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

Office Use Only
Application Number:

Application for resource consent or fast-track resource consent

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

1. Pre-Lodgement Meeting

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

2. Type of Consent being applied for

(more than one circle can be ticked):

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

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

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

✓ **Yes** ◯ **No**

4. Consultation

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

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

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

5. Applicant Details

Name/s: D & B Hoult LImited

Email: [redacted]

Phone number: Work [redacted] Home

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

[redacted]

Postcode 0230

6. Address for Correspondence

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

Name/s: Lynley Newport

Email: [redacted]

Phone number: Work [redacted] Home

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

[redacted]

Postcode 0245

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

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

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

Name/s: as per item 5

Property Address/ Location:

Postcode

8. Application Site Details

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

Name/s:	as per item 5
Site Address/ Location:	Ness Road Waipapa Postcode
Legal Description:	Lot 14 DP 374120 **Val Number:**
Certificate of title:	299166

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 contact either applicant or agent prior to any site visit.

9. Description of the Proposal:

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

To carry out a subdivision to create three lots (two additional) on land zoned Rural Production, as a discretionary activity.

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

10. Would you like to request Public Notification?

◯ **Yes** ✓ **No**

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

(more than one circle can be ticked):

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

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

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

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

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

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

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

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

✓ **Subdividing land**

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

◯ **Disturbing, removing or sampling soil**

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

13. Assessment of Environmental Effects:

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

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

13. Draft Conditions:

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

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

14. Billing Details:

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

Name/s: (please write in full) D & B Hoult Ltd

Email: [redacted]

Phone number: Work [redacted] Home

Postal address: (or alternative method of service under section 352 of the act)
25 Harmony Lane
WAIPAPA.
Postcode 0230

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

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

Name: (please write in full) Barbara Hoult

Signature: (signature of bill payer) [redacted] MANDATORY

Date 6/10/23

15. Important Information:

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

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

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

15. Important information continued...

Declaration

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

Name: (please write in full) Barbara Hoult

Signature: [redacted] Date

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

Checklist (please tick if information is provided)

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

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

THOMSON SURVEY LIMITED

SURVEYORS AND RESOURCE PLANNERS

Our Reference: 10735.1 (FNDC)

6 October 2025

Resource Consents Department
Far North District Council
JB Centre
KERIKERI

Dear Sir/Madam

RE: Proposed Subdivision of land at Ness Road, Waipapa – D & B Hoult Limited

I am pleased to submit application on behalf of D & B Hoult Limited, for a proposed subdivision of land at Ness Road, Waipapa, zoned Rural Production. The application is a discretionary activity.

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

Regards

Lynley Newport
Senior Planner
THOMSON SURVEY LTD

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

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

D & B Hoult Limited

PROPOSED SUBDIVISION PURSUANT TO FNDC OPERATIVE DISTRICT PLAN

Ness Road, Waipapa

PLANNER'S REPORT & ASSESSMENT OF ENVIRONMENTAL EFFECTS

Thomson Survey Ltd
Kerikeri

1.0 INTRODUCTION

1.1 The Proposal

The applicant proposes to subdivide their property to create three (two additional) lots of 4ha area apiece. Access to the site is via a long leg-in off Ness Road – a sealed Council road. This will remain in the ownership of proposed Lot 2 on the Scheme Plan, with proposed Lots 1 & 3 having right of way easement over it.

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

A copy of the scheme plan(s) is attached in Appendix 1 and location map in Appendix 2.

1.2 Scope of this Report

This assessment and report accompanies the Resource Consent Application made by the applicant, and is provided in accordance with Section 88 and Schedule 4 of the Resource Management Act 1991. The application seeks consent to subdivide an existing site to create a total of three lots (two additional), as a discretionary activity.

The information provided in this assessment and report is considered commensurate with the scale and intensity of the activity for which consent is being sought. Applicant details are contained within the Application Form 9.

2.0 PROPERTY DETAILS

Location:	Ness Road, Waipapa
Legal description & RT's:	Lot 14 DP 374120; held in Record of Title 299166, copy attached in Appendix 3.

3.0 SITE DESCRIPTION

3.1 Site Characteristics

The site is zoned Rural Production in the Operative District Plan (ODP) and Horticulture in the Proposed District Plan (PDP). No resource features apply in either the ODP or PDP with the exception of a small area of land mapped as river flood hazard, following a stream/water course in the southern portion of proposed Lot 2.

The site is located on the east side of Ness Road, near the end of that road.

The site is currently in grazing with areas of scrubby mixed indigenous/exotic vegetation in the southern corner of proposed Lot 2.

There is no built development within the application site. There is an existing farm access the length of the leg-in and extending part way into the balance of proposed Lot 2. The property has fencing and stock water reticulation in place.

The site is located on and around a ridgeline and highpoint, with slopes falling away either side. The site then flattens out to the south east. Refer to Subdivision Site Suitability Report for further site description information.

Looking downslope to the south from within Lot 2, towards the scrubby vegetation referred to above.

Looking southeast from top knoll on Lot 3 towards land to be in proposed Lot 1

LUC maps show the bulk of the site as containing LUC 4 soils *(Far North Maps, Soil layer)*. The exceptions are the water course referred to early in relation to flood hazard area, is mapped as LUC 3, as is the bulk of the narrow leg-in within which access is already formed, and the very southeastern extreme of proposed Lot 1.

The land is not erosion prone.

There are no features as mapped in the Regional Policy Statement for Northland, or the PDP, that affect the ability to subdivide or develop the property. The property lies within a large area notated as potentially having kiwi present. There are no areas of indigenous vegetation or habitat.

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

3.2 Legal Interests

The property is subject to a water supply right in gross in favour of the Kerikeri Irrigation Company. This is shown B, C and D on the scheme plan, and will carry over onto the titles for new Lots 2 & 3. The property is also subject to existing easement shown A on the scheme plan, for right of way and services. The right of way is in favour of Lots 1 & 2 DP 467522, the two properties on the right hand side of the leg-in as you travel into the site.

The property is subject to Consent Notice 7711934.2 registered on the title in 2008. This contains a clause in regard to the filtration of drinking water.

Easements and instruments relevant to the subdivision form part of Appendix 3.

3.3 Consent History

There are no buildings on the property.

Subdivision consent history shows the property is one of several created by RC 2040273-RMASUB, a multi stage subdivision, issued in 2004. The application site was one of the Stage 4 lots created (total number of stages being 5).

4.0 SCHEDULE 4 – INFORMATION REQUIRED IN AN APPLICATION

Clauses 2 & 3: Information required in all applications

(1) An application for a resource consent for an activity must include the following:	
(a) a description of the activity: .	Refer Sections 1 and 5 of this Planning Report.
(b) an assessment of the actual or potential effect on the environment of the activity:	Refer to Section 6 of this Planning Report.
(b) a description of the site at which the activity is to occur:	Refer to Section 3 of this Planning Report.
(c) the full name and address of each owner or occupier of the site:	This information is contained in the Form 9 attached to the application.
(d) a description of any other activities that are part of the proposal to which the application relates:	No other activities are part of the proposal. The application is for subdivision pursuant to the FNDC's ODP.
(e) a description of any other resource	None are required.

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

unless the subdivision involves a cross lease, company lease, or unit plan: *(c) the locations and areas of new reserves to be created, including any esplanade reserves and esplanade strips:* *(d) the locations and areas of any existing esplanade reserves, esplanade strips, and access strips:* *(e) the locations and areas of any part of the bed of a river or lake to be vested in a territorial authority under section 237A:* *(f) the locations and areas of any land within the coastal marine area (which is to become part of the common marine and coastal area under section 237A):* *(g) the locations and areas of land to be set aside as new roads.*	

Clause 6: Information required in assessment of environmental effects

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

(f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted:	Refer to Section 8 of this planning report. No affected persons have been identified.
g) if the scale and significance of the activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved:	No monitoring is required as the scale and significance of the effects do not warrant it.
(h) if the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).	No protected customary right is affected.

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

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

5.0 ACTIVITY STATUS

5.1 Operative District Plan

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

Table 13.7.2.1: Minimum Lot Sizes

(i) RURAL PRODUCTION ZONE

Controlled Activity Status (Refer also to 13.7.3)	**Restricted Discretionary Activity Status (Refer also to 13.8)**	**Discretionary Activity Status (Refer also to 13.9)**
The minimum lot size is 20ha.	1. The minimum lot size is 12ha; or 2. The minimum lot size is 12ha; or 3. A maximum of 3 lots in any subdivision, provided that the minimum lot size is 4,000m2 and there is at least 1 lot in the subdivision with a minimum lot size of 4ha, and provided further that the subdivision is of sites which existed at or prior to 28 April 2000, or which are amalgamated from titles existing at or prior to 28 April 2000; or 4. A maximum of 5 lots in a subdivision (including the parent lot) where the minimum size of the lots is 2ha, and where the subdivision is created from a site that existed at or prior to 28 April 2000; Option 5. N/A as the proposal does not utilise remaining rights.	**1. The minimum lot size is 4ha**; or 2. A maximum of 3 lots in any subdivision, provided that the minimum lot size is 2,000m² and there is at least 1 lot in the subdivision with a minimum size of 4ha, and provided further that the subdivision is of sites which existed at or prior to 28 April 2000, or which are amalgamated from titles existing at or prior to 28 April 2000; or 3. A subdivision in terms of a management plan as per Rule 13.9.2 may be approved. Option 4 N/A

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

Other Rules:

Zone Rules:

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

District Wide Rules:

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

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

Chapter 12.3 Soils and Minerals does not apply/ is complied with. Only minor subdivision earthworks will be required for access, highly unlikely to breach the zone's permitted activity thresholds.

Chapter 12.4 Natural Hazards does not apply as the site is not subject to any coastal hazard as currently mapped in the Operative District Plan (the only hazards with rules). There are no areas of bush from which a 20m buffer is required.

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

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

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

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

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

Chapter 15.1 Traffic, Parking and Access

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

Chapter 15.1.6C (access) is the only part of Chapter 15.1 relevant to a subdivision. I have not identified any breaches. Ness Road is sealed council road, to the appropriate standard. Access within the subdivision can be formed to the required standard.

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

5.2 Proposed District Plan

The FNDC publicly notified its PDP on 27th July 2022. Whilst the majority of rules in the PDP will not have legal effect until such time as the FNDC publicly notifies its decisions on submissions, there are certain rules that have been identified in the PDP as having immediate legal effect

and that may therefore need to be addressed in this application and may affect the category of activity under the Act. These include:

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

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

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

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

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

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

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

No indigenous vegetation clearance is proposed.

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

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

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

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

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

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

6.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS

6.1 Allotment Sizes and Dimensions

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

The Site Suitability Report in Appendix 4 confirms that the proposed lots are all suitable for their intended use in regard to civil engineering matters.

6.2 Natural and Other Hazards

The site is not mapped as being subject to any hazard apart from an area on either side of the minor water course that flows through the southern corner of proposed Lot 2. This area can be readily avoided and is some distance from, and well below (in terms of elevation) likely house sites and access.

The Subdivision Site Suitability Report contains a natural hazard assessment in its section 9. The site is not subject to any hazard associated with erosion; landslip; rockrall; alluvion; avulsion; unconsolidated fill; soil contamination; subsidence; fire hazard or sea level rise. In regard to overland flow paths, flooding and inundation hazard risk, any potential effects associated with overland flow paths can be mitigated by means of swales & check dams and by directing flows into ponds to reduce flow velocities and peak discharge, resulting in less than minor effects.

6.3 Water Supply

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

6.4 Energy Supply & Telecommunications

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

6.5 Stormwater Disposal

Refer to the Subdivision Site Suitability Report in Appendix 4, specifically Section 6 of that report. This confirms that impermeable coverage on each lot will readily comply with the zone's permitted activity threshold, including Lot 2 which will accommodate the bulk of the formed shared access. Stormwater management concepts are discussed both for subdivision development works and for future on-lot development.

Concept stormwater attenuation is discussed, for both future development within the lots and the right of way. The latter includes discussion of the existing culverts within the leg-in access. These are 600mm and 900mm diameter. The report discusses two upgrading/ improved capacity alternatives in its section 6.5.2.

The Subdivision Site Suitability Report contains an assessment against the Regional Plan's Stormwater Rule C.6.4.2, showing no consent is required – refer to Appendix C, Table 17.

6.6 Sanitary Sewage Disposal

Refer to Section 5 of the Report in Appendix 4. For the purposes of feasibility the report considered a five bedroom / 8 occupant scenario for each lot. The report verifies that onsite wastewater treatment to secondary aerated treatment level is definitely possible on all lots in compliance with the Regional Plan's permitted standard, and also states that at time of building consent a primary treatment solution may also be considered for lot development.

The Subdivision Site Suitability Report contains a Wastewater Assessment of Environmental Effects in its Appendix C, Table 16.

6.7 Easements for any purpose

The property will remain subject to existing easements (including in gross) as shown on the scheme plan. New easements for right of way and various services, are listed in the Memorandum of Easements on the face of the Scheme – refer Appendix 1.

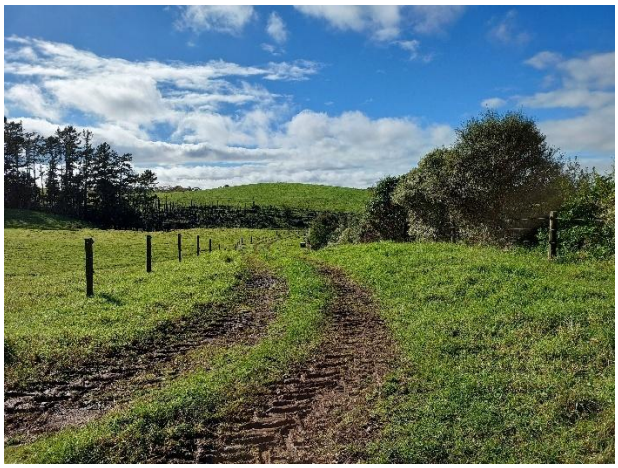
6.8 Property Access

Property access into the lots will be directly off Ness Road at the western extreme of the property. All three lots will be accessed via the long leg-in and then over proposed Lot 2, to lot boundaries. The Subdivision Site Suitability Report addresses internal roading and vehicle crossings in its Section 10. The report does not include the two other dominant tenement properties that are able to utilise existing right of way easement A. Up to the point of driveway entrance to the house on Lot 2 DP 467522, there will be five titles utilising ROW A. The Operative District Lan's standards require that portion of the right of way, therefore, to be to 5m metal carriageway width.

Beyond the Lot 2 DP 467522 driveway entrance, the rest of right of way A will serve four titles and can be at 3m metal carriageway width, with passing bays where required. Rights of Way E & F serve three lots and can be to the same standard, whilst rights of way C & G effectively only serve proposed Lot 1 and can also be to 3m metal carriageway width. No passing bay would be required over C and G.

It is proposed to construct a grassed swale drain along each face of the proposed right of way which should be graded to direct stormwater runoff to stormwater infrastructure at indicated locations along the right of way alignment. Please note also, the recommended upgrading/improvement of culverts within the leg-in portion of the right of way.

First section of right of way A off Ness Road, looking eastwards



Existing farm access within leg-in beyond right of way A and into easement E. There is metal base course underneath.

Access alignment at beginning of right of way looking at hill top knoll within proposed Lot 2

6.9 Earthworks

The Subdivision Site Suitability Report addresses earthworks in its section 8. It is expected that earthworks volumes for creation of access and associated stormwater ponds will be within the 5,000m^3 permitted volume specified in the Operative District Plan; and also to comply with the Regional Plan's Rule C.8.3.1. An assessment against the latter is contained in the Report's Appendix C, Table 18.

The Subdivision Site Suitability Report contains some general recommendations, and discusses basic Erosion and Sediment Control measures.

6.10 Building Locations

There are no restrictions in regard to natural hazard as to where dwellings/buildings can be located and no need to impose minimum floor levels. All lots contain elevated house sites. All lots can support buildings with associated on-site services. There is no requirement to clear any vegetation in order to ensure buffer distance between future dwellings and scrubland.

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

Vegetation, fauna and landscape

The site has no resource feature overlays. It contains no features mapped in the Regional Policy Statement (or PDP) as having any high or outstanding landscape or natural values and there are no mapped biodiversity wetlands. The site contains one small area of mixed species indigenous & exotic scrubland, all within proposed Lot 2 and not affected by the subdivision or future development.

The property is mapped as 'kiwi present'. The title is not subject to any restriction on the keeping of cats and dogs. I believe no restriction is necessary. An Advice Note can advise that any cats or dogs on the lots should be kept inside at night, or at most a consent notice condition applying to all lots saying the same thing could be applied.

Heritage/Cultural

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

6.12 Soil

The soils on the property are predominantly mapped as being LUC 4, with two small areas of LUC 3 soils on the edges of the application site. These areas are entirely contained within a proposed lot (i.e. not fragmented). The lots are all 4ha or more meaning small scale grazing can continue. In summary, I do not believe the proposed subdivision will adversely affect the life supporting capacity of soil.

6.13 Access to, and protection of, waterbodies

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

6.14 Land use compatibility (reverse sensitivity)

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

6.15 Proximity to Airports

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

6.16 Natural Character of the Coastal Environment

The site is not within the coastal environment.

6.17 Energy Efficiency and renewable Energy Development/Use

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

6.18 National Grid Corridor

The National Grid does not run through the application site.

6.19 Effects on Rural Character and Amenity

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

6.20 Cumulative and Precedent Effects

Cumulative Effect:

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

Precedent Effect:

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

7.0 STATUTORY ASSESSMENT

7.1 Operative District Plan Objectives and Policies

Objectives and policies relevant to this proposal are considered to be primarily those listed in Chapter 8.6 (Rural Production Zone); and 13 (Subdivision), of the District Plan. These are listed and discussed below where relevant to this proposal.

Subdivision Objectives & Policies

Objectives

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

This is an enabling objective. The Rural Production Zone is predominantly, but not exclusively, a working productive rural zone. The site is 12ha in area and is utilised for grazing. It has not historically supported any horticulture crops, likely because of soil and climate limitations. This use can continue on the new lots, albeit at a slightly reduced intensity in terms of stock numbers. The creation of 4ha rural lots, with frontage to Council maintained public road is considered a sustainable use of the land.

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

The Assessment of Environmental Effects and supporting report conclude that the proposed subdivision is appropriate for the site and that the subdivision can avoid, remedy or mitigate any potential adverse effects.

Objectives 13.3.3 and 13.3.4 refer to outstanding landscapes or natural features; and scheduled heritage resources; and to land in the coastal environment. The site exhibits none of these features.

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

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

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

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

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

And related Policy

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

The site is not known to contain any sites of cultural significance to Maori, or wahi tapu. The subdivision will have minimal, if any, impact on water quality. I do not believe that the proposal adversely impacts on the ability of Maori to maintain their relationship with ancestral lands, water, sites, wahi tapu and other taonga.

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

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

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

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

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

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

Policies

13.4.1 That the sizes, dimensions and distribution of allotments created through the subdivision process be determined with regard to the potential effects including cumulative effects, of the use of those allotments on:
(a) natural character, particularly of the coastal environment;
(b) ecological values;
(c) landscape values;
(d) amenity values;
(e) cultural values;
(f) heritage values; and
(g) existing land uses.

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

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

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

Access to all lots is off Ness Road via a shared private accessway. There will be minor works required to upgrade access, including upgrading/new culverts. This will not entail any removal of indigenous vegetation and works can be subject to sediment control measures. On site wastewater treatment and disposal and stormwater management is achievable.

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

The site is not identified as being subject to any hazard that impacts on location of future built development.

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

Power and telecommunications are not a requirement for rural allotments.

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

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

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

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

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

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

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

The application is not lodged as a Management Plan application.

13.4.13 Subdivision, use and development shall preserve and where possible enhance, restore and rehabilitate the character of the applicable zone in regards to ***s6 matters****. In addition subdivision, use and development shall avoid adverse effects as far as practicable by using techniques including:*
(a) clustering or grouping development within areas where there is the least impact on natural character and its elements such as indigenous vegetation, landforms, rivers, streams and wetlands, and coherent natural patterns;
(b) minimising the visual impact of buildings, development, and associated vegetation clearance and earthworks, particularly as seen from public land and the coastal marine area;
(c) providing for, through siting of buildings and development and design of subdivisions, legal public right of access to and use of the foreshore and any esplanade areas;
(d) through siting of buildings and development, design of subdivisions, and provision of access that recognise and provide for the relationship of Maori with their culture, traditions and taonga including concepts of mauri, tapu, mana, wehi and karakia and the important contribution Maori culture makes to the character of the District (refer Chapter 2 and in particular Section 2.5 and Council's "Tangata Whenua Values and Perspectives" (2004);
(e) providing planting of indigenous vegetation in a way that links existing habitats of indigenous fauna and provides the opportunity for the extension, enhancement or creation of habitats for indigenous fauna, including mechanisms to exclude pests;
(f) protecting historic heritage through the siting of buildings and development and design of subdivisions.
(g) achieving hydraulic neutrality and ensuring that natural hazards will not be exacerbated or induced through the siting and design of buildings and development.

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

In addition:

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

I consider the proposal to be consistent with Policy 13.4.13.

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

The subdivision has had regard to the underlying zone's objectives and policies – see below.

13.4.15 That conditions be imposed upon the design of subdivision of land to require that the layout and orientation of all new lots and building platforms created include, as appropriate, provisions for

achieving the following: (a) development of energy efficient buildings and structures; (b) reduced travel distances and private car usage; (c) encouragement of pedestrian and cycle use; (d) access to alternative transport facilities; (e) domestic or community renewable electricity generation and renewable energy use

The subdivision layout has taken the above matters into account.

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

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

Rural Production Zone Objectives and Policies

Objectives:

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

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

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

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

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

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

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

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

And policies

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

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

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

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

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

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

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

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

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

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

Policy 8.6.4.7 anticipates a wide range of activities that promote rural productivity, and the underlying goal is to avoid any actual and potential adverse effects of conflicting land use activities. I believe in the case of this proposal, given the site's location, and the existing and proposed land uses around it, that additional adverse reverse sensitivity effects are unlikely. The site contains only isolated small areas of highly versatile soils. These areas are not fragmented by the subdivision. The vast majority of the site is not highly versatile soils.

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

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

7.2 Proposed District Plan Objectives and Policies

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

SUB-O1
Subdivision results in the efficient use of land, which:
a. achieves the objectives of each relevant zone, overlays and district wide provisions;
b. contributes to the local character and sense of place;
c. avoids reverse sensitivity issues that would prevent or adversely affect activities already established on land from continuing to operate;

d. avoids land use patterns which would prevent land from achieving the objectives and policies of the zone in which it is located;
e. does not increase risk from natural hazards or risks are mitigates and existing risks reduced; and
f. manages adverse effects on the environment.

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

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

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

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

The site contains two small areas of land that are mapped as meeting the definition of 'highly productive land'. One is entirely within Lot 2 and the other entirely within Lot 1 – in other words they are not fragmented. These areas can also be avoided in terms of future built development. The site contains no ONF's or ONL's, nor any areas of high or outstanding natural character. There are no wetlands affected and no lakes or rivers, nor Sites and Areas of Significance to Maori and no Historic Heritage areas. There are no areas of significant indigenous vegetation (SUB-O2).

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

SUB-P1
Enable boundary adjustments that:

Not relevant – application is not a boundary adjustment.

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

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

SUB-P3
Provide for subdivision where it results in allotments that:

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

The subdivision results in lots that are consistent with the Horticulture Zone discretionary minimum lot size even though the land has never been considered suitable for supporting productive horticultural use, likely because of poorer quality soils. In any event the subdivision provisions have no legal effect and are the subject of multiple submissions. The allotments will be of size that is consistent with the purpose, characteristics and qualities of the zone, where the expectation is for limited residential use on productive holdings (in this case grazing as opposed to horticulture crops). The lots can accommodate building platforms and have legal and physical access.

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

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

SUB-P5
Manage subdivision design and layout in the General Residential, Mixed Use and Settlement zoneto provide for safe, connected and accessible environments by.....:

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

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

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

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

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

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

Not relevant. Site is not zoned Rural Production in the PDP.

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

Not relevant as the site is not zoned Rural Production or Rural Lifestyle in the PDP.

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

Not relevant. No minor residential units exist.

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

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

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

The site is zoned Horticulture in the Proposed District Plan.

Objectives

HZ-O1
The Horticulture zone is managed to ensure its long-term availability for horticultural activities and its longterm protection for the benefit of current and future generations.

HZ-O2
The Horticulture zone enables horticultural and ancillary activities, while managing adverse environmental effects on site.

HZ-O3
Land use and subdivision in the Horticulture zone:
a.avoids land sterilisation that reduces the potential for highly productive land to be used for a horticulture activity;
b. avoids land fragmentation that comprises the use of land for horticultural activities;
c.avoids any reverse sensitivity effects that may constrain the effective and efficient operation of primary production activities;
d. does not exacerbate any natural hazards;
e. maintains the rural character and amenity of the zone;
f. is able to be serviced by on-site infrastructure.

The site has not ever proven to be productive in terms of any horticultural crops. Notwithstanding this, at 4ha in area, each lot is of sufficient area to enable residential living as well as some limited productive use (HZ-O1 and O2). Should a future lot owner wish to continue with grazing on the lots, they can. Should a future lot owner wish to pursue a horticultural activity they can, albeit there are limitations to this being a likely viable option. The subdivision does not exacerbate natural hazards, maintains the rural character and amenity of the zone and is able to be serviced by onsite infrastructure (HZ-O3).

Policies

HZ-P1
Identify a Horticulture zone in the Kerikeri/Waipapa area using the following criteria:
a. presence of highly productive land suitable for horticultural use;
b. access to a water source, such as an irrigation scheme or dam able to support horticultural use; and
c. infrastructure available to support horticultural use.

This policy applies to the consent authority, not an individual property owner. Information is provided with this application showing 'highly productive land' is not present.

HZ-P2
Avoid land use that: ....

Not relevant as the application is a subdivision, not a land use.

HZ-P3
Enable horticulture and associated ancillary activities that support the function of the Horticulture zone, where:
a. adverse effects are contained on site to the extent practicable; and
b. they are able to be serviced by onsite infrastructure.

Not relevant as the subdivision does not include a horticulture or associated ancillary activity.

HZ-P4
Ensure residential activities are designed and located to avoid, or otherwise mitigate, reverse sensitivity effects on horticulture activities, including adverse effects associated with dust, noise, spray drift and potable water collection.

The application does not include residential activities, but does provide for future residential use on all lots. All can accommodate residential activity well inside any of its boundaries, creating minimal, if any, reverse sensitivity effects on production activities on adjacent land – primarily grazing.

HZ-P5
Manage the subdivision of land in the Horticulture zone to:
a.avoid fragmentation that results in loss of highly productive land for use by horticulture and other farming activities;
b.ensure the long-
term viability of the highly productive land resource to undertake a range of horticulture uses;

c. enable a suitable building platform for a future residential unit; and
d. ensure there is provision of appropriate onsite infrastructure.

The lots are larger than the discretionary minimum lot size applying in the zone. The proposal is consistent with parts (c) & (d).

HZ-P6
Encourage the amalgamation or boundary adjustments of Horticulture zoned land where this will help to make horticultural activities more viable on the land.

This is not considered a viable or practical alternative given the poor quality soils present on the site.

HZ-P7
Manage land use and subdivision to address the effects of the activity ***requiring resource consent****, including (but not limited to) consideration of the following matters where relevant to the application:*
a. whether the proposal will increase production potential in the zone;
b. whether the activity relies on the productive nature of the soil;
c. consistency with the scale and character of the rural environment;
d. location, scale and design of buildings or structures;
e. for subdivision or non-primary production activities:
i. scale and compatibility with rural activities;
ii. potential reverse sensitivity effects on primary production activities and existing infrastructure;
iii. the potential for loss of highly productive land, land sterilisation or fragmentation
f. at zone interfaces:
i. any setbacks, fencing, screening or landscaping required to address potential conflicts;
ii.the extent to which adverse effects on adjoining or surrounding sites are mitigated and internalised within the site as far as practicable;
g.the capacity of the site to cater for on-site infrastructure associated with the proposed activity, including whether the site has access to a water source such as an irrigation network supply, dam or aquifer;
h. the adequacy of roading infrastructure to service the proposed activity;
i.Any adverse effects on historic heritage and cultural values, natural features and landscapes or indigenous biodiversity;
j.Any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.

The subdivision does not require any consent under the PDP and the above policy is therefore of limited relevance. I consider the subdivision to maintain rural character and amenity and the lots are suitable for their intended use.

7.3 Part 2 Matters

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

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

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

6 Matters of national importance

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

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

The site does not exhibit the features listed above.

7 Other matters

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

(a) kaitiakitanga:
(aa) the ethic of stewardship:
(b) the efficient use and development of natural and physical resources:
(ba) the efficiency of the end use of energy:
(c) the maintenance and enhancement of amenity values:
(d) intrinsic values of ecosystems:
(e) [Repealed]
(f) maintenance and enhancement of the quality of the environment:
(g) any finite characteristics of natural and physical resources:
(h) the protection of the habitat of trout and salmon:

(i) the effects of climate change:

(j) the benefits to be derived from the use and development of renewable energy.

Regard has been had to any relevant parts of Section 7 of the RMA, "Other Matters". These include 7(b), (c), (d), (f) and (g). Proposed layout and lot size, along with appropriate waste water and stormwater management, will ensure the maintenance of amenity values and the quality of the environment. The proposal has had regard to the values of ecosystems. The subdivision does not materially affect the productive capacity of any rural zoned land.

8 Treaty of Waitangi

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

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

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

7.4 National Policy Statement – Highly Productive Land

The National Policy Statement for Highly Productive Land is relevant given that (a) the site is zoned Rural Production (under the ODP – the only plan with legal effect in regard to zoning); and (b) the application site is mapped as containing two small pockets of LUC 3 soils - according to the 1:50,000 LUC maps used by the Council. In addition, the long narrow leg-in containing nothing other than an existing access track into the site, contains LUC 3 soils (in part).

Clause 3.5(7) reads:

Until a regional policy statement containing maps of highly productive land in the region is operative, each relevant territorial authority and consent authority must apply this National Policy Statement as if references to highly productive land were references to land that, at the commencement date:

(a) is

(i) zoned general rural or rural production; and

(ii) LUC 1, 2, or 3 land; but

(b) is not: (i) identified for future urban development; or

(ii) subject to a Council initiated, or an adopted, notified plan change to rezone it from general rural or rural production to urban or rural lifestyle.

Small areas of the site therefore fall within the definition of "highly productive land" as outlined in 3.5(7) above. However, the site has never been economically productive in terms of horticultural use, instead used for grazing.

An assessment of the proposal against the Objective and Policies of the NPS-HPL follows:

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

2.2 Policies
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 proposal sees each isolated pocket of highly productive land remain within the boundaries of a single title, i.e. not fragmented. The ability to use those areas in land-based primary production therefore remains. The leg-in is not capable of productive use given its dimensions and use for access. The proposal is consistent with the above objective.

Policies 1-5 are all aimed at providing guidance to regional and district councils and do not apply to individual property owners and what they do on their land. Policy 6's priority is re-zoning – again something territorial authorities do as opposed to individual property owners. It does, however, also use the word 'development' which would include building. The policy requires the avoidance of development of highly productive land as rural lifestyle, except as provided in this NPS. The property is likely already too small to be considered a productive unit and already better suited to rural lifestyle living than production use. Policy 7 is explicitly about 'subdivision' and requires that the subdivision of highly productive land be avoided, except as provided for in this NPS. I address this in more detail below.

Policy 8 focuses on 'inappropriate use and development'. I consider the proposal to be entirely appropriate for the site and circumstances and as such the proposal is consistent with this policy.

Policy 9 focuses on reverse sensitivity. The site is utilised for grazing. The surrounding area is also in grazing, interspersed with residential living. The proposal is entirely consistent with this

existing character. I believe the proposal will not create reverse sensitivity issues to the extent these would constrain land based primary production activities to continue.

The current government is looking to amend the NPS HPL in regard to the inclusion of all LUC class 3 soils with the realisation that this category encompasses an enormous amount of land and includes a wide range of soils, some of which are not at all suitable for horticultural production because of limitations such as leaching; excessive drainage characteristics; shallow top soil; overly wet – the list of constraints goes on. However, until such time as sensible and practical identification of truly highly productive land occurs, we are stuck with the current NPS.

Section 3.8 of the NPS HPL reads:

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.

The subdivision layout is such that no area of highly productive land is subdivided, i.e. they are not fragmented. They remain intact within new lots, either in Lot 2, but essentially unusable in any event because of dimensions and existing use as access, and because of wetness; and the other in Lot 1, at one end of that lot and able to be left available for productive use in its entirety.

I believe the proposal entirely consistent with 3.8 because the *subdivision* [i.e. fragmentation] of highly productive land is avoided.

Clause (2) can also be satisfied. There is no cumulative loss of the availability and productive capacity of highly productive land in the district. And the subdivision will have no reverse sensitivity effects on surrounding land-based primary production activities on highly productive land. Mitigation of the effects of the subdivision in regard to the matters in clause (2), if required at all, is achieved through the size of the lots and the ability to internalise built development, along with the existing character in the general area.

Clause 3.9 of the NPS HPL requires the avoidance of inappropriate use or development of highly productive land that is not land-based primary production. Given that the pockets of

so-called highly productive land remain untouched and unchanged by the proposal, I consider the subdivision to be appropriate and consistent with 3.9.

In summary, I believe the proposal to be consistent with the NPS HPL.

7.5 Other National Policy Statements and National Environmental Standards

NES Freshwater

The site does not contain any 'natural inland wetlands', nor any waterbodies in the vicinity of any future works.

NES Assessing and Management Contaminants in Soil to Protect Human Health

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

NPS Indigenous Biodiversity

The site contains indigenous vegetation, none of which is mapped as having any significance. No clearance is required. I consider the proposal is consistent with the NPS IB.

7.6 Regional Policy Statement

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

Objective 3.6 Economic activities – reverse sensitivity and sterilisation

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

(a) Reverse sensitivity for existing:

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

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

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

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

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

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

the net public benefit exceeds the reduced potential for soil-based primary production activities; and …

Policy 5.1.1 seeks to ensure that subdivision in a primary production zone does not "*materially reduce the potential for soil-based primary production on land with highly versatile soils, or if they do, the net public benefit exceeds the reduced potential for soil-based primary production activities*".

This has been discussed at length elsewhere in this planning report. The subdivision does not "*materially reduce the potential for soil-based primary production on land with highly versatile soils*".

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

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

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

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

8.0 s95A-E ASSESSMENT & CONSULTATION

8.1 S95A Public Notification Assessment

A consent authority must follow the steps set out in s95A to determine whether to publicly notify an application for a resource consent. Step 1 specifies when public notification is mandatory in certain circumstances. No such circumstances exist. Step 2 of s95A specifies the circumstances that preclude public notification. No such circumstance exists and Step 3 of s95A must be considered. This specifies that public notification is required in certain circumstances. No such circumstance exists. In summary public notification is not required pursuant to Step 3 of s95A.

8.2 S95B Limited Notification Assessment

A consent authority must follow the steps set out in s95B to determine whether to give limited notification of an application for a resource consent, if the application is not publicly notified pursuant to s95A. Step 1 identifies certain affected groups and affected persons that must be notified. None exist in this instance. Step 2 of s95B specifies the circumstances that preclude limited notification. No such circumstance exists and Step 3 of s95B must be considered. This specifies that certain other affected persons must be notified. The application is not for a boundary activity and the s95E assessment below concludes that there are no affected persons to be notified. There is no requirement to limited notify the application pursuant to Step 3.

8.3 S95D Level of Adverse Effects

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

8.4 S95E Affected Persons

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

The activity is a discretionary activity and within the expected outcomes of subdivision and development of the Rural Production Zone. Built development can occur within the proposed new lots in compliance with all bulk and location rules applying to the zone. The proposal does not unduly increase reverse sensitivity effects. No dispensation is being sought in terms of access standards and supporting reports indicate that development can occur on the lots with no off-site adverse effects. I have reached the conclusion that the proposal will not have any minor or more than minor effects on adjacent properties.

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

9.0 CONCLUSION

The site is considered suitable for the proposed subdivision. Effects on the wider environment are no more than minor. The proposal is not considered contrary to the relevant objectives and policies of the Operative and Proposed District Plans, and is considered to be consistent with relevant objectives and policies of National and Regional Policy Statements. Part 2 of the Resource Management Act has been had regard to. There is no District Plan rule or national environmental standard that requires the proposal to be publicly notified. No affected persons have been identified.

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

Signed Dated 6th October 2025

Lynley Newport,
Senior Planner
Thomson Survey Ltd

10.0 LIST OF APPENDICES

Appendix 1 Scheme Plan(s)

Appendix 2 Location Plan

Appendix 3 Records of Title & Relevant Instruments

Appendix 4 Subdivision Site Suitability Report

Appendix 1

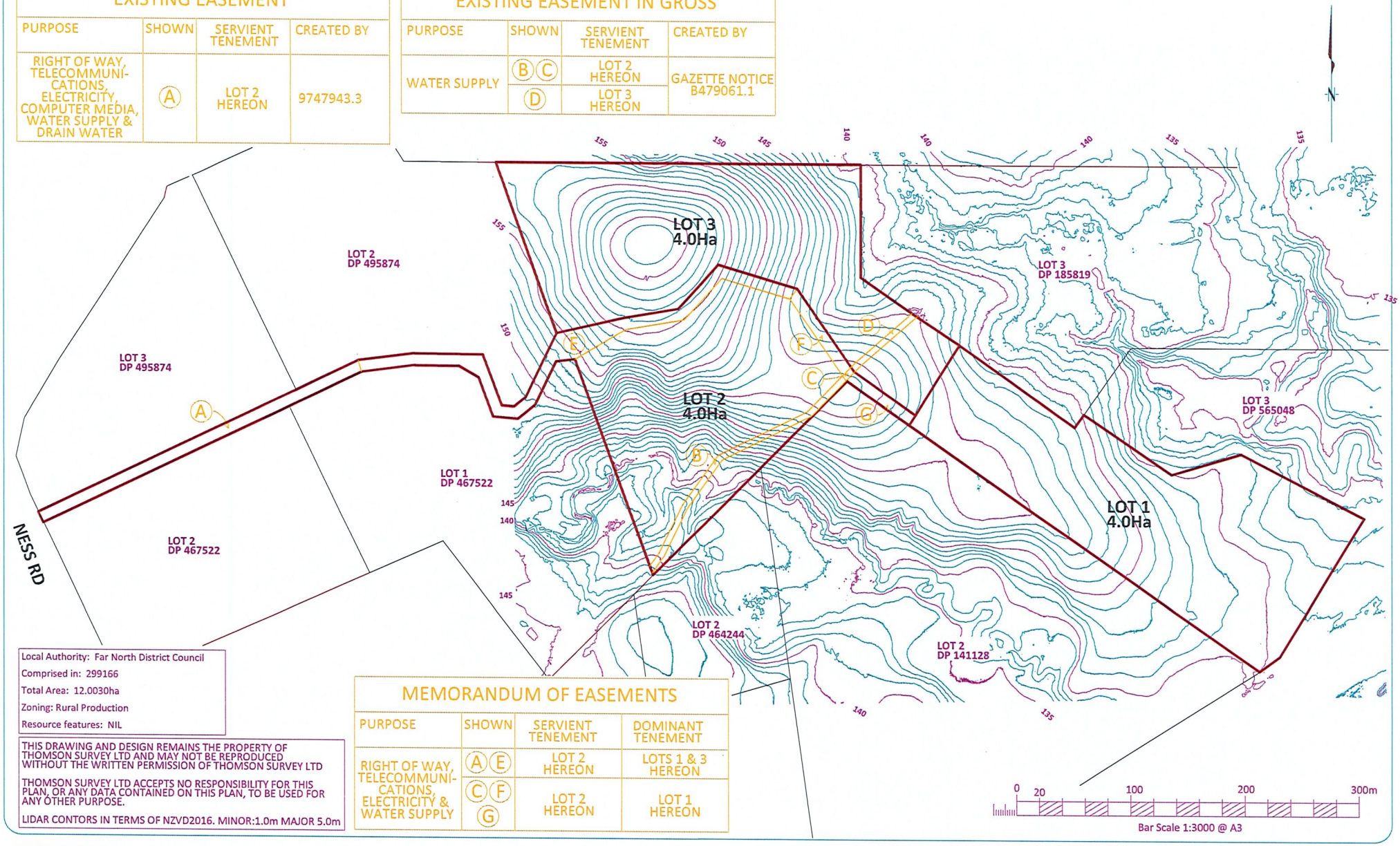
Scheme Plan(s)

EXISTING EASEMENT

PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
RIGHT OF WAY, TELECOMMUNI-CATIONS, ELECTRICITY, COMPUTER MEDIA, WATER SUPPLY & DRAIN WATER	A	LOT 2 HEREON	9747943.3

EXISTING EASEMENT IN GROSS

PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
WATER SUPPLY	B C	LOT 2 HEREON	GAZETTE NOTICE B479061.1
	D	LOT 3 HEREON	



Local Authority: Far North District Council
Comprised in: 299166
Total Area: 12.0030ha
Zoning: Rural Production
Resource features: NIL

LIDAR CONTORS IN TERMS OF NZVD2016. MINOR:1.0m MAJOR 5.0m

MEMORANDUM OF EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNI-CATIONS, ELECTRICITY & WATER SUPPLY	A E	LOT 2 HEREON	LOTS 1 & 3 HEREON
	C F G	LOT 2 HEREON	LOT 1 HEREON

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 14 DP 374120

NESS ROAD, WAIPAPA

PREPARED FOR: D & B HOULT LTD

	Name	Date
Survey		
Design		
Drawn	TH	15/01/25
Approved		
Rev	KY	01/09/25

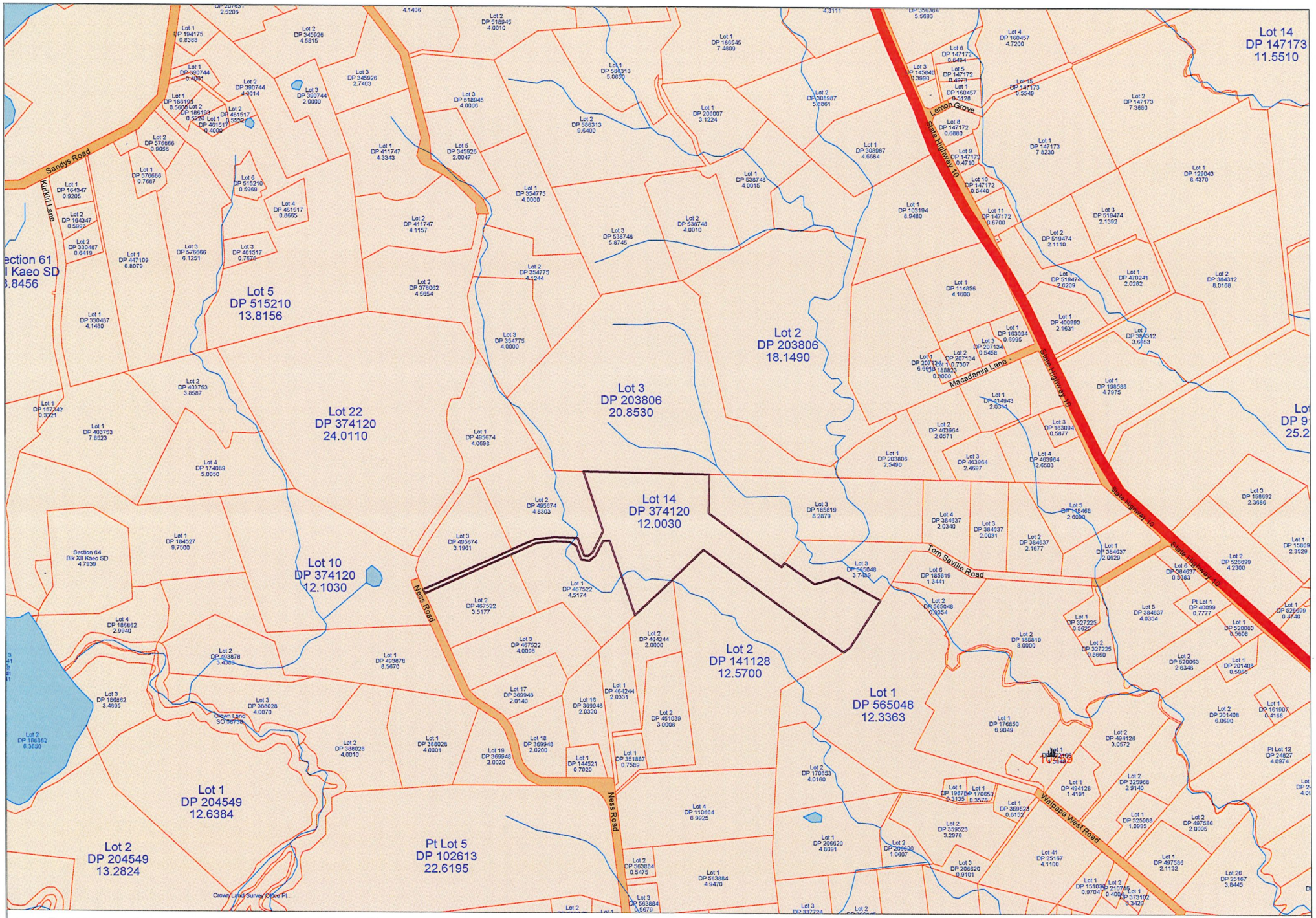
ORIGINAL
SCALE 1:3000
SHEET SIZE A3

JOB 10735 Scheme 20250901 Option 3

Surveyors Ref. No: *10735*
Series
Sheet 1 of 1

Appendix 2

Location Plan



QuickMap
Custom Software Ltd

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

Scale 1:12000 Topographical and Cadastral map derived from LINZ data. Printed: 30-Sept-2025 11:07.

Appendix 3

Records of Title & Relevant Instruments

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**299166**
Land Registration District	**North Auckland**
Date Issued	13 February 2008

Prior References
283796

Estate	Fee Simple
Area	12.0030 hectares more or less
Legal Description	Lot 14 Deposited Plan 374120
Registered Owners	
D & B Hoult Limited	

Interests

Subject to Section 8 Mining Act 1971 (affects part formerly contained in CT NA115D/751)

Subject to Section 168A Coal Mines Act 1925 (affects part formerly contained in CT NA115D/751)

Subject to a water supply right (in gross) over part marked A on DP 374120 in favour of Kerikeri Irrigation Company Limited created by Gazette Notice B479061.1

Fencing Covenant in Transfer 5635563.2 - 26.6.2003 at 9:00 am

Land Covenant in Transfer 7045195.7 - 26.9.2006 at 9:00 am

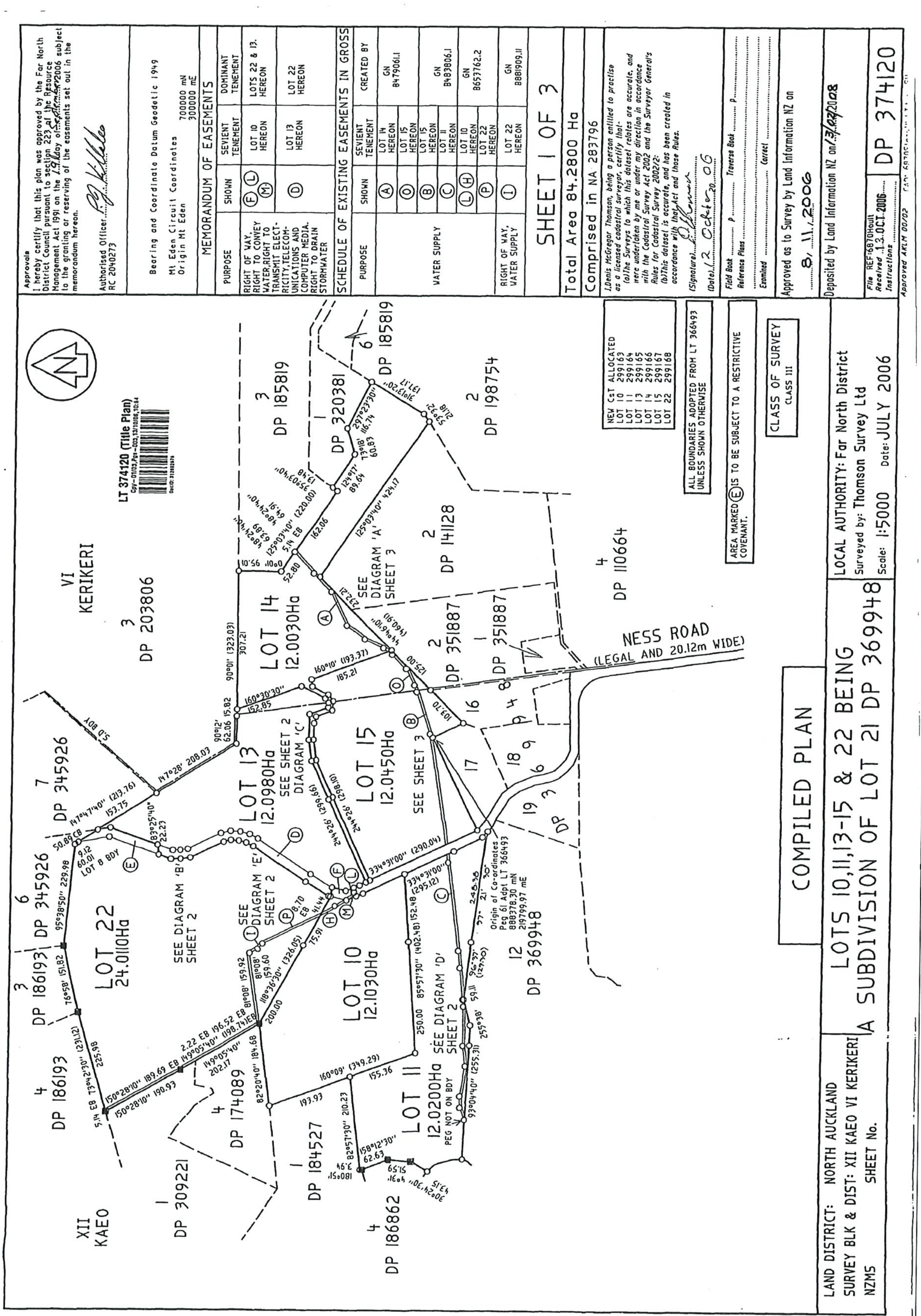
7536666.1 Variation of Land Covenant 7045195.7 - 11.9.2007 at 9:00 am

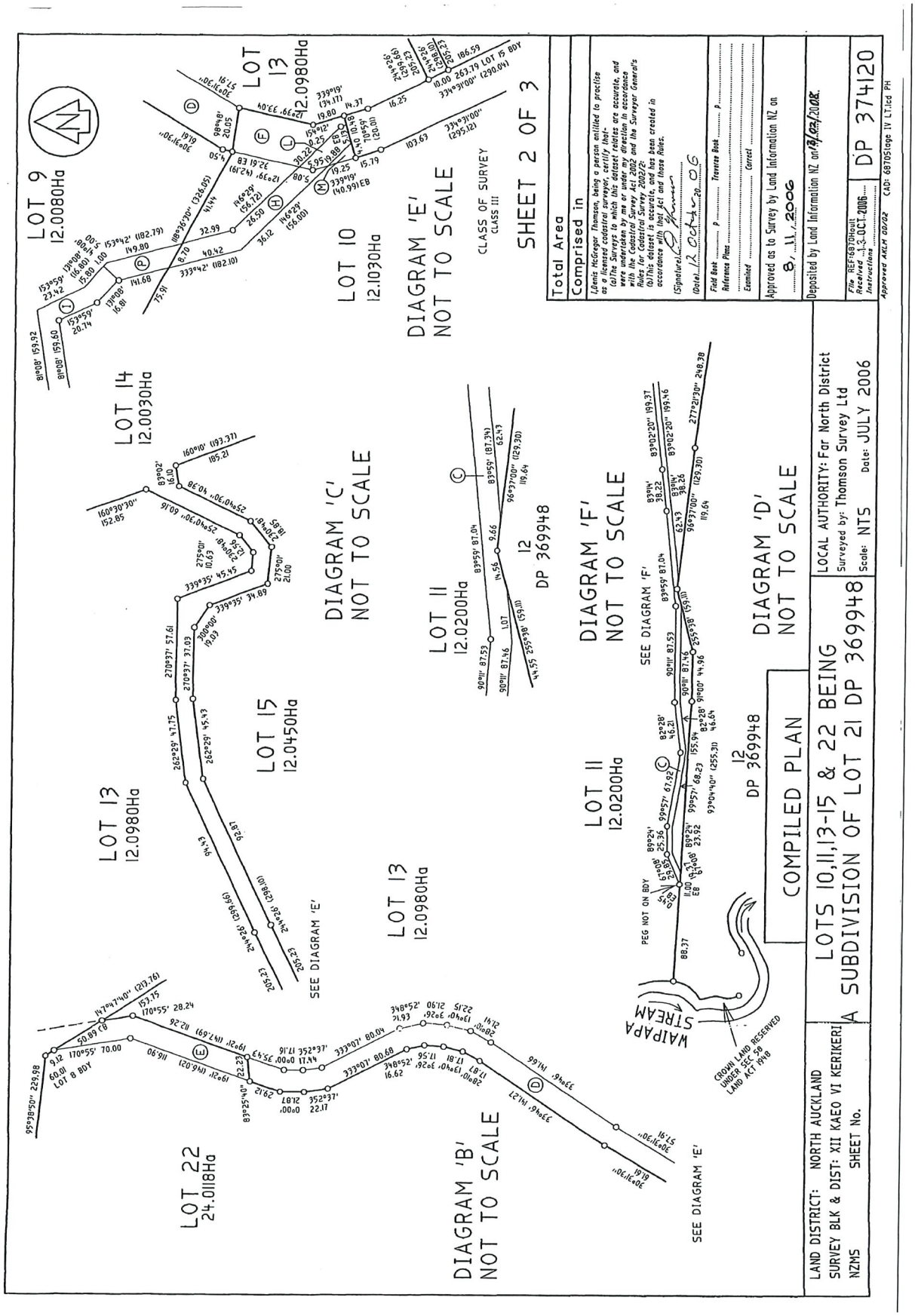
Appurtenant hereto are rights of way,rights to transmit electricity,telecommunications & computer media,rights to convey water and rights to drain sewage created by Easement Instrument 7544609.3 - 18.9.2007 at 9:00 am

7711934.2 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 13.2.2008 at 9:00 am

Subject to a right of way, right to convey electricity, water, telecommunications and computer media and a right to drain water over part marked A on DP 467522 created by Easement Instrument 9747943.3 - 24.7.2014 at 2:43 pm

The easements created by Easement Instrument 9747943.3 are subject to Section 243 (a) Resource Management Act 1991


Approvals
I hereby certify that this plan was approved by the Far North District Council pursuant to section 223 of the Resource Management Act 1991 on the 19 day of September 2006 subject to the granting or reserving of the easements set out in the memorandum hereon.
Authorised Officer
RC 2040273
Bearing and Coordinate Datum Geodetic 1949
Mt Eden Circuit Coordinates
Origin Mt Eden 700000 mN 300000 mE
MEMORANDUM OF EASEMENTS
PURPOSE | SHOWN | SERVIENT TENEMENT | DOMINANT TENEMENT
RIGHT OF WAY, RIGHT TO CONVEY WATER, RIGHT TO TRANSMIT ELECTRICITY, TELECOMMUNICATIONS AND COMPUTER MEDIA, RIGHT TO DRAIN STORMWATER | F L M | LOT 10 HEREON | LOTS 22 & 13 HEREON
D | LOT 13 HEREON | LOT 22 HEREON
SCHEDULE OF EXISTING EASEMENTS IN GROSS
PURPOSE | SHOWN | SERVIENT TENEMENT | CREATED BY
A | LOT 14 HEREON | GN B479061.1
O | LOT 15 HEREON
WATER SUPPLY | B | LOT 15 HEREON | GN B483806.1
C | LOT 11 HEREON
L H | LOT 10 HEREON | GN B653762.2
P | LOT 22 HEREON
RIGHT OF WAY, WATER SUPPLY | I | LOT 22 HEREON | GN B881909.11
SHEET 1 OF 3
Total Area 84.2800 Ha
Comprised in NA 283796
I, Denis McGregor Thomson, being a person entitled to practise as a licensed cadastral surveyor, certify that—(a) the Surveys to which this dataset relates are accurate, and were undertaken by me or under my direction in accordance with the Cadastral Survey Act 2002 and the Surveyor General's Rules for Cadastral Survey 2002/2; (b) This dataset is accurate, and has been created in accordance with that Act and those Rules.
(Date) 12 October 2006
Approved as to Survey by Land Information NZ on 8.11.2006
Deposited by Land Information NZ on 13/02/2008
File REF 6870Hout
Received 13 OCT 2006
DP 374120
LT 374120 (Title Plan)
NEW CsT ALLOCATED
LOT 10 299163
LOT 11 299164
LOT 13 299165
LOT 14 299166
LOT 15 299167
LOT 22 299168
ALL BOUNDARIES ADOPTED FROM LT 366493 UNLESS SHOWN OTHERWISE
AREA MARKED E IS TO BE SUBJECT TO A RESTRICTIVE COVENANT.
CLASS OF SURVEY
CLASS III
COMPILED PLAN
LOTS 10,11,13-15 & 22 BEING
A SUBDIVISION OF LOT 21 DP 369948
LAND DISTRICT: NORTH AUCKLAND
SURVEY BLK & DIST: XII KAEO VI KERIKERI
NZMS SHEET No.
LOCAL AUTHORITY: Far North District
Surveyed by: Thomson Survey Ltd
Scale: 1:5000 Date: JULY 2006
VI KERIKERI
XII KAEO
LOT 22 24.0110Ha
LOT 13 12.0980Ha
LOT 14 12.0030Ha
LOT 15 12.0450Ha
LOT 10 12.1030Ha
LOT 11 12.0200Ha
NESS ROAD (LEGAL AND 20.12m WIDE)
SEE DIAGRAM 'A' SHEET 3
SEE DIAGRAM 'B' SHEET 2
SEE SHEET 2 DIAGRAM 'C'
SEE DIAGRAM 'D' SHEET 2
SEE DIAGRAM 'E' SHEET 2
SEE SHEET 3
3 DP 203806
7 DP 345926
6 DP 345926
3 DP 186193
4 DP 186193
1 DP 309221
4 DP 174089
1 DP 184527
4 DP 186862
12 DP 369948
3 DP 185819
6 DP 185819
1 DP 320381
2 DP 198754
2 DP 141128
4 DP 110664
2 DP 351887
1 DP 351887
Origin of Co-ordinates Peg 61 Adpt LT 366493 888378.30 mN 299799.97 mE
PEG NOT ON BDY


LOT 9
12.0080Ha
LOT 13
12.0980Ha
LOT 10
12.1030Ha
DIAGRAM 'E'
NOT TO SCALE
CLASS OF SURVEY
CLASS III
SHEET 2 OF 3
Total Area
Comprised in
LOT 14
12.0030Ha
DIAGRAM 'C'
NOT TO SCALE
LOT 11
12.0200Ha
12
DP 369948
LOT 13
12.0980Ha
LOT 15
12.0450Ha
SEE DIAGRAM 'E'
LOT 11
12.0200Ha
DIAGRAM 'F'
NOT TO SCALE
SEE DIAGRAM 'F'
LOT 13
12.0980Ha
12
DP 369948
DIAGRAM 'D'
NOT TO SCALE
COMPILED PLAN
LOT 22
24.0118Ha
DIAGRAM 'B'
NOT TO SCALE
SEE DIAGRAM 'E'
WAIPAPA STREAM
PEG NOT ON BDY
CROWN LAND RESERVED UNDER SEC 56 LAND ACT 1948
LAND DISTRICT: NORTH AUCKLAND
SURVEY BLK & DIST: XII KAEO VI KERIKERI
NZMS SHEET No.
LOTS 10,11,13-15 & 22 BEING
A SUBDIVISION OF LOT 21 DP 369948
LOCAL AUTHORITY: Far North District
Surveyed by: Thomson Survey Ltd
Scale: NTS Date: JULY 2006
I,Dennis McGregor Thomson, being a person entitled to practise as a licensed cadastral surveyor, certify that-
(a)The Surveys to which this dataset relates are accurate, and were undertaken by me or under my direction in accordance with the Cadastral Survey Act 2002 and the Surveyor Generals Rules for Cadastral Survey 2002/2; and the Surveyor General's
(b)This dataset is accurate, and has been created in accordance with that Act and those Rules.
Signature
Date: 12 October 06
Field Book ..... P ..... Traverse Book ..... P .....
Reference Plans .....
Examined .....
Approved as to Survey by Land Information NZ on
8, 11, 2006
Deposited by Land Information NZ on 13/12/2006
File Ref: 6870Hoult
Received 13 OCT 2006
Instructions .....
DP 374120
Approved AKLH 10042
CAD: 6870Stage IV LT.tied PH

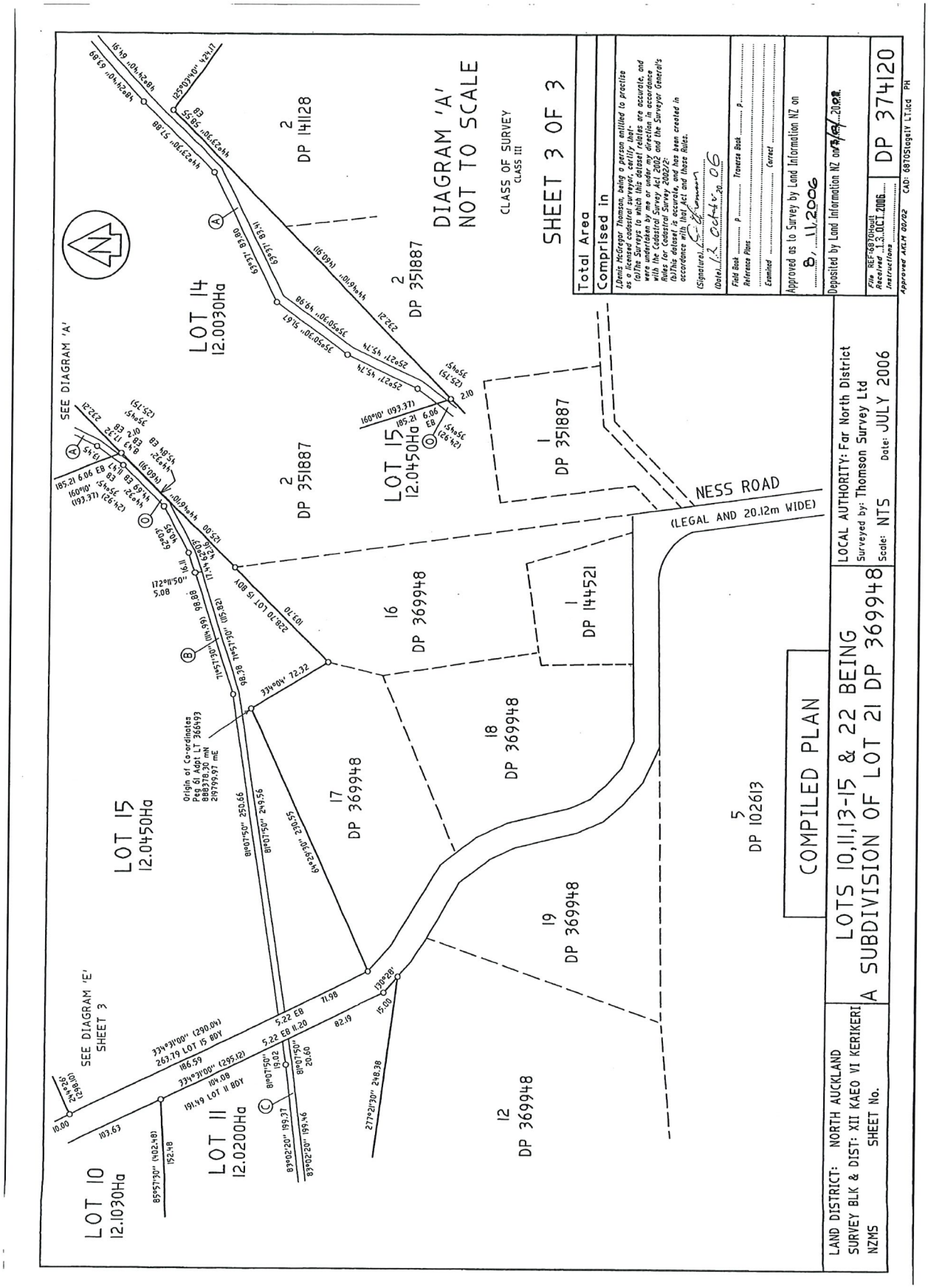
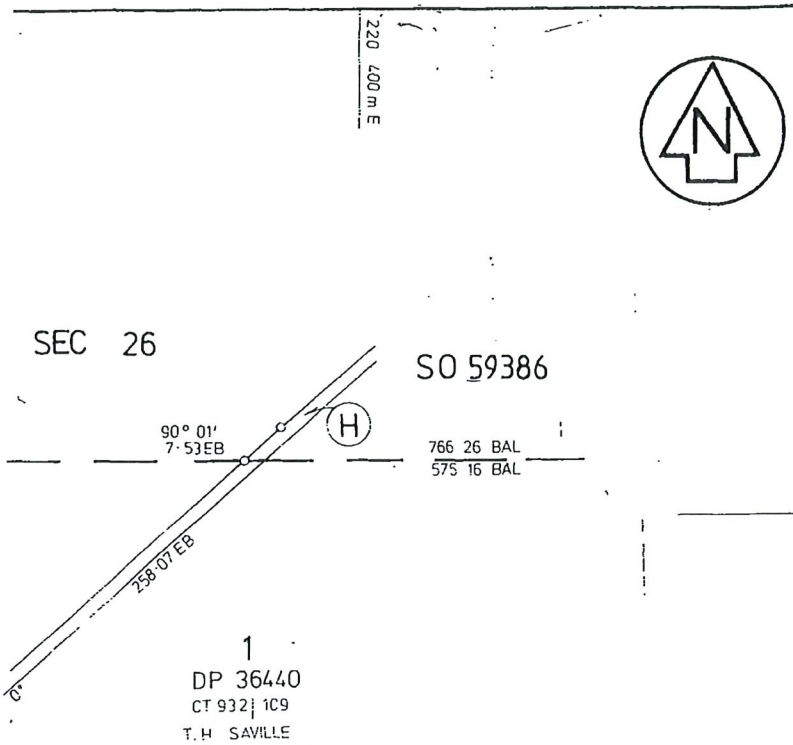


DIAGRAM 'A'
NOT TO SCALE
CLASS OF SURVEY
CLASS III
SHEET 3 OF 3
Total Area
Comprised in
LOTS 10,11,13-15 & 22 BEING
A SUBDIVISION OF LOT 21 DP 369948
COMPILED PLAN
LOCAL AUTHORITY: Far North District
Surveyed by: Thomson Survey Ltd
Scale: NTS Date: JULY 2006
DP 374120
LAND DISTRICT: NORTH AUCKLAND
SURVEY BLK & DIST: XII KAEO VI KERIKERI
NZMS SHEET No.
NESS ROAD
(LEGAL AND 20.12m WIDE)
LOT 10
12.1030Ha
LOT 11
12.0200Ha
LOT 14
12.0030Ha
LOT 15
12.0450Ha
LOT 15
12.0450Ha
2 DP 14128
2 DP 351887
2 DP 351887
1 DP 351887
16 DP 369948
17 DP 369948
18 DP 369948
19 DP 369948
12 DP 369948
1 DP 144521
5 DP 102613
SEE DIAGRAM 'A'
SEE DIAGRAM 'E' SHEET 3
Origin of Co-ordinates Peg 61 Adpt LT 366493 888378.30 mN 269799.97 mE

B479061.1 GN



ER SUPPLY EASEMENT
5·0 m wide)

Approvals

SCHEDULE OF EASEMENTS REQUIRED FOR WATER SUPPLY PURPOSES.

SHOWN	DESCRIPTION	CT	AREA
(G)	PT LOT 1 DP 36440	CT 932/109	3106 m²

THIS PLAN IS CONCURRENT WITH
SO's 59383, 59384, 59386

APPROVED AS TO EASEMENT BOUNDARIES

RE 21/5/85

FOR
DISTRICT COMMISSIONER OF WORKS.

Total Area 3106 m²

Comprised in CT 932/109 (PT.)

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* 16th *day of* May *19* 85 *Signature* R.J. Donaldson

Field Book 7620 p. 14-22 *Traverse Book* 1022 p.167-169

Reference Plans

Examined Malcolm Perry *Correct* W.M. Coltman

Approved as to Survey

Chief Surveyor

Deposited this day of 19

District Land Registrar

ER

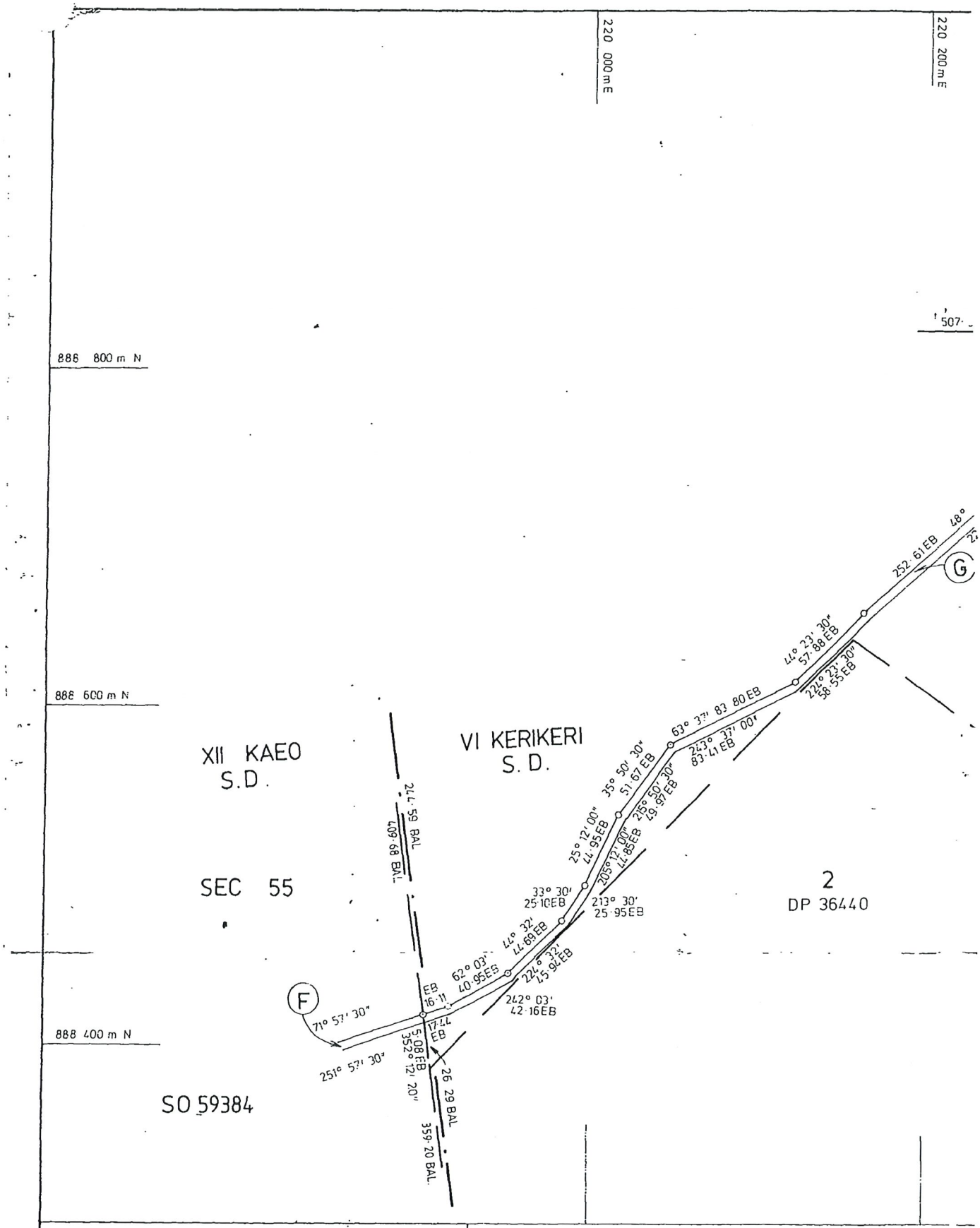
LOCAL AUTHORITY BAY OF ISLANDS COUNTY
Surveyed by R.J. DONALDSON & ASSOC
Scale 1 : 2000 Date MARCH 1985

File 1061 'E' 03/92
Received Instructions 5 JUN 1985

SO 59385

of Lands and Survey Wellington

L&S FORM N 93



LAND DISTRICT NORTH AUCKLAND

SURVEY BLK.& DIST. XII KAEO & VI KERIKERI.

NZMS SHEET No.

EASEMENTS REQUIRED FOR W. SUPPLY PURPOSES.

Printed by Sterling Imports Ltd, Auckland, New Zealand

W. N Hawkey, Surveyor-Genera Depart

Extract from *N.Z. Gazette*, 3 October 1985, No. 185, page 4314

Declaring a Water Supply Pipeline Easement, in Gross, Acquired for Irrigation Purposes in Block XII, Kaeo Survey District and Block VI, Kerikeri Survey District, Bay of Islands County

PURSUANT to section 20 of the Public Works Act 1981, the Minister of Works and Development declares that an agreement between T. H. Saville, as registered proprietor, and the Crown dated the 25th day of October 1984 and held in the office of the District Commissioner of Works at Auckland, having been entered into, a water supply pipeline easement in gross over the land described in the Schedule hereto subject to the rights and imposing the conditions contained in the said agreement is hereby acquired for irrigation purposes and shall vest in the Crown on the 3rd day of October 1985.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALL that piece of land containing 3106 square metres, situated in Block XII, Kaeo Survey District and Block VI, Kerikeri Survey District and being part Lot 1, D.P. 36446, as shown marked "G" on S.O. Plan 59385, lodged in the office of the Chief Surveyor at Auckland.

CT 932/109

Dated at Wellington this 27th day of September 1985.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 64/1/1/6; Ak. D.O. 50/12/52/0/272)

16/1

Noted
MC

acquiring, water supply easement in gross over part for irrigation purposes & vesting the said easement in the Crown on 3/10/1985.

AW

10.55 11.NOV85 B 479061

PARTICULARS ENTERED IN REGISTER

LAND REGISTRY AUCKLAND

ASST. LAND REGISTRAR

DISTRICT LAND REGISTRAR NORTH AUCKLAND

932/109

CONO 7711934.2 Cons
Cpy – 01/01, Pgs – 001, 13/02/08, 08:39
DocID: 313061051

Far North District Council

Private Bag 752, Memorial Ave
Kaikohe 0400, New Zealand
Freephone: 0800 920 029
Phone: (09) 405 2750
Fax: (09) 401 2137
Email: ask.us@fndc.govt.nz
Website: www.fndc.govt.nz

THE RESOURCE MANAGEMENT ACT 1991

SECTION 221 : CONSENT NOTICE

REGARDING RC 2040273
the Subdivision of Lot 3 DP 207631, Lots 1 & 3 DP 187364 and Lot 2 DP 320381
North Auckland Registry

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

SCHEDULE

Lot 14 DP 374120 – Stage 4

- The operation of agricultural and horticultural equipment including sprays and chemicals (subject to compliance with any relevant legislation) may be a permitted activity. Accordingly, where rainwater is collected from exposed surfaces for human consumption in connection with any residential development on the site, the occupiers or any such dwelling shall install an approved water filtration system.

SIGNED: pp _____ Mr Pat Killalea
By the FAR NORTH DISTRICT COUNCIL
Under delegated authority:
RESOURCE CONSENTS MANAGER

DATED at **KAIKOHE** this 6th day of December 2007

View Instrument Details

Instrument No	9747943.3
Status	Registered
Date & Time Lodged	24 July 2014 14:43
Lodged By	Fountain, David Robin
Instrument Type	Easement Instrument

Affected Computer Registers	Land District
299165	North Auckland
628049	North Auckland
628050	North Auckland
299166	North Auckland

Annexure Schedule: Contains 2 Pages.

Grantor Certifications

I certify that I have the authority to act for the Grantor and that the party has the legal capacity to authorise me to lodge this instrument ☑

I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument ☑

I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply ☑

I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period ☑

I certify that the Mortgagee under Mortgage 6713626.5 has consented to this transaction and I hold that consent ☑

Signature

Signed by David Robin Fountain as Grantor Representative on 01/08/2014 11:47 AM

Grantee Certifications

I certify that I have the authority to act for the Grantee and that the party has the legal capacity to authorise me to lodge this instrument ☑

I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument ☑

I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply ☑

I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period ☑

Signature

Signed by David Robin Fountain as Grantee Representative on 01/08/2014 11:48 AM

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

Approved by Registrar-General of **Land** under **No.** 2002/6055
Easement instrument to grant easement or *profit a prendre*, or create land covenant
Sections 90A and 90F, Land Transfer Act 1952

BARCODE

Grantor *Surname(s) must be underlined or in CAPITALS*

DBH KERIKERI PROPERTIES LIMITED

Grantee

DBH KERIKERI PROPERTIES LIMITED

Grant* of easement or *profit a prendre* or creation or covenant

The Grantor, being the registered proprietor of the servient tenement(s) set out in Schedule A, **grants to the Grantee** (and, if so stated, in gross) the easement(s) ~~or *profit(s) a prendre*~~ set out in Schedule A, ~~or creates the covenant(s) set out in Schedule A~~, with the rights and powers or provisions set out in the Annexure Schedule(s)

Schedule A *(Continue in additional Annexure Schedule if required)*

Purpose (nature and extent) of easement, *profit*, or covenant	Shown (plan reference)	Servient tenement (Identifier/CT)	Dominant tenement (Identifier/CT *or* in gross)
Right to Way, Right to Convey Electricity, Telecommunciations & Computer Media, Right to Convey Water and Right to Drain Water	Marked "A" on Deposited Plan 467522	Lot 14 on Deposited Plan 374120 in CT299166	Lots 1 and 2 on DP467522 in CT628049 and CT628050
Right to Convey Electricity, Telecommunications & Computer Media, Right to Convey Water and Right to Drain Water	Marked "A" on Deposited Plan 467522	Lot 14 on Deposited Plan 374120 in CT299166	Lot 13 on DP374120 in CT299165

Easements or *profits a pendre* rights and powers (including terms, covenants, and conditions)

Delete phrases in [ ] and insert memorandum number as required; continue in additional Annexure Schedule if required

Unless otherwise provided below, the rights and powers implied in specific classes of easement are those prescribed by the Land Transfer Regulations 2002 and/or the Schedule Five of the Property Law Act 2007

~~The implied rights and powers are [**varied**] [**negative**] [**added to**] or [**substituted**] by~~:
~~[Memorandum number , registered under section 155A of the Land Transfer Act 1952]~~

~~[the provisions set out in Annexure Schedule 2]~~

Covenant provisions

Delete phrases in [ ] and insert memorandum number as required; continue in additional Annexure Schedule if required

~~The provisions applying to the specified covenants are those set out in:~~

~~[Memorandum number , registered under section 155A of the Land Transfer Act 1952]~~

~~[Annexure Schedule 2]~~

Appendix 4

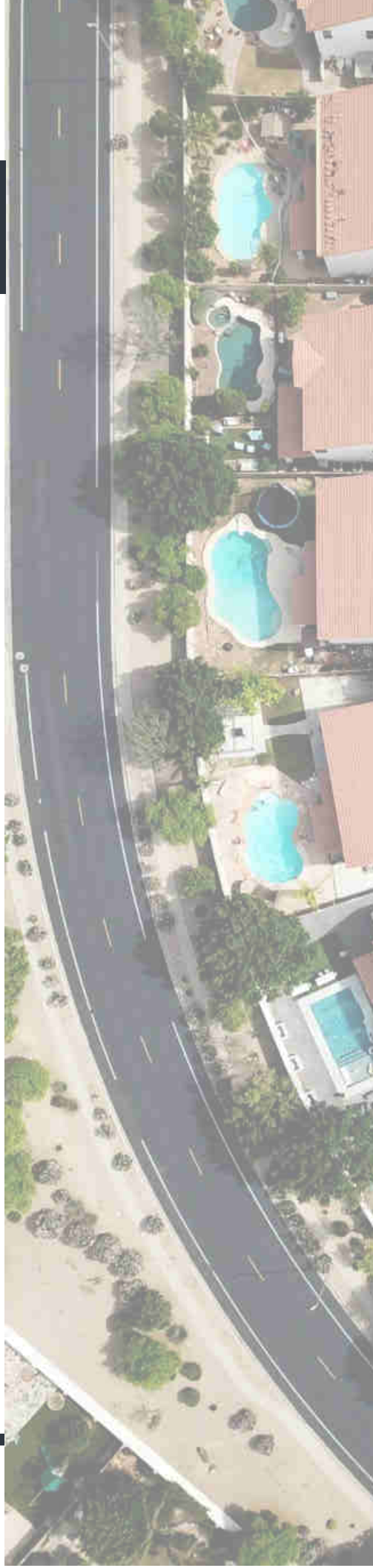
Subdivision Site Suitability Report

geologix
consulting engineers

SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

NESS ROAD, LOT 14 DP374120

D & B HOULT LIMITED



C0661-S-01-R01
SEPTEMBER 2025
REVISION 1

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

geologix
consulting engineers

DOCUMENT MANAGEMENT

Document Title	Subdivision Site Suitability Engineering Report
Site Reference	Ness Road, Lot 14 DP374120
Client	D & B Hoult Limited
Geologix Reference	C0661-S-01-R01
Issue Date	September 2025
Revision	01
Prepared	Olivia Hext Chartered Professional Engineer, CPEng, CMEngNZ
Reviewed and Approved	Edward Collings Director, CPEng, CMEngNZ, CEnvP, MPhys (Hons)
File Reference	*Z:\Geologix Files\Projects\C0600-C0699\C0661N - Ness Road, Waipapa (Lot 14 DP 374120)\06 - Reports\C0661N-S-01-R01 Draft OH (2).docx*

REVISION HISTORY

Date	Issue	Prepared	Approved
September 2025	First Issue	OH	SH

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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 D & B Hoult Ltd 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 the rural property (Lot 14 DP374120) off Ness Road, Waipapa, the 'site'. Specifically, this assessment addresses engineering elements of wastewater, stormwater, water supply 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.

Access to and within the site will be addressed by others, but an assessment of the stormwater runoff affects will consider this access.

1.1 Proposal

A proposed concept scheme plan was presented to Geologix at the time of writing, prepared Thomson Survey[1] and provided within Appendix A as a separate drawing. It is understood the Client proposes to subdivide the site to create three new residential lots with Right of Way (RoW) to facilitate access. The above is outlined in Table 1. Amendments to the referenced scheme plan may require an update to the recommendations of this report which are based on conservative, typical rural residential development concepts.

Table 1: Summary of Proposed Scheme

Proposed Lots	Size	Purpose
1	4.0 ha	New residential
2	4.0 ha	New residential
RoW A (Lot 2)		Right of Way
3	4.0 ha	New residential

Site access will be provided from Ness Road at the southwestern boundary from an existing accessway. This existing accessway will form part of proposed Lot 2, and will be extended past its current formation, entering the proposed subdivision at the southwestern boundary.

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

2 DESKTOP APPRAISAL

The site is located set back from Ness Road. Topographically the site area located on and around a ridgeline and highpoint, with defined slopes that fall away either side and then flattens out to the south-east. At the time of writing, we did not have a detailed survey model of the site.

[1] *Williams and King, Scheme Plan Ref. 23457.01 and 23457.02, dated August 2021.*

The entire site area is currently in pasture with rough grass and occasional vegetation. No existing structures or infrastructure are present within the site boundaries. A detailed review of existing watercourses and overland flow paths is presented as Section 0. In brief, the site is intersected by multiple small ditches, draining downslope to watercourses at the north-eastern and southern boundaries. The site is split into two defined catchments, with the northeastern watercourse flowing to a tributary of Wairawarawa Steam and the southern to a tributary of Waipapa Stream.

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

2.1 Existing Reticulated Networks

Far North District Council (FNDC) GIS mapping indicates that no existing three waters infrastructure or reticulated networks are present within Ness 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 mainly underlain by Late Miocene to Pliocene-aged Kerikeri Volcanic Group soils of the Bay of Islands Volcanic Field, described as basalt lava, volcanic plugs and minor tuff.

3 SURFACE WATER FEATURES AND OVERLAND FLOWPATHS

During our site walkover and desktop appraisal of the supplied topographic data, Geologix have developed an understanding of the surface water features and overland flow paths influencing the site. The developed understanding summarised in the following sections is shown schematically on Drawings No. 100 - 102 with associated off-set requirements.

3.1 Surface Water Features

The site is split across two catchments as it sits predominantly along a ridgeline feature. The western and southwestern portions of the site are at the upper elevations of a larger catchment that extends to the south/southeast through the site and adjacent downstream properties, eventually meeting the Waipapa Stream.

Flow to the south is channelled into small gullies and streams that flow down into the main watercourse. The remaining sections of the site, the northern, northeastern and eastern sections flow north to the Wairawarawa Stream tributary. Flow to the north is more gradual with no defined streams or channels on the site.

There are flood hazards identified at both watercourses. The southern Waipapa Stream tributary has a Priority River Flood Hazard zone, for 10, 50 and 100yr extent. This is also

[2] *https://data.gns.cri.nz/geology/*

located within the site boundaries along the southern boundary, as can be seen from Figure 1.

The northern watercourse, the Wairawarawa Stream tributary, also has Regionwide River Flood Hazard zone, the 10, 50 and 100yr extent. This intersects the southeastern boundary slightly but is largely located outside of the site extent.

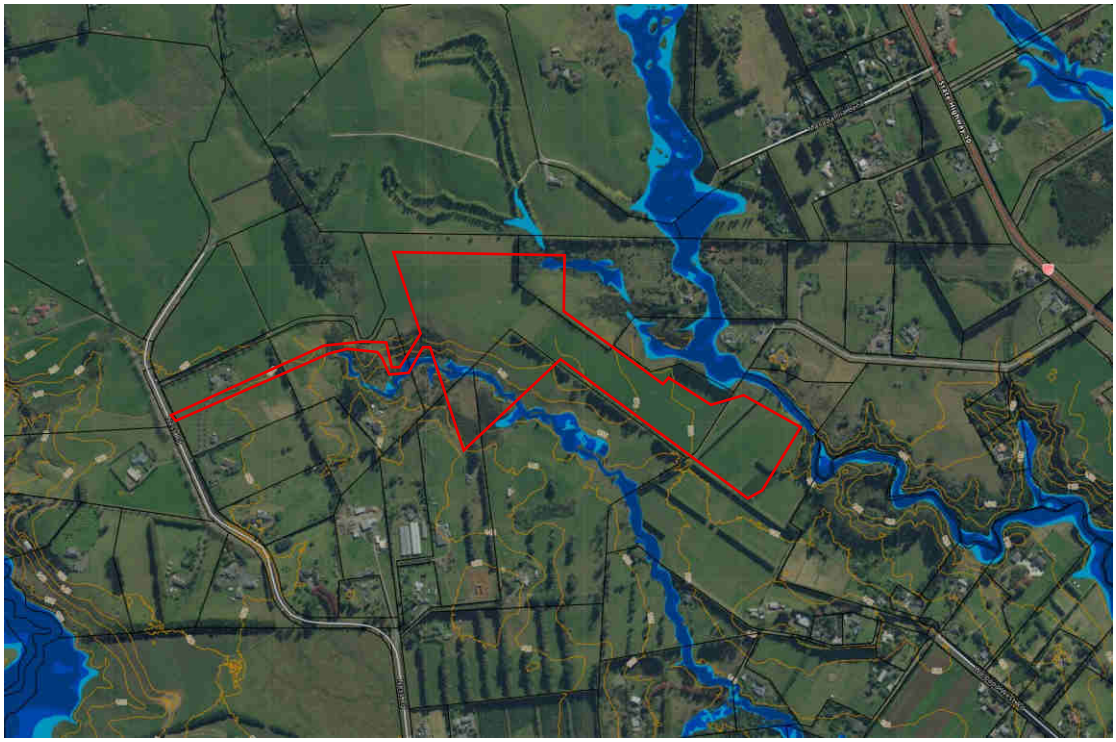


Figure 1. NRC Natural Hazard Maps, 10, 50, 100yr Flood Extent

3.2 Sensitive Receptors

Based on GIS data, national topographic maps and site data provided at the time of writing there are no sensitive wetland receptors within or close to the site boundaries.

3.3 Overland Flow Paths

Clearly defined flow paths are present through and around the site. There is a main overland flow path that crosses the access to the site, west of the main site area, that then travels south and east, crossing through the southern site boundary before heading southeast parallel to the site boundary. To the north there is another main flow path, outside the site, and several smaller overland flow paths within the site that feed this.

Our walkover survey was undertaken in a wet period between winter and spring seasons and noted flow through the major overland flow path and a number of saturated areas on site. The above is indicated across our drawing set, on Drawing No. 103.

4 GROUND INVESTIGATION

A site-specific walkover survey and intrusive ground investigation was undertaken by Geologix on 16 July 2025. The ground investigation was scoped to confirm the findings of the above information and to provide parameters for wastewater assessment. The ground investigation comprised:

- Three hand augered boreholes designated HA01 to HA03, inclusive formed within suitable areas of wastewater disposal fields on each proposed residential lot with a target depth of 1.2 m below ground level (bgl). See Figure 2 below for location of the boreholes.

Figure 2: Hand Auger (HA) locations

4.1 Site Walkover Survey

A visual walkover survey of the property confirmed:

- Topography data supplied is in general accordance with that outlined in Section 2 and observed site conditions. Suitable building envelopes[3] can be formed on gently sloping to sloped land <20° on each proposed lot.
- The site is bound in all directions by similar farming or rural lifestyle block properties.
- Well-formed access is existing from Ness Road through to the main property where it opens up. This access does include grassed swale drains. Ness Road also includes a well-formed and maintained grass swale, and the existing access has a culvert installed to maintain this conveyance.

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

- No structures or suitably formed roads are present within the site boundary, with the exception of the existing length of access from Ness Road.
- Two culverts are in place at the crossing of the major overland flow path however this should be subject to upgrading as outlined by this report.

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[4]. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 100 within Appendix A. Strata identified during the ground investigation can be summarised as follows:

- **Topsoil encountered to 0.15 m bgl.** Described as generally dark brown silt with trace rootlets, moist and of low plasticity.
- **Kerikeri Volcanic Group Residual Soils to depths >1.2 m bgl.** Exploratory holes recorded a consistent sequence of volcanic residual soils across the site. This generally comprised an upper light grey, moist and low plasticity silt overlying an orange brown moist clayey silt.
- **Groundwater.** Locally, within HA02, groundwater was encountered at the base of the hole at 1.2 m bgl. This is considered representative of winter groundwater levels.

  Based on the above shallow ground profile, the Kerikeri Volcanic Group soils were determined to be equivalent to moderate to slow draining soils for the wastewater appraisal.

A summary of the above strata horizons and wastewater properties is presented as Table 2.

Table 2: Summary of Ground Investigation

Hole ID	Proposed Lot	Hole Depth	Topsoil Depth	Groundwater	Wastewater Category
HA01	1	1.2 m	0.15 m	NE	5 – moderate to slow draining
HA02	2	1.2 m	0.15 m	1.2m	5 – moderate to slow draining
HA03	3	1.2 m	0.15 m	NE	5 – moderate to slow draining

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:

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

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

The concept rural residential developments within this report assume that the proposed new lot may comprise up to a five-bedroom dwelling with a peak occupancy of eight people[5]. 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

No existing wastewater treatment or disposal systems have been identified or surveyed within the 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 assumed for this assessment. The design water volume for roof water tank supply is estimated at 160 litres/ person/ day[6]. This assumes standard water saving fixtures[7] 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 within the concept solution provided that to meet suitable minimum treated effluent output, secondary treatment systems are accounted for across the site. The concept solution is detailed further in the following sections.

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

- Rule C.6.1.3 (6), discharge of wastewater from primary systems is to slopes less than 10°.

---

[5] TP58 Table 6.1.

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

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

- Rule C.6.1.3 (9.a), 100 % reserve disposal area where the wastewater has received primary treatment.
- Table 9, exclusion areas and setback distances for primary treated domestic type wastewater.

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

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

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

Table 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 >10 ° compliance with Northland Regional Plan (NRP) rule C.6.1.3(6) is required.	Concept design complies, all disposal fields sited on slopes <20 °.
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

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. This transposes to NZS1547 Category 4. For a PCDI system, a soil loading rate of 3.5 mm/ day is recommended within NZS1547 Table 5.2 and TP58 Table 9.2.

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

- 100 to 150 mm minimum depth of good quality topsoil (NZS1547 Table M1, note 1) to slow the soakage and assist with nutrient reduction.

The proposed concept design adopts 3.5 mm /day SLR, utilising a 30% reserve disposal field area.

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 Nos. 131 and 132.

- **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. This concept design therefore allows for a 110 m^2 reserve disposal area to be laid parallel to the natural contours.

Topography at the proposed wastewater disposal fields has been measured as ranging from gentle sloping to <20 °. Surface water cut-off drains are not considered necessary to meet the provisions of NRP rule C.6.1.3. In addition, no Discharge Consent is required. These requirements should be reviewed at the Building Consent stage.

5.5 Summary of Concept Wastewater Design

Based on the above design assumptions a concept wastewater design is presented as Table 4 and presented schematically upon Drawing Nos. 100 and 102. 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 not required. Stormwater management discharges downslope of all disposal fields.

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 Nos. 100 to 102, 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 Impervious Surfaces and Activity Status

A summary of the impervious areas of the proposed lots 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.

The activity status reflected in Table 5 is with respect to Operative FNDC Plan Section 8.6.5.1.3 only. Considering this, all proposed lots, Lot 1, Lot 2 and Lot 3 are considered **Permitted Activity.**

Table 5. Site Areas, Pervious and Impervious with Activity Status

Surface	Proposed Lot 1		Proposed Lot 2		Proposed Lot 3	
Existing Condition						
Roof	0 m^2	0 %	0 m2	0 %	0 m^2	0 %
Driveway + Parking	0 m^2	0 %	0 m2	0 %	0 m^2	0 %
Right of Way	0 m^2	0 %	705 m^2	1.76 %	0 m^2	0 %
Total impervious	0 m^2	0 %	705 m^2	1.76 %	0 m^2	0 %
Proposed Condition	**(40,000m^2)**		**(40,000 m^2)**		**(40,000 m^2)**	
Roof	300 m^2 (Concept)	0.75 %	300 m^2 (Concept)	0.75 %	300 m^2 (Concept)	0.75 %
Driveway + Parking	200 m^2 (Concept)	0.50 %	200 m^2 (Concept)	0.50 %	200 m^2 (Concept)	0.50 %
Right of Way	0 m^2	0 %	2,864 m^2	7.16 %	0 m^2	0 %
Total impervious	500 m^2	1.25 %	3,364 m^2	8.41 %	500 m^2	1.25 %
Activity Status	**Permitted**		**Permitted**		**Permitted**	

6.2 Stormwater Management Concept

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

- **Probable Future Development.** The proposed application includes subdivision formation only, with no on-lot specific development at this stage. However, a conservative model of probable future on-lot attenuation discharging to suitably sized dispersion devices has been developed for this concept assessment considering the variation of scale in typical rural residential developments. The probable future development concept includes up to 300 m^2 potential roof area and up to 200 m^2 potential driveway or parking areas for each Lot. The latter has been modelled as an offset within lot specific attenuation devices.

- **Subdivision Development.** Access to each proposed lot will be established by one RoW internal road, formed as part of Lot 2. Utilising the natural contour and gravity flows, stormwater discharges from the RoW areas can be directly routed through the site to attenuation devices, before discharging to the overland flow paths and watercourses present in the site.

  These areas will drain through grassed swales and associated easements, and attenuation has been provided as outlined Section 6.4 and Drawing No. 100, 101 and 102.

6.3 Design Storm Event

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model[8]. The NIWA HIRDS rainfall data is presented in full within Appendix D. Provision for climate change has been adopted by means of applying a factor of 20 % to rainfall intensities, in accordance with FNDC Engineering Standards 2023.

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

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

Furthermore, the Table 4-1 stipulates that flow attenuation controls reduce the post-development peak discharge to 80 % of the pre-development condition for the 50 % and 20% AEP storm event. To be compliant with the above rules, the attenuation modelling within this report has been undertaken for all of the above storm events. The results are summarised in Table 7 with calculations provided in full in Appendix D.

Outlet dispersion devices have been designed to manage the 1% AEP event to reduce scour and erosion at discharge locations. These are detailed further in 6.4.3 of this report.

6.4 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 1% AEP storm event. This is achievable by installing specifically sized low-flow orifices into the attenuation devices.

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards[9] to provide a suitable concept attenuation design to limit post-development peak flows to 80% of pre-development conditions. The proposed devices with the concept design are listed below:

- Roof Runoff Tanks (refer to Table 6)
- Attenuation Ponds for RoW runoff (refer to Table 8)

[8] *NIWA High Intensity Rainfall Data System, https://hirds.niwa.co.nz.*
[9] *FNDC Engineering Standards 2023, Version 0.6, Issued May 2023.*

6.4.1 *Concept Attenuation Roof Tanks*

Conceptual storage and outlet requirements within the tanks are included in Appendix D and a typical schematic retention/ detention tank arrangement detail is presented as Drawing No. 400 within Appendix A.

Table 6: Summary of Concept Stormwater Attenuation – Roof Tanks

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

Table 7: Probable Future Development Attenuation Concept - Tanks

Design Parameter	Flow Attenuation: 50 % AEP (80 % of pre dev)	Flow Attenuation: 20 % AEP (80 % of pre dev)	Flood Control: 10 % AEP	Flood Control: 1 % AEP (80 % of pre dev)
Proposed Lot 1, 2 and 3 (new impervious building and driveway only)				
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan	FNDC Engineering Standards Table 4-1
Pre-development peak flow	5.29 l/s	6.84 l/s	7.99 l/s	11.88 l/s
80 % pre-development peak flow	4.23 l/s	5.47 l/s	NA	9.51 l/s
Post-development peak flow	9.63 l/s	12.47 l/s	14.56 l/s	21.65 l/s
Total Storage Volume Required	3,659 litres	4,754 litres	5,579 litres	8,566 litres
Concept Summary:	- Attenuation storage calculation accounts for offset flow from 200 m^2 driveway (not indicated explicitly indicated in summary above. Refer Appendix D for calcs in full) - Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage. - 2 x 25,000 litre tanks are sufficient for attenuation (8,566 l) + domestic water storage (41,434 l) - 1 % AEP attenuation (in isolation) requires a 64 mm orifice 0.50 m below overflow. However regulatory requirements are to consider an additional orifice/s to control the 50 %, 20 % and 1 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.			

Calculations to support the concept design are presented as Appendix D to this report. As above, it is recommended that this concept design is refined at the Building Consent stage once final development plans are available.

6.4.2 *Concept Attenuation Right of Way*

Below and within Appendix D, are the calculations to support the attenuation and required offset for the new impervious area within the Right of Way. The Right of Way has been split into sections, based on the discharge catchment, and the proposed locations for attenuation devices. These devices have been conceptually sized for the 1% AEP to demonstrate feasibility but will require detailed design to be submitted prior to construction.

No attenuation is proposed for the small increase in impervious areas due to parking bays along the existing access from Ness Road as the effects are considered less than minor and the swale will provide water quality treatment.

We also note that where ponds are proposed as the form of attenuation, this may be modified through detailed design to better reflect the design of the proposed RoW. Storage may be able to be accommodated within specifically designed swales with check dam structures.

Table 8. Summary of Concept Stormwater Attenuation – RoW Attenuation

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
Future Concept Development (RoW)			
Right of Way Section 1	705 m^2	730 m^2	Flows to Ness Road, no attenuation. Ness Road catchment.
Right of Way Section 2	0 m^2	336 m^2	Flows directly to overland flow path, no attenuation, offset within same catchment (Pond 1). Southern catchment.
Right of Way Section 3	0 m^2	635 m^2	Pond 1. Southern catchment.
Right of Way Section 4	0 m^2	447 m^2	Pond 2. Southern catchment.
Right of Way Section 5	0 m^2	499 m^2	Pond 3. Northern catchment.
Right of Way Section 5	0 m^2	180 m^2	Flows into Lot 1, no attenuation. Offset within same catchment. Northern catchment.
Total	**705 m^2**	**2,830 m^2**	

Table 9: RoW Attenuation Summary

Design Parameter	RoW Section 1 Ness Road, not attenuated 1 % AEP	RoW Section 3 (with offset from Section 2) POND 1 Flood Control: 1 % AEP (80 % of pre dev)	RoW Section 4 POND 2 Flood Control: 1 % AEP (80 % of pre dev)	RoW Section 5 POND 3 Flood Control: 1 % AEP (80 % of pre dev)	RoW Section 6 Lot 1 (not attenuated)
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1
Pre-development peak flow	22.72 l/s	23.07 l/s	10.62 l/s	11.86 l/s	4.28 l/s
80 % pre-development peak flow	18.17 l/s	18.46 l/s	8.50 l/s	9.49 l/s	3.42 l/s
Post-development peak flow	28.23 l/s	37.55 l/s	17.28 l/s	19.29 l/s	6.96 l/s
Total Storage Volume Required	3306 litres 3.31 m3	10,050 litres 10.05 m3	3,997 litres 4.00 m3	4,462 litres 4.46 m3	1,610 litres 1.61 m3
Concept Summary:	- Attenuation storage for POND 1 calculation accounts for offset flow from 336 m^2 RoW that contributes to the same catchment but flows directly to the southern overland flow path. - Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design pond storage. - Regulatory requirements are to consider orifice/s to control the 50 %, 20 % and 1 % AEP events specifically. This should be provided with detailed design for engineering approval.				

6.4.3 *On-Lot Discharge*

The direct discharge of water tank overflow in a concentrated manner can cause scour and erosion in addition to excessive saturation of shallow soils. Roof water will be captured in detention tanks and used for drinking water supply needs. It is recommended that overflow from rainwater detention tanks is conveyed in sealed pipes to a designated discharge point downslope of proposed building footprints and wastewater disposal fields. A concept design accommodating this is presented within Appendix A on Drawing Nos. 100 and 102.

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

Typical rural residential developments construct either above or below ground discharge dispersion pipes. Feeding pipes can be either buried or pinned to the surface as desired. It is recommended that all pipes are designed to accommodate the design storm event peak flows from the attenuation tank and including minimum 100 mm dia. PVC piping. A concept dispersion pipe or trench length is presented as Table 10Calculations to derive this are presented within Appendix D, based on the NIWA HIRDS Depth-Duration data. Typical details of these options are presented within Appendix A as Drawing No. 401.

Table 10. Summary of Concept Dispersion Devices

Concept Impervious Area to Tank	Velocity at single spreader orifices	Tank outlet pipe diameter	Spreader pipe diameter	Dispersion Pipe/ Trench Length	Spreader orifice size	Concept
Proposed Lot 1, 2, 3						
500 m^2 (inc. 200m^2 offset)	0.92 m/s	0.1 m	0.15 m	4.35 m	20 mm, spaced at 150 mm intervals	Above ground dispersion device or in-ground dispersion trench.

6.5 Subdivision Development Management

The above stormwater concept provides specific attenuation of subdivision RoW impermeable surface areas, for up to the 1% AEP, due to downstream flooding effects.

The right of way (RoW) will cross an existing overland flow path, located just before Lots 1 and 2. The upstream catchment at this overland flow path has been assessed using the Rational Method, to provide sizing for the culvert, and an assessment of overflow. This is outlined further below in Section 6.5.1.

General stormwater management of the subdivision development is proposed as follows:

- RoWs formed with a 4 % cross fall from the crown.
- Grassed swale drains formed along each RoW face with check dams on sloping terrain to improve stormwater quality.
- RCP culverts formed where RoWs cross existing drainage channels, suitably sized as outlined by this report to accommodate peak run-off flows for the design storm event from the upstream catchment.

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

6.5.1 Right of Way Stormwater Infrastructure

Grassed swale drains shall be constructed along the entire length of the RoW to manage sheet flows and to act as stormwater quality improvement devices. Due to the surrounding sensitive environments, all grassed swale drains shall be installed with specifically sized check dames to reduce flows and improve stormwater output quality.

Referring to the proposed RoW layout from the Thomson Survey plan, presented in Appendix A as Drawing No. 100, stormwater flows are anticipated to move as follows:

- **Section 1 - Existing formed accessway** – anticipated to flow to the west, towards Ness Road within the existing formed grass swale. Only small additional flow will be diverted to this swale due to the construction of passing bays.

- **Section 2 - New RoW, from existing formed to OLFP crossing -** anticipated to flow east to the existing overland flow path that flows south, from the newly constructed impervious area of RoW. Natural flow is achieved, and the swale drains shall be installed with check dams to reduce flows and increase stormwater quality. The grassed swale drains with check dams shall terminate with a specifically engineered dissipation device. The additional discharge shall be offset by other devices within the site.
- **Section 3 - New RoW, from OLFP crossing to main Lot boundary -** anticipated to flow west to the existing overland flow path that flows south, from the newly constructed impervious area of RoW. Natural flow is achieved, and the swale drains shall be installed with check dams to reduce flows and increase stormwater quality. The grassed swale drains with check dams shall be collected in an appropriately sized attenuation device (pond), then discharge to the existing gully to the south, by a specifically sized energy dissipation device.
- **Section 4 - Western portion of new RoW, internal to the site** – anticipated to flow along the RoW in grassed swale, collected in an appropriately sized attenuation device (pond), then discharge to the existing gully to the south, by a specifically sized energy dissipation device.
- **Section 5 - Eastern portion of new RoW, internal to the site** – anticipated to flow along the RoW in grassed swale, collected in an appropriately sized attenuation device (pond), then discharge as dispersion flow, to the north, by a specifically sized energy dissipation device.

Grassed swale drains shall be constructed along the entire length of the RoW to manage sheet flows and to act as stormwater quality improvement devices. The entire length of grassed swale drains shall be installed with specifically sized check dames to reduce flows and improve stormwater output quality.

6.5.2 Culverts

There are 2x existing culverts present at the existing OLFP crossing (600mm and 900mm). It is proposed that this RoW crossing retains the existing 900mm culvert, and an additional 900mm RCP or CivilBoss culvert to convey the 10% AEP, with a ford constructed in the RoW to provide overflow capacity for the 1% AEP.

Alternatively, a culvert of 1350mm could be installed to provide full capacity for 1% AEP, however we would still recommend the accessway is designed and constructed such that it provides suitable overflow and direction. We recommend this is completed under detailed design and submitted to Council prior to construction.

This proposed RCP culvert within the RoW alignment has been sized according to runoff calculations presented within Appendix D from the upslope catchments for the design storm event. The calculation results are summarised below in Table 11.

Table 11: Summary of Proposed RCP Culvert Sizes

Location	Upslope Catchment	Peak Runoff, 10 % AEP	Peak Runoff, 1 % AEP	Min. RCP Culvert
Main access into site, existing overland flow path	689,200 m^2	5,832.85 l/s (48min time of concentration *ToC*)	8760.57 l/s (48min time of concentration *ToC*)	1200 mm dia. @ 3 % fall

6.6 Stormwater Quality

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

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

Stormwater treatment requirements are minor to maintain good quality stormwater discharge. However, additional measures of stormwater filtration have been adopted due to the proximity to sensitive surface water receptors. Stormwater quality will be provided by:

- Leaf guards on roof guttering/ first flush devices on roof guttering and downpipes.
- Rainwater tank for potable use onsite only to be filled by roof runoff.
- Room for sedimentation (minimum 150 mm according to Auckland Council GD01) within the base of the stormwater attenuation pond and roof runoff tanks as dead storage volume.
- Stormwater discharges directed towards roading swale drains where possible.
- Grassed swale drains from rainwater inception (road surfaces) to discharge points.
- All grassed swales with check dams to increase stormwater quality subject to specific engineering design.
- Energy dissipation devices subject to specific engineering design installed at discharge point of all attenuation ponds, and tank overflows.

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.

7 POTABLE WATER & FIRE FIGHTING

In the absence of potable water infrastructure within Ness 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 for proposed Lots 1, 2 and 3. On these properties a second tank may be required for sufficient potable water volumes.

Furthermore, the absence of potable water infrastructure and fire hydrants within Ness 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 and all access to the site for firefighting personnel and equipment should be made in accordance with SNZ PAS4509:2008.

8 EARTHWORKS

Earthworks will be required to form the proposed attenuation ponds for stormwater runoff from the RoW. These volumes of earthworks are as follows:

Table 12: Summary of Proposed Earthwork Volumes

Activity	Proposed Volume	Max. Height
Pond 1		**1m**
Cut	10m3	
Fill	0m3	
Sub-total	10m3	
Pond 2		**1m**
Cut	4m3	
Fill	0m3	
Sub-total	4m3	
Pond 3		1m
Cut	4.5m3	
Fill	0m3	
Sub-total	4.5m3	
Total	**18.5m3**	

Earthworks will also be required to form the proposed RoW, but detailed design of this accessway has not been undertaken as part of the scope of this assessment. Proposed earthwork volumes are expected to be 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. A full assessment according to the criteria is presented within Appendix D; of primary concern is effectively controlling the sediment runoff from earthworks to comply with Rule C.8.3.1(6). This has been addressed further within Section 8.2.

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

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

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

8.2 Erosion and Sediment Control

Erosion and sediment control measures are required to control sediment runoff from areas of proposed earthworks within the scope of this application. To form the subdivision the following erosion and sediment control measures are recommended:

- Super silt fences installed along perimeter faces of earthworks RoW alignments and downslope of culvert crossings to be constructed.
- Construction of the culverts should be completed in dry conditions.
- Clean water diversion above earthwork area to divert the upslope catchment.
- Temporary diversion of existing overland flow paths, i.e. drainage ditches around culvert crossings during the construction period.

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[10], Northland Regional Council (NRC) Proposed Regional Plan for Northland[11] and Regional Water and Soil Plan for Northland. Following our ground

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

investigation and considering the measures presented in this report, a summary of the proposed activities against defined natural hazards is presented as Table 13.

Table 13: Summary of Natural Hazards

Natural Hazard	Applicability	Mitigation & Effect on Environment
Erosion	NA	No mitigation required, less than minor.
Overland flow paths, flooding, inundation	NA	Potential effects during development mitigated by means of swales & check dams and by directing flows into ponds to reduce flow velocities and peak discharge; 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 Factors (TIF) and Household Equivalents have been developed for the proposed RoW of a TIF of 30 from three HE.

10.2 Right of Ways

One proposed RoW at this time will provide internal access to all proposed lots and will be constructed to the standards specified in Appendix 3B-1 of the Operative District Plan, as summarised in Table 14.

Table 14: Summary of Proposed RoW Specification

Location	Lots	Current H.E.	Combined Future H.E	Standard	Min. Legal Width	Min. Carriageway Width
RoW	1 to 3	0	3	Rural Private Access	7.5m	3.0 m with passing bays until accessing 2 lots only All with grassed swale drains and check dams

H.E – Household Equivalents

The RoW is proposed to be unsealed, with a maximum gradient of 1:5. Passing bays must be provided every 100m, and indicative locations have been provided in Drawing No. 101 and 102.

The existing section of the RoW from Ness Road will need to have at least 2x passing bays installed along it, with additional passing bays installed along the new section of RoW, in line with the FNDC Engineering Standards.

It is proposed to construct a grassed swale drain along each face of the proposed RoW which should be graded to direct stormwater runoff to stormwater infrastructure at indicated locations along the RoW alignment. Specific engineering design and sizing of the stormwater infrastructure, swale and check dams should be undertaken within a detailed design phase with accompanying construction drawings prior to breaking ground.

10.3 Vehicle Crossings

Access to the proposed subdivision is through existing access to Ness Road, which is proposed to be upgraded to FNDC Engineering Standard.

Each of the proposed lots is recommended by standard domestic crossings according to current FNDC Engineering Standards. The access points to proposed lots may be determined at the Building Consent Stage according to NZS4404 Clause 3.3.17.2. A summary of proposed vehicle crossings is presented as Table 15.

Table 15: Summary of Proposed Vehicle Crossings

Location	Type	Detail	Formation
Site entrance, existing Ness Road crossing	Domestic crossing, rural/ unkerbed.	FNDC/S/6 and FNDC/S/6B double width with minimum 375 mm dia. RCP culvert.	At subdivision formation
Lots 1 to 3	Domestic crossing, rural/ unkerbed	FNDC/S/6 and FNDC/S/6B single width with minimum 375 mm dia. RCP culvert.	At building consent

RCP – Reinforced Concrete Pipe

11 LIMITATIONS

This report has been prepared for D&B Hoult 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

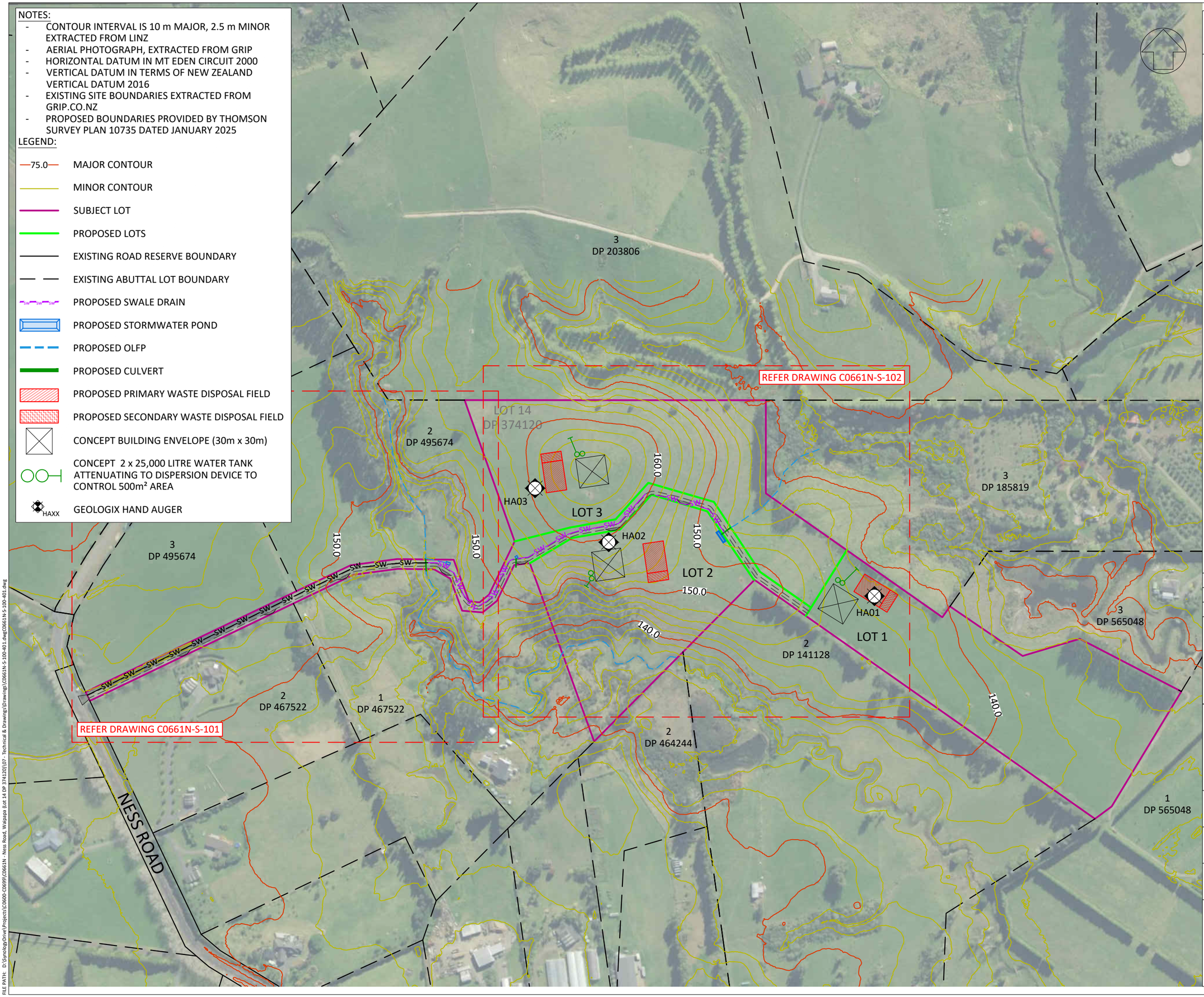
Drawings

NOTES:

- CONTOUR INTERVAL IS 10 m MAJOR, 2.5 m MINOR EXTRACTED FROM LINZ
- AERIAL PHOTOGRAPH, EXTRACTED FROM GRIP
- HORIZONTAL DATUM IN MT EDEN CIRCUIT 2000
- VERTICAL DATUM IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016
- EXISTING SITE BOUNDARIES EXTRACTED FROM GRIP.CO.NZ
- PROPOSED BOUNDARIES PROVIDED BY THOMSON SURVEY PLAN 10735 DATED JANUARY 2025

LEGEND:

- 75.0 — MAJOR CONTOUR
- MINOR CONTOUR
- SUBJECT LOT
- PROPOSED LOTS
- EXISTING ROAD RESERVE BOUNDARY
- EXISTING ABUTTAL LOT BOUNDARY
- PROPOSED SWALE DRAIN
- PROPOSED STORMWATER POND
- PROPOSED OLFP
- PROPOSED CULVERT
- PROPOSED PRIMARY WASTE DISPOSAL FIELD
- PROPOSED SECONDARY WASTE DISPOSAL FIELD
- CONCEPT BUILDING ENVELOPE (30m x 30m)
- CONCEPT 2 x 25,000 LITRE WATER TANK ATTENUATING TO DISPERSION DEVICE TO CONTROL 500m² AREA
- HAXX GEOLOGIX HAND AUGER



GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY PROPOSED SCHEME PLAN REF. 10735, DATED JANUARY 2025.
3. HORIZONTAL CO ORDINATE SYSTEM = NZTM.
4. VERTICAL DATUM = NZVD.
5. MAJOR INTERVALS 10.0 m.
6. MINOR INTERVALS 2.5 m.
7. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.

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	NO
DISCHARGE CONSENT	NO

0 50 100 200 Meters
1:3500

Revision	Issue	Date
A	FIRST ISSUE	24/07/25

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address

C0661N
NESS ROAD
WAIPAPA
LOT 14 DP 374120

Project	Drawn By
C0661N	B.NEL

Client

D&B HOULT

Sheet Title

SITE SUITABILITY OVERALL LAYOUT

Sheet

100

FILE PATH: D:\Synology Drive\Projects\C0600-C0699\C0661N - Ness Road, Waipapa (Lot 14 DP 374120)\07 - Technical & Drawings\Drawings\C0661N-S-100-401.dwgC0661N-S-100-401.dwg

PLOTTED: 09/04/2025

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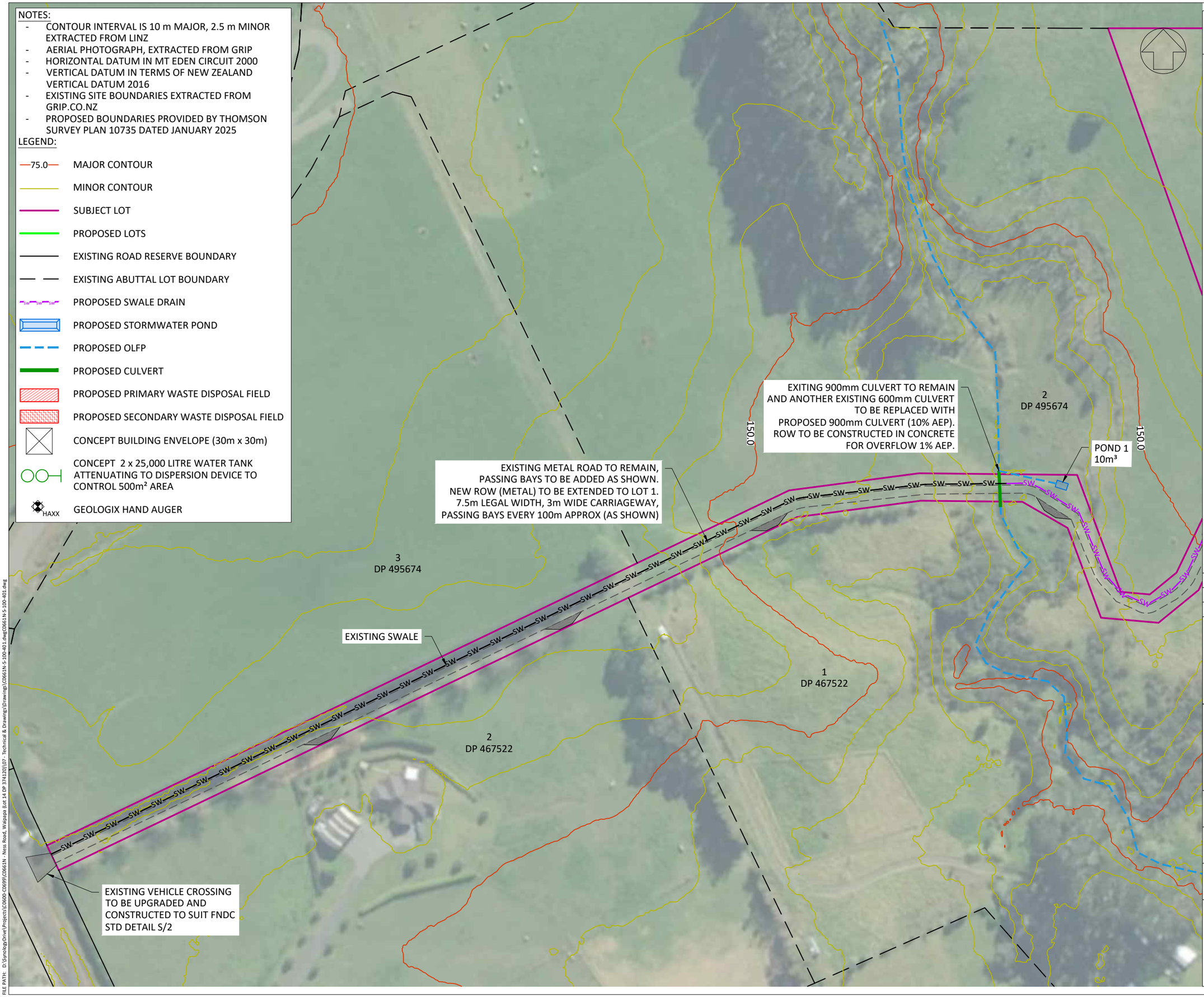

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7. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.

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	NO
DISCHARGE CONSENT	NO

0 25 50 100 Meters
1:1250

Revision	Issue	Date
A	FIRST ISSUE	24/07/25

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address

C0661N
NESS ROAD
WAIPAPA
LOT 14 DP 374120

Project	Drawn By
C0661N	B.NEL

Client

D&B HOULT

Sheet Title

SITE SUITABILITY ENLARGED LAYOUT

Sheet

101

FILE PATH: D:\Synology Drive\Projects\C0600-C0699\C0661N - Ness Road, Waipapa (Lot 14 DP 374120)\07 - Technical & Drawings\Drawings\C0661N-S-100-401.dwg\C0661N-S-100-401.dwg

PLOTTED: 03/04/2022

NOTES:
- CONTOUR INTERVAL IS 10 m MAJOR, 2.5 m MINOR EXTRACTED FROM LINZ
- AERIAL PHOTOGRAPH, EXTRACTED FROM GRIP
- HORIZONTAL DATUM IN MT EDEN CIRCUIT 2000
- VERTICAL DATUM IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016
- EXISTING SITE BOUNDARIES EXTRACTED FROM GRIP.CO.NZ
- PROPOSED BOUNDARIES PROVIDED BY THOMSON SURVEY PLAN 10735 DATED JANUARY 2025

LEGEND:

- 75.0 — MAJOR CONTOUR
- MINOR CONTOUR
- SUBJECT LOT
- PROPOSED LOTS
- EXISTING ROAD RESERVE BOUNDARY
- EXISTING ABUTTAL LOT BOUNDARY
- PROPOSED SWALE DRAIN
- PROPOSED STORMWATER POND
- PROPOSED OLFP
- PROPOSED CULVERT
- PROPOSED PRIMARY WASTE DISPOSAL FIELD
- PROPOSED SECONDARY WASTE DISPOSAL FIELD
- CONCEPT BUILDING ENVELOPE (30m x 30m)
- CONCEPT 2 x 25,000 LITRE WATER TANK ATTENUATING TO DISPERSION DEVICE TO CONTROL 500m² AREA
- HAXX GEOLOGIX HAND AUGER

3
DP 203806

LOT 14
DP 374120

LOT 3

160.0

HA03

3
DP 185

150.0

POND 2
4m³

HA02

POND 3
46m³
OUTLET TO CULVERT
UNDER ACCESS

LOT 2

150.0

LOT 1

HA01

140.0

2
DP 141128

2
DP 464244

GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY PROPOSED SCHEME PLAN REF. 10735, DATED JANUARY 2025.
3. HORIZONTAL CO ORDINATE SYSTEM = NZTM.
4. VERTICAL DATUM = NZVD.
5. MAJOR INTERVALS 10.0 m.
6. MINOR INTERVALS 2.5 m.
7. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.

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
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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	NO
DISCHARGE CONSENT	NO

0 25 50 100 Meters
1:1250

A	FIRST ISSUE	24/07/25
Revision	Issue	Date

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Project Name and Address
C0661N
NESS ROAD
WAIPAPA
LOT 14 DP 374120

Project	Drawn By
C0661N	B.NEL

Client
D&B HOULT

Sheet Title
SITE SUITABILITY ENLARGED LAYOUT

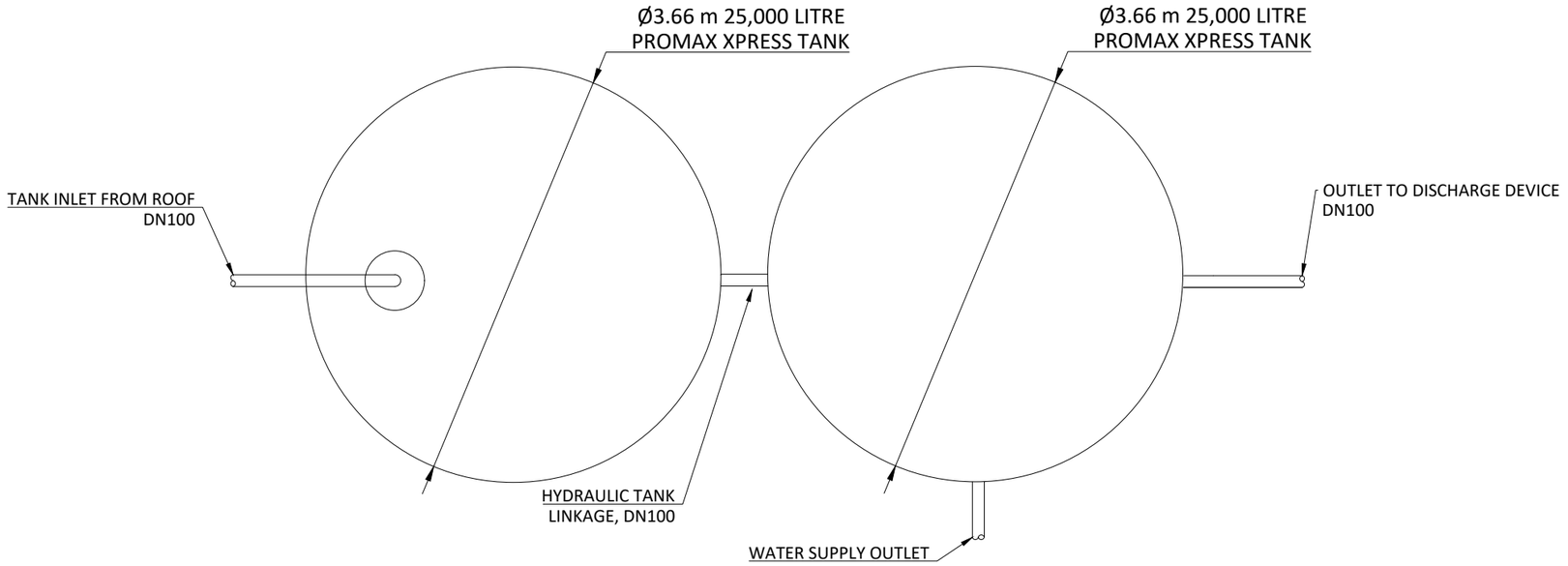
Sheet
102

FILE PATH: D:\Synology Drive\Projects\C0600-C0699\C0661N - Ness Road, Waipapa (Lot 14 DP 374120)\07 - Technical & Drawings\Drawings\C0661N-S-100-401.dwgC0661N-S-100-401.dwg

PLOTTED: 03/04/2022

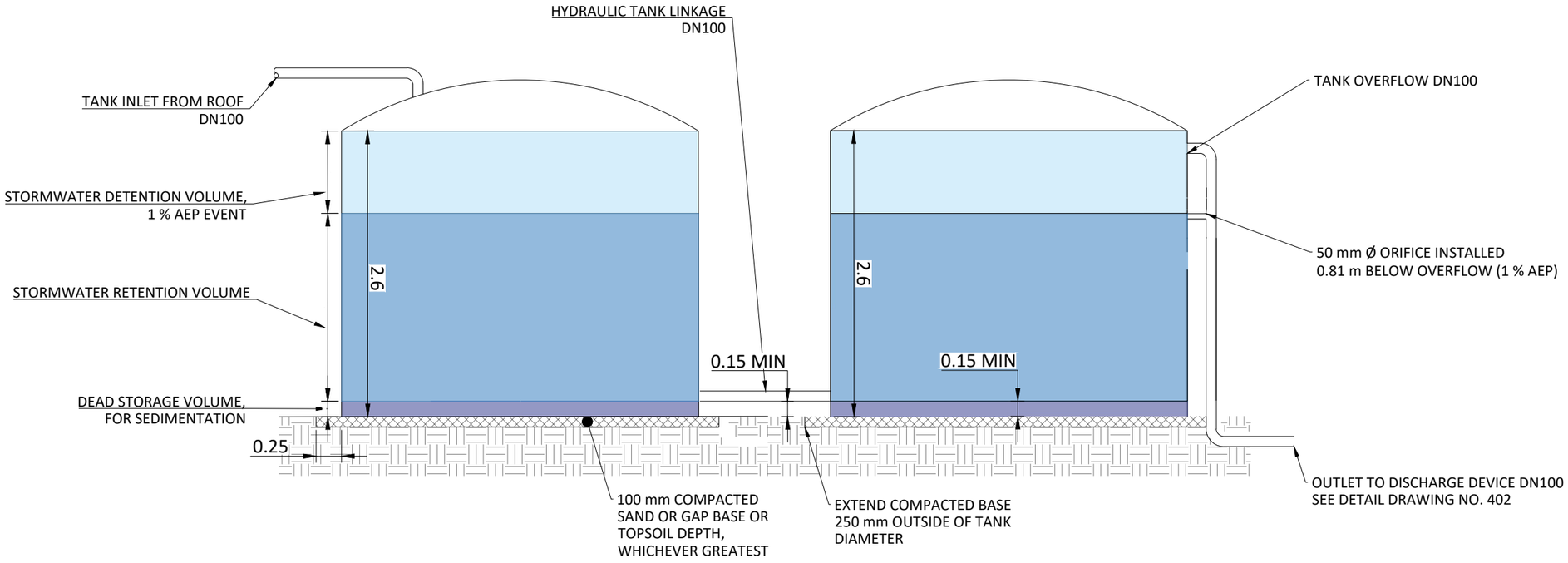
PROPOSED TANK PLAN VIEW

1:50, A3



PROPOSED TANK SIDE VIEW

1:50, A3



GENERAL NOTES

0 1.25 2.5 5 Meters
1:50

A	FIRST ISSUE	24/07/25
Revision	Issue	Date

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AUCKLAND | NORTHLAND

Project Name and Address

C0661N
NESS ROAD
WAIPAPA
LOT 14 DP 374120

Project	Drawn By
C0661N	B.NEL

Client

D&B HOULT

Sheet Title

STORMWATER TANK DETAILS

Sheet

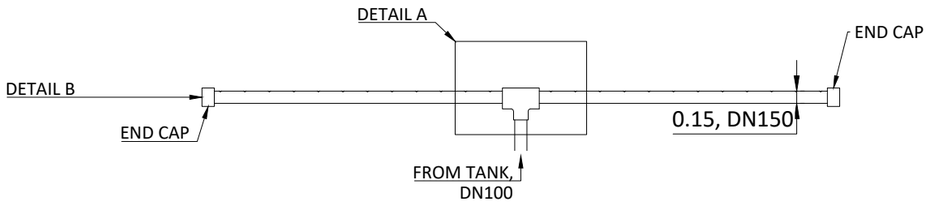
400

FILE PATH: D:\Synology\Drive\Projects\C0600-C0699\C0661N - Ness Road, Waipapa (Lot 14 DP 374120)\07 - Technical & Drawings\Drawings\C0661N-S-100-401.dwgC0661N-S-100-401.dwg

PLOTTED: 03/04/2022

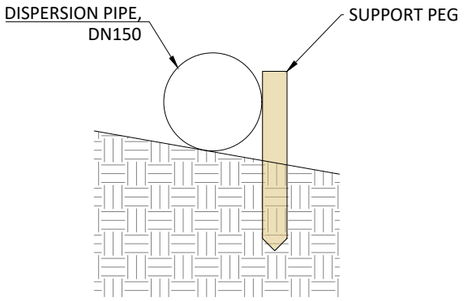
OPTION 1: DISPERSION VIA ABOVE GROUND PIPE

NOT TO SCALE



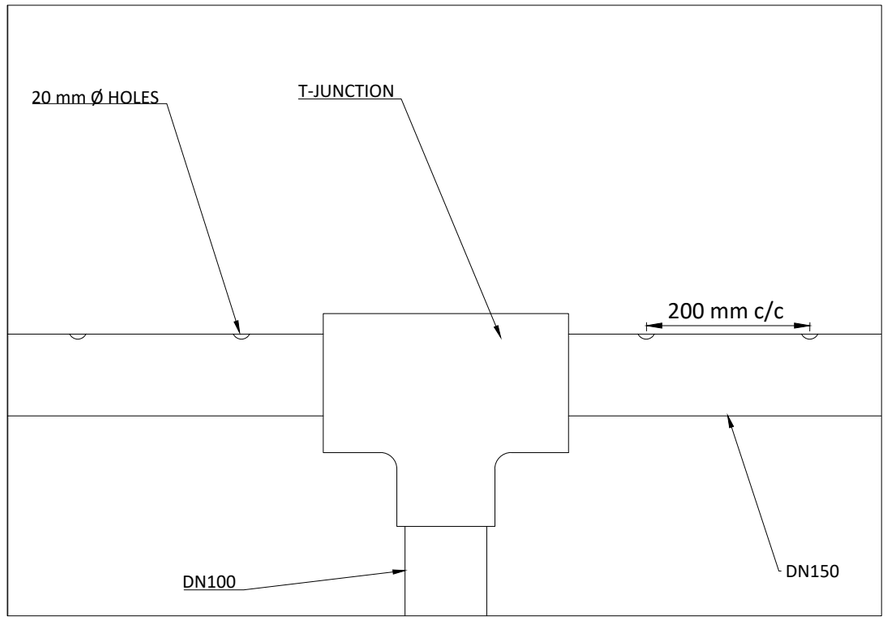
DETAIL B - SIDE VIEW

NOT TO SCALE



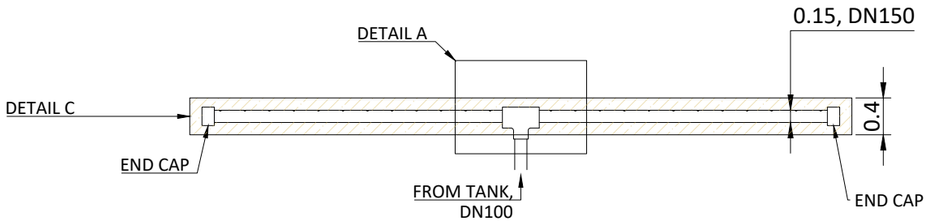
DETAIL A - T JUNCTION AND PERFORATIONS

NOT TO SCALE



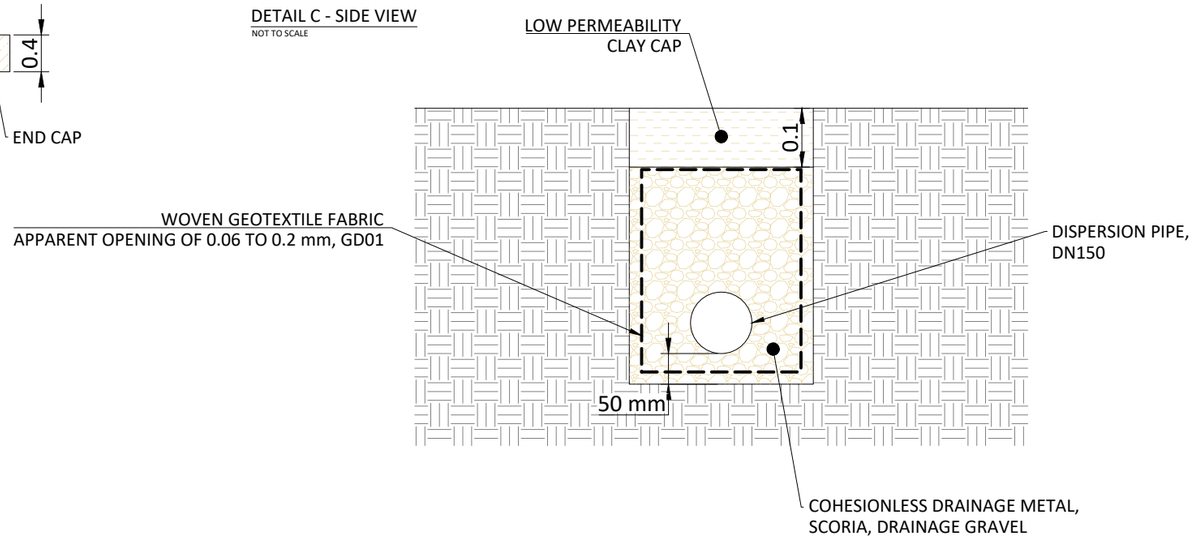
OPTION 2: DISPERSION VIA BELOW GROUND TRENCH

NOT TO SCALE



DETAIL C - SIDE VIEW

NOT TO SCALE



GENERAL NOTES

0 1.25 2.5 5 Meters

1:50

A	FIRST ISSUE	24/07/25
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

C0661N
NESS ROAD
WAIPAPA
LOT 14 DP 374120

Project	Drawn By
C0661N	B.NEL

Client

D&B HOULT

Sheet Title

STORMWATER TANK DETAILS

Sheet

401

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PLOTTED: 03/04/2022

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APPENDIX B

Engineering Borehole Records

INVESTIGATION LOG

HOLE NO.: HA01

CLIENT: Barbara Hoult

PROJECT: Ness Road, Waipapa (Lot 14 DP 374120)

JOB NO.: C0661N

SITE LOCATION: Ness Road, Waipapa

START DATE: 16/07/2025

CO-ORDINATES:

ELEVATION: Ground

END DATE: 16/07/2025

CONTRACTOR: Internal

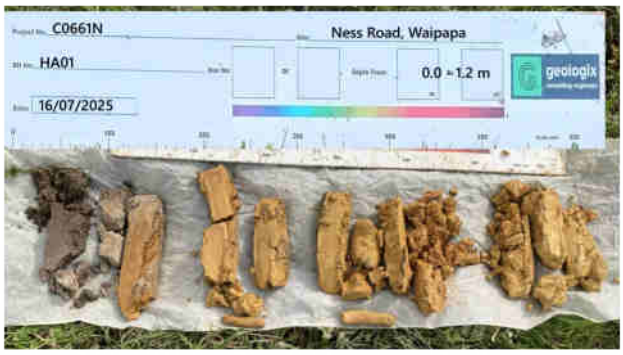
RIG: 50 mm Auger head

DRILLER: FS

LOGGED BY: FS

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa)	WATER
TOPSOIL; SILT; dark brown. Moist; low plasticity.		0.0	TS	2 4 6 8 10 12 14 16 18	50 100 150 200 Values	Groundwater Not Encountered
SILT; light grey. Moist; low plasticity; [Kerikeri Volcanic Group].		0.2				
Clayey SILT; orange with red mottles. Moist; low plasticity; slightly friable [Kerikeri Volcanic Group].		0.4				
		0.6				
		0.8				
Clayey SILT; orange. Moist; low plasticity; [Kerikeri Volcanic Group].		1.0				
		1.2				
End Of Hole: 1.20m		1.4				
		1.6				
		1.8				
		2.0				
		2.2				
		2.4				
		2.6				
		2.8				
		3.0				
		3.2				
		3.4				
		3.6				
		3.8				
		4.0				
		4.2				
		4.4				
		4.6				
		4.8				

PHOTO(S)



REMARKS

1. Hand auger drilled to target depth of 1.2 m bgl.
2. Groundwater not encountered during drilling.

WATER

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

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA02

CLIENT: Barbara Hoult

PROJECT: Ness Road, Waipapa (Lot 14 DP 374120)

JOB NO.: C0661N

SITE LOCATION: Ness Road, Waipapa

START DATE: 16/07/2025

CO-ORDINATES:

ELEVATION: Ground

END DATE: 16/07/2025

CONTRACTOR: Internal

RIG: 50 mm Auger head

DRILLER: FS

LOGGED BY: FS

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa)	WATER
TOPSOIL; SILT with trace rootlets; dark brown. Moist; low plasticity		0.0	TS	2 4 6 8 10 12 14 16 18	Vane: 50 100 150 200 Values	
Clayey SILT; orange. Moist; low plasticity; [Kerikeri Volcanic Group].		0.2				
Clayey SILT; orange with white specks. Moist; low plasticity; [Kerikeri Volcanic Group].		0.4				
		0.6				
		0.8				
Clayey SILT; orange with red and white specks. Moist; low plasticity; [Kerikeri Volcanic group].		1.0				
		1.2				▼ 16/07/2025
End Of Hole: 1.20m		1.4				
		1.6				
		1.8				
		2.0				
		2.2				
		2.4				
		2.6				
		2.8				
		3.0				
		3.2				
		3.4				
		3.6				
		3.8				
		4.0				
		4.2				
		4.4				
		4.6				
		4.8				

PHOTO(S)

REMARKS

1. Hand auger drilled to target depth of 1.2 m bgl.
2. Groundwater not encountered during drilling.

WATER

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

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA03

CLIENT: Barbara Hoult

PROJECT: Ness Road, Waipapa (Lot 14 DP 374120)

JOB NO.: C0661N

SITE LOCATION: Ness Road, Waipapa

START DATE: 16/07/2025

CO-ORDINATES:

ELEVATION: Ground

END DATE: 16/07/2025

CONTRACTOR: Internal

RIG: 50 mm Auger head

DRILLER: FS

LOGGED BY: FS

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa)	WATER
TOPSOIL; SILT with trace rootlets; dark brown. Moist; low plasticity.		0.0	TS	2 4 6 8 10 12 14 16 18	Vane: 50 100 150 200 Values	Groundwater Not Encountered
Clayey SILT; orange. Moist; low plasticity; Kerikeri Volcanic Group].		0.2				
Clayey SILT; orange with red and white specks. Moist; low plasticity; [Kerikeri Volcanic Group].		0.4				
		0.6				
		0.8				
Clayey SILT; orange with pinkish red and white. Moist; low plasticity; [Kerikeri Volcanic Group].		1.0				
		1.2				
End Of Hole: 1.20m		1.4				
		1.6				
		1.8				
		2.0				
		2.2				
		2.4				
		2.6				
		2.8				
		3.0				
		3.2				
		3.4				
		3.6				
		3.8				
		4.0				
		4.2				
		4.4				
		4.6				
		4.8				

PHOTO(S)

REMARKS

1. Hand auger drilled to target depth of 1.2 m bgl.
2. Groundwater not encountered during drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

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APPENDIX C

Assessment of Environmental Effects and Assessment Criteria

Table 16: Wastewater Assessment of Environmental Effects

Item	NRC Separation Requirement[2]	FNDC Separation Requirement	Site Assessment[3]
Individual System Effects			
Flood Plains	Above 5 % AEP	NR	Complies according to available GIS data and visual assessment.
Stormwater Flowpath[4]	5 m	NR	Complies, see annotations on Drawing Nos 100 - 102.
Surface water feature[5]	15 m	15 m (3x feature area in ha)	Complies.
Coastal Marine Area	15 m	30 m	NR
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 gently sloping to <20 °.
Cut off drain required?			No.
Discharge Consent Required?			No.
	TP58	**NZS1547**	
Cumulative Effects			
Biological Oxygen Demand	≤20 g/m^3		Complies – secondary treatment.
Total Suspended Solids	≤30 g/m^3		Complies – secondary treatment.
Total Nitrogen	10 – 30 g/m^3	15 – 75 g/m^3	Complies – secondary treatment.
Phosphorous	NR	4 – 10 g/m^3	Complies – secondary treatment.
Ammonia	NR	Negligible	Complies – secondary treatment.
Nitrites/ Nitrates	NR	15 – 45 g/m^3	Complies – secondary treatment.
Conclusion: Effects are less than minor on the environment.			

1. AEE based on proposed secondary treated effluent.
2. Northland Regional Plan Table 9.
3. Based on the recommendations of this report and Drawing No. 100 - 102.
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 17: Proposed Northland Regional Plan Stormwater Assessment Criteria, to rule C.6.4.2

Assessment Criteria	Comments
1) the discharge or diversion is not from: a) a public stormwater network, or b) a high-risk industrial or trade premises	Complies
2) the diversion and discharge does not cause or increase flooding of land on another property in a storm event of up to and including a 10 percent annual exceedance probability, or flooding of buildings on another property in a storm event of up to and including a one percent annual exceedance probability	Complies, attenuation will be provided on site to 80% of pre-development level.
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 and RoWs.
7) the discharge does not contain more than 15 milligrams per litre of total petroleum hydrocarbons	Complies. Site is residential.
8) the discharge does not cause any of the following effects in the receiving waters beyond the zone of reasonable mixing: a) the production of conspicuous oil or grease films, scums or foams, of floatable or suspended materials, or b) a conspicuous change in the colour or visual clarity, or c) an emission of objectionable odour, or d) the rendering of fresh water unsuitable for consumption by farm animals, or 163 e) the rendering of fresh water taken from a mapped priority drinking water abstraction point (refer I Maps | Ngā mahere matawhenua) unsuitable for human consumption after existing treatment.	Complies.

Table 18: 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.
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.
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.
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.
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:	C0611N		**STORMWATER RUNOFF CALCULATIONS**	geologix consulting engineers
Project Address:	Ness Road, Waipapa			
Design Case:	PROPOSED DEVELOPMENT (Lot 1, 2, 3)		**50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2025	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.59	Pasture, Type C
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			
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	64.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	77.40	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

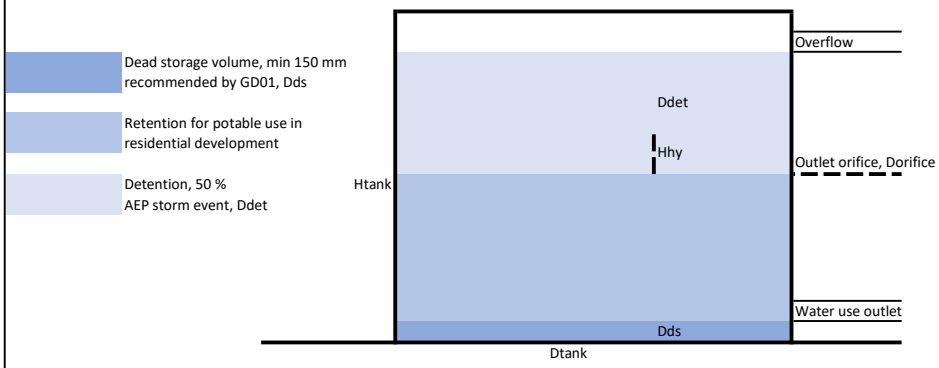
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpa, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	64.50	1.2	77.40	9.63	5.29	4.23	*Critical duration (time of concentration) for the catchments is 10min*
20	48.10	1.2	57.72	7.18	3.94	3.15	
30	40.40	1.2	48.48	6.03	3.31	2.65	
60	29.70	1.2	35.64	4.44	2.43	1.95	
120	21.40	1.2	25.68	3.20	1.75	1.40	*Pre-dev calculated on Intensity without CC factor*
360	12.10	1.2	14.52	1.81	0.99	0.79	
720	8.10	1.2	9.72	1.21	0.66	0.53	
1440	5.19	1.2	6.23	0.78	0.43	0.34	
2880	3.16	1.2	3.79	0.47	0.26	0.21	
4320	2.31	1.2	2.77	0.34	0.19	0.15	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECT. TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	3.44	6.192	1.85	1.85	4.35	2607.95	*select largest required storage , regardless of duration, to avoid overflow*
20	2.57	4.6176	1.38	1.85	2.77	3326.62	
30	2.15	3.8784	1.16	1.85	2.03	3659.37	
60	1.58	2.8512	0.85	1.85	1.01	3620.82	
120	1.14	2.0544	0.61	1.85	0.21	1504.68	
360	0.65	1.1616	0.35	1.85	No Att. Req.	0.00	
720	0.43	0.7776	0.23	1.85	No Att. Req.	0.00	
1440	0.28	0.49824	0.15	1.85	No Att. Req.	0.00	
2880	0.17	0.30336	0.09	1.85	No Att. Req.	0.00	
4320	0.12	0.22176	0.07	1.85	No Att. Req.	0.00	

TION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	3.659	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.57	m	No. of Tanks 2
TANK AREA, Atank	20.02	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	50049	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.18	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.33	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00185	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.09	m	
AREA OF ORIFICE, Aorifice	2.22E-03	m2	
ORIFICE DIAMETER, Dorifice	53	mm	
VELOCITY AT ORIFICE	1.89	m/s	At max. head level

Project Ref:	C0611N		**STORMWATER RUNOFF CALCULATIONS**	geologix consulting engineers
Project Address:	Ness Road, Waipapa			
Design Case:	PROPOSED DEVELOPMENT (Lot 1, 2, 3)		**20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2025	REV 1		

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	0.59	Pasture, Type C
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
0	0	0	
OFFSET	200	0.8	DRIVEWAY - metal
0	0	0	
Pervious	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	83.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	100.2	mm/hr

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

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

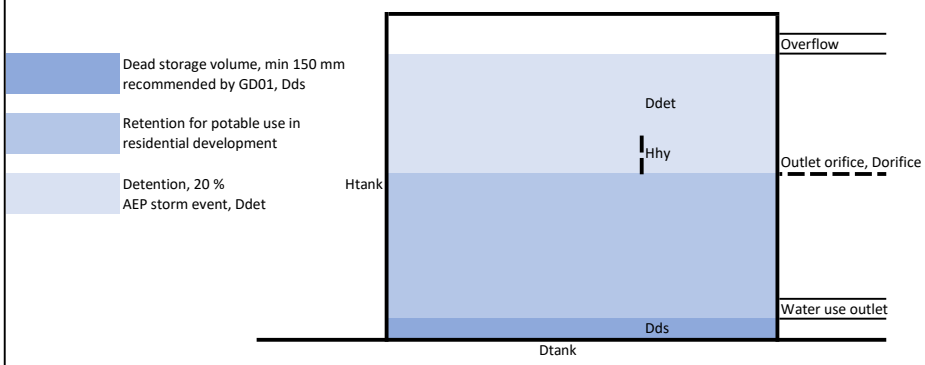
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpa, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	83.50	1.2	100.20	12.47	6.84	5.47	*Critical duration (time of concentration) for the catchments is 10min*
20	62.40	1.2	74.88	9.32	5.11	4.09	
30	52.40	1.2	62.88	7.83	4.29	3.44	
60	38.60	1.2	46.32	5.76	3.16	2.53	
120	27.90	1.2	33.48	4.17	2.29	1.83	*Pre-dev calculated on Intensity without CC factor*
360	15.80	1.2	18.96	2.36	1.29	1.04	
720	10.60	1.2	12.72	1.58	0.87	0.69	
1440	6.79	1.2	8.15	1.01	0.56	0.45	
2880	4.15	1.2	4.98	0.62	0.34	0.27	
4320	3.03	1.2	3.64	0.45	0.25	0.20	

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,	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	4.45	8.02	2.39	2.39	5.63	3376	*select largest required storage , regardless of duration, to avoid overflow*
20	3.33	5.99	1.79	2.39	3.60	4322	
30	2.79	5.03	1.50	2.39	2.64	4754	
60	2.06	3.71	1.10	2.39	1.32	4740	
120	1.49	2.68	0.80	2.39	0.29	2083	
360	0.84	1.52	0.45	2.39	No Att. Req.	0	
720	0.57	1.02	0.30	2.39	No Att. Req.	0	
1440	0.36	0.65	0.19	2.39	No Att. Req.	0	
2880	0.22	0.40	0.12	2.39	No Att. Req.	0	
4320	0.16	0.29	0.09	2.39	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	4.754	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.57	m	No. of Tanks 2
TANK AREA, Atank	20.02	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	50049	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.24	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.39	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00239	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.12	m	
AREA OF ORIFICE, Aorifice	2.52E-03	m2	
ORIFICE DIAMETER, Dorifice	57	mm	
VELOCITY AT ORIFICE	2.16	m/s	At max. head level

Project Ref:	C0611N		**STORMWATER RUNOFF CALCULATIONS**	geologix consulting engineers
Project Address:	Ness Road, Waipapa			
Design Case:	PROPOSED DEVELOPMENT (Lot 1, 2, 3)		**10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW**	
Date:	14 July 2025	REV 1		

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	0.59	Pasture, Type C
0	0	0	
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
0	0	0	
OFFSET	200	0.8	DRIVEWAY - metal
0	0	0	
Pervious	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	97.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	117.0	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, 10%AEP WITH CC, VARIOUS DURATIONS

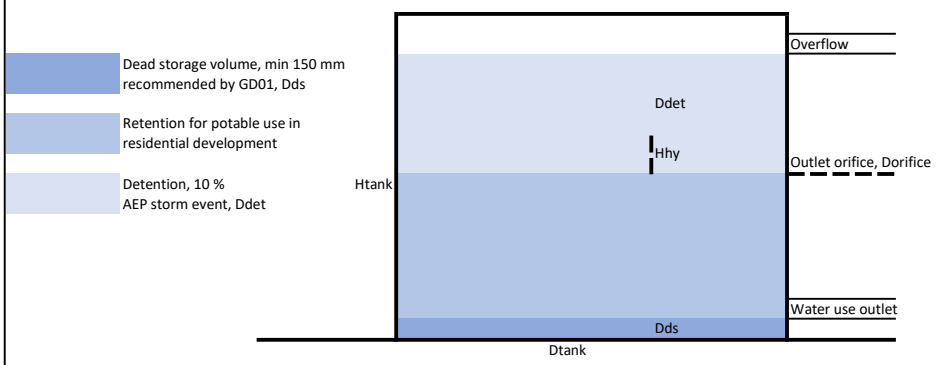
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s		COMMENTS
10	97.50	1.2	117.00	14.56	7.99		*Critical duration (time of concentration) for the catchments is 10min*
20	72.90	1.2	87.48	10.89	5.97		
30	61.30	1.2	73.56	9.15	5.02		
60	45.20	1.2	54.24	6.75	3.70		
120	32.70	1.2	39.24	4.88	2.68		*Pre-dev calculated on Intensity without CC factor*
360	18.60	1.2	22.32	2.78	1.52		
720	12.40	1.2	14.88	1.85	1.02		
1440	7.99	1.2	9.59	1.19	0.65		
2880	4.88	1.2	5.86	0.73	0.40		
4320	3.57	1.2	4.28	0.53	0.29		

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,	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	5.20	9.36	2.79	2.79	6.57	3942	*select largest required storage , regardless of duration, to avoid overflow*
20	3.89	7.00	2.09	2.79	4.21	5051	
30	3.27	5.88	1.75	2.79	3.10	5571	
60	2.41	4.34	1.29	2.79	1.55	5579	
120	1.74	3.14	0.94	2.79	0.35	2517	
360	0.99	1.79	0.53	2.79	No Att. Req.	0	
720	0.66	1.19	0.35	2.79	No Att. Req.	0	
1440	0.43	0.77	0.23	2.79	No Att. Req.	0	
2880	0.26	0.47	0.14	2.79	No Att. Req.	0	
4320	0.19	0.34	0.10	2.79	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	5.579	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.57	m	No. of Tanks 2
TANK AREA, Atank	20.02	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	50049	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.28	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.43	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00279	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.14	m	
AREA OF ORIFICE, Aorifice	2.72E-03	m2	
ORIFICE DIAMETER, Dorifice	59	mm	
VELOCITY AT ORIFICE	2.34	m/s	At max. head level

Project Ref:	C0611N		**STORMWATER RUNOFF CALCULATIONS**	geologix consulting engineers
Project Address:	Ness Road, Waipapa			
Design Case:	PROPOSED DEVELOPMENT (Lot 1, 2, 3)		**1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2025	REV 1		

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				**POST DEVELOPMENT CATCHMENT PARAMETERS**			
ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0		0	0	0	
IMPERVIOUS C	0	0		OFFSET	200	0.8	DRIVEWAY - metal
EX. PERVIOUS	500	0.59	Pasture, Type C	0	0	0	
0	0	0		Pervious	0	0	
TOTAL	**500**	TYPE C		**TOTAL**	**500**	TYPE C	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	145.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	174.0	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, 1%AEP WITH CC, VARIOUS DURATIONS

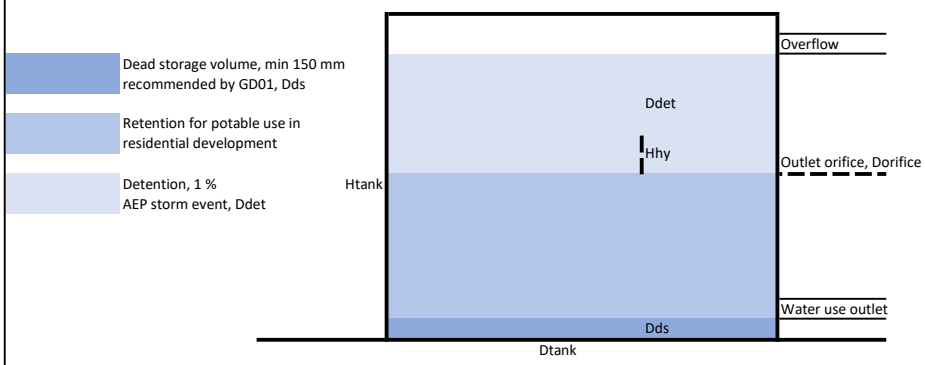
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	145.00	1.2	174.00	21.65	11.88	9.51	*Critical duration (time of concentration) for the catchments is 10min*
20	109.00	1.2	130.80	16.28	8.93	7.15	
30	91.90	1.2	110.28	13.72	7.53	6.02	
60	68.00	1.2	81.60	10.15	5.57	4.46	
120	49.40	1.2	59.28	7.38	4.05	3.24	*Pre-dev calculated on Intensity without CC factor*
360	28.20	1.2	33.84	4.21	2.31	1.85	
720	18.90	1.2	22.68	2.82	1.55	1.24	
1440	12.20	1.2	14.64	1.82	1.00	0.80	
2880	7.49	1.2	8.99	1.12	0.61	0.49	
4320	5.49	1.2	6.59	0.82	0.45	0.36	

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,	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	7.73	13.92	4.15	4.15	9.77	5863	*select largest required storage , regardless of duration, to avoid overflow*
20	5.81	10.46	3.12	4.15	6.32	7578	
30	4.90	8.82	2.63	4.15	4.67	8413	
60	3.63	6.53	1.95	4.15	2.38	8566	
120	2.63	4.74	1.41	4.15	0.59	4275	
360	1.50	2.71	0.81	4.15	No Att. Req.	0	
720	1.01	1.81	0.54	4.15	No Att. Req.	0	
1440	0.65	1.17	0.35	4.15	No Att. Req.	0	
2880	0.40	0.72	0.21	4.15	No Att. Req.	0	
4320	0.29	0.53	0.16	4.15	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	8.566	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.57	m	No. of Tanks 2
TANK AREA, Atank	20.02	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	50049	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.43	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.58	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00415	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.21	m	
AREA OF ORIFICE, Aorifice	3.27E-03	m2	
ORIFICE DIAMETER, Dorifice	64	mm	
VELOCITY AT ORIFICE	2.90	m/s	At max. head level

Project Ref:	C0611N		**STORMWATER RUNOFF CALCULATIONS**	geologix consulting engineers
Project Address:	Ness Road, Waipapa			
Design Case:	PROPOSED DEVELOPMENT ROW POND 1		**1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2025	REV 1		

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	971	0.59	Pasture, Type C
0	0	0	
TOTAL	**971**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO POND	635	0.8	DRIVEWAY - metal
0	0	0	
OFFSET	336	0.8	DRIVEWAY - metal
0	0	0	
Pervious	0	0	
TOTAL	**971**	TYPE C	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	145.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	174.0	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, 1%AEP WITH CC, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	145.00	1.2	174.00	37.55	23.07	18.46	*Critical duration (time of concentration) for the catchments is 10min*
20	109.00	1.2	130.80	28.22	17.35	13.88	
30	91.90	1.2	110.28	23.80	14.62	11.70	
60	68.00	1.2	81.60	17.61	10.82	8.66	
120	49.40	1.2	59.28	12.79	7.86	6.29	*Pre-dev calculated on Intensity without CC factor*
360	28.20	1.2	33.84	7.30	4.49	3.59	
720	18.90	1.2	22.68	4.89	3.01	2.41	
1440	12.20	1.2	14.64	3.16	1.94	1.55	
2880	7.49	1.2	8.99	1.94	1.19	0.95	
4320	5.49	1.2	6.59	1.42	0.87	0.70	

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	12.99	24.55	10.08	10.08	14.47	8682	*select largest required storage , regardless of duration, to avoid overflow*
20	9.77	18.46	7.58	10.08	8.37	10050	
30	8.23	15.56	6.39	10.08	5.48	9862	
60	6.09	11.51	4.73	10.08	1.43	5155	
120	4.43	8.37	3.44	10.08	No Att. Req.	0	
360	2.53	4.78	1.96	10.08	No Att. Req.	0	
720	1.69	3.20	1.31	10.08	No Att. Req.	0	
1440	1.09	2.07	0.85	10.08	No Att. Req.	0	
2880	0.67	1.27	0.52	10.08	No Att. Req.	0	
4320	0.49	0.93	0.38	10.08	No Att. Req.	0	

Project Ref:	C0611N	**STORMWATER RUNOFF CALCULATIONS**	geologix consulting engineers
Project Address:	Ness Road, Waipapa		
Design Case:	PROPOSED DEVELOPMENT ROW POND 2	**1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2025 REV 1		

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	447	0.59	Pasture, Type C
0	0	0	
TOTAL	**447**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO POND	447	0.8	DRIVEWAY - metal
0	0	0	
OFFSET	0	0.8	DRIVEWAY - metal
0	0	0	
Pervious	0	0	
TOTAL	**447**	TYPE C	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	145.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	174.0	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, 1%AEP WITH CC, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	145.00	1.2	174.00	17.28	10.62	8.50	*Critical duration (time of concentration) for the catchments is 10min*
20	109.00	1.2	130.80	12.99	7.99	6.39	
30	91.90	1.2	110.28	10.95	6.73	5.39	
60	68.00	1.2	81.60	8.11	4.98	3.99	
120	49.40	1.2	59.28	5.89	3.62	2.90	*Pre-dev calculated on Intensity without CC factor*
360	28.20	1.2	33.84	3.36	2.07	1.65	
720	18.90	1.2	22.68	2.25	1.38	1.11	
1440	12.20	1.2	14.64	1.45	0.89	0.72	
2880	7.49	1.2	8.99	0.89	0.55	0.44	
4320	5.49	1.2	6.59	0.65	0.40	0.32	

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	0.00	17.28	10.62	10.62	6.66	3997	*select largest required storage , regardless of duration, to avoid overflow*
20	0.00	12.99	7.99	10.62	2.37	2844	
30	0.00	10.95	6.73	10.62	0.33	598	
60	0.00	8.11	4.98	10.62	No Att. Req.	0	
120	0.00	5.89	3.62	10.62	No Att. Req.	0	
360	0.00	3.36	2.07	10.62	No Att. Req.	0	
720	0.00	2.25	1.38	10.62	No Att. Req.	0	
1440	0.00	1.45	0.89	10.62	No Att. Req.	0	
2880	0.00	0.89	0.55	10.62	No Att. Req.	0	
4320	0.00	0.65	0.40	10.62	No Att. Req.	0	

Project Ref:	C0611N		**STORMWATER RUNOFF CALCULATIONS**	geologix consulting engineers
Project Address:	Ness Road, Waipapa			
Design Case:	PROPOSED DEVELOPMENT ROW POND 3		**1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2025	REV 1		

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				**POST DEVELOPMENT CATCHMENT PARAMETERS**			
ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO POND	499	0.8	DRIVEWAY - metal
IMPERVIOUS B	0	0		0	0	0	
IMPERVIOUS C	0	0		OFFSET	0	0.8	
EX. PERVIOUS	499	0.59	Pasture, Type C	0	0	0	
0	0	0		Pervious	0	0	
TOTAL	**499**	TYPE C		**TOTAL**	**499**	TYPE C	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	145.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	174.0	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, 1%AEP WITH CC, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	145.00	1.2	174.00	19.29	11.86	9.49	*Critical duration (time of concentration) for the catchments is 10min*
20	109.00	1.2	130.80	14.50	8.91	7.13	
30	91.90	1.2	110.28	12.23	7.52	6.01	
60	68.00	1.2	81.60	9.05	5.56	4.45	
120	49.40	1.2	59.28	6.57	4.04	3.23	*Pre-dev calculated on Intensity without CC factor*
360	28.20	1.2	33.84	3.75	2.31	1.84	
720	18.90	1.2	22.68	2.51	1.55	1.24	
1440	12.20	1.2	14.64	1.62	1.00	0.80	
2880	7.49	1.2	8.99	1.00	0.61	0.49	
4320	5.49	1.2	6.59	0.73	0.45	0.36	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	ATTENUATION INFLOW , Qin, l/s	ALLOWABLE ATTENUATION OUTFLOW, Qpre - Qoff, l/s	SELECTED ATTENUATION OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	0.00	19.29	11.86	11.86	7.44	4462	*select largest required storage , regardless of duration, to avoid overflow*
20	0.00	14.50	8.91	11.86	2.65	3175	
30	0.00	12.23	7.52	11.86	0.37	667	
60	0.00	9.05	5.56	11.86	No Att. Req.	0	
120	0.00	6.57	4.04	11.86	No Att. Req.	0	
360	0.00	3.75	2.31	11.86	No Att. Req.	0	
720	0.00	2.51	1.55	11.86	No Att. Req.	0	
1440	0.00	1.62	1.00	11.86	No Att. Req.	0	
2880	0.00	1.00	0.61	11.86	No Att. Req.	0	
4320	0.00	0.73	0.45	11.86	No Att. Req.	0	

Project Ref:	C0611N		**STORMWATER RUNOFF CALCULATIONS**	geologix consulting engineers
Project Address:	Ness Road, Waipapa			
Design Case:	OLFP CULVERT CAPACITY		**10 % & 1% AEP STORM EVENT, CULVERT SIZING**	
Date:	14 July 2025	REV 1		

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				**POST DEVELOPMENT CATCHMENT PARAMETERS**			
ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO CULVERT	0	0	
IMPERVIOUS B	0	0		0	0	0	
IMPERVIOUS C	0	0		OFFSET	0	0	
EX. PERVIOUS	689200	0.59	Pasture, Type C	0	0	0	
0	0	0		Pervious	0	0	
TOTAL	**689200**	TYPE C		**TOTAL**	**0**	TYPE C	

RAINFALL INTENSITY, 1% AEP & 10% AEP, 10MIN DURATION		
10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	97.5	mm/hr
1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	120.0	mm/hr

CATCHMENT RUNOFF, 10%AEP, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s		COMMENTS
10	97.50	1.2	117.00	0.00	11012.84		*Critical duration (time of concentration) for the catchments is 48min duration considered critical*
20	72.90	1.2	87.48	0.00	8234.22		
30	61.30	1.2	73.56	0.00	6923.97		
48	51.64	1.2	61.97	0.00	5832.85		
60	45.20	1.2	54.24	0.00	5105.44		*Pre-dev calculated on Intensity without CC factor*
120	49.40	1.2	59.28	0.00	5579.84		
360	18.60	1.2	22.32	0.00	2100.91		
720	12.40	1.2	14.88	0.00	1400.61		
1440	7.99	1.2	9.59	0.00	902.49		
2880	4.88	1.2	5.86	0.00	551.21		
4320	3.57	1.2	4.28	0.00	403.24		

Project Ref:	C0611N	STORMWATER DISPERSION PIPE/ TRENCH	geologix consulting engineers
Project Address:	Ness Road, Waipapa		
Design Case:	CONCEPT DEVELOPMENT	DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH	
Date:	14 July 2025 REV 1		

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

DESIGN STORM EVENT **1%** AEP EVENT

SLOPE BETWEEN SOURCE & DISPERSION DEVICE

ELEVATION	h	CHAINAGE, x	Δ x	h bar	Δ A
m	m	m	m	m	m2
160	0	0	0	0	0
155	5	20	20	2.5	50
	TOTALS	20	20		50
	SLOPE, Sc	0.250	m/m		

MANNINGS PIPE FLOW - INCOMING PIPE

Dia, m	d/D	α, rad	P, m	A, m^2	R	1:S	n	V, m/s	Q, m^3/s	Q, l/s	
0.1	0.000	6.283	0.0000	0.0000	0.000	4.0000	0.009	0.000	0.0000	0.000	**0 % full**
0.100	0.050	5.381	0.0451	0.0001	0.003	4.0000	0.009	1.220	0.0002	0.179	
0.100	0.100	4.996	0.0644	0.0004	0.006	4.0000	0.009	1.905	0.0008	0.779	
0.100	0.150	4.692	0.0795	0.0007	0.009	4.0000	0.009	2.455	0.0018	1.813	
0.100	0.200	4.429	0.0927	0.0011	0.012	4.0000	0.009	2.921	0.0033	3.267	
0.100	0.250	4.189	0.1047	0.0015	0.015	4.0000	0.009	3.328	0.0051	5.110	
0.100	0.300	3.965	0.1159	0.0020	0.017	4.0000	0.009	3.687	0.0073	7.306	
0.100	0.350	3.751	0.1266	0.0024	0.019	4.0000	0.009	4.004	0.0098	9.809	
0.100	0.400	3.544	0.1369	0.0029	0.021	4.0000	0.009	4.285	0.0126	12.572	
0.100	0.450	3.342	0.1471	0.0034	0.023	4.0000	0.009	4.533	0.0155	15.539	
0.100	0.500	3.142	0.1571	0.0039	0.025	4.0000	0.009	4.750	0.0187	18.653	**50 % full**
0.100	0.550	2.941	0.1671	0.0044	0.026	4.0000	0.009	4.937	0.0219	21.850	
0.100	0.600	2.739	0.1772	0.0049	0.028	4.0000	0.009	5.094	0.0251	25.064	
0.100	0.650	2.532	0.1875	0.0054	0.029	4.0000	0.009	5.222	0.0282	28.218	
0.100	0.700	2.319	0.1982	0.0059	0.030	4.0000	0.009	5.319	0.0312	31.234	
0.100	0.750	2.094	0.2094	0.0063	0.030	4.0000	0.009	5.384	0.0340	34.018	
0.100	0.800	1.855	0.2214	0.0067	0.030	4.0000	0.009	5.414	0.0365	36.465	
0.100	0.850	1.591	0.2346	0.0071	0.030	4.0000	0.009	5.403	0.0384	38.441	
0.100	0.900	1.287	0.2498	0.0074	0.030	4.0000	0.009	5.340	0.0398	39.761	
0.100	0.950	0.902	0.2691	0.0077	0.029	4.0000	0.009	5.201	0.0401	40.086	
0.100	1.000	0.000	0.3142	0.0079	0.025	4.0000	0.009	4.750	0.0373	37.306	**Flowing full**

DISPERSION SPECIFICATION

INCOMING PIPE PROPERTIES:

TANK OUTFLOW, 1 % AEP	4.15	l/s		
MAXIMUM PIPE FLOW	40.09	l/s		
SUFFICIENT CAPACITY IN PIPE	YES			
LONGITUDINAL SLOPE	0.250	m/m		
DESIGN VELOCITY, Dv	5.414	m/s		

LEVEL SPREADER SPECIFICATIONS:

PIPE DIAMETER, m	0.15	m		
MANNINGS PIPE ROUGHNESS	0.009			
NUMBER OF ORIFICES	30	No.		
DIA. OF ORIFICE, D	20	mm		
ORIFICE INTERVALS, C/C	150	mm		
DISPERSION PIPE LENGTH, L	**4.35**	**m**	Adopt 6m standard pipe length minimum	

ORIFICE DESIGN FLOW CHECK:

AREA OF SINGLE ORIFICE, A	0.00031	m2		
FLOW OUT OF 1 ORIFICE	0.000289379	m3/s	0.29 l/s	
FLOW OUT OF ALL ORIFICES	0.00868138	m3/s	8.68 l/s	**DESIGN OK**
VELOCITY FROM SINGLE ORIFICE	0.92	m/s		

BROAD CRESTED WEIR DESIGN FLOW CHECK:

FLOW DEPTH, h	0.1125	m		
BASE WIDTH = L	4.35	m		
FLOW AREA	0.49	m2		
WEIR FLOW	0.01157	m3/s	11.57 l/s	**DESIGN OK**
WEIR VELOCITY	0.024	m/s		

INCOMING PIPE & SPREADER SUMARY:

	LOT 1, 2, 3	
INCOMING PIPE DIAMETER, m	0.100	m
SPREADER PIPE DIAMETER, m	0.150	m
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	30	No.
DIA. OF ORIFICE, D	20	mm
ORIFICE INTERVALS, C/C	150	mm
DISPERSION PIPE LENGTH, L	**4.35**	**m**

HIRDS V4 Intensity-Duration-Frequency Results
Sitename: Ness Road, Waipapa
Coordinate system: WGS84
Longitude: 173.8804
Latitude: -35.1757

DDF Mode	Parameter	c	d	e	f	g	h	i
	Values:	0.0021	0.54344	-0.01861	-0.00338	0.25264	-0.01149	3.29997

Example:	Duration (h)	ARI (yrs)	x	y	Rainfall Rate (mm/hr)
	24	100	3.17805	4.60015	12.21

Rainfall intensities (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	59	43.9	36.9	27.1	19.5	11	7.38	4.72	2.88	2.1	1.66	1.37
2	0.5	64.5	48.1	40.4	29.7	21.4	12.1	8.1	5.19	3.16	2.31	1.82	1.51
5	0.2	83.5	62.4	52.4	38.6	27.9	15.8	10.6	6.79	4.15	3.03	2.4	1.98
10	0.1	97.5	72.9	61.3	45.2	32.7	18.6	12.4	7.99	4.88	3.57	2.83	2.34
20	0.05	112	83.6	70.3	51.9	37.6	21.4	14.3	9.22	5.64	4.13	3.27	2.71
30	0.033	120	89.9	75.7	55.9	40.5	23.1	15.5	9.96	6.1	4.47	3.53	2.93
40	0.025	126	94.5	79.6	58.8	42.6	24.3	16.3	10.5	6.43	4.71	3.73	3.09
50	0.02	131	98	82.6	61	44.3	25.2	16.9	10.9	6.69	4.9	3.88	3.21
60	0.017	135	101	85	62.8	45.6	26	17.5	11.2	6.9	5.05	4	3.31
80	0.013	141	106	88.9	65.7	47.7	27.2	18.3	11.8	7.23	5.3	4.2	3.48
100	0.01	145	109	91.9	68	49.4	28.2	18.9	12.2	7.49	5.49	4.35	3.6
250	0.004	164	123	104	77	56	32.1	21.6	13.9	8.56	6.27	4.97	4.12

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	7.3	4.5	3.4	2.6	1.8	1.1	0.83	0.68	0.39	0.32	0.24	0.22
2	0.5	8	4.9	3.7	2.8	2	1.2	0.91	0.75	0.44	0.35	0.27	0.24
5	0.2	11	7.1	5.5	4	2.8	1.7	1.3	1	0.59	0.48	0.37	0.33
10	0.1	14	9.5	7.5	5.2	3.7	2.2	1.6	1.2	0.71	0.58	0.44	0.39
20	0.05	18	13	10	6.8	5	2.9	2.1	1.5	0.85	0.69	0.53	0.47
30	0.033	21	15	12	8	5.9	3.4	2.5	1.6	0.94	0.76	0.59	0.52
40	0.025	23	17	14	9	6.6	3.8	2.8	1.8	1	0.81	0.63	0.55
50	0.02	25	18	15	9.8	7.2	4.1	3	1.9	1.1	0.86	0.66	0.58
60	0.017	27	20	16	11	7.8	4.5	3.3	2	1.1	0.9	0.69	0.61
80	0.013	30	22	18	12	8.7	5	3.6	2.1	1.2	0.96	0.74	0.65
100	0.01	33	24	20	13	9.5	5.5	4	2.2	1.3	1	0.79	0.68
250	0.004	45	34	28	18	14	7.9	5.7	2.8	1.6	1.3	0.99	0.85

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	63.1	47	39.5	29	20.8	11.7	7.72	4.92	2.98	2.16	1.7	1.41
2	0.5	69.2	51.6	43.3	31.8	22.9	12.8	8.5	5.41	3.28	2.38	1.88	1.55
5	0.2	89.8	67.1	56.4	41.5	29.9	16.8	11.2	7.1	4.31	3.14	2.48	2.05
10	0.1	105	78.5	66	48.7	35.1	19.8	13.1	8.37	5.09	3.71	2.93	2.42
20	0.05	120	90.1	75.9	56	40.4	22.8	15.2	9.67	5.88	4.29	3.39	2.8
30	0.033	130	97.1	81.7	60.3	43.6	24.6	16.4	10.4	6.36	4.64	3.67	3.03
40	0.025	136	102	85.9	63.4	45.9	25.9	17.3	11	6.71	4.9	3.87	3.2
50	0.02	141	106	89.2	65.9	47.6	26.9	17.9	11.4	6.98	5.09	4.02	3.32
60	0.017	145	109	91.8	67.8	49.1	27.8	18.5	11.8	7.2	5.26	4.15	3.43
80	0.013	152	114	96.1	71	51.4	29.1	19.4	12.4	7.55	5.51	4.35	3.6
100	0.01	157	118	99.3	73.4	53.2	30.1	20.1	12.8	7.82	5.71	4.52	3.73
250	0.004	177	133	112	83.2	60.4	34.2	22.9	14.6	8.94	6.53	5.16	4.27

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	63.1	47	39.5	29	20.8	11.7	7.72	4.92	2.98	2.16	1.7	1.41
2	0.5	69.2	51.6	43.3	31.8	22.9	12.8	8.5	5.41	3.28	2.38	1.88	1.55
5	0.2	89.8	67.1	56.4	41.5	29.9	16.8	11.2	7.1	4.31	3.14	2.48	2.05
10	0.1	105	78.5	66	48.7	35.1	19.8	13.1	8.37	5.09	3.71	2.93	2.42
20	0.05	120	90.1	75.9	56	40.4	22.8	15.2	9.67	5.88	4.29	3.39	2.8
30	0.033	130	97.1	81.7	60.3	43.6	24.6	16.4	10.4	6.36	4.64	3.67	3.03
40	0.025	136	102	85.9	63.4	45.9	25.9	17.3	11	6.71	4.9	3.87	3.2
50	0.02	141	106	89.2	65.9	47.6	26.9	17.9	11.4	6.98	5.09	4.02	3.32
60	0.017	145	109	91.8	67.8	49.1	27.8	18.5	11.8	7.2	5.26	4.15	3.43
80	0.013	152	114	96.1	71	51.4	29.1	19.4	12.4	7.55	5.51	4.35	3.6
100	0.01	157	118	99.3	73.4	53.2	30.1	20.1	12.8	7.82	5.71	4.52	3.73
250	0.004	177	133	112	83.2	60.4	34.2	22.9	14.6	8.94	6.53	5.16	4.27

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	64.2	47.8	40.1	29.5	21.2	11.8	7.81	4.97	3	2.18	1.72	1.42
2	0.5	70.4	52.5	44.1	32.4	23.3	13	8.61	5.46	3.31	2.4	1.89	1.56
5	0.2	91.4	68.3	57.4	42.2	30.4	17.1	11.3	7.18	4.35	3.17	2.5	2.06
10	0.1	107	79.9	67.2	49.5	35.7	20.1	13.3	8.47	5.14	3.74	2.95	2.44
20	0.05	123	91.8	77.3	57	41.2	23.1	15.4	9.78	5.94	4.33	3.42	2.82
30	0.033	132	98.9	83.2	61.4	44.4	25	16.6	10.6	6.43	4.69	3.7	3.05
40	0.025	139	104	87.5	64.6	46.7	26.3	17.5	11.1	6.78	4.94	3.9	3.22
50	0.02	144	108	90.8	67.1	48.5	27.3	18.2	11.6	7.05	5.14	4.06	3.35
60	0.017	148	111	93.5	69.1	50	28.2	18.8	12	7.28	5.31	4.19	3.46
80	0.013	155	116	97.9	72.3	52.3	29.5	19.7	12.5	7.63	5.57	4.4	3.63
100	0.01	160	120	101	74.8	54.1	30.6	20.4	13	7.91	5.77	4.56	3.77
250	0.004	181	136	115	84.8	61.5	34.8	23.2	14.8	9.03	6.6	5.21	4.31

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	67.5	50.3	42.2	31	22.2	12.3	8.09	5.12	3.08	2.23	1.75	1.45
2	0.5	74.1	55.2	46.4	34.1	24.5	13.6	8.93	5.64	3.4	2.46	1.94	1.6
5	0.2	96.5	72	60.6	44.6	32.1	17.8	11.8	7.43	4.48	3.26	2.56	2.11
10	0.1	113	84.4	71	52.3	37.7	21	13.9	8.77	5.3	3.85	3.03	2.5
20	0.05	130	97	81.7	60.2	43.4	24.3	16	10.1	6.14	4.46	3.51	2.9
30	0.033	140	105	88	65	46.8	26.2	17.3	11	6.64	4.83	3.8	3.14
40	0.025	147	110	92.5	68.3	49.3	27.6	18.3	11.6	7	5.09	4.01	3.31
50	0.02	152	114	96.1	71	51.2	28.7	19	12	7.28	5.3	4.18	3.44
60	0.017	157	117	98.9	73.1	52.8	29.6	19.6	12.4	7.51	5.47	4.31	3.55
80	0.013	164	123	104	76.5	55.3	31	20.5	13	7.89	5.74	4.52	3.73
100	0.01	169	127	107	79.1	57.2	32.1	21.3	13.5	8.17	5.95	4.69	3.87
250	0.004	191	144	121	89.7	64.9	36.5	24.2	15.4	9.33	6.8	5.36	4.43

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	63.8	47.5	39.9	29.3	21	11.8	7.78	4.95	2.99	2.17	1.71	1.41
2	0.5	69.9	52.1	43.8	32.2	23.1	12.9	8.57	5.44	3.29	2.4	1.89	1.56
5	0.2	90.8	67.8	57	42	30.2	17	11.2	7.15	4.34	3.16	2.49	2.06
10	0.1	106	79.4	66.8	49.2	35.5	19.9	13.2	8.43	5.12	3.73	2.94	2.43
20	0.05	122	91.1	76.7	56.6	40.9	23	15.3	9.73	5.92	4.32	3.41	2.81
30	0.033	131	98.1	82.6	61	44.1	24.8	16.5	10.5	6.4	4.67	3.69	3.04
40	0.025	138	103	86.8	64.1	46.4	26.2	17.4	11.1	6.75	4.92	3.89	3.21
50	0.02	143	107	90.2	66.6	48.2	27.2	18.1	11.5	7.02	5.12	4.05	3.34
60	0.017	147	110	92.8	68.6	49.6	28	18.7	11.9	7.24	5.29	4.17	3.45
80	0.013	154	115	97.1	71.8	52	29.4	19.5	12.5	7.6	5.55	4.38	3.62
100	0.01	159	119	100	74.3	53.8	30.4	20.2	12.9	7.87	5.75	4.54	3.75
250	0.004	179	135	114	84.2	61	34.6	23.1	14.7	8.99	6.57	5.19	4.29

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	70.4	52.5	44.1	32.4	23.1	12.7	8.34	5.26	3.15	2.27	1.79	1.47
2	0.5	77.4	57.7	48.4	35.6	25.5	14.1	9.22	5.79	3.48	2.52	1.98	1.63
5	0.2	101	75.4	63.4	46.6	33.5	18.5	12.2	7.65	4.6	3.34	2.62	2.16
10	0.1	118	88.4	74.4	54.8	39.4	21.8	14.4	9.04	5.44	3.95	3.1	2.56
20	0.05	136	102	85.6	63.1	45.4	25.3	16.6	10.5	6.31	4.57	3.6	2.96
30	0.033	146	110	92.3	68.1	49	27.3	18	11.3	6.83	4.95	3.9	3.21
40	0.025	154	115	97	71.6	51.6	28.8	18.9	11.9	7.19	5.23	4.11	3.39
50	0.02	160	120	101	74.4	53.6	29.9	19.7	12.4	7.49	5.44	4.28	3.53
60	0.017	164	123	104	76.7	55.3	30.8	20.3	12.8	7.73	5.62	4.42	3.64
80	0.013	172	129	109	80.3	57.9	32.3	21.3	13.4	8.12	5.89	4.63	3.82
100	0.01	178	133	112	83	59.9	33.5	22.1	13.9	8.41	6.11	4.81	3.96
250	0.004	201	151	127	94.1	68	38.1	25.1	15.9	9.6	6.98	5.5	4.53

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	64.9	48.4	40.6	29.8	21.4	11.9	7.88	5	3.02	2.19	1.73	1.42
2	0.5	71.2	53.1	44.6	32.8	23.6	13.1	8.68	5.5	3.33	2.42	1.9	1.57
5	0.2	92.6	69.2	58.1	42.8	30.8	17.2	11.4	7.24	4.38	3.19	2.51	2.07
10	0.1	108	81	68.1	50.2	36.2	20.3	13.4	8.54	5.18	3.77	2.97	2.45
20	0.05	124	93	78.3	57.7	41.7	23.4	15.5	9.86	5.99	4.36	3.44	2.84
30	0.033	134	100	84.3	62.3	45	25.3	16.8	10.7	6.48	4.72	3.72	3.07
40	0.025	141	105	88.6	65.5	47.3	26.6	17.7	11.2	6.83	4.98	3.93	3.24
50	0.02	146	109	92.1	68	49.1	27.7	18.4	11.7	7.11	5.18	4.09	3.37
60	0.017	150	113	94.8	70	50.6	28.5	19	12.1	7.33	5.35	4.22	3.48
80	0.013	157	118	99.2	73.3	53	29.9	19.9	12.6	7.69	5.61	4.42	3.66
100	0.01	162	122	103	75.8	54.9	30.9	20.6	13.1	7.97	5.81	4.59	3.79
250	0.004	183	138	116	85.9	62.3	35.2	23.4	14.9	9.1	6.64	5.25	4.34

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	77.1	57.4	48.2	35.4	25.2	13.7	8.9	5.57	3.31	2.38	1.86	1.53
2	0.5	84.9	63.3	53.1	39	27.9	15.2	9.87	6.15	3.66	2.64	2.06	1.7
5	0.2	111	83	69.7	51.3	36.8	20.1	13.1	8.16	4.87	3.52	2.75	2.26
10	0.1	130	97.5	82	60.4	43.3	23.7	15.5	9.66	5.77	4.17	3.26	2.68
20	0.05	150	112	94.5	69.7	50	27.5	17.9	11.2	6.69	4.83	3.79	3.11
30	0.033	162	121	102	75.2	54	29.7	19.4	12.1	7.25	5.24	4.11	3.37
40	0.025	170	127	107	79.1	56.8	31.4	20.5	12.8	7.64	5.53	4.33	3.56
50	0.02	176	132	111	82.2	59.1	32.6	21.3	13.3	7.96	5.75	4.52	3.71
60	0.017	182	136	115	84.7	60.9	33.7	22	13.7	8.21	5.95	4.66	3.83
80	0.013	190	143	120	88.8	63.8	35.3	23	14.4	8.63	6.24	4.89	4.02
100	0.01	196	147	124	91.8	66	36.6	23.9	14.9	8.94	6.47	5.08	4.17
250	0.004	222	167	141	104	75	41.6	27.2	17	10.2	7.39	5.81	4.77

HIRDS V4 Depth-Duration-Frequency Results
Sitename: Ness Road, Waipapa
Coordinate system: WGS84
Longitude: 173.8804
Latitude: -35.1757

DDF Mode	Parameter	c	d	e	f	g	h	i
	Values:	0.0021	0.54344	-0.01861	-0.00338	0.25264	-0.01149	3.29997

Example:	Duration (h)	ARI (yrs)	x	y	Rainfall Depth (mm)
	24	100	3.17805	4.60015	293.04

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.83	14.6	18.4	27.1	39.1	66.3	88.5	113	138	151	159	165
2	0.5	10.8	16	20.2	29.7	42.9	72.7	97.2	124	152	166	175	181
5	0.2	13.9	20.8	26.2	38.6	55.8	94.9	127	163	199	218	230	238
10	0.1	16.2	24.3	30.6	45.2	65.4	111	149	192	234	257	271	281
20	0.05	18.6	27.9	35.2	51.9	75.2	128	172	221	271	297	314	325
30	0.033	20	30	37.9	55.9	81	138	186	239	293	321	339	351
40	0.025	21	31.5	39.8	58.8	85.2	146	196	252	309	339	358	370
50	0.02	21.8	32.7	41.3	61	88.5	151	203	262	321	353	372	385
60	0.017	22.4	33.6	42.5	62.8	91.2	156	210	270	331	364	384	398
80	0.013	23.5	35.2	44.5	65.7	95.4	163	220	283	347	381	403	417
100	0.01	24.2	36.4	46	68	98.7	169	227	293	360	395	418	432
250	0.004	27.4	41.1	52	77	112	192	259	334	411	452	477	495

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	1.2	1.6	1.7	2.5	3.5	6.8	9.9	15	20	22	23	25
2	0.5	1.3	1.7	1.9	2.8	3.9	7.5	11	17	22	25	26	28
5	0.2	1.8	2.5	2.7	3.9	5.5	10	15	23	30	34	35	37
10	0.1	2.2	3.2	3.7	5.2	7.2	13	19	28	35	41	42	44
20	0.05	2.8	4.2	5	7	9.6	17	25	33	42	49	50	52
30	0.033	3.2	5	5.9	8.3	11	20	29	37	46	54	55	57
40	0.025	3.5	5.5	6.7	9.3	13	22	32	39	49	58	59	61
50	0.02	3.8	6	7.3	10	14	24	35	42	52	61	62	64
60	0.017	4	6.5	7.8	11	15	26	38	44	54	64	65	67
80	0.013	4.5	7.2	8.8	12	17	29	42	47	58	68	70	71
100	0.01	4.8	7.9	9.6	14	18	32	46	49	61	72	74	75
250	0.004	6.6	11	13	20	26	46	65	62	76	90	93	93

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	10.5	15.7	19.7	29	41.7	70	92.7	118	143	156	164	169
2	0.5	11.5	17.2	21.7	31.8	45.8	76.9	102	130	157	172	180	186
5	0.2	15	22.4	28.2	41.5	59.9	101	134	170	207	226	238	246
10	0.1	17.5	26.2	33	48.7	70.2	119	158	201	244	267	281	290
20	0.05	20.1	30	37.9	56	80.9	137	182	232	282	309	325	336
30	0.033	21.6	32.4	40.9	60.3	87.2	148	197	251	305	334	352	363
40	0.025	22.7	34	42.9	63.4	91.7	155	207	264	322	352	371	383
50	0.02	23.5	35.3	44.6	65.9	95.3	162	215	275	335	367	386	399
60	0.017	24.2	36.3	45.9	67.8	98.2	167	222	284	346	379	399	412
80	0.013	25.3	38	48	71	103	174	233	297	363	397	418	432
100	0.01	26.2	39.3	49.6	73.4	106	181	241	308	376	411	434	448
250	0.004	29.6	44.4	56.2	83.2	121	205	274	351	429	470	496	513

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	10.5	15.7	19.7	29	41.7	70	92.7	118	143	156	164	169
2	0.5	11.5	17.2	21.7	31.8	45.8	76.9	102	130	157	172	180	186
5	0.2	15	22.4	28.2	41.5	59.9	101	134	170	207	226	238	246
10	0.1	17.5	26.2	33	48.7	70.2	119	158	201	244	267	281	290
20	0.05	20.1	30	37.9	56	80.9	137	182	232	282	309	325	336
30	0.033	21.6	32.4	40.9	60.3	87.2	148	197	251	305	334	352	363
40	0.025	22.7	34	42.9	63.4	91.7	155	207	264	322	352	371	383
50	0.02	23.5	35.3	44.6	65.9	95.3	162	215	275	335	367	386	399
60	0.017	24.2	36.3	45.9	67.8	98.2	167	222	284	346	379	399	412
80	0.013	25.3	38	48	71	103	174	233	297	363	397	418	432
100	0.01	26.2	39.3	49.6	73.4	106	181	241	308	376	411	434	448
250	0.004	29.6	44.4	56.2	83.2	121	205	274	351	429	470	496	513

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	10.7	15.9	20.1	29.5	42.3	70.9	93.7	119	144	157	165	170
2	0.5	11.7	17.5	22	32.4	46.6	78	103	131	159	173	182	187
5	0.2	15.2	22.8	28.7	42.2	60.9	102	136	172	209	228	240	247
10	0.1	17.8	26.6	33.6	49.5	71.5	120	160	203	247	270	283	292
20	0.05	20.4	30.6	38.6	57	82.3	139	184	235	285	312	328	339
30	0.033	22	33	41.6	61.4	88.8	150	199	254	309	337	355	367
40	0.025	23.1	34.6	43.7	64.6	93.4	158	210	267	325	356	374	387
50	0.02	24	35.9	45.4	67.1	97	164	218	278	339	370	390	402
60	0.017	24.7	37	46.8	69.1	100	169	225	287	349	382	402	415
80	0.013	25.8	38.7	48.9	72.3	105	177	236	301	366	401	422	436
100	0.01	26.7	40	50.6	74.8	108	184	244	312	380	415	438	452
250	0.004	30.1	45.3	57.3	84.8	123	209	278	355	434	475	500	517

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	11.2	16.8	21.1	31	44.4	73.8	97.1	123	148	161	168	174
2	0.5	12.3	18.4	23.2	34.1	48.9	81.4	107	135	163	177	186	192
5	0.2	16.1	24	30.3	44.6	64.1	107	141	178	215	235	246	254
10	0.1	18.8	28.1	35.5	52.3	75.3	126	166	210	254	277	291	300
20	0.05	21.6	32.3	40.8	60.2	86.8	146	192	243	295	321	337	347
30	0.033	23.3	34.8	44	65	93.7	157	208	263	319	348	365	376
40	0.025	24.4	36.6	46.2	68.3	98.5	166	219	277	336	367	385	397
50	0.02	25.4	38	48	71	102	172	228	288	350	382	401	413
60	0.017	26.1	39.1	49.5	73.1	106	178	235	298	361	394	414	427
80	0.013	27.3	41	51.8	76.5	111	186	246	312	379	413	434	448
100	0.01	28.2	42.3	53.5	79.1	114	193	255	324	392	428	450	464
250	0.004	31.9	47.9	60.6	89.7	130	219	291	369	448	489	515	531

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	10.6	15.8	19.9	29.3	42.1	70.5	93.3	119	144	156	164	170
2	0.5	11.7	17.4	21.9	32.2	46.3	77.6	103	131	158	172	181	187
5	0.2	15.1	22.6	28.5	42	60.5	102	135	172	208	227	239	247
10	0.1	17.7	26.5	33.4	49.2	71	120	159	202	246	269	282	291
20	0.05	20.3	30.4	38.3	56.6	81.7	138	183	234	284	311	327	338
30	0.033	21.8	32.7	41.3	61	88.1	149	198	253	307	336	354	365
40	0.025	22.9	34.4	43.4	64.1	92.7	157	209	266	324	355	373	385
50	0.02	23.8	35.7	45.1	66.6	96.3	163	217	277	337	369	388	401
60	0.017	24.5	36.7	46.4	68.6	99.3	168	224	286	348	381	401	414
80	0.013	25.6	38.4	48.6	71.8	104	176	235	299	365	399	420	434
100	0.01	26.5	39.7	50.2	74.3	108	182	243	310	378	414	436	450
250	0.004	29.9	44.9	56.8	84.2	122	207	277	354	432	473	499	515

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	11.7	17.5	22	32.4	46.2	76.4	100	126	151	164	171	177
2	0.5	12.9	19.2	24.2	35.6	51	84.4	111	139	167	181	190	195
5	0.2	16.8	25.1	31.7	46.6	67	111	146	184	221	240	251	259
10	0.1	19.7	29.5	37.2	54.8	78.8	131	172	217	261	284	298	307
20	0.05	22.6	33.9	42.8	63.1	90.9	152	199	251	303	329	345	355
30	0.033	24.4	36.5	46.1	68.1	98.1	164	215	271	328	357	374	385
40	0.025	25.6	38.4	48.5	71.6	103	173	227	286	345	376	394	407
50	0.02	26.6	39.9	50.4	74.4	107	179	236	298	360	392	411	423
60	0.017	27.4	41.1	51.9	76.7	111	185	244	307	371	405	424	437
80	0.013	28.7	43	54.3	80.3	116	194	255	322	390	424	445	459
100	0.01	29.6	44.4	56.1	83	120	201	265	334	404	440	462	475
250	0.004	33.4	50.2	63.6	94.1	136	228	302	381	461	503	528	544

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	10.8	16.1	20.3	29.8	42.8	71.6	94.5	120	145	158	166	171
2	0.5	11.9	17.7	22.3	32.8	47.1	78.8	104	132	160	174	183	188
5	0.2	15.4	23.1	29.1	42.8	61.6	103	137	174	210	230	241	249
10	0.1	18.1	27	34.1	50.2	72.4	122	161	205	248	271	285	294
20	0.05	20.7	31	39.1	57.7	83.4	140	186	237	288	314	330	341
30	0.033	22.3	33.4	42.2	62.3	89.9	152	201	256	311	340	358	369
40	0.025	23.4	35.1	44.3	65.5	94.6	160	212	270	328	358	377	389
50	0.02	24.3	36.4	46	68	98.3	166	220	280	341	373	392	405
60	0.017	25	37.5	47.4	70	101	171	227	289	352	385	405	418
80	0.013	26.2	39.2	49.6	73.3	106	179	238	303	369	404	425	439
100	0.01	27	40.6	51.3	75.8	110	186	247	314	383	418	441	455
250	0.004	30.5	45.9	58	85.9	125	211	281	359	437	478	504	520

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	12.8	19.1	24.1	35.4	50.4	82.4	107	134	159	171	179	184
2	0.5	14.1	21.1	26.6	39	55.8	91.1	118	148	176	190	198	203
5	0.2	18.5	27.7	34.9	51.3	73.5	121	157	196	234	253	264	271
10	0.1	21.7	32.5	41	60.4	86.6	142	186	232	277	300	313	322
20	0.05	25	37.4	47.2	69.7	100	165	215	268	321	348	364	373
30	0.033	26.9	40.3	51	75.2	108	178	233	290	348	377	394	405
40	0.025	28.3	42.4	53.5	79.1	114	188	246	306	367	398	416	428
50	0.02	29.4	44.1	55.7	82.2	118	196	255	318	382	414	434	445
60	0.017	30.3	45.4	57.3	84.7	122	202	264	329	394	428	447	459
80	0.013	31.7	47.5	60.1	88.8	128	212	276	345	414	449	469	483
100	0.01	32.7	49.1	62.1	91.8	132	219	287	358	429	466	488	500
250	0.004	37	55.6	70.3	104	150	250	326	408	490	532	558	573