THOMSON SURVEY LIMITED

SURVEYORS AND RESOURCE PLANNERS

Our Reference: 10179.1 (FNDC)

4 June 2024

Resource Consents Department
Far North District Council
JB Centre
KERIKERI

Dear Sir/Madam

RE: Proposed Subdivision at 611 & 621 Puketotara Road, Kerikeri – Greenacre Heights Limited

I am pleased to submit application on behalf of Greenacre Heights Limited, for a proposed two lot (one additional) subdivision on land at Puketotara Road, zoned Rural Production. The application is a restricted discretionary activity.

The application fee of $2,900 has been paid separately via direct credit.

Regards

[redacted]

Lynley Newport
Senior Planner
THOMSON SURVEY LTD

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

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

Far North District Council

Office Use Only
Application Number:

Private Bag 752, Memorial Ave
Kaikohe 0440, New Zealand
Freephone: 0800 920 029
Phone: (09) 401 5200
Fax: (09) 401 2137
Email: ask.us@fndc.govt.nz
Website: www.fndc.govt.nz

APPLICATION FOR RESOURCE CONSENT OR FAST-TRACK RESOURCE CONSENT

(Or Associated Consent Pursuant to the Resource Management Act 1991 (RMA))
(If applying for a Resource Consent pursuant to Section 87AAC or 88 of the RMA, this form can be used to satisfy the requirements of Form 9)

Prior to, and during, completion of this application form, please refer to Resource Consent Guidance Notes and Schedule of Fees and Charges – both available on the Council's web page.

1. Pre-Lodgement Meeting

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

2. Type of Consent being applied for (more than one circle can be ticked):

O Land Use O Fast Track Land Use* ☑ Subdivision O Discharge

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

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

O Other (please specify) _____

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

3. Would you like to opt out of the Fast Track Process? Yes / ~~No~~

4. Applicant Details:

Name/s: Greenacre Heights Ltd

Electronic Address for Service (E-mail): [redacted]

Phone Numbers: [redacted] me:

Postal Address: (*or* alternative method of service under section 352 of the Act) 534 Puketotara Road,
RD2,
Kerikeri Post Code: 0295

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

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

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

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

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

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

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

Name/s: *Greenacre Heights Limited*

Property Address/: Location *As per Item 4*

7. Application Site Details:

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

Site Address/ Location: ***611 & 621 Puketotara Road***

KERIKERI

Legal Description: ***Lot 3 DP 87228***

Record of Title: ***NA44D/1007***

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

Site Visit Requirements:

Is there a locked gate or security system restricting access by Council staff? ~~Yes~~ / No

Is there a dog on the property? ~~Yes~~ / No

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

Please notify when council are coming on property.

8. Description of the Proposal:

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

Subdivision of land in the Rural Production Zone, to create two (one additional) lots, as a restricted discretionary subdivision activity.

If this is an application for an Extension of Time (s.125); Change of Consent Conditions (s.127) or Change or Cancellation of Consent Notice conditions (s.221(3)), please quote relevant existing Resource Consents and Consent Notice identifiers and provide details of the change(s) or extension being sought, with reasons for requesting them.

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

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

O Building Consent (BC ref # if known) O Regional Council Consent (ref # if known)

O National Environmental Standard consent O Other (please specify)

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

The site and proposal may be subject to the above NES. In order to determine whether regard needs to be had to the NES please answer the following (further information in regard to this NES is available on the Council's planning web pages):

Is the piece of land currently being used or has it historically ever been used for an activity or industry on the Hazardous Industries and Activities List (HAIL) — O yes ☑ no O don't know

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

O Subdividing land O Changing the use of a piece of land

O Disturbing, removing or sampling soil O Removing or replacing a fuel storage system

12 Assessment of Environmental Effects:

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

Please see attached AEE.

13. Billing Details:

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

Name/s: (please write all names in full) Greenacre Heights Ltd

Email: greenacreheights@gmail.com

Postal Address: 534 Puketotara Road

Kerikeri

Post Code: 0295

Phone Numbers: Wor[redacted] Home: Fax:

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

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

Na[redacted] (please print)

Sig[redacted] (signature of bill payer – *mandatory*) Date: 31 May 2024

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

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

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

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

Na[redacted]____(please print)

Sig[redacted]____(signature) Date: 31 May 2024

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

(please tick if information is provided)

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

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

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

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

UNBOUND SINGLE SIDED NO LARGER THAN A3 in SIZE

Greenacres Heights Limited

Far North District Plan

PROPOSED SUBDIVISION

611 & 621 Puketotara Road, Okaihau

PLANNING REPORT AND ASSESSMENT OF ENVIRONMENTAL EFFECTS

Thomson Survey Ltd
Kerikeri

1.0 INTRODUCTION

1.1 The Proposal

The applicants propose to carry out a subdivision of land at 611 & 621 Puketotara Road, Okaihau. Puketotara Road in this location is public road, metal surface. The application title is one of several that make up the entire farmed operation (dairy). Record of Title NA44D/1007 (the application site), is 72.39ha in area.

The proposal creates one additional rural lot at the extreme western end of the underlying title. Lot 1 of 7.44ha in area is proposed to be created, leaving a balance Lot 2 of 64.95ha, to remain with the dairy operation.

Access to the new Lot 1 will be via an existing farm crossing at the north west corner of the lot. No easements are proposed or necessary.

The scheme plans are attached in Appendix 1. A Location Map is attached in Appendix 2.

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 restricted discretionary activity subdivision. The name and address of the owner of the property is contained in the Form 9 Application form.

2.0 PROPERTY DETAILS

Location: 611 Puketotara Road, Okaihau

Legal description: Lot 3 DP 87228

Record of Title: NA44D/1007 (copy attached in Appendix 3).

3.0 SITE DESCRIPTION

3.1 Site Characteristics

The application site is 72.4ha but is combined with other land to form the applicants' current dairying operation. The land is in pasture with areas of bush, mostly within gullies. The topography varies from moderately sloping rolling pasture land to steeper slopes around areas of bush. The property's southern boundary is with the Puketotara Stream within what is shown as 'legal road' on Quickmap.

The property has a dairy shed, farm and residential buildings, along with farm races and fencing.

The property has a mixture of soil types and underlying geology. One of the reasons for choosing to subdivide as proposed, is to avoid fragmenting highly productive land and to avoid placing residential living right in the middle of a farming operation, the other being to create an attractive 'bush block'.

Vegetation is predominantly indigenous, with some exotic species along the roadside. The indigenous vegetation is mapped (in part) as being within the Puketotara River Bush PNA.

The new proposed lot's southern boundary is with the Puketotara Stream, flowing west to east. The Northland Regional Council's on line maps show the presence of a 'known wetland' near the Puketotara Stream, to be within large Lot 2 – described as 'swamp'.

There are no areas within the application site that are mapped as being susceptible to flood hazard, and no areas mapped as erosion prone.

The site is mapped as 'kiwi present' on Far North maps.

The site is zoned Rural Production in the Operative District Plan (ODP) and in the Proposed District Plan (PDP).

No resource features are mapped as being present within the site in either the ODP or PDP maps. The site is not mapped as containing any areas of high or outstanding landscape or natural character as mapped in the Regional Policy Statement (RPS) for Northland.

The application property is mapped as having several distinct LUC classifications, one of which is LUC class 3. However, all of the class 3 land is to remain in the large balance lot, with the proposed new lot containing only class 4 and 6 soils.

Neither Far North Maps, nor the NRC's on-line maps show any hazardous or industrial activity (HAIL) within the site.

Far North Maps does not show any historic, cultural or archaeological sites within the property's boundaries.

3.2 Legal Interests

The title has an appurtenant water supply and electricity supply right. The property is subject to a Caveat by Top Energy Limited. This affects large balance Lot 2 only.

3.3 Consent History

The property file shows a building consent history that covers more than just the application site's title. This is because the application site is only one title making up the overall rating property. Building consents on Council files include those for cowshed and other farm buildings, as well as various dwellings. There is no resource consent history relevant to this title.

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 1.0 of this Planning Report.
(b) an assessment of the actual or potential effect on the environment of the activity:	Refer to Section 6.0 of this Planning Report.
(b) a description of the site at which the activity is to occur:	Refer to Section 3.0 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 Section 3.0 of this Planning Report for existing activities within the site. The application is for subdivision only and there are no other activities that are part of the proposal.
(e) a description of any other resource consents required for the proposal to which the application relates:	Consent is only being sought for subdivision, 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 7.3 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*	Refer to Sections 5.2, 7.1, 7.2, 7.4, 7.5 and 7.6 of this Planning Report.

environmental standard or other regulations).	
(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)):	The site supports two dwellings, a cowshed and other farm buildings. The subdivision does not render any of these existing activities as requiring resource consent, i.e. no new boundaries proposed where existing buildings are located, and no reduction in total site area that result in breaches of stormwater management or building coverage rules.
(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: *(b) the areas of all new allotments, unless the subdivision involves a cross lease, company lease, or unit plan:* *(c) the locations and areas of new reserves to be created, including any esplanade reserves and esplanade strips:* *(d) the locations and areas of any existing esplanade reserves, esplanade strips, and access strips:* *(e) the locations and areas of any part of the bed of a river or lake to be vested in a territorial authority under section 237A:* *(f) the locations and areas of any land within the coastal marine area (which is to become part of the common marine and coastal area under section 237A):* *(g) the locations and areas of land to be set aside as new roads.*	Refer to Scheme Plans in Appendix 1.

Clause 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 6.0 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 6.0 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 6.0 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 8.0 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 6.0 and 8.0 of this planning report and also to the assessment of objectives and policies in Sections 7.1 and 7.2.
(b) any physical effect on the locality, including any landscape and visual effects:	Refer to Section 6.0. The site has no areas of outstanding landscape or areas of natural character.
(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 site has pockets of indigenous vegetation, along with a known wetland. None of these areas and associated ecosystems will be adversely affected by the proposal.
(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 6.0. The site is not known to contain any historical, spiritual or cultural values.
(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 mapped as being subject to any hazard. The proposal does not involve hazardous installations.

5.0 ACTIVITY STATUS

5.1 Operative District Plan

The property is zoned Rural Production, with no resource overlays applying.

TABLE 13.7.2.1: MINIMUM LOT SIZES

(viii) 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	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

	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;** 5.....	management plan as per Rule 13.9.2 may be approved. ....

This is the first subdivision of a title dated 1979. The subdivision creates one additional 7.44ha lot and is being carried out pursuant to Option 4 of the above **restricted discretionary** options, using only a portion of the rights provided for by that option. The applicant reserves the right to utilise remaining rights under that Option, at a later date.

Zone Rules:

The site has existing buildings, all on the 64.95ha lot. The new proposed 7.44ha lot is vacant. The proposed new boundary is not in the vicinity of any existing building. I have not identified any zone rule breached as a result of the proposed subdivision.

District Wide Rules:

Chapter 12.1 Landscapes and Natural Features – the site contains no areas mapped as requiring consent to Chapter 12.1.

Chapter 12.2 Indigenous Vegetation – the proposal does not involve any clearance of indigenous vegetation.

The subdivision works will not require earthworks in excess of Chapter 12.3 permitted volume and cut/fill face height thresholds.

The site is not mapped as having any coastal hazard in the ODP so rules in Chapter 12.4 in regard these hazards are not relevant. There will eventually be a new residential unit on proposed Lot 1 and this can be constructed achieving the required 20m buffer distance from the dripline of any area of trees (Fire Risk to Residential Unit rule).

The site contains no mapped or scheduled archaeological, heritage or cultural features so no rules in Chapters 12.5, 12.5A or 12.5B apply.

Proposed Lot 1 and some of Lot 2 are bound by the Puketotara Stream on their southern boundaries. No buildings or impermeable surfaces are proposed within the required setback distances from the waterbody.

Chapters 12.8 Hazardous Facilities and 12.9 Energy Efficiency are not relevant and have not been considered. Chapter 14 does not apply as, whilst there is a qualifying waterbody, both lots are in excess of 4ha in area and there is no requirement under the Act or District Plan to provide esplanade.

Chapter 15.1 Traffic, Parking and Access contains some rules that may be relevant. Chapter 15.1.6A Traffic Intensity relates to land uses, not subdivision and in any event the proposal will not result in any breach of any rule in this section of the ODP, and land uses within each proposed lot are existing. Chapter 15.1.6B relates to parking. Lots already support residential living with adequate parking and the new lot also has abundant space for parking.

Chapter 15.1.6C relates to access. The site gets access off unsealed public road (Puketotara Road) which I believe to be to the required Type A rural road standard for Council maintained roads. The entrance into new Lot 1 can be formed to the required relevant entrance standard, as can access internal to the site. I have not identified any breaches of Chapter 15.1.6C.

In summary I have not identified any other rule breaches. The activity is regarded as a **restricted discretionary** activity overall.

5.2 Proposed District Plan

The property is zoned Rural Production under the new PDP, publicly notified 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. As the application site and proposal does not involve hazardous substances, 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.

IB-R1 is entitled *Indigenous vegetation pruning, trimming and clearance and any associated land disturbance for specified activities within and outside a Significant Natural Area* and applies to all zones. As no clearance is required or anticipated this rule is not relevant.

IB-R2 is not relevant as it only applies to clearance required for papakainga housing.

IB-R3 and IB-R4 control the amount of clearance of indigenous vegetation that can occur. The subdivision does not involve indigenous vegetation clearance. IB-R5 relates only to

plantation forestry and activities and whilst the application site supports plantation forestry, this is not a consideration in this subdivision.

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 Heritage Resources and it is not intended to subdivide under any provisions relating to Environmental Benefit (indigenous vegetation protection).

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. The subdivision works will only involve the formation/upgrade of any new crossings required and will therefore be minimal. Any earthworks can be subject to the ADP. EW-13 and associated EW-S5 relate to ensuring Erosion and Sediment Control measures are in place during earthworks. They cite compliance with GD05. Any earthworks necessary will need to ensure appropriate Erosion and Sediment Control measures are in place during works.

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.

In summary, 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

The assessment of environmental effects below includes such detail as corresponds with the scale and significance of the effects that the activity may have on the environment, as required by Clause 2(3)(c) of Schedule 4 of the Act.

A restricted discretionary activity is described in s87A of the Act, clause (3).

If an activity is described in this Act, regulations (including any national environmental standard), a plan, or a proposed plan as a restricted discretionary activity, a resource consent is required for the activity and—

*(a)**the consent authority's power to decline a consent, or to grant a consent and to impose conditions on the consent, is restricted to the matters over which discretion is restricted** (whether in its plan or proposed plan, a national environmental standard, or otherwise); and*

(b)if granted, the activity must comply with the requirements, conditions, and permissions, if any, specified in the Act, regulations, plan, or proposed plan.

It is also subject to s104C of the Act:

*(1) When considering an application for a resource consent for a restricted discretionary activity, a consent authority must consider **only** those matters over which-*

(a) A discretion is restricted in national environmental standards or other regulations;

(b) It has restricted the exercise of its discretion in its plan or proposed plan; …..
(3) ……. if it grants the application, the consent authority may impose conditions under section 108 ***only*** *for those matters over which –*
(a) A discretion is restricted in national environmental standards or other regulations;
(b) It has restricted the exercise of its discretion in its plan or proposed plan.

The subdivision meets the restricted discretionary number/size of lots specified in Table 13.7.2.1. Far North District Plan lays out in 13.8.1, the matters to which it restricts its discretion in determining whether to grant consent to a restricted discretionary activity, and then lays out the matters to which it will restrict its discretion when considering whether to impose conditions.

13.8.1 SUBDIVISION WITHIN THE RURAL PRODUCTION ZONE

……. In considering ***whether or not to grant consent*** *on applications for restricted discretionary subdivision activities, the Council will restrict the exercise of its discretion to the following matters:*

(i) for applications under 13.8.1(a):

- *effects on the natural character of the coastal environment for proposed lots which are in the coastal environment.*

(ii) for applications under 13.8.1(b) or (c):

- *effects on the natural character of the coastal environment for proposed lots which are in the coastal environment;*
- *effects of the subdivision under (b) and (c) above within 500m of land administered by the Department of Conservation upon the ability of the Department to manage and administer its land;*
- *effects on areas of significant indigenous flora and significant habitats of indigenous fauna;*
- *the mitigation of fire hazards for health and safety of residents.*

In considering ***whether or not to impose conditions*** *on applications for restricted discretionary subdivision activities the Council will restrict the exercise of its discretion to the following matters:*
(1) the matters listed in 13.7.3;
(2) the matters listed in (i) and (ii) above

In the case of this application, the application is lodged pursuant to 13.8.1(c), and therefore clause (ii) applies:

- *effects on the natural character of the coastal environment for proposed lots which are in the coastal environment;*

The property is not within the coastal environment.

- *effects of the subdivision under (b) and (c) above within 500m of land administered by the Department of Conservation upon the ability of the Department to manage and administer its land;*

Not adjacent to the application site, but on the adjacent title, is Marginal Strip alongside Puketotara Stream. Marginal Strips are Crown Land. I do not believe the Department of Conservation actively manages the strip in any way and the subdivision, given that it does not adjoin the Crown Land, will not adversely impact on the ability of DoC to administer the land.

- *effects on areas of significant indigenous flora and significant habitats of indigenous fauna;*

Whilst there are pockets of vegetation identified in DoC's Protected Natural Area publication for the relevant Ecological District, these are not adversely affected by the proposed subdivision – refer to section 6.9 of the AEE below.

- *the mitigation of fire hazards for health and safety of residents.*

There is ample scope within proposed Lot 1 to provide for residential living an appropriate distance from areas of vegetation in order to ensure mitigation of fire hazard.

In summary, there are no grounds for the Council to refuse consent.

In determining conditions of consent, the following AEE is offered.

6.1 Allotment sizes and dimensions

Proposed Lot 1 can readily accommodate a 30m x 30m square building envelope. The lot, being 7.44ha in area, is suitable as a semi rural production / lifestyle lot supporting residential living, with more than one option for future built development. The remaining balance farming lot already supports residential living.

Looking south along existing farm access into proposed Lot 1.
The indicative building site as depicted in the site suitability report,
will be on the moderately sloping area just beyond the totara tree.

6.2 Property Access

Access and crossings are existing in several locations for the balance Lot 2. The new lot's frontage to Puketotara Road is 106m long, with the logical crossing place at the western corner. Visibility is good in both directions and a crossing can be upgraded to the appropriate rural unkerbed road standard. Refer also to Section 10 of the Subdivision Site Suitability Report (Appendix 5).

6.3 Natural and Other Hazards

The site is not subject to any mapped hazards. The Subdivision Site Suitability (SSS) Report in Appendix 5 assesses natural hazards in its Section 9. It concludes that risk is low and that effects from any natural hazards are less than minor (refer to that report's Table 9).

To my knowledge, the site is not currently supporting, and has not historically supported a Hazardous Activity or Industry. It is not shown on *Far North Maps* as a HAIL site containing any contaminated soil.

6.4 Water Supply

There is no Council reticulated water supply available to the property. The new lot will be reliant on on-site rainwater harvesting or through alternative supply, for potable, non potable and fire fighting water supply. The Council can impose its standard consent notice in regard to future water supply being provided at time of any building consent being applied for.

6.5 Sanitary Sewage Disposal

The SSS Report in Appendix 5 addresses wastewater in its Section 5. The report suggests secondary treatment and confirms compliance with the Regional Plan's permitted activity standards. Detailed design of any on-site wastewater system is best left until building consent stage.

6.6 Stormwater Disposal

The SSS report in Appendix 5 addresses stormwater in its Section 6. Impermeable surface will be less than 1% of each respective lot. The report includes a concept storwmater attenuation design. Given the extremely los % coverage anticipated however, I do not believe there needs to be any specific requirement in a Consent Notice, for a detailed stormwater management report at Building Consent stage. This would be covered by E1 of the Building Code in any event, once the final design of any development is known.

6.7 Energy Supply & Telecommunications

Power and telecoms are not a requirement for rural subdivisions. The Council can impose its standard consent notice advising any future owner of the proposed Lot 1 that power and telecoms were not a requirement of the subdivision and remain the responsibility of the lot owner. The balance lot has power.

6.8 Easements for any purpose

Refer to scheme plan in Appendix 1. There are no easements proposed or required.

6.9 Preservation of heritage resources, vegetation, fauna and landscape, and land set aside for conservation purposes

The site contains none of the following items listed in Rule 13.7.3.9 of the District Plan. There are no Notable Trees (Appendix 1D of the DP); no Historic Sites, Buildings of Objects (1E); no Outstanding Natural Features or Outstanding Landscape Features (1A and 1B); and no archaeological sites (1G) or Sites of Cultural Significance to Māori (1F).

Indigenous Flora & Fauna:

There are two areas within the application site mapped as Protected Natural Area P05/095 Puketotara River Bush (DoC Kerikeri Ecological District publication, dated 1999). There is small 'known wetland' mapped by the NRC on its on-line maps. The actual bush coverage on the site no longer matches the somewhat outdated DoC publication. It is intended to protect the bush within proposed Lot 1 – see below.

Looking east into proposed Lot 1. Totara dominated bush to be subject to protection.

Given the inconsistency between the actual bush and the mapped bush within Lot 1, it is proposed that a s223 condition not refer to the area mapped as PNA, but instead refer to "areas of indigenous vegetation within Lot 1 to be subject to bush protection" to be shown on the survey pan. It is proposed that this area be first identified and then subject to a Consent Notice requiring that the bush "shall not cut down, damaged or destroyed".

Given the ongoing use of the large Lot 2 for farming, it is proposed that there be no restriction on working dogs for Lot 2. Noting the area is only kiwi present, with no known high density kiwi areas in proximity, I believe it is sufficient to simply require that any dogs kept on site (working or domestic) are kept under control during the day and kept inside or in a secure run/kennel at night. If the Council is of a mind to want to restrict the number of non-working (domestic) dogs on Lot 2, then I would consider a maximum of two to be reasonable. I have been advised that there are existing dogs on Lot 2 (both working dogs and non-working). The application would like to ensure that those existing dogs can remain, regardless of any restriction in numbers that might apply in the future for non working dogs on Lot 2. This enables replacement non working dogs, but only to the maximum number provided for.

The proposed Lot 1 is large enough to support stock and for that reason I consider that up to one working dog should be allowed. In addition to any working dog, I believe up to one domestic dog, micro chipped and under effective control at all times should also be allowed. A future owner may choose to have two working dogs instead. The overall limit applying to the lot would be 2 dogs.

6.10 Access to reserves and waterbodies

There are no lots of less than 4ha with a 'qualifying' water body boundary. There is no requirement to provide for esplanade access to any water body. There is / will be considerable distance between any new development likely to occur within Lot 2 and any water body. Development within the proposed Lot 1 can readily meet the required setback distance from any water body.

6.11 Earthworks

As stated earlier in this report, subdivision site works will be minimal.

6.12 Land use compatibility (reverse sensitivity)

This proposal subdivides off an attractive 7.44ha rural / bush / lifestyle block from the existing dairy farm, with very little, if any, impact on productive capacity. The new lot is physically quite separate, with a bush filled gully forming a natural 'boundary' and achieving considerable distance and buffer between any future development within the new lot and the dairying operation. I do not believe the proposal will result in any additional adverse reverse sensitivity effects.

7.0 STATUTORY ASSESSMENT

7.1 Operative District Plan Objectives and Policies

The proposal 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, or ecosystems, and adverse effects are capable of mitigation. The size of the additional lot will allow for a level of density not dissimilar from that already in existence in the immediate area (Objectives 13.3.1 and 2 and Policy 13.4.14).

The proposed lot is large with ample scope for on-site wastewater treatment and disposal. The lot will be reliant on on-site water catchment and supply. Stormwater management is readily achievable (Objective 13.3.5 and related Policy 13.4.8).

I am not aware of any sites of significance to Māori or cultural values associated with the site. No major earthworks are required and no indigenous vegetation clearance is envisaged or required (Objective 13.3.7 and Policy 13.4.11)

Objectives 13.3.8-13.3.10 are about ensuring subdivisions have access to adequate services and make efficient use of infrastructure. I believe the proposal is consistent with these objectives. Power and telecoms are not a requirement of rural subdivisions.

The site contains areas mapped as having indigenous flora & fauna values (PNA's and wetland) and it is proposed to protect such areas. There are no known cultural or heritage values. The site does not have outstanding natural character values. Waterbodies will not be adversely affected by the proposal, or by future development. I do not believe the subdivision will prevent adjacent land uses from continuing to operate (Policy 13.4.1).

Safe and efficient access can be provided (Policies 13.4.2 and 3)

Relevant Rural Production Zone objectives and policies include:

Objectives:

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

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

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

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

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

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

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

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

And policies

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

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

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

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

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

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

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

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

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

Refer to Section 6.0 Assessment of Environmental Effects. The proposed subdivision promotes an efficient use and development of the land. The land being subdivided off is discrete from the main dairying operation and contains an area of less productive land (Objective 8.6.3.2). Amenity values can be maintained (8.6.3.3). I do not believe there will be additional reverse sensitivity effects as a result of the proposal. The site will continue to be used for land based production. The proposed development is low density and will not prevent the continued use of adjacent land for productive uses (Objectives 8.6.3.6-8.6.3.9 inclusive and Policies 8.6.4.8 and 8.6.4.9).

Policy 8.6.4.7 anticipates a wide range of activities that promote rural productivity, whilst avoiding the actual and potential adverse effects of conflicting land use activities. The proposed subdivision does not affect the continued ability of lots to continue to provide for use reliant on soils. The immediate area supports an existing range of activities, including productive use; residential; and forestry. I am of the view that the subdivision does not create additional land use incompatibility effects of a minor or more than minor nature.

The proposal provides for sustainable management of natural and physical resources (8.6.4.1). Off site effects can be avoided, remedied or mitigated (8.6.4.2 and 8.6.4.3). Amenity values can be maintained through the size of the lots (open space to built environment ratio) (8.6.4.4). The proposal enables the efficient use and development of natural and physical resources (8.6.4.5).

In summary, I believe the proposal to be more consistent than not with the Rural Production Zone objectives and policies.

Other relevant objectives and policies in the ODP are those relating to Indigenous Vegetation. No clearance is proposed or necessary. Consent Notice(s) is/are suggested as means of protecting flora and fauna. I believe the proposal, a restricted discretionary activity, to be consistent with the objectives and policies relating to indigenous vegetation.

7.2 Proposed District Plan

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

SUB-O1
Subdivision results in the efficient use of land, which:
a. achieves the objectives of each relevant zone, overlays and district wide provisions;
b. contributes to the local character and sense of place;

c. avoids reverse sensitivity issues that would prevent or adversely affect activities already established on land from continuing to operate;
d. avoids land use patterns which would prevent land from achieving the objectives and policies of the zone in which it is located;
e. does not increase risk from natural hazards or risks are mitigates and existing risks reduced; and
f. manages adverse effects on the environment.

SUB-O2
Subdivision provides for the:
a. Protection of highly productive land; and
b. Protection, restoration or enhancement of Outstanding Natural Features, Outstanding Natural Landscapes, Natural Character of the Coastal Environment, Areas of High Natural Character, Outstanding Natural Character, wetland, lake and river margins, Significant Natural Areas, Sites and Areas of Significance to Māori, and Historic Heritage.

SUB-O3 *Infrastructure is planned to service the proposed subdivision and development where:*
a. there is existing infrastructure connection, infrastructure should provided in an integrated, efficient, coordinated and future-proofed manner at the time of subdivision; and
b.where no existing connection is available infrastructure should be planned and consideration be give n to connections with the wider infrastructure network.

SUB-O4
Subdivision is accessible, connected, and integrated with the surrounding environment and provides for:
a. public open spaces;
b. esplanade where land adjoins the coastal marine area; and
c. esplanade where land adjoins other qualifying water bodies

The subdivision provides for ongoing productive use of the land. It contributes to local character and avoids additional reverse sensitivity issues. The proposal does not increase the risk of natural hazard and there are no adverse effects (SUB-O1). The land being subdivided off does not contain any highly productive land, nor any ONF's, ONL's or areas of ONC's and is not in the Coastal Environment. It does not contain any Significant Natural Areas as identified in the PDP, nor any Areas of Significance to Maori, or Historic Heritage Areas (SUB-O2). No additional infrastructure is required and there are no qualifying water bodies (SUB-03 and 04).

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 relevant – application is not a boundary adjustment.

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

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

SUB-P3
Provide for subdivision where it results in allotments that:
a. are consistent with the purpose, characteristics and qualities of the zone;
b. comply with the minimum allotment sizes for each zone;
c. have an adequate size and appropriate shape to contain a building platform; and

d. have legal and physical access.

The proposal is considered to be consistent with the purpose, characteristics and qualities of the zone, in the immediate environs; the lots are of an appropriate shape and size to contain building platforms (which already exist in any event on the large balance lot); and have legal and physical access. The proposal does not meet the controlled minimum lot size applying the PDP's Rural Production zone, but these lot sizes do not yet have legal effect.

SUB-P4
Manage subdivision of land as detailed in the district wide, natural environment values, historical and cultural values and hazard and risks sections of the plan

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

SUB-P5
Manage subdivision design and layout in the General Residential, Mixed Use and Settlement zoneto provide for safe, connected and accessible environments by:
a. minimising vehicle crossings that could affect the safety and efficiency of the current and future transport network;
b. avoid cul-de-sac development unless the site or the topography prevents future public access and connections;
c. providing for development that encourages social interaction, neighbourhood cohesion, a sense of place and is well connected to public spaces;
d.contributing to a well connected transport network that safeguards future roading connections; and
e. maximising accessibility, connectivity by creating walkways, cycleways and an interconnected transport network.

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

SUB-P6 *Require infrastructure to be provided in an integrated and comprehensive manner by:*
a. demonstrating that the subdivision will be appropriately serviced and integrated with existing and planned infrastructure if available; and
b. ensuring that the infrastructure is provided is in accordance the purpose, characteristics and qualities of the zone.

The site is either already developed or will be reliant on on-site servicing. The site has existing access to Council road.

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

No Esplanade Reserve is required.

SUB-P8 *Avoid rural lifestyle subdivision in the Rural Production zone unless the subdivision:*
- *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 soils on the lot being subdivided off are not regarded as highly versatile. The balance lot will remain part of the existing dairy farm. The subdivision does not result in the loss of versatile soils for primary production activities.

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

The subdivision is not a Management Plan.

SUB-P10
To protect amenity and character by avoiding the subdivision of minor residential units from principalresidential units where resultant allotments do not comply with minimum allotment size and resi dential density.

Not relevant. No minor residential units exist.

SUB-P11
Manage subdivision to address the effects of the activity requiring resource consent including (but not limited to) consideration of the following matters where relevant to the application:
a.consistency with the scale, density, design and character of the environment and purpose of the zone;
b. the location, scale and design of buildings and structures;
c.the adequacy and capacity of available or programmed development infrastructure to accommodate the proposed activity; or the capacity of the site to cater for on-site infrastructure associated with the proposed activity;
d. managing natural hazards;
e. Any adverse effects on areas with historic heritage and cultural values, natural features and landscapes, natural character or indigenous biodiversity values; and
f. any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.

The proposal does not require consent under the PDP and the policy is therefore not relevant. In any event, all of the above have been considered in the layout and number of lots being proposed, to the extent required.

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

The site is zoned Rural Production in the Proposed District Plan, and contains pockets of indigenous vegetation.

Objectives

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.

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.

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.

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

The subdivision maintains rural character and amenity. The development can occur without exacerbating natural hazards and is able to be serviced with on-site infrastructure. RPROZ-O2 is written in a way that excludes any use other than primary production in the zone, yet zone rules provide for other activities as permitted activities. This is contradictory in intent. Be that as it may, residential use associated with and on the same title as, production use, is an accepted and expected feature of the rural zone.

The soils over the additional lot are classified as LUC 4 and 6. The proposal is not considered to have minor or more than minor adverse impact on the overall productivity of the soils on the site. The subdivision does not unduly increase any risk of reverse sensitivity and does not compromise the use of nearby land for farming activities.

Policies

RPROZP1
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.

This proposal will enable primary production activities to continue.

RPROZP2
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.

The proposal does not impact on the land's ability to support primary production use and/or compatible activities that support that use.

RPROZP3
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.

Reverse sensitivity effects have been discussed elsewhere in this report and it is considered the proposal does not unduly or significantly increase the risk of reverse sensitivity.

RPROZP4
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.

I believe the proposal maintains rural character and amenity. The proposal is low density and will result in low site coverage by buildings or structures.

RPROZP5

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.

Not relevant as the proposal is not a land use.

RPROZP6

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 does not result in the loss of highly productive land for use by farming activities as the land being subdivided off does not fall within the parameters of 'highly productive land'. Even if it did, the lot is large and can continue to support grazing use.

RPROZP7

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.

As this application does not require resource consent under the PDP, the policy is of limited relevance. The proposal is of a scale and design that is consistent with the character of the zone and immediate environs. Reverse sensitivity effects are not increased.

The site is served by Council roads and can provide for on-site servicing. The site does not exhibit any historic heritage or cultural values and there will be no adverse effects on landscape values, natural character values, or indigenous biodiversity.

7.3 Part 2 Matters

5 Purpose

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

(2) In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

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

6 Matters of national importance

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

(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:

(c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:

(d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:

(e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:

(f) the protection of historic heritage from inappropriate subdivision, use, and development:

(g) the protection of protected customary rights:

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

There is a known wetland to remain within the balance lot. This appears to be within the boundaries of a PNA and it is proposed, therefore, to be protected. The application site has a river boundary, however development can occur well away from the river (part (a)). The

application site does not contain or display any of the features, resources or values outlined in parts (b), or (d)-(g) inclusive of Section 6. It does contain segments of indigenous vegetation, that whilst included in Protected Natural Area mapping, has not more recently had its 'significance' assessed (PNA publication dated 1999) or confirmed – part (c) above. Notwithstanding this the proposal offers protection. Part (h) is not relevant as the site is not subject to any natural hazards.

7 Other matters

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

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

Regard has been had to any relevant parts of Section 7 of the RMA, "Other Matters". These include 7(b), (c), (d) and (f). It is considered that the proposal represents efficient use and development of a site. Proposed layout, along with waste water and stormwater management, will ensure the maintenance of amenity values and the quality of the environment. The proposal has had regard to the values of ecosystems.

8 Treaty of Waitangi

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

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

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

7.4 National Policy Statements

The proposal does not give offence to, and is not contrary to, the National Policy Statement for Freshwater Management.

The National Policy Statement for Highly Productive Land (NPS-HPL) is relevant insofar as the overall application site does contain areas of highly productive land - land with soils of LUC

class 3. An excerpt from the FNDC's on-line maps is attached in Appendix 4. An assessment of the proposed subdivision against the Objectives and Policies of the NPS-HPL follows. It should be noted that as a restricted discretionary subdivision activity, the Council's discretion is limited to the matters outlined in its ODP. Fragmentation of productive land is not one of those matters. Reverse sensitivity is, however, a matter the Council has discretion over in determining conditions of consent:

Objective: *Highly productive land is protected for use in land-based primary production, both now and for future generations.*

The subdivision creates a separate title containing soils not falling within the definition of highly productive land, leaving all highly productive land in the balance land to continue to be used for land based primary production. This is entirely consistent with the above objective.

Policy 1*: Highly productive land is recognised as a resource with finite characteristics and long-term values for land-based primary production.*
Policy 2*: The identification and management of highly productive land is undertaken in an integrated way that considers the interactions with freshwater management and urban development.*
Policy 3*: Highly productive land is mapped and included in regional policy statements and district plans.*
Policy 4*: The use of highly productive land for land-based primary production is prioritised and supported.*
Policy 5*: The urban rezoning of highly productive land is avoided, except as provided in this National Policy Statement.*
Policy 6*: The rezoning and development of highly productive land as rural lifestyle is avoided, except as provided in this National Policy Statement.*
Policy 7*: The subdivision of highly productive land is avoided, except as provided in this National Policy Statement.*
Policy 8*: Highly productive land is protected from inappropriate use and development.*
Policy 9*: Reverse sensitivity effects are managed so as not to constrain land-based primary production activities on highly productive land.*

The highly productive land within the application site is recognised and remains in the large balance farm lot (Policies 1 & 4). Policy 2 applies to territorial authorities as opposed to individual lot owners, as does Policy 3 and Policies 5 & 6.

Policy 7 requires that subdivision of highly productive land is avoided, except as provided for in the NPS. The proposal does not subdivide highly productive land such that any productive capacity is removed or reduced, and is therefore consistent with Policy 7 and clause 3.8 as outlined below.

Highly productive land remains available for pastoral use (Policy 8). The proposal does not create any additional reverse sensitivity effects as it does not change the status quo (Policy 9).

The proposal is a subdivision, therefore clause 3.8 of the NPS-HPL is relevant:

3.8 Avoiding subdivision of highly productive land

(1) Territorial authorities must avoid the subdivision of highly productive land unless one of the following applies to the subdivision, and the measures in subclause (2) are applied:

(a) the applicant demonstrates that the proposed lots will retain the overall productive capacity of the subject land over the long term:

(b) the subdivision is on specified Māori land:

(c) the subdivision is for specified infrastructure, or for defence facilities operated by the New Zealand Defence Force to meet its obligations under the Defence Act 1990, and there is a functional or operational need for the subdivision.

(2) Territorial authorities must take measures to ensure that any subdivision of highly productive land:

(a) avoids if possible, or otherwise mitigates, any potential cumulative loss of the availability and productive capacity of highly productive land in their district; and

(b) avoids if possible, or otherwise mitigates, any actual or potential reverse sensitivity effects on surrounding land-based primary production activities.

*(3) In subclause (1), **subdivision** includes partitioning orders made under Te Ture Whenua Māori Act 1993.*

(4) Territorial authorities must include objectives, policies, and rules in their district plans to give effect to this clause.

Clause 1(a) provides the justification for the subdivision to proceed. This report has demonstrated that the proposed additional lot does not subdivide (fragment) highly productive land in the first instance. The subdivision will retain the overall productive capacity of any highly productive land within the site over the long term.

Clause 2(b) addresses reverse sensitivity, the only criteria the ODP provides for assessment of, given the restricted discretionary category of activity. In regard this clause, there is no cumulative loss of the availability and productive capacity of highly productive land within the site (or district). There are no actual or potential reverse sensitivity effects on surrounding land-based primary production activities. The lot being subdivided off is physically separated from farming operations.

The National Policy Statement for Indigenous Biodiversity has been considered in preparing this application. The subdivision is not contrary to the intent of this NPS. No clearance is proposed, and areas of indigenous vegetation are proposed for protection.

7.5 National Environmental Standards (NES)

The NES for Assessing and Managing Contaminants in Soil to Protect Human Health is not considered relevant as there is no known current or historic land use that would render the land a 'piece of land' subject to that NES.

The NES for Freshwater is relevant insofar as there is a water boundary and an area of swamp wetland on the application site. Neither are adversely affected by the proposal and no consents are required pursuant to the NES for Freshwater.

7.6 Regional Policy Statement for Northland (RPS)

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

The RPS also has policies ensuring that productive land is not subject to fragmentation and/or sterilisation to the point where productive capacity is materially reduced, and that reverse sensitivity effects be avoided, remedied or mitigated.

Objective 3.6 Economic activities – reverse sensitivity and sterilisation

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

(a) Reverse sensitivity for existing:

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

In regard to this subdivision, it is considered that no additional reverse sensitivity issues arise as a result. The area around the site supports a mixture of agricultural, residential, and forestry use. In my opinion the proposal does not prevent or threaten the continuation of the adjacent land for ongoing production use.

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

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

(c) Recognises and addresses potential cumulative effects of subdivision, use, and development, and is based on sufficient information to allow assessment of the potential long-term effects; ...

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

(f) Ensures that plan changes and subdivision to / in a primary production zone, do not materially reduce the potential for soil-based primary production on land with highly versatile soils, or if they do, the net public benefit exceeds the reduced potential for soil-based primary production activities; and ...

Objectives and Policies in the Regional Policy Statement for Northland (RPS) provide direction when examining the subdivision of land in production zones where the soils meet the definition of 'highly versatile', the RPS states that Class I, II and III soils are 'highly versatile'. The land being subdivided off contains no such soils. The proposal, therefore, does not materially reduce the potential for soil-based primary production on land with highly versatile soils.

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);.....

The proposal does not, in my opinion, prevent the continued use of adjacent land for production use. Reverse sensitivity effects have been addressed earlier.

I believe the proposal is not contrary to any of the objectives or policies in the Regional Policy Statement for Northland.

7.7 Regional Plans

The subdivision does not result in any breaches of the Proposed Regional Plan (Appeals version).

8.0 S 95A-E & 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 exist. Step 2 of s95A specifies the circumstances that preclude public notification. No such circumstance exists. Step 3 of s95A must therefore be considered. This specifies that public notification is required in certain circumstances. These include:

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

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

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

8.2 S95B Limited Notification Assessment

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

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

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

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

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

8.3 S95D Level of Adverse Effects

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

8.4 S95E Affected Persons

A person is an 'affected person' if the consent authority decides that the activity's adverse effects on the person are minor or more than minor (but are not less than minor). A person is not an affected person if they have provided written approval for the proposed activity.

The activity is a restricted discretionary subdivision and the proposal is consistent with the objectives and policies of both the Operative and Proposed District Plan. The density level proposed is low and development within sites can be internalised so as not to generate adverse effects on adjacent properties.

The site does not contain any heritage or cultural sites or values and areas of significant indigenous vegetation within in the site are proposed to be protected from being cut down, damaged or destroyed. Dog ownership is also proposed to be restricted in terms of number and means of control. No pre lodgement consultation has been considered necessary with tangata whenua, Heritage NZ, or Department of Conservation. The site is not accessed off state highway and consultation with (NZTA) Waka Kotahi has not been necessary.

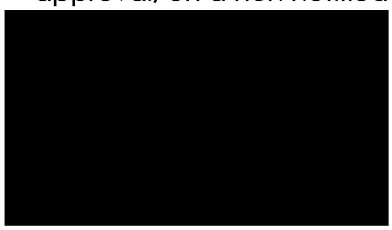
I do not believe there to be any adjacent properties affected in a minor or more than minor and have therefore not identified any affected persons.

9.0 CONCLUSION

The site is considered suitable for the proposed subdivision, and effects on the wider environment are no more than minor. There is no District Plan rule or national environmental standard that requires the proposal to be publicly notified. No special circumstances have been identified that would suggest public notification is required. No affected persons are identified.

I consider the proposal to be consistent with both the Operative and Proposed District Plans' objectives and policies, relevant national and regional policy statements and plans, and Part 2 of the Act.

It is requested that the Council give favourable consideration to this application and grant approval, on a non notified basis.



Signed Dated 31st May 2024

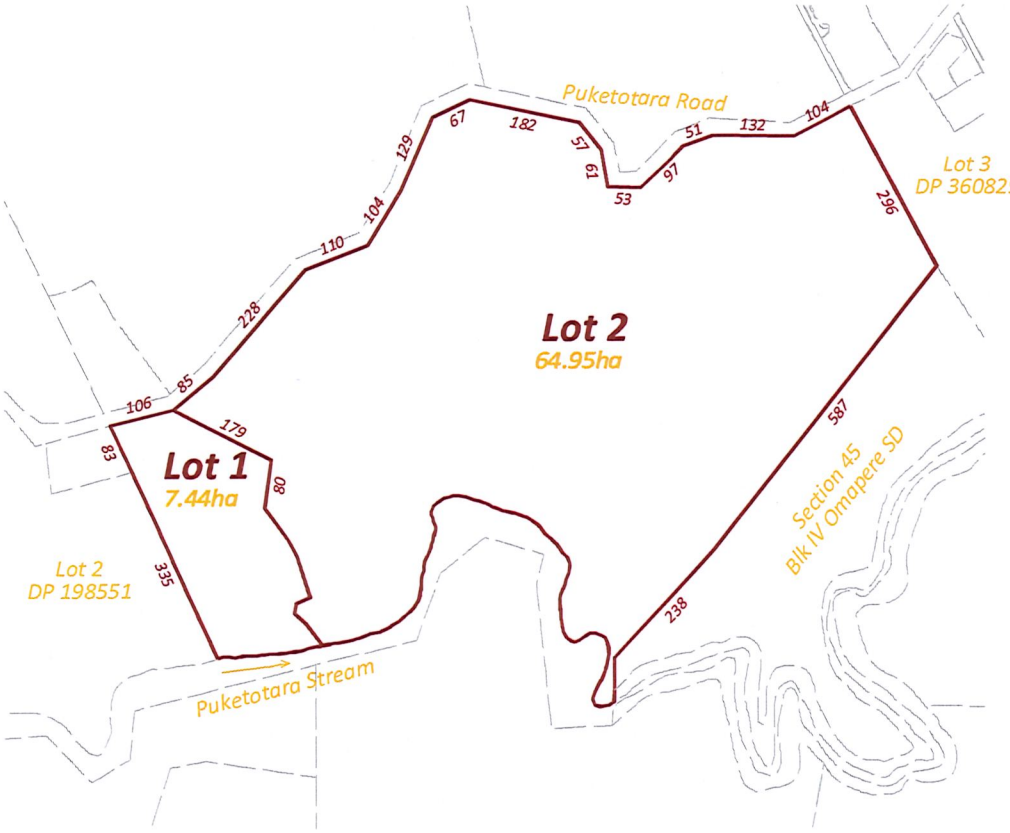
Lynley Newport
Senior Planner
THOMSON SURVEY LTD

10.0 LIST OF APPENDICES

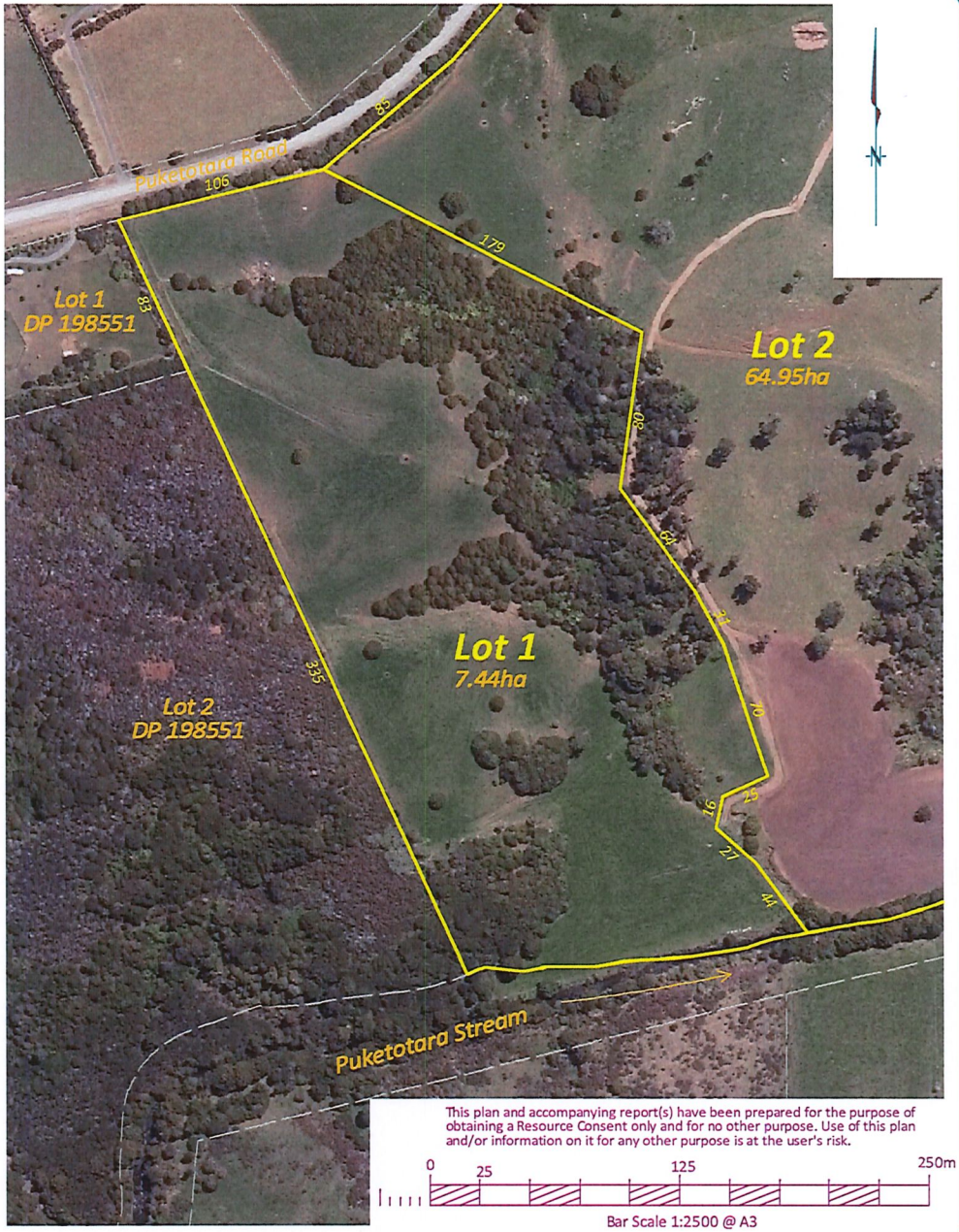
Appendix 1	Scheme Plan(s)
Appendix 2	Locality Plan
Appendix 3	Record of Title & relevant easement instruments
Appendix 4	Map Excerpt - LUC
Appendix 5	Subdivision Site Suitability Report

Appendix 1

Scheme Plan(s)



OVERALL DIAGRAM
PROPORTIONAL



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 25 125 250m

Bar Scale 1:2500 @ A3

Local Authority: Far North District Council
Comprised in: NA44D/1007
Total Area: 72.3900ha
Zoning: Rural Production
Resource features: NIL

AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY AND SCALED FROM AERIAL PHOTOGRAPHY

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

PROPOSED SUBDIVISION OF LOT 3 DP 87228

523, 611 & 621 PUKETOTARA ROAD, KERIKERI

PREPARED FOR: GREENACRE HEIGHTS LTD

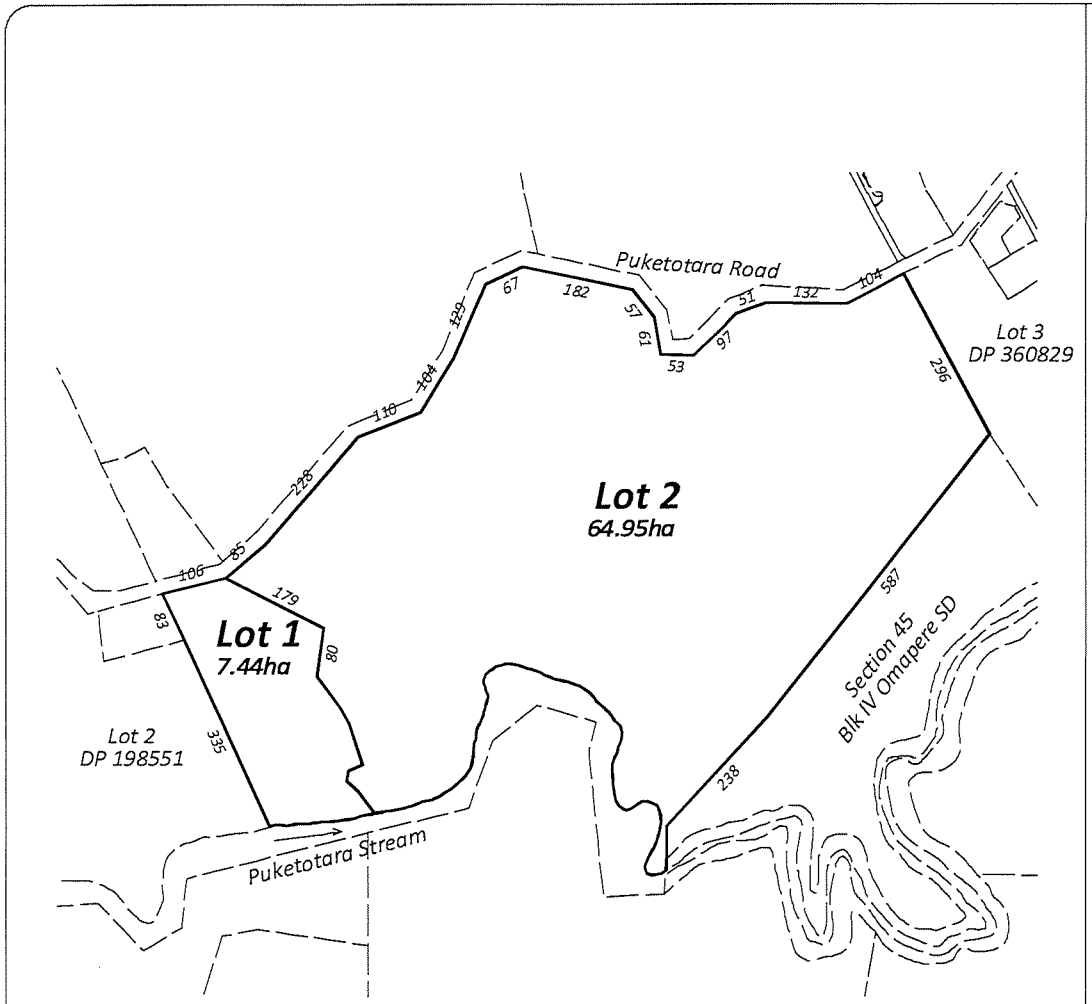
	Name	Date
Survey		
Design		
Drawn	KY	09.10.23
Approved		
Rev		

10179 Scheme - NA44D-1007 20231009

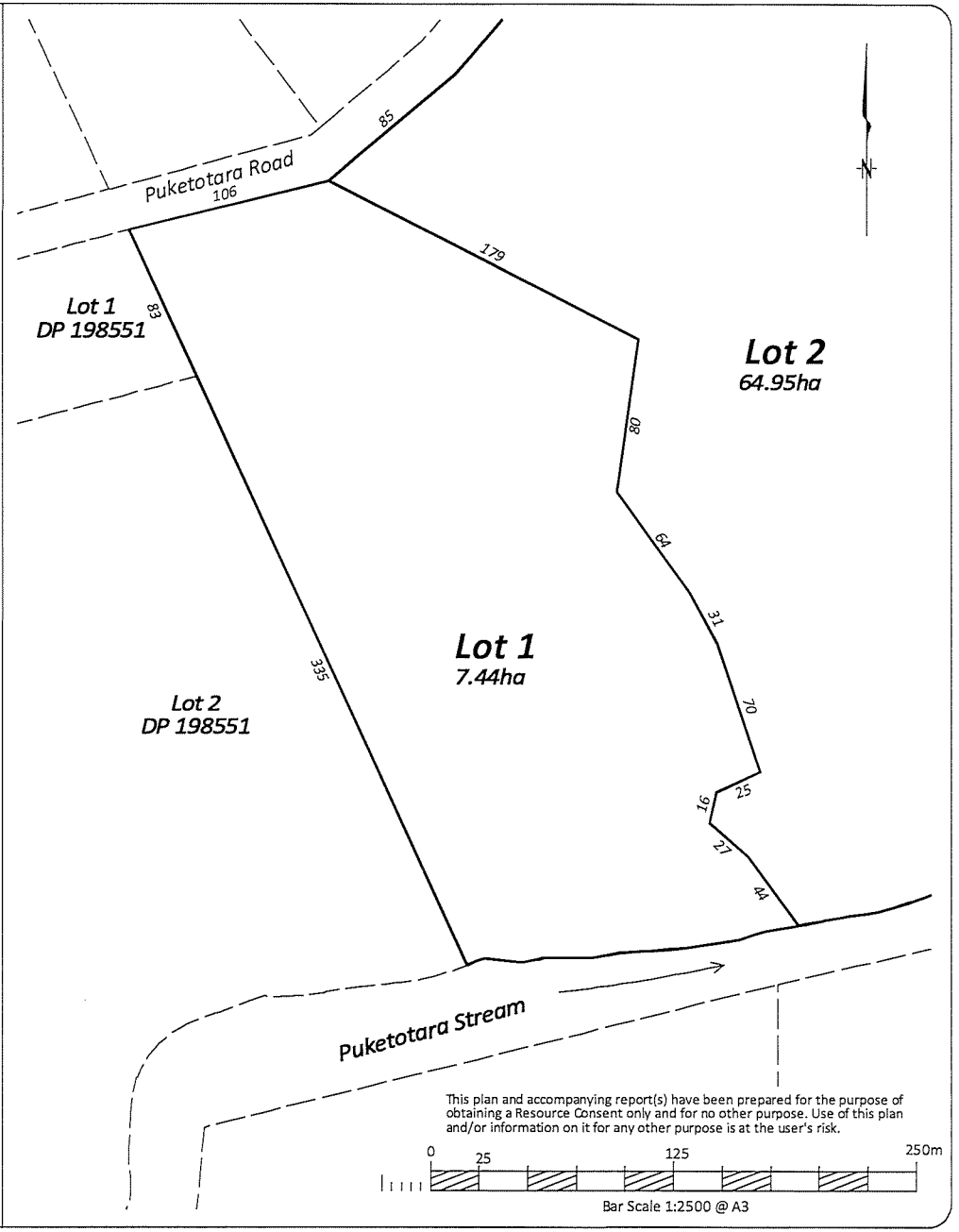
ORIGINAL
SCALE 1:2500
SHEET SIZE A3

Surveyors Ref. No: 10179

Sheet 1 of 1



OVERALL DIAGRAM
PROPORTIONAL



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.

Local Authority: Far North District Council
Comprised in: NA44D/1007
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	Name	Date
Survey		
Design		
Drawn	KY	09.10.23
Approved		
Rev		

ORIGINAL
SCALE 1:2500
SHEET SIZE A3

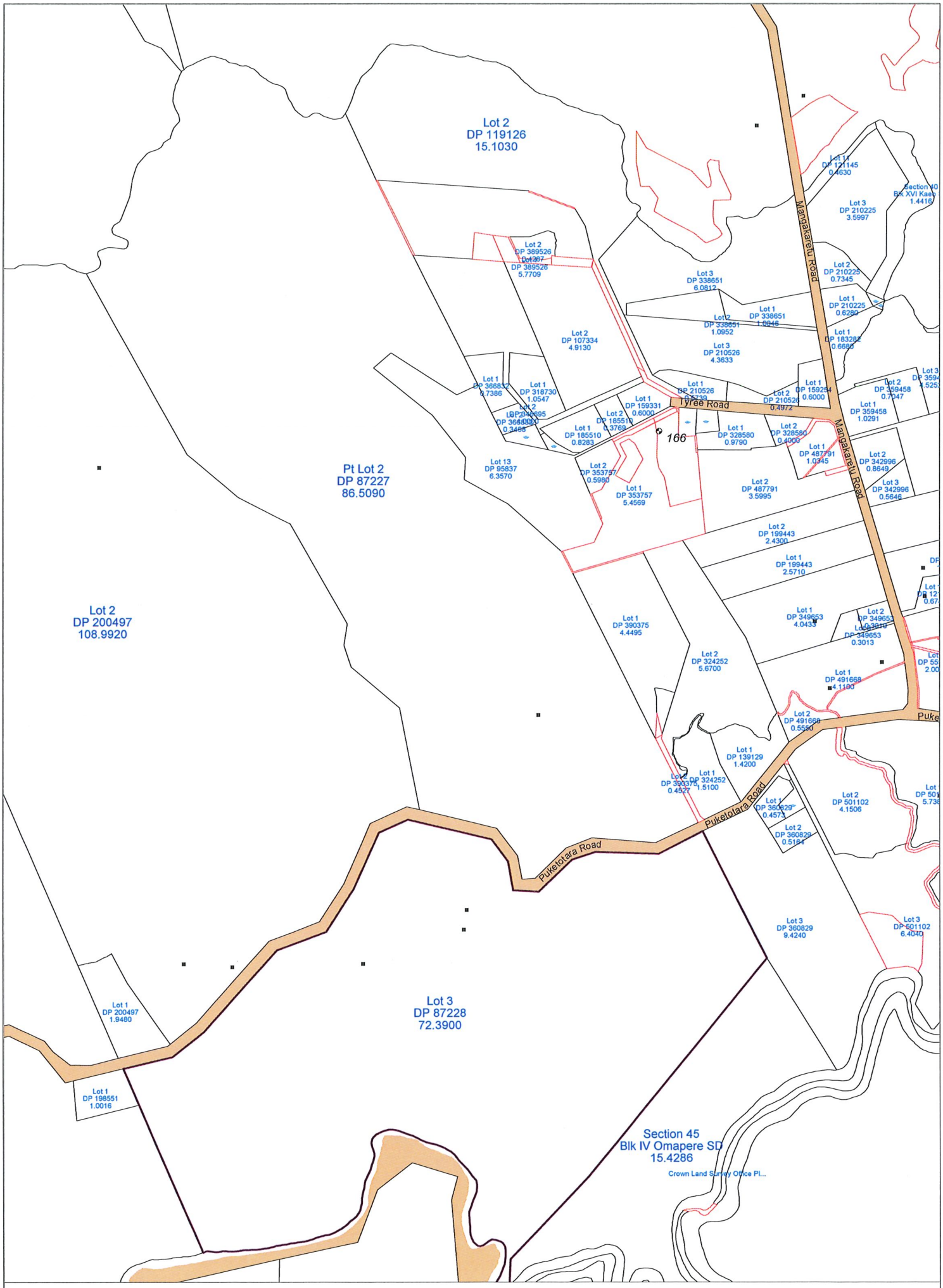
10179 Scheme - NA44D-1007 20231009

Surveyors Ref. No: 10179

Sheet 1 of 1

Appendix 2

Locality Plan



QuickMap
Custom Software Ltd

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

Scale 1:10000 Topographical and Cadastral map derived from LINZ data. Printed: 30-May-2024 10:12.

Appendix 3

Record of Title &

relevant easement instruments

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**NA44D/1007**
Land Registration District	**North Auckland**
Date Issued	07 March 1979

Prior References
NA3C/539

Estate	Fee Simple
Area	72.3900 hectares more or less
Legal Description	Lot 3 Deposited Plan 87228

Registered Owners
Greenacre Heights Limited

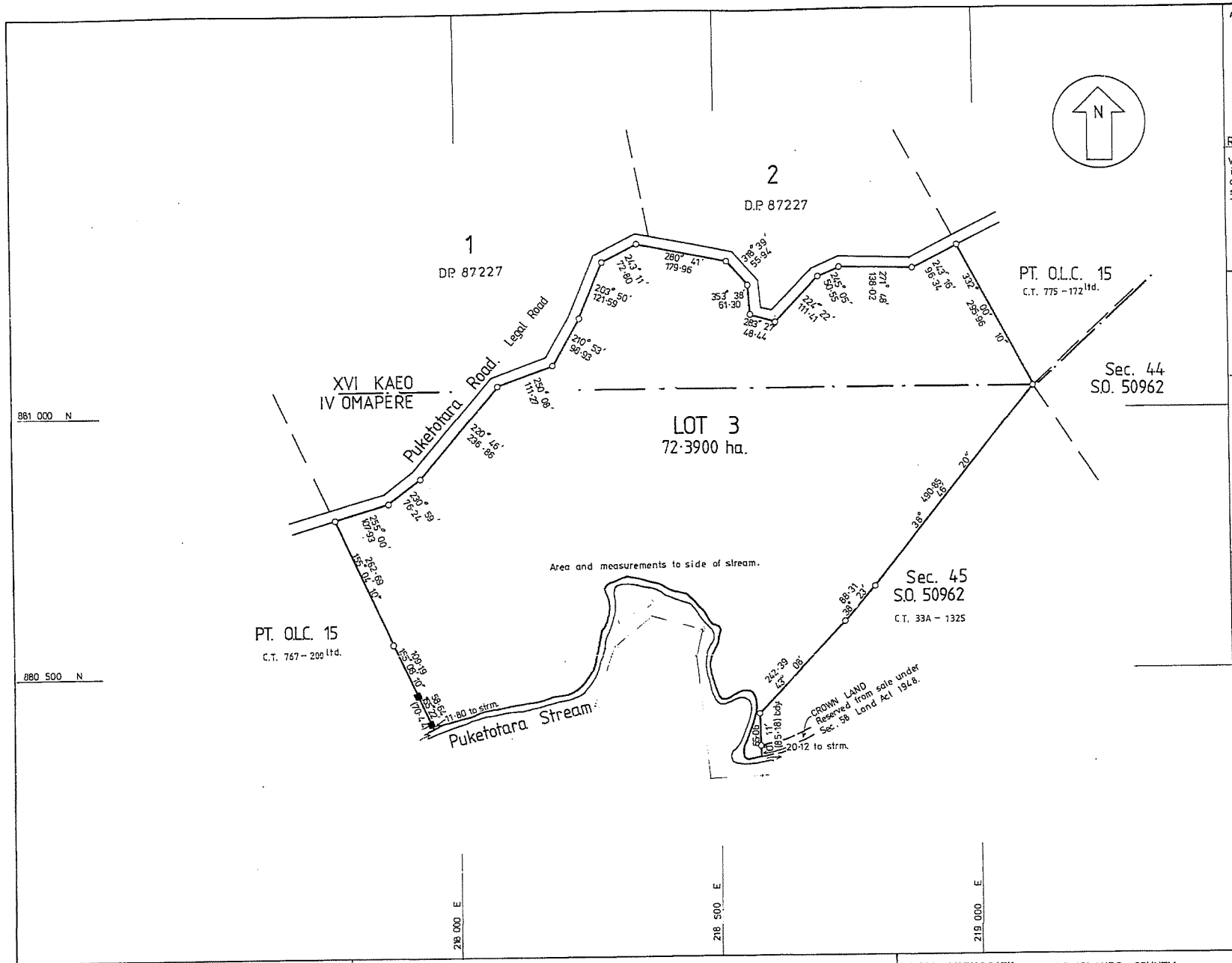
Interests

Appurtenant hereto is a water supply right and an electricity supply right created by Transfer B821478.1

6678067.7 Mortgage to (now) Westpac New Zealand Limited - 6.12.2005 at 9:00 am

8648775.1 Mortgage to Brian Stewart and Lorraine Grace Stewart - 27.9.2011 at 11:28 am

9845747.1 CAVEAT BY TOP ENERGY LIMITED - 19.9.2014 at 3:05 pm



Approvals.

REGISTERED PROPRIETOR

We L.E. & P.L. Tyree registered proprietors of the land in Certificate of Title 775/172 Ltd. agree to the definition of the boundary with that part of C.T. 3C/539 Ltd. as shown hereon and concent to the issue of a Certificate of Title in accordance therewith.

L E Tyree

P L Tyree

I D.R.B. Taucher registered proprietor of the land in Certificate of Title 767/200 Ltd. agree to the definition of the boundary with that of C.T. 3C/539 Ltd. as shown hereon and concent to the issue of a Certificate of Title in accordance therewith.

THIS PLAN IS CONCURRENT WITH DP 87227

NEW C.T. ALLOCATED
LOT 3: 440/1007.

Total Area 72·3900 ha.

Comprised in C.T. 3C/539 LTD (Lot)

I, Robert John Donaldson of Kerikeri
Registered Surveyor and holder of an annual practising certificate hereby certify that this plan has been made from Surveys executed by me or under my direction; that both plan and Survey are correct and have been made in accordance with the regulations under the Surveyors Act 1966
Dated at Kerikeri *this* 14th *day of* July 1978. *Signature* R J Donaldson

Field Book p. *Traverse Book* p.

Reference Plans S.O.s 26277, 50962 & 51493

Examined D. Enoka *Correct*

Approved as to Survey

1/2/79 *for Chief Surveyor*

Deposited this 13th day of March 1979

District Land Registrar

File *Received* 5 JUL 1978 *Instructions*

DP 87228.

LAND DISTRICT NORTH AUCKLAND
SURVEY BLK.& DIST. XVI KAEO & IV OMAPERE.
NZMS 261 SHEET No. P05/4.1 4.2

LOT 3, BEING PLAN OF PT. O.L.C. 15,

LOCAL AUTHORITY BAY OF ISLANDS COUNTY
Surveyed by KNIGHT DONALDSON & ASSOC LTD.
Scale 1:5000 Date MAY 1978

L.E.Stirling, Surveyor-General, Department of Lands and Survey, Wellington

L&S FORM N 1

CENTIMETRES

Appendix 4

Map Excerpt - LUC

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

Far North Maps

0 0 0 1 km

Projection NZTM2000. Datum NZGD2000. Scale:1:9,028

DISCLAIMER:
While the Far North District Council strives to keep the data in this service current, it may not be the most recent or most accurate data available. No reliance on the information contained on this map by any person is permitted. FNDC will not be liable for any omissions or errors of information contained on this map. FNDC recommends that persons seek specific advice on individual properties from FNDC and other specialist organisations which may hold more up to date or accurate information.

Created: 30/01/2024

Appendix 5

Subdivision Site Suitability Report

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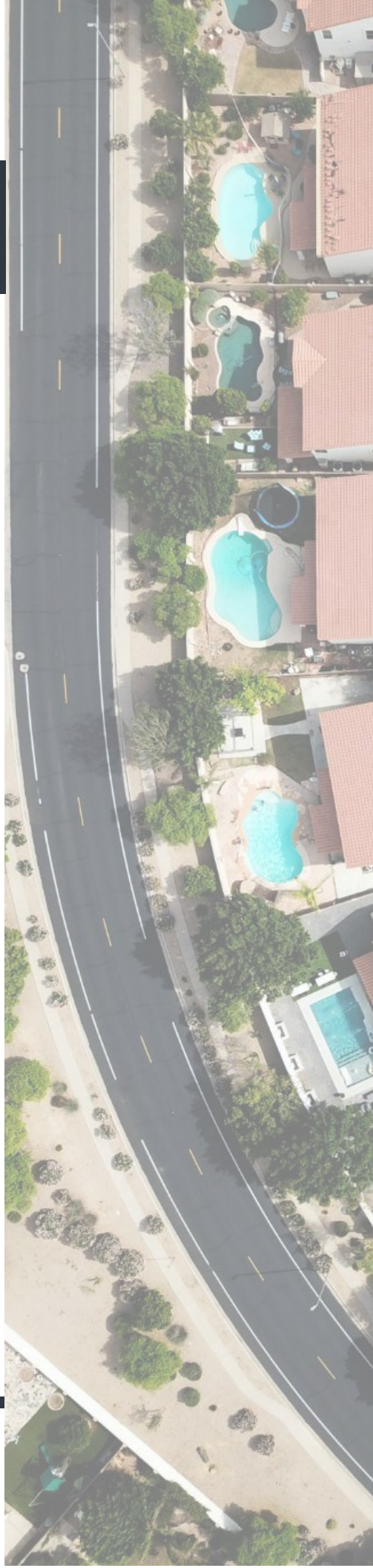
consulting engineers

SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

523, 611, & 621 PUKETOTARA ROAD, OKAIHAU

GREENACRE HEIGHTS LIMITED



C0451-S-01-R01
MAY 2024
REVISION 1

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

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consulting engineers

DOCUMENT MANAGEMENT

Document Title	Subdivision Site Suitability Engineering Report
Site Reference	523, 611 & 621 Puketotara Road, Okaihau
Client	Greenacre Heights Limited
Geologix Reference	C0451-S-01
Issue Date	15 May 2024
Revision	01
Prepared	Sander Derks Graduate Civil Engineer, Dip. Eng [redacted]
Approved	Edward Collings Managing Director, CEnvP Reg. 0861, CPEng Reg. 1033153, CMEngNZ [redacted]
File Reference	*Z:\Projects\C0400-C0499\534 Puketotara Road, Okaihau (Lot 3 DP 87228) - C0451\06 - Reports\C0451-S-01-R01.docx*

REVISION HISTORY

Date	Issue	Prepared	Reviewed	Approved
May 2024	First Issue	SD	EC	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 Greenacre Heights Limited as our Client in accordance with our standard short form agreement and general terms and conditions of engagement.

Our scope of works has been undertaken to assist with Resource Consent application in relation to the proposed subdivision of a rural property Lot 3 DP 87228, comprising 621, 611, and 523 Puketotara Road, Okaihau, the 'site'. Specifically, this assessment addresses engineering elements of natural hazards, wastewater, stormwater, internal roading and associated earthwork requirements to provide safe and stable building platforms with less than minor effects on the environment as a result of the proposed activities outlined in Section 1.1.

1.1 Proposal

A proposed scheme plan was presented to Geologix at the time of writing, prepared by Thomson Survey[1] and has been reproduced within Appendix A as Drawing No 500. It is understood that the Client proposes to subdivide the site into two separate lots. This is summarised in Table 1. Any 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	7.44 ha	New residential
2	64.95 ha	Existing residential/ balance

Site access for the proposed two lots will be provided from Puketotara Road. The parent lot is assigned three non-boundary addresses and proposed Lot 2 will contain the three existing vehicle crossings located at various entry points along Puketotara Road serving a rural residential dwelling, and another two vehicle crossings serving the agriculture buildings. Access way and vehicle crossing considerations will be taken in account due to the increase of lot numbers occurring in this development.

A proposed vehicle crossing for Lot 1 will be constructed within the scope of this application. This is discussed in Section 10. A specific Traffic Impact Assessment (TIA) is not within the scope of this report.

[1] *Thomson Survey, Scheme Plan Ref. 10179, dated 9 October 2023.*

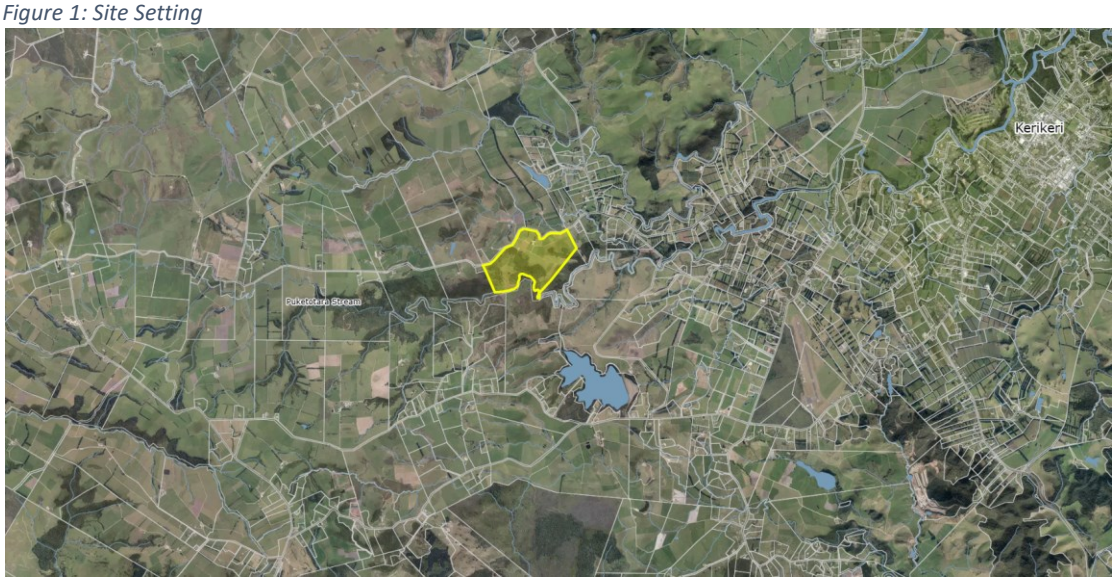
2 DESKTOP APPRAISAL

The site is located on the southern face of Puketotara Road, west of Kerikeri township. The site is irregular in shape and is bound by Puketotara stream to the south and rural agricultural lands to all other directions. Topographically, majority of the site is moderately sloping with deep gullies covered with vegetation in localised throughout the site.

The site setting is presented schematically as

Figure 1 below.

Figure 1: Site Setting



The entire site area is currently in agricultural use with rough grass and vegetation, interlinked by farm access roads. An existing residential dwelling collectively with farming sheds and access are located towards the northern boundary within proposed lot 2. A detailed review of existing watercourses and overland flow paths is presented in Section 3. In brief, the site is intersected by multiple small to large ditches, directing south towards Puketotara stream bordering the southern site boundary.

2.1 Existing Reticulated Networks

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

2.2 Geological Setting

Available geological mapping[2] indicates the site to be underlain by the Kerikeri Volcanics group which occupies the wider Kerikeri area. The unit is typically consistent in nature across the local area and is commonly weathered to clay and silt residual soils. The geological mapping describes the strata as basalt lava flows with older flows and flow remnants.

Some weaker alluvial soils may also be present in the vicinity of the Puketotara stream. However, the proposed building site is elevated and setback at least 350m from the stream and the possibility of encountering alluvial soils are considered low.

2.3 Existing Geotechnical Information

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

3 SURFACE WATER FEATURES AND OVERLAND FLOWPATHS

During our site walkover and desktop appraisal of the supplied topographic data, Geologix have developed an understanding of the surface water features and overland flow paths influencing the site. This is summarised in the following sections and shown schematically on Drawing No. 500 with associated off-set requirements to hydrological features.

3.1 Surface Water Features

The site is at the lower elevations of a larger catchment that extends to the west upstream of Puketotara stream which trends east along the southern site boundary and beyond towards Kerikeri.

3.2 Overland Flow Paths

Some clearly defined flow paths are evident within the site boundaries upon moderately sloping land. Due to the volcanic geology, these overland flow paths develop into well defined, steep gullies terminating at the Puketotara stream to the south.

Our walkover survey was undertaken in late February during a relatively dry period and noted no flow through the overland flow paths. The above is indicated and detailed with associated off-sets on Drawing No. 500.

---

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

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

4 GROUND INVESTIGATION

A site-specific walkover survey and intrusive ground investigation was undertaken by Geologix on 21 February 2024. The ground investigation was scoped to confirm the findings of the above information and to provide parameters for wastewater assessment. The ground investigation comprised:

- Two hand augered boreholes designated BH01 and BH02 inclusive, formed within suitable areas for wastewater disposal fields on proposed residential lot 1 with a target depth of 1.2 m below ground level (bgl).

4.1 Site Walkover Survey

A visual walkover survey of the property confirmed:

- The topographical understanding of the site developed from our desktop study, as outlined in Section 2, is in general accordance with that observed on site.
- Suitable building envelopes[4] can be formed on moderately sloping land 15° to 20°. However, the site also consists of some steep gullies.
- Current agricultural activities such as pasture and grazing were observed on proposed lot 2.
- Puketotara Road provides an established access point to the existing development where access will remain unchanged when developed to lot 2. Access for proposed lot 1 is achievable at the northwestern corner of the site.
- Nearby land in all directions includes similar rural properties with open pasture, dense bush, and agriculture.
- The area of proposed lot 2 comprises of existing agricultural buildings, an existing residential dwelling, and associated gravelled internal farm tracks.
- The far north portion of proposed lot 1, directly adjacent to the road has visual signs of stormwater scouring down the slope from the road.
- Overland flow paths extend east/ southeast throughout the site and are predominantly covered in vegetation. These overland flow paths vary in size and depth from fairly shallow channels in the upper grassed areas to very deep gulleys (no more than approximately 6m) with naturally defined steep faces within the areas of densely covered bush towards the Puketotara Stream.
- Puketotara stream defines the southern boundary of the site.

[4] *Measuring 30 m x 30 m according to FNDC District Plan Rule 13.7.2.2.*

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[5]. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 500 within Appendix A. Strata identified during the ground investigation can be summarised as follows:

- **Topsoil encountered to 0.1 m bgl.** Described as organic silt, brown, stiff and dry.
- **Kerikeri Volcanics Group Residual Soil to depths >1.2m bgl.** The residual soils encountered are generally silty with trace clay and gravel, low plasticity and high permeability. They are brownish red to red in colour.

  In-situ field vane tests was taken at 0.3 m depth intervals to determine soil strength within this layer. All in-situ tests recorded vane shear strengths either exceeded peak of 195kPa or became Unable to Penetrate (UTP), indicative of very stiff strengths.

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

Table 2: Summary of Ground Investigation

Hole ID	Lot	Hole Depth	Topsoil Depth	Groundwater[2]	Wastewater Category[4]
BH01	1	1.2 m	0.1 m	NE	5 – moderate to slow draining
BH02	1	1.2 m	0.1 m	NE	5 – moderate to slow draining

1. *All depths recorded in m bgl unless stated.*
2. *Groundwater measurements taken on day of drilling.*
3. *NE – Not Encountered.*
4. *Wastewater category in accordance with Auckland Council TP58[6].*

5 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.

[5] *New Zealand Geotechnical Society, Field Description of Soil and Rock, 2005.*
[6] *Auckland Council, Technical Publication 58, On-site Wastewater Systems: Design and Management Manual, 2004, Table 5.1.*

The concept rural residential developments within this report assume that the proposed new lot may comprise up to a five-bedroom dwelling with a peak occupancy of eight people[7]. 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.

5.1 Existing Wastewater Systems

A total site visit inspection was not concluded in and around the dwelling on proposed lot 2 although it can be confirmed an existing wastewater treatment system and associated disposal fields are contained within the lot boundaries. Furthermore, other existing wastewater treatment or disposal systems were not identified or surveyed within proposed lot 1 site boundaries.

5.2 Wastewater Generation Volume

In lieu of potable water infrastructure servicing the site, roof rainwater collection within on-lot tanks has been proposed for this assessment. The design water volume for roof water tank supply is estimated at 160 litres/ person/ day[8]. This assumes standard water saving fixtures[9] 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.

5.3 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 may be 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.

5.4 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

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[7] TP58 Table 6.1.

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

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

Compensating Dripper Irrigation (PCDI) systems, a commonplace method of wastewater disposal.

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

Table 3: 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 ° but <20 °. Concept design does comply, with required cutoff drains.
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. All watercourse separation distances to disposal areas are 30 m.

5.4.1 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 5, sandy clay-loam, clay-loam, and silty clay loam – moderate to slow drainage. This correlates to NZS1547 Category 4, imperfectly drained described as clay loams. For a typical PCDI system, a Soil Loading Rate (SLR) of 3 to 4mm/ day is recommended within NZS1547 Table 5.2 and TP58 Table 9.2.

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

- 100 to 150 mm minimum depth of good quality topsoil (NZS1547 Table M1, note 1) to slow the soakage and assist with nutrient reduction.
- Minimum 30 % reserve disposal field area to enact 3.5 mm/ day SLR.

5.4.2 *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. 500.

- **Primary Disposal Field.** A minimum PCDI primary disposal field of 366 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. It is recommended each proposed lot provides a 110 m^2 reserve disposal area to be laid parallel to the natural contours.
- Concept disposal field locations require the provision of surface water cut-off drains to meet the provisions of NRP rule C.6.1.3.
- 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.

5.5 Summary of Concept Wastewater Design

Based on the above design assumptions a concept wastewater design is presented in Table 4 and presented schematically upon Drawing No. 500. It is recommended that each lot is subject to Building Consent specific review and design amendment according to final development plans.

Table 4: 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 5, NZS1547 Category 4
Soil Loading Rate	3.5 mm/ day
Primary disposal field	Surface/ subsurface laid PCDI, min. 366 m^2
Reserve disposal field	Surface/ subsurface laid PCDI, min. 30 % or 110 m^2
Dosing Method	Pump with high water level visual and audible alarm. Minimum 24-hour emergency storage volume.
Stormwater Control	Divert surface/ stormwater drains away from disposal fields. Cut off drains required.

1. Unless further water saving measures are included.

5.6 Assessment of Environmental Effects

An Assessment of Environmental Effects (AEE) is required to address two aspects of wastewater disposal. These include the effect of treated wastewater disposal for an individual lot and the cumulative or combined effect of multiple lots discharging treated wastewater to land as a result of subdivision.

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

It is recommended that the AEE is reviewed at the time of Building Consent once specific development plans, final disposal field locations and treatment systems are established. The TP58 guideline document provides a detailed AEE for Building Consent application. Based on the proposed scheme, ground investigation, walkover inspection and Drawing No. 500, 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.

6 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.

6.1 Regulatory Requirements

Stormwater management for the proposed activity is controlled by the FNDC Operative District Plan[10] and NRC Proposed Regional Plan[11]. The requirement for subdivision and probable future development under these legislations is summarised below.

6.1.1 Regional Provisions

The Proposed Regional Plan states the diversion and discharge of stormwater into water or onto or into land where it may enter water from an impervious area or by way of a stormwater collection system, is a permitted activity, provided the criteria of Rule C.6.4.2(1) to (8) are met.

6.1.2 District Wide Provisions

Subdivision activity and provisions for probable future development within both urban and rural environments is controlled by District Plan Rule 13.7.3.4. In relation to rural subdivision the following apply which this concept design provisions for:

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[10] *https://www.fndc.govt.nz/Your-Council/District-Plan/Operative-plan*
[11] *Proposed Regional Plan for Northland July 2021 – Appeals Version*

(a) All allotments shall be provided, within their net area, with a means for the disposal of collected stormwater from the roof of all potential or existing buildings and from all impervious surfaces, in such a way so as to avoid or mitigate any adverse effects of stormwater runoff on receiving environments, including downstream properties. This shall be done for a rainfall event with a 10% Annual Exceedance Probability (AEP).

(c) The provision of grass swales and other water retention devices such as ponds and depressions in the land surface may be required by the Council in order to achieve adequate mitigation of the effects of stormwater runoff.

(d) All subdivision applications creating sites 2ha or less shall include a detailed report from a Chartered Professional Engineer or other suitably qualified person addressing stormwater disposal.

(d) Where flow rate control is required to protect downstream properties and/or the receiving environment then the stormwater disposal system shall be designed in accordance with the onsite control practices as contained in "Technical Publication 10, Stormwater Management Devices – Design Guidelines Manual" Auckland Regional Council (2003).

6.1.3 Environmental Zone Provisions

Permitted activity status for proposed impervious surface areas within the rural production zone is determined by Rule 8.6.5.1.3 which is presented below.

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

6.2 Impervious Surfaces and Activity Status

The proposed activity has been assessed as a Permitted Activity in accordance with rules outlined by Section 6.1. A summary of this is provided as Table 5 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 6.3.

Table 5: Summary of Impervious Surfaces

Surface	Proposed Lot 1	Proposed Lot 2
Existing Condition	**NA**	**(723,900 m²)**
Roof	776 m²	0.11 %
Driveway	3760 m²	0.52 %
Right of Way	0 m²	0.0 %
Total impervious	4536 m²	0.63 %

Proposed Condition	(74,400 m²)		(649,500 m²)	
Roof	300 m²	0.4 %	776 m²	0.1 %
Driveway	300 m²	0.4 %	3760 m²	0.6 %
Right of Way	0 m²	0.0 %	0 m²	0.0 %
Total	600 m²	0.8 %	4536 m²	0.7 %
Activity Status	Permitted		Permitted	

6.3 Stormwater Management Concept

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

- **Probable Future Development (Proposed Lot 1).** The proposed application includes subdivision formation only and not lot-specific residential development at this stage. However, a conservative model of probable future on-lot development has been developed for this assessment considering variation of scale in typical rural residential development. The probable future on-lot development concept includes up to 300 m² potential roof area and up to 300 m² potential driveway or parking areas which allows for the length of a 3 m driveway from the edge of Puketotara Road carriageway to the proposed house site. The latter has been modelled as an offset within lot-specific attenuation devices. The conceptual driveway length from vehicle crossing to the proposed building footprint is considered.
- **Existing On-site Development (Proposed Lot 2).** An existing dwelling and agricultural buildings with a total roof area of 776 m² and impervious driveway areas of 3760 m² is sited on the northern aspect of the site. Total impervious areas are below the Permitted Activity threshold (15% of gross site area) and therefore no attenuation is proposed for the presumably existing, consented development.

6.4 Design Storm Event

No increase to flooding hazard on downstream property has been identified with the future development of the site and therefore there is no requirement to provide flood control in compliance with FNDC Engineering Standard Table 4-1. The concept design attenuates the post-development stormwater runoff peak discharge to 80 % of the pre-development condition for the 20 % and 50 % AEP storm event.

The attenuation modelling within this report has been undertaken for all of the above storm events. The results are summarised in Table 6 and provided in full in Appendix D.

Correctly sized discharge devices have adopted the 20 % AEP event to reduce scour and erosion at discharge locations which may otherwise result in concentrated discharge. These are detailed further in Section 6.5.1 of this report.

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model[12]. NIWA provides guidelines for modelling the effects of potential climate change effects of rainfall intensity increase by applying a potential change factor to historical data. This report has adopted potential change factors to account for a 2.1 °C climate change increase scenario. NIWA HIRDS and climate change factor data is presented in full within Appendix D.

6.5 Concept Stormwater Attenuation

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 20 % AEP storm event. This is achievable by installing specifically sized low-flow orifices into the attenuation tanks (for roofs or roadways) which provides sufficient detention volume. A typical schematic retention/ detention tank arrangement detail is presented as Drawing No. 401 within Appendix A.

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

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

Table 6: Summary of Probable Future and Existing Development Concept

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
Future Concept Developments (Lot 1)			
Potential buildings	0 m^2	300 m^2	Detention within roof water tanks
Potential driveways	0 m^2	300 m^2	Off-set detention in roof water tanks
Total	**0 m^2**	**600 m^2**	
Existing Development Concept (Lot 2)			
Existing buildings	776 m^2	776 m^2	NR
Existing driveway	3760 m^2	3760 m^2	NR
Total	**4536 m^2**	**4536 m^2**	

NR – Not Required.

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

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

Calculations to support the concept design are presented as Appendix D to this report. A summary of the proposed on-lot stormwater attenuation design is presented as Table 7. As above, it is recommended that this concept design is refined at the Building Consent stage once final development plans are available. A Consent notice may be required to be applied to each title to ensure this is undertaken.

Table 7: Probable Future Development Attenuation Concept

Design Parameter	Flow Attenuation: 50 % AEP (80% of pre dev)	Flow Attenuation: 20 % AEP (80% of pre dev)
Proposed Lot 1		
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1
Pre-development peak flow	5.32 l/s	6.86 l/s
80 % pre-development peak flow	4.26 l/s	5.49 l/s
Post-development peak flow	9.93 l/s	12.81 l/s
Total Storage Volume Required	10598 litres	13824 litres
Concept Summary:	- Attenuation storage calculation accounts for offset flow from driveway (not indicated explicitly in summary above. Refer Appendix D for calcs in full) - Attenuation to 80 % of pre-development condition for 20 % 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 (13824l) + potable storage (11176l) - 20% AEP attenuation in isolation requires a 22 mm orifice 1.44 m below overflow. However regulatory requirements are to consider an additional orifice to control the 50%. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.	

6.5.1 On-Lot Discharge Dispersion

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

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

Typical rural residential developments construct either above or below ground discharge dispersion pipes. Feeding pipes can be either buried or pinned to the surface as desired. It is recommended that all pipes are designed to accommodate the maximum tank overflow. A concept dispersion pipe or trench length is presented as Table 8. Calculations to derive this

are presented within Appendix D, based on the Auckland Council TR2013/018 document, a widely adopted standard for this application in New Zealand.

Table 8: Summary of Concept Dispersion Devices

Concept Impervious Area to Tank	Velocity at single spreader orifice	Tank outlet pipe diameter	Spreader pipe diameter	Dispersion Pipe/ Trench Length	Spreader orifice size	Concept
Concept Lot 1 Future development						
600 m^2	0.75 m/s	0.1 m	0.15 m	6.8 m	15 mm, spaced at 200mm intervals	Above ground dispersion device or in-ground dispersion trench.

6.6 Subdivision Development Management

The above stormwater concept does not provide specific attenuation of subdivision vehicle crossing impermeable surface areas due to the relatively minor catchments and effects on the downstream environment.

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

- RC pipe culvert formed at lot 1 intersection between proposed lot entry and vehicle crossing to provide conveyance of drainage beneath the lot accessway.

6.7 Stormwater Quality

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

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

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

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

- Grassed swale drains from rainwater inception (road surfaces) to discharge points.

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

6.8 Assessment Criteria and Consent Status

Assessment criteria are presented in full within Appendix C. A summary of the assessment is presented below:

6.8.1 District Plan

The proposed activity has been assessed as a **Restricted Discretionary Activity** according to FNDC Operative Plan Rule 13.7.2, where 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.

The proposed activity is determined to meet the requirements of a **Permitted Activity** according to the provisions of Proposed Regional Plan Rule C.6.4.2, on the basis that sufficient attenuation measures have been provided as presented in this report.

7 POTABLE WATER & FIRE FIGHTING

In the absence of potable water infrastructure within Puketotara Road or within the site it is recommended that roof runoff water tanks are adopted for potable water supply with appropriate filtration and UV disinfection at point of use. The volume of potable water supply on each lot should consider the required stormwater detention volume identified within Table 7.

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

8 EARTHWORKS

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

- **New vehicle crossing.** Cut/ fill earthworks for construction of the vehicle crossing 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.

8.1 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 scope of work and 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.

8.2 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 proposed lot 1.

9 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[15], Northland Regional Council (NRC) Proposed Regional Plan for Northland[16] and Regional Water and Soil Plan for Northland. Following our ground investigation and considering the measures presented in this report, a summary of the proposed activities against defined natural hazards is presented as Table 9.

Table 9: Summary of Natural Hazards

Natural Hazard	Applicability	Mitigation & Effect on Environment
Erosion	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	No mitigation required, less than minor.
Rockfall	NA	No mitigation required, less than minor.
Alluvion	NA	No mitigation required, less than minor.
Avulsion	NA	No mitigation required, less than minor.
Unconsolidated fill	NA	No mitigation required, less than minor.
Soil contamination	NA	No mitigation required, less than minor.
Subsidence	NA	No mitigation required, less than minor.
Fire hazard	NA	No mitigation required, less than minor.
Sea level rise	NA	No mitigation required, less than minor.

NA – Not Applicable.

10 INTERNAL ROADING AND VEHICLE CROSSINGS

It should be noted that we are not traffic engineers, and no specific Traffic Impact Assessment is included within the scope of these works. If required, it is recommended that advice is sought from a chartered traffic engineer.

10.1 Traffic Intensity Factor and Household Equivalents

According to Appendix 3A of the Operative District Plan, providing for one standard residential unit per lot, each accounting for up to 10 traffic movements per unit per day the following Traffic Intensity Factor (TIF) and Household Equivalents have been calculated.

- **Current Condition:** TIF of 10 from one HE.
- **Proposed Condition:** TIF of 20 from two HE.

10.2 Vehicle Crossings

Vehicle crossings will be formed at subdivision stage. A summary of proposed vehicle crossings is presented as Table 10.

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

Table 10: Summary of Proposed Vehicle Crossings

Location	Type	Detail	Formation
Puketotara Road/ Lot 1	FNDC Type 1A, Light Vehicles	Construct to typical detail with 375 mm dia. RC pipe culvert and 3.0 m width at boundary.	Subdivision
Puketotara Road/ Lot 2	FNDC Type 1A, Light Vehicles	Currently constructed to minimum FNDC requirements. Provide any minor upgrades required to Type 1A standard.	Subdivision – as required.

RCP – Reinforced Concrete Pipe

11 LIMITATIONS

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

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

The recommendations and opinions in this report are based on arisings extracted from exploratory boreholes at discrete locations and any available existing borehole records. The nature and continuity of subsurface conditions, interpretation of ground condition and models away from these 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

NEW VEHICLE CROSSING AS PER FNDC TYPE 1A STANDARD WITH MIN. 375 mm Ø. RCP CULVERT

PUKETOTARA ROAD

FUTURE DEVELOPMENT 3m WIDE PRIVATE DRIVEWAY AS PART OF BUILDING CONSENT (AREA 220 m²)

LOT 1
7.44 ha

LOT 2
64.95 ha

PUKETOTARA STREAM

BH01

BH02

17°

6.8

21.2

19.8

205.0 200.0 195.0 190.0 185.0 175.0 170.0 165.0 160.0 155.0 150.0 145.0 140.0 135.0

SW

GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY PROPOSED SCHEME PLAN REF. 10124, DATED 9 OCTOBER 2023.
2. HORIZONTAL CO ORDINATE SYSTEM = NZTM.
3. VERTICAL DATUM NZTM.
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 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT SYSTEM	NO - SUBJECT TO BUILDING CONSENT DESIGN
PRIMARY DISPOSAL AREA	366 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO - SUBJECT TO BUILDING CONSENT DESIGN
CUT OFF DRAINS?	YES
DISCHARGE CONSENT?	NO

PROPOSED BUILDING PLATFORM

BHXX GEOLOGIX HAND AUGER LOCATION - FEBRUARY 2024

WATERCOURSE

OVERLAND FLOWPATH

SW EXISTING ROADSIDE GRASSED SWALE DRAIN

SW PROPOSED ROADSIDE GRASSED SWALE DRAIN

PRIMARY DISPOSAL FIELD

RESERVE DISPOSAL FIELD

WASTEWATER FIELD CUTOFF DRAIN

CONCEPT 1 X 25,000 LITRE WATER TANK ATTENUATING TO DISPERSION DEVICE TO CONTROL 600 m² AREA

17.5 0 Meters 17.5 35

1:1750

Revision	Issue	Date
A	CONSENT	14/05/2024

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

523, 611 & 621 PUKETOTARA ROAD

OKAIHAU, FAR NORTH

LOT 3 DP 87228

Project	Drawn By
C0451	SD

Client

GREENACRE HEIGHTS LTD

Sheet Title

ENGINEERING PLAN

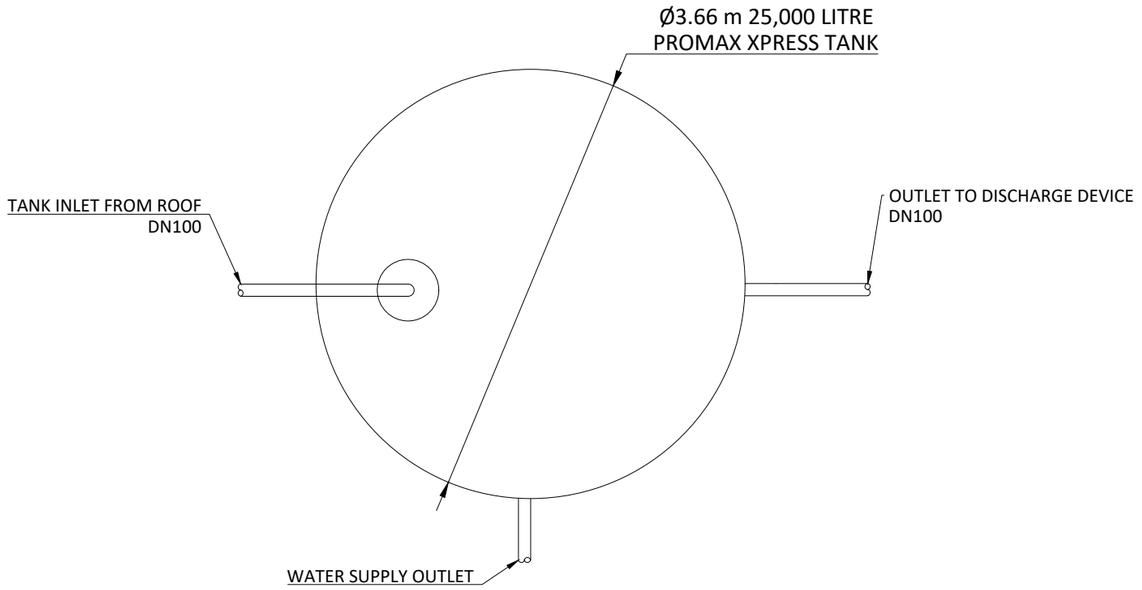
Sheet

500

PLOTTED: 03/04/2022

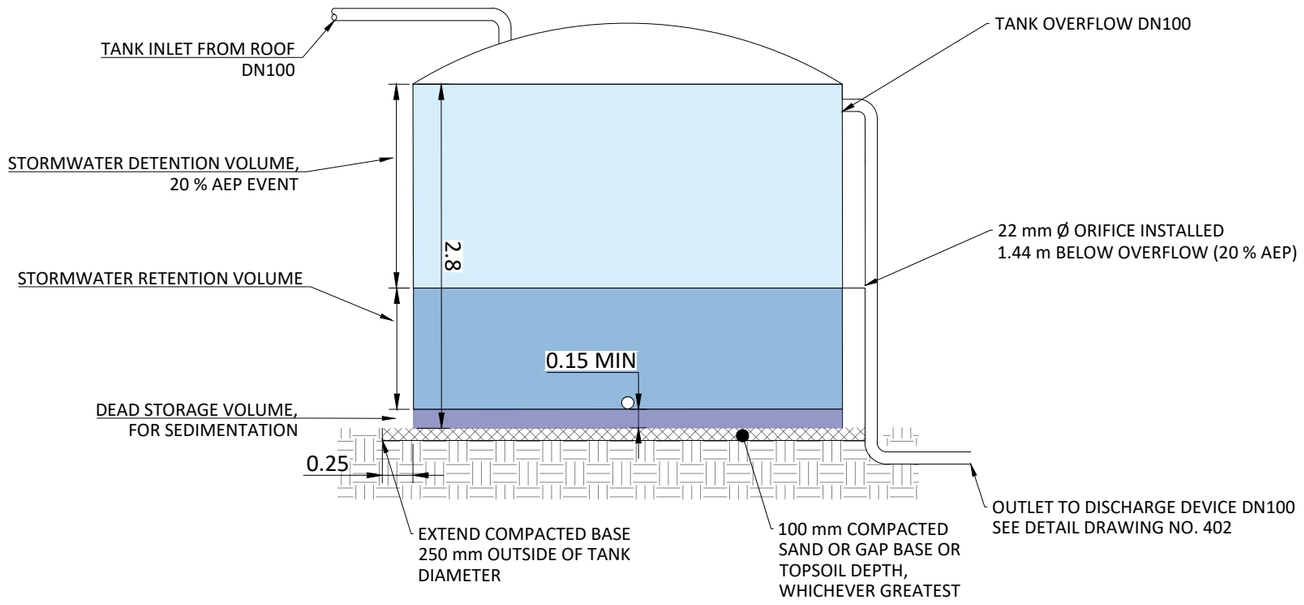
PROPOSED TANK PLAN VIEW

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.

0	CONSENT	15/04/2024
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

523, 611 & 621 PUKETOTARA ROAD

OKAIHAU, FAR NORTH

LOT 3 DP 87228

Project	Drawn By
C0451	SD

Client

GREENACRE HEIGHTS LTD

Sheet Title

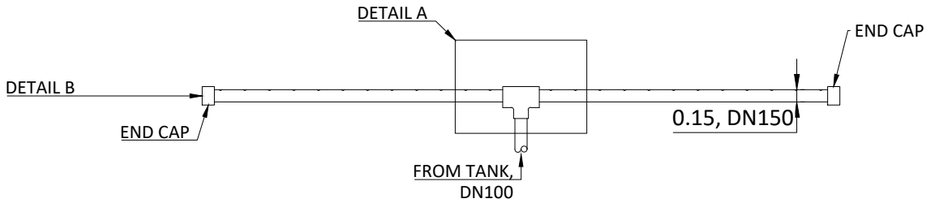
TYPICAL TANK DETAIL

Sheet

401

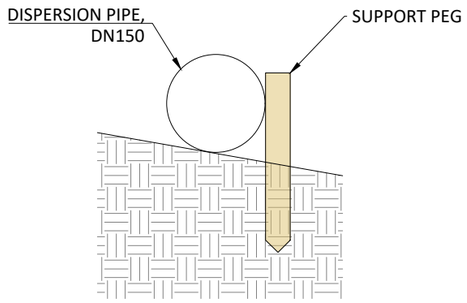
OPTION 1: DISPERSION VIA ABOVE GROUND PIPE

NOT TO SCALE



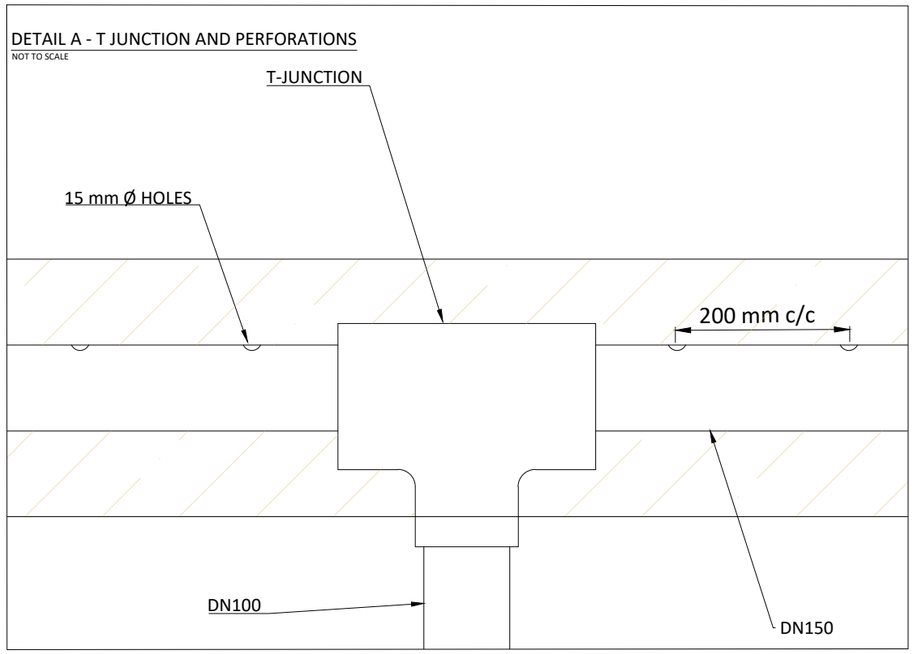
DETAIL B - SIDE VIEW

NOT TO SCALE



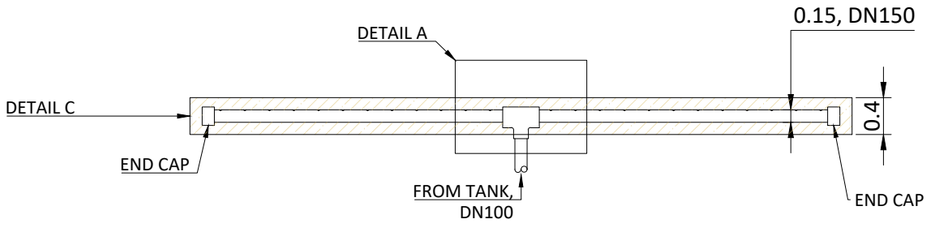
DETAIL A - T JUNCTION AND PERFORATIONS

NOT TO SCALE



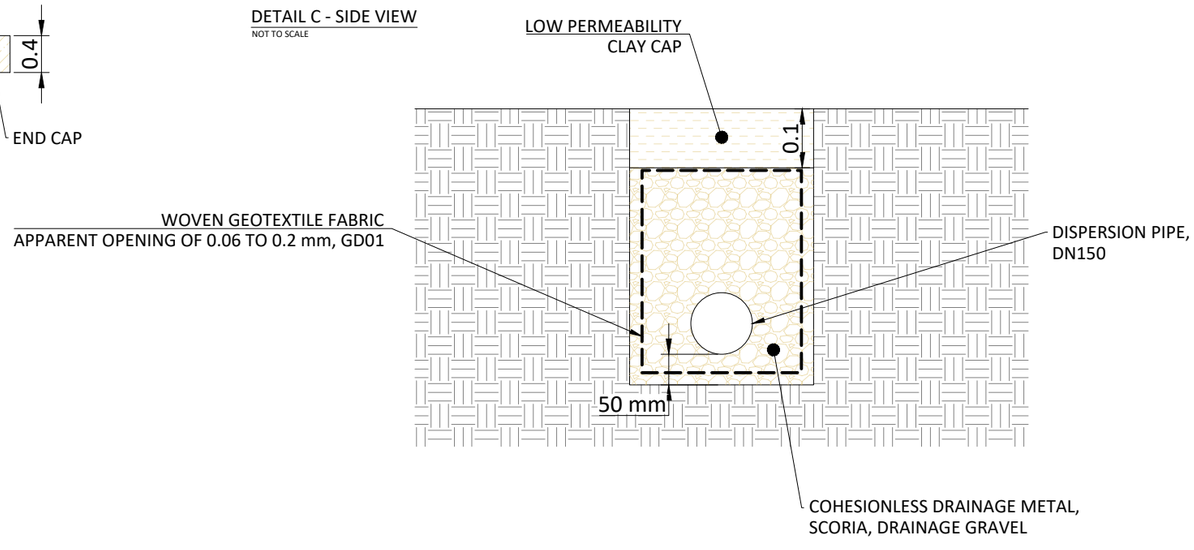
OPTION 2: DISPERSION VIA BELOW GROUND TRENCH

NOT TO SCALE



DETAIL C - SIDE VIEW

NOT TO SCALE



GENERAL NOTES

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

0	CONSENT	15/04/2024
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

523, 611 & 621 PUKETOTARA ROAD

OKAIHAU, FAR NORTH

LOT 3 DP 87228

Project	Drawn By
C0451	SD

Client

GREENACRE HEIGHTS LTD

Sheet Title

TYPICAL DISPERSION PIPE DETAIL

Sheet

402

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APPENDIX B

Engineering Borehole Records

INVESTIGATION LOG

HOLE NO.: BH01

CLIENT: Greenacre Heights Ltd, R Kask Webster

PROJECT: 534 Puketotara Road, Okaihau

JOB NO.: C0451

SITE LOCATION: South Side of Puketotara Road, Okaihau

START DATE: 21/02/2024

CO-ORDINATES:

ELEVATION: Ground

END DATE: 21/02/2024

CONTRACTOR: Internal

RIG: HAND AUGER

DRILLER: TW

LOGGED BY: SD

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa) Vane: 3282	Values	WATER
TOPSOIL comprising organic SILT; brown; moist; low plasticity.		0.0	TS				
Clayey SILT, with trace gravel; light brown. Very stiff; moist; low plasticity; gravel, fine.		0.2			195+	-	
		0.4					
SILT, with minor clay, with trace sand; red. Very stiff; moist; low plasticity; sand, fine, white.		0.6			195+	-	Groundwater Not Encountered
		0.8					
		1.0			195+	-	
End Of Hole: 1.20m		1.2			195+	-	
		1.4					

Scala Penetrometer: 2 4 6 8 10 12 14 16 18

Vane Shear Strength (kPa): 50 100 150 200

PHOTO(S)

REMARKS

1. Hand auger completed at target depth 1.2m bgl.
2. Groundwater not encountered at the time of drilling.
3. Slope Angle 15°-20°

WATER

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

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: BH02

CLIENT: Greenacre Heights Ltd, R Kask Webster
PROJECT: 534 Puketotara Road, Okaihau

JOB NO.: C0451

SITE LOCATION: South Side of Puketotara Road, Okaihau
START DATE: 21/02/2024
CO-ORDINATES:
ELEVATION: Ground
END DATE: 21/02/2024
CONTRACTOR: Internal
RIG: HAND AUGER
DRILLER: TW
LOGGED BY: SD

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa) Vane: 3282	WATER
TOPSOIL comprising organic SILT; brown; moist; low plasticity.		0.0	TS			
SILT, with trace clay; light brown. Very stiff; moist; low plasticity.		0.2			195+	
SILT, with some clay, with trace gravel; light brown. Very stiff; moist; low plasticity; gravel, fine.		0.4 0.6 0.8			195+	Groundwater Not Encountered
SILT, with some clay; red. Very stiff; moist; low plasticity.		1.0			195+	
End Of Hole: 1.20m		1.2 1.4			195+	

Scala Penetrometer: 2, 4, 6, 8, 10, 12, 14, 16, 18
Vane Shear Strength (kPa): 50, 100, 150, 200 | Values

PHOTO(S)

REMARKS

1. Hand auger completed at target depth 1.2m bgl.
2. Groundwater not encountered at the time of drilling.
3. Slope Angle 15°-20°

WATER

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

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

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APPENDIX C

Assessment of Environmental Effects and Assessment Criteria

Table 11: 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. 500.
Surface water feature[5]	15 m	30 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 <20 °.
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. 500.
4. Including any formed road with kerb and channel, and water-table drain that is down-slope of the disposal area.
5. River, lake, stream, pond, dam, or natural wetland.

AEP Annual Exceedance Probability.
NR No Requirement.

Table 12: Proposed Northland Regional Plan Stormwater Assessment Criteria, to rule C.6.4.2

Assessment Criteria	Comments
1) the discharge or diversion is not from: a) a public stormwater network, or b) a high-risk industrial or trade premises	Complies
2) the diversion and discharge does not cause or increase flooding of land on another property in a storm event of up to and including a 10 percent annual exceedance probability, or flooding of buildings on another property in a storm event of up to and including a one percent annual exceedance probability	Complies, all discharges attenuated to 80 % of pre-development 20 % AEP, which is more conservative than the 10 % AEP.
3) where the diversion or discharge is from a hazardous substance storage or handling area: a) the stormwater collection system is designed and operated to prevent hazardous substances stored or used on the site from entering the stormwater system, or b) there is a secondary containment system in place to intercept any spillage of hazardous substances and either discharges that spillage to a trade waste system or stores it for removal and treatment, or c) if the stormwater contains oil contaminants, the stormwater is passed through a stormwater treatment system designed in accordance with the Environmental Guidelines for Water Discharges from Petroleum Industry Sites in New Zealand (Ministry for the Environment, 1998) prior to discharge	Complies. Site is residential.
4) where the diversion or discharge is from an industrial or trade premises: a) the stormwater collection system is designed and operated to prevent any contaminants stored or used on the site, other than those already controlled by condition 3) above, from entering stormwater unless the stormwater is discharged through a stormwater treatment system, and b) any process water or liquid waste stream on the site is bunded, or otherwise contained, within an area of sufficient capacity to provide secondary containment equivalent to 100 percent of the quantity of any process water or liquid waste that has the potential to spill into a stormwater collection system, in order to prevent trade waste entering the stormwater collection system	Complies. Site is residential.
5) the diversion or discharge is not into potentially contaminated land, or onto potentially contaminated land that is not covered by an impervious area	Complies.
6) the diversion and discharge does not cause permanent scouring or erosion of the bed of a water body at the point of discharge	Complies, specifically sized discharge devices are provided from all on-lot devices.
7) the discharge does not contain more than 15 milligrams per litre of total petroleum hydrocarbons	Complies. Site is residential.
8) the discharge does not cause any of the following effects in the receiving waters beyond the zone of reasonable mixing: a) the production of conspicuous oil or grease films, scums or foams, of floatable or suspended materials, or b) a conspicuous change in the colour or visual clarity, or c) an emission of objectionable odour, or d) the rendering of fresh water unsuitable for consumption by farm animals, or 163 e) the rendering of fresh water taken from a mapped priority drinking water abstraction point (refer I Maps | Ngā mahere matawhenua) unsuitable for human consumption after existing treatment.	Complies.

Table 13: Proposed Northland Regional Plan Stormwater Assessment Criteria, to rule C.8.3.1

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

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APPENDIX D

Stormwater Calculations

Project Ref:	C0451	**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	523, 611, 621 PUKETOTARA ROAD, OKA		
Design Case:	CONCEPT FUTURE DEVELOPMENT	**50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	4 April 2024 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.

RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.48	GRASS & BUSH
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.8	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	66.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	79.80	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

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

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Q, l/s	COMMENTS
10	66.50	1.2	79.80	9.93	5.32	4.26	*Critical duration (time of concentration) for the catchments is 10min*
20	48.90	1.2	58.68	7.30	3.91	3.13	
30	40.90	1.2	49.08	6.11	3.27	2.62	
60	30.00	1.2	36.00	4.48	2.40	1.92	
120	21.70	1.2	26.04	3.24	1.74	1.39	
360	12.50	1.2	15.00	1.87	1.00	0.80	
720	8.41	1.2	10.09	1.26	0.67	0.54	
1440	5.45	1.2	6.54	0.81	0.44	0.35	
2880	3.36	1.2	4.03	0.50	0.27	0.22	
4320	2.46	1.2	2.95	0.37	0.20	0.16	

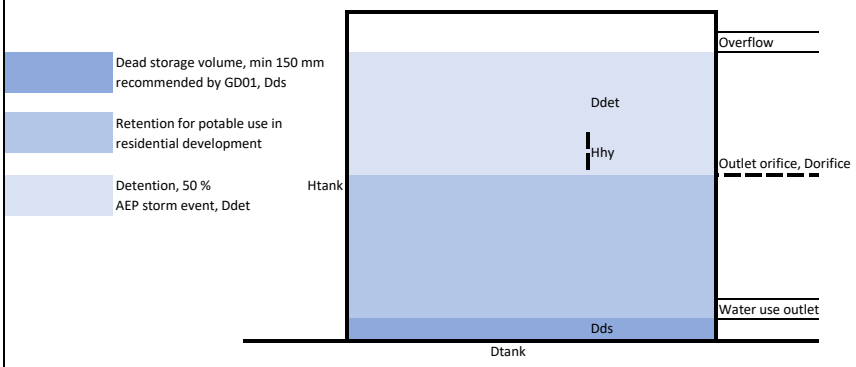
ATTENUATION ANALYSIS, VARIOUS DURATIONS

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	3.55	6.38	0.71	0.71	5.67	3405	*select largest required storage , regardless of duration, to avoid overflow*
20	2.61	4.69	0.52	0.71	3.99	4782	
30	2.18	3.93	0.44	0.71	3.22	5791	
60	1.60	2.88	0.32	0.71	2.17	7814	
120	1.16	2.08	0.23	0.71	1.37	9892	
360	0.67	1.20	0.13	0.71	0.49	10598	
720	0.45	0.81	0.09	0.71	0.10	4235	
1440	0.29	0.52	0.06	0.71	No Att. Req.	0	
2880	0.18	0.32	0.04	0.71	No Att. Req.	0	
4320	0.13	0.24	0.03	0.71	No Att. Req.	0	

NOTE: ALLOWABLE FLOW PROVIDES FOR ANY OFFSET ARISING FROM FLOWS NOT DIRECTLY DISCHARGING TO TANK

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	10.598	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.6	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.5	m	No. of Tanks 1
TANK AREA, Atank	9.62	m2	Area of two tanks hydraulically linked
TANK MAX STORAGE VOLUME, Vtank	25015	litres	
REQUIRED STORAGE HEIGHT, Ddet	1.10	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.25	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00071	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.55	m	
AREA OF ORIFICE, Aorifice	3.48E-04	m2	
ORIFICE DIAMETER, Dorifice	21	mm	
VELOCITY AT ORIFICE	4.65	m/s	At max. head level

Project Ref:	C0451		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	523, 611, 621 PUKETOTARA ROAD, OK			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	4 April 2024	REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.

RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.48	GRASS & BUSH
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.8	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	85.8	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	103.0	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

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

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Q, l/s	COMMENTS
10	85.80	1.2	102.96	12.81	6.86	5.49	*Critical duration (time of concentration) for the catchments is 10min*
20	63.20	1.2	75.84	9.44	5.06	4.04	
30	53.00	1.2	63.60	7.91	4.24	3.39	
60	38.90	1.2	46.68	5.81	3.11	2.49	
120	28.30	1.2	33.96	4.23	2.26	1.81	
360	16.20	1.2	19.44	2.42	1.30	1.04	
720	11.00	1.2	13.20	1.64	0.88	0.70	
1440	7.13	1.2	8.56	1.06	0.57	0.46	
2880	4.40	1.2	5.28	0.66	0.35	0.28	
4320	3.24	1.2	3.89	0.48	0.26	0.21	

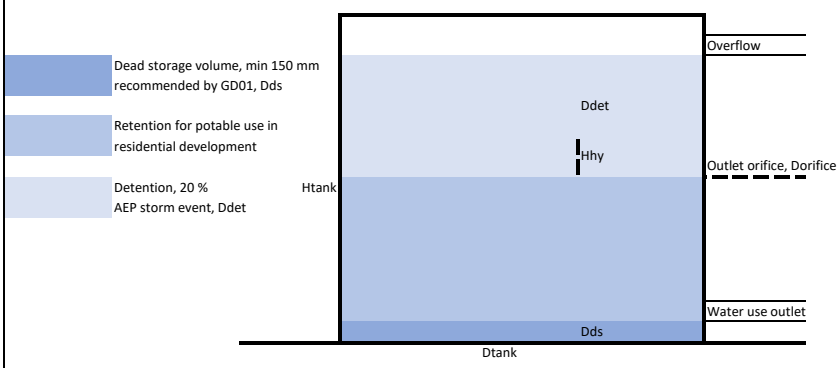
ATTENUATION ANALYSIS, VARIOUS DURATIONS

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	4.58	8.24	0.92	0.92	7.32	4393	*select largest required storage , regardless of duration, to avoid overflow*
20	3.37	6.07	0.67	0.92	5.15	6182	
30	2.83	5.09	0.57	0.92	4.17	7511	
60	2.07	3.73	0.41	0.92	2.82	10149	
120	1.51	2.72	0.30	0.92	1.80	12972	
360	0.86	1.56	0.17	0.92	0.64	13824	
720	0.59	1.06	0.12	0.92	0.14	6083	
1440	0.38	0.68	0.08	0.92	No Att. Req.	0	
2880	0.23	0.42	0.05	0.92	No Att. Req.	0	
4320	0.17	0.31	0.03	0.92	No Att. Req.	0	

NOTE: ALLOWABLE FLOW PROVIDES FOR ANY OFFSET ARISING FROM FLOWS NOT DIRECTLY DISCHARGING TO TANK

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	13.824	m3	Select largest storage as per analysis	
TANK HEIGHT, Htank	2.6	m	Concept sizing for 25,000 litre tank	
TANK DIAMETER, Dtank	3.5	m	No. of Tanks	1
TANK AREA, Atank	9.62	m2	Area of two tanks hydraulically linked	
TANK MAX STORAGE VOLUME, Vtank	25015	litres		
REQUIRED STORAGE HEIGHT, Ddet	1.44	m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	1.59	m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00092	m3/s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	0.72	m		
AREA OF ORIFICE, Aorifice	3.93E-04	m2		
ORIFICE DIAMETER, Dorifice	22	mm		
VELOCITY AT ORIFICE	5.31	m/s	At max. head level	

Project Ref:	C0451	STORMWATER ATTENUATION TANK DESIGN	geologix consulting engineers
Project Address:	523, 611, 621 PUKETOTARA ROAD, OKAIHA		
Design Case:	CONCEPT FUTURE DEVELOPMENT	CLIMATE CHANGE FACTORS	
Date:	4 April 2024 REV 1		

CLIMATE CHANGE PROJECTIONS

REPRODUCED FROM NIWA HIRDS, *https://niwa.co.nz/information-services/hirds/help*

Duration/ARI	2 yr	5 yr	10 yr	20 yr	30 yr	40 yr	50 yr	60 yr	80 yr	100 yr
1 hour	12.2	12.8	13.1	13.3	13.4	13.4	13.5	13.5	13.6	13.6
2 hours	11.7	12.3	12.6	12.8	12.9	12.9	13	13	13.1	13.1
6 hours	9.8	10.5	10.8	11.1	11.2	11.3	11.3	11.4	11.4	11.5
12 hours	8.5	9.2	9.5	9.7	9.8	9.9	9.9	10	10	10.1
24 hours	7.2	7.8	8.1	8.2	8.3	8.4	8.4	8.5	8.5	8.6
48 hours	6.1	6.7	7	7.2	7.3	7.3	7.4	7.4	7.5	7.5
72 hours	5.5	6.2	6.5	6.6	6.7	6.8	6.8	6.9	6.9	6.9
96 hours	5.1	5.7	6	6.2	6.3	6.3	6.4	6.4	6.4	6.5
120 hours	4.8	5.4	5.7	5.8	5.9	6	6	6	6.1	6.1

HIRDS V4 Intensity-Duration-Frequency Results
Sitename: Okaihau
Coordinate system: WGS84
Longitude: 173.874
Latitude: -35.2408

DDF Mode Parameters:	c	d	e	f	g	h	i
Values:	0.00253083	0.5448526	-0.0131054	-0.0040595	0.25089898	-0.0115367	3.3112377

Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Rate (mm/hr)
	24	100	3.17805383	4.60014923	12.79590208

Rainfall intensities (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	60.8	44.7	37.4	27.4	19.8	11.4	7.66	5	3.1	2.2	1.8	1.47
2	0.5	66.5	48.9	40.9	30	21.7	12.5	8.41	5.5	3.4	2.5	2	1.62
5	0.2	85.8	63.2	53	38.9	28.3	16.2	11	7.1	4.4	3.2	2.6	2.13
10	0.1	99.9	73.8	61.8	45.5	33.1	19	12.9	8.4	5.2	3.8	3	2.51
20	0.05	114	84.4	70.8	52.2	38	21.9	14.9	9.7	6	4.4	3.5	2.9
30	0.033	123	90.8	76.2	56.2	40.9	23.6	16	10	6.5	4.8	3.8	3.14
40	0.025	129	95.3	80	59	43	24.9	16.9	11	6.8	5	4	3.31
50	0.02	133	98.8	83	61.2	44.6	25.8	17.5	11	7.1	5.2	4.2	3.45
60	0.017	137	102	85.4	63	46	26.6	18.1	12	7.3	5.4	4.3	3.56
80	0.013	143	106	89.2	65.9	48.1	27.9	18.9	12	7.7	5.7	4.5	3.73
100	0.01	148	110	92.2	68.1	49.7	28.8	19.6	13	7.9	5.9	4.7	3.87
250	0.004	167	124	104	77.1	56.3	32.7	22.3	15	9.1	6.7	5.3	4.42

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	2.2	3.5	2.7	1.2	1.2	0.75	0.25	0.4	0.3	0.2	0.2	0.11
2	0.5	2.2	3.7	2.9	1.2	1.3	0.82	0.26	0.4	0.3	0.2	0.2	0.13
5	0.2	4.8	5.9	4.6	2.3	2	1.2	0.52	0.6	0.4	0.2	0.2	0.17
10	0.1	8	8.3	6.5	3.6	2.8	1.7	0.88	0.8	0.5	0.3	0.3	0.22
20	0.05	12	12	9.1	5.3	3.9	2.4	1.4	1	0.6	0.4	0.4	0.27
30	0.033	15	14	11	6.5	4.7	2.9	1.8	1.1	0.7	0.5	0.4	0.32
40	0.025	18	16	12	7.5	5.4	3.3	2.1	1.2	0.8	0.5	0.4	0.35
50	0.02	20	17	14	8.3	6	3.7	2.3	1.3	0.8	0.6	0.5	0.37
60	0.017	21	19	15	9.1	6.5	4.1	2.6	1.4	0.9	0.6	0.5	0.4
80	0.013	24	21	17	10	7.3	4.6	3	1.5	1	0.7	0.6	0.44
100	0.01	27	23	18	11	8	5.1	3.3	1.6	1	0.7	0.6	0.47
250	0.004	40	33	26	17	12	7.7	5.1	2.2	1.4	1	0.8	0.64

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	65.1	47.9	40	29.3	21.1	12	8.03	5.2	3.2	2.3	1.8	1.51
2	0.5	71.3	52.4	43.9	32.2	23.2	13.2	8.83	5.7	3.5	2.5	2	1.66
5	0.2	92.2	68	57	41.9	30.3	17.2	11.6	7.5	4.6	3.4	2.7	2.2
10	0.1	108	79.5	66.6	49	35.5	20.3	13.6	8.8	5.4	4	3.1	2.59
20	0.05	123	91.1	76.4	56.3	40.8	23.4	15.7	10	6.2	4.6	3.6	3
30	0.033	132	98	82.2	60.6	44	25.2	17	11	6.8	5	3.9	3.25
40	0.025	139	103	86.3	63.7	46.3	26.5	17.9	12	7.1	5.2	4.1	3.43
50	0.02	144	107	89.6	66.1	48	27.5	18.6	12	7.4	5.4	4.3	3.57
60	0.017	148	110	92.2	68.1	49.5	28.4	19.2	12	7.6	5.6	4.4	3.68
80	0.013	155	115	96.4	71.2	51.8	29.7	20.1	13	8	5.9	4.7	3.86
100	0.01	160	119	99.6	73.6	53.6	30.8	20.8	13	8.3	6.1	4.8	4
250	0.004	180	134	112	83.2	60.7	35	23.6	15	9.5	7	5.5	4.58

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	65.1	47.9	40	29.3	21.1	12	8.03	5.2	3.2	2.3	1.8	1.51
2	0.5	71.3	52.4	43.9	32.2	23.2	13.2	8.83	5.7	3.5	2.5	2	1.66
5	0.2	92.2	68	57	41.9	30.3	17.2	11.6	7.5	4.6	3.4	2.7	2.2
10	0.1	108	79.5	66.6	49	35.5	20.3	13.6	8.8	5.4	4	3.1	2.59
20	0.05	123	91.1	76.4	56.3	40.8	23.4	15.7	10	6.2	4.6	3.6	3
30	0.033	132	98	82.2	60.6	44	25.2	17	11	6.8	5	3.9	3.25
40	0.025	139	103	86.3	63.7	46.3	26.5	17.9	12	7.1	5.2	4.1	3.43
50	0.02	144	107	89.6	66.1	48	27.5	18.6	12	7.4	5.4	4.3	3.57
60	0.017	148	110	92.2	68.1	49.5	28.4	19.2	12	7.6	5.6	4.4	3.68
80	0.013	155	115	96.4	71.2	51.8	29.7	20.1	13	8	5.9	4.7	3.86
100	0.01	160	119	99.6	73.6	53.6	30.8	20.8	13	8.3	6.1	4.8	4
250	0.004	180	134	112	83.2	60.7	35	23.6	15	9.5	7	5.5	4.58

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	66.1	48.7	40.7	29.8	21.5	12.1	8.12	5.2	3.2	2.3	1.8	1.52
2	0.5	72.5	53.3	44.6	32.7	23.6	13.4	8.94	5.7	3.5	2.6	2	1.68
5	0.2	93.9	69.2	58	42.6	30.8	17.5	11.7	7.5	4.6	3.4	2.7	2.21
10	0.1	110	80.9	67.8	49.9	36.1	20.6	13.8	8.9	5.5	4	3.2	2.61
20	0.05	125	92.7	77.8	57.3	41.6	23.7	15.9	10	6.3	4.6	3.7	3.03
30	0.033	135	99.8	83.7	61.7	44.8	25.6	17.2	11	6.8	5	4	3.28
40	0.025	142	105	87.9	64.9	47.1	26.9	18.1	12	7.2	5.3	4.2	3.46
50	0.02	147	109	91.2	67.3	48.9	28	18.8	12	7.5	5.5	4.4	3.6
60	0.017	151	112	93.9	69.3	50.4	28.9	19.4	13	7.7	5.7	4.5	3.71
80	0.013	158	117	98.2	72.5	52.7	30.2	20.3	13	8.1	5.9	4.7	3.9
100	0.01	163	121	101	75	54.5	31.3	21.1	14	8.4	6.2	4.9	4.04
250	0.004	184	136	115	84.8	61.8	35.5	24	16	9.6	7	5.6	4.62

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	69.5	51.2	42.8	31.4	22.5	12.6	8.41	5.4	3.3	2.4	1.9	1.55
2	0.5	76.3	56.1	47	34.4	24.8	13.9	9.28	5.9	3.6	2.6	2.1	1.71
5	0.2	99	73	61.2	45	32.5	18.3	12.2	7.8	4.8	3.5	2.7	2.27
10	0.1	116	85.4	71.6	52.7	38.1	21.5	14.4	9.2	5.6	4.1	3.2	2.68
20	0.05	133	98	82.2	60.6	43.8	24.9	16.6	11	6.5	4.8	3.8	3.11
30	0.033	143	105	88.5	65.3	47.3	26.8	17.9	12	7	5.2	4.1	3.36
40	0.025	150	111	92.9	68.6	49.7	28.3	18.9	12	7.4	5.4	4.3	3.55
50	0.02	155	115	96.5	71.2	51.6	29.4	19.6	13	7.7	5.7	4.5	3.7
60	0.017	160	118	99.3	73.3	53.2	30.3	20.3	13	8	5.8	4.6	3.81
80	0.013	167	124	104	76.8	55.7	31.7	21.2	14	8.4	6.1	4.8	4.01
100	0.01	172	128	107	79.3	57.6	32.8	22	14	8.7	6.3	5	4.15
250	0.004	194	144	121	89.7	65.3	37.3	25	16	9.9	7.3	5.7	4.75

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	65.7	48.3	40.4	29.6	21.3	12.1	8.08	5.2	3.2	2.3	1.8	1.52
2	0.5	72	53	44.3	32.5	23.5	13.3	8.9	5.7	3.5	2.6	2	1.67
5	0.2	93.2	68.8	57.6	42.3	30.6	17.4	11.7	7.5	4.6	3.4	2.7	2.21
10	0.1	109	80.3	67.3	49.5	35.9	20.4	13.7	8.9	5.4	4	3.2	2.61
20	0.05	125	92.1	77.2	56.9	41.3	23.6	15.8	10	6.3	4.6	3.7	3.02
30	0.033	134	99	83.1	61.3	44.5	25.4	17.1	11	6.8	5	4	3.27
40	0.025	140	104	87.3	64.4	46.8	26.8	18	12	7.2	5.3	4.2	3.45
50	0.02	146	108	90.6	66.8	48.6	27.8	18.7	12	7.5	5.5	4.3	3.59
60	0.017	150	111	93.2	68.8	50	28.7	19.3	13	7.7	5.6	4.5	3.7
80	0.013	157	116	97.5	72	52.4	30	20.2	13	8.1	5.9	4.7	3.88
100	0.01	162	120	101	74.4	54.1	31.1	21	14	8.4	6.1	4.9	4.03
250	0.004	182	135	114	84.2	61.3	35.3	23.8	15	9.5	7	5.6	4.61

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	72.6	53.4	44.6	32.7	23.5	13.1	8.66	5.5	3.3	2.4	1.9	1.58
2	0.5	79.7	58.7	49.1	36	25.9	14.4	9.58	6.1	3.7	2.7	2.1	1.74
5	0.2	104	76.4	64	47	33.9	19	12.6	8	4.9	3.6	2.8	2.31
10	0.1	121	89.5	75	55.2	39.8	22.4	14.9	9.5	5.8	4.2	3.3	2.74
20	0.05	139	103	86.2	63.5	45.9	25.9	17.2	11	6.7	4.9	3.9	3.18
30	0.033	149	111	92.8	68.4	49.5	27.9	18.6	12	7.2	5.3	4.2	3.44
40	0.025	157	116	97.4	71.9	52	29.4	19.6	13	7.6	5.6	4.4	3.64
50	0.02	163	121	101	74.7	54.1	30.6	20.4	13	8	5.8	4.6	3.78
60	0.017	167	124	104	76.9	55.7	31.6	21	13	8.2	6	4.7	3.9
80	0.013	175	130	109	80.5	58.3	33	22	14	8.6	6.3	5	4.1
100	0.01	181	134	113	83.2	60.3	34.2	22.8	15	8.9	6.5	5.2	4.25
250	0.004	204	151	127	94.1	68.4	38.9	26	17	10	7.4	5.9	4.86

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	66.9	49.2	41.2	30.2	21.7	12.3	8.18	5.3	3.2	2.3	1.9	1.53
2	0.5	73.4	54	45.2	33.1	23.9	13.5	9.02	5.8	3.5	2.6	2	1.68
5	0.2	95.1	70.1	58.7	43.2	31.2	17.7	11.8	7.6	4.7	3.4	2.7	2.23
10	0.1	111	82	68.7	50.6	36.6	20.8	13.9	9	5.5	4	3.2	2.63
20	0.05	127	94	78.8	58.1	42.1	24	16.1	10	6.4	4.7	3.7	3.05
30	0.033	137	101	84.8	62.6	45.4	25.9	17.4	11	6.9	5	4	3.3
40	0.025	143	106	89.1	65.7	47.7	27.3	18.3	12	7.2	5.3	4.2	3.48
50	0.02	149	110	92.5	68.3	49.6	28.3	19	12	7.5	5.5	4.4	3.62
60	0.017	153	113	95.2	70.3	51	29.2	19.6	13	7.8	5.7	4.5	3.74
80	0.013	160	119	99.5	73.5	53.4	30.6	20.6	13	8.2	6	4.7	3.92
100	0.01	165	122	103	76	55.2	31.6	21.3	14	8.5	6.2	4.9	4.07
250	0.004	186	138	116	86	62.6	35.9	24.2	16	9.7	7.1	5.6	4.65

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	79.5	58.4	48.9	35.8	25.6	14.1	9.25	5.9	3.5	2.5	2	1.64
2	0.5	87.4	64.3	53.8	39.5	28.3	15.6	10.3	6.5	3.9	2.8	2.2	1.82
5	0.2	114	84.1	70.4	51.8	37.2	20.6	13.6	8.6	5.2	3.8	2.9	2.42
10	0.1	134	98.7	82.7	60.9	43.8	24.3	16.1	10	6.1	4.5	3.5	2.88
20	0.05	153	113	95.1	70.1	50.5	28.2	18.6	12	7.1	5.2	4.1	3.34
30	0.033	165	122	102	75.6	54.5	30.5	20.1	13	7.7	5.6	4.4	3.62
40	0.025	173	128	108	79.4	57.3	32.1	21.2	13	8.1	5.9	4.6	3.82
50	0.02	180	133	112	82.6	59.6	33.4	22	14	8.5	6.1	4.8	3.98
60	0.017	185	137	115	85	61.4	34.4	22.8	14	8.7	6.4	5	4.11
80	0.013	194	144	121	89	64.3	36.1	23.8	15	9.2	6.7	5.2	4.32
100	0.01	200	148	125	92	66.5	37.4	24.7	16	9.5	6.9	5.4	4.47
250	0.004	225	167	141	104	75.4	42.5	28.1	18	11	7.9	6.2	5.12

HIRDS V4 Depth-Duration-Frequency Results
Sitename: Custom Location Okaihau
Coordinate system: WGS84
Longitude: 173.874
Latitude: -35.2408
DDF Model

Parameters:	c	d	e	f	g	h	i
Values:	0.00253083	0.5448526	-0.0131054	-0.0040595	0.25089898	-0.0115367	3.31124

Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Depth (mm)
	24	100	3.17805383	4.60014923	307.1016499

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.1	14.9	18.7	27.4	39.7	68.1	92	119	147	161	170	177
2	0.5	11.1	16.3	20.5	30	43.5	74.7	101	131	161	177	187	194
5	0.2	14.3	21.1	26.5	38.9	56.5	97.4	132	171	211	233	246	255
10	0.1	16.6	24.6	30.9	45.5	66.1	114	155	201	249	274	290	301
20	0.05	19	28.1	35.4	52.2	75.9	131	178	232	287	317	336	348
30	0.033	20.4	30.3	38.1	56.2	81.8	142	193	251	311	343	363	377
40	0.025	21.5	31.8	40	59	86	149	203	264	327	362	383	397
50	0.02	22.2	32.9	41.5	61.2	89.2	155	211	274	340	376	398	413
60	0.017	22.9	33.9	42.7	63	91.9	160	217	283	351	388	411	427
80	0.013	23.9	35.4	44.6	65.9	96.1	167	227	297	368	407	431	448
100	0.01	24.7	36.6	46.1	68.1	99.4	173	235	307	381	422	447	464
250	0.004	27.8	41.3	52.1	77.1	113	196	268	350	435	482	511	531

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	0.36	1.1	1.3	1.1	2.4	4.7	3	9.4	13	11	13	14
2	0.5	0.34	1.2	1.4	1.2	2.6	5.2	3	10	15	12	15	15
5	0.2	0.78	2	2.2	2.1	4.1	7.6	6	15	21	17	21	21
10	0.1	1.3	2.9	3.2	3.4	5.9	10	10	19	26	22	26	27
20	0.05	1.9	4	4.4	5.1	8.3	15	16	23	32	28	33	34
30	0.033	2.4	4.8	5.3	6.3	10	18	20	27	36	33	38	39
40	0.025	2.7	5.4	6	7.3	12	20	24	30	40	37	42	43
50	0.02	3	5.9	6.6	8.2	13	23	27	32	42	40	45	46
60	0.017	3.2	6.4	7.2	8.9	14	25	30	34	45	42	48	49
80	0.013	3.7	7.2	8.1	10	16	28	35	38	49	47	53	54
100	0.01	4	7.8	8.8	11	17	31	39	41	53	51	57	59
250	0.004	5.8	11	13	17	25	46	59	55	70	70	76	79

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	10.8	16	20	29.3	42.3	71.9	96.3	124	152	166	175	181
2	0.5	11.9	17.5	21.9	32.2	46.5	79.1	106	136	167	183	193	200
5	0.2	15.4	22.7	28.5	41.9	60.6	103	139	179	220	241	255	263
10	0.1	17.9	26.5	33.3	49	71	122	164	211	259	285	301	311
20	0.05	20.5	30.4	38.2	56.3	81.7	140	189	243	300	330	348	360
30	0.033	22.1	32.7	41.1	60.6	88	151	204	263	324	357	377	390
40	0.025	23.2	34.3	43.2	63.7	92.5	159	214	277	341	376	397	411
50	0.02	24	35.6	44.8	66.1	96.1	165	223	288	355	391	413	428
60	0.017	24.7	36.6	46.1	68.1	99	170	230	297	366	404	427	442
80	0.013	25.8	38.3	48.2	71.2	104	178	241	311	384	423	447	464
100	0.01	26.6	39.5	49.8	73.6	107	185	249	323	398	439	464	481
250	0.004	30	44.6	56.2	83.2	121	210	284	368	455	501	531	550

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	10.8	16	20	29.3	42.3	71.9	96.3	124	152	166	175	181
2	0.5	11.9	17.5	21.9	32.2	46.5	79.1	106	136	167	183	193	200
5	0.2	15.4	22.7	28.5	41.9	60.6	103	139	179	220	241	255	263
10	0.1	17.9	26.5	33.3	49	71	122	164	211	259	285	301	311
20	0.05	20.5	30.4	38.2	56.3	81.7	140	189	243	300	330	348	360
30	0.033	22.1	32.7	41.1	60.6	88	151	204	263	324	357	377	390
40	0.025	23.2	34.3	43.2	63.7	92.5	159	214	277	341	376	397	411
50	0.02	24	35.6	44.8	66.1	96.1	165	223	288	355	391	413	428
60	0.017	24.7	36.6	46.1	68.1	99	170	230	297	366	404	427	442
80	0.013	25.8	38.3	48.2	71.2	104	178	241	311	384	423	447	464
100	0.01	26.6	39.5	49.8	73.6	107	185	249	323	398	439	464	481
250	0.004	30	44.6	56.2	83.2	121	210	284	368	455	501	531	550

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11	16.2	20.3	29.8	43	72.9	97.4	125	153	167	176	182
2	0.5	12.1	17.8	22.3	32.7	47.2	80.2	107	138	168	185	195	201
5	0.2	15.6	23.1	29	42.6	61.6	105	141	181	222	244	257	266
10	0.1	18.3	27	33.9	49.9	72.3	123	166	213	262	288	303	314
20	0.05	20.9	30.9	38.9	57.3	83.1	142	191	246	303	333	351	363
30	0.033	22.5	33.3	41.9	61.7	89.6	154	206	266	327	360	380	393
40	0.025	23.6	34.9	44	64.9	94.2	162	218	280	345	380	401	415
50	0.02	24.5	36.2	45.6	67.3	97.8	168	226	292	359	395	417	432
60	0.017	25.2	37.3	47	69.3	101	173	233	301	370	408	431	446
80	0.013	26.3	39	49.1	72.5	105	181	244	315	389	428	452	468
100	0.01	27.1	40.3	50.7	75	109	188	253	327	402	443	468	485
250	0.004	30.6	45.4	57.3	84.8	124	213	288	372	459	506	535	555

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	11.6	17.1	21.4	31.4	45.1	75.9	101	129	157	171	180	186
2	0.5	12.7	18.7	23.5	34.4	49.6	83.6	111	142	173	189	199	205
5	0.2	16.5	24.3	30.6	45	64.9	110	147	187	229	250	263	272
10	0.1	19.3	28.5	35.8	52.7	76.2	129	173	221	270	296	311	322
20	0.05	22.1	32.7	41.1	60.6	87.7	149	199	255	313	343	361	373
30	0.033	23.8	35.2	44.3	65.3	94.6	161	215	276	338	371	391	404
40	0.025	24.9	36.9	46.5	68.6	99.4	170	227	291	356	391	412	426
50	0.02	25.9	38.3	48.3	71.2	103	176	236	302	371	407	429	443
60	0.017	26.6	39.4	49.7	73.3	106	182	243	312	383	420	443	458
80	0.013	27.8	41.2	51.9	76.8	111	190	255	327	402	441	465	481
100	0.01	28.7	42.6	53.7	79.3	115	197	264	339	416	457	482	498
250	0.004	32.4	48.1	60.6	89.7	131	224	300	386	475	522	551	570

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11	16.1	20.2	29.6	42.7	72.5	97	125	152	167	176	182
2	0.5	12	17.7	22.2	32.5	46.9	79.7	107	137	168	184	194	201
5	0.2	15.5	22.9	28.8	42.3	61.2	104	140	180	221	243	256	265
10	0.1	18.1	26.8	33.7	49.5	71.8	123	165	212	261	287	302	313
20	0.05	20.8	30.7	38.6	56.9	82.5	141	190	245	302	332	350	362
30	0.033	22.3	33	41.5	61.3	89	153	205	265	326	359	379	392
40	0.025	23.4	34.7	43.6	64.4	93.5	161	216	279	344	378	399	414
50	0.02	24.3	36	45.3	66.8	97.1	167	225	290	358	393	416	430
60	0.017	25	37	46.6	68.8	100	172	232	299	369	406	429	444
80	0.013	26.1	38.7	48.7	72	105	180	243	314	387	426	450	466
100	0.01	26.9	40	50.4	74.4	108	186	251	325	401	441	467	483
250	0.004	30.4	45.1	56.9	84.2	123	212	286	370	457	504	534	553

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	12.1	17.8	22.3	32.7	46.9	78.6	104	133	161	175	184	189
2	0.5	13.3	19.6	24.5	36	51.8	86.7	115	146	177	193	203	209
5	0.2	17.3	25.5	32	47	67.8	114	152	193	234	256	269	278
10	0.1	20.2	29.8	37.5	55.2	79.7	134	179	228	277	304	319	329
20	0.05	23.2	34.2	43.1	63.5	91.8	155	207	263	321	351	370	381
30	0.033	24.9	36.9	46.4	68.4	99	168	223	285	348	380	401	413
40	0.025	26.1	38.7	48.7	71.9	104	177	235	300	366	402	422	436
50	0.02	27.1	40.2	50.6	74.7	108	183	245	312	381	418	440	454
60	0.017	27.9	41.4	52.1	76.9	111	189	252	322	393	432	454	468
80	0.013	29.2	43.3	54.5	80.5	117	198	264	338	413	453	476	492
100	0.01	30.1	44.7	56.3	83.2	121	205	274	350	428	469	494	510
250	0.004	33.9	50.4	63.6	94.1	137	233	312	399	488	536	565	583

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.2	16.4	20.6	30.2	43.5	73.6	98.2	126	154	168	177	183
2	0.5	12.2	18	22.6	33.1	47.8	81	108	139	170	186	196	202
5	0.2	15.8	23.4	29.4	43.2	62.4	106	142	183	223	245	258	267
10	0.1	18.5	27.3	34.3	50.6	73.2	125	167	215	264	290	305	316
20	0.05	21.2	31.3	39.4	58.1	84.2	144	193	248	305	335	354	366
30	0.033	22.8	33.7	42.4	62.6	90.8	155	209	268	330	363	383	396
40	0.025	23.9	35.4	44.5	65.7	95.4	164	220	283	348	382	403	418
50	0.02	24.8	36.7	46.2	68.3	99.1	170	228	294	362	398	420	435
60	0.017	25.5	37.8	47.6	70.3	102	175	236	303	373	411	433	448
80	0.013	26.7	39.5	49.8	73.5	107	183	247	318	392	431	455	471
100	0.01	27.5	40.8	51.4	76	110	190	256	330	406	446	472	488
250	0.004	31	46	58.1	86	125	216	291	376	463	510	539	558

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	13.2	19.5	24.4	35.8	51.1	84.7	111	141	169	183	191	197
2	0.5	14.6	21.4	26.9	39.5	56.6	93.6	123	155	187	203	212	218
5	0.2	19	28	35.2	51.8	74.4	124	163	206	248	270	283	291
10	0.1	22.3	32.9	41.3	60.9	87.6	146	193	243	294	320	335	345
20	0.05	25.6	37.8	47.6	70.1	101	169	223	281	341	371	390	401
30	0.033	27.5	40.7	51.2	75.6	109	183	241	304	369	402	422	434
40	0.025	28.9	42.8	53.8	79.4	115	193	254	321	389	425	445	459
50	0.02	30	44.4	55.9	82.6	119	200	264	334	405	442	464	477
60	0.017	30.9	45.7	57.6	85	123	207	273	345	418	457	479	493
80	0.013	32.3	47.8	60.3	89	129	216	286	362	439	479	502	518
100	0.01	33.3	49.4	62.3	92	133	224	297	375	455	497	522	537
250	0.004	37.5	55.8	70.3	104	151	255	338	428	520	567	597	614

Project Ref:	C0451	**STORMWATER DISPERSION PIPE/ TRENCH**	geologix consulting engineers
Project Address:	523, 611 & 621 PUKETOTARA ROAD, OKAIHAU		
Design Case:	DISPERSION DEVICE SIZING	**DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH**	
Date:	18 April 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 **20%** AEP EVENT

SLOPE BETWEEN SOURCE & DISPERSION DEVICE

ELEVATION	h	CHAINAGE, x	Δ x	h bar	Δ A
m	m	m	m	m	m2
190	0	0	0	0	0
187	3	8	8	1.5	12
	TOTALS	8	8		12
	SLOPE, Sc	0.375	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	2.66666667	0.009	0.000	0.0000	0.000	**0 % full**
0.100	0.050	5.381	0.0451	0.0001	0.003	2.666666667	0.0090	1.494	0.0002	0.219	
0.100	0.100	4.996	0.0644	0.0004	0.006	2.666666667	0.0090	2.334	0.0010	0.954	
0.100	0.150	4.692	0.0795	0.0007	0.009	2.666666667	0.0090	3.006	0.0022	2.221	
0.100	0.200	4.429	0.0927	0.0011	0.012	2.666666667	0.0090	3.578	0.0040	4.001	
0.100	0.250	4.189	0.1047	0.0015	0.015	2.666666667	0.0090	4.076	0.0063	6.259	
0.100	0.300	3.965	0.1159	0.0020	0.017	2.666666667	0.0090	4.515	0.0089	8.948	
0.100	0.350	3.751	0.1266	0.0024	0.019	2.666666667	0.0090	4.904	0.0120	12.014	
0.100	0.400	3.544	0.1369	0.0029	0.021	2.666666667	0.0090	5.248	0.0154	15.397	
0.100	0.450	3.342	0.1471	0.0034	0.023	2.666666667	0.0090	5.552	0.0190	19.031	
0.100	0.500	3.142	0.1571	0.0039	0.025	2.666666667	0.0090	5.817	0.0228	22.845	**50 % full**
0.100	0.550	2.941	0.1671	0.0044	0.026	2.666666667	0.0090	6.046	0.0268	26.761	
0.100	0.600	2.739	0.1772	0.0049	0.028	2.666666667	0.0090	6.239	0.0307	30.697	
0.100	0.650	2.532	0.1875	0.0054	0.029	2.666666667	0.0090	6.395	0.0346	34.560	
0.100	0.700	2.319	0.1982	0.0059	0.030	2.666666667	0.0090	6.514	0.0383	38.254	
0.100	0.750	2.094	0.2094	0.0063	0.030	2.666666667	0.0090	6.594	0.0417	41.664	
0.100	0.800	1.855	0.2214	0.0067	0.030	2.666666667	0.0090	6.630	0.0447	44.661	
0.100	0.850	1.591	0.2346	0.0071	0.030	2.666666667	0.0090	6.617	0.0471	47.081	
0.100	0.900	1.287	0.2498	0.0074	0.030	2.666666667	0.0090	6.541	0.0487	48.696	
0.100	0.950	0.902	0.2691	0.0077	0.029	2.666666667	0.0090	6.370	0.0491	49.095	
0.100	1.000	0.000	0.3142	0.0079	0.025	2.666666667	0.0090	5.817	0.0457	45.690	**Flowing full**

DISPERSION SPECIFICATION

INCOMING PIPE PROPERTIES:

TANK OUTFLOW, 20% AEP	4.58	l/s		
MAXIMUM PIPE FLOW	49.09	l/s		**DESIGN OK**
SUFFICIENT CAPACITY IN PIPE	YES			
LONGITUDINAL SLOPE	0.375	m/m		
DESIGN VELOCITY, Dv	6.630	m/s		

LEVEL SPREADER SPECIFICATIONS:

PIPE DIAMETER, m	0.15	m
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	35	No.
DIA. OF ORIFICE, D	15	mm
ORIFICE INTERVALS, C/C	200	mm
DISPERSION PIPE LENGTH, L	**6.8**	**m**

ORIFICE DESIGN FLOW CHECK:

AREA OF SINGLE ORIFICE, A	0.00018	m2			
FLOW OUT OF 1 ORIFICE	0.000132906	m3/s	0.13	l/s	
FLOW OUT OF ALL ORIFICES	0.00465171	m3/s	4.65	l/s	**DESIGN OK**
VELOCITY FROM SINGLE ORIFICE	0.75	m/s			

BROAD CRESTED WEIR DESIGN FLOW CHECK:

FLOW DEPTH, h	0.075	m			
BASE WIDTH = L	6.8	m			
FLOW AREA	0.51	m2			
WEIR FLOW	0.00535	m3/s	5.35	l/s	**DESIGN OK**
WEIR VELOCITY	0.010	m/s			

INCOMING PIPE & SPREADER SUMARY:

	LOT 1	
INCOMING PIPE DIAMETER, m	0.100	m
SPREADER PIPE DIAMETER, m	0.150	m
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	35	No.
DIA. OF ORIFICE, D	15	mm
ORIFICE INTERVALS, C/C	200	mm
DISPERSION PIPE LENGTH, L	**6.8**	**m**