P11 have been considered.

7.3 Part 2 Matters

5 Purpose
(1)The purpose of this Act is to promote the sustainable management of natural and physical resources.

The proposal is considered to have had adequate regard to Part 2 matters. I believe the proposal fulfils the Purpose in s5.

6Matters of national importance
(a)the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:
(b)the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:
(c)the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:
(d)the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:
(e)the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:
(f)the protection of historic heritage from inappropriate subdivision, use, and development:
(g)the protection of protected customary rights:

(h)the management of significant risks from natural hazards.

The site is not within the coastal environment. The layout and number of lots is appropriate for the site. There are no wetlands, lakes or rivers affected by the subdivision. The site does not display any outstanding landscape values. There is no indigenous bush on the property. No public access is required to any lake or river. There are no culturally significant areas on or near the application site. The nearest Sites of Cultural Significance to Māori are at least 2km away on the coastal fringes of Karikari Peninsula. There are no significant risks from natural hazards.

7 Other matters
(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.

In regard to "other matters" (s7), I see (c) the maintenance and enhancement of amenity values; (d) intrinsic values of ecosystems; and (f) maintenance and enhancement of the quality of the environment as having relevance. All lots are large enough to provide for house sites and on-site services. The proposal represents the efficient use and development of resources. It has minimal, if any, adverse effect on amenity values or the intrinsic values of ecosystems.

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

I have not identified anything in the proposal that gives offence to, or is contrary to, s8.

7.4 National Policy Statements & Standards

The National Policy Statement for Freshwater Management and associated National Environment Standards for Freshwater (NES F) have been considered when preparing this application. Across the road, in Crown Land, is an area identified as a Top 150 wetland. However, there is no hydrological connectivity between that and the application site, with an intervening road and the land sloping in opposite directions. I do not believe, therefore that development on the proposed lots will trigger any consent requirements under the NES F.

Internal to the site are existing man made stock dams, pre-dating the legislation. These have existing use rights in terms of their maintenance. There are also areas of wet ground / overland flow, particularly within Lot 3. It is doubtful these meet the definition of 'natural inland wetland' given that they are grazed pasture.

In summary I have not identified any consent requirements under the NES-F relating to the subdivision.

I do not believe the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health to be relevant. I am not aware of any HAIL activity historically or currently taking place on the site. The NRC's Specified Land Use database does not identify any HAIL activity on the site.

Given the lack of indigenous vegetation or habitat on the site, I do not believe the National Policy Statement for Indigenous Biodiversity to be relevant.

7.5 Regional Policy Statement for Northland (RPS)

I do not consider the proposal to be inconsistent with any relevant objectives and policies in the RPS for Northland. The proposed lots will result in additional built development, but the proposal does not result in any material loss in productivity and does not result in reverse sensitivity effects.

5.1.1 Policy – 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;

(d) Is integrated with the development, funding, implementation, and operation of transport, energy, water, waste, and other infrastructure;

(e) Should not result in incompatible land uses in close proximity and avoids the potential for reverse sensitivity;

(f) Ensures that plan changes and subdivision ..... 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

The property is currently in pasture. It does not possess highly versatile soils (no LUC class I, II or III soils) in the location of Lots 1 through 4. The number of lots being created in an area already supporting lifestyle lots and residential uses set amongst farming uses, does not, in my opinion, result in adverse land use incompatibility effects arising.

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);.....

I do not believe the subdivision adversely impacts on the ability for any adjacent property to continue to support primary production activity.

7.6 Regional Plan (Appeals Version)

The subdivision does not result in any breaches of rules in the Regional Plan.

8.0 NOTIFICATION 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. None of these circumstances apply. Step 2 of s95A specifies the circumstances that preclude public notification. Neither circumstance exists therefore public notification is not precluded and Step 3 of s95A must be considered. This specifies that public notification is required in certain circumstances. These include:

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

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

Step 4 of s95A states that the consent authority is to determine if there are any special circumstances under which public notification may be warranted. No such circumstances exist.

8.2 S95B Limited Notification Assessment

A consent authority must follow the steps set out in s95B to determine whether to give limited notification of an application for a resource consent, if the application is not publicly notified pursuant to s95A. Step 1 identifies certain affected groups and affected persons that must be notified. No such group or persons exist in this case. Step 2 of s95B specifies the circumstances that preclude limited notification. Neither circumstance applies and Step 3 of s95B must be considered. This specifies that certain other affected persons must be notified, specifically:

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

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

Step 4 of s95B states that the consent authority is to determine if there are any special circumstances under which limited notification may be warranted. No such circumstances exist.

8.3 S95D Level of Adverse Effects

The AEE in this report assesses effects on the environment and concludes that these will be no more than minor, therefore no public notification is required.

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 size and layout of the proposed lots is such that I believe future built development can be readily absorbed into the landscape so as not to create adverse effects on visual amenity as it relates to adjacent properties. There are a number of new titles along Tahanga Road, albeit many are yet to be developed. I have not identified any adjacent properties as being affected persons. The subdivision density meets restricted discretionary subdivision thresholds.

There are no identified Sites of Significance to Māori in the vicinity of the property. With less than minor effects on any habitat, including water bodies, and no impact on DOC's ability to manage its resources across the road from the property, it has not been considered necessary to consult with DOC.

9.0 CONCLUSION

The effects of the subdivision on the wider environment are less then minor, and no special circumstances exist that would suggest public notification is required. No affected persons have been identified and limited notification is not required.

Part 2 matters have been had regard to and the proposal is considered consistent with the objectives and policies of relevant planning provisions in the Operative and Proposed District Plans, relevant National Policy Statements and the Regional Policy Statement.

It is requested that the Council give favourable consideration to the application and grant approval, subject to appropriate conditions, under delegated authority.

Lynley Newport Dated 25th November 2024
Senior Planner
THOMSON SURVEY LTD

10.0 LIST OF APPENDICES

Appendix 1 Scheme Plan(s)

Appendix 2 Locality Plan

Appendix 3 Record of Title & Relevant Instruments

Appendix 4 Existing subdivision consent RC 2230395

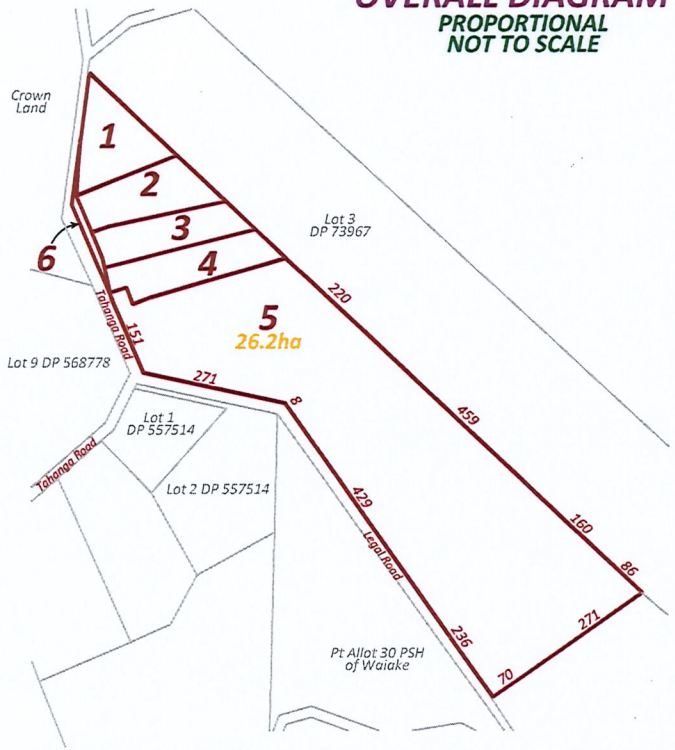
Appendix 5 Subdivision Site Suitability Engineering Report

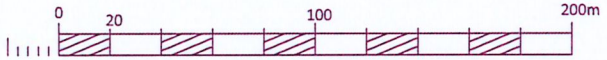
Appendix 1

Scheme Plan(s)

OVERALL DIAGRAM

PROPORTIONAL NOT TO SCALE





Bar Scale 1:2000 @ A3

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AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY AND SCALED FROM AERIAL PHOTOGRAPHY

Local Authority: Far North District Council
Comprised in: NA64B/773
Total Area: 34.8976ha
Zoning: Rural Production
Resource features: NIL

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Registered Land Surveyors, Planners & Land Development Consultants

PROPOSED SUBDIVISION OF PT LOT 4 DP 73967 & PT LOT 1 DP 101253

TAHANGA ROAD, KAINGAROA

PREPARED FOR: M, VINAC

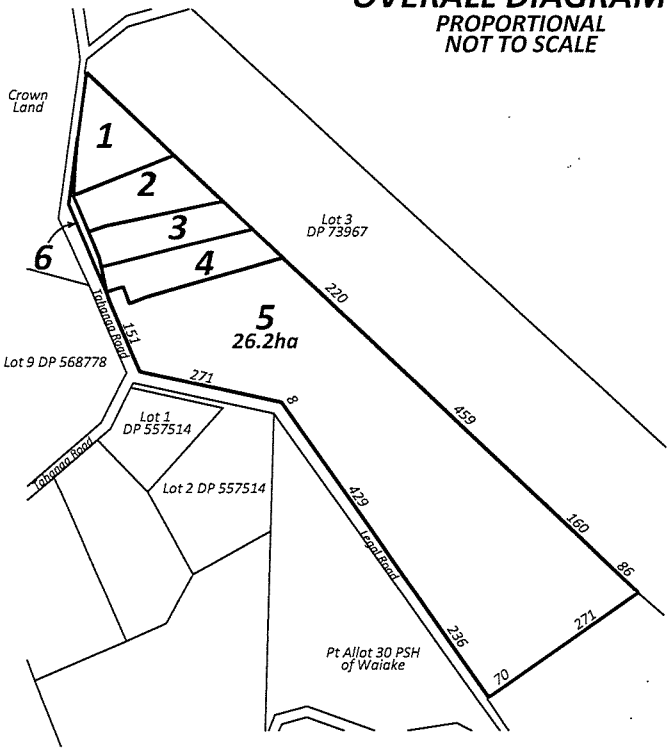
	Name	Date
Survey		
Design		
Drawn	EM	01.08.24
Approved		
Rev		

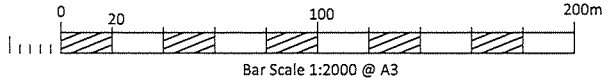
10421 Scheme 01.08.24

ORIGINAL
SCALE 1:2000
SHEET SIZE A3

Surveyors Ref. No: 10421

OVERALL DIAGRAM
PROPORTIONAL
NOT TO SCALE





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Total Area: 34.8976ha
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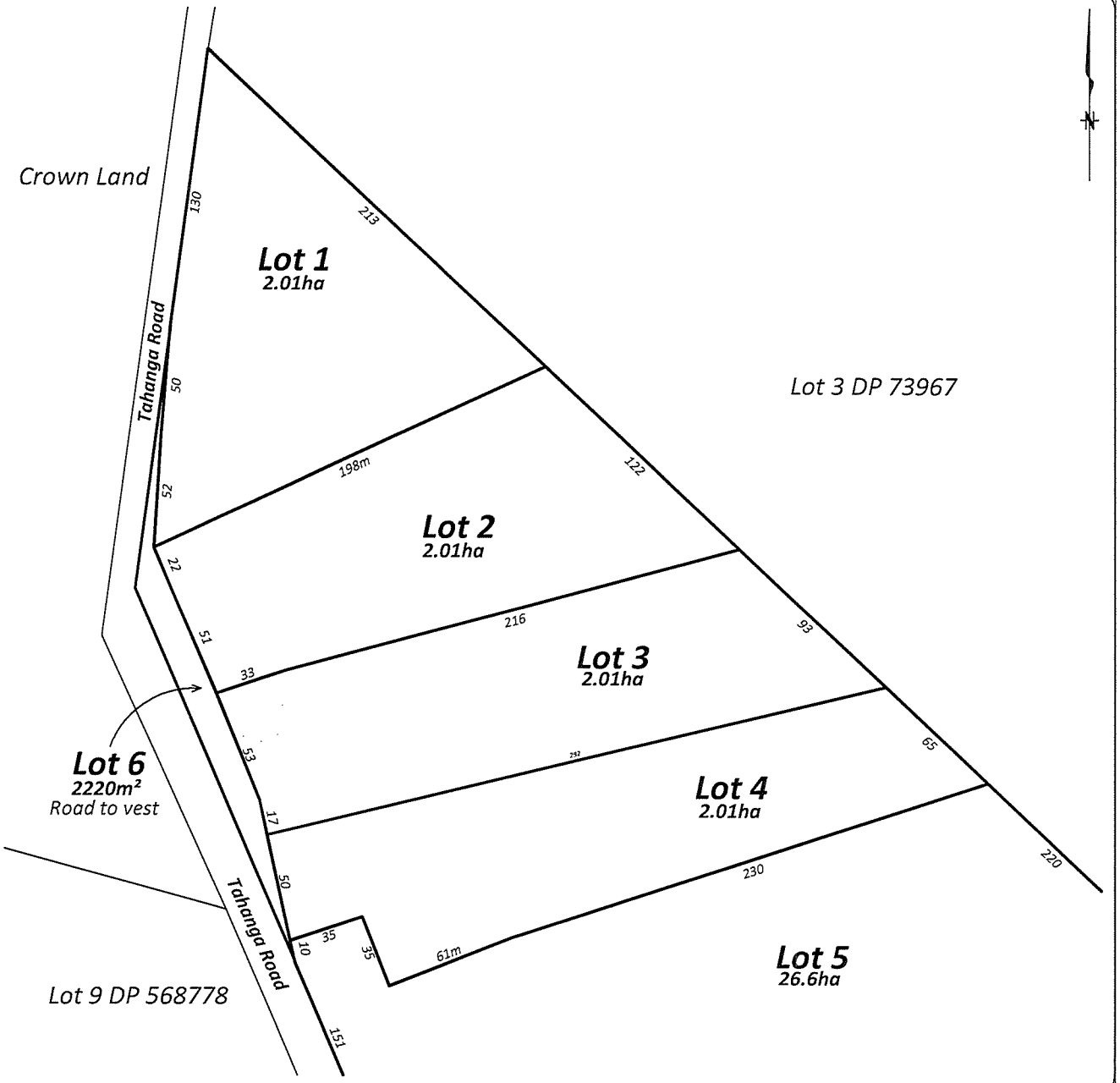
Resource features: NIL



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PROPOSED SUBDIVISION OF PT LOT 4 DP 73967 & PT LOT 1 DP 101253

TAHANGA ROAD, KAINGAROA

PREPARED FOR: M, VINAC

	Name	Date
Survey		
Design		
Drawn	EM	01.08.24
Approved		
Rev		

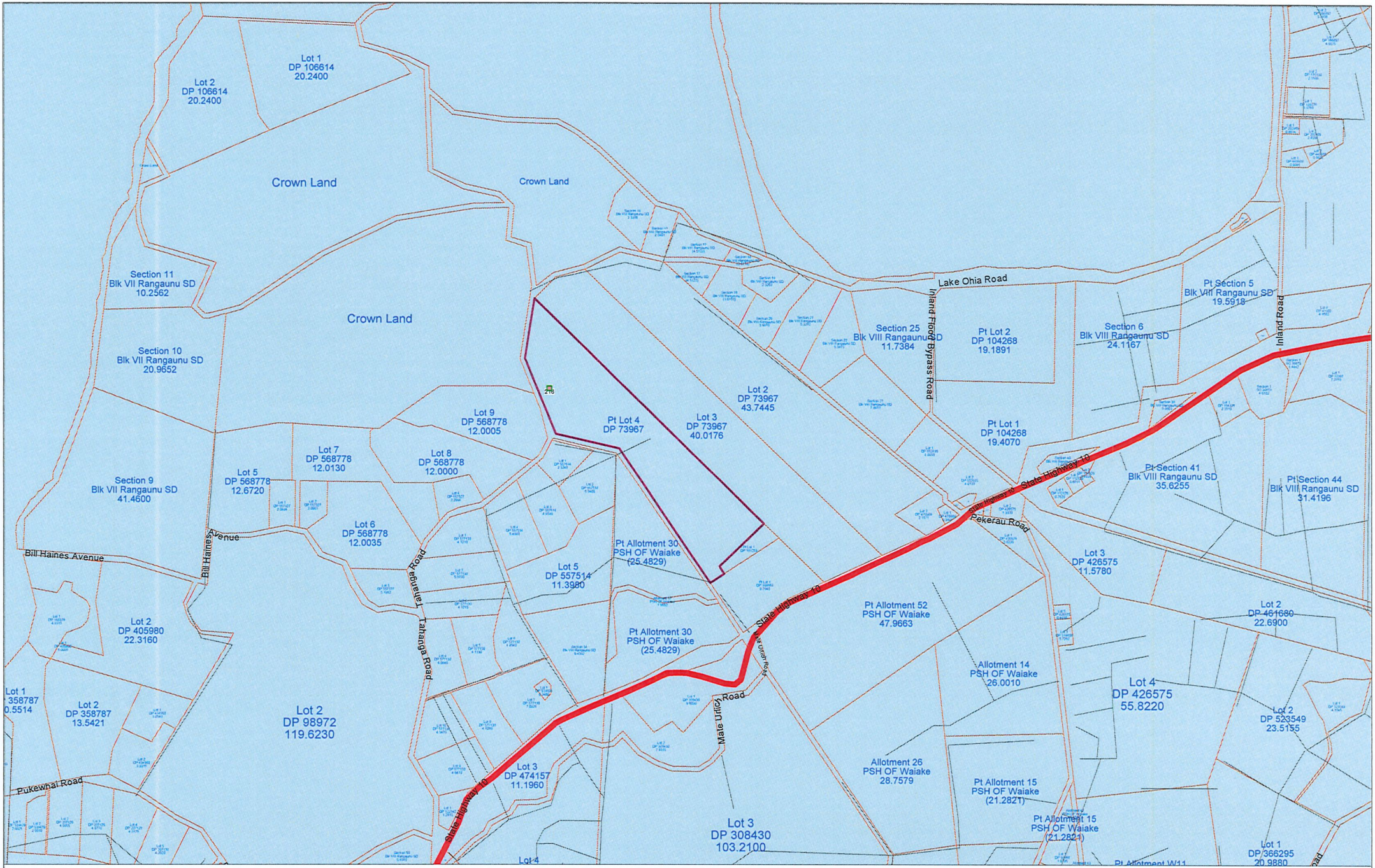
10421 Scheme 01.08.24

ORIGINAL
SCALE 1:2000
SHEET SIZE A3

Surveyors Ref. No: 10421

Appendix 2

Locality Plan



0 250 500 750 1000 1250 1500 1750 2000 2250 2500m

QuickMap
Custom Software Ltd

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

Scale 1:20000 Topographical and Cadastral map derived from LINZ data. Printed: 25-Nov-2024 10:04.

Appendix 3

Record of Title &

Relevant Instruments

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**NA64B/773**
Land Registration District	**North Auckland**
Date Issued	24 April 1987

Prior References

NA29D/700 NA55D/287

Estate	Fee Simple
Area	34.8976 hectares more or less
Legal Description	Part Lot 1 Deposited Plan 101253 and Part Lot 4 Deposited Plan 73967

Registered Owners

Melay Victor Vinac as to a 1/2 share

Joyce Patricia Vinac as to a 1/2 share

Interests

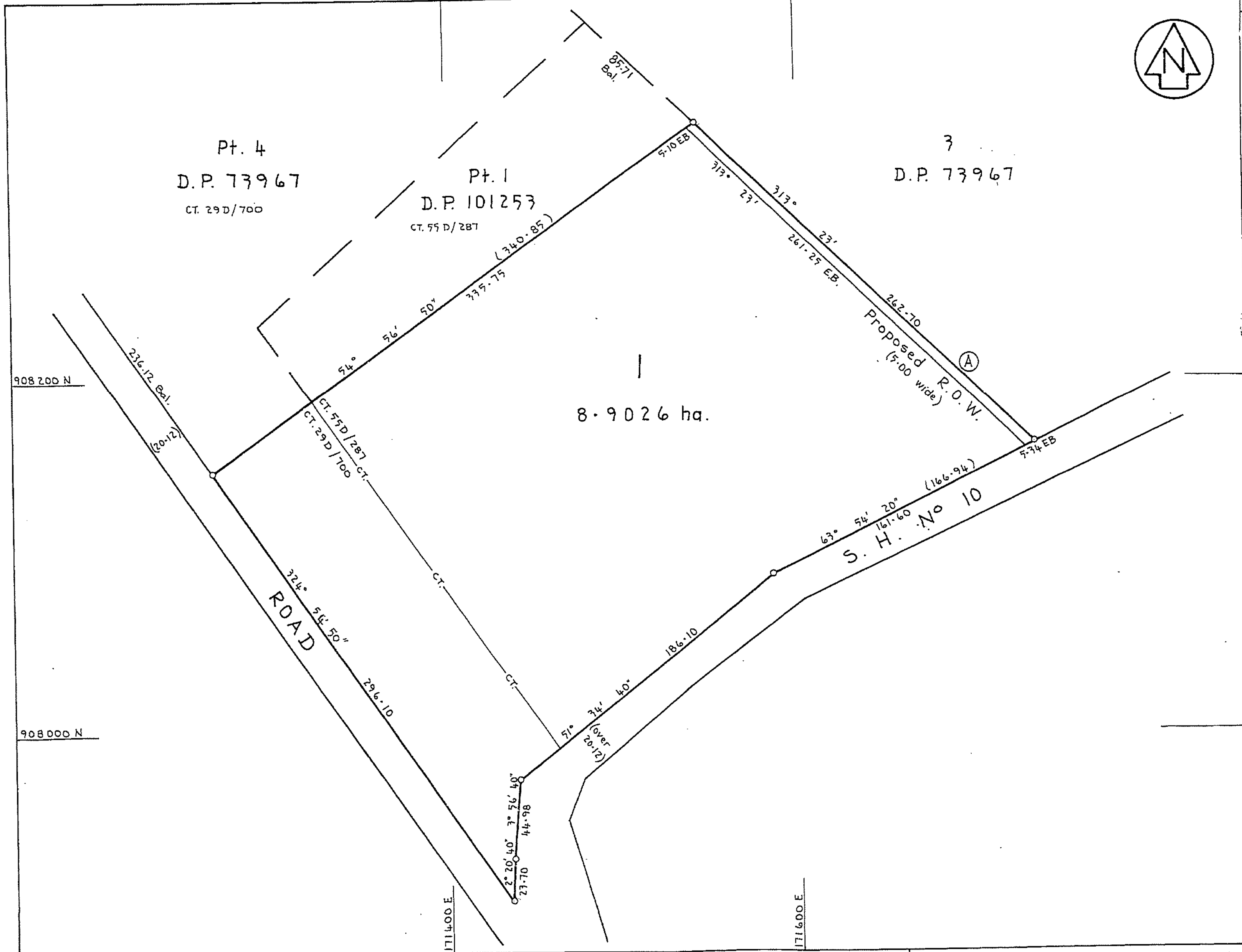
SUBJECT TO SECTION 308 (4) AND (5) LOCAL GOVERNMENT ACT 1974

Subject to Section 206 Land Act 1924 9 (affects part)

Appurtenant hereto is a right of way specified in Easement Certificate C987139.1 - 29.4.1996 at 10.04 am

D534038.1 Notice pursuant to Section 94C Transit New Zealand Act 1989 declaring the adjoining State Highway 10 to be a limited access road - 21.8.2000 at 2.05 pm

D539212.1 Notice pursuant to Section 91 Transit New Zealand Act 1989 - 7.9.2000 at 1.31 pm



Approvals. Roads shown are Legal.

Pursuant to a resolution of the Mangonui County Council passed on the 11th day of APRIL 1985 approving pursuant to Section 305 of the Local Government Act 1974 this survey plan subject to the conditions of amalgamation set out hereon and certifying that the survey plan is in accordance with the requirements and provisions of the operative district scheme for the area to which the survey plan relates the common seal of the Mangonui County Council was affixed hereto in the presence of

THE COMMON SEAL OF MANGONUI COUNTY COUNCIL

Chairman

County Clerk

Approved :
The Common Seal of B.J. Jurlina Farms Ltd. was affixed hereto in the presence of
Director
Secretary

Panel of Proposed Easement

Purpose	Shown	Serv. Tene.	Dom. Tene.
Right of Way	Ⓐ	Pt Lot 1 hereon.	Pt. Lot 1 DP. 101253 Pt Lot 4 DP. 73967

Amalgamation Condition

That one Certificate of Title be issued for Pt. Lot 1 DP. 101253 (C.T. 55D/287 Bal.) and Pt Lot 4 DP. 73967 (C.T. 29D/700 Bal.)
See A626128

New C.T. Allocated
Lot 1 - 59B/1043

Total Area 8·9026 ha

Comprised in C.T. 29D/700 (Pt.)
C.T. 55D/287 (Pt.)

I, Donald Barrington von Sturmer of Kaitaia registered surveyor and holder of an annual practising certificate (or who may act as a registered surveyor pursuant to the proviso to section 33 (2) of the Surveyors Act 1956) hereby certify that this plan has been made from surveys executed by me or under my directions, and that both plan and survey are correct and have been made in accordance with the Survey Regulations 1972.
Dated at Kaitaia this 12th day of April 1985 Signature

Field Book ... p. ... Traverse Book ... p. ...
Reference Plans
Examined ... Correct ...

Approved as to Survey
8/7/85 Deputy Chief Surveyor

Deposited this 24th day of ... 1987
Asst. District Land Registrar

File
Received 24 APR 1985
Instructions

DP106559

LAND DISTRICT NORTH AUCKLAND SURVEY BLK.& DIST. VIII RANGAUNU NZMS ___ SHEET No. 004/3.2	Lot 1 being Subdivision of Lot 1 DP. 101253 and Pt. Lot 4 D.P. 73967	LOCAL AUTHORITY MANGONUI COUNTY Surveyed by D B VON STURMER Scale 1:1500 Date FEB. 1985

Surveyor-General, Department of Lands and Survey, Wellington

CENTIMETRES 1 2 3 4 5 6 7 8 9 10 11 12 13 14 ... 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

Approved by the District Land Registrar, South Auckland No. 351560
Approved by the District Land Registrar, North Auckland, No. 4380/81
Approved by the Registrar-General of Land, Wellington, No. 436748.1/81

C987139.1 EC

EASEMENT CERTIFICATE

(IMPORTANT: Registration of this certificate does not of itself create any of the easements specified herein).

I/We JAMES EDWIN BEARD of Rangiputa, Farm Manager and AISLA JOY BEARD his wife and MAUREEN DOROTHY BEARD of Lake Ohia, widow

being the registered proprietor(s) of the land described in the Schedule hereto hereby certify that the easements specified in that Schedule, the servient tenements in relation to which are shown on a plan of survey deposited in the Land Registry Office at Auckland on the 24th day of April 1987 under No. 106559 are the easements which it is intended shall be created by the operation of section 90A of the Land Transfer Act 1952.

SCHEDULE

DEPOSITED PLAN NO. 106559

Nature of Easement (e.g., Right of Way, etc.)	Servient Tenement		Dominant Tenement Lot No.(s) or other Legal Description	Title Reference
	Lot No.(s) or other Legal Description	Colour, or Other Means of Identification, of Part Subject to Easement		
Right of Way	Part Lot 1	shown marked "A"	Part Lot 1 Deposited Plan 101253 and part Lot 4 Deposited Plan 73967	Dominant Tenement: 64B/773 Servient Tenement: 59B/1043

State whether any rights or powers set out here are in addition to or in substitution for those set out in the Seventh Schedule to the Land Transfer Act 1952.

1. Rights and powers: as set out in the Seventh Schedule to the Land Transfer Act 1952 and in the Ninth Schedule to the Property Law Act 1952.

2. Terms, conditions, covenants, or restrictions in respect of any of the above easements:

As set out in the Seventh Schedule to the Land Transfer Act 1952 and in the Ninth Schedule to the Property Law Act 1952.

Dated this 26th day of March 1996

Signed by the above-named
JAMES EDWIN BEARD,
AISLA JOY BEARD and
MAUREEN DOROTHY BEARD

J E Beard
A J Beard
Maureen Beard

in the presence of

Witness .....

Occupation ..... SOLICITOR (REG. MANNING)

Address ..... KAITAIA

EASEMENT CERTIFICATE

(IMPORTANT): Registration of this certificate does not of itself create any of the easements specified herein.

Correct for the purposes of the Land Transfer Act

Solicitor for the registered proprietor

10.04 29.APR96 C 987139.1

PARTICULARS ENTERED IN THE REGISTER
LAND REGISTRY NORTH AUCKLAND
ASS.

59B/1043
648/773

FOUNTAIN MANNING & CO
SOLICITORS
KAITAIA

© AUCKLAND DISTRICT LAW SOCIETY 1983
REF 4050

Appendix 4

Existing subdivision consent RC 2230395

Far North District Council

DECISION ON COMBINED RESOURCE CONSENT APPLICATION UNDER THE RESOURCE MANAGEMENT ACT 1991

Decision

Pursuant to section 34(1) and sections 104, 104B, 106 and Part 2 of the Resource Management Act 1991 (the Act), the Far North District Council **grants** land use and subdivision resource consent for a Discretionary activity, subject to the conditions listed below, to:

Council Reference:	2230395-RMACOM
Applicant:	Melay Victor Vinac and Joyce Patricia Vinac
Property Address:	216 Tahanga Road, Karikari Peninsula 0483
Legal Description:	PT LOT 4 DP 73967; PT LOT 1 DP 101253 BLK VIII RANGAUNU SD

The activities to which this decision relates are listed below:

Activity A – Subdivision:

To subdivide to create two additional lots in the Rural Production Zone, and one lot to vest as road.

Activity B – Land Use:

Having a formed width of less than 6m. parts of Tahanga Road are not currently formed to engineering standards for a Type A Rural Road. The applicant does not propose to upgrade this road.

Subdivision Conditions

Pursuant to sections 108 and 220 of the Act, this subdivision consent is granted subject to the following conditions:

1. The activity shall be carried out in accordance with the approved Scheme Plan prepared by Thomson Survey Limited, referenced 10421, dated 03/11/22 titled 'Proposed Subdivision of Pt Lot 4 DP 73967 & Pt Lot 1 DP 101253' and attached to this consent with Council's 'Approved Stamp' affixed to it.

Survey plan approval (s223) conditions

2. Prior to the approval of the survey plan pursuant to Section 223 of the Act, the consent holder shall:
   a. Lot 4 road to vest must be surveyed off and vest in Council, such that the legal road boundary along the road frontage of the subject site is at least 6m from the centreline of the carriageway.

Section 224(c) compliance conditions

3. Prior to the issuing of a certificate pursuant to Section 224(c) of the Act, the consent holder shall:

   a. Provide a formed single width entrance to Lot 1, Lot 2 and Lot 3 which complies with Council's Engineering Standard FNDC/S/6 and 6B.

   b. Secure the conditions below by way of a Consent Notice issued under Section 221 of the Act, to be registered against the titles of the affected allotment. The cost of preparing, checking and executing the Notice shall be met by the applicant of the affected allotment.

      i. At the time of lodging an application for building consent on any of the lots the building applicant is to provide a report from a Chartered Professional engineer with recognised competence in relevant geotechnical and structural matters, which addresses the site's investigation undertaken, sets out the specific design of the building's foundations and indicates the programme of supervision of the foundation construction.

      [Lot 1 - 3]

      ii. In conjunction with the construction of any habitable buildings or shed greater than 110m^2, the lot owner shall install stormwater retention tank/s with a flow attenuated outlet/s. The system shall be designed such that the total stormwater discharged from the site, after development, is no greater than the predevelopment flow from the site for rainfall events up to a 10% AEP plus allowance for climate change, with overland/secondary flow paths able to accommodate a 1% AEP event. The details of the on-site detention storage and flow attenuation shall be prepared by a suitably qualified engineer.

      [Lot 1 - 2]

      iii. The lot owner shall ensure that stormwater from all roofed and paved areas is diverted away from the wastewater treatment and disposal areas. In addition, stormwater from the surrounding areas shall be prevented from entering the treatment system.

      [Lot 1 - 3]

iv. In conjunction with the construction of any dwelling, and in addition to a potable water supply, a water collection system with sufficient supply for firefighting purposes is to be provided by way of tank or other approved means and to be positioned so that it is safely accessible for this purpose. These provisions will be in accordance with the New Zealand Fire Fighting Water Supply Code of Practice SNZ PAS 4509.

[Lot 1 - 3]

v. Electricity supply is not a condition of this consent and power has not been reticulated to the boundary of the lot. The lot owner is responsible for the provision of a power supply to operate the on-site aerobic wastewater treatment plant and any other device which requires electrical power to operate.

[Lot 1 - 3]

vi. In conjunction with the construction of any building which includes a wastewater treatment and effluent disposal system the applicant shall submit for Council approval a TP58 Report prepared by a Chartered Professional Engineer or an approved TP58 Report Writer. The report shall identify a suitable method of wastewater treatment for the proposed development along with an identified effluent disposal area plus a 100% reserve disposal area. The report shall confirm that all of the treatment & disposal system can be fully contained within the lot boundary and comply with the Regional Water & Soil Plan Permitted Activity Standards. Reference to the Onsite Wastewater Site Suitability Report, by O'Brien Design Consulting (ref 2823, dt 3 October 2022) shall be made.

[Lot 1 - 3]

Subdivision Advice Notes

Lapsing of Consent

1. *Pursuant to section 125 of the Act, this resource consent will lapse five (5) years after the date of commencement of consent unless, before the consent lapses;*
   a) *A survey plan is submitted to Council for approval under section 223 of the RMA before the lapse date, and that plan is deposited within three years of the date of approval of the survey plan in accordance with section 224(h) of the RMA; or*
   b) *An application is made to the Council to extend the period of consent, and the council decides to grant an extension after taking into account the statutory considerations, set out in section 125(1)(b) of the Act.*

General

2. *This consent has been granted on the basis of all the documents and information provided by the consent holder, demonstrating that the new lot(s) can be appropriately serviced (infrastructure and access).*

Land Use Conditions

Pursuant to sections 108 of the Act, this land use consent is granted subject to the following condition:

1. The activity shall be carried out in accordance with the document titled Proposed Subdivision 216 Tahanga Road, Kaingaroa Planning Report and Assessment of Environmental Effects prepared by Thomson Survey Ltd, Kerikeri.

Land Use Advice Notes

Lapsing of Consent

1. *Pursuant to section 125 of the Act, this resource consent will lapse five (5) years after the date of commencement of consent unless, before the consent lapses;*
   a) *The consent is given effect to; or*
   b) *An application is made to the Council to extend the period of consent, and the council decides to grant an extension after taking into account the statutory considerations, set out in section 125(1)(b) of the Act.*

General Advice Notes (Subdivision and Land Use)

1. *If you are dissatisfied with the decision or any part of it, you have the right (pursuant to section 357A of the Act) to object to the decision. The objection must be in writing, stating reasons for the objection and must be received by Council within 15 working days of the receipt of this decision.*

2. *Archaeological sites are protected pursuant to the Heritage New Zealand Pouhere Taonga Act 2014. It is an offence, pursuant to the Act, to modify, damage or destroy an archaeological site without an archaeological authority issued pursuant to that Act. Should any site be inadvertently uncovered, the procedure is that work should cease, with the Trust and local iwi consulted immediately. The New Zealand Police should also be consulted if the discovery includes koiwi (human remains). A copy of Heritage New Zealand's Archaeological Discovery Protocol (ADP) is attached for your information. This should be made available to all person(s) working on site.*
3. *The site is accessed off an unsealed road. Unsealed roads have been shown to create a dust nuisance from vehicle usage. It is advised that the dwelling is either located as far as possible or at least 80m from the road, and/or boundary planting within the site is utilised to assist with this nuisance. Alternatively the applicant may consider sealing their road frontage to remove the issue.*

4. *It is recommended that all culverts within the subdivision are constructed with a 375mm minimum diameter RCP culvert to provide improvements from the current published FNDC Engineering Standards.*

5. *TP58 Reports must be prepared be a person who is on a list of approved TP58 writers maintained by Far North District Council. Persons on the approved list must be either a Chartered Professional Engineer or a Registered Drainlayer who has attended and passed a TP58 writers course approved by Far North District Council.*

6. *All earthworks are required to be completed in accordance with Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region Guideline Document 2016/005.*

7. *The consent holder will be responsible for the repair and reinstatement of the public roads carriageway, if damaged as a result of the works and building operations.*

8. *The consent holder is responsible for arranging for buried services to be located and marked prior to commencing earthworks and is also responsible for the repair and reinstatement of any underground services damaged as a result of the earthworks.*

9. *Any debris deposited on the public road as a result of the earthworks shall be removed by or at the expense of the applicant.*

10. *A Traffic Management Plan (TMP) and Corridor Access Request must be provided to Council and approved prior to works commencing in the road corridor.*

Resolution

1. In addition to the approval of this resource consent, Pursuant to s241(3) the Far North District cancels in whole the amalgamation condition requiring Part Lot 1 DP 101253 and Part Lot 4 DP 73967 to be held in the same Record of Title

Reasons for the Decision

1. By way of an earlier report that is contained within the electronic file of this consent, it was determined that; pursuant to sections 95A and 95B of the Act, the proposed activity will not have, and is not likely to have, adverse effects on the environment that are more than minor, there are no affected persons, and no special circumstances exist. Therefore, under delegated authority, it was determined that the application be processed without notification.

2. The application is for a Discretionary activity resource consent; as such, under section 104, the Council can consider all relevant matters. In particular, the matters listed in Chapters 12 and 15 of the District Plan are of particular relevance.

3. In regard to section 104(1)(a) of the Act, the actual and potential effects of the proposal will be acceptable as:

    a. The additional lots are of an appropriate size and shape to accommodate future rural-residential development and provide necessary on-site services. The size of the lots allow sufficient building setbacks to manage reverse sensitivity effects. The size of the lots and resulting development pattern are consistent with that of the wider area.

    b. The two lots that are to be created are not contained on highly productive land. The highly productive land on site will remain within the balance lot, which is Lot 3. The productive potential of the site remains and life supporting capacity of the high class soils is not compromised.

c. All lots can be serviced, with stormwater attenuation to mitigate potential effects on the stability of gully slopes. The proposed additional lots are away from the areas of the site subject to flood plains and the building areas are on generally flat land.

d. All lots have conditions for safe vehicle access, and vehicle crossings are able to comply with the relevant standards. The balance lot will continue to have legal access to the crossing place from State Highway 10 and there is no change in the effect of the use of this crossing place. The intensity and nature of use remains the same.

e. A section of road will be vested to ensure a compliant 20m legal width and that the physical road formation is within the road reserve. Tahanga Road does not currently meet engineering standards and the applicant does not propose to upgrade the road. The effects of this; however, are acceptable, as the additional traffic flow on the road as a result of the proposal will be small and the road has relatively low traffic volumes.

f. The proposal will also result in positive effects, including increasing potential residences within the Karikari Peninsula.

4. In regard to section 104(1)(ab) of the Act there are no offsetting or environmental compensation measures proposed or agreed to by the applicant for the activity.

5. In regard to section 104(1)(b) of the Act the following statutory documents are considered to be relevant to the application:
   a. Northland Regional Policy Statement 2016,
   b. Operative Far North District Plan 2009,
   c. Proposed Far North District Plan 2022

   The activity is consistent with these documents for the reasons set out in pages 18 to 29 of the Assessment of Environmental Effects submitted with the application. In particular:

   - The subdivision does will not compromise the life supporting capacity of natural resources, is consistent with sustainable management and will promote the well-being of the applicant.
   - All lots are able to be serviced adequately with sufficient space to accommodate services without adversely affecting the amenity of neighbouring properties.
   - The pattern of subdivision is consistent with the character of the surrounding area and compatible with the landscape the subdivision is a part of.
   - The subdivision is consistent with restoring and enhancing natural values across the district, noting that it does not contain any areas of indigenous vegetation and is not in a kiwi present area. The site is within a different catchment to the wetland land on the other side of Tahanga Road that is administered by Department of Conservation. This minimises the potential for adverse effects on this land as a result of the proposed development.

- The lots are of a sufficient size to manage reverse sensitivity and the land use proposed (rural residential) should not result in undue restriction on rural production activities.
- The loss of rural production land is small, as the proposed lots are of a small size. The proposed lots are not located on segments of the property that meet the definition of highly productive land and the majority of the parent site is able to be maintained for productive use.

6. In regard to section 104(1)(c) of the Act there are no other matters relevant to the application.

7. In terms of s106 of the RMA, the proposal is not considered to give rise to a significant risk from natural hazards. Whilst there is a flood plain on the site and some signs of instability in gully slopes, the proposed building areas are outside of the areas that are impacted by these features. Sufficient provision has been made for legal and physical access to the proposed allotments. Accordingly, council is able to grant this subdivision consent subject to the conditions above.

8. Based on the assessment above the activity will be consistent with Part 2 of the Act. The activity will avoid, remedy or mitigate any potential adverse effects on the environment while providing for the sustainable management of natural and physical resources and is therefore in keeping with the Purpose and Principles of the Act. There are no matters under section 6 that are relevant to the application. The proposal is an efficient use and development of the site that will maintain existing amenity values without compromising the quality of the environment. The activity is not considered to raise any issues in regard to Te Tiriti o Waitangi.

9. Overall, for the reasons above, it is appropriate for consent to be granted subject to the imposed conditions.

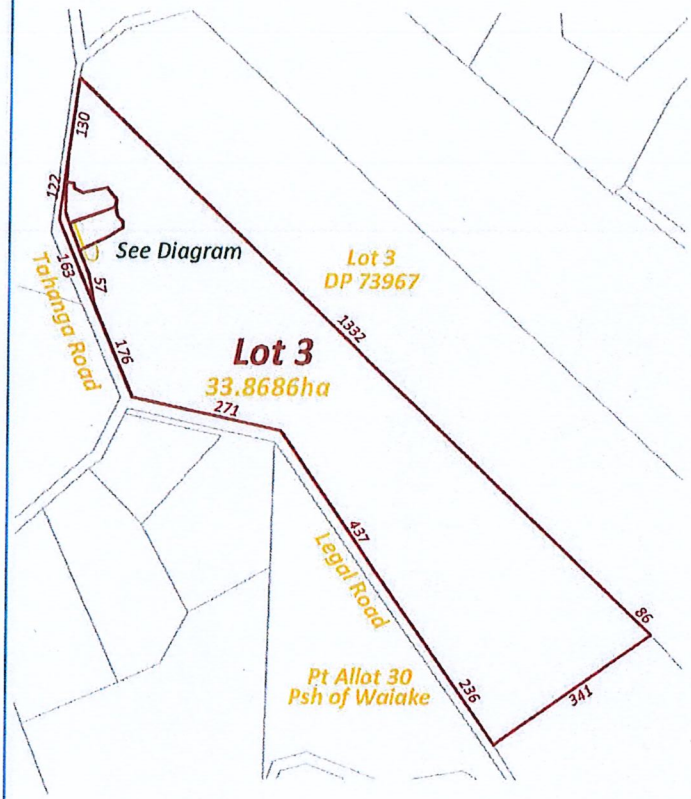
Approval

This resource consent has been prepared by Angela Goodwin – Consultant Resource Planner. I have reviewed this and the associated information (including the application and electronic file material) and for the reasons and subject to the conditions above, and under delegated authority, grant this resource consent.

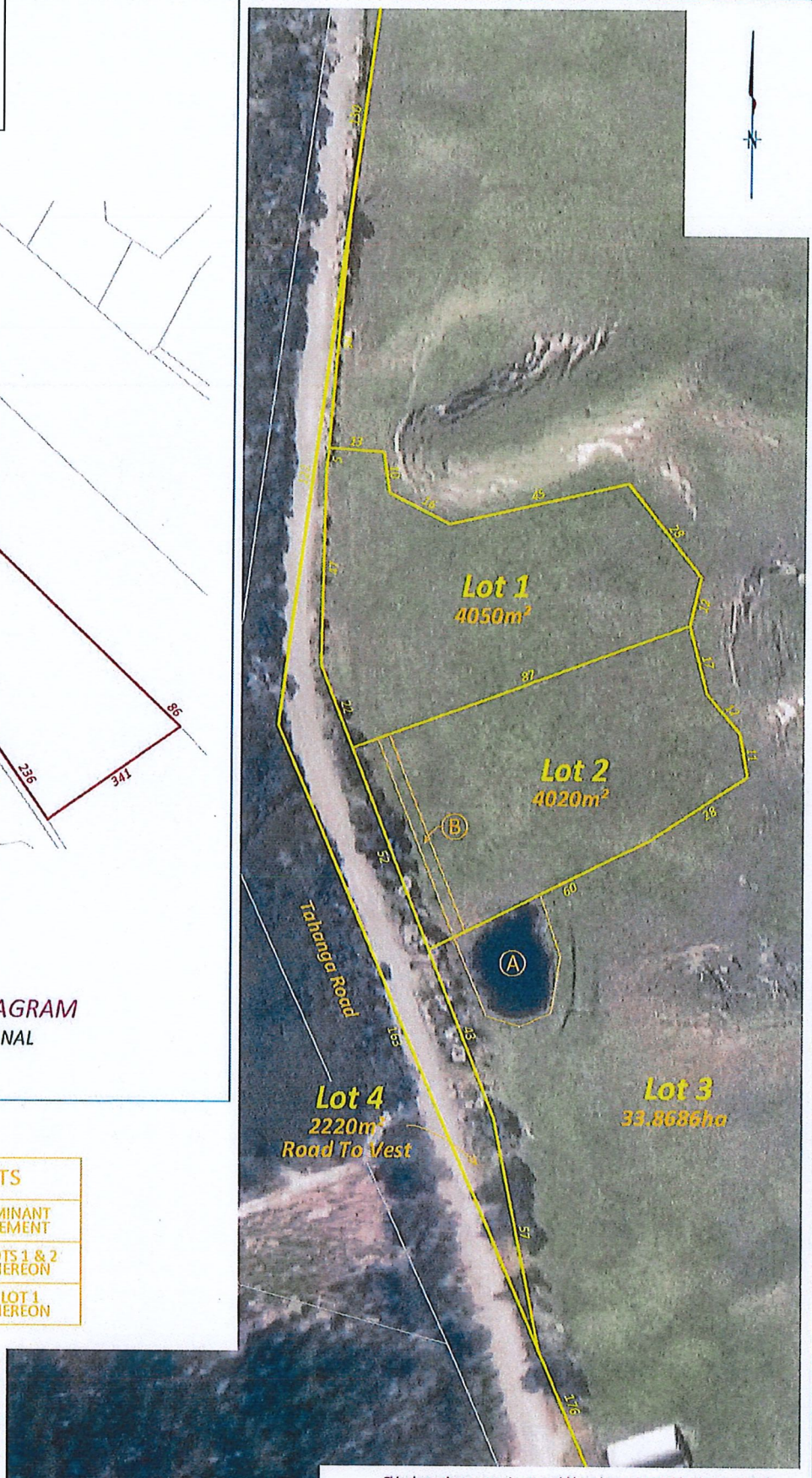
Simeon Mclean **Date: 2 June 2023**
Team Leader Resource Consents

APPROVED PLAN

Planner: Simeon McLean
pp: ENathan
RC: 2230395-RMACOM
Date: 02/06/2023



OVERALL DIAGRAM
PROPORTIONAL



MEMORANDUM OF EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT TO CONVEY WATER	(A)	LOT 3 HEREON	LOTS 1 & 2 HEREON
	(B)	LOT 2 HEREON	LOT 1 HEREON

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AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY AND SCALED FROM AERIAL PHOTOGRAPHY

Local Authority: Far North District Council
Comprised in: NA64B/773
Total Area: 34.8976ha
Zoning: Rural Production
Resource features: NIL

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.

0 10 50 100m

Bar Scale 1:1000 @ A3

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PROPOSED SUBDIVISION OF PT LOT 4 DP 73967 & PT LOT 1 DP 101253

PREPARED FOR: VINAC

	Name	Date
Survey		
Design		
Drawn	KY	31.10.22
Approved		
Rev	KY	03.11.22

ORIGINAL
SCALE 1:1000
SHEET SIZE A3
10421 Scheme 20221103.lcd

Surveyors Ref. No: 10421
Sheet 1 of 1

Appendix 5

Subdivision Site Suitability Engineering Report

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SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

216 TAHANGA ROAD, LOT 3 599884 KAINGAROA

MELAY VINAC

C0523-S-01
NOVEMBER 2024
REVISION 1

www.geologix.co.nz 09 392 0007 Auckland | Northland

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DOCUMENT MANAGEMENT

Document Title	Subdivision Site Suitability Engineering Report
Site Reference	216 Tahanga Road, Kaingaroa
Client	Melay Vinac
Geologix Reference	C0523-S-01
Issue Date	November 2024
Revision	01
Prepared	Sander Derks Graduate Civil Engineer, Dip. Eng  *p.p*
Reviewed	Sebastian Hicks Principal Civil Engineer, CPEng, CMEngNZ, IntPE(NZ) /APEC Engineer 
Approved	Edward Collings Managing Director, CEnvP Reg. 0861, CPEng Reg. 1033153, CMEngNZ 
File Reference	*Z:\Projects\C0500-C0599\C0523 - Tahanga Road, Kaingaroa\06 - Reports\C0523-S-01-R01.docx*

REVISION HISTORY

Date	Issue	Prepared	Reviewed	Approved
November 2024	First Issue	SD	SH	EC

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TABLE OF CONTENTS

TABLES

1 INTRODUCTION

This Site Suitability Engineering Report has been prepared by Geologix Consulting Engineers Ltd (Geologix) for Melay Vinac 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 a Resource Consent application in relation to the proposed subdivision of property Lot 3 DP 599884, Tahanga Road, Kaingaroa, the 'site'. Specifically, this assessment addresses engineering elements of natural hazards, wastewater, stormwater and associated earthwork requirements to provide safe and stable building platforms with less than minor effects on the environment as a result of the proposed activities outlined in Section 1.1.

1.1 Proposal

A proposed scheme plan was presented to Geologix at the time of writing, prepared by Thomson Survey[1] and reproduced within Appendix A as Drawing No 100. It is understood the Client proposes to subdivide the site to create four new residential lots and one balance lot. The above is summarised in Table 1. Geologix was informed an investigation on proposed lot 2 has been done by 'others' therefore it is not included in this report. 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.

The site is located in the Rural Production zone as per the FNDC Operative District Plan.

Table 1: Summary of Proposed Scheme

Proposed Lot No.	Size	Purpose
1	2.01 ha	New residential lot
2	2.01 ha	New residential lot
3	2.01 ha	New residential lot
4	2.01 ha	New residential lot
5	26.6 ha	Balance Lot

Site access and Traffic Impact Assessment (TIA) is not within the scope of this report.

2 DESKTOP APPRAISAL

The site is located along the eastern edge of Tahanga Road which has an irregular alignment to define the western boundary. Topographically the site area falls eastward and is undulating with drainage gullies that trend to the eastern boundary. The overall slope of the terrain is moderate to gently sloping.

A shallow geological feature tracks through lots 1 to 5 a short distance east from Tahanga Road presenting as a scouring erosion of loose soil against a hardpan sublayer.

[1] *Thomson, Scheme Plan Ref. 10608, dated 01 March 2024.*

The site setting is presented schematically as Figure 1 below.

Figure 1 - Site Setting[2]

The entire site area is currently in pasture with rough grass and no other prominent vegetation. An existing barn is present on proposed Lot 5. No public infrastructure is present within the site boundaries. A detailed review of existing watercourses and overland flow paths is presented as Section 3.

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 Tahanga 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[3] indicates the site to be directly underlain by Neogene sedimentary rocks of Awhitu Group described as cemented dune sands and associated facies.

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[4] did not indicate borehole records within 500 m of the site.

[2] *GRIP Mapping Platform Service*
[3] *Geological & Nuclear Science, 1:250,000 scale Geological Map, Sheet 2, Whangarei, 2009.*
[4] *https://www.nzgd.org.nz*

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 is shown schematically on Drawing No. 100 with associated off-set requirements.

3.1 Surface Water Features

The site is at the upper elevations of a larger catchment that extends to the east through other adjacent properties. There are two ponds within the site. One on Lot 3 a short distance to the western boundary adjacent to Tahanga Road. A second pond is situated in Lot 5 adjacent to the northern boundary with Lot 4.

3.2 Overland Flow Paths

Clearly defined flow paths are evident within the site boundaries upon moderate to gentle sloping land. Many of the minor overland flow paths source from the upper elevations of the site bordering Tahanga Road as it wraps around the site, of which later intercepts a major overland flow path bearing southeast through the neighbouring site.

Beyond the site boundary, the overland flow discharges into a tributary of the Aurere Stream. This stream system has a mapped flood hazard overlay according to NRC Maps Natural Hazards, that does impact multiple properties downstream of the site.

Our walkover survey was undertaken during a wet winter day in July and noted no flow through the overland flow paths, though the pond within proposed lot 3 was at full capacity. The above is indicated across our drawing set, where in view and detailed with associated off-sets on Drawing No. 100.

4 GROUND INVESTIGATION

A site-specific walkover survey and intrusive ground investigation was undertaken by Geologix on 1st August 2024. The ground investigation was scoped to confirm the findings of the desktop appraisal and to provide parameters for geotechnical and wastewater assessment. The ground investigation comprised:

- Seven hand augered boreholes designated BH01 to BH03, inclusive formed at the proposed building site with a target depth of 5.0 m below ground level (bgl).
- Four hand augered boreholes designated BH04 to BH07 inclusive, formed within suitable areas for wastewater disposal fields on each proposed residential lot with a target depth of 1.2 m below ground level (bgl).
- Dynamic Cone Penetration (DCP) testing was carried out from the base of BH01 and next to the remaining boreholes until final refusal i.e. 20 blows per 100 mm penetration. Refusals were encountered upon hard strata within boreholes on the building platforms at depths ranging from 0.6-1.6m bgl and downslope of the building platforms at depth ranging from 1.0-2.5m bgl

- Three cross sections were generated from the Far North District Council GIS contours through the critical slope for Lot 1, Lot 3 and Lot 4 to confirm the ground stability on site.

The proposed dwellings, wastewater disposal fields, cross sections and boreholes are shown on the appended site plan (Geologix drawing No. 100 and Nos. 201 - 203).

4.1 Site Walkover Survey

A visual walkover survey of the property confirmed:

- Topography data supplied is in general accordance with that outlined in Section 2 and observed site conditions. Suitable building envelopes[5] can be formed on gently sloping land <15 ° on all proposed lots.
- Tahanga Road defines the eastern site boundaries of proposed lots 1 to 4 and lot 5 is partially bound. Land in all directions includes similar rural properties with open pasture.
- A prominent landslide feature is located in proposed lots 1 and 3.
- Moderate to minor overland flow paths extend downslope from the upper elevations of the site.
- Tahanga Road has no roadside swale directly adjacent to lot boundaries. However, some developed lots have modestly constructed channel in proximity to vehicle access.
- Two moderately sized ponds are indicated, one in the northwest corner of proposed lot 3 and the other in the northeast position of lot 2.
- An existing farm structure occupies lot 5 (balance lot) remaining for agriculture purpose and is excluded in our investigations.

4.2 Ground Conditions

Arisings recovered from the exploratory boreholes were logged by a suitably qualified geotechnical engineering professional in general accordance with New Zealand Geotechnical Society guidelines[6]. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 200 within Appendix A.

Strata identified during the ground investigation can be summarised as follows:

- **Topsoil encountered to depths ranging between 0.15 to 0.4 m bgl.** Described as moist, friable, greyish brown to dark brown, organic silty sand.
- **Awhitu group residual soil to depths ranging between 0.6 to 1.2 m bgl.** Topsoil was found to be underlain by residual Awhitu group soils. The soils encountered ranged from sand to sandy silt with occasional sandy silt layers. The recovered materials were generally greyish and brown in colour with shades ranging from light to dark, moist or

[5] *Measuring 30 m x 30 m according to FNDC District Plan Rule 13.7.2.2.*
[6] *New Zealand Geotechnical Society, Field Description of Soil and Rock, 2005.*

wet and fine.

Scala penetrometer tests were carried out next to each of the boreholes and reached 20+ blows per 100m at 0.6-1.6m in the area of the building platforms (HA01, HA03, HA04 &HA06). In the area downslope of the building platforms (HA02, HA05 & HA07) the scala reached 25+ blows per 100 mm at 1.0m to 2.5m. The very dense sand at the refusal depths is inferred as hardpan. The sand and sandy SILT varied from loose to hard in density.

A summary of ground investigation data is presented below as Table 2.

Table 2: Summary of Ground Investigation

Hole ID	Lot	Hole Depth	Refusal Depth	Fill /Topsoil Depth	Groundwater[2]	Wastewater Category[5]
BH01	1	0.4 m	1.6 m	0.4 m	NE	7 – hardpan, poorly or non-draining
BH02	1	1.2 m	2.8 m	0.3 m	NE	7 – hardpan, poorly or non-draining
BH03	3	0.6 m	1.0 m	0.2 m	NE	7 – hardpan, poorly or non-draining
BH04	3	0.6 m	0.6 m	0.2 m	0.5 m	7 – hardpan, poorly or non-draining
BH05	3	0.8 m	1.0 m	0.15 m	0.5 m	7 – hardpan, poorly or non-draining
BH06	4	0.9 m	0.9 m	0.3 m	0.9 m	7 – hardpan, poorly or non-draining
BH07	4	0.7 m	2.3 m	0.2 m	0.5 m	7 – hardpan, poorly or non-draining

1. *All depths recorded in m bgl unless stated.*
2. *Groundwater measurements taken on day of drilling.*
3. *NE – Not Encountered.*
4. *CW – Completely Weathered*
5. *Wastewater category in accordance with Auckland Council TP58[7].*

4.2.1 Groundwater

The ground investigation was undertaken during winter and formed exploratory boreholes to depths greater than any expected potential excavation to form typical rural residential building platform. Groundwater levels were monitored utilising a groundwater dip meter on the day of drilling, the results summarised in Table 2 above. Groundwater was encountered in hand augers HA04-07 during our ground investigation at depths varying from 0.5-0.9m bgl. This is likely to be a perched groundwater table due to being encountered only above hard stratum and not in other hand augers which went up to 1.2m bgl.

[7] Auckland Council, Technical Publication 58, On-site Wastewater Systems: Design and Management Manual, 2004, Table 5.1.

Groundwater levels commonly fluctuate according to the season and rainfall events. As such, groundwater levels may vary and be identified at higher levels than monitored during this ground investigation. It is recommended that during earthworks should any water ingress be noted that further advice is sought from Geologix which may require amendments to the recommendations of this report.

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 buildings site area.

It is recommended that further site-specific investigation is undertaken at the Building Consent stage by a professional geotechnical engineer. 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/m^3	Effective Friction Angle, °
Awhitu Group Loose Residual Soils	18	28
Awhitu Group Dense Residual Soils	18	34
Awhitu Group Very Dense Residual Soils	18	38

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[8].

5.3 Preliminary Seismic Hazard

New Zealand Standard NZS1170.5:2004 Clause 2.1.4 specifies that to meet the

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

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 19. Table 4 presents the return periods for earthquakes with ULS and SLS 'unweighted' PGAs and design earthquake loads for the corresponding magnitude. The PGAs were determined using building Importance Level (IL) 2, defined by NZS1170.5:2004. Reference should be made to the structural designer's assessment for the final determination of building importance level.

Table 4: Summary of Seismic Hazard Parameters

Limit State	Effective Magnitude	Return Period (years)	Unweighted PGA
ULS	6.5	500	0.19 g
SLS	5.9	25	0.05 g

5.4 Preliminary Site Stability

At the time of writing, no obvious indications of major deep-seated instability were identified at the site, and the risk of such deep-seated instability developing as a result of the development proposal is low. Within the scope of this ground investigation, Geologix have undertaken computer modelled slope stability analysis through a critical section of the proposed Lots 1, 3 and 4. The cross-sections alignment are presented on Drawing No. 100 within Appendix A and developed ground model as Drawing No. 201, 202 & 203.

The slope was analysed using a software Slide 2, developed by RocScience Inc. The purpose of the stability assessment was to:

- Ensure the proposed building sites are feasible.
- Provide a working, accurate ground model in relation to site stability refined according to observed conditions and the results of this ground investigation.
- Develop a development engineering solution with any specific geotechnical stability

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

requirements.

- Inform the requirements of Consent, and any further engineering works.

The stability analysis process was undertaken by calibrating the model to observed conditions by refining the ground investigation data to develop the effective stress parameters presented in Table 3 and applying them to the proposed condition. In summary, the key aspect of potential ground instability identified in the walkover survey include:

- Topographic profile from the ridgeline dips at angles close to the natural equilibrium balance, steepening into the gully features.

Limit equilibrium stability analysis was adopted in the analysis to express the results as a Factor of Safety (FS). When FS = 1.0, the represented mechanism is in equilibrium with the disturbing, active forces equal to the resisting, stabilising forces. A lower FS indicates that instability could occur under the modelled scenario whereas a higher FS demonstrates a margin of safety in respect of stability. Minimum FS criteria have been developed for use in residential development by Auckland Council[10] which are widely adopted in the region. Modelling three separate event scenarios the accepted minimum FS are summarised as follows:

- Minimum FS = 1.5 for static, normal groundwater conditions.
- Minimum FS = 1.3 for elevated groundwater conditions (storm events).
- Minimum FS = 1.0 for dynamic, seismic events.

Stability Analysis Results

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

Table 5: Summary of Stability Analysis Results

Profile	Scenario	Global Min.	Building Site Footprint (min FS)	Result
Section A (LOT 1)				
Existing	Static	1.738	>1.5	Pass
	Elevated GW	1.389	>1.3	Pass
	Seismic	0.971	>1.0	Pass
Section B (LOT 3)				
Existing	Static	2.118	2.118	Pass
	Elevated GW	1.903	1.903	Pass
	Seismic	1.027	>1.0	Pass

[10] *Auckland Council, Code of Practice for Land Development and Subdivision, Section 2 Earthworks and Geotechnical Requirements, Version 1.6, September 2013.*

Section C (LOT 4)				
Existing	Static	1.875	1.875	Pass
	Elevated GW	1.433	1.433	Pass
	Seismic	1.055	1.055	Pass

5.4.1 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 plan were available during the preparation of this report. Slope stability analyses may be subject to revision once earthworks extents are known.

From the current modelled slope stability analysis computation, factors of safety are satisfactory for the existing site conditions and the current building platform.

5.5 Soil Expansivity

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

- Influence of garden watering and site drainage.
- The presence of mature vegetation.
- Initial soil moisture conditions at the time of construction.

Due to the granular nature of the shallow soils underlying the site, the soils are considered to meet the requirements of good ground in accordance with NZS3604 and New Zealand Building Code Clause B1 in relation to soil expansivity.

5.6 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 proposed building sites (HA01, HA03 & HA06) was underlain by a thin 100mm layer of loose liquifiable sand at a depth varying from 0.3-0.5m bgl. A groundwater table was encountered in hand augers HA04-HA07 at 0.5-0.9m bgl which appeared to be perched due

to being very close to the inferred hardpan layer. These loose layers above the hardpan were not saturated during the investigation.

Downslope of the building sites loose silty Sand was encountered in HA02 down to a depth of 1.4m bgl. No groundwater was encountered down to a depth of 1.2m bgl in this hand auger during the investigation, the silty SAND was moist, and it is unlikely the local groundwater will be high enough to saturate these layers as the encountered groundwater in hand augers HA04-HA07 appeared to be perched.

The subject site is not close to fault lines so the level of seismic shaking will be low and unlikely to be strong enough to trigger liquefaction in the loose sand which generally had a blow count of 2-3.

The potential for liquefaction to affect the proposed building sites is low.

6 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The following preliminary geotechnical recommendations have been developed based on a typical, conceptual rural residential development formed within the designated house sites 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 Concept Foundations

It is recommended that non-engineered fill, any underlying soft spots (S_u <75kPa) 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.

6.1.1 Foundations within Cut Platforms

Based on a 300 mm layer of compacted GAP65 on natural undisturbed soils then it is expected that either conventional shallow raft/strip footings, or short bored and cast piles are suitable for the proposed development. Any foundation would need to be embedded into natural ground a minimum depth of 0.6 m. Such foundations may be designed by a professional structural engineer adopting an Ultimate Bearing Capacity of 300 kPa in accordance with NZS3604:2011 due to the granular nature of the underlying soils and absence of potential expansive cohesive deposits.

Where filling/cutting within proposed dwelling footprints, the retaining of placed materials will be required. It is recommended that all retaining walls are designed by a suitably qualified professional engineer familiar with the findings of this report.

Construction monitoring requirements of the above recommendations are detailed in Section 6.4 of this report.

6.2 Concept Retaining Walls

No specific development plans were provided to Geologix at the time of writing. As per the site topography with gentle to moderate slopes within the proposed building sites and surrounding area retaining walls may be required to support the future building structures.

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.

Based on the results of the ground investigation and for a back slope and toe slope of 0 °, 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
Awhitu Group Loose Residual Soils	0.531	0.321	5.172
Awhitu Group Dense Residual Soils	0.441	0.254	9.007
Awhitu Group Very Dense Residual Soils	0.384	0.217	14.345

1. Adopts soil/ wall friction coefficient of 0.67 for timber according to NZBC B1/VM4 Table
2. Considers a 0° backslope and 0° toe slope.

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 pressure.

6.3 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 Awhitu Group 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.

It is recommended that any driveway cuts/ fills are fully supported by retaining walls or subject to further specific geotechnical analysis at the Building Consent stage.

6.4 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 end bearing 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 capable under CM2 level construction monitoring accompanied by appropriate Producer Statements. Monitoring should be undertaken or supervised by a chartered professional engineer.

6.5 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 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 assume that the proposed new residential lots may comprise up to a five-bedroom dwelling with a peak occupancy of eight

people[11]. This considers the uncertainty of potential future Building Consent designs. The number of usable bedrooms within a residential dwelling must consider that proposed offices, studies, gyms, or other similar spaces maybe considered a potential bedroom by the Consent Authority.

7.1 Existing Wastewater Systems

No existing wastewater treatment and associated disposal fields have been identified or surveyed within the site boundaries.

7.2 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[12]. This assumes standard water saving fixtures[13] 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.

7.3 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 that to meet suitable minimum treated effluent output, secondary treatment systems are accounted for across the site. In Building Consent design, considering final disposal field topography and proximity to controlling site feature, a higher treated effluent output standard such as UV disinfection to tertiary quality maybe required.

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.

7.4 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

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[11] TP58 Table 6.1.

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

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

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 7: 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 <25 ° but >10 °, compliance with Northland Regional Plan (NRP) rule C.6.1.3(6) is required.	Disposal fields sited on slopes <10 °. Concept design does comply, with cutoff drains not required.
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. All overland flow paths separation distances to disposal areas are 15 m.
The effluent is treated and disposed of on-site such that each site has its own treatment and disposal system no part of which shall be located closer than 30m from the boundary of any river, lake, wetland, or the boundary of the coastal marine area. FNDC rule 12.7.6.1.4	Concept design complies. Separation distance complies to rule at 30m.

7.4.1 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 7, swelling clay, grey clay, hardpan – poorly draining or non-draining. This correlates to NZS1547 Category 6, very poorly drained described as medium to heavy clays. For a typical PCDI system, a Soil Loading Rate (SLR) of 2 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 2) to slow the soakage and assist with nutrient reduction.

7.4.2 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 640 m^2 laid parallel to the natural contours.

- **Reserve Disposal Field.** A minimum reserve disposal field equivalent to 30 % of the primary disposal field is required under NRP rule C.6.1.3(9)(b) for secondary or tertiary treatment systems. However, due to the hard-pan present within the site, a 100 % equivalent of the primary field area is proposed. It is recommended each proposed lot provides a 640 m^2 reserve disposal area to be laid parallel to the natural contours.
- Concept disposal field locations meet the provisions of NRP rule C.6.1.3 and do not require surface water cut-off drains.
- 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 not been identified within the site boundaries and as such the site can provide freeboard above the 1 % AEP flood height to comply with this rule.

7.5 Summary of Concept Wastewater Design

Based on the above design assumptions a concept wastewater design is presented in Table 8 and presented schematically upon Drawing No. 100. It is recommended that each lot is subject to Building Consent specific review and design amendment according to final development plans.

Table 8: 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	2 mm/ day
Primary disposal field	Surface/ subsurface laid PCDI, min. 640 m^2
Reserve disposal field	Surface/ subsurface laid PCDI, min. 100 % or 640 m^2
Dosing Method	Pump with high water level visual and audible alarm. Minimum 24-hour emergency storage volume.
Stormwater Control	Cut off drains not required. Stormwater management discharges downslope.

1. Unless further water saving measures are included.

7.6 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 impervious features are considered to be comprised within the conceptual 30 x 30 m square building envelope shown on Drawing Sheet 100, Appendix A. The conceptual wastewater disposal field areas are clear of this indicative building envelope area.

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, walkover inspection and Drawing No. 100, 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.

8 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.

8.1 Impervious Surfaces and Activity Status

A summary of the impervious areas of the proposed lots is provided as Table 9 below which has been developed from our observations and the provided Scheme Plan. For the proposed lots, this has been taken as conceptual maximum probable development of typical rural residential scenarios. Refer Section 8.2.

The activity status reflected in Table 9 is with respect to Operative FNDC Plan Section 8.6.5.1.3 only. Furthermore, the subdivision stormwater proposal has been assessed in accordance with the Operative FNDC Plan Section 13.8 on the basis that the overall subdivision is determined to be a Restricted Discretionary Activity.

Table 9: Summary of Impervious Surfaces

Surface	Proposed Lot 1		Proposed Lot 2 (NOT IN SCOPE)	Proposed Lot 3		Proposed Lot 4	
Existing Condition	**(0 m²)**		**NA**	**(0 m²)**		**(0 m²)**	
Roof	0 m²	0.0 %		0 m²	0.0 %	0 m²	0.0 %
Driveway	0 m²	0.0 %		0 m²	0.0 %	0 m²	0.0 %
Total impervious	0 m²	0.0 %		0 m²	0.0 %	0 m²	0.0 %
Proposed Condition	**(20,100 m²)**		**NA**	**(20,100 m²)**		**(20,100 m²)**	
Roof	300 m²	2.8 %		300 m²	5.1 %	300 m²	1.5 %
Driveway	200 m²	1.9 %		200 m²	3.4 %	200 m²	1.0 %
Total	500 m²	4.7 %		500 m²	8.5 %	500 m²	2.5 %
Activity Status	Permitted			Permitted		Permitted	

8.2 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. As such, a conservative model of probable future on-lot development has been developed for this assessment considering the scale of a 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.** It is anticipated that access to each proposed lot will be established by individual vehicle crossings at the boundary. These impervious surfaces will produce an insignificant increase in runoff, with less than minor adverse effect on environment, therefore requiring no attenuation.

8.3 Design Storm Event

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model[16]. 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.

Noting the risk of flood hazard downstream of the site as discussed in Section 3.2, 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.

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

Furthermore, the Table 4-1 stipulates that flow attenuation controls reduce the post-development peak discharge to 80 % of the pre-development condition for the 50 % and 20 % AEP storm event. To be compliant with the above rules, the attenuation modelling within this report has been undertaken for all of the above storm events. The results are summarised in Table 11: Probable and provided in full in Appendix D.

Outlet dispersion devices have been designed to manage the 1 % AEP event to reduce scour and erosion at discharge locations. These are detailed further in Section 8.4.1of this report.

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

8.4 Concept Attenuation Model

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

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

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards[18] to provide a suitable attenuation design to limit post-development peak flows to 80 % of pre-development conditions.

Table 10: Summary of Probable Future Development Concept

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
Future Concept Developments			
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**	

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

Table 11: Probable Future Development Attenuation Concept

Design Parameter	Flow Attenuation: 50 % AEP (80% of pre dev)	Flow Attenuation: 20 % AEP (80% of pre dev)	Flood Control: 10 % AEP	Flood Control: 1 % AEP (80% of pre dev)
Proposed Lots 1, 3, 4				
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan Rule C6.4.2(2)	FNDC Engineering Standards Table 4-1

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

Pre-development peak flow	5.27 l/s	6.83 l/s	7.99 l/s	12.19 l/s
80 % pre-development peak flow	4.21 l/s	5.46 l/s	NA	9.75 l/s
Post-development peak flow	8.57 l/s	11.11 l/s	13.00 l/s	19.82 l/s
Total Storage Volume Required	5,299 litres	6,908 litres	3,844 litres	12,449 litres
Concept Summary:	- Attenuation storage calculation accounts for offset flow from driveway (not indicated explicitly in summary above. Refer Appendix C 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. - 1 x 25,000 litre tank is sufficient for attenuation (12,449l) + potable water (12,551l) - 1 % AEP attenuation in isolation requires a 39 mm orifice 1.22 m below overflow. However regulatory requirements are to consider an additional orifice/s to control the 50 %, 20 % and 1 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.			

8.4.1 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 may 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. A concept dispersion pipe or trench length is presented as Table 12. Calculations to derive this are presented within Appendix , based on the NIWA HIRDS Depth-Duration data. Typical details of these options are presented within Appendix A as Drawing No. 402 and TR2013/018 document. Typical details of these options are presented within Appendix A as Drawing No. 402.

Table 12: Summary of Concept Dispersion Devices

Concept Impervious Area to Tank	Tank Outlet Velocity (at spreader orifices)	Tank outlet pipe diameter	Spreader pipe diameter	Dispersion Pipe/ Trench Length	Spreader orifice size	Concept
Proposed Lots						
500 m^2	0.87 m/s	0.1 m	0.2 m	9.2 m	20 mm	Above ground dispersion device or in-ground dispersion trench.

8.5 Stormwater Quality

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

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

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

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

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

9 POTABLE WATER & FIRE FIGHTING

In the absence of potable water infrastructure within Tahanga Road or within the site it is recommended that the 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 each water tank.

Furthermore, the absence of potable water infrastructure and fire hydrants within Tahanga 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.

10 EARTHWORKS

As part of the subdivision application, earthworks are only required for anticipated vehicle crossings to be formed, as follows:

- **New vehicle crossings.** Cut/ fill earthworks for construction of the vehicle crossings to current Council Engineering Standards.

Proposed earthwork volumes are well within a 5,000 m^3 Permitted Activity volume limit outlined by FNDC District Plan Rule 12.3.6.1.1(a) and the maximum cut and fill height is <3 m to comply with 12.3.6.1.1(b).

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'. Proposed earthwork areas to form the subdivision, are anticipated to comply with the Permitted Activity standard for other areas.

10.1 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 0.5 m. Excavations >0.5 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.

10.2 Erosion and Sediment Control

Specific erosion and sediment control measures are required to control sediment runoff from areas of proposed earthworks within the scope of this application. It is recommended that specific on-lot development is assessed at the time of Building Consent by the future developer. To form the subdivision the following erosion and sediment control measures are recommended:

• Silt fence around the downslope face of the proposed vehicle crossing at each lot.

11 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[19], Northland Regional Council (NRC) Proposed Regional Plan for Northland[20] and Regional Water and Soil Plan for Northland. Following our ground investigation and considering the measures presented in this report, a summary of the proposed activities against defined natural hazards is presented as Table 13.

Table 13: Summary of Natural Hazards

Natural Hazard	Applicability	Mitigation & Effect on Environment
Erosion	Yes	Mitigation provided, resultant effects are less than minor.
Overland flow paths, flooding, inundation	Yes	Mitigation provided, resultant effects are less than minor.
Landslip	NA	Subject to geotechnical assessment at building consent stage.
Rockfall	NA	No anticipated effects, less than minor.
Alluvion	NA	No anticipated effects, less than minor.
Avulsion	NA	No anticipated effects, less than minor.
Unconsolidated fill	NA	No anticipated effects, less than minor.
Soil contamination	NA	No anticipated effects, less than minor.
Subsidence	NA	No anticipated effects, less than minor.
Fire hazard	NA	No anticipated effects, less than minor.
Sea level rise	NA	No anticipated effects, less than minor.

NA – Not Applicable.

12 LIMITATIONS

This report has been prepared for Melay Vinac 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

[19] *Operative District Plan Rule 13.7.3.2.*

[20] *Proposed Regional Plan for Northland, Appeals Version, July 2021, Chapter D.6.*

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

1. DRAWING REPRODUCED FROM THOMSON SURVEY PROPOSED SCHEME PLAN REF. 10626, DATED APRIL 2024.
2. HORIZONTAL CO ORDINATE SYSTEM = NZTM.
3. VERTICAL DATUM = NZVD.
4. MAJOR INTERVALS 5.0 m.
5. MINOR INTERVALS 1.0 m.
6. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
7. DO NOT SCALE FROM THIS DRAWING.

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 7
SOIL CATEGORY (NZS1547)	CATEGORY 6
SOIL LOADING RATE	2.0 mm/ DAY
TREATMENT SYSTEM	NO - SUBJECT TO BUILDING CONSENT DESIGN
PRIMARY DISPOSAL AREA	640 m²
RESERVE DISPOSAL AREA	640 m² (100 %)
FINAL DESIGN?	NO - SUBJECT TO BUILDING CONSENT DESIGN
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

GEOLOGIX HAND AUGER & DYNAMIC CONE PENETROMETER

BHXX CONCEPT BUILDING ENVELOPE (30 m X 30 m)

PROPOSED LOT BOUNDARY

EASEMENT

EXISTING BUILDING

POND

OVERLAND FLOWPATH

SW EXISTING GRASSED SWALE

PRIMARY DISPOSAL FIELD

RESERVE DISPOSAL FIELD

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

20 0 Meters 20 40

1:2000

A	CONSENT	12/09/2024
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

TAHANGA ROAD
KAINGAROA
LOT 3 DP 599884

Project	Drawn By
C0523	SD

Client

MALAY VINAV

Sheet Title

ENGINEERING PLAN

Sheet

100

LOT 1
2.01 ha

LOT 2
2.01 ha

LOT 3
2.01 ha

LOT 4
2.01 ha

LOT 5
26.6 ha

POND OVERFLOW VIA CULVERT AND SWALE

EXISTING VEHICLE TRACK

TAHANGA ROAD

BH01 BH02 BH03 BH04 BH05 BH06 BH07

BP 0.000

EP 180.000

EP 180.001

A B C

3.0 1.6 9.2 10.3 3.7 15.8 15.1 1.5 10.0 3.0 9.2 10.0 10.0

40.0 45.0 50.0 35.0 30.0 25.0 20.0 15.0 10.0

FILE PATH: Z:\Projects\C0500-0599\C0523 - Tahanga Road, Kaingaroa\07 - Technical & Drawings\3D rawings\C0523-S-01-R01.dwg\C0523-S-01-R01.dwg

PLOTTED: 03/04/2022

GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY PROPOSED SCHEME PLAN REF. 10626, DATED APRIL 2024.
3. HORIZONTAL CO ORDINATE SYSTEM = NZTM.
4. VERTICAL DATUM = NZVD.
5. MAJOR INTERVALS 5.0 m.
6. MINOR INTERVALS 1.0 m.
7. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
8. DO NOT SCALE FROM THIS DRAWING.

GEOLOGIX HAND AUGER & DYNAMIC CONE PENETROMETER

BHXX

CONCEPT BUILDING ENVELOPE (30 m X 30 m)

PROPOSED LOT BOUNDARY

EXISTING BUILDING

POND

OVERLAND FLOWPATH

EASEMENT

20 0 Meters 20 40

1:2000

Revision	Issue	Date
A	CONSENT	12/09/2024

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

TAHANGA ROAD
KAINGAROA
LOT 3 DP 599884

Project	Drawn By
C0523	SD

Client

MALAY VINAV

Sheet Title

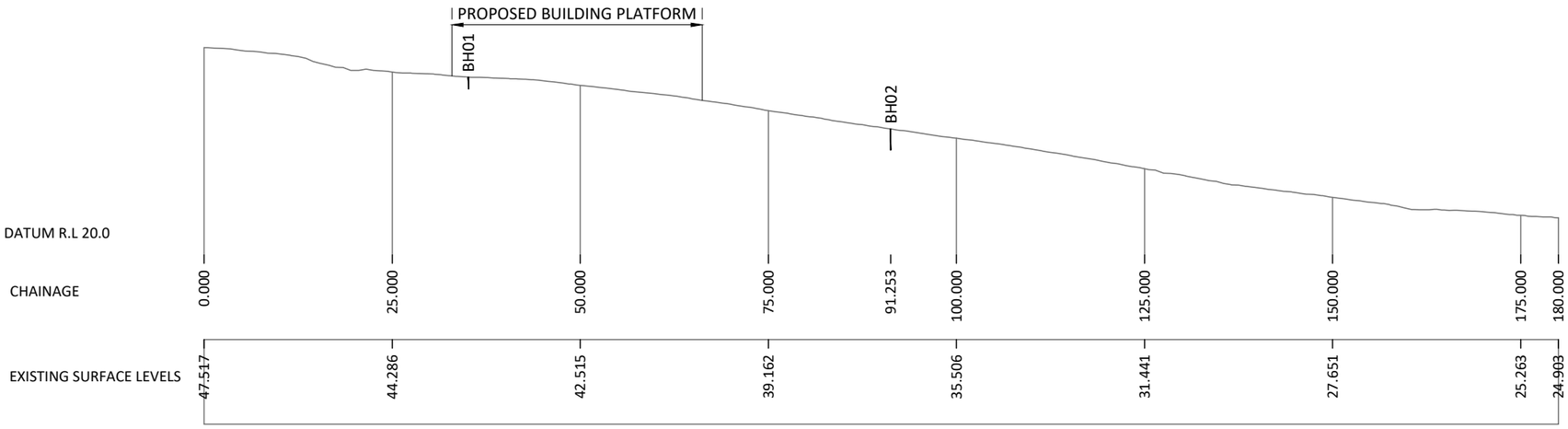
GEOTECHNICAL PLAN

Sheet

200

FILE PATH: Z:\Projects\C0500-C0599\C0523 - Tahanga Road, Kaingaroa\07 - Technical & Drawings\Drawings\C0523-S-01-R01.dwg C0523-S-01-R01.dwg

PLOTTED: 03/04/2022



LONGITUDINAL SECTION - A
SCALE - HORIZ 1:750.000, VERT. 1:750.000

GENERAL NOTES

1. TOPOGRAPHIC SURVEY DATA PROVIDED BY LINZ.
2. HORIZONTAL CO ORDINATE SYSTEM = NZGD2000.
3. VERTICAL DATUM = NZVD2016.
4. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
5. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
6. DO NOT SCALE FROM THIS DRAWING.

7.5 0 Meters 7.5 15

1:750

A	CONSENT	27/08/2024
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

TAHANGA ROAD
KAINGAROA
LOT 3 DP 599884

Project	Drawn By
C0523	SD

Client

MALAY VINAV

Sheet Title

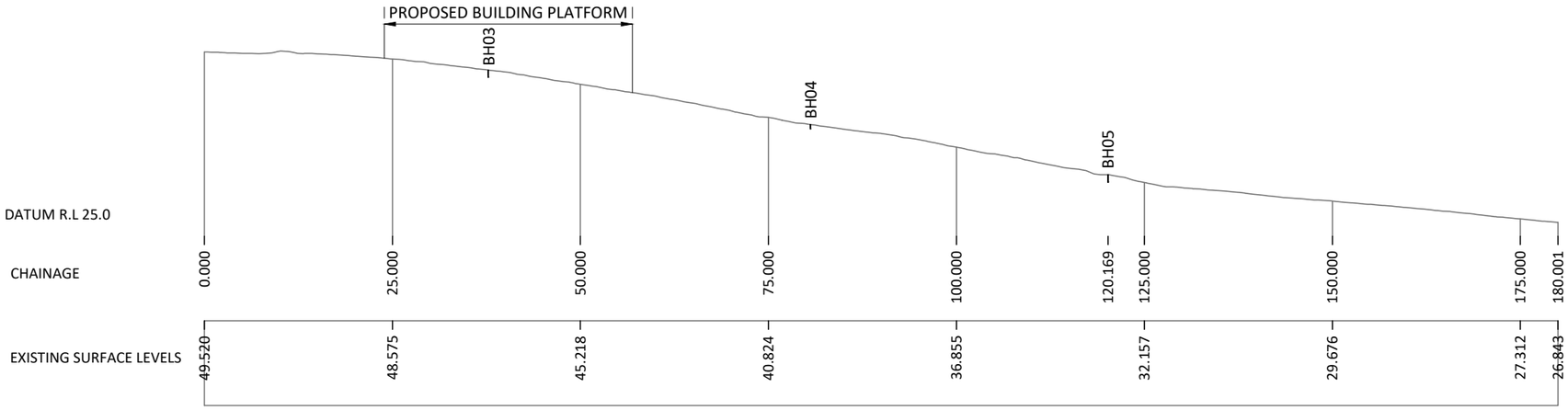
LONG SECTION A

Sheet

201

FILE PATH: Z:\Projects\C0500-C0599\C0523 - Tahanga Road, Kaingaroa\07 - Technical & Drawings\Drawings\C0523-S-01-R01.dwgC0523-S-01-R01.dwg

PLOTTED: 03/04/2022



LONGITUDINAL SECTION - B
SCALE - HORIZ 1:750.000, VERT. 1:750.000

GENERAL NOTES

1. TOPOGRAPHIC SURVEY DATA PROVIDED BY LINZ.
2. HORIZONTAL CO ORDINATE SYSTEM = NZGD2000.
3. VERTICAL DATUM = NZVD2016.
4. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
5. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
6. DO NOT SCALE FROM THIS DRAWING.

7.5 0 Meters 7.5 15
1:750

A	CONSENT	27/08/2024
Revision	Issue	Date

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
TAHANGA ROAD
KAINGAROA
LOT 3 DP 599884

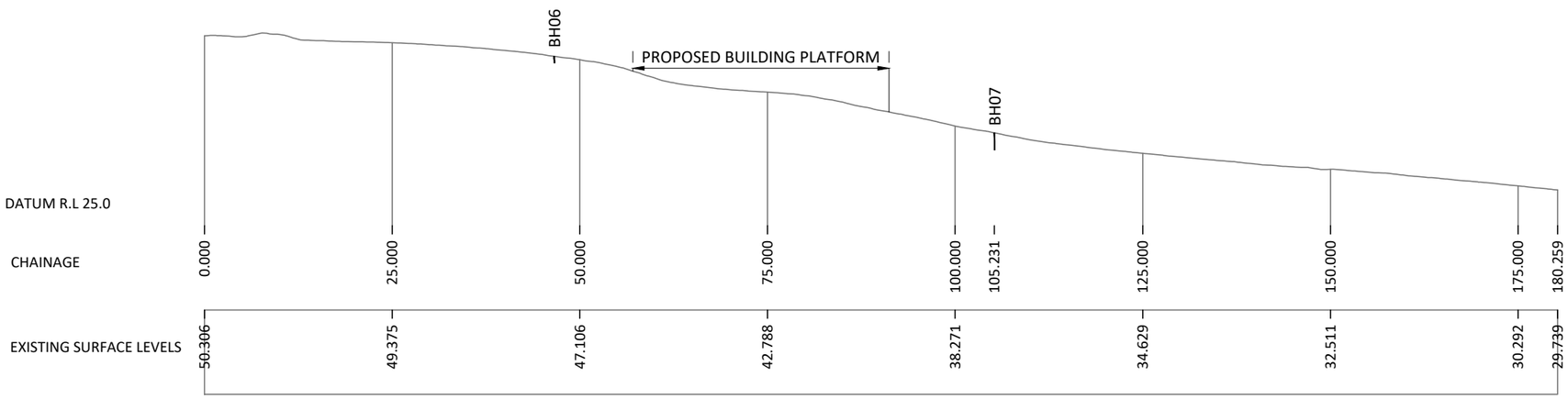
Project	Drawn By
C0523	SD

Client
MALAY VINAV

Sheet Title
LONG SECTION B

Sheet
202

FILE PATH: Z:\Projects\C0500-C0599\C0523 - Tahanga Road, Kaingaroa\07 - Technical & Drawings\Drawings\C0523-S-01-R01.dwgC0523-S-01-R01.dwg
PLOTTED: 03/04/2022



LONGITUDINAL SECTION - C
SCALE - HORIZ 1:750.000, VERT. 1:750.000

GENERAL NOTES

1. TOPOGRAPHIC SURVEY DATA PROVIDED BY LINZ.
2. HORIZONTAL CO ORDINATE SYSTEM = NZGD2000.
3. VERTICAL DATUM = NZVD2016.
4. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
5. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
6. DO NOT SCALE FROM THIS DRAWING.

7.5 0 Meters 7.5 15
1:750

Revision	Issue	Date
A	CONSENT	27/08/2024

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
TAHANGA ROAD
KAINGAROA
LOT 3 DP 599884

Project	Drawn By
C0523	SD

Client
MALAY VINAV

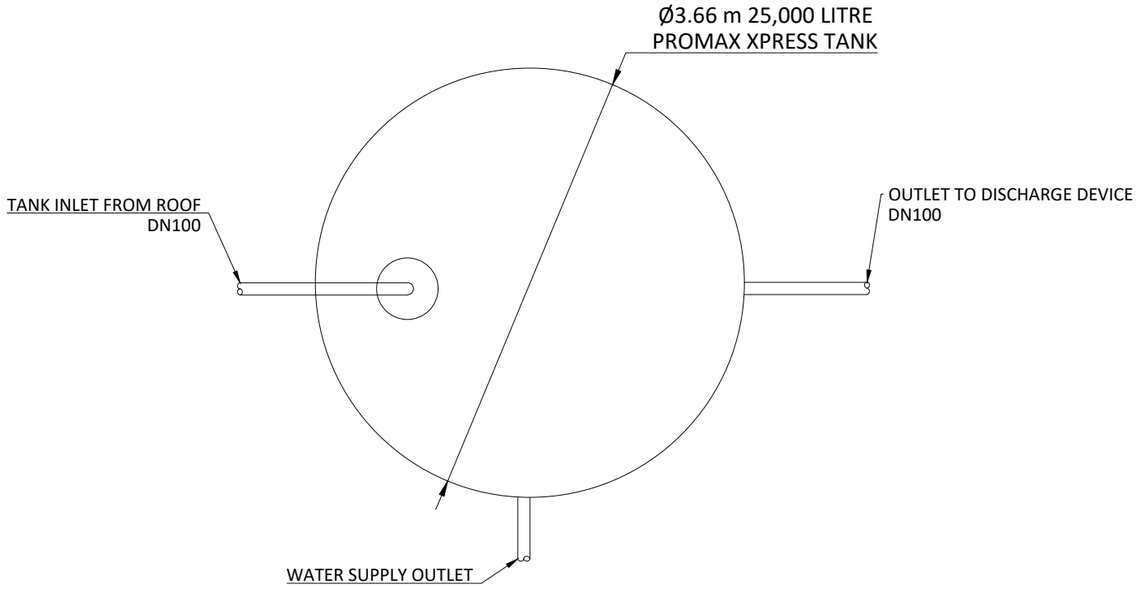
Sheet Title
LONG SECTION C

Sheet
203

FILE PATH: Z:\Projects\C0500-C0599\C0523 - Tahanga Road, Kaingaroa\07 - Technical & Drawings\Drawings\C0523-S-01-R01.dwg(C0523-S-01-R01.dwg
PLOTTED: 03/04/2022

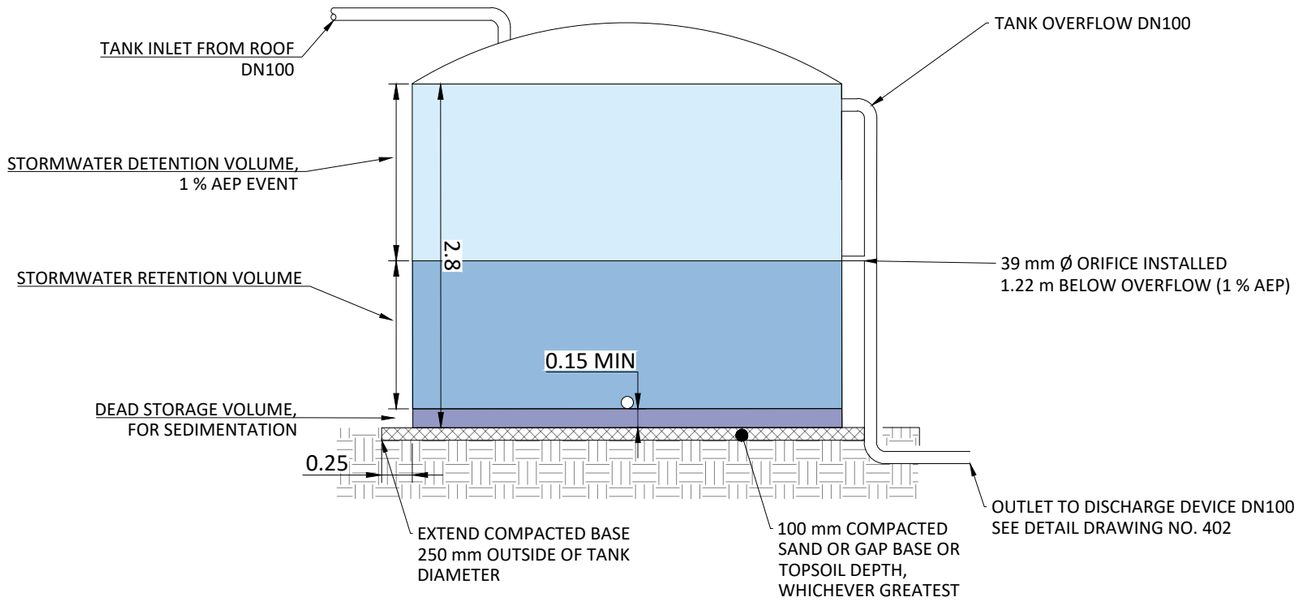
PROPOSED TANK PLAN VIEW

1:50, A3



PROPOSED TANK SIDE VIEW

1:50, A3



GENERAL NOTES

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

Revision	Issue	Date
1	CONSENT	25/07/2024

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

216 TAHANGA ROAD
KAINGAROA
LOT 3 DP 599884

Project	Drawn By
C0523	SD

Client

MELAY VINAC

Sheet Title

TYPICAL TANK DETAIL

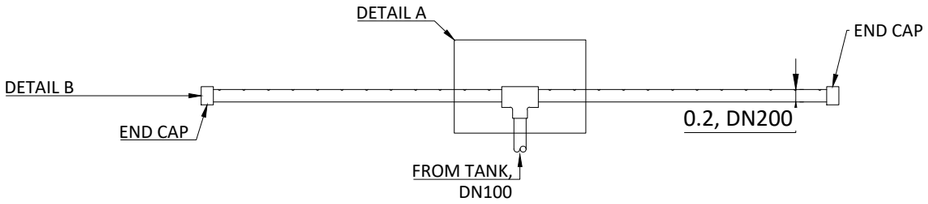
Sheet

401

FILE PATH: Z:\Projects\C0500-C0599\C0523 - Tahanga Road, Kaingaroa\07 - Technical & Drawings\Drawings\C0523-SW-DETAILS.dwgC0523-SW-DETAILS.dwg
PLOTTED: 03/05/2022

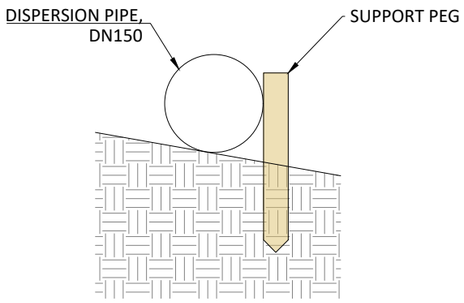
OPTION 1: DISPERSION VIA ABOVE GROUND PIPE

NOT TO SCALE



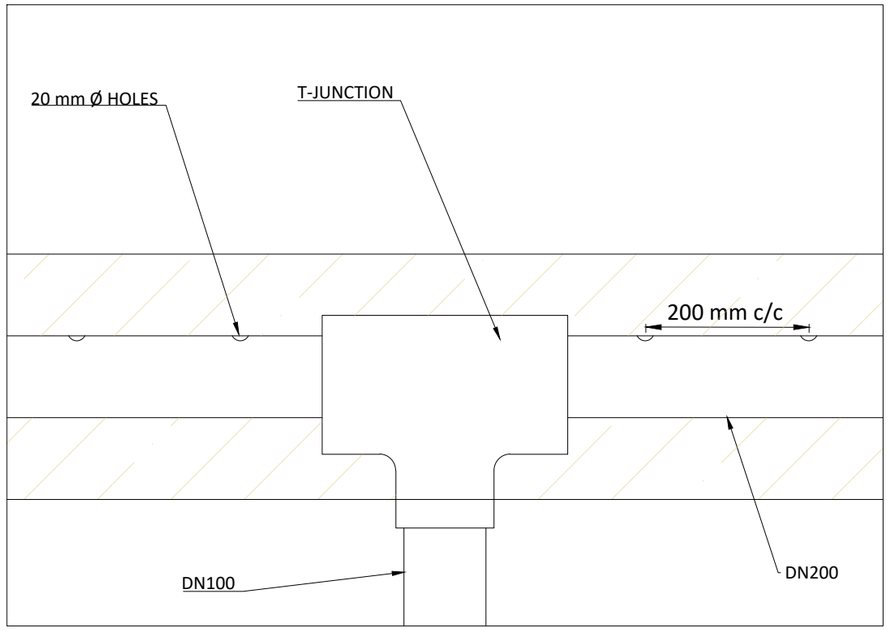
DETAIL B - SIDE VIEW

NOT TO SCALE



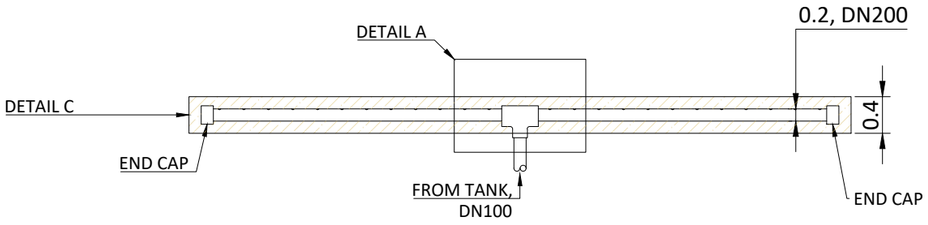
DETAIL A - T JUNCTION AND PERFORATIONS

NOT TO SCALE



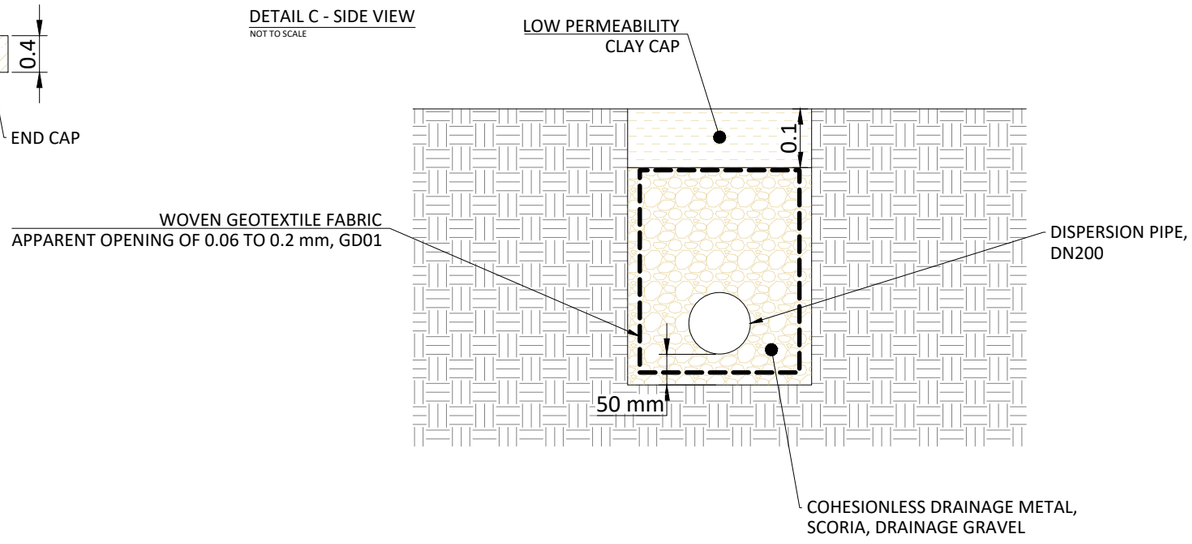
OPTION 2: DISPERSION VIA BELOW GROUND TRENCH

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.

Revision	Issue	Date
1	CONSENT	25/07/2024

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

216 TAHANGA ROAD
KAINGAROA
LOT 3 DP 599884

Project	Drawn By
C0523	SD

Client

MELAY VINAC

Sheet Title

TYPICAL DISPERSION PIPE DETAIL

Sheet

402

FILE PATH: Z:\Projects\C0500-C0599\C0523 - Tahanga Road, Kaingaroa\07 - Technical & Drawings\Drawings\C0523-SW-DETAILS.dwg|C0523-SW-DETAILS.dwg
PLOTTED: 03/05/2022

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consulting engineers

APPENDIX B

Engineering Borehole Records

INVESTIGATION LOG

HOLE NO.: BH01

CLIENT: Melay Vinac

PROJECT: 216 Tahanga Road, Kaingaroa

JOB NO.: C0523

SITE LOCATION: Eastern side of Tahanga Road

START DATE: 01/08/2024

CO-ORDINATES: 1631627mE, 6128697mN

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

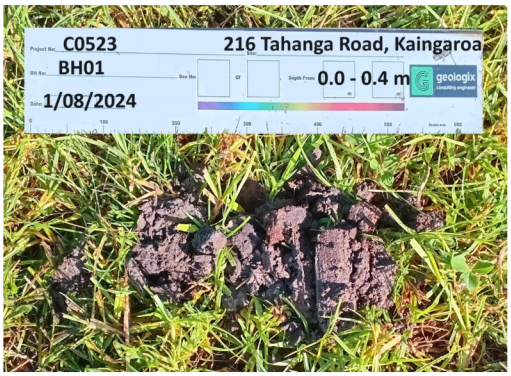
RIG: 50 mm Auger and DCP

DRILLER: GB/SD

LOGGED BY: GB/SD

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa)	WATER
TOPSOIL comprising of organic silty sand; greyish brown. Loose; moist; sand, fine		0.0	TS	2 4 6 8 10 12 14 16 18	Vane: 50 100 150 200 Values	Groundwater Not Encountered
0.3m - 0.4m: Becoming moist to wet		0.2				
End Of Hole: 0.40m		0.4		3		
		0.6		6		
		0.8		8		
		1.0		7		
		1.2		8		
		1.4		10		
		1.6		22 >>		
		1.8		18		
		2.0		8		
		2.2		11		
		2.4		12		
		2.6		22 >>		
		2.8				

PHOTO(S)



REMARKS

1. Hand auger terminated at 0.4 m bgl due to dense strata/hard pan encountered.
2. Groundwater not encountered during drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

Generated with CORE-GS by Geroc - Hand Auger - scala & vane bars - 20/08/2024 10:26:32 am

INVESTIGATION LOG

HOLE NO.: BH02

CLIENT: Melay Vinac

PROJECT: 216 Tahanga Road, Kaingaroa

JOB NO.: C0523

SITE LOCATION: Eastern side of Tahanga Road

START DATE: 01/08/2024

CO-ORDINATES: 1631672mE, 6128692mN

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: 50 mm Auger and DCP

DRILLER: GB/SD

LOGGED BY: GB/SD

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa)	WATER
Topsoil comprising of organic silty sand; dark brown. Loose; moist; sand, fine		0.0 – 0.2	TS	1, 1, 1		Groundwater Not Encountered
Silty SAND; light brown. Loose to medium dense; moist; sand, fine; [Awhitu Group Dunes].		0.2 – 1.0		2, 7, 5, 3, 2, 3, 3, 5, 5		
End Of Hole: 1.20m		1.0 – 2.8		3, 3, 4, 4, 6, 8, 12, 12, 6, 4, 9, 18, 18, 22 >>, 17, 25 >>		

Vane: Values

PHOTO(S)

REMARKS

1. Hand auger terminated at 1.2 m bgl due to dense strata/hard pan encountered.
2. Groundwater encountered at 1.1 m bgl during drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

Generated with CORE-GS by Geroc - Hand Auger - scala & vane bars - 20/08/2024 10:26:37 am

INVESTIGATION LOG

HOLE NO.: BH03

CLIENT: Melay Vinac

PROJECT: 216 Tahanga Road, Kaingaroa

JOB NO.: C0523

SITE LOCATION: Eastern side of Tahanga Road

START DATE: 01/08/2024

CO-ORDINATES: 1631652mE, 6128453mN

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: 50 mm Auger and DCP

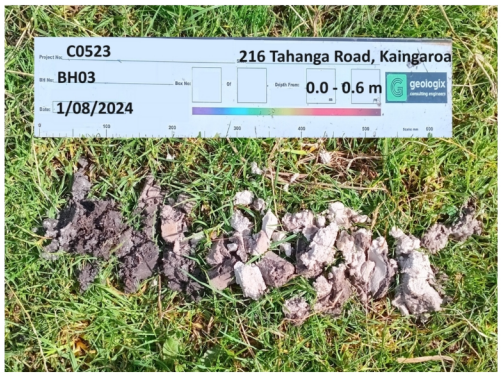
DRILLER: GB/SD

LOGGED BY: GB/SD

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa)	WATER
TOPSOILI comprising of organic silty sand; dark brown. Loose; moist to wet; sand, fine		0.0	TS	1		Groundwater Not Encountered
SAND, with minor silt; light greyish white. Loose to dense; wet; sand, fine; [Awhitu Group Dunes].		0.2		2, 3, 6, 10, 21 >>		
End Of Hole: 0.60m		0.6		29 >>, 6, 10, 25 >>		

Vane: Values

PHOTO(S)



REMARKS

1. Hand auger terminated at 0.6 m bgl due to dense strata/hard pan encountered.
2. Groundwater not encountered during drilling.

WATER

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

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

Generated with CORE-GS by Geroc - Hand Auger - scala & vane bars - 20/08/2024 10:26:43 am

INVESTIGATION LOG

HOLE NO.: BH04

CLIENT: Melay Vinac

PROJECT: 216 Tahanga Road, Kaingaroa

JOB NO.: C0523

SITE LOCATION: Eastern side of Tahanga Road

START DATE: 01/08/2024

CO-ORDINATES: 1631689mE, 6128458mN

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

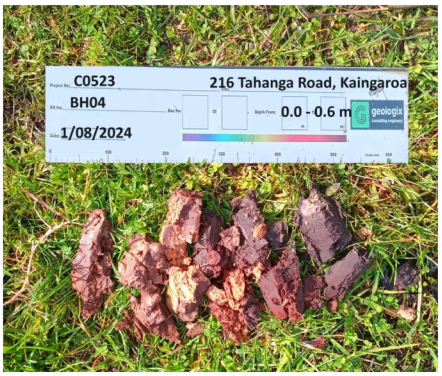
RIG: 50 mm Auger and DCP

DRILLER: GB/SD

LOGGED BY: GB/SD

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: Values	WATER
TOPSOIL comprising organic silty sand; dark brown. Loose; moist to wet; sand, fine		0.0	TS	6		
Silty SAND; light brown. Loose to very dense; wet; sand, fine; [Awhitu Group Dunes].		0.2		20		
		0.4		30 >>		
End Of Hole: 0.60m		0.6				
		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 terminated at 0.6 m bgl due to dense strata/hard pan encountered.
2. Groundwater encountered at 0.5 m bgl during drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

Generated with CORE-GS by Geroc - Hand Auger - scala & vane bars - 20/08/2024 10:26:49 am

INVESTIGATION LOG

HOLE NO.: BH05

CLIENT: Melay Vinac

PROJECT: 216 Tahanga Road, Kaingaroa

JOB NO.: C0523

SITE LOCATION: Eastern side of Tahanga Road

START DATE: 01/08/2024

CO-ORDINATES: 1631733mE, 6128472mN

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: 50 mm Auger and DCP

DRILLER: GB/SD

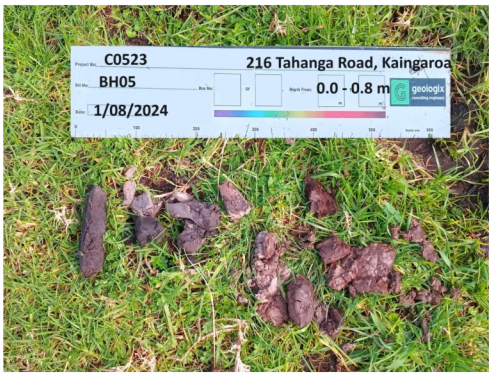
LOGGED BY: GB/SD

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa)	WATER
Topsoil comprising of organic silty sand; dark brown. Loose; moist; sand, fine		0.0	TS	2		
SAND, with trace silt; greyish white with brown mottles. Loose to medium dense; moist to wet; sand, fine, Liquefiable; [Awhitu Group Dunes].		0.2		2		
		0.4		4		
				5		
		0.6		10		
SAND, with trace silt; brown. Medium dense to dense; saturated; sand, fine, liquefiable; [Awhitu Group Dunes].				7		
		0.8		4		
End Of Hole: 0.80m				14		
		1.0		34 >>		
		1.2				
		1.4				
		1.6				
		1.8				
		2.0				
		2.2				
		2.4				
		2.6				
		2.8				

Scala penetrometer: 2 4 6 8 10 12 14 16 18 (Blows / 100mm)

Vane shear strength (kPa): Vane: 50 100 150 200 Values

PHOTO(S)



REMARKS

1. Hand auger terminated at 0.8 m bgl due to dense strata/hard pan encountered.
2. Groundwater encountered at 0.5 m bgl during drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

Generated with CORE-GS by Geroc - Hand Auger - scala & vane bars - 20/08/2024 10:26:55 am

INVESTIGATION LOG

HOLE NO.: BH06

CLIENT: Melay Vinac

PROJECT: 216 Tahanga Road, Kaingaroa

JOB NO.: C0523

SITE LOCATION: Eastern side of Tahanga Road

START DATE: 01/08/2024

CO-ORDINATES: 1631673mE, 6128408mN

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: 50 mm Auger and DCP

DRILLER: GB/SD

LOGGED BY: GB/SD

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa)	WATER
Topsoil comprising of organic silty sand; dark brown. Loose; moist; sand, fine		0.0 – 0.2	TS	1, 2, 4		
Silty SAND; greyish light brown. Loose to medium dense; moist to wet; sand, fine; [Awhitu Group Dunes].		0.2 – 0.4		6, 6		
Sandy SILT; dark brownish black. Hard; moist; non-plastic; sand, fine; [Awhitu Group Dunes].		0.4 – 0.6		16		
0.8m - 0.9m: Becoming brown with black mottles		0.6 – 0.8		17, 13, 30 >>		◁
End Of Hole: 0.90m		0.8 – 0.9				

Scala penetrometer axis: 2, 4, 6, 8, 10, 12, 14, 16, 18 (Blows / 100mm)

Vane shear strength (kPa) axis: 50, 100, 150, 200; Vane: Values

PHOTO(S)

REMARKS

1. Hand auger terminated at 0.9 m bgl due to dense strata/hard pan encountered.
2. Groundwater encountered at 0.9 m bgl during drilling.

WATER

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

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

Generated with CORE-GS by Geroc - Hand Auger - scala & vane bars - 20/08/2024 10:27:03 am

INVESTIGATION LOG

HOLE NO.: BH07

CLIENT: Melay Vinac

PROJECT: 216 Tahanga Road, Kaingaroa

JOB NO.: C0523

SITE LOCATION: Eastern side of Tahanga Road

START DATE: 01/08/2024

CO-ORDINATES: 1631745mE, 6128419mN

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: 50 mm Auger and DCP

DRILLER: GB/SD

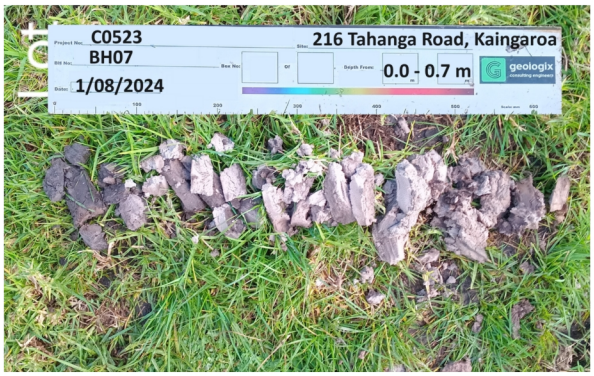
LOGGED BY: GB/SD

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa)	WATER
Topsoil comprising of organic silty sand; dark brown. Loose; moist; sand, fine		0.0	TS	1, 1, 1		
SAND, with trace silt; greyish white. Loose to medium dense; wet; non-plastic; sand, fine; [Awhitu Group Dunes].		0.2		3, 5, 5, 13, 19, 15, 7, 10, 10, 21 >>		◁
SAND, with trace silt; brown. Medium dense to dense; saturated; dilatant; sand, fine; [Awhitu Group Dunes].		0.6		6, 8, 11, 21 >>, 21 >>, 20, 10, 15, 21 >>, 30 >>		
End Of Hole: 0.70m		0.8				
		1.0				
		1.2				
		1.4				
		1.6				
		1.8				
		2.0				
		2.2				
		2.4				
		2.6				
		2.8				

Scala penetrometer scale: 2, 4, 6, 8, 10, 12, 14, 16, 18

Vane shear strength (kPa) scale: 50, 100, 150, 200; Vane: Values

PHOTO(S)



REMARKS

1. Hand auger terminated at 0.7 m bgl due to dense strata/hard pan encountered.
2. Groundwater encountered at 0.5 m bgl during drilling.

WATER

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

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

Generated with CORE-GS by Geroc - Hand Auger - scala & vane bars - 20/08/2024 10:27:08 am

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APPENDIX C

Assessment of Environmental Effects and Assessment Criteria

Table 14: 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 No. 100.
Surface water feature[5]	15 m	15 m	Complies.
Coastal Marine Area	15 m	30 m	Complies, site is inland.
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 moderately sloping to <15 °.
Cut off drain required?			Yes.
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. 100.
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.

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APPENDIX D

Stormwater Calculations

Project Ref:	C0523		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	216 TAHANGA ROAD, KAINGAROA			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	12 September 2024	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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	0.96	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
TOTAL	**500**	TYPE D	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	56.6	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	67.92	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, VARIOUS DURATIONS

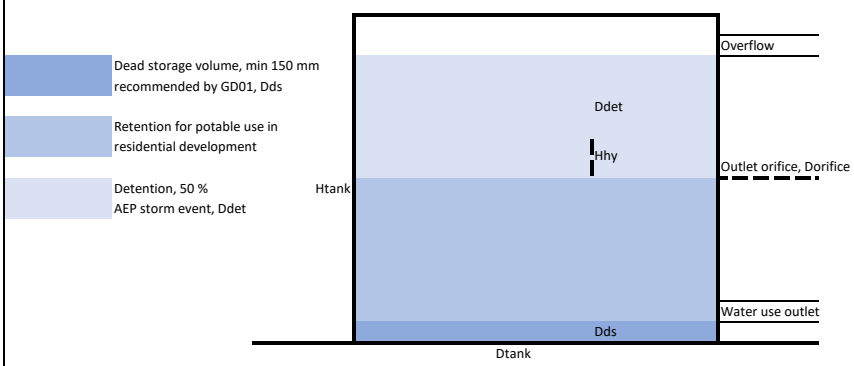
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	56.60	1.2	67.92	8.57	5.27	4.21	*Critical duration (time of concentration) for the catchments is 10min*
20	43.60	1.2	52.32	6.60	4.87	3.89	
30	36.80	1.2	44.16	5.57	4.11	3.29	
60	26.60	1.2	31.92	4.03	2.97	2.38	
120	18.50	1.2	22.20	2.80	2.07	1.65	*Pre-dev calculated on Intensity without CC factor*
360	9.58	1.2	11.50	1.45	1.07	0.86	
720	6.01	1.2	7.21	0.91	0.67	0.54	
1440	3.62	1.2	4.34	0.55	0.40	0.32	
2880	2.10	1.2	2.52	0.32	0.23	0.19	
4320	1.50	1.2	1.80	0.23	0.17	0.13	

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	3.13	5.43	1.08	1.08	4.35	2611	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	2.41	4.19	1.48	1.08	3.10	3725	
30	2.04	3.53	1.25	1.08	2.45	4412	
60	1.47	2.55	0.90	1.08	1.47	5299	
120	1.02	1.78	0.63	1.08	0.69	4999	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	0.53	0.92	0.33	1.08	No Att. Req.	0	
720	0.33	0.58	0.20	1.08	No Att. Req.	0	
1440	0.20	0.35	0.12	1.08	No Att. Req.	0	
2880	0.12	0.20	0.07	1.08	No Att. Req.	0	
4320	0.08	0.14	0.05	1.08	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	5.299	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.6	m	No. of Tanks 1
TANK AREA, Atank	10.18	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	25447	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.52	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.67	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00108	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.26	m	
AREA OF ORIFICE, Aorifice	7.72E-04	m2	
ORIFICE DIAMETER, Dorifice	31	mm	
VELOCITY AT ORIFICE	3.20	m/s	At max. head level

Project Ref:	C0523	**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	216 TAHANGA ROAD, KAINGAROA		
Design Case:	CONCEPT FUTURE DEVELOPMENT	**20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	12 September 2024 REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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	0.96	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	73.4	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	88.1	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, VARIOUS DURATIONS

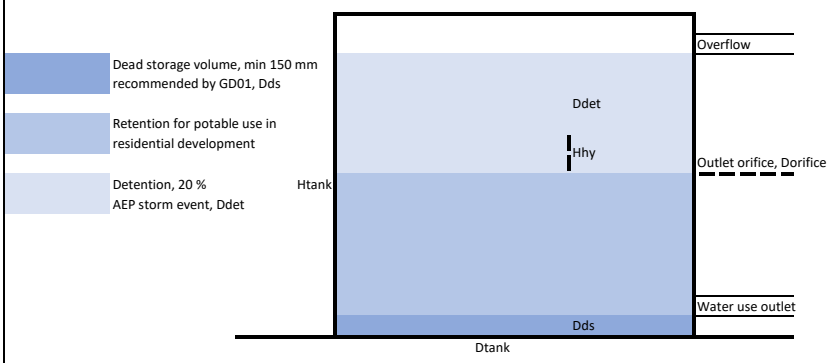
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	73.40	1.2	88.08	11.11	6.83	5.46	*Critical duration (time of concentration) for the catchments is 10min*
20	56.60	1.2	67.92	8.57	6.32	5.06	
30	47.80	1.2	57.36	7.23	5.34	4.27	
60	34.60	1.2	41.52	5.24	3.86	3.09	
120	24.10	1.2	28.92	3.65	2.69	2.15	*Pre-dev calculated on Intensity without CC factor*
360	12.50	1.2	15.00	1.89	1.40	1.12	
720	7.86	1.2	9.43	1.19	0.88	0.70	
1440	4.74	1.2	5.69	0.72	0.53	0.42	
2880	2.75	1.2	3.30	0.42	0.31	0.25	
4320	1.96	1.2	2.35	0.30	0.22	0.18	

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	4.06	7.05	1.40	1.40	5.64	3386	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	3.13	5.43	3.19	1.40	4.03	4837	
30	2.64	4.59	2.69	1.40	3.19	5735	
60	1.91	3.32	1.95	1.40	1.92	6908	
120	1.33	2.31	1.36	1.40	0.91	6558	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	0.69	1.20	0.70	1.40	No Att. Req.	0	
720	0.43	0.75	0.44	1.40	No Att. Req.	0	
1440	0.26	0.46	0.27	1.40	No Att. Req.	0	
2880	0.15	0.26	0.15	1.40	No Att. Req.	0	
4320	0.11	0.19	0.11	1.40	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	6.908	m3	Select largest storage as per analysis	
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank	
TANK DIAMETER, Dtank	3.6	m	No. of Tanks	1
TANK AREA, Atank	10.18	m2	Area of ONE tank	
TANK MAX STORAGE VOLUME, Vtank	25447	litres		
REQUIRED STORAGE HEIGHT, Ddet	0.68	m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	0.83	m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00140	m3/s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	0.34	m		
AREA OF ORIFICE, Aorifice	8.77E-04	m2		
ORIFICE DIAMETER, Dorifice	33	mm		
VELOCITY AT ORIFICE	3.65	m/s	At max. head level	

Project Ref:	C0523	**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	216 TAHANGA ROAD, KAINGAROA		
Design Case:	CONCEPT FUTURE DEVELOPMENT	**10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW**	
Date:	12 September 2024 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER 2023 FNDC ENGINEERING STANDARDS). THE 10% AEP SCENARIO IS PROVIDED TO SATISFY FNDC DISTRICT PLAN RULE 13.7.3.4 (FOR CONTROLLED ACTIVITY). PRE-DEVELOPMENT RUNOFF REMAINS UNFACTORED IN THIS SCENARIO.
RUNOFF COEFFICIENTS 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	0.96	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE D	

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	85.9	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	103.1	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, 10%AEP, VARIOUS DURATIONS

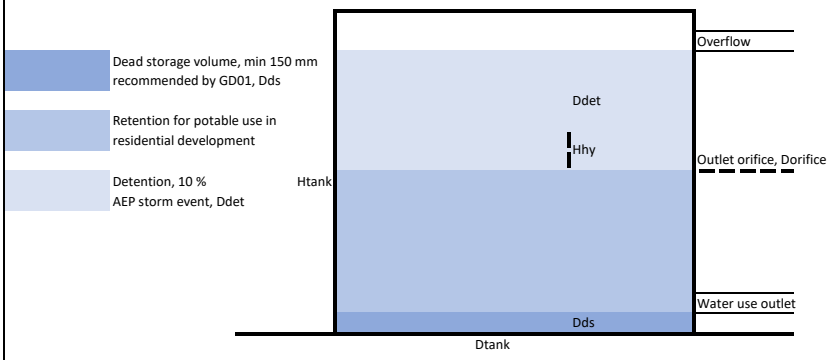
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s		COMMENTS
10	85.90	1.2	103.08	13.00	7.99		*Critical duration (time of concentration) for the catchments is 10min*
20	66.40	1.2	79.68	10.05	7.41		
30	56.00	1.2	67.20	8.47	6.25		
60	40.60	1.2	48.72	6.14	4.53		
120	28.30	1.2	33.96	4.28	3.16		*Pre-dev calculated on Intensity without CC factor*
360	14.70	1.2	17.64	2.22	1.64		
720	9.25	1.2	11.10	1.40	1.03		
1440	5.58	1.2	6.70	0.84	0.62		
2880	3.24	1.2	3.89	0.49	0.36		
4320	2.31	1.2	2.77	0.35	0.26		

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	4.75	8.25	3.24	3.24	5.01	3004	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	3.67	6.37	3.74	3.24	3.13	3761	
30	3.10	5.38	3.15	3.24	2.14	3844	
60	2.25	3.90	2.29	3.24	0.66	2366	
120	1.57	2.72	1.59	3.24	No Att. Req.	0	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	0.81	1.41	0.83	3.24	No Att. Req.	0	
720	0.51	0.89	0.52	3.24	No Att. Req.	0	
1440	0.31	0.54	0.31	3.24	No Att. Req.	0	
2880	0.18	0.31	0.18	3.24	No Att. Req.	0	
4320	0.13	0.22	0.13	3.24	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	3.844	m3	Select largest storage as per analysis	
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank	
TANK DIAMETER, Dtank	3.6	m	No. of Tanks	1
TANK AREA, Atank	10.18	m2	Area of ONE tank	
TANK MAX STORAGE VOLUME, Vtank	25447	litres		
REQUIRED STORAGE HEIGHT, Ddet	0.38	m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	0.53	m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00324	m3/s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	0.19	m		
AREA OF ORIFICE, Aorifice	2.72E-03	m2		
ORIFICE DIAMETER, Dorifice	59	mm		
VELOCITY AT ORIFICE	2.72	m/s	At max. head level	

Project Ref:	C0523	**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	216 TAHANGA ROAD, KAINGAROA		
Design Case:	CONCEPT FUTURE DEVELOPMENT	**1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	12 September 2024 REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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	0.96	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	131.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	157.2	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, VARIOUS DURATIONS

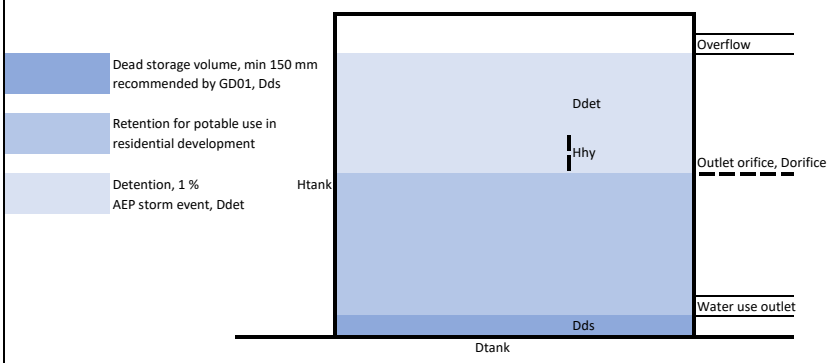
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	131.00	1.2	157.20	19.82	12.19	9.75	*Critical duration (time of concentration) for the catchments is 10min*
20	101.00	1.2	121.20	15.28	11.28	9.02	
30	85.50	1.2	102.60	12.94	9.55	7.64	
60	62.10	1.2	74.52	9.40	6.93	5.55	
120	43.40	1.2	52.08	6.57	4.85	3.88	*Pre-dev calculated on Intensity without CC factor*
360	22.70	1.2	27.24	3.44	2.53	2.03	
720	14.30	1.2	17.16	2.16	1.60	1.28	
1440	8.65	1.2	10.38	1.31	0.97	0.77	
2880	5.03	1.2	6.04	0.76	0.56	0.45	
4320	3.60	1.2	4.32	0.54	0.40	0.32	

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	7.25	12.58	2.50	2.50	10.07	6043	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	5.59	9.70	3.43	2.50	7.19	8631	
30	4.73	8.21	2.91	2.50	5.70	10268	
60	3.44	5.96	2.11	2.50	3.46	12449	
120	2.40	4.17	1.48	2.50	1.66	11972	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	1.26	2.18	0.77	2.50	No Att. Req.	0	
720	0.79	1.37	0.49	2.50	No Att. Req.	0	
1440	0.48	0.83	0.29	2.50	No Att. Req.	0	
2880	0.28	0.48	0.17	2.50	No Att. Req.	0	
4320	0.20	0.35	0.12	2.50	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	12.449	m3	Select largest storage as per analysis	
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank	
TANK DIAMETER, Dtank	3.6	m	No. of Tanks	1
TANK AREA, Atank	10.18	m2	Area of ONE tank	
TANK MAX STORAGE VOLUME, Vtank	25447	litres		
REQUIRED STORAGE HEIGHT, Ddet	1.22	m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	1.37	m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00250	m3/s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	0.61	m		
AREA OF ORIFICE, Aorifice	1.17E-03	m2		
ORIFICE DIAMETER, Dorifice	39	mm		
VELOCITY AT ORIFICE	4.90	m/s	At max. head level	

Project Ref:	C0523	**STORMWATER DISPERSION PIPE/ TRENCH**	geologix consulting engineers
Project Address:	216 TAHANGA ROAD, KAINGAROA		
Design Case:	CONCEPT FUTURE DEVELOPMENT	**DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH**	
Date:	12 September 2024 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
42	0	0	0	0	0
40	2	8	8	1	8
	TOTALS	8	8		8
	SLOPE, Sc	0.250	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	4	0.009	0.000	0.0000	0.000	**0 % full**
0.100	0.050	5.381	0.0451	0.0001	0.003	4	0.009	1.220	0.0002	0.179	
0.100	0.100	4.996	0.0644	0.0004	0.006	4	0.009	1.905	0.0008	0.779	
0.100	0.150	4.692	0.0795	0.0007	0.009	4	0.009	2.455	0.0018	1.813	
0.100	0.200	4.429	0.0927	0.0011	0.012	4	0.009	2.921	0.0033	3.267	
0.100	0.250	4.189	0.1047	0.0015	0.015	4	0.009	3.328	0.0051	5.110	
0.100	0.300	3.965	0.1159	0.0020	0.017	4	0.009	3.687	0.0073	7.306	
0.100	0.350	3.751	0.1266	0.0024	0.019	4	0.009	4.004	0.0098	9.809	
0.100	0.400	3.544	0.1369	0.0029	0.021	4	0.009	4.285	0.0126	12.572	
0.100	0.450	3.342	0.1471	0.0034	0.023	4	0.009	4.533	0.0155	15.539	
0.100	0.500	3.142	0.1571	0.0039	0.025	4	0.009	4.750	0.0187	18.653	**50 % full**
0.100	0.550	2.941	0.1671	0.0044	0.026	4	0.009	4.937	0.0219	21.850	
0.100	0.600	2.739	0.1772	0.0049	0.028	4	0.009	5.094	0.0251	25.064	
0.100	0.650	2.532	0.1875	0.0054	0.029	4	0.009	5.222	0.0282	28.218	
0.100	0.700	2.319	0.1982	0.0059	0.030	4	0.009	5.319	0.0312	31.234	
0.100	0.750	2.094	0.2094	0.0063	0.030	4	0.009	5.384	0.0340	34.018	
0.100	0.800	1.855	0.2214	0.0067	0.030	4	0.009	5.414	0.0365	36.465	
0.100	0.850	1.591	0.2346	0.0071	0.030	4	0.009	5.403	0.0384	38.441	
0.100	0.900	1.287	0.2498	0.0074	0.030	4	0.009	5.340	0.0398	39.761	
0.100	0.950	0.902	0.2691	0.0077	0.029	4	0.009	5.201	0.0401	40.086	
0.100	1.000	0.000	0.3142	0.0079	0.025	4	0.009	4.750	0.0373	37.306	**Flowing full**

DISPERSION SPECIFICATION

INCOMING PIPE PROPERTIES:

TANK OUTFLOW, 1 % AEP	12.58	l/s		
MAXIMUM PIPE FLOW	40.09	l/s		
SUFFICIENT CAPACITY IN PIPE	YES			
LONGITUDINAL SLOPE	0.250	m/m		
DESIGN VELOCITY, Dv	5.414	m/s		

LEVEL SPREADER SPECIFICATIONS:

PIPE DIAMETER, m	0.20	m
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	47	No.
DIA. OF ORIFICE, D	20	mm
ORIFICE INTERVALS, C/C	200	mm
DISPERSION PIPE LENGTH, L	**9.2**	**m**

ORIFICE DESIGN FLOW CHECK:

AREA OF SINGLE ORIFICE, A	0.00031	m2			
FLOW OUT OF 1 ORIFICE	0.000272829	m3/s	0.27	l/s	
FLOW OUT OF ALL ORIFICES	0.01282298	m3/s	12.82	l/s	**DESIGN OK**
VELOCITY FROM SINGLE ORIFICE	0.87	m/s			

BROAD CRESTED WEIR DESIGN FLOW CHECK:

FLOW DEPTH, h	0.1	m			
BASE WIDTH = L	9.2	m			
FLOW AREA	0.92	m2			
WEIR FLOW	0.01716	m3/s	17.16	l/s	**DESIGN OK**
WEIR VELOCITY	0.019	m/s			

INCOMING PIPE & SPREADER SUMARY:

	LOT 1		LOT 3		LOT 4	
INCOMING PIPE DIAMETER, m	0.100	m	0.100	m	0.100	m
SPREADER PIPE DIAMETER, m	0.200	m	0.200	m	0.200	m
MANNINGS PIPE ROUGHNESS	0.009		0.009		0.009	
NUMBER OF ORIFICES	47	No.	47	No.	47	No.
DIA. OF ORIFICE, D	20	mm	20	mm	20	mm
ORIFICE INTERVALS, C/C	200	mm	200	mm	200	mm
DISPERSION PIPE LENGTH, L	**9.2**	**m**	**9.2**	**m**	**9.2**	**m**

HIRDS V4 Intensity-Duration-Frequency Results
Sitename: Custom Location
Coordinate system: WGS84
Longitude: 173.3471
Latitude: -34.9863
DDF Model

Parameters:	c	d	e	f	g	h	i
Values:	0.00166402	0.5037479	-0.0414711	0	0.25152217	-0.010308	3.1903313

Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Rate (mm/hr)
	24	100	3.17805383	4.60014923	8.650270025

Rainfall intensities (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	51.7	39.8	33.6	24.3	16.9	8.74	5.48	3.3	1.9	1.4	1.1	0.87
2	0.5	56.6	43.6	36.8	26.6	18.5	9.58	6.01	3.6	2.1	1.5	1.2	0.96
5	0.2	73.4	56.6	47.8	34.6	24.1	12.5	7.86	4.7	2.8	2	1.5	1.26
10	0.1	85.9	66.4	56	40.6	28.3	14.7	9.25	5.6	3.2	2.3	1.8	1.49
20	0.05	98.9	76.4	64.5	46.8	32.7	17	10.7	6.5	3.8	2.7	2.1	1.72
30	0.033	107	82.5	69.7	50.6	35.3	18.4	11.6	7	4.1	2.9	2.3	1.87
40	0.025	112	86.8	73.4	53.3	37.2	19.4	12.2	7.4	4.3	3.1	2.4	1.97
50	0.02	117	90.3	76.3	55.4	38.7	20.2	12.7	7.7	4.5	3.2	2.5	2.05
60	0.017	120	93.1	78.7	57.2	39.9	20.8	13.1	7.9	4.6	3.3	2.6	2.12
80	0.013	126	97.6	82.5	60	41.9	21.9	13.8	8.3	4.9	3.5	2.7	2.23
100	0.01	131	101	85.5	62.1	43.4	22.7	14.3	8.7	5	3.6	2.8	2.32
250	0.004	149	116	97.7	71.1	49.8	26	16.4	10	5.8	4.2	3.3	2.67

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	6.7	4.4	3.1	2.3	1.6	1	0.69	0.6	0.3	0.3	0.2	0.18
2	0.5	7.2	4.8	3.4	2.5	1.7	1.1	0.76	0.6	0.4	0.3	0.2	0.2
5	0.2	9.8	6.9	5	3.6	2.5	1.6	1	0.8	0.5	0.4	0.3	0.26
10	0.1	13	9.1	6.8	4.7	3.3	2	1.3	1	0.6	0.5	0.4	0.31
20	0.05	16	12	9.1	6.3	4.4	2.5	1.6	1.2	0.7	0.5	0.4	0.37
30	0.033	19	14	11	7.5	5.2	2.9	1.9	1.3	0.8	0.6	0.5	0.4
40	0.025	21	16	12	8.4	5.8	3.2	2	1.4	0.8	0.6	0.5	0.43
50	0.02	23	17	13	9.3	6.3	3.5	2.2	1.5	0.9	0.7	0.5	0.45
60	0.017	25	19	14	10	6.8	3.8	2.4	1.6	0.9	0.7	0.6	0.47
80	0.013	28	21	16	11	7.6	4.2	2.6	1.7	1	0.7	0.6	0.5
100	0.01	30	23	17	12	8.3	4.6	2.8	1.8	1	0.8	0.6	0.53
250	0.004	43	32	25	18	12	6.6	4	2.2	1.3	1	0.8	0.65

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	55.4	42.6	35.9	26	18	9.22	5.74	3.4	2	1.4	1.1	0.9
2	0.5	60.7	46.8	39.4	28.5	19.8	10.1	6.31	3.8	2.2	1.5	1.2	0.99
5	0.2	78.9	60.9	51.4	37.2	25.8	13.3	8.28	5	2.9	2	1.6	1.3
10	0.1	92.6	71.5	60.3	43.8	30.4	15.6	9.76	5.9	3.4	2.4	1.9	1.54
20	0.05	107	82.4	69.6	50.5	35.1	18.1	11.3	6.8	3.9	2.8	2.2	1.78
30	0.033	115	89	75.2	54.6	38	19.6	12.2	7.3	4.2	3	2.4	1.93
40	0.025	121	93.7	79.2	57.5	40	20.7	12.9	7.8	4.5	3.2	2.5	2.04
50	0.02	126	97.5	82.4	59.8	41.7	21.5	13.4	8.1	4.7	3.3	2.6	2.13
60	0.017	130	101	84.9	61.7	43	22.2	13.9	8.3	4.8	3.4	2.7	2.2
80	0.013	136	105	89.1	64.8	45.1	23.3	14.6	8.8	5.1	3.6	2.8	2.31
100	0.01	141	109	92.3	67.1	46.8	24.2	15.1	9.1	5.3	3.8	2.9	2.4
250	0.004	161	125	106	76.8	53.6	27.8	17.4	11	6.1	4.3	3.4	2.77

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	55.4	42.6	35.9	26	18	9.22	5.74	3.4	2	1.4	1.1	0.9
2	0.5	60.7	46.8	39.4	28.5	19.8	10.1	6.31	3.8	2.2	1.5	1.2	0.99
5	0.2	78.9	60.9	51.4	37.2	25.8	13.3	8.28	5	2.9	2	1.6	1.3
10	0.1	92.6	71.5	60.3	43.8	30.4	15.6	9.76	5.9	3.4	2.4	1.9	1.54
20	0.05	107	82.4	69.6	50.5	35.1	18.1	11.3	6.8	3.9	2.8	2.2	1.78
30	0.033	115	89	75.2	54.6	38	19.6	12.2	7.3	4.2	3	2.4	1.93
40	0.025	121	93.7	79.2	57.5	40	20.7	12.9	7.8	4.5	3.2	2.5	2.04
50	0.02	126	97.5	82.4	59.8	41.7	21.5	13.4	8.1	4.7	3.3	2.6	2.13
60	0.017	130	101	84.9	61.7	43	22.2	13.9	8.3	4.8	3.4	2.7	2.2
80	0.013	136	105	89.1	64.8	45.1	23.3	14.6	8.8	5.1	3.6	2.8	2.31
100	0.01	141	109	92.3	67.1	46.8	24.2	15.1	9.1	5.3	3.8	2.9	2.4
250	0.004	161	125	106	76.8	53.6	27.8	17.4	11	6.1	4.3	3.4	2.77

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	56.3	43.4	36.5	26.4	18.3	9.34	5.8	3.5	2	1.4	1.1	0.9
2	0.5	61.7	47.6	40.1	29	20.1	10.3	6.39	3.8	2.2	1.6	1.2	0.99
5	0.2	80.4	62	52.3	37.9	26.3	13.5	8.39	5	2.9	2.1	1.6	1.31
10	0.1	94.3	72.8	61.4	44.6	30.9	15.9	9.9	5.9	3.4	2.4	1.9	1.55
20	0.05	109	83.9	70.9	51.4	35.7	18.4	11.5	6.9	4	2.8	2.2	1.8
30	0.033	117	90.6	76.6	55.6	38.7	19.9	12.4	7.4	4.3	3.1	2.4	1.95
40	0.025	123	95.5	80.6	58.6	40.7	21	13.1	7.8	4.5	3.2	2.5	2.06
50	0.02	128	99.3	83.9	60.9	42.4	21.9	13.6	8.2	4.7	3.4	2.6	2.14
60	0.017	132	102	86.5	62.9	43.8	22.6	14.1	8.4	4.9	3.5	2.7	2.22
80	0.013	139	107	90.8	66	45.9	23.7	14.8	8.9	5.1	3.7	2.8	2.33
100	0.01	144	111	94.1	68.4	47.6	24.6	15.4	9.2	5.3	3.8	3	2.42
250	0.004	164	127	108	78.3	54.6	28.2	17.6	11	6.1	4.4	3.4	2.79

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	59.2	45.6	38.4	27.8	19.2	9.73	6.01	3.6	2	1.5	1.1	0.92
2	0.5	65	50.1	42.2	30.5	21.1	10.7	6.63	3.9	2.3	1.6	1.2	1.01
5	0.2	84.8	65.4	55.2	40	27.7	14.1	8.73	5.2	3	2.1	1.6	1.34
10	0.1	99.5	76.9	64.9	47.1	32.6	16.6	10.3	6.1	3.5	2.5	1.9	1.59
20	0.05	115	88.7	74.9	54.4	37.7	19.3	11.9	7.1	4.1	2.9	2.3	1.84
30	0.033	124	95.8	81	58.8	40.8	20.9	12.9	7.7	4.4	3.1	2.4	2
40	0.025	130	101	85.3	61.9	43	22	13.7	8.1	4.7	3.3	2.6	2.11
50	0.02	136	105	88.7	64.5	44.8	22.9	14.2	8.5	4.9	3.5	2.7	2.2
60	0.017	140	108	91.5	66.5	46.2	23.7	14.7	8.8	5	3.6	2.8	2.28
80	0.013	147	114	96.1	69.8	48.5	24.9	15.4	9.2	5.3	3.8	2.9	2.39
100	0.01	152	118	99.5	72.4	50.3	25.8	16	9.6	5.5	3.9	3	2.49
250	0.004	174	135	114	82.8	57.6	29.6	18.4	11	6.3	4.5	3.5	2.87

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	55.9	43.1	36.3	26.2	18.2	9.29	5.78	3.5	2	1.4	1.1	0.9
2	0.5	61.3	47.2	39.8	28.8	20	10.2	6.36	3.8	2.2	1.6	1.2	0.99
5	0.2	79.8	61.6	51.9	37.6	26.1	13.4	8.35	5	2.9	2.1	1.6	1.3
10	0.1	93.6	72.3	61	44.2	30.7	15.8	9.84	5.9	3.4	2.4	1.9	1.54
20	0.05	108	83.3	70.4	51.1	35.5	18.3	11.4	6.8	3.9	2.8	2.2	1.79
30	0.033	116	90	76	55.2	38.4	19.8	12.3	7.4	4.3	3	2.4	1.94
40	0.025	122	94.8	80.1	58.1	40.5	20.9	13	7.8	4.5	3.2	2.5	2.05
50	0.02	127	98.6	83.3	60.5	42.1	21.7	13.6	8.1	4.7	3.3	2.6	2.14
60	0.017	131	102	85.9	62.4	43.4	22.4	14	8.4	4.9	3.5	2.7	2.21
80	0.013	138	107	90.1	65.5	45.6	23.5	14.7	8.8	5.1	3.6	2.8	2.32
100	0.01	143	110	93.4	67.9	47.3	24.4	15.3	9.2	5.3	3.8	2.9	2.41
250	0.004	163	126	107	77.7	54.2	28.1	17.5	11	6.1	4.3	3.4	2.78

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	61.8	47.6	40.1	29	20	10.1	6.19	3.7	2.1	1.5	1.1	0.94
2	0.5	67.9	52.3	44.1	31.9	22	11.1	6.84	4.1	2.3	1.6	1.3	1.03
5	0.2	88.7	68.5	57.8	41.8	28.9	14.7	9.04	5.3	3.1	2.2	1.7	1.37
10	0.1	104	80.5	68	49.3	34.1	17.3	10.7	6.3	3.6	2.6	2	1.62
20	0.05	120	93	78.5	57	39.5	20.1	12.4	7.3	4.2	3	2.3	1.89
30	0.033	130	100	84.9	61.6	42.7	21.7	13.4	7.9	4.6	3.2	2.5	2.05
40	0.025	137	106	89.4	64.9	45	23	14.2	8.4	4.8	3.4	2.6	2.16
50	0.02	142	110	93.1	67.6	46.9	23.9	14.8	8.7	5	3.6	2.8	2.25
60	0.017	147	114	96	69.7	48.4	24.7	15.3	9	5.2	3.7	2.9	2.33
80	0.013	154	119	101	73.2	50.8	25.9	16	9.5	5.4	3.9	3	2.45
100	0.01	159	123	104	75.9	52.7	26.9	16.6	9.9	5.7	4	3.1	2.55
250	0.004	182	141	119	86.9	60.4	30.9	19.1	11	6.5	4.6	3.6	2.94

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	57	43.9	37	26.7	18.5	9.43	5.85	3.5	2	1.4	1.1	0.91
2	0.5	62.5	48.1	40.6	29.4	20.3	10.4	6.44	3.8	2.2	1.6	1.2	1
5	0.2	81.4	62.8	53	38.4	26.6	13.6	8.47	5.1	2.9	2.1	1.6	1.32
10	0.1	95.5	73.8	62.3	45.1	31.3	16.1	9.99	6	3.4	2.4	1.9	1.56
20	0.05	110	85.1	71.8	52.1	36.2	18.6	11.6	6.9	4	2.8	2.2	1.81
30	0.033	119	91.9	77.6	56.3	39.2	20.1	12.5	7.5	4.3	3.1	2.4	1.96
40	0.025	125	96.7	81.7	59.4	41.3	21.2	13.2	7.9	4.6	3.3	2.5	2.07
50	0.02	130	101	85	61.8	43	22.1	13.8	8.2	4.8	3.4	2.6	2.16
60	0.017	134	104	87.7	63.7	44.3	22.8	14.2	8.5	4.9	3.5	2.7	2.23
80	0.013	141	109	92	66.9	46.5	24	14.9	8.9	5.2	3.7	2.9	2.35
100	0.01	146	113	95.3	69.3	48.2	24.9	15.5	9.3	5.4	3.8	3	2.44
250	0.004	166	129	109	79.4	55.3	28.6	17.8	11	6.2	4.4	3.4	2.81

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	67.6	52.1	43.9	31.7	21.8	10.9	6.61	3.9	2.2	1.5	1.2	0.97
2	0.5	74.4	57.4	48.3	35	24.1	12	7.33	4.3	2.4	1.7	1.3	1.08
5	0.2	97.6	75.4	63.6	46.1	31.7	15.9	9.72	5.7	3.2	2.3	1.8	1.43
10	0.1	115	88.8	74.9	54.3	37.5	18.8	11.5	6.8	3.8	2.7	2.1	1.7
20	0.05	133	103	86.7	62.9	43.4	21.9	13.4	7.8	4.5	3.1	2.4	1.98
30	0.033	144	111	93.7	68.1	47	23.7	14.5	8.5	4.8	3.4	2.6	2.15
40	0.025	151	117	98.7	71.7	49.6	25	15.3	9	5.1	3.6	2.8	2.28
50	0.02	157	122	103	74.7	51.7	26	15.9	9.4	5.3	3.8	2.9	2.37
60	0.017	162	126	106	77.1	53.3	26.9	16.5	9.7	5.5	3.9	3	2.45
80	0.013	170	132	111	81	56	28.3	17.3	10	5.8	4.1	3.2	2.58
100	0.01	176	137	115	83.9	58.1	29.4	18	11	6	4.2	3.3	2.68
250	0.004	201	156	132	96.1	66.6	33.7	20.7	12	6.9	4.9	3.8	3.09

HIRDS V4 Depth-Duration-Frequency Results
Sitename: Custom Location
Coordinate system: WGS84
Longitude: 173.3471
Latitude: -34.9863
DDF Model

Parameters:	c	d	e	f	g	h	i
Values:	0.00166402	0.5037479	-0.0414711	0	0.25152217	-0.010308	3.19033

Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Depth (mm)
	24	100	3.17805383	4.60014923	207.6064806

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	8.62	13.3	16.8	24.3	33.8	52.4	65.7	79	92	98	102	105
2	0.5	9.43	14.5	18.4	26.6	37	57.5	72.1	87	101	108	112	115
5	0.2	12.2	18.9	23.9	34.6	48.2	75.1	94.3	114	132	141	147	151
10	0.1	14.3	22.1	28	40.6	56.6	88.3	111	134	156	167	174	178
20	0.05	16.5	25.5	32.3	46.8	65.3	102	128	155	180	193	201	207
30	0.033	17.8	27.5	34.8	50.6	70.6	110	139	168	195	209	218	224
40	0.025	18.7	28.9	36.7	53.3	74.4	116	146	177	206	221	230	237
50	0.02	19.4	30.1	38.1	55.4	77.4	121	152	184	215	230	240	246
60	0.017	20	31	39.3	57.2	79.8	125	157	190	222	238	248	255
80	0.013	21	32.5	41.2	60	83.8	131	165	200	233	250	260	268
100	0.01	21.8	33.7	42.7	62.1	86.8	136	171	208	242	259	270	278
250	0.004	24.8	38.5	48.9	71.1	99.5	156	197	239	278	299	312	320

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	1.1	1.5	1.7	2.3	3.4	6.2	8	14	16	19	20	20
2	0.5	1.2	1.6	1.8	2.5	3.7	6.8	8.8	15	18	21	22	22
5	0.2	1.7	2.2	2.6	3.6	5.2	9.4	12	21	24	28	29	30
10	0.1	2.2	3	3.4	4.7	6.8	12	15	25	29	34	35	36
20	0.05	2.7	4	4.6	6.2	9	15	20	29	35	40	42	42
30	0.033	3.2	4.7	5.5	7.3	11	18	23	32	38	44	46	47
40	0.025	3.5	5.3	6.2	8.2	12	20	25	34	41	47	49	50
50	0.02	3.8	5.8	6.8	9	13	22	28	36	43	50	52	53
60	0.017	4.1	6.2	7.3	9.7	14	24	30	37	45	52	54	55
80	0.013	4.5	7	8.3	11	16	26	33	40	49	55	58	59
100	0.01	4.9	7.6	9.1	12	17	29	37	42	51	58	61	62
250	0.004	6.8	11	13	17	25	41	52	52	64	72	75	76

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	9.23	14.2	18	26	36	55.3	68.8	83	95	101	105	107
2	0.5	10.1	15.6	19.7	28.5	39.5	60.8	75.7	91	104	111	115	118
5	0.2	13.2	20.3	25.7	37.2	51.7	79.7	99.4	119	137	146	152	156
10	0.1	15.4	23.8	30.2	43.8	60.8	93.9	117	140	162	173	180	184
20	0.05	17.8	27.5	34.8	50.5	70.2	109	136	163	188	201	209	214
30	0.033	19.2	29.7	37.6	54.6	75.9	118	147	176	204	218	226	232
40	0.025	20.2	31.2	39.6	57.5	80	124	155	186	215	230	239	245
50	0.02	21	32.5	41.2	59.8	83.3	129	161	194	224	239	249	255
60	0.017	21.6	33.5	42.5	61.7	86	133	167	200	231	247	257	264
80	0.013	22.7	35.1	44.5	64.8	90.2	140	175	210	243	260	270	277
100	0.01	23.5	36.4	46.2	67.1	93.5	145	182	218	252	270	281	288
250	0.004	26.8	41.6	52.8	76.8	107	167	209	251	291	311	324	332

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	9.23	14.2	18	26	36	55.3	68.8	83	95	101	105	107
2	0.5	10.1	15.6	19.7	28.5	39.5	60.8	75.7	91	104	111	115	118
5	0.2	13.2	20.3	25.7	37.2	51.7	79.7	99.4	119	137	146	152	156
10	0.1	15.4	23.8	30.2	43.8	60.8	93.9	117	140	162	173	180	184
20	0.05	17.8	27.5	34.8	50.5	70.2	109	136	163	188	201	209	214
30	0.033	19.2	29.7	37.6	54.6	75.9	118	147	176	204	218	226	232
40	0.025	20.2	31.2	39.6	57.5	80	124	155	186	215	230	239	245
50	0.02	21	32.5	41.2	59.8	83.3	129	161	194	224	239	249	255
60	0.017	21.6	33.5	42.5	61.7	86	133	167	200	231	247	257	264
80	0.013	22.7	35.1	44.5	64.8	90.2	140	175	210	243	260	270	277
100	0.01	23.5	36.4	46.2	67.1	93.5	145	182	218	252	270	281	288
250	0.004	26.8	41.6	52.8	76.8	107	167	209	251	291	311	324	332

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	9.38	14.5	18.3	26.4	36.5	56.1	69.6	83	96	102	106	108
2	0.5	10.3	15.9	20	29	40.2	61.7	76.7	92	105	112	116	119
5	0.2	13.4	20.7	26.2	37.9	52.6	80.9	101	120	139	148	153	157
10	0.1	15.7	24.3	30.7	44.6	61.9	95.3	119	142	164	175	181	186
20	0.05	18.1	28	35.4	51.4	71.5	110	138	165	190	203	210	216
30	0.033	19.5	30.2	38.3	55.6	77.3	119	149	178	206	220	228	234
40	0.025	20.6	31.8	40.3	58.6	81.5	126	157	188	217	232	241	247
50	0.02	21.4	33.1	41.9	60.9	84.8	131	164	196	226	242	251	257
60	0.017	22	34.1	43.3	62.9	87.5	135	169	202	234	250	259	266
80	0.013	23.1	35.8	45.4	66	91.9	142	177	213	246	263	273	280
100	0.01	23.9	37.1	47	68.4	95.2	148	184	221	255	272	283	290
250	0.004	27.3	42.4	53.8	78.3	109	169	212	254	294	314	327	335

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	9.86	15.2	19.2	27.8	38.3	58.4	72.1	86	98	104	108	110
2	0.5	10.8	16.7	21.1	30.5	42.2	64.3	79.5	95	108	115	119	122
5	0.2	14.1	21.8	27.6	40	55.4	84.6	105	125	143	152	157	161
10	0.1	16.6	25.6	32.4	47.1	65.2	99.8	124	147	169	180	186	191
20	0.05	19.1	29.6	37.5	54.4	75.4	116	143	171	196	209	216	221
30	0.033	20.7	31.9	40.5	58.8	81.6	125	155	185	212	226	235	240
40	0.025	21.7	33.6	42.6	61.9	86	132	164	195	224	239	248	254
50	0.02	22.6	35	44.4	64.5	89.5	138	171	203	234	249	258	264
60	0.017	23.3	36.1	45.8	66.5	92.4	142	176	210	241	258	267	273
80	0.013	24.5	37.9	48	69.8	97	149	185	221	254	271	281	287
100	0.01	25.3	39.2	49.8	72.4	101	155	192	229	264	281	292	298
250	0.004	28.9	44.9	56.9	82.8	115	178	221	264	304	324	336	344

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	9.32	14.4	18.1	26.2	36.3	55.8	69.3	83	95	101	105	108
2	0.5	10.2	15.7	19.9	28.8	39.9	61.3	76.3	91	105	112	116	119
5	0.2	13.3	20.5	26	37.6	52.2	80.4	100	120	138	147	153	157
10	0.1	15.6	24.1	30.5	44.2	61.4	94.7	118	141	163	174	181	185
20	0.05	18	27.8	35.2	51.1	71	110	137	164	189	202	210	215
30	0.033	19.4	30	38	55.2	76.8	119	148	177	205	219	227	233
40	0.025	20.4	31.6	40	58.1	80.9	125	156	187	216	231	240	246
50	0.02	21.2	32.9	41.6	60.5	84.2	130	163	195	225	241	250	256
60	0.017	21.9	33.9	42.9	62.4	86.9	135	168	202	233	249	258	265
80	0.013	22.9	35.5	45.1	65.5	91.2	141	176	212	245	261	272	279
100	0.01	23.8	36.8	46.7	67.9	94.5	147	183	220	254	271	282	289
250	0.004	27.1	42.1	53.4	77.7	108	168	211	253	293	313	325	334

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	10.3	15.9	20	29	39.9	60.4	74.3	88	100	106	110	112
2	0.5	11.3	17.4	22	31.9	44.1	66.7	82.1	97	111	117	121	124
5	0.2	14.8	22.8	28.9	41.8	57.9	87.9	108	128	146	156	161	164
10	0.1	17.4	26.8	34	49.3	68.2	104	128	152	173	184	191	195
20	0.05	20	31	39.3	57	78.9	120	149	176	201	214	222	226
30	0.033	21.7	33.5	42.4	61.6	85.4	130	161	191	218	232	240	246
40	0.025	22.8	35.3	44.7	64.9	90	138	170	201	231	245	254	260
50	0.02	23.7	36.7	46.5	67.6	93.8	143	177	210	240	256	265	271
60	0.017	24.5	37.9	48	69.7	96.7	148	183	217	248	264	274	279
80	0.013	25.7	39.7	50.4	73.2	102	155	192	228	261	278	288	294
100	0.01	26.6	41.2	52.2	75.9	105	161	200	237	271	288	299	305
250	0.004	30.3	47.1	59.7	86.9	121	185	229	272	312	332	345	352

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	9.49	14.6	18.5	26.7	37	56.6	70.2	84	96	102	106	109
2	0.5	10.4	16	20.3	29.4	40.7	62.3	77.3	92	106	113	117	120
5	0.2	13.6	20.9	26.5	38.4	53.2	81.8	102	121	140	149	154	158
10	0.1	15.9	24.6	31.1	45.1	62.7	96.4	120	143	165	176	182	187
20	0.05	18.3	28.4	35.9	52.1	72.4	112	139	166	191	204	212	217
30	0.033	19.8	30.6	38.8	56.3	78.3	121	150	180	207	221	230	235
40	0.025	20.8	32.2	40.9	59.4	82.5	127	159	190	219	234	243	249
50	0.02	21.7	33.5	42.5	61.8	85.9	133	165	198	228	243	253	259
60	0.017	22.3	34.6	43.8	63.7	88.7	137	171	204	236	252	261	268
80	0.013	23.4	36.3	46	66.9	93.1	144	179	215	248	264	275	282
100	0.01	24.3	37.6	47.7	69.3	96.5	149	186	223	257	274	285	292
250	0.004	27.7	43	54.5	79.4	111	171	214	256	296	316	329	337

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	11.3	17.4	21.9	31.7	43.5	65.1	79.3	94	105	111	114	117
2	0.5	12.4	19.1	24.2	35	48.2	72	87.9	103	117	123	127	129
5	0.2	16.3	25.1	31.8	46.1	63.5	95.4	117	137	155	164	169	172
10	0.1	19.2	29.6	37.5	54.3	75	113	138	162	184	195	200	204
20	0.05	22.1	34.2	43.3	62.9	86.9	131	160	188	214	226	233	238
30	0.033	23.9	37	46.9	68.1	94.1	142	174	204	232	245	253	258
40	0.025	25.2	39	49.4	71.7	99.1	150	184	216	245	260	268	273
50	0.02	26.2	40.6	51.4	74.7	103	156	191	224	256	270	279	285
60	0.017	27	41.8	53	77.1	107	162	198	232	264	280	289	294
80	0.013	28.4	43.9	55.7	81	112	170	208	244	278	294	303	310
100	0.01	29.4	45.5	57.7	83.9	116	176	216	254	288	305	316	322
250	0.004	33.6	52	66	96.1	133	202	248	292	332	352	364	371

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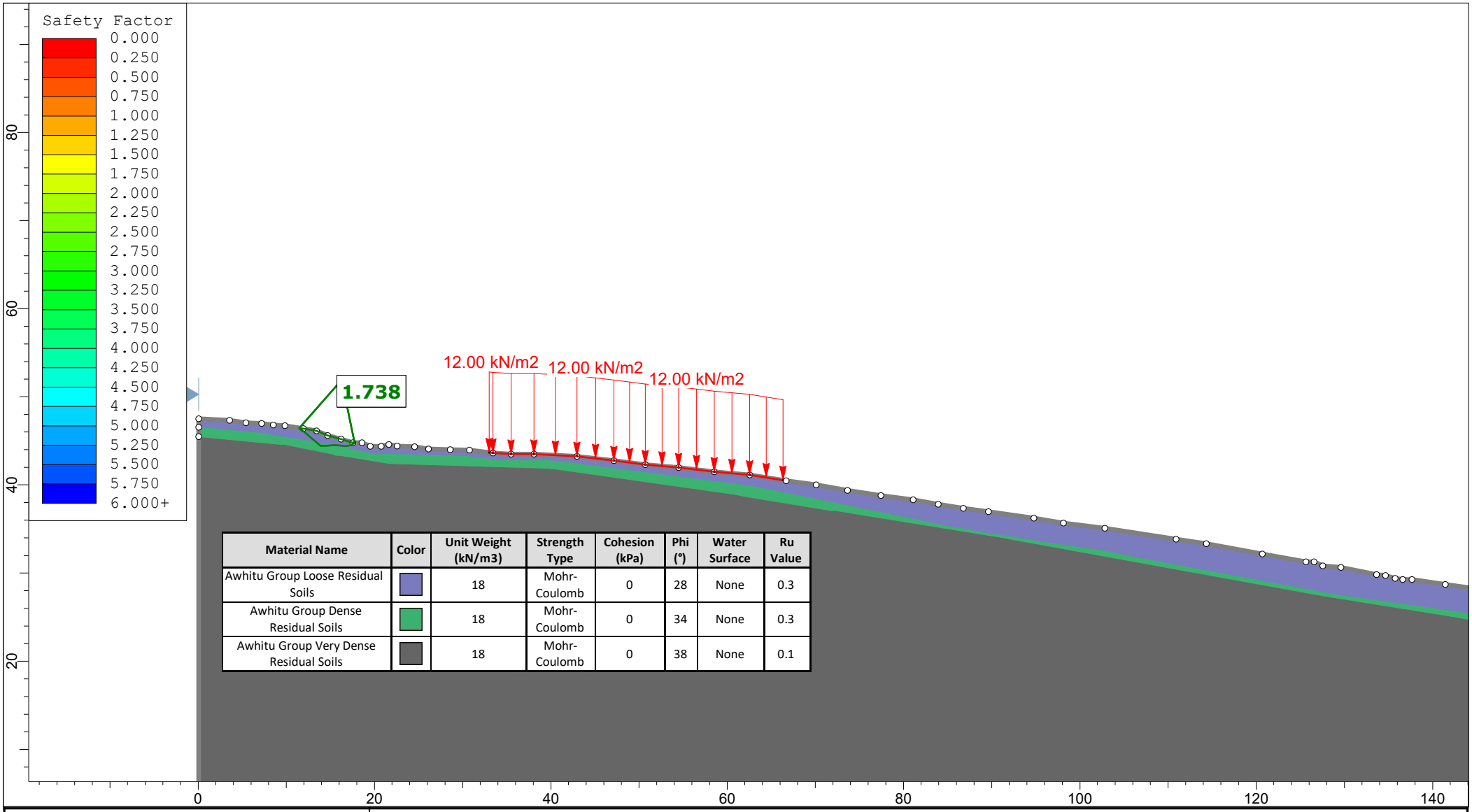
APPENDIX E

Slope Stability Analysis Results



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Water Surface	Ru Value
Awhitu Group Loose Residual Soils		18	Mohr-Coulomb	0	28	None	0.3
Awhitu Group Dense Residual Soils		18	Mohr-Coulomb	0	34	None	0.3
Awhitu Group Very Dense Residual Soils		18	Mohr-Coulomb	0	38	None	0.1

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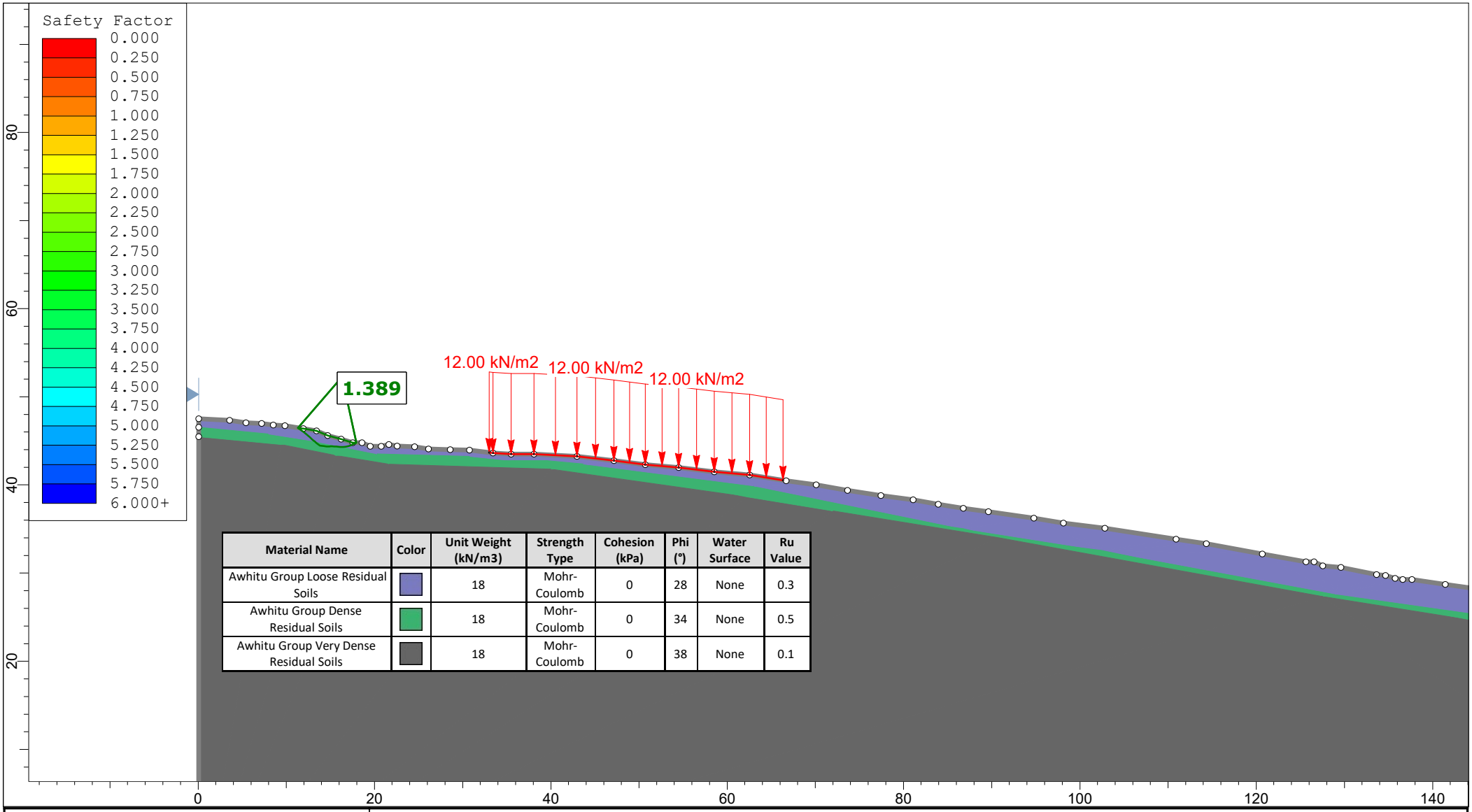
SLIDEINTERPRET 9.034

Project	216 Tahanga Road, Kaingaroa		
Group	Section A	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	29/08/2024, 1:05:56 pm	*File Name*	Slope Stability.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Water Surface	Ru Value
Awhitu Group Loose Residual Soils		18	Mohr-Coulomb	0	28	None	0.3
Awhitu Group Dense Residual Soils		18	Mohr-Coulomb	0	34	None	0.5
Awhitu Group Very Dense Residual Soils		18	Mohr-Coulomb	0	38	None	0.1

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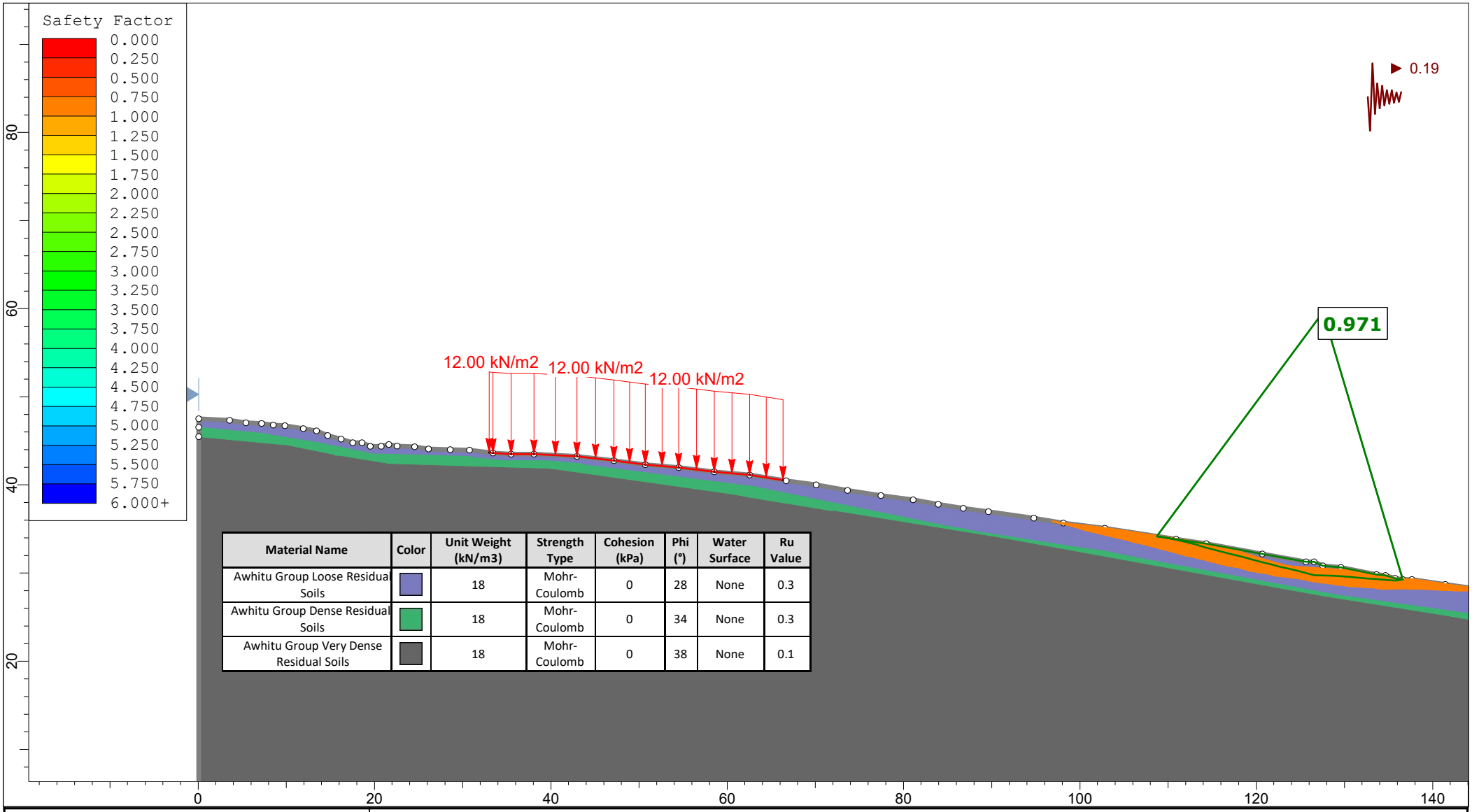
SLIDEINTERPRET 9.034

Project	216 Tahanga Road, Kaingaroa		
Group	Section A	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	29/08/2024, 1:05:56 pm	*File Name*	Slope Stability.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Water Surface	Ru Value
Awhitu Group Loose Residual Soils		18	Mohr-Coulomb	0	28	None	0.3
Awhitu Group Dense Residual Soils		18	Mohr-Coulomb	0	34	None	0.3
Awhitu Group Very Dense Residual Soils		18	Mohr-Coulomb	0	38	None	0.1

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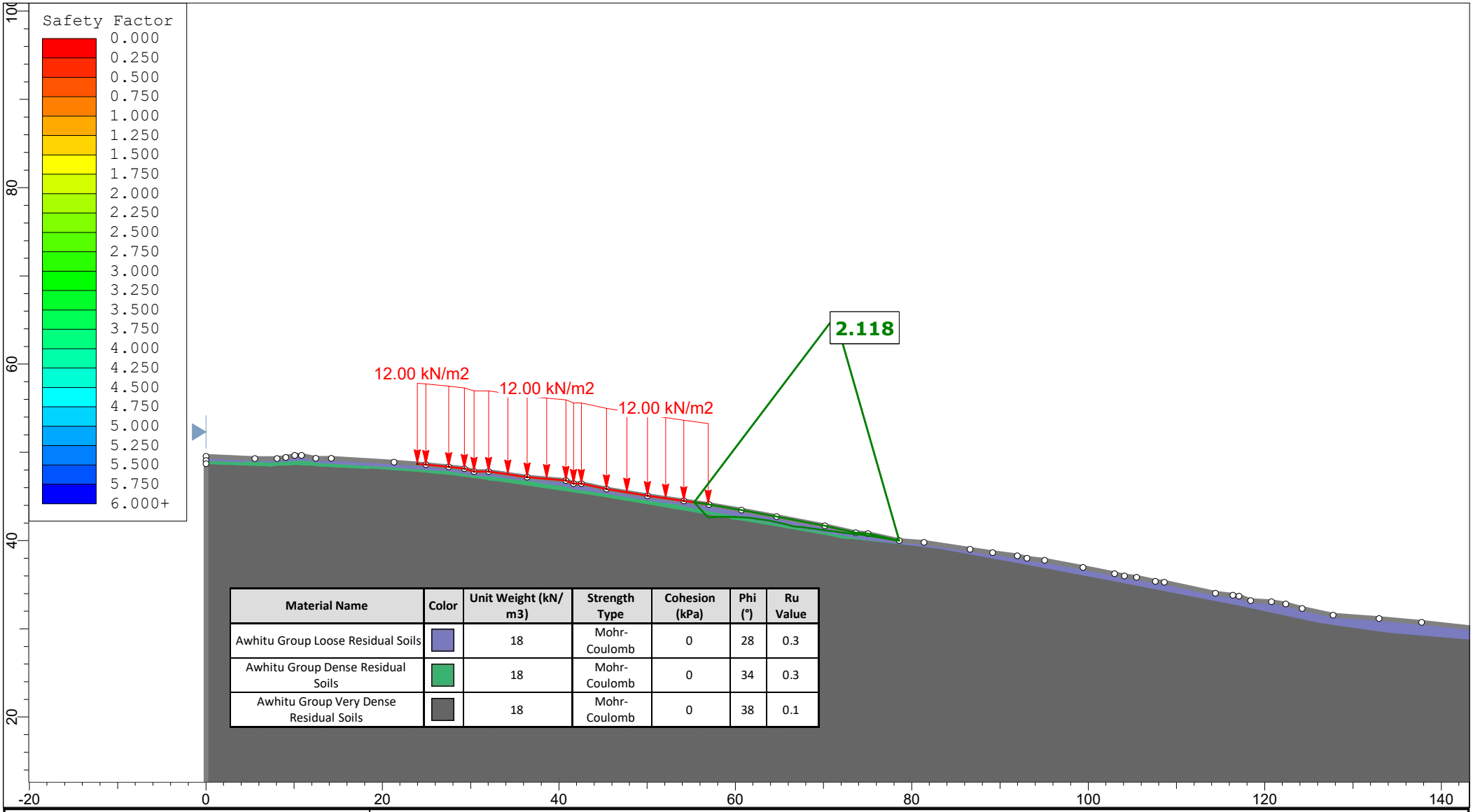
SLIDEINTERPRET 9.034

Project	216 Tahanga Road, Kaingaroa		
Group	Section A	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	29/08/2024, 1:05:56 pm	*File Name*	Slope Stability.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Awhitu Group Loose Residual Soils		18	Mohr-Coulomb	0	28	0.3
Awhitu Group Dense Residual Soils		18	Mohr-Coulomb	0	34	0.3
Awhitu Group Very Dense Residual Soils		18	Mohr-Coulomb	0	38	0.1

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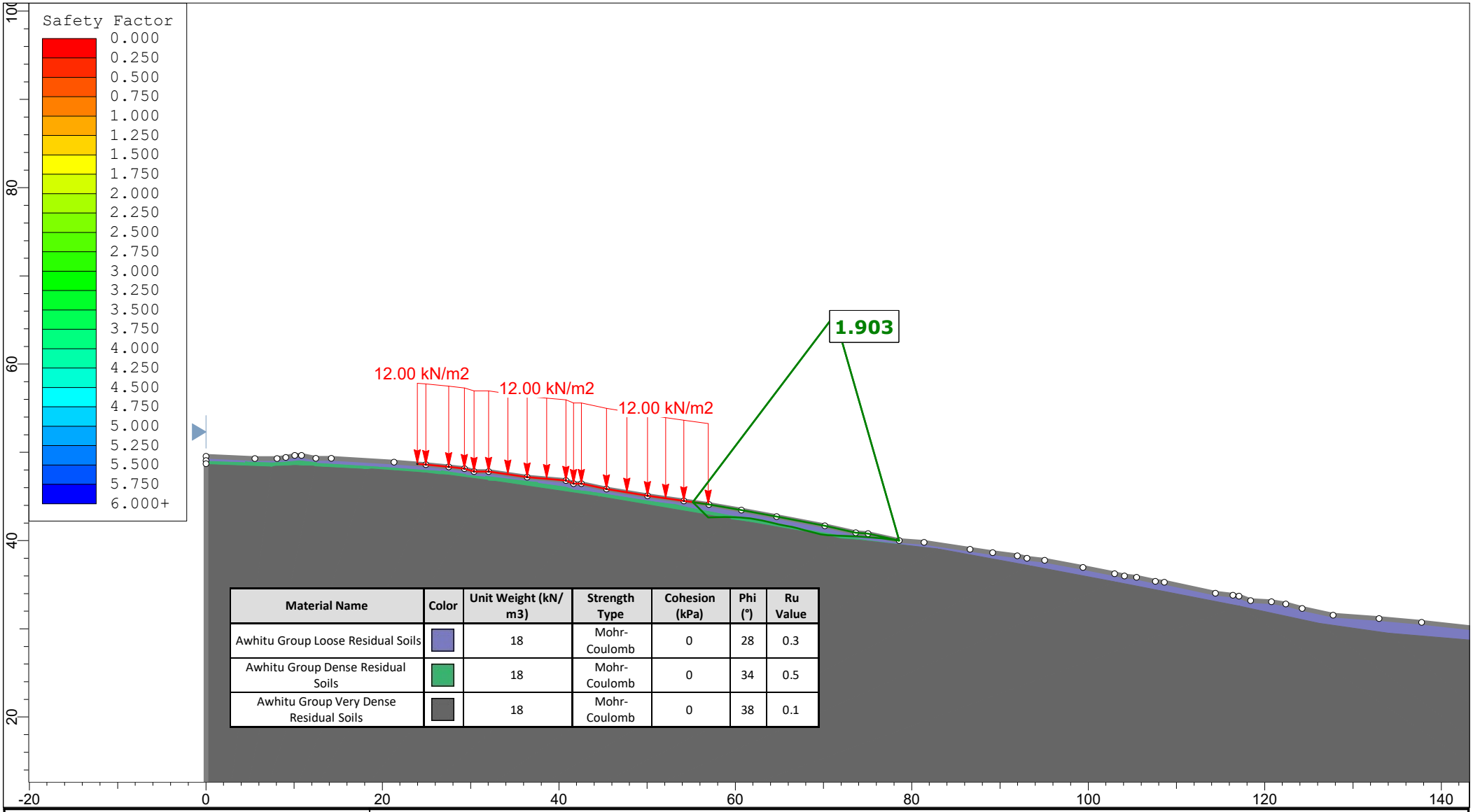
SLIDEINTERPRET 9.034

Project	216 Tahanga Road, Kaingaroa		
Group	Section B	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	29/08/2024, 1:05:56 pm	*File Name*	Slope Stability.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Awhitu Group Loose Residual Soils		18	Mohr-Coulomb	0	28	0.3
Awhitu Group Dense Residual Soils		18	Mohr-Coulomb	0	34	0.5
Awhitu Group Very Dense Residual Soils		18	Mohr-Coulomb	0	38	0.1

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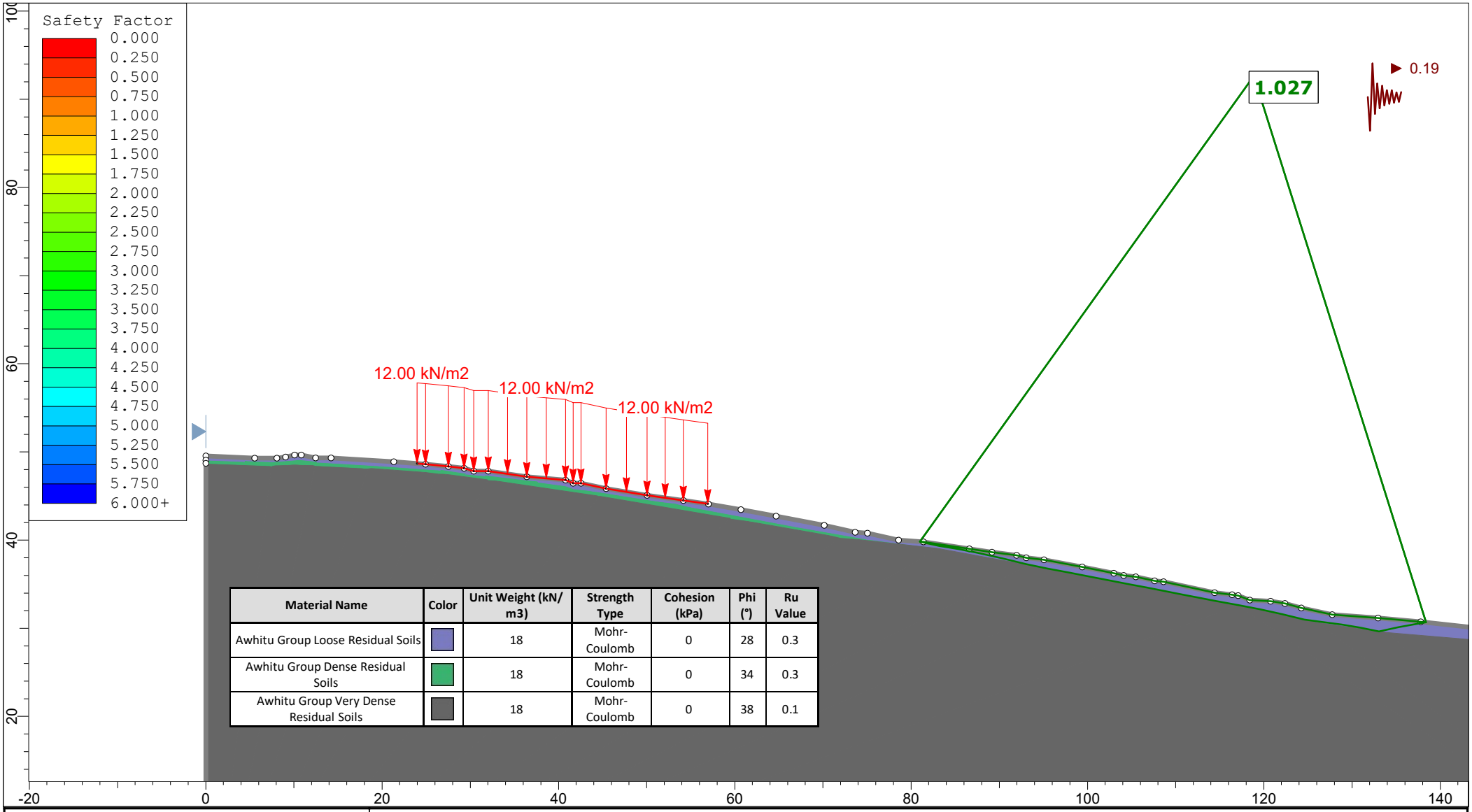
SLIDEINTERPRET 9.034

Project	216 Tahanga Road, Kaingaroa		
Group	Section B	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	29/08/2024, 1:05:56 pm	*File Name*	Slope Stability.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Awhitu Group Loose Residual Soils		18	Mohr-Coulomb	0	28	0.3
Awhitu Group Dense Residual Soils		18	Mohr-Coulomb	0	34	0.3
Awhitu Group Very Dense Residual Soils		18	Mohr-Coulomb	0	38	0.1

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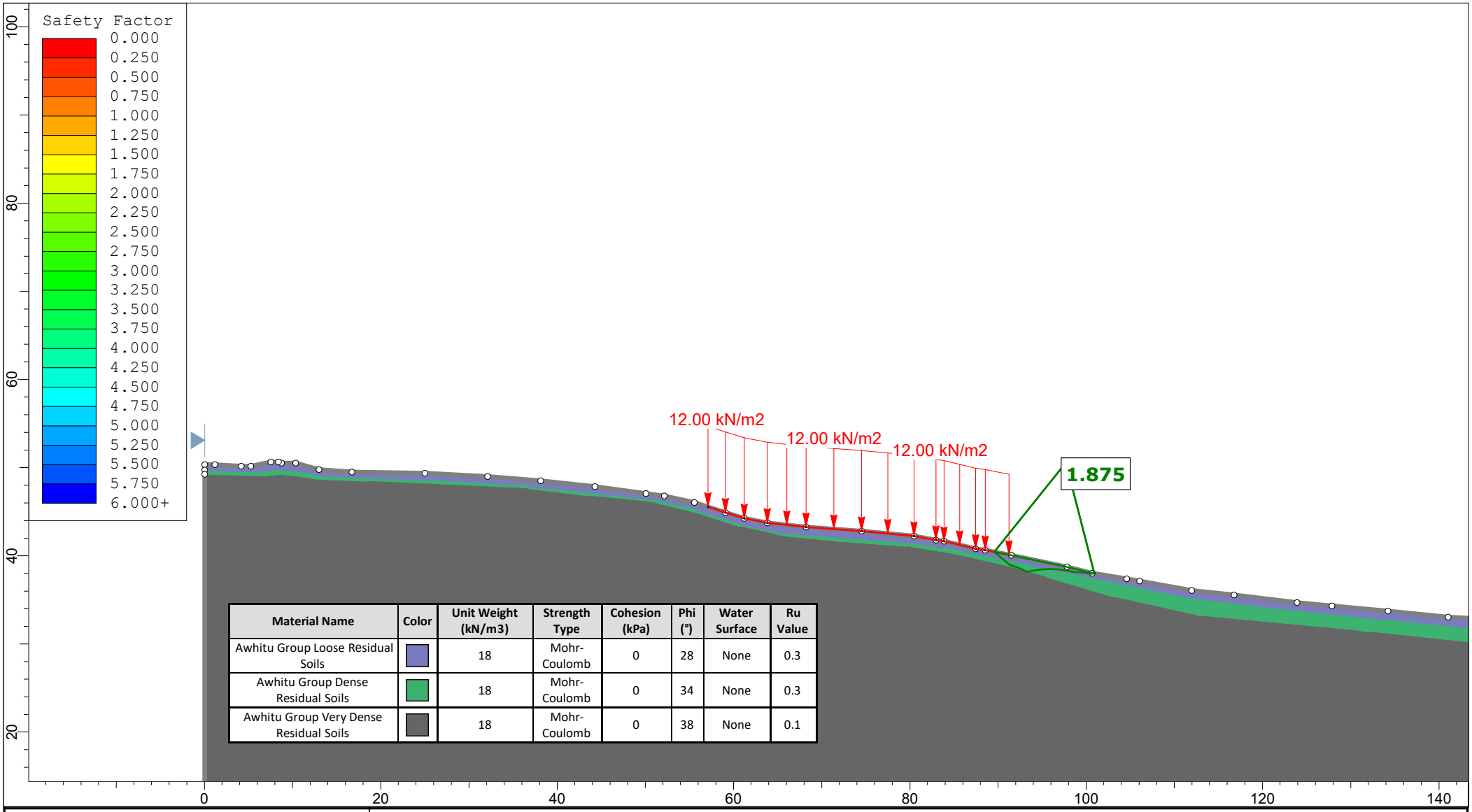
SLIDEINTERPRET 9.034

Project	216 Tahanga Road, Kaingaroa		
Group	Section B	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	29/08/2024, 1:05:56 pm	*File Name*	Slope Stability.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Water Surface	Ru Value
Awhitu Group Loose Residual Soils		18	Mohr-Coulomb	0	28	None	0.3
Awhitu Group Dense Residual Soils		18	Mohr-Coulomb	0	34	None	0.3
Awhitu Group Very Dense Residual Soils		18	Mohr-Coulomb	0	38	None	0.1

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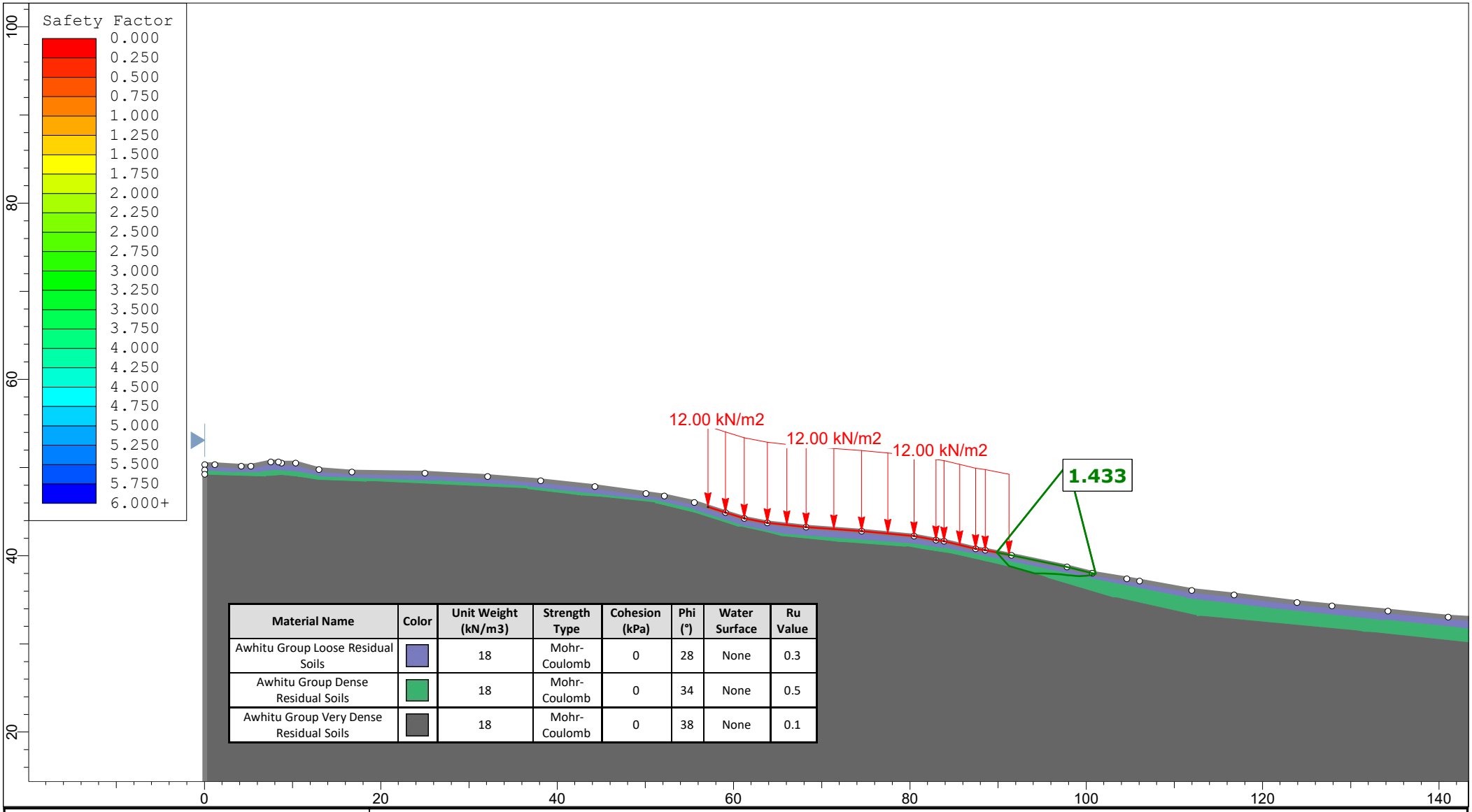
SLIDEINTERPRET 9.034

Project	216 Tahanga Road, Kaingaroa		
Group	Section C	*Scenario*	Normal GW
Drawn By	DBT	*Company*	Geologix
Date	29/08/2024, 1:05:56 pm	*File Name*	Slope Stability.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Water Surface	Ru Value
Awhitu Group Loose Residual Soils		18	Mohr-Coulomb	0	28	None	0.3
Awhitu Group Dense Residual Soils		18	Mohr-Coulomb	0	34	None	0.5
Awhitu Group Very Dense Residual Soils		18	Mohr-Coulomb	0	38	None	0.1

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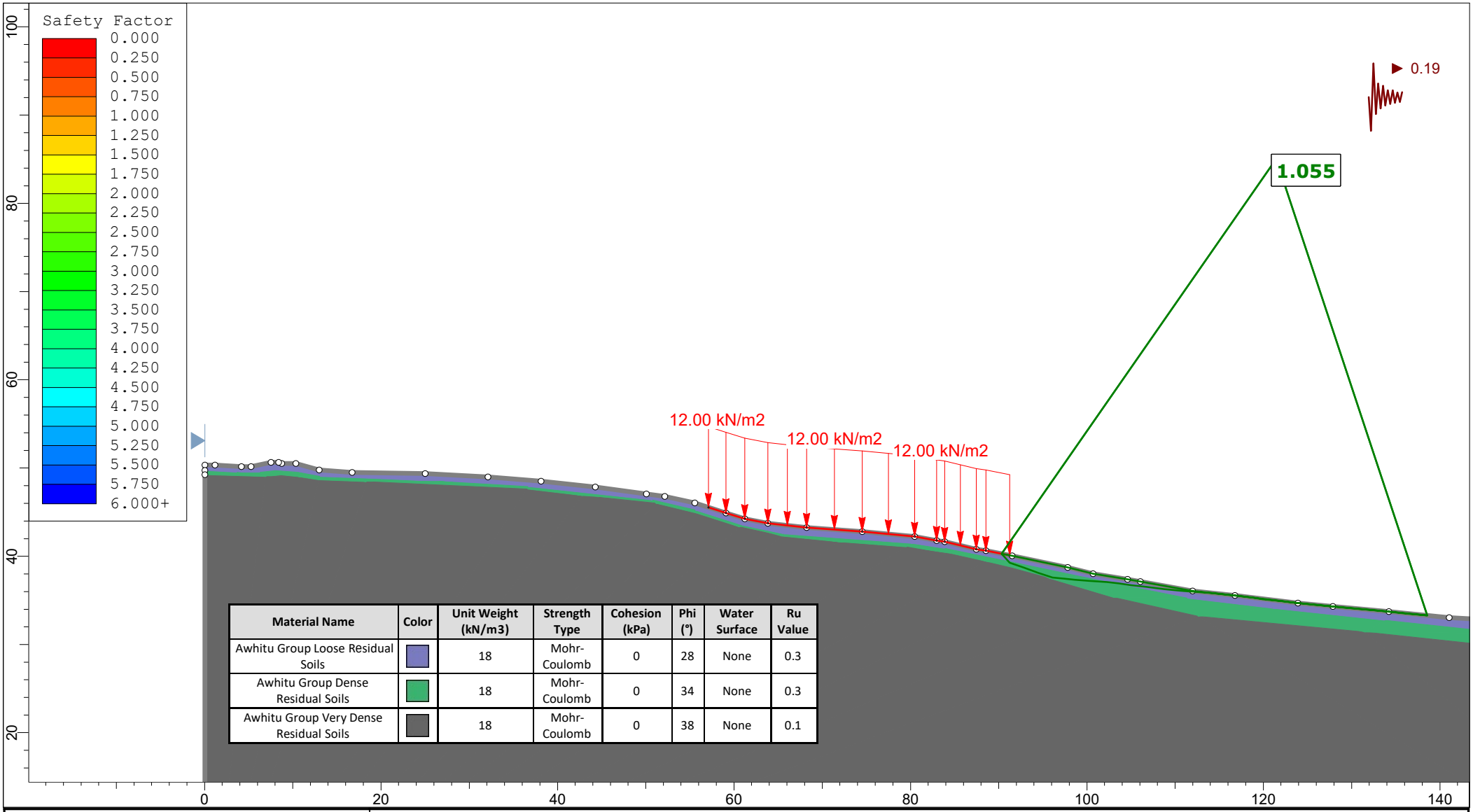
SLIDEINTERPRET 9.034

Project	216 Tahanga Road, Kaingaroa		
Group	Section C	*Scenario*	Elevated GW
Drawn By	DBT	*Company*	Geologix
Date	29/08/2024, 1:05:56 pm	*File Name*	Slope Stability.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Water Surface	Ru Value
Awhitu Group Loose Residual Soils		18	Mohr-Coulomb	0	28	None	0.3
Awhitu Group Dense Residual Soils		18	Mohr-Coulomb	0	34	None	0.3
Awhitu Group Very Dense Residual Soils		18	Mohr-Coulomb	0	38	None	0.1

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SLIDEINTERPRET 9.034

Project	216 Tahanga Road, Kaingaroa		
Group	Section C	*Scenario*	Seismic
Drawn By	DBT	*Company*	Geologix
Date	29/08/2024, 1:05:56 pm	*File Name*	Slope Stability.slmd