THOMSON SURVEY LIMITED

SURVEYORS AND RESOURCE PLANNERS

Our Reference: 10741.1 (FNDC)

19 January 2026

Resource Consents Department
Far North District Council
JB Centre
KERIKERI

Dear Sir/Madam

RE: Proposed Subdivision at Puketona, State Highway 10 – LV Trust Holdings Ltd & KP Trust Holdings Ltd

I am pleased to submit application on behalf of LV Trust Holdings Ltd & KP Trust Holdings Ltd, for a proposed subdivision of land at Puketona (SH 10), zoned Rural Production. The application is a non complying activity due to the age of title, affected by a road legalisation process.

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

Regards

Lynley Newport
Senior Planner
THOMSON SURVEY LTD

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After Hours: Office Manager: Sam Lee 021 1370060

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

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

Office Use Only
Application Number:

Application for resource consent or fast-track resource consent

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

1. Pre-Lodgement Meeting

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

◯ Yes ☑ No

2. Type of consent being applied for

(more than one circle can be ticked):

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

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

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

☑ Yes ◯ No

4. Consultation

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

If yes, which groups have you consulted with?

Who else have you consulted with? NZTA

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: LV Trust Holdings Ltd & KP Trust Holdings Ltd

Email:

Phone number:

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

[redacted]

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

If yes, please provide details.

6. Address for correspondence

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

Name/s: Lynley Newport

Email:

Phone number:

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

[redacted]

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

7. Details of property owner/s and occupier/s

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

Name/s: As per item 5 above

Property address/
location:

Postcode

8. Application site details

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

Name/s: As per Item 5

Site address/ location: State Highway 10
Puketona Junction

Postcode

Legal description: Lot 2 DP 325964 & Sec 18 **Val Number:**

Certificate of title: 105042 & 1207111 (two titles)

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.

For access ph Dickie Mapp. 027 490 1269.

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.

Subdivision of two titles in the Rural Production Zone to create a total of five lots (three additional),

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

10. Would you like to request public notification?

◯ **Yes** ☑ **No**

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

(more than one circle can be ticked):

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

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

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

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

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

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

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

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

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

13. Assessment of environmental effects:

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

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

14. Draft conditions:

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

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

15. Billing Details:

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

Name/s: (please write in full) LV Trust Holdings Ltd & KP Trust Holdings Ltd as trustees for The Pugh Property Trust.

Email: [redacted]

Phone number:

Postal address:
(or alternative method o
service under section 35
of the act)

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

15. Billing details continued...

Declaration concerning Payment of Fees

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

Name: (please write in full) Kevin Pugh

Signature: [redacted] Date 14-01-2026

(signature of bill payer) **MANDATORY**

16. Important Information:

Note to applicant

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

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

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

Fast-track application

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

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

Privacy Information:

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

17. Declaration

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

Name (please write in full) Kevin Pugh

Signature [redacted] Date 14-01-2026

application is made by electronic means

See overleaf for a checklist of your information...

Checklist

Please tick if information is provided

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

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

LV Trust Holdings Ltd & KP Trust Holdings Ltd

PROPOSED SUBDIVISION
PURSUANT TO
FNDC OPERATIVE DISTRICT PLAN

State Highway 10, Puketona Junction

PLANNER'S REPORT & ASSESSMENT OF ENVIRONMENTAL EFFECTS

Thomson Survey Ltd
Kerikeri

1.0 THE PROPOSAL

The applicant proposes to subdivide their land, held in two contiguous but separate titles, at Puketona Junction, zoned Rural Production. Each title has existing legal crossings off State Highway 10/11.

The proposal is to create a total of 5 lots from the existing two titles (three additional). Four of the lots are in the 2-4ha size range, with a balance lot of 64.097ha. Refer to Scheme Plan attached in Appendix 1.

It is proposed that Lots 2-4 and Lot 5 will be able to utilise an existing State Highway crossing to the south (CP78A); whilst Lots 1 and 5 (that lot's other point of access) will utilise an existing crossing off the roundabout at the SH 10 and 11 intersection. Both crossings are already to the required standard. NZTA has provided its written approval – refer to correspondence in Appendix 4.

Internal to the site, ROW's will be constructed to the appropriate standard.

The indigenous vegetation within the large balance Lot 5 (over 64ha in area), coinciding with outstanding landscape notation, is to be subject to protective covenant – see area 'E' on Scheme Plan in Appendix 1.

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 for a non complying activity subdivision. 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:	State Highway 10, Puketona Junction - location map in Appendix 2
Legal descriptions & RT's:	Lot 2 DP 325964 & Section 18 SO 575856, held in Records of Title 105042 and 1207111 respectively, with total area of 74.657ha. Copies of titles attached in Appendix 3.

3.0 SITE DESCRIPTION

3.1 Site Characteristics

The site is situated to the east of State Highway 10 as one approaches the Puketona Junction state highway roundabout from the south. The land is farmed and slopes uphill, away from the highway, to the east, where the top slopes are bush covered. There is a pine plantation in the northern portion of Section 18. The balance of the land is in pasture.

There are one or two wet areas, mostly within gullies in large balance Lot 5 and outside of any area on which development is likely to occur.

Existing built structures are limited to access; shed and stock yards – as depicted in the photograph below.

Looking into the site with proposed Lot 1 to left of shed, and proposed Lot 2 behind and to the right of the shed (which is within balance Lot 5).

The Site Suitability Report in Appendix 5 contains more details of the site's physical characteristics.

The Operative District Plan (ODP) zones the site Rural Production with an area of Outstanding Landscape along the upper, bush clad slopes of both underlying titles. The Proposed District Plan (PDP) proposes a Rural Production Zone for the site, plus an Outstanding Natural Landscape (ONL) notation generally the same as in the ODP, albeit with slightly less area within the ONL.

The ODP shows Outstanding Natural Feature Site 49 – Puketutu (Puketona) volcanic cones – at the extreme western corner of Lot 2 DP 325964. This notation has not, however, transferred over into the PDP. It is believed to be in error as the site contains no volcanic cones.

Adjacent, to the northern boundary of Section 18 is a Site of Significance to Maori – referenced MS09-35 (Puketona Pa) in both the ODP and PDP. Adjacent to the northern boundary of Lot 2 DP 325964 on the extreme western edge of that boundary, is Minerals Zone (upper/outer extremes of the Puketona Quarry).

The Site of Significance to Maori (a pa site) is also an NZAA recorded Archaeological Site (P05/211 – Ridge Pa). There are no other NZAA recorded sites on the properties.

The portion of the bush mapped as Outstanding Landscape is also a Protected Natural Area identified in DoC's 2016 mapping and publications – part of the much, much larger "Opua Forest". The properties are within a mapped 'high density' kiwi area.

The site exhibits LUC Class 6e soils right across the northern and eastern ridgeline and flanks – effectively the area in tree cover. The vast majority of grazed pasture within the properties is mapped as being LUC Class 4e soils, with two small wet areas, one in proposed Lot 1 and across the already developed part of Lot 5 (supporting access, buildings and yards); and the other in the balance Lot 5, mapped as LUC Class 3w (wet) soils.

The site, whilst containing several water courses running down slope, and some swampy areas, does not contain any biodiversity wetlands; Top 150 Wetlands, or Known Wetlands as mapped by the Northland Regional Council on their on-line maps.

The site is not mapped as containing any HAIL land or Selected Land Use Sites (Far North Maps and NRC online maps).

Both of the areas of lower lying LUC Class 3w soils are mapped as potentially subject to flooding in the 100 year ARI Event (low risk).

3.2 Legal Interests on Titles

Record of title 1207111, the northern most of the two, is subject to a right of way over part marked D on SO 575856, created in Easement Instrument 6068035.4. This is a reciprocal right of way, providing appurtenant rights of access as well. It covers the double width existing

crossing off State Highway 10, referenced CP78A. Record of Title 105042 has the same instrument registered on it. There will be no need for this easement once new titles are deposited, with replacement easements to be registered. Both titles have a Gazette Notice registered against them declaring state highway Limited Access Road.

3.3 Consent History

The shed is consented through EBC-2023-1129, issued in 2023. There are no other buildings.

Subdivision history includes RC 1970108-RMASUB, issued in 1996, which created Lots 1 & 2 (the larger of which being the equivalent of both our application sites added together), from a title older than April 2000.

RC 2010806-RMASUB, issued in 2003, subdivided Lot 1 DP 194864 (title older than April 2000), to create two allotments, one of 22ha and the other of 52ha, the equivalent of our two application properties, prior to road legalisation relating to the construction of the roundabout.

RC 2050141-RMASUB is on the property file, but no decision was ever issued.

The most recent resource consent associated with the consent is RC 2300095-RMALUC, issued to Fulton Hogan in 2023 for excavation and filling operations associated with the roundabout upgrade. Land in Record of Title 1207111 was utilised in giving effect to that land use consent. There is an equivalent regional consent issued for the same works.

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:	The application is for subdivision pursuant to the FNDC's ODP.
(e) a description of any other resource	No other consent under the ODP is 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 an area of outstanding landscape, associated with bush cover, proposed for protection as part of this application.
(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 will have no effect on ecosystems or habitat. The bush within the site is to be subject to protective covenant.
(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 itself has no aesthetic, recreational or scientific values that that will be adversely affected by the act of subdividing. The mapped archaeological site, and Site of Significance to Maori on adjacent property is not adversely affected.
(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, with a small portion of the site containing an Outstanding Landscape.

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	1. The minimum lot size is 4ha; or 2. A maximum of 3 lots in any subdivision, provided ...

(xix) OUTSTANDING LANDSCAPE, OUTSTANDING LANDSCAPE FEATURES AND OUTSTANDING NATURAL FEATURES

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 except in the General Coastal Zone.	The minimum lot size is 20ha in the General Coastal Zone.	1. For the Rural Production, General Coastal and Coastal Living Zones subdivision via a management plan as per Rule 13.9.2;

Lot 5, containing all of the Outstanding Landscape area, is greater than 20ha.

Lots 1-4 are all in excess of 2ha. The land in Records of Title 1207111 and 105042 was originally in a single Title NA121C/732, Lot 1 DP 194864, dated 1999 with an area of 74.6461ha. This compares with a combined area of the current application site, of 74.657ha. That land would have had the right and the capability to be subdivided into five lots with minimum lot areas of 2ha were it to be subdivided today. RC 2010806 subdivided the land into two allotments, generally the same as the current 1207111 and 105042, prior to road legalisation. Titles resulting from that subdivision were deposited in 2004. That would have accounted for only one of the additional lots allowable.

Road legalisation resulted in more recent title issue for the northern lot, but not the southern. However, title changes solely because of road legalisation should not impact on the property owners' subdivision rights especially as such legalisation normally only involve slivers of land, unusable for any purpose other than road.

I believe, that although the subdivision is technically **non complying** because of the size of lots and age of title, it should be regarded / assessed on a level similar to that of a restricted discretionary activity given the sites' history, which effectively demonstrates that the underlying land has not been subject to any significant prior development and fragmentation and remains pretty much as it was prior to April 2000.

The applicant could have applied for 4ha lots plus balance larger lot containing the Outstanding Landscape, rather than 2ha lots, as a discretionary activity, or created 4 x 12ha lots plus 20ha+ lot containing the Outstanding Landscape, as a restricted discretionary activity. Their preference, however, is to keep future development at one end of the property (western), in proximity to the highway, and to retain a reasonably sized pastoral lot at the rear.

Other Rules:

In terms of zone rules (Rural Production) the only built development is within Lot 5 and this is a non habitable shed. Boundaries have been drawn to ensure compliance with bulk and location rules in relation to the building.

In terms of District Wide rules, I have not identified any breaches resulting from the subdivision, nor for which any consent is required in advance of any development.

12.1 Landscape and Natural Features
A portion of the balance Lot 5 is Outstanding Landscape notation. This is proposed to be protected and there is no built development proposed anywhere in its vicinity, nor any development proposed within the OL.

12.2 Indigenous Flora and Fauna
Subdivision site works does not require any clearance of indigenous vegetation.

12.3 Soils and Minerals
Subdivision works are limited to entrance tidy up and NZTA requirements regarding sight distance, albeit the latter is already achieved without the need for any additional earthworks. Internal rights of way within B is already formed, and within C and D will need to be formed to the appropriate standard. The works will not exceed the zone's excavation and filling thresholds. No earthworks is proposed within Outstanding Landscape.

12.4 Natural Hazards
The ODP's natural hazards section only contains rules in regard to mapped coastal hazards, none of which affect the application site. The natural hazards section of the ODP also contains a rule in relation to maintaining a 20m minimum separation between residential units and areas of bush and shrubland. This will be easily achievable on all lots.

12.5 Heritage
There are no heritage / cultural features that are mapped or scheduled in the ODP, within the application site. As such rules in Chapter 12.5 do not apply.

12.7 Lakes, Rivers, Wetlands and the Coastline
There are no lakes in excess of 8ha, nor rivers with an average width of 3m or more. The site does not adjoin the coastal marine area. There is no development near any "smaller" rivers. No works are being done within any wetlands.

The remainder of Chapter 12 is not relevant to the application.

Chapter 15.1 Traffic, Parking and Access

The traffic intensity rules apply to land uses proposed or existing on a "site". The rules are not applicable to a subdivision, albeit the likely increase in traffic movements and their impact on Council roading network is a relevant consideration in assessing the effects of a subdivision.

The parking requirements are also based on a "site" and a proposed or existing land use activity. It is not applicable to a subdivision where future land uses have not been determined. Notwithstanding this, every lot can readily provide the required number of car park spaces for a residential use.

Relevant rules in 15.1.6C (Access) are assessed briefly below:

15.1.6C.1.1(a) requires private accessway to be undertaken in accordance with Appendix 3B-1. This will be done.
Part (c) of this same rules limits private accessway to serving a maximum of 8 household equivalents and part (d) requires any access serving 9 or more sites to be public road. No private access proposed in the subdivision will serve more than 8 household equivalents of sites.
All parts of 15.1.6C.1.1(e) can be complied with. Access is to State Highway, however both crossings are already in existence (no new access to be formed) and require no upgrading. NZTA has provided its conditional approval.
Passing bays will comply with 15.1.6C.1.3 (if required).
Crossings into individual lots will be constructed in compliance with 15.1.6C.1.5.
All parts of 15.1.6C.1.7 can be complied with.
Similarly all parts of 15.1.6C.1.8 that are relevant can be complied with.

In summary I have not identified any rule breaches for which land use consent is required.

5.2 Proposed District Plan (PDP)

The original consent was granted before 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.

Compliance with both these aspects can be ensured by either Advice Notes (given that the ADP is required to be complied with by way of other legislation in any event) or conditions of consent.

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 lots, at all over 2ha in area, can easily accommodate 30m x 30m square building envelopes.

6.2 Natural and Other Hazards

Refer to the Subdivision Site Suitability Report in Appendix 5, specifically its Section 8 which contains a summary of natural hazards (Table 10).

In summary only two types of hazard are potentially present on the site, erosion and flooding/inundation. The potential for erosion can be adequately mitigated through stormwater dispersion control and erosion and sediment control measures, resulting in less than minor effects. Localised flooding may occur within the low lying portion of Lot 1, so future development should be subject to specifically engineering finished floor levels where required. Wastewater disposal fields will need to be constructed on sloping ground, at a minimum elevation to provide freeboard.

No other hazards are applicable. In summary there is no reason pursuant to s106 of the Act that precludes subdivision consent being granted.

6.3 Water Supply

The site has no access to a reticulated supply and all new lots will be reliant on on-site water collection and storage, for potable, non-potable and firefighting supply. It is anticipated that the Council will impose its standard consent notice condition in regard to the provision of water supply at time of building consent.

6.4 Stormwater Disposal

Refer to the Subdivision Site Suitability Report in Appendix 5, specifically Section 6 of that report. This shows that no lot will have impermeable coverage in excess of 3.91% (Lot 1 having the most cover). This is substantially below the permitted threshold of 15% applying in the zone.

The report discusses stormwater management concepts for all lots and rights of way. It discusses concept attenuation in its section 6.4.

In summary all proposed lots can manage stormwater without off-site effects.

6.5 Sanitary Sewage Disposal

Refer to the Subdivision Site Suitability Report in Appendix 5, specifically Section 5 of that report. There is no existing wastewater system within the site. The report investigated ground

conditions and based its assessment on a standard 160 litres / person / day, or 1,280 litres per day per lot.

Secondary treatment will definitely meet regional plan permitted activity standards, as would tertiary treatment and primary treatment may also be considered for lot development, provided the system complies with the proposed Regional Plan.

6.6 Energy Supply & Telecommunications

Power and phone is not a requirement for rural subdivision. The Council can impose a consent notice on the titles to this effect.

6.7 Easements for any Purpose

Refer to scheme plan in Appendix 1. This shows the cancellation of existing reciprocal right of way easement and new easements in its place for right of way and services.

6.8 Property Access

Refer to the Subdivision Site Suitability Report in Appendix 5 and to the NZTA Approval in Appendix 4. Two existing crossing points are in place and legally established, constructed to the required standards. NZTA require no upgrades. A condition that NZTA has imposed is to show a sight line to the south from CP78A of a minimum 262m. This is already achieved and evidence of that can be provided at 224(c) stage. The roundabout crossing, to serve Lots 1 & 5 is already to standard, constructed when the roundabout upgrade works were being carried out.

In summary, NZTA conditions include:

1. *Prior to Section 224(c) certification the Consent Holder shall complete earthworks so that Crossing Place 78a located at NZTM 1687684.97, 6092614.13 allows for sightlines of 262m.*

2. *Prior to the issuing of a certificate pursuant to Section 224(c) of the Resource Management Act 1991, the consent holder shall provide to Council, correspondence from the New Zealand Transport Agency confirming that works in the State Highway have been constructed to the New Zealand Transport Agency standards.*

3. *Prior to the issuing of a certificate pursuant to Section 224(c) of the Resource Management Act 1991, the consent holder shall provide to Council confirmation that the New Zealand Transport Agency has been advised of relevant similar documentation such as a draft LT (Land Transfer) plan to facilitate the registration of any new Crossing Place (CP) Notices against those new titles, under Section 91 of the Government Roading Powers Act 1989.*

4. *A consent notice pursuant to Section 221 of the Resource Management Act 1991 shall be registered against the title of proposed 1-5 of the subdivision of land shown on Scheme Plan "Access Option A – PROPOSED SUBDIVISION OF SECTION 18 SO 575856 & LOT 2 DP 325964 STATE HIGHWAY 10- PUKETONA" by Thomson Survey Ltd, dated 15.05.2025 and referenced as 10741 that addresses potential reverse sensitivity effects resulting from the normal operation of State Highways 10 and 11. This consent notice shall read as follows:*

Any dwelling or other building used for a noise sensitive activity on the site in or partly within 85m of the edge of State Highway 10 or State Highway 11 must be designed, constructed and maintained to achieve. an indoor design noise level of 40 dB LAeq(24hr) inside all habitable spaces.

These conditions are accepted by the applicant and volunteered as part of this application.

Internal to the site, there is existing formed access to the shed within the site and this is the alignment of proposed right of way B, over Lot 1 in favour of Lot 5. No physical works are considered necessary for this existing accessway.

Proposed right of way C will be 3m metal carriageway width with drainage, as required by Appendix 3B-1 of the ODP. I do not believe there is any gradient steeper than 1:5. Right of Way C is 135m long and therefore one passing bay is likely to be required. This can be formed to the appropriate standard.

Right of Way D then provides access around to the likely house site within Lot 4. This will be formed to 3m metal carriageway with drainage, over gentle contour.

6.9 Earthworks

Earthworks to give effect to the subdivision are minimal and only relating to the access referred to above. Any access formation works will be subject to the ADP and to Erosion and Sediment Control measures.

6.10 Building Locations

There are no restrictions necessary in terms of building locations within Lots 2-5. These lots have gently sloping elevated sites on which to place future dwellings.

Looking from highway across proposed Lot 2

Looking across Lots 3 and 4

Lot 1 is mapped as potentially subject to flooding (100 year ARI event) across its flat area, but contains elevated ground at its rear. The location of any future residential unit within Lot 1 will be influenced by the need to achieve required minimum floor level.

Looking across Lot 1, with pine trees on Lot 5 in the background

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

Heritage/Cultural resources

NZAA mapping indicates an archaeological site potentially within the site, but more likely associated with the ridge pa site on the adjacent property to the north. In any event this site is adjacent the large balance Lot 5 and there is a large area of pine trees between it and any of the smaller lots being proposed. This results in a substantial buffer between the pa site / archaeological site and any future built development, which is all proposed to be down slope, nearer the state highway.

Flora and Fauna

The indigenous vegetation within the site is proposed for ongoing protection. It is all within the large balance Lot 5, some distance from any of the proposed smaller lots, which contain no indigenous vegetation.

The site is mapped as being a high density kiwi area and there is the likelihood of kiwi within the bush and pine tree areas given its connectivity to the large Opua Forest PNA. Provision needs to be made for working dogs to be present on the large Lot 5 which, at over 64ha in area, will remain a pastoral unit requiring stock management. The property owner has experienced issues with security in regard to entry onto their land. It is proposed to ban cats and mustelids on all lots, but in regards to Lots 1-4, to provide for one dog only, for security purposes, to be kept on each lot. The dog must be kept under control at all times, within a dog and kiwi proof enclosure or on a lead when out of the enclosure; micro chipped; undergo kiwi aversion training; and at night must be securely tethered/enclosed or inside.

Landscape

The outstanding landscape notation coincides with the area proposed for bush protection. As such, its values are protected. No development is proposed in or near the Outstanding Landscape.

The ODP shows an Outstanding Natural Feature also within the property, but notably this was removed from PDP maps. It is believed to be incorrectly mapped and the feature is now largely quarried out (on the adjacent site) in any event.

6.12 Soil

As described in section 3.0, the site is a mixture of soil types and classifications. The vast majority of the large balance is grazing land and will remain so. The lots being created are large enough to retain some pasture for small scale domestic grazing and for domestic gardens / planting. I do not consider the proposal to adversely affect the life supporting capacity of soils.

6.13 Access to waterbodies

There are no qualifying waterbodies to which access must be provided.

6.14 Land use compatibility (reverse sensitivity)

The land is currently one large grazing lot. It does not support high intensity grazing. Whilst the proposal will introduce more residential use into a rural setting, I believe the level of density and size of lots will mitigate adequately against the risk of reverse sensitivity issues arising. The area is already a mix of rural and residential uses.

There is a Minerals Zone adjoining the site at its northern boundary (at extreme western end). This is the back of the Puketona Quarry, a quarry that has been in operation for many years.

Rules in the plan require a minimum of 100m separation distance between a Minerals Zone and a residential (or other sensitive) activity. The quarry is approximately 1km from proposed Lot 4, the closest additional lot proposed. Should a dwelling be constructed within the large balance lot, it too can achieve a similar buffer distance. I do not consider there to be any risk of reverse sensitivity issues arising because of the location of the Minerals Zone.

The other reverse sensitivity aspect is that related to noise from the State Highway. NZTA has requested the imposition of a consent notice condition in this regard, which the applicant agrees to.

6.15 Proximity to Airports

The site is not near any airport.

6.16 Natural Character of the Coastal Environment

The site is not in the coastal environment.

6.17 Energy Efficiency and Renewable Energy Development/use

The proposal has not considered energy efficiency and renewable energy use specifically. However, all lots are large enough to enable ample access to sunlight should a future lot owner choose to consider utilisation of solar energy.

6.18 National Grid Corridor

The site does not accommodate a national grid corridor.

6.19 Cumulative and Precedent Effects

The underlying land was originally in a title dated prior to April 2000 and was then split into two titles, very similar to the existing ones, after that date, but more than 20 years ago. Four 12ha lots and one 20ha lot could be created on the two titles combined, as a restricted discretionary activity. This proposal creates the same number of titles, but in a configuration that creates a more practical outcome. I believe the site is large enough to accommodate the proposed level of density without adverse cumulative effects.

Precedent effects need to be considered when assessing non complying activities. I believe the history of the sites' titles sets this application apart from other sites in the Rural Production Zone. Whilst the titles are younger than April 2000, they are effectively over 20 years old, with the more recent northern title only having a more recent date because of road legalisation to accommodate the roundabout. It has not been a case of progressive piecemeal subdivision that has resulted in title dates. In my mind, the titles should therefore be able to enjoy the rights they would have had when there was one title dated 1999. This subdivision proposal does no more than those rights allow.

I do not believe the proposal sets an adverse precedent that threatens the integrity of the ODP.

7.0 STATUTORY ASSESSMENT

7.1 Operative District Plan (ODP) Objectives and Policies

The relevant objectives and policies in the ODP are those relating to subdivision and to the Rural Production Zone.

Subdivision Objectives & Policies

Objectives

The subdivision is consistent with the purpose of the zone and promotes sustainable management of natural and physical resources 13.3.1. The proposed subdivision is consistent with the ODP and appropriate for the site. The subdivision can avoid, remedy or mitigate any potential adverse effects (13.3.2).

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 contains a small area of outstanding landscape, already included within a protective bush covenant. The site does not contain any scheduled heritage resource and is not in the coastal environment.

The lots will be required to be self sufficient in terms of on-site water storage and appropriate stormwater management (13.3.5 & 13.4.8). The subdivision adjoins Council road (13.3.10).

The site itself does not contain any sites of cultural significance to Maori, or wahi tapu. The site is adjacent to a ridge pa, however, no works is proposed or necessary anywhere in the vicinity of that pa site. The subdivision will not adversely affect water quality, with the smaller lots not containing any water bodies and all draining towards the highway. 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 (13.3.7 and 13.4.11).

In determining the layout, size and number of lots, the relevant values listed in Policy 13.4.1 have been had regard to.

Access has been designed to meet the necessary standards (13.4.2 and 13.4.5). The site is generally not identified as being subject to any hazard, the exception being the low lying ground within Lot 1 and road frontage of Lot 5. These areas can be avoided by any future habitable dwellings (13.4.3).

The site does not contain any heritage resources mapped or scheduled in the ODP. The site contains an area of indigenous vegetation, coinciding with the Outstanding Landscape notation and this is proposed for bush protection. Restrictions on the keeping of dogs and cats are also proposed (13.4.6).

S6 matters (National Importance) are addressed later in this report and any relevant matter listed in Policy 13.4.13 has been had regard to. The subdivision has had regard to the underlying zone's objectives and policies (13.4.14).

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 noting the generous size of allotments and ability to internalise effects (8.6.3.3). Reverse sensitivity effects are not considered to be an issue, because of the generous size of lots and existing land use pattern in the area. Reverse sensitivity effects in regard to the proximity of the highway are mitigated by way of the proposed consent notice requested by NZTA and although there is a Minerals Zone on part of the northern boundary, this is some distance away. The continued use of parts of the application site, and adjacent land for productive uses, is not threatened by the subdivision (Objectives 8.6.3.6-8.6.3.9 inclusive and Policies 8.6.4.8 and 8.6.4.9).

Policy 8.6.4.7 anticipates a wide range of activities that promote rural productivity, whilst avoiding the actual and potential adverse effects of conflicting land use activities. The proposed subdivision leaves a large balance lot to continue in productive grazing use. The smaller lots have large areas of open space that could conceivably support domestic (hobby) level grazing and plantings. I am of the view that the subdivision does not create additional land use incompatibility effects of a more than minor nature.

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 through the size of the lots (open space to built environment ratio) (8.6.4.4). The proposal enables the efficient use and development of natural and physical resources (8.6.4.5).

The proposal is considered consistent with the relevant Rural Production Zone's objectives and policies.

7.2 Proposed District Plan (PDP) Objectives and Policies

Relevant objectives and policies in the PDP include those pertaining to Subdivision and those pertaining to the Rural Production Zone.

The PDP reduces the area of outstanding natural landscape within the site compared to the Operative District Plan. Notwithstanding this, a brief assessment of the proposal against objectives and policies in the PDP's Natural Landscapes and Features section is included in this section.

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 represent an efficient use of the land, consistent with the objectives of the zone, overlays and district wide provisions, especially where the site contains only two small areas of LUC class 3w soils, primarily areas that have historically been 'wet'. The proposal does not fragment either of these areas, with one within Lot 1 and the already developed portion of the road frontage of large Lot 5; and the other entirely within Lot 5. The proposal does not further fragment or sterilise those soils.

Local character will change slightly given that three additional titles are proposed. However, the level of density proposed is consistent with the surrounding area's rural character. The lots are large and expansive and will retain their 'rural' character; the likelihood of reverse sensitivity issues arising will not unduly increase and the risk of such issues arising can be mitigated by size of lots and ability to build away from boundaries. Lots can be developed whilst avoiding risk from natural hazards. Adverse effects on the environment are considered to be less than minor and not requiring mitigation (SUB-O1).

As stated above, the site contains small areas of land that meets the definition of 'highly productive land' as laid out in the National Policy Statement Highly Productive Land. They are low lying wet areas which, although LUC class 3, have limited productive potential because of their wetness. In addition part of such soils is already developed in access,

buildings and yards and therefore removed from any productive potential. The proposal does not further fragment or sterilise highly productive land.

The site is mapped as accommodating an area of Outstanding Natural Landscape and this is proposed for protection. The site is not in the Coastal Environment. There are no Sites or Areas of Significance to Maori or any sites of Historic Heritage (as mapped or scheduled in the PDP) within the site, and no Significant Natural Areas as mapped or scheduled in the PDP. There is one area of indigenous vegetation, matching the outstanding natural landscape and this is proposed to be protected (SUB-O2).

The site is rural and will never be serviced by a Council reticulated 3 waters system. The site is accessed off existing sealed State Highway (SUB-O3). There is no qualifying waterbody to which esplanade requirements might apply. There is no public access across the application site to any of the reserve land and none is proposed (SUB-O4).

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.

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 I believe remain consistent with the purpose, characteristics and qualities of the zone. The lots do not comply with the minimum allotment sizes for the zone, however these lot sizes have been heavily submitted on and do not yet have legal effect in any event. The lots are of an adequate size and appropriate shape to contain 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 zone....

N/A.

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.

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

The subdivision will not protect a qualifying SNA in perpetuity, however all references to SNA's are likely to be removed from the PDP. The subdivision does offer permanent protection to indigenous vegetation within the site. The proposal does not result in the loss of versatile soils for primary production. I consider the proposal to be more consistent than not with the above policy.

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

Refer to comment under SUB-P8. The subdivision is not a Management Plan subdivision.

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

Not relevant.

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.

No consent is required under the PDP so the above policy has little relevance. In summary I believe the proposed subdivision to be more consistent than not with the PDP's objectives and policies in regard to subdivision.

The site is zoned Rural Production in the Proposed District Plan.

Objectives

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

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

RPROZ-O3
Land use and subdivision in the Rural Production zone:
a.protects highly productive land from sterilisation and enables it to be used for more productive forms of primary production;
b.protects primary production activities from reverse sensitivity effects that may constrain their effective and efficient operation;
c.does not compromise the use of land for farming activities, particularly on highly productive land;
d.does not exacerbate any natural hazards; and
e. is able to be serviced by on-site infrastructure.

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

The subdivision creates rural allotments capable of ongoing primary production activity, most likely grazing, to some extent. A large balance area will remain a large grazing unit. The application site contains only small pockets of soils that meet the definition of highly productive land, and these areas are not further fragmented or sterilised by this proposed subdivision. I do not believe the subdivision will create a scenario where existing primary production activities on adjacent sites will be constrained. Development can occur on the lots without exacerbating natural hazards. The lots are able to be serviced by on-site infrastructure.

Policies

RPROZP2
Ensure the Rural Production zone provides for activities that require a rural location by:
a. enabling primary production activities as the predominant land use;
b. enabling a range of compatible activities that support primary production activities, including ancillary activities, rural produce manufacturing, rural produce retail, visitor accommodation and home businesses.

The application is not for a primary production activity.

RPROZP3
Manage the establishment, design and location of new sensitive activities and other non-productive activities in the Rural Production Zone to avoid where possible, or otherwise mitigate, reverse sensitivity effects on primary production activities.

The proposal will not worsen / increase reverse sensitivity effects on existing primary production activities on adjacent land.

RPROZP4
Land use and subdivision activities are undertaken in a manner that maintains or enhances the rural character and amenity of the Rural Production zone, which includes:
a. a predominance of primary production activities;
b. low density development with generally low site coverage of buildings or structures;
c. typical adverse effects such as odour, noise and dust associated with a rural working environment; and
d. a diverse range of rural environments, rural character and amenity values throughout the District.

The proposal maintains rural character and amenity. The subdivision is low density and future built development can easily comply with the zone's impermeable and building coverage permitted thresholds. Reverse sensitivity effects, or lack thereof, are discussed earlier.

RPROZP5
Avoid land use that:
.....

Application is not a land use. N/A.

RPROZP6
Avoid subdivision that:
a. results in the loss of highly productive land for use by farming activities;
b. fragments land into parcel sizes that are no longer able to support farming activities,taking into account:
1. *the type of farming proposed; and*
2. *whether smaller land parcels can support more productive forms of farming due to the presence of highly productive land.*

c. provides for rural lifestyle living unless there is an environmental benefit.

The proposal does not result in the loss of highly productive land and does not fragment any such land. The proposal offers permanent protection to a large area of indigenous vegetation.

RPROZP7
Manage land use and subdivision to address the effects of the activity ***requiring resource consent****, including (but not limited to) consideration of the following matters where relevant to the application:*
a. whether the proposal will increase production potential in the zone;
b. whether the activity relies on the productive nature of the soil;
c. consistency with the scale and character of the rural environment;
d. location, scale and design of buildings or structures;
e. for subdivision or non-primary production activities:

i. scale and compatibility with rural activities;
ii. potential reverse sensitivity effects on primary production activities and existing infrastructure;
iii. the potential for loss of highly productive land, land sterilisation or fragmentation

f. at zone interfaces:
i. any setbacks, fencing, screening or landscaping required to address potential conflicts;
ii.the extent to which adverse effects on adjoining or surrounding sites are mitigated and internalised within the site as far as practicable;

g.the capacity of the site to cater for on-site infrastructure associated with the proposed activity, including whether the site has access to a water source such as an irrigation network supply, dam or aquifer;

h. the adequacy of roading infrastructure to service the proposed activity;

i.Any adverse effects on historic heritage and cultural values, natural features and landscapes or indigenous biodiversity;

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

No consent is required under the PDP and the above policy is therefore of limited relevance.

The Natural Features and Landscapes objectives and policies have some limited relevance noting the area of Outstanding Landscape within the application site's proposed large balance lot. NFL objectives seek to identify and manage outstanding natural landscapes to ensure their long term protection; to not compromise the characteristics and qualities of that landscape; and to recognise any ancestral Tangata Whenua relationship with that landscape or feature.

The policies build on these objectives, seeking the avoidance of significant adverse effects on outstanding landscapes outside the coastal environment, but providing for ongoing farming activities where this is consistent, and does not compromise the characteristics and qualities of the landscape.

The entire area of Outstanding Landscape within the application is proposed to be subject to protective covenant such that no development can occur within it. Its value is primarily the vegetative cover and this will be protected from clearance. The protected area is totally within the boundaries of the large balance lot. I believe the proposal to be consistent with the objectives and policies in the PDP.

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.

I believe the application recognises and provides for the relevant s6 matters 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".

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

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

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

7.4 National Policy Statements and National Environmental Standards

NPS Highly Productive Land (NPS HPL)

There is a small amount of land within the site meeting the definition of "highly productive land". One such area covers the lowland flats within Lot 1 and crosses into the already developed (and removed from production) portion of Lot 5's entrance area off State Highway. This area is not fragmented or sterilised as a result of the proposal. The other are of supposed highly productive land is a swamp entirely within the large balance Lot 5. It is not fragmented or sterilised as a result of the proposal. Lot 5 is not a rural lifestyle lot and therefore does not need to consider the NPS HPL.

I do not believe the proposal to be contrary to the NPS HPL. The overall productive capacity of the land is not reduced and the proposal does not adversely affect the ability of any adjacent sites from continuing in productive use.

NES Assessing and Management Contaminants in Soil to Protect Human Health

No HAIL activity has been identified within the application site, either historic or current.

NPS Indigenous Biodiversity

The proposal does not involve any clearance of indigenous vegetation. It includes the ongoing protection of one area of indigenous vegetation. I consider the proposal to be consistent with the NPS IB.

7.5 Regional Policy Statement

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

The RPS also contains objectives and policies protecting highly versatile soils such that productivity is not materially reduced, and ensuring that reverse sensitivity effects and

potential sterilisation of such soils do not occur. For reasons outlined earlier in this report, I consider the proposal to be consistent with these objectives and policies.

The RPS contains objectives and policies aimed at protecting outstanding natural landscapes. The proposal includes the protection of an area of outstanding landscape.

In summary, I consider the proposal to be consistent with the RPS.

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 circumstances exist. Step 3 of s95A must therefore be considered. This specifies that public notification is required in certain circumstances, neither of which exists. The application is not subject to a rule or national environmental standard that requires public notification; and this report and AEE concludes that the activity will not have, nor is it likely to have, adverse effects on the environment that are more than minor. No special circumstances exist under which public notification may be warranted.

8.2 S95B Limited Notification Assessment

A consent authority must follow the steps set out in s95B to determine whether to give limited notification of an application for a resource consent, if the application is not publicly notified pursuant to s95A. Step 1 identifies certain affected groups and affected persons that must be notified. No such group or persons are identified in this instance. Step 2 of s95B specifies the circumstances that preclude limited notification. No such circumstances exist and Step 3 of s95B must be considered. This specifies that certain other affected persons must be notified, specifically:

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

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

The application is not for a boundary activity. The s95E assessment below concludes that there are no affected persons to be notified. No special circumstances exist under which limited notification may be warranted.

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.

8.5 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 does nothing more than what is provided for as a restricted discretionary activity even though the activity might technically be considered a non complying activity because of the age of the titles. The proposal is consistent with the objectives and policies of the Operative District Plan. The level of density that will result from the proposed subdivision is within the permitted residential intensity threshold across two existing titles - (1 per 12ha+ – potential for 5 residential units (one per new lot) over an area of 75ha. No adjacent properties have been identified as affected, noting the size of the lots and setback from boundaries that can be achieved. There is no new internal access on or near the boundary of any adjacent site.

The site gains access off State Highway and NZTA has been consulted. They have provided Written Approval, subject to conditions.

The site does not contain any mapped or scheduled heritage or cultural sites or values (ODP) and the area of indigenous vegetation within the site is to be subject to protection. No pre lodgement consultation has been considered necessary with tangata whenua, Heritage NZ, or the Department of Conservation.

9.0 s104D GATEWAY TEST FOR NON COMPLYING ACTIVITIES

S104D of the Act requires a consent authority to be satisfied of one or other, or both, of the following thresholds to be met, before it can consider granting consent.

(a) the adverse effects of the activity on the environment (other than any effect to which section 104(3)(a)(ii) applies) will be minor; or

(b) the application is for an activity that will not be contrary to the objectives and policies of—

- *(i) the relevant plan, if there is a plan but no proposed plan in respect of the activity; or*
- *(ii) the relevant proposed plan, if there is a proposed plan but no relevant plan in respect of the activity; or*
- *(iii) both the relevant plan and the relevant proposed plan, if there is both a plan and a proposed plan in respect of the activity.*

The application will not create adverse effects on the environment of a more than minor nature. I do not believe the application is contrary to the objectives and policies of the Operative District Plan and Proposed District Plans in their entirety or to the extent that the proposal should not proceed. I consider the proposal to meet at least one of the gateway tests, if not both.

10.0 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 19th January 2026
Lynley Newport,
Senior Planner
Thomson Survey Ltd

11.0 LIST OF APPENDICES

Appendix 1 Scheme Plan(s)

Appendix 2 Location Plan

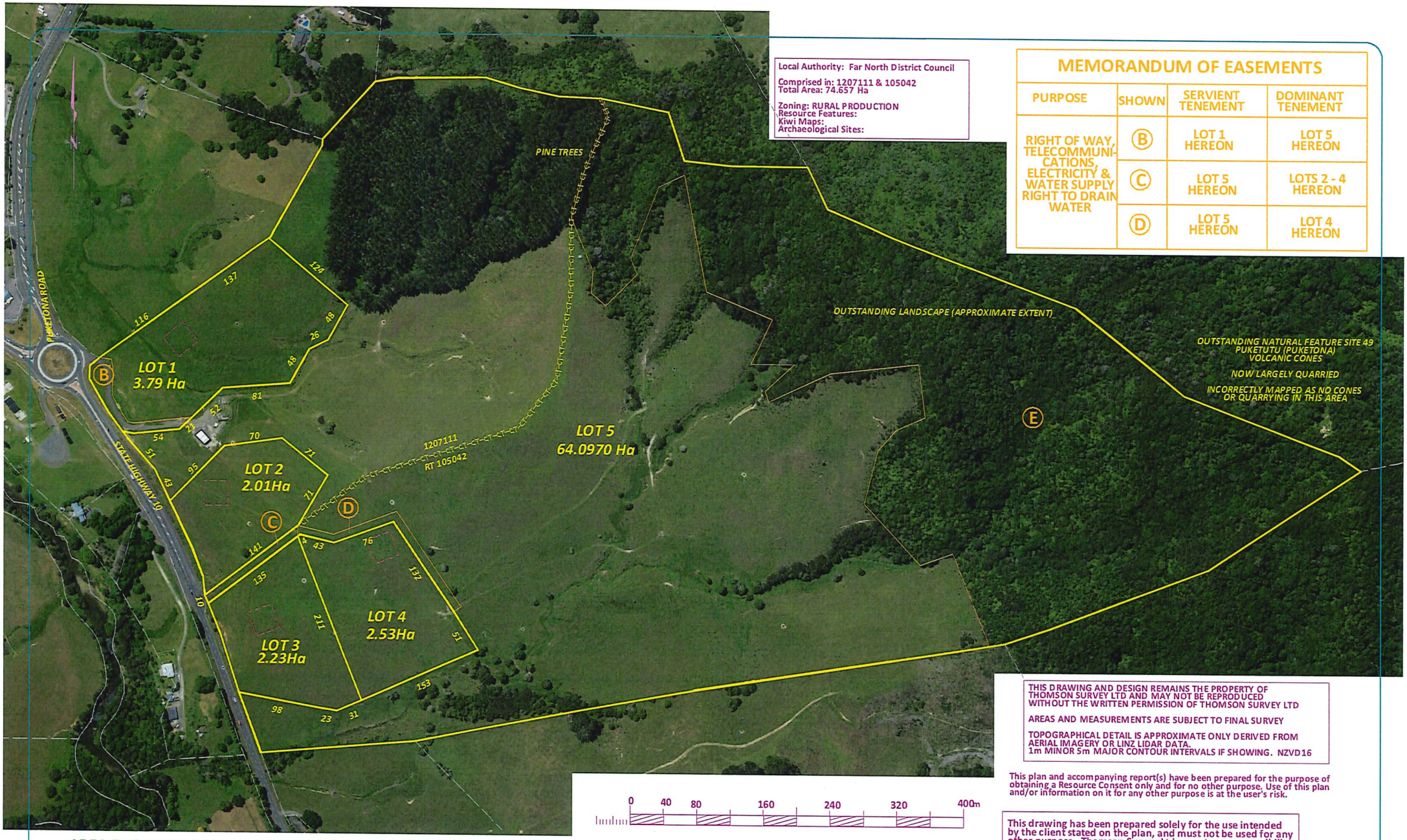
Appendix 3 Record of Title & Relevant Instruments

Appendix 4 NZTA Consultation

Appendix 5 Subdivision Site Suitability Engineering Report

Appendix 1

Scheme Plan(s)



Local Authority: Far North District Council

Comprised in: 1207111 & 105042
Total Area: 74.657 Ha

Zoning: RURAL PRODUCTION
Resource Features:
Kiwi Maps:
Archaeological Sites:

MEMORANDUM OF EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS, ELECTRICITY & WATER SUPPLY RIGHT TO DRAIN WATER	B	LOT 1 HEREON	LOT 5 HEREON
	C	LOT 5 HEREON	LOTS 2 - 4 HEREON
	D	LOT 5 HEREON	LOT 4 HEREON

AREA E TO BE SUBJECT TO FNDC CONSENT NOTICE CONDITION FOR VEGETATION PROTECTION

ACCESS OPTION A

0 40 80 160 240 320 400m

AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY DERIVED FROM AERIAL IMAGERY OR LINZ LIDAR DATA.
1m MINOR 5m MAJOR CONTOUR INTERVALS IF SHOWING. NZVD16

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

This drawing has been prepared solely for the use intended by the client stated on the plan, and must not be used for any other purpose. Thomson Survey Ltd accepts no responsibility for this plan, or any data contained on this plan, to be used for any other purpose.

THOMSON SURVEY LIMITED
315 Kerikeri Rd
P.O. Box 372 Kerikeri
Email: kerikeri@tsurvey.co.nz
Ph: (09) 4077360 Fax (09) 4077322
Registered Land Surveyors, Planners & Land Development Consultants

PROPOSED SUBDIVISION OF SECTION 18 SO 575856 & LOT 2 DP 325964

STATE HIGHWAY 10 - PUKETONA

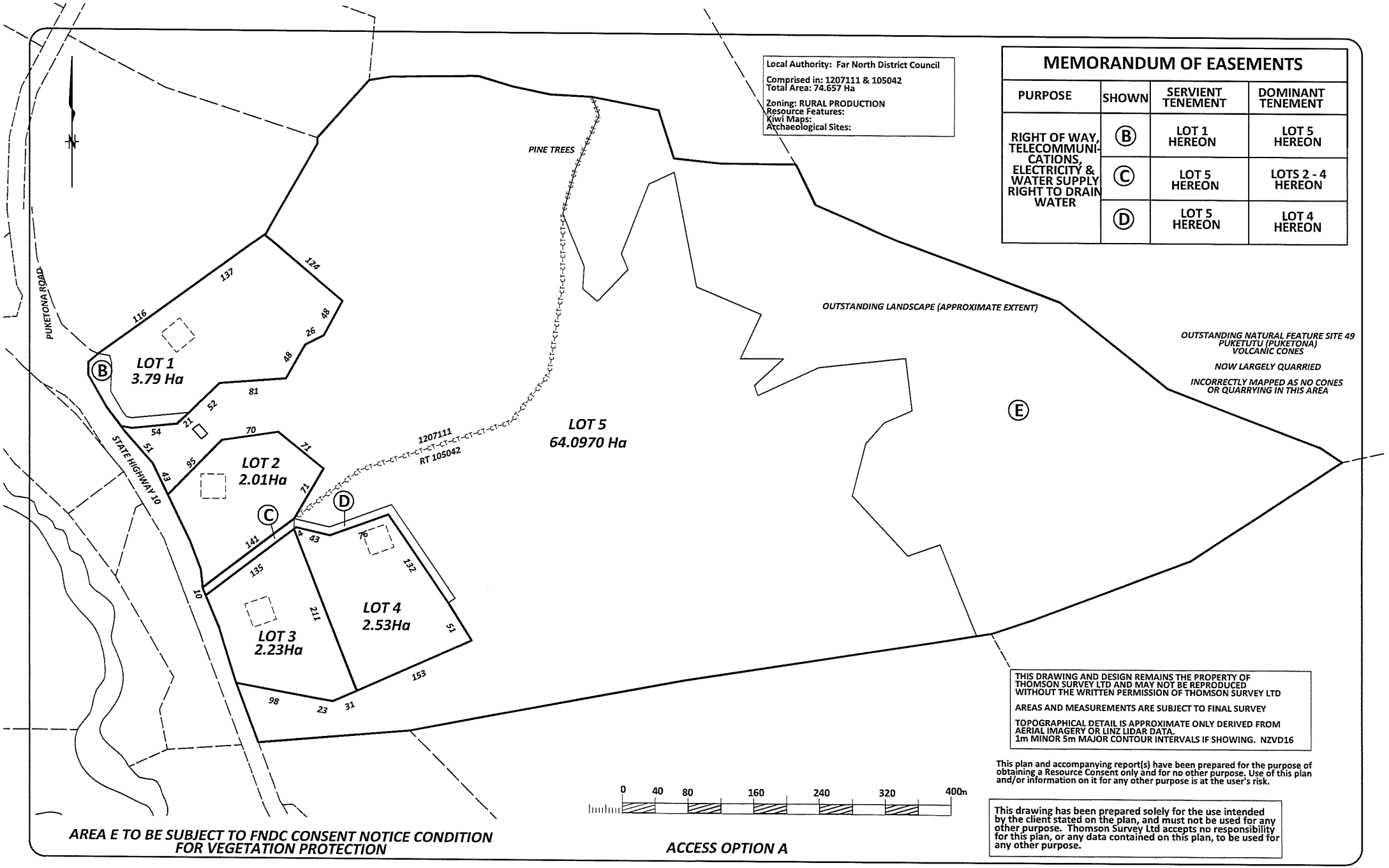
PREPARED FOR: PUGH

	Name	Date
Survey		
Design		
Drawn	SL	9.05.25
Approved		
Rev	KY	19.11.25

10741 Scheme 20251119

ORIGINAL
SCALE 1:4000
SHEET SIZE A3

Surveyors Ref. No: 10741
Series
Sheet of



AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY DERIVED FROM AERIAL IMAGERY OR LINZ LIDAR DATA.
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STATE HIGHWAY 10 - PUKETONA

PREPARED FOR: PUGH

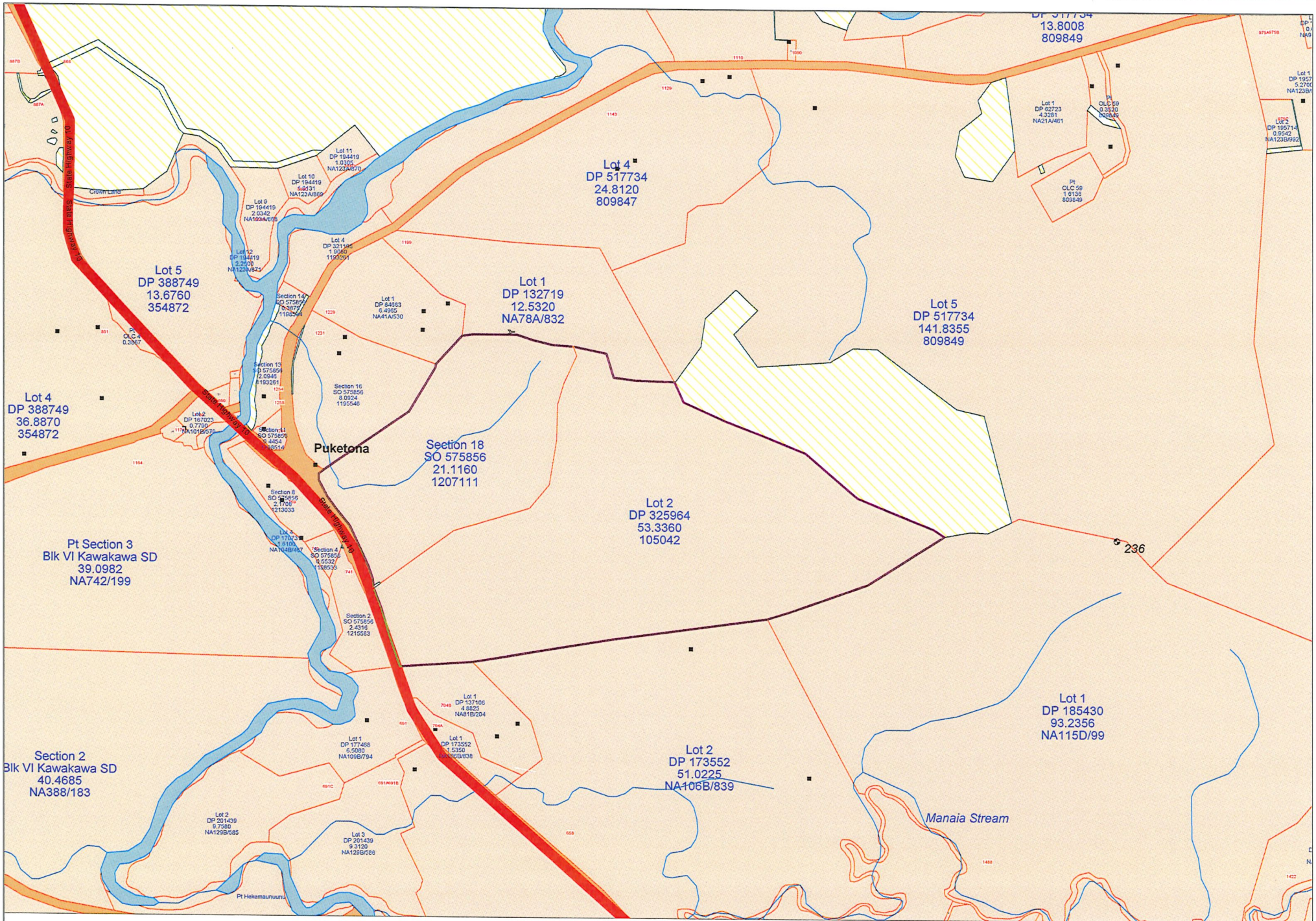
	Name	Date
Survey		
Design		
Drawn	SL	9.05.25
Approved		
Rev	KY	19.11.25

ORIGINAL
SCALE 1:4000
SHEET SIZE A3
10741 Scheme 20251119

Surveyors Ref. No: 10741
Series
Sheet of

Appendix 2

Location Plan



QuickMap
Custom Software Ltd

0 200 400 600 800 1000 1200 1400 1600m

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: 29-Oct-2025 03:02.

Appendix 3

Record of Title & Relevant Instruments

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**1207111**
Land Registration District	**North Auckland**
Date Issued	23 September 2024

Prior References
105041

Estate	Fee Simple
Area	21.1160 hectares more or less
Legal Description	Section 18 Survey Office Plan 575856
Registered Owners	

KP Trust Holdings Limited and LV Trust Holdings Limited

Interests

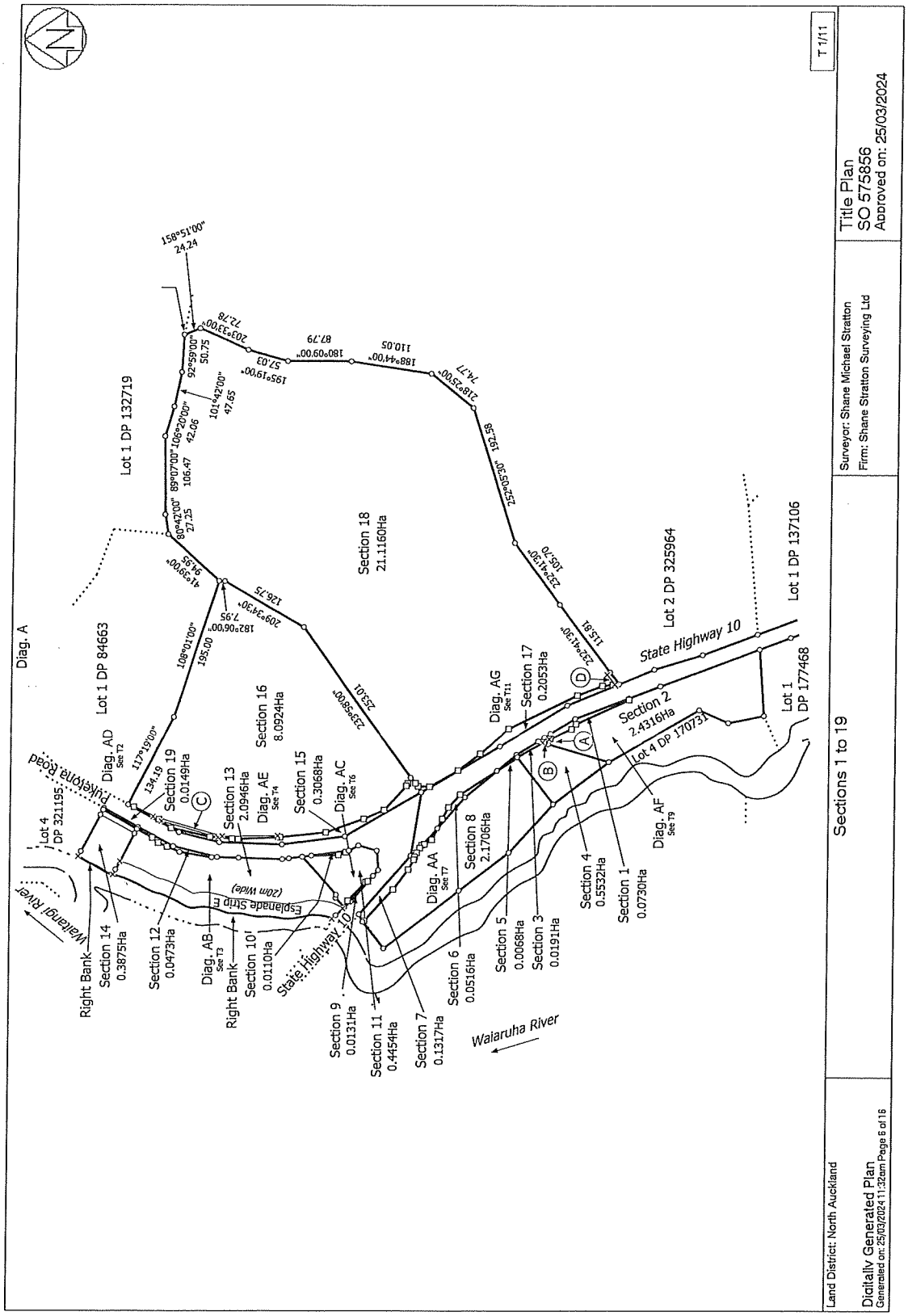
Subject to Section 8 Coal Mines Amendment Act 1950 (affects part formerly Section 9 SO 34177)

750179.1 Gazette Notice (14.12.1978 pg 3422) declaring part State Highway no.10 (Pakaraka to Awanui via Maungonui) from it's junction with State Highway no.1 to the Waitangi River to be a limited access road - 2.8.1979 at 10:42 am

Subject to a right of way over part marked D on SO 575856 created by Easement Instrument 6068035.4 - 6.7.2004 at 9:00 am

Appurtenant hereto is a right of way created by Easement Instrument 6068035.4 - 6.7.2004 at 9:00 am

The easements created by Easement Instrument 6068035.4 are subject to Section 243 (a) Resource Management Act 1991


T 1/11
Title Plan
SO 575856
Approved on: 25/03/2024
Surveyor: Shane Michael Stratton
Firm: Shane Stratton Surveying Ltd
Sections 1 to 19
Land District: North Auckland
Digitally Generated Plan
Generated on: 25/03/2024 11:32am Page 6 of 16
Lot 1 DP 132719
Lot 1 DP 84663
Lot 2 DP 325964
Lot 1 DP 137106
Lot 1 DP 177468
Lot 4 DP 321195
Lot 4 DP 170731
Diag. A
Section 18
21.1160Ha
Section 19
0.0149Ha
Section 16
8.0924Ha
Section 17
0.2053Ha
Section 15
0.3068Ha
Section 13
2.0946Ha
Section 2
2.4316Ha
Section 14
0.3875Ha
Section 12
0.0473Ha
Section 10
0.0110Ha
Section 9
0.0131Ha
Section 11
0.4454Ha
Section 7
0.1317Ha
Section 6
0.0516Ha
Section 8
2.1706Ha
Section 5
0.0068Ha
Section 3
0.0191Ha
Section 4
0.5532Ha
Section 1
0.0730Ha
Diag. AA
Diag. AB
Diag. AC
Diag. AD
Diag. AE
Diag. AF
Diag. AG
Pukekohe Road
State Highway 10
Waiaruha River
Waitangi River
Esplanade Strip E
(20m Wide)
Right Bank
Left Bank

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**105042**
Land Registration District	**North Auckland**
Date Issued	06 July 2004

Prior References
NA121C/732

Estate	Fee Simple
Area	53.3360 hectares more or less
Legal Description	Lot 2 Deposited Plan 325964
Registered Owners	

KP Trust Holdings Limited and LV Trust Holdings Limited

Interests

Subject to Section 8 Coal Mines Amendment Act 1950 (affects part)

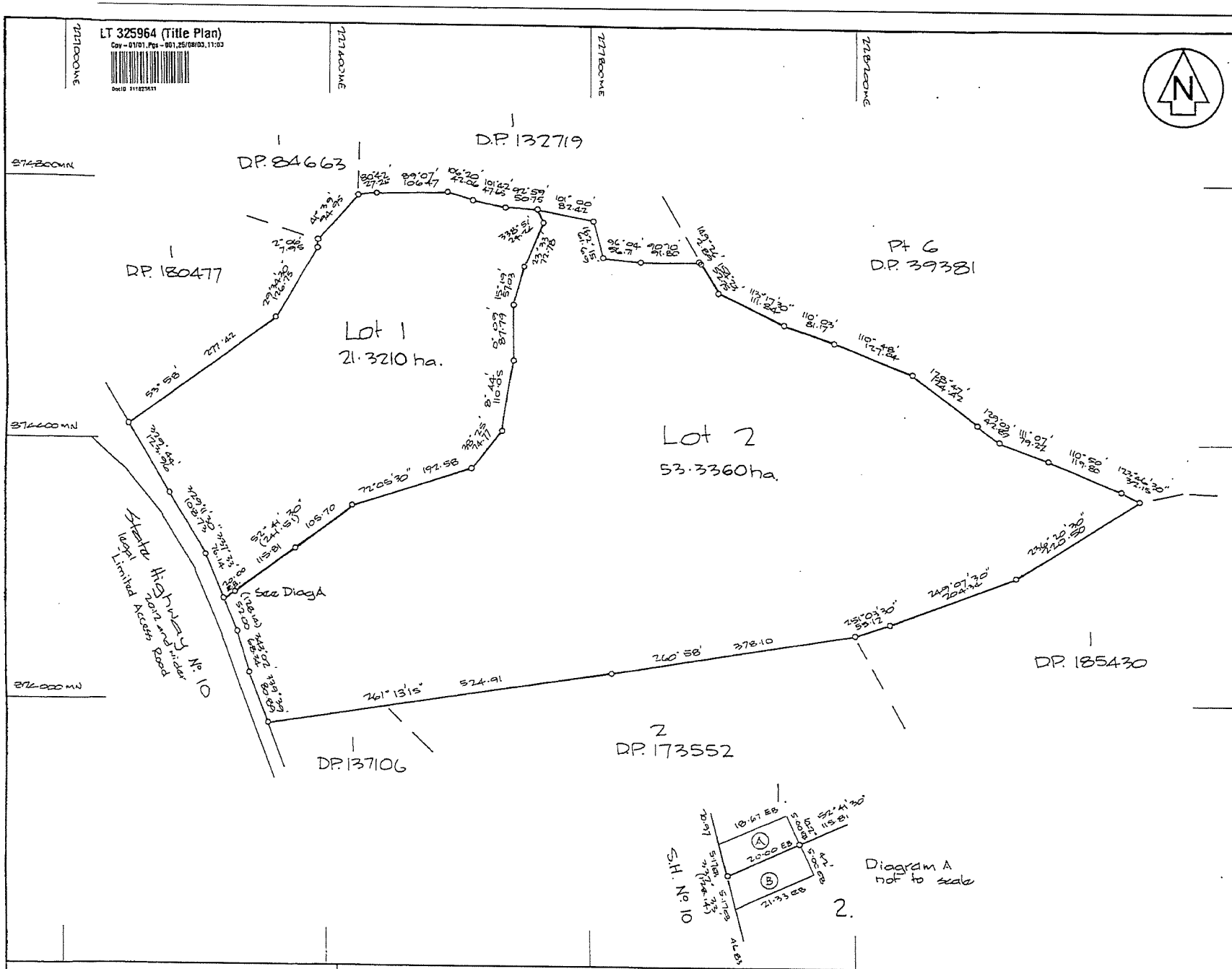
750179.1 Gazette Notice (14.12.1978 pg 3422) declaring part State Highway no.10 (Pakaraka to Awanui via Maungonui) from it's junction with State Highway no.1 to the Waitangi River to be a limited access road - 2.8.1979 at 10:42 am

Subject to a right of way over part marked B on DP 325964 created by Easement Instrument 6068035.4 - 6.7.2004 at 9:00 am

Appurtenant hereto is a right of way created by Easement Instrument 6068035.4 - 6.7.2004 at 9:00 am

The easements created by Easement Instrument 6068035.4 are subject to Section 243 (a) Resource Management Act 1991

LT 325964 (Title Plan)
Dep - 01/01, Pcs - 001, 25/08/03, 11:03
DocID 311823533



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 30th day of July 2003 subject to the granting or reserving of the easements set out in the Memorandum hereon.

RC 2010806

P.J. Killalea
Authorised Officer

Memorandum of Easements

Purpose	Shown	Servient Tenement	Dominant Tenement
Right of Way	A	Lot 1 Hereon	Lot 2 Hereon
	B	Lot 2 Hereon	Lot 1 Hereon

Class III survey

New CS T. Allocated
Lot 1: 105041
Lot 2: 105042

Total Area 74.6570 ha.

Comprised in C.T. 1216/732 (All)

I Nigel Ross of Kaikohe
being a person entitled to practise as a registered 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 Survey Act 1986 and the Survey Regulations 1998.

(b) This dataset is accurate and has been created in accordance with that Act and those Regulations.

Signed NHRoss Date 20/5/2003

Field Book ____ p. ____ Traverse Book ____ p.

Reference Plans DPs 180477, 170731, 137106, 132719, 84663, 393381, 37126; SO 33519

Examined ____ Correct ____

Approved as to Survey by Land Information NZ on

19/9/2003 ~~Chief Surveyor~~

Deposited by Land Information NZ on

6/7/2004 ~~Registrar-General of Land~~

File Received Instructions 25 AUG 2003

DP 325964

LAND DISTRICT North Auckland
Survey Blk. & Dist. VI Kawakawa
NZMS 261 Sheet ____ Record Map No. ____

Lots 1 and 2 being subdivision of Lot 1 D.P. 194864

TERRITORIAL AUTHORITY Far North District
Surveyed by Surveyors North
Scale 1:4000 Date July 2001

4817

A.J. BEVIN, SURVEYOR GENERAL, LAND INFORMATION, NEW ZEALAND.

"APPROVED AKL 99/05"

Approved by Registrar –General of Land under No. 2002/6055

Easement instrument to grant easement or profit à prendre, or create land covenant

Sections 90A and 90F, Land Transfer Act 1952

EI 6068035.4 Easement I
Cpy – 01/01, Pgs – 004, 21/10/04, 13:00
DocID: 311494165

Land registration district

North Auckland

Grantor *Surname(s) must be underlined*

NEVILLE ALBERT RULE

Grantee *Surname(s) must be underlined*

NEVILLE ALBERT RULE

Grant* of easement or profit à 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 pendre* 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)

Dated this 30th day of June 2004

Attestation

N. Rule **Signature [common seal] of Grantor**	**Signed in my presence by the Grantor** *Signature of witness* *Witness to complete in BLOCK letters (unless legibly printed)* *Witness name* D. J. Blackie *Occupation* Solicitor *Address* Kaikohe
N Rule **Signature [common seal] of Grantee**	**Signed in my presence by the Grantee** *Signature of witness* *Witness to complete in BLOCK letters (unless legibly printed)* *Witness name* D. J. Blackie *Occupation* Solicitor *Address* Kaikohe

Certified correct for the purposes of the Land Transfer Act 1952.

(Solicitor for) the Grantee

*If the consent of any person is required for the grant, the specified consent form must be used.

Approved by Registrar-General of Land under No. 2002/6055
Annexure Schedule 1

Easement instrument Dated 30 June 2004 Page 2 of 2

Schedule A (Continue in additional Annexure Schedule if required)

Purpose (nature and extent) of easement	Shown (plan reference)	Servient tenement (identifier/CT)	Dominant tenement (identifier/CT or in gross)
Right of Way	A on DP325964	Lot 1 DP325964	Lot 2 DP325964
Right of Way	B on DP325964	Lot 2 DP325964	Lot 1 DP325964

Easements or profits à prendre
Rights and powers (including terms, covenants, and conditions)

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 Ninth Schedule of the Property Law Act 1952.

The implied rights and powers are varied by the provisions set out in Annexure Schedule 2

Annexure Schedule 2

N/A

All signing parties and either their witnesses or solicitors must sign or initial in this box

MR. M

LANDinfoNET Limited
Approved Registrar-General
Of Land 2002/0000 EF

ANNEXURE SCHEDULE – CONSENT FORM

Land Transfer Act 1952 SECTION 238 (2)

Easement instrument

*Insert type of instrument.

Person giving consent *Surname(s) must be underlined or in CAPITALS*	**Capacity and Interest of Person giving consent** *(eg. Caveator under Caveat no.)*
~~THE NATIONAL BANK OF NEW ZEALAND LIMITED.~~ 19 ANZ National Bank Limited	Mortgage under mortgage number B992980.3

Consent
Delete words in [ ] if inconsistent with the consent
State full details of the matter for which consent is required

[Without prejudice to the rights and powers existing under the interest of the person giving consent,] the **Person giving consent hereby consents to:** registration of the within Easement Instrument.

It is certified that on 26 June 2004 The National Bank of New Zealand Limited was amalgamated with ANZ Banking Group (New Zealand) Limited to become ANZ National Bank Limited and that the mortgage has become the property of ANZ National Bank Limited (as the amalgamated company) under Part XIII of the Companies Act 1993.

Dated this 1st day of July 2004

Attestation

	Signed in my presence by the Grantee
ANZ National Bank Limited by its Attorney KAPUA KATRINA GARDINER	*Signature of witness* *Witness to complete in BLOCK letters (unless legibly printed)*
	Witness name JEANNE ANN FAOAGALI
	Occupation BANK OFFICER
	Address AUCKLAND
Signature [common seal] of Grantee	

An Annexure Schedule in this form may be attached to the relevant instrument, where consent is required to enable registration under the Land Transfer Act 1952, or other enactments, under which no form is prescribed.

The National Bank
of New Zealand

CERTIFICATE OF NON-REVOCATION OF POWER OF ATTORNEY

I, Kapua Katrina Gardiner, Manager Lending Services of Auckland in New Zealand hereby certifies that:

1. By Deed dated 28 June 1996 deposited in the Land Registry Offices situated at:

Auckland	as No.	D.016180	Hokitika	as No.	105147
Blenheim	as No.	186002	Invercargill	as No.	242542.1
Christchurch	as No.	A.256503.1	Napier	as No	644654.1
Dunedin	as No.	911369	Nelson	as No.	359781
Gisborne	as No.	G.210991	New Plymouth	as No.	433509
Hamilton	as No.	B.355185	Wellington	as No.	B.530013.1

The National Bank of New Zealand Limited appointed me its attorney with the powers and authorities specified in that Deed.

2. On 26 June 2004 The National Bank of New Zealand Limited was amalgamated with ANZ Banking Group (New Zealand) Limited to become ANZ National Bank Limited and the property being dealt with pursuant to the Deed has become the property of ANZ National Bank Limited (as the amalgamated company) under Part XIII of the Companies Act 1993.

3. At the date of this certificate, I am the Manager Lending Services, Auckland Lending Services Centre of The National Bank of New Zealand, part of the ANZ National Bank Limited.

4. At the date of this certificate, I have not received any notice or information of the revocation of that appointment by the winding-up or dissolution of the ANZ National Bank Limited or otherwise.

DATED at Auckland this 1st day of July 2004

.....

Appendix 4

NZTA Consultation

NZ TRANSPORT AGENCY
WAKA KOTAHI

www.nzta.govt.nz

44 Bowen Street
Pipitea, Wellington 6011
Private Bag 6995
Wellington 6141
New Zealand
T 0800 699 000
www.nzta.govt.nz

NZ Transport Agency Waka Kotahi Reference: Application-2025-0644

12 November 2025

C/ KP Trust Holdings and LV Trust Holdings
Lynley Newport
Thomson Survey
315 Kerikeri Road,
Kerikeri
0230

Sent via Email: lynley@tsurvey.co.nz

Dear Lynley,

Five lot subdivision at Puketona Junction, State Highway 10, Northland - KP Trust Holdings and LV Trust Holdings

Thank you for your request for written approval from NZ Transport Agency Waka Kotahi (NZTA) under section 95E of the Resource Management Act 1991. Your proposal has been considered as follows:

Proposal

Resource consent is sought for the following activities:

- To subdivide the site creating five lots (an increase of three lots) as a Discretionary activity under the Operative Far North District Plan. "The site" is made up of:
  - Section 18 SO 575856 / 1207111
  - Lot 2 DP 325964 / 105042
- The subdivision will result in the following lots and associated access to the state highway:
  - Lot 1 - access via the crossing place located at NZTM 1806266.92, 5667945.56 only
  - Lot 2 – access via CP 78a only
  - Lot 3 – access via CP 78a only
  - Lot 4 – access via CP 78a only
  - Lot 5 – access via both crossings

Assessment

In assessing the proposed activity, NZTA notes the following:

- State Highway 10 and State Highway 11 are Limited Access Roads (LAR) in this location, with 100km/h speed limits and has 4954vpd with 7% heavy vehicles (SH10), and (SH11) 5263vpd with 5% heavy vehicles.
- The land use on the property is rural.
- NZTA's Senior Safety Engineer has considered the proposal and confirmed the proposed access arrangement is considered suitable provided:
  - The applicant completes the proposed works to achieve a suitable sightline for CP78a– which must be a minimum of 262m.
  - That further development should not exceed the figures outlined in the planning policy manual – noting CP78a is considered consistent with a Diagram C standard.

- That the existing access directly onto the roundabout intersection of SH10 & SH11 is suitable, with no upgrades required for the proposed level of development.

- Following the proposed subdivision, there is the potential for dwellings to be established near SH10 & SH11 creating adverse reverse sensitivity effects. It is therefore appropriate to manage these effects through a reverse sensitivity effects condition on the title of proposed Lots 1-5.

Limited Access Road (LAR)

Your client's site adjoins State Highway 010 which is identified as a limited access road. Per Section 91 of the Government Roading Powers Act 1989, to access your client's site your client requires a crossing place authorised by NZTA. In this instance the site has an existing formed access to State Highway 11 via a Crossing Place located at NZTM 1806266.92, 5667945.56, and to State Highway 10 via Crossing Place 78a (CP78a).

The crossing place for notice CP78a will be updated and the crossing place relabelled as CP78b by NZTA to reflect the presence and location of the vehicle crossing and authorise access onto SH10 for the following activities and uses:

- Proposed Lot 1: A 3.79ha rural property for residential use (single dwelling) and rural lifestyle use.
- Proposed Lot 2: A 2.01ha rural property for residential use (single dwelling) and rural lifestyle use.
- Proposed Lot 3: A 2.23ha rural property for residential use (single dwelling) and rural lifestyle use.
- Proposed Lot 4: A 2.53ha rural property for residential use (single dwelling) and rural lifestyle use.

NZTA will issue a notice for the crossing place located at NZTM 1806266.92, 5667945.56 and the crossing place will be labelled as CP78c by NZTA to reflect the presence and location of the vehicle crossing and authorise access onto SH1 for the following activities and uses:

- Proposed Lot 1: A 3.79ha rural property for residential use (single dwelling) and rural lifestyle use.
- Proposed Lot 5: A 64.21ha rural property for house and farm access including stock and associated farm vehicles.

The new crossing place notices will be registered on the Record of Title of the relevant properties by NZTA, and a copy of this notice will be sent to you in due course. The request for confirmation of the facilitation of the registration of the crossing place notice on the Record of Title to Far North District Council is repurposed as Condition 3 of this letter.

Conditions

In discussion with NZTA your client has agreed to include the following conditions as part of your client's resource consent application. The legal name of NZTA is the **New Zealand Transport Agency**; therefore our full legal name is referred to in the conditions and approval.

1. Prior to Section 224(c) certification the Consent Holder shall complete earthworks so that Crossing Place 78a located at NZTM 1687684.97, 6092614.13 allows for sightlines of 262m.

2. Prior to the issuing of a certificate pursuant to Section 224(c) of the Resource Management Act 1991, the consent holder shall provide to Council, correspondence from the New Zealand Transport Agency confirming that works in the State Highway have been constructed to the New Zealand Transport Agency standards.

3. Prior to the issuing of a certificate pursuant to Section 224(c) of the Resource Management Act 1991, the consent holder shall provide to Council confirmation that the New Zealand Transport Agency has been advised of relevant similar documentation such as a draft LT (Land Transfer) plan to facilitate the registration of any new Crossing Place (CP) Notices against those new titles, under Section 91 of the Government Roading Powers Act 1989.

4. A consent notice pursuant to Section 221 of the Resource Management Act 1991 shall be registered against the title of proposed 1-5 of the subdivision of land shown on Scheme Plan "Access Option A – PROPOSED SUBDIVISION OF SECTION 18 SO 575856 & LOT 2 DP 325964 STATE HIGHWAY 10- PUKETONA" by Thomson Survey Ltd, dated 15.05.2025 and referenced as 10741 that addresses potential reverse sensitivity

effects resulting from the normal operation of State Highways 10 and 11. This consent notice shall read as follows:

Any dwelling or other building used for a noise sensitive activity on the site in or partly within 85m of the edge of State Highway 10 or State Highway 11 must be designed, constructed and maintained to achieve. an indoor design noise level of 40 dB LAeq(24hr) inside all habitable spaces.

Determination

On the basis of the above assessment of the proposed activity, and the conditions volunteered by the applicant, the New Zealand Transport Agency provides written approval under section 95E of the Resource Management Act 1991.

Limited Access Road

As the site fronts a Limited Access Road, the New Zealand Transport Agency provides approval under Section 93 of the Government Roading Powers Act 1989 for the site to gain direct access from the state highway as described in this written approval.

We are happy for you to provide this letter to the territory authority as evidence of our s95E RMA and s93 GRPA approvals.

Advice Notes

Before you undertake any physical work on the state highway, including the formation of any vehicle crossing, you are legally required to apply to the New Zealand Transport Agency for a Corridor Access Request (CAR) and for that request to be approved.

Please submit your CAR to via www.submitica.com a minimum of fourteen working days prior to the commencement of any works on the state highway; longer is advised for complex works.

As the properties have access to a limited access road, once the works have been completed to the satisfaction of the New Zealand Transport Agency Network Manager, a crossing place notice/s per Section 91 of the Government Roading Powers Act 1989 will be registered on the titles confirming the legal establishment of the crossing place.

Expiry of this approval

Unless resource consent has been obtained this approval will expire two years from the date of this approval letter. This approval will lapse at that date unless prior agreement has been obtained from The New Zealand Transport Agency.

If you have any queries regarding the above or wish to discuss matters further, please feel free to contact the Environmental Planning team at environmentalplanning@nzta.govt.nz.

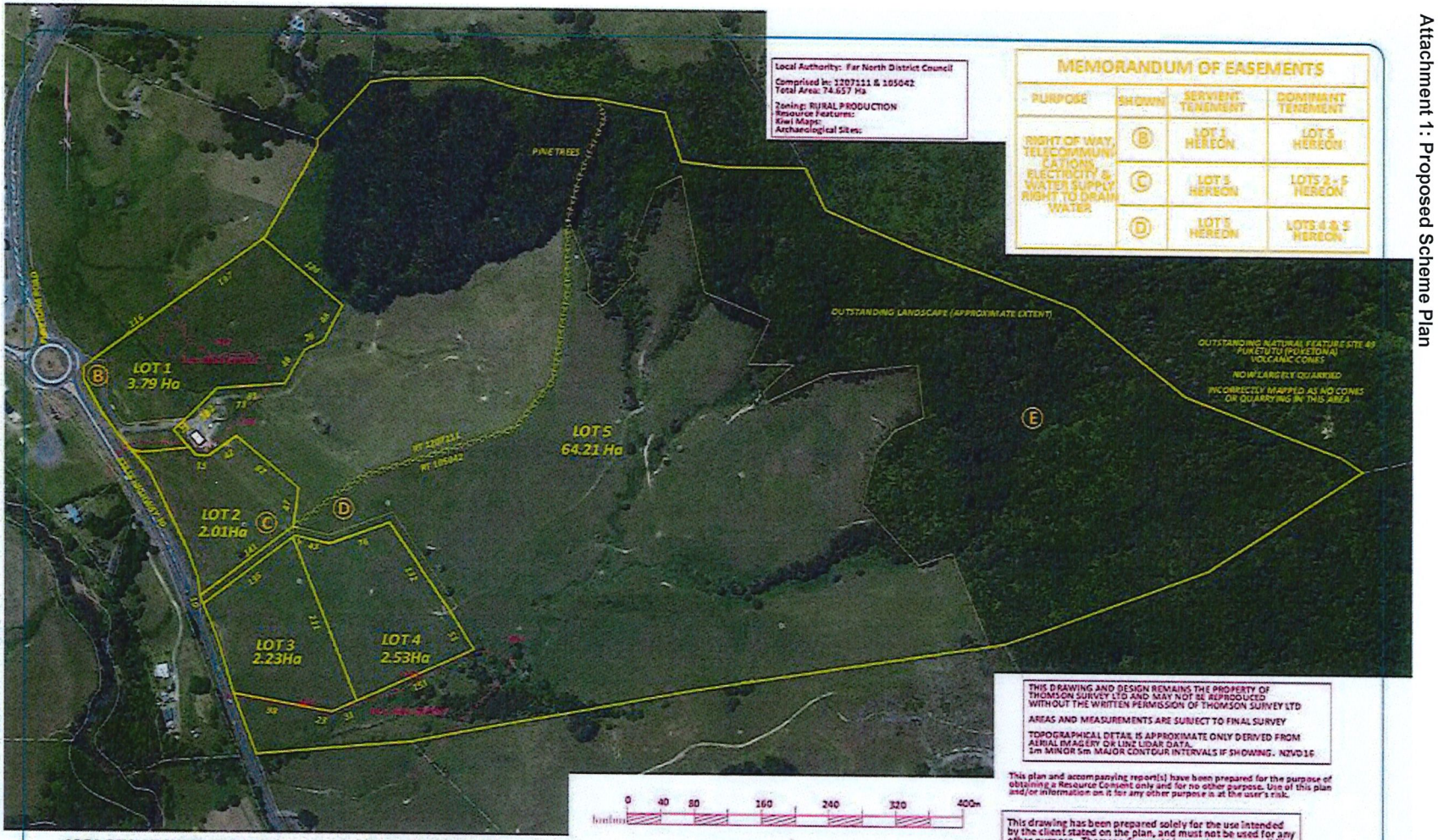
Yours sincerely,

Jordan Pauw
Planner
Poutiaki Taiao / Environmental Planning, System Design, on behalf of NZ Transport Agency Waka Kotahi.

Enclosed:

- Attachment 1: Proposed Scheme Plan

Attachment 1: Proposed Scheme Plan



Local Authority: Far North District Council
Comprised in: 129711 & 185042
Total Area: 74.657 Ha
Zoning: RURAL PRODUCTION
Resource Features:
Kiwi Maps:
Archaeological Sites:

MEMORANDUM OF EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS, ELECTRICITY & WATER SUPPLY, RIGHT TO DRAIN WATER	B	LOT 1 HEREON	LOT 5 HEREON
	C	LOT 3 HEREON	LOTS 2 - 5 HEREON
	D	LOT 5 HEREON	LOTS 4 & 5 HEREON

0 40 80 160 240 320 400m

AREA E TO BE SUBJECT TO FNDC CONSENT NOTICE CONDITION FOR VEGETATION PROTECTION

ACCESS OPTION A

AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY DERIVED FROM AERIAL IMAGERY OR LINZ LIDAR DATA. 1m MINOR 5m MAJOR CONTOUR INTERVALS IF SHOWING. NZVD16

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

This drawing has been prepared solely for the use intended by the client stated on the plan, and must not be used for any other purpose. Thomson Survey Ltd accepts no responsibility for this plan, or any data contained on this plan, to be used for any other purpose.

THOMSON SURVEY
315 Kerikeri Rd
P.O. Box 372 Kerikeri
Email: kerikeri@tsurvey.co.nz
Ph: (09) 4077360 Fax (09) 4077322
Registered Land Surveyors, Planners & Land Development Consultants

PROPOSED SUBDIVISION OF SECTION 18 SO 575856 & LOT 2 DP 325964

STATE HIGHWAY 10 - PUKETONA

PREPARED FOR: PUGH

	Name	Date
Survey		
Design		
Drawn	SL	9.05.25
Approved		
Rev	KY	15.05.25

10741 SCHEME 20250515

ORIGINAL
SCALE 1:4000
SHEET SIZE A3

Surveyors Ref. No: 10741
Series
Sheet of

Appendix 5

Subdivision Site Suitability Engineering Report

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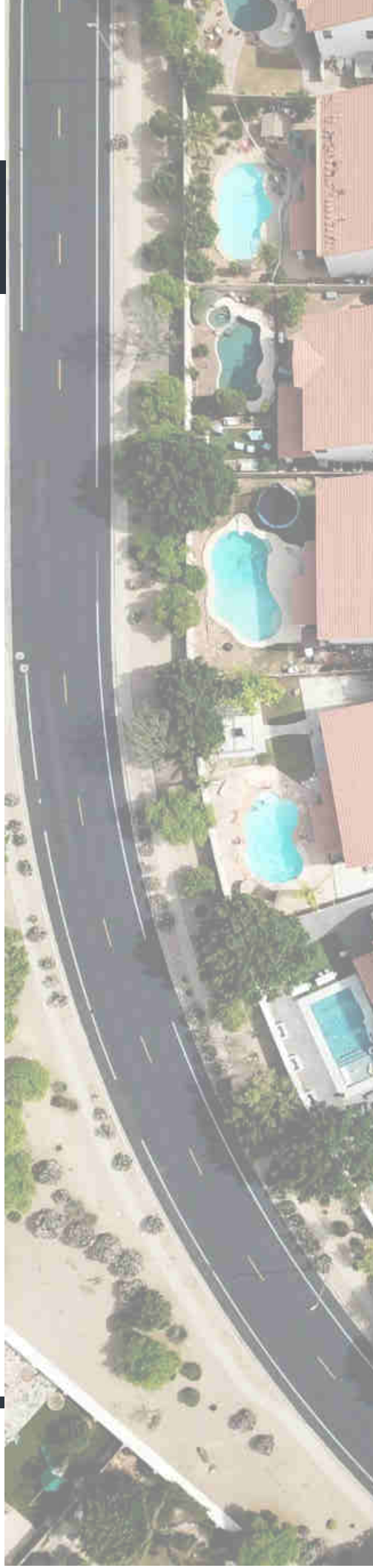
SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

LOTS 1 & 2 DP 325964, STATE HIGHWAY 10, PUKETONA

KEVIN PUGH



C0655N-S-01
OCTOBER 2025
REVISION 1

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DOCUMENT MANAGEMENT

Document Title	Subdivision Site Suitability Engineering Report
Site Reference	Lots 1 & 2 DP 325964, State Highway 10, Puketona
Client	Kevin Pugh
Geologix Reference	C0655N-S-01
Issue Date	October 2025
Revision	01
Prepared	Fred Sennoga Civil Design Engineer, BScEng Civil, MEngNZ
Reviewed	Sebastian Hicks Principal Civil Engineer, CPEng Reg. 1168062, CMEngNZ, IntPE(NZ) /APEC Engineer
Approved	Edward Collings Managing Director, CEnvP Reg. 0861, CPEng Reg. 1033153, CMEngNZ
File Reference	*C:\Users\GeologixConsultingEn\SynologyDrive\Projects\C0600-C0699\C0655N - Lots 1 & 2 DP 325964 - State Highway 10, Puketona\06 - Reports\C0655N-S-R01-Draft FS_OH_FS.docx*

REVISION HISTORY

Date	Issue	Prepared	Reviewed	Approved
July 2025	Draft Issue	FS	SH	EC
October 2025	First Issue - Consent	FS	SH	EC

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TABLE OF CONTENTS

1 INTRODUCTION

This Site Suitability Engineering Report has been prepared by Geologix Consulting Engineers Ltd (Geologix) for Kevin Pugh 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 two existing rural properties (Lots 1 & 2 DP 325964) off State Highway 10, Puketona, the 'site' into five proposed lots (Lots 1 -5). Specifically, this assessment addresses engineering elements of wastewater, stormwater and water supply with less than minor effects on the environment as a result of the proposed activities outlined in Section 1.1.

1.1 Proposal

A proposed scheme plan was presented to Geologix at the time of writing, prepared by Thomson Survey[1] and reproduced within Appendix A as Drawing No. 100. It is understood the Client proposes to subdivide the site to create five new residential lots with easements over the lots to provide Right of Way (RoW) to facilitate suitably sized 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 Range	Purpose
Lot 1	3.79 ha	New residential
Lot 2	2.01 ha	New residential
Lot 3	2.23 ha	New residential
Lot 4	2.53 ha	New residential
Lot 5	64.21 ha	Balance Lot

1.2 Scope

This site suitability report is prepared based upon a limited scope of engagement comprising on lot, future residential stormwater, wastewater and potable water elements only. Our scope of engagement does not allow for assessment of access and/or mitigation of effects of proposed RoW surfaces or geotechnical components. It is recommended that these aspects are addressed at the Building Consent stage once final development plans are available for each proposed lot. This may be adequately captured as relevant conditions of consent.

This report provides a conceptual assessment of potential future development options and must be advanced at the Building Consent stage once final development concepts are available.

[1] *Thomson Survey, Scheme Plan Ref. 10741, dated 15 May 2025.*

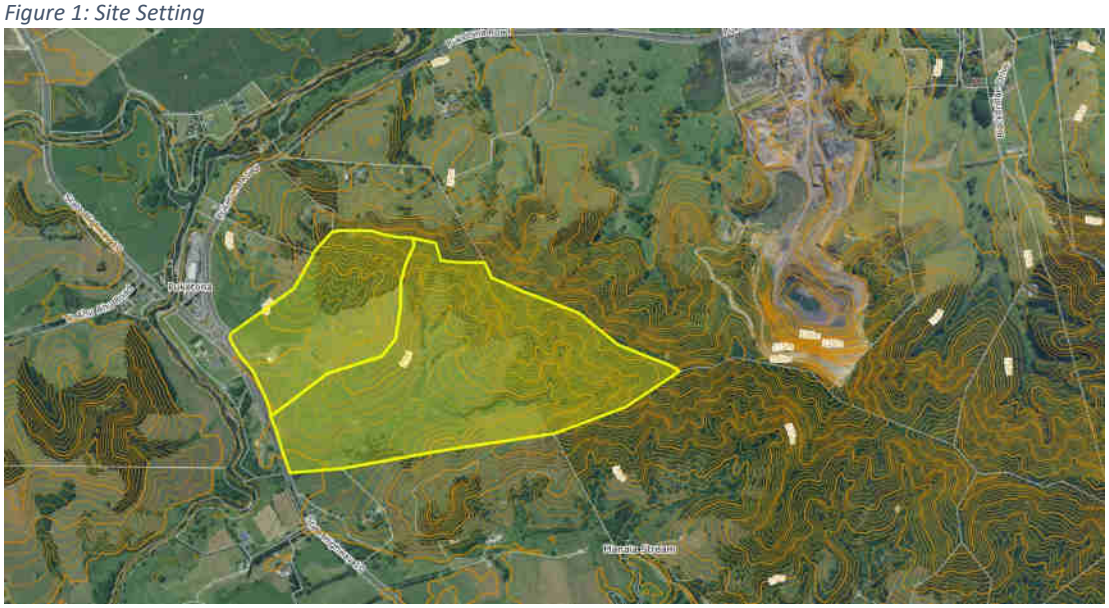
2 DESKTOP APPRAISAL

The site is located to the eastern face of State Highway 10 which has a straight alignment to define the western boundary. Topographically the site area has elevated northeastern slopes that reduce down to lower-lying areas to the southern and south-western boundaries. These slopes have wide gulleys that run through the terrain from north to south and east to west.

Approximately 60% of the site area is currently in pasture in the lower lying western areas with rough grass and the balance of the site is covered in mature forest that extends to the higher northeastern slopes that form the northern and eastern boundary to Lot 5. There is an existing livestock farming structure and shed present within the site boundary of Lot 5, adjacent to the proposed Lot 1 and Lot 2 boundaries. A detailed review of existing watercourses and overland flow paths is presented as Section 3. In brief, the site is intersected by multiple small ditches, draining downslope, from the northeastern boundary, towards watercourses that trend towards the southern boundary.

Some existing farm tracks and culvert crossings are present within the site boundaries.

Figure 1: Site Setting



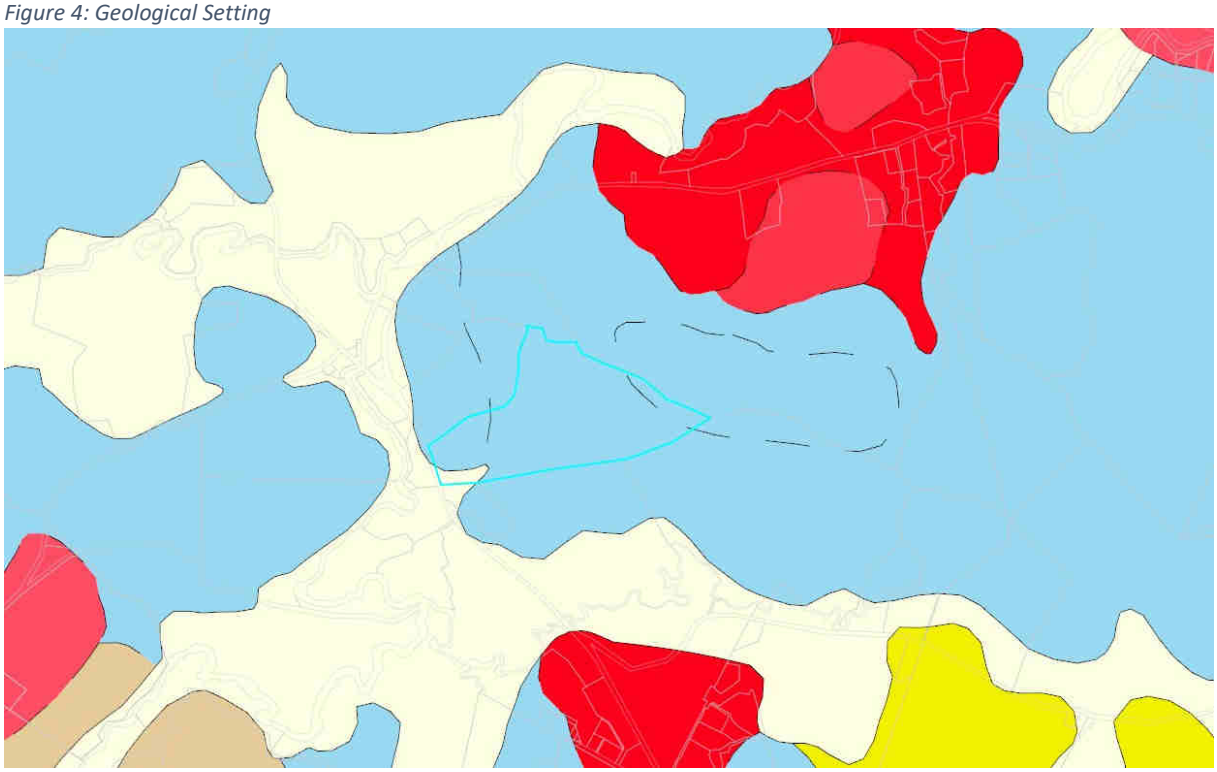
2.1 Existing Reticulated Networks

Far North District Council (FNDC) GIS mapping indicates that there isn't existing 3 water infrastructure or reticulated networks near this section of State Highway 10 road and/ or within 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 immediately underlain by Waipapa Group metavolcanics (Waipapa Composite Terrane) described as beds dominated by basaltic lava flows, pillow lavas and volcaniclastics.

Figure 4: Geological Setting



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.

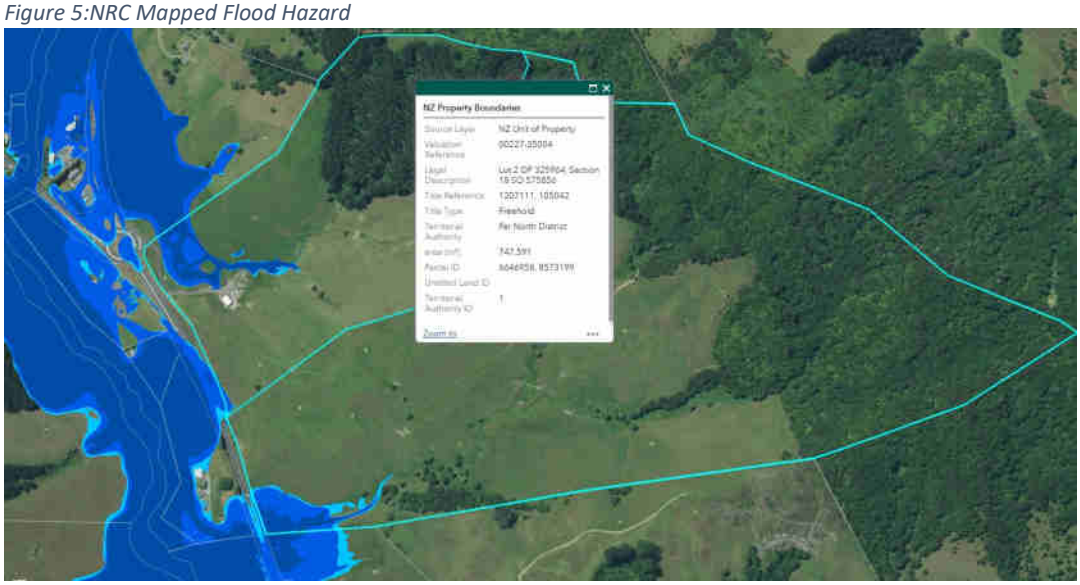
3.1 Surface Water Features

The site is at the lower elevations of a larger catchment that extends from the north/ northeast through the proposed future subdivision and to the south. This includes a network of streams that are fed from small valley catchments in the northern and northeastern areas of Lot 5. These drain towards the southwest corner of Lot 5. There is evidence of a river found in the northwest corner of Lot 5 that drains in a south-westerly direction along the proposed eastern border of Lot 1 before turning across the site in a north-westerly direction towards the river flood hazard boundary of the nearby Waiaruhe river.

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

The River Flood Hazard extent is identified close to or within the site boundaries at two points. No downstream properties are present between the site and the flood hazard extent. Secondly, to the western corner of the site the flood hazard extent is marked within a shallow river approximately 230 m from the site boundary at its closest. There is a northern upslope gulley that trends downslope towards the afore mentioned shallow river.

Figure 5:NRC Mapped Flood Hazard



3.2 Sensitive Receptors

Based on GIS data, national topographic maps and survey data provided at the time of writing we do not understand there to be sensitive receptors such as wetlands at the site. However, we have not been engaged to provide an ecological assessment of the site or surface water features.

3.3 Overland Flow Paths

Clearly defined flow paths are evident within the site boundaries upon relatively steep to gently sloping land, generally fed from minor overland flow paths sourcing from the northern and north-eastern site boundaries. Minor overland flow paths found in the eastern area of Lot 5 are approximately 200 to 400 m in length converging to a single major overland flow path that trends roughly from northwest through the site to a discharge point at the southwest corner of the proposed Lot 5 and adjacent to the Flood Hazard extent in this area. Minor overland flows are also evident and slope towards the river found in the northwest region of Lot 5.

Our walkover survey was undertaken in a wet period in winter and spring seasons and noted no significant flows through the overland flow paths.

4 SITE WALKOVER SURVEY

A visual walkover survey of the property confirmed:

- Topography data supplied is in general accordance with that outlined in Section 1.2 and observed site conditions. Suitable building envelopes[4] can be formed on gently sloping land <10 ° on each proposed lot.
- The site is currently in rough pasture with a saturated surface covering strata, as a result of the underlying ground properties, see proceeding sections.
- The site is bound in all directions by similar farming or rural lifestyle block properties.
- State Highway 10 defines the south-western boundary with a low point to the southwest corner of the site at a small road culvert and the Flood Hazard extent. The road does include grassed swale drains which are largely overgrown and require maintenance to clean out.
- There is an existing livestock farming structure and shed present within the site boundary of Lot 5.

5 WASTEWATER ASSESSMENT

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

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

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[8]. 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 Ground Investigation

A site-specific walkover survey and intrusive ground investigation was undertaken by Geologix on 8 July 2025. The ground investigation was scoped to confirm the findings of the above information and to provide parameters for a wastewater assessment. The ground investigation comprised:

[4] *Measuring 30 m x 30 m according to FNDC District Plan Rule 13.7.2.2.*
[8] *TP58 Table 6.1.*

- Four hand augered boreholes designated HA01 to HA04, 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).

5.1.1 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[9]. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 100 and 101 within Appendix A. Strata identified during the ground investigation can be summarised as follows:

- **Topsoil encountered ranging between 0.15 and 0.3 m bgl.** Described as generally dark brown silty or sandy clay.
- **Waipapa Group residual soils to depths >1.2 m bgl.** Exploratory holes recorded a consistent sequence of residual soils the site. This generally comprised of upper layers of a yellow/orange silt. The underlying cohesive deposits generally trended into drier sandy silt. A shallow groundwater strike at 1m depth was encountered in HA01.

  Based on the above shallow ground profile, the Waipapa Group residual soils were determined to be equivalent to poorly draining soils for the wastewater appraisal.

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

Table 2: Summary of Ground Investigation

Hole ID	Proposed Lot	Hole Depth	Topsoil Depth	Groundwater	Wastewater Category
HA01	1	1.2 m	0.3 m	1 m – strike	6 – poorly draining
HA02	2	1.2 m	0.15 m	NE	6 – poorly draining
HA03	3	1.2 m	0.15 m	NE	6 – poorly draining
HA04	4	1.2 m	0.2 m	NE	6 – poorly draining

1. All depths recorded in m bgl unless stated. 2. Groundwater measurements taken on day of drilling. 3. NE – Not Encountered. 4. Wastewater category in accordance with Auckland Council TP58[10].

5.2 Existing Wastewater Systems

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

5.3 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

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

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

tank supply is estimated at 160 litres/ person/ day[12]. This assumes standard water saving fixtures[13] being installed within the proposed future developments. This should be reviewed for each proposed lot at the Building Consent stage.

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

5.4 Treatment System

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

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

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

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

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

5.5 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

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

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

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 <10 °.
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.

5.5.1 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 67, poorly draining. This transposes to NZS1547 Category 5. For a PCDI system, a soil loading rate of 2 mm/ day is recommended within NZS1547 Table 5.2 and TP58 Table 9.2.

5.5.2 Disposal Areas

The sizing of wastewater system disposal areas is a function of soil drainage, the loading rate and topographic relief. For each proposed lot a primary and reserve disposal field is required as follows. The recommendations below are presented on Drawing No. 101.

- **Primary Disposal Field.** A minimum PCDI primary disposal field of 640 m^2 laid parallel to the natural contours.
- **Reserve Disposal Field.** A minimum reserve disposal field equivalent to 30 % of the primary disposal field is required under NRP rule C.6.1.3(9)(b) for secondary or tertiary treatment systems. This concept design therefore allows for a 192 m^2 reserve disposal area to be laid parallel to the natural contours.
- Disposal fields discharging secondary treated effluent are to be set above the 20-year ARI (5 % AEP) flood inundation height to comply with the above NRP rule. Flood hazard potential has been identified over the western portion of Lot 1, approximate flood RL =48m. Another flood hazard potential is at the southwest corner of Lot 5, approximate flood RL =50m . All proposed WW field sites have been located above level 50m. This represents a minimum freeboard of approximately 2m of the concept wastewater fields to the mapped flood hazard level. As such the site/s can provide freeboard well above the 1 % AEP (and 5% AEP) flood height to comply with this rule.

Topography at the proposed wastewater disposal fields has been measured as ranging from gentle to <10 °. 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.

5.6 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 No. 101. 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 6, NZS1547 Category 5
Soil Loading Rate	2 mm/ day
Primary disposal field	Surface/ subsurface laid PCDI, min. 640 m^2
Reserve disposal field	Surface/ subsurface laid PCDI, min. 30 % or 192 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.

5.7 Assessment of Environmental Effects

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

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

It is recommended that the AEE is reviewed at the time of Building Consent once specific development plans, final disposal field locations and treatment systems are established. The TP58 guideline document provides a detailed AEE for Building Consent application. Based on the proposed scheme, ground investigation, walkover inspection and Drawing No. 101, 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.

Considering the nature of rural 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 8 is with respect to Operative FNDC Plan Section 8.6.5.1.3 only. Considering this, all proposed lots, being Lot 1 – 5 are considered to be **Permitted Activity.**

Table 5: Summary of Impervious Surfaces

Surface	Proposed Lot 1		Proposed Lots 2 to 4		Balance Lot 5	
Existing Condition					**(746, 570m²)**	
Roof	0 m²	0 %	0 m²	0 %	173 m²	0.02 %
Driveway + Parking	0 m²	0 %	0 m²	0 %	2352m²	0.32 %
Right of Way	0 m²	0 %	0 m²	0 %	0 m²	0 %
Total impervious	0 m²	0 %	0m²	0 %	2525m²	0.34 %
Proposed Condition	**(37,900m²)**		**(20,100 m²) min**		**(642,100 m²)**	
Roof	300 m² (Concept)	0.79 %	300 m² (Concept)	1.49 %	173 m²	0.03 %
Driveway + Parking	300 m² (Concept)	0.53 %	200 m² (Concept)	1 %	1371 m²	0.21 %
Right of Way	RoW B - 980 m² (Concept)	2.59 %	0m² (Concept)	0 %	RoW C&D - 1372m²	0.21 %
Total impervious	1480 m²	3.91 %	500 m²	2.49%	2916 m²	0.45 %
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 Residential Development (Lot 1 to 4).** The proposed application includes subdivision formation only and not lot-specific residential development at this stage. However, a conservative model of probable future on-lot development for proposed Lots 1 to 4 has been developed for this assessment considering variation of scale in typical rural residential development. The probable future on-lot development concept for Lot 1 includes up to 300 m^2 potential roof area and up to 200 m^2 potential driveway or parking areas within the lot boundary.
- **Existing Development (Lot 5).** Lot 5 consists of existing minor impervious areas and existing structures only. As there are no proposed amendments and/ or additions to proposed lot 5 no additional attenuation and/ or stormwater management is proposed.
- **Right of Way B.** A RoW is proposed over the existing driveway to lot 5 from the SH10 intersection. No attenuation is proposed for the RoW as the existing impervious surfaces will be transferred from the existing title to proposed lot 1 which will remain within the Permitted Activity thresholds. Further, as outlined in this report the farm access track was commissioned and constructed by Fulton Hogan under subcontract to NZTA. The works were completed under FNDC Resource Consent Ref. 2300095-RMALUC and NRC Consent Ref. 42084. No further works/ amendment from the approved consents are proposed.
- **Right of Ways C and D.** These proposed RoWs form a total length of approximately 392m^2 and a total anticipated surface area of 1372 m^2 based upon a carriageway width of 3.0 m and two shoulders of 0.25 m each. Assessment of these RoWs is currently outside of our scope of engagement. However, it is recommended that these proposed new surfaces are mitigated as a condition of consent by specifically engineered stormwater devices, most likely forming attenuation ponds by gravity feed.

6.3 Design Storm Event

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model[14]. 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 within proposed lot 1 and downstream of the site, this assessment has been modelled to provide stormwater attenuation up to and including 80 %

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

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.

Outlet dispersion devices have been designed to manage the 1% AEP event to reduce scour and erosion at discharge locations.

6.4 Concept Stormwater Attenuation

Based on the design storm events indicated above and the corresponding modelling results 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[15] 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 for future on-lot residential development.

Conceptual storage and outlet requirements within the tanks are included in Table 7 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

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
Future Concept Development (Lot 1)			
Potential buildings	0 m^2	300 m^2	Detention within roof water tanks
Potential driveways	0 m^2	300 m^2	Off-set detention in roof water tanks
ROW B	980 m^2	980 m^2	No mitigation, existing consented areas.
Total	**980 m^2**	**1480 m^2**	

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

Future Concept Development (Lot 2,3,4)			
Potential buildings	0 m^2	300 m^2	Detention within roof water tanks
Potential driveways	0 m^2	200 m^2	Off-set detention in roof water tanks
Total	**0 m2**	**500 m^2**	

Proposed Lot 5			
Buildings	173 m^2	173 m^2	No mitigation, existing areas.
Driveways	2352 m^2	1371 m^2	No mitigation, existing areas.
RoW	0 m^2	1372 m^2	Outside of scope, future specifically designed pond
Total	**0 m^2**	**2916 m^2**	

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

Table 7: Attenuation Concept – Proposed Lot 1

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				
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	7.98 l/s	10.31 l/s	11.95 l/s	17.76 l/s
80 % pre-development peak flow	6.39 l/s	8.25 l/s	NA	14.20 l/s
Post-development peak flow	12.80 l/s	16.52 l/s	19.15 l/s	28.46 l/s
Total Storage Volume Required	12,199 litres	16,196 litres	5,020 litres	29,467 litres
Concept Summary:	- Attenuation storage calculation accounts for offset flow from 300 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 is sufficient for attenuation (29,467 l) + domestic water storage (20,533l). However a standalone tank for the driveway maybe preferred. - 1 % AEP attenuation (in isolation) requires a 21 mm orifice 2.06 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.			

Table 8: Attenuation Concept – Proposed Lots 2 to 4

Design Parameter	Flow Attenuation: 50 % AEP (80 % of pre dev)	Flow Attenuation: 20 % AEP (80 % of pre dev)	Flood Control: 10 % AEP	Flood Control: 1 % AEP (80 % of pre dev)
Proposed Lots 2-4				
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	6.65 l/s	8.59 l/s	9.96 l/s	14.80 l/s
80 % pre-development peak flow	5.32 l/s	6.87 l/s	NA	11.84 l/s
Post-development peak flow	10.82 l/s	13.97 l/s	16.19 l/s	24.06 l/s
Total Storage Volume Required	4,827 litres	6,299 litres	3,796 litres	11,179 litres
Concept Summary:	- Attenuation storage calculation accounts for offset flow from 200 m² 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. - 1 x 25,000 litre tanks is sufficient for attenuation (11,179 l) + domestic water storage (13,821 l) - 1 % AEP attenuation (in isolation) requires a 44 mm orifice 1.05 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.			

6.4.1 On-Lot Discharge

The direct discharge of water tank overflow in a concentrated manner can cause scour and erosion in addition to excessive saturation of shallow soils. Roof water will be captured in detention tanks and used for drinking 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 No. 101.

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 9. Calculations to derive this are presented within Appendix D, based on the NIWA HIRDS Depth-Duration data. Typical details of these options are presented within Appendix A as Drawing No. 401.

Table 9: 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 1,2,3,4						
500 m^2 (inc. 200m^2 offset)	0.87 m/s	0.1 m	0.2 m	8.225 m	23 mm, spaced at 175 mm intervals	Above ground dispersion device or in-ground dispersion trench.

6.5 Stormwater Quality

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

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

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

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

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 SH10 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 conceptual development proposes 2 x 25,000l tanks for suitable rainwater harvesting provisions for each proposed Lot. The storage provisions shall be finalised at Building Consent stage.

Furthermore, the absence of potable water infrastructure and fire hydrants within SH10 road require provision of the on-lot roof water supply tanks to be used for firefighting purposes (if required).

In addition, any proposed accessway to and through the site must appropriately cater for access for firefighting vehicles (to be allowed for and designed by others). These access requirements should be in line with SNZ PAS4509:2008 or as otherwise agreed.

Specific analysis and calculations for firefighting is outside the scope of this report and may require specialist input. Supply for firefighting should be made in accordance with SNZ PAS4509:2008.

8 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[16], Northland Regional Council (NRC) Proposed Regional Plan for Northland[17] and Regional Water and Soil Plan for Northland. Following our ground investigation and considering the measures presented in this report, a summary of the proposed activities against defined natural hazards is presented as Table 10.

Table 10: Summary of Natural Hazards

Natural Hazard	Applicability	Mitigation & Effect on Environment
Erosion	Yes	Mitigation provided by means of stormwater dispersion control and erosion and sediment control measures; resultant effects are less than minor.
Overland flow paths, flooding, inundation	NA	Localised flooding within proposed lot 1, future development subject to specifically engineered finished floor levels. Wastewater mitigation by constructing disposal fields on sloping ground, min 50 m elevation NZVD2016 to provide freeboard above 5 % and 1 % events.
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.

[16] *Operative District Plan Rule 13.7.3.2.*

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

9 LIMITATIONS

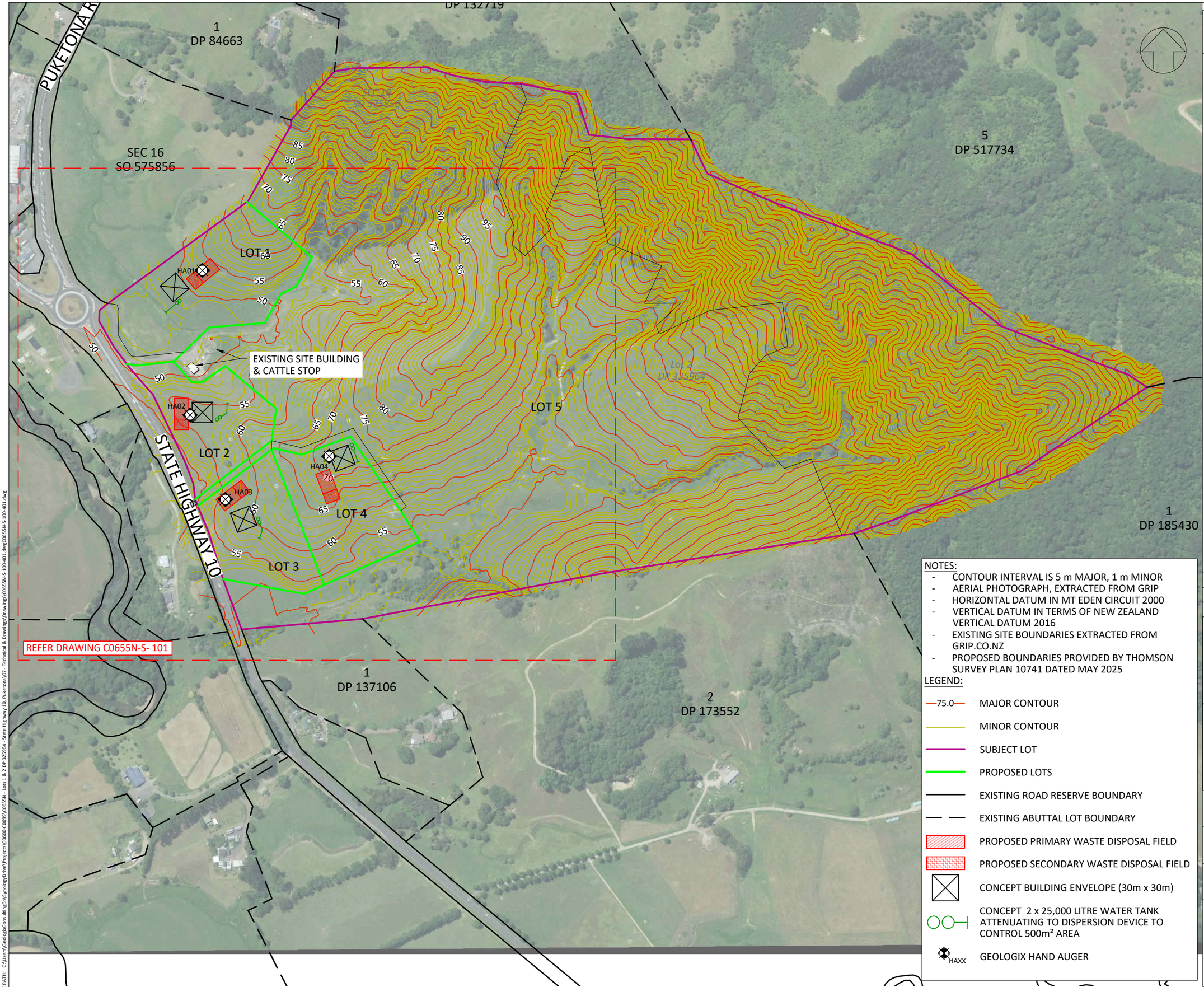
This report has been prepared for Kevin Pugh as our Client. It may be relied upon by our Client and their appointed Consultants, Contractors and for the purpose of Consent as outlined by the specific objectives in this report. This report and associated recommendations, conclusions or intellectual property 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



GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY PROPOSED SCHEME PLAN REF. 10741, DATED MAY 2025.
3. HORIZONTAL CO ORDINATE SYSTEM = NZTM.
4. VERTICAL DATUM = NZVD.
5. MAJOR INTERVALS 5.0 m.
6. MINOR INTERVALS 1.0 m.
7. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.

CONCEPT WASTEWATER DESIGN

CONCEPT DEVELOPMENT	5 BEDROOM
CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 6
SOIL CATEGORY (NZS1547)	CATEGORY 5
SOIL LOADING RATE	3.0 mm/ DAY
TREATMENT SYSTEM	NO - SUBJECT TO BUILDING CONSENT DESIGN
PRIMARY DISPOSAL AREA	640 m²
RESERVE DISPOSAL AREA	320 m² (50 %)
FINAL DESIGN	NO - SUBJECT TO BUILDING CONSENT DESIGN
CUT OFF DRAINS LOT 1 & 2	NO
CUT OFF DRAINS LOT 3 & 4	YES
DISCHARGE CONSENT	NO

0 2.5 5 10 Meters
1:5000

NOTES:
- CONTOUR INTERVAL IS 5 m MAJOR, 1 m MINOR
- 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 10741 DATED MAY 2025

LEGEND:

- 75.0 MAJOR CONTOUR
- MINOR CONTOUR
- SUBJECT LOT
- PROPOSED LOTS
- EXISTING ROAD RESERVE BOUNDARY
- EXISTING ABUTTAL LOT BOUNDARY
- 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

Revision	Issue	Date
A	FIRST ISSUE	23/07/25

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
C0655N
STATE HIGHWAY 10
PUKETONA
SECTION 18 SO 575856 & LOT 2 DP 325964

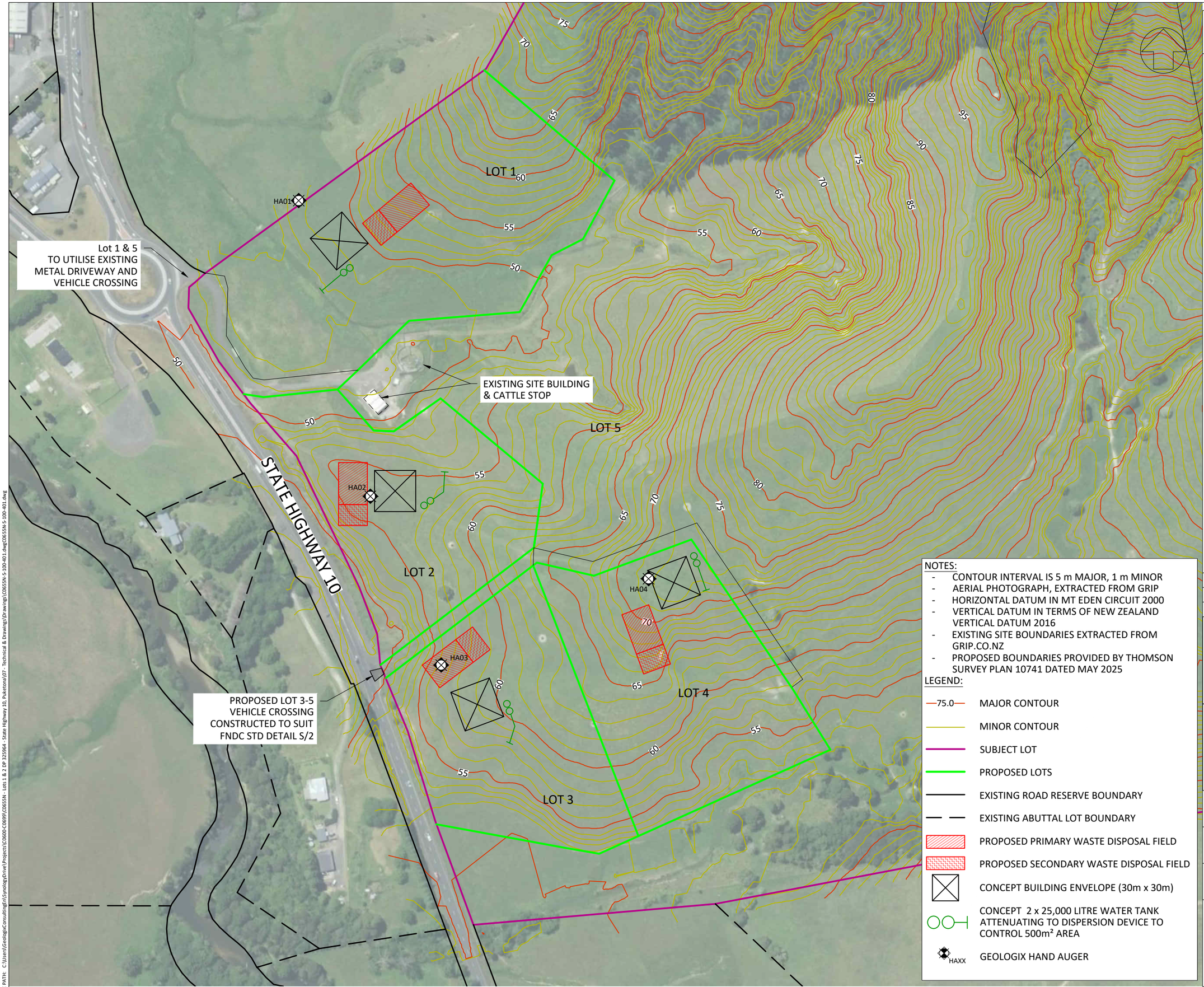
Project	Drawn By
C0655N	B.NEL

Client
LV TRUST HOLDINGS LTD & KP TRUST HOLDINGS LTD

Sheet Title
SITE SUITABILITY LAYOUT

Sheet
100

FILE PATH: C:\Users\GeologixConsulting\SynologyDrive\Projects\C0600-C0699\C0655N - Lots 1 & 2 DP 325964 - State Highway 10, Puketona\07 - Technical & Drawings\Drawings\C0655N-S-100-401.dwg
PLOTTED: 09/04/2022



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CONCEPT NO. OF OCCUPANTS	8 PERSONS
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SOIL CATEGORY (NZS1547)	CATEGORY 5
SOIL LOADING RATE	3.0 mm/ DAY
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RESERVE DISPOSAL AREA	320 m² (50 %)
FINAL DESIGN	NO - SUBJECT TO BUILDING CONSENT DESIGN
CUT OFF DRAINS LOT 1 & 2	NO
CUT OFF DRAINS LOT 3 & 4	YES
DISCHARGE CONSENT	NO

NOTES:
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- PROPOSED BOUNDARIES PROVIDED BY THOMSON SURVEY PLAN 10741 DATED MAY 2025

LEGEND:

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- MINOR CONTOUR
- SUBJECT LOT
- PROPOSED LOTS
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- EXISTING ABUTTAL LOT BOUNDARY
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- CONCEPT 2 x 25,000 LITRE WATER TANK ATTENUATING TO DISPERSION DEVICE TO CONTROL 500m² AREA
- HAXX GEOLOGIX HAND AUGER

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Revision	Issue	Date
A	FIRST ISSUE	23/07/25

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
C0655N
STATE HIGHWAY 10
PUKETONA
SECTION 18 SO 575856 & LOT 2 DP 325964

Project	Drawn By
C0655N	B.NEL

Client
LV TRUST HOLDINGS LTD & KP TRUST HOLDINGS LTD

Sheet Title
SITE SUITABILITY ENLARGED LAYOUT

Sheet
101

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PLOTTED: 03/04/2022

PROPOSED TANK PLAN VIEW

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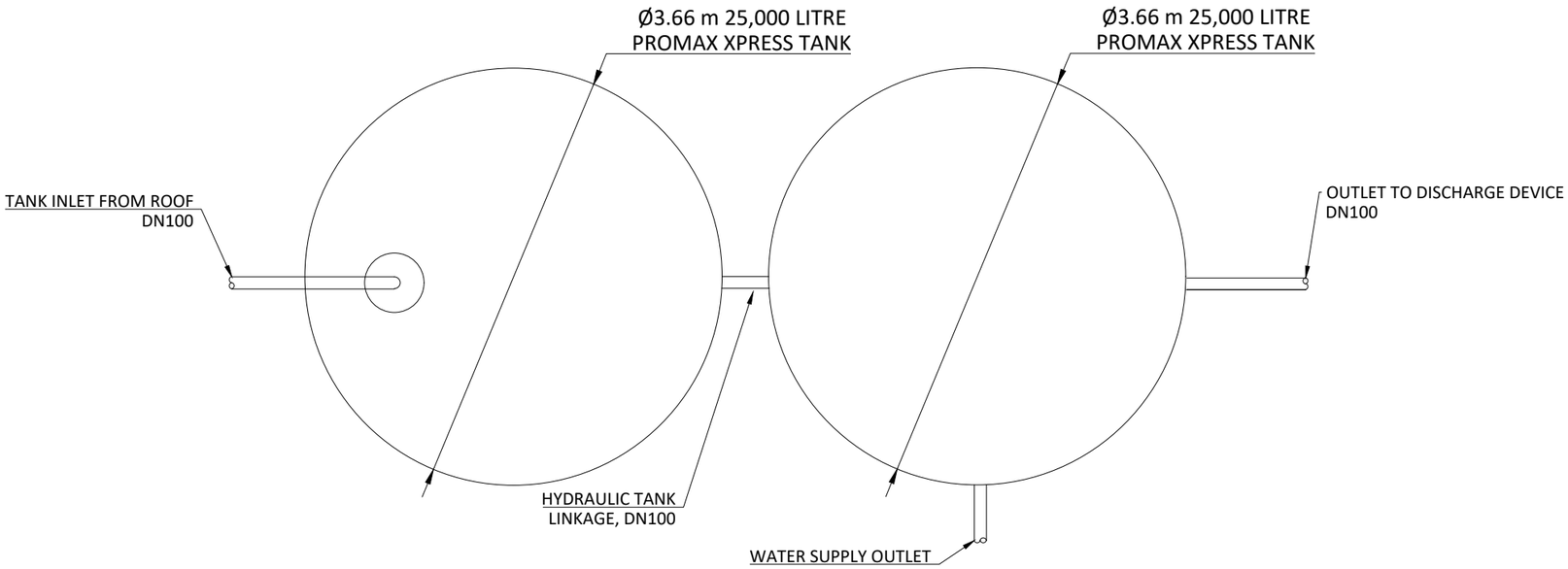
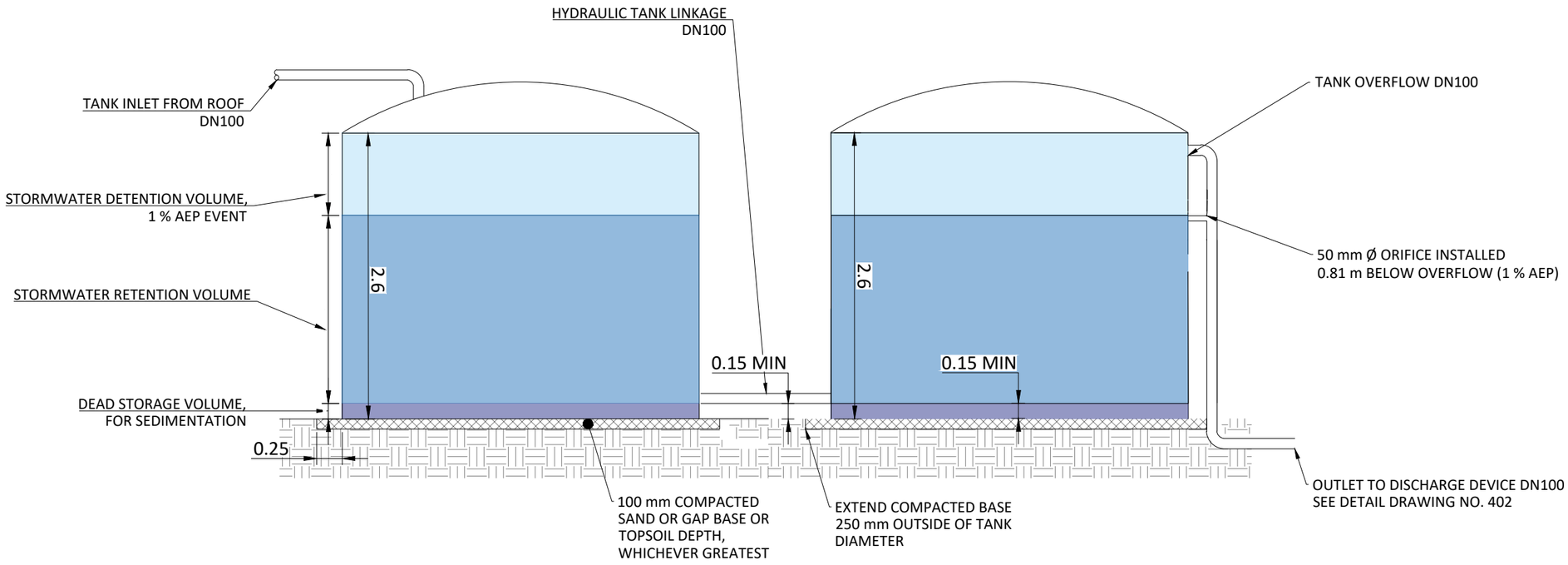


PROPOSED TANK SIDE VIEW

1:50, A3



GENERAL NOTES

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Revision	Issue	Date
A	FIRST ISSUE	23/07/25

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

C0655N
STATE HIGHWAY 10
PUKETONA
SECTION 18 SO 575856 & LOT 2 DP 325964

Project	Drawn By
C0655N	B.NEL

Client

LV TRUST HOLDINGS LTD & KP TRUST HOLDINGS LTD

Sheet Title

STORMWATER TANK DETAILS

Sheet

400

FILE PATH: C:\Users\GeologixConsulting&n\Synology Drive\Projects\C0600-C0699\C0655N - Lots 1 & 2 DP 325964 - State Highway 10, Puketona\07 - Technical & Drawings\Drawings\C0655N-S-100-401.dwg C0655N-S-100-401.dwg

PLOTTED: 03/04/2025

OPTION 1: DISPERSION VIA ABOVE GROUND PIPE

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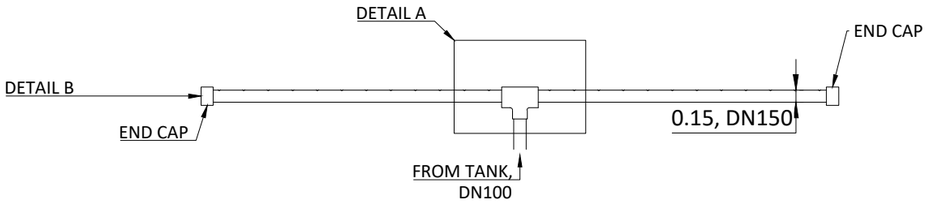

DETAIL B - SIDE VIEW

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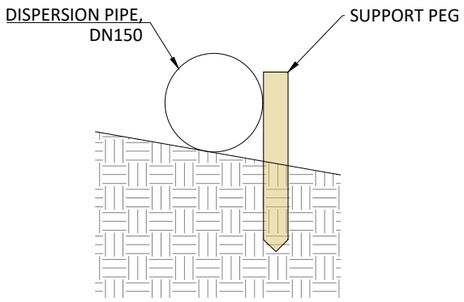

DETAIL A - T JUNCTION AND PERFORATIONS

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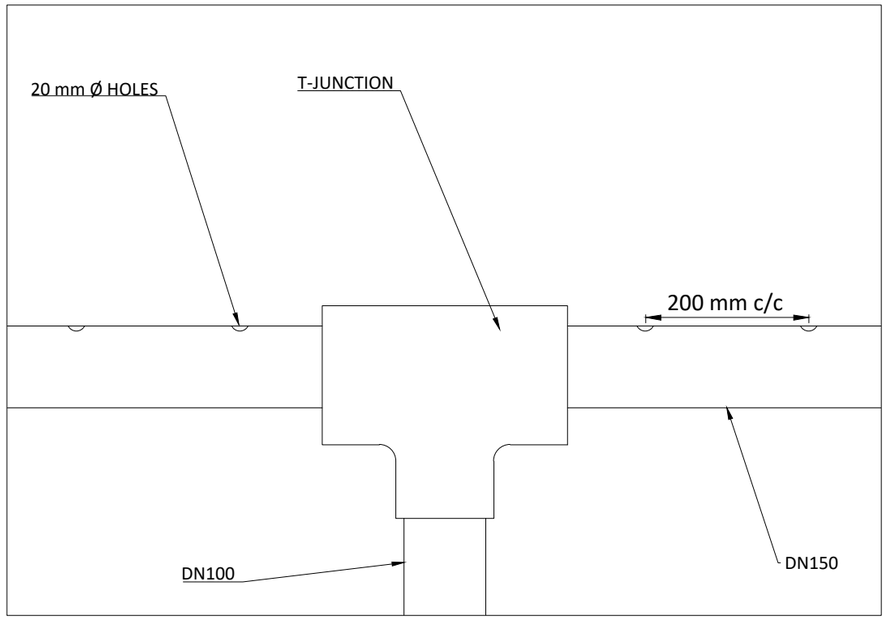
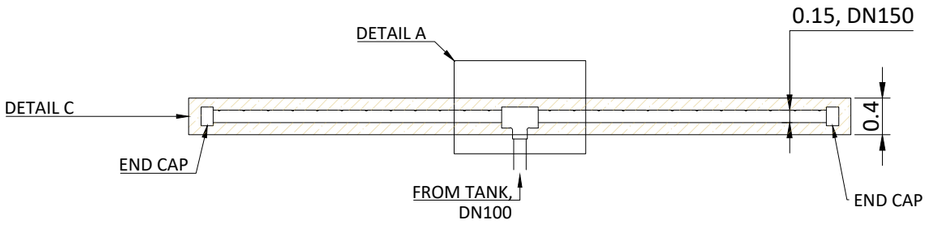


OPTION 2: DISPERSION VIA BELOW GROUND TRENCH

NOT TO SCALE



DETAIL C - SIDE VIEW

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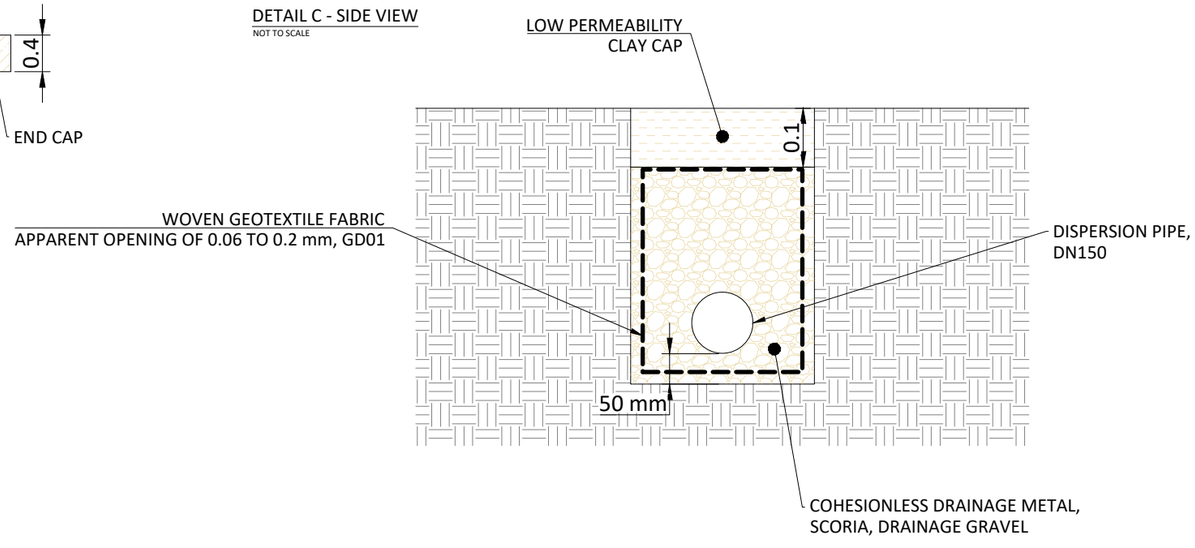
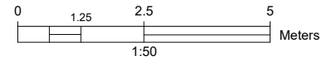


GENERAL NOTES



A	FIRST ISSUE	23/07/25
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

C0655N
STATE HIGHWAY 10
PUKETONA
SECTION 18 SO 575856 & LOT 2 DP 325964

Project	Drawn By
C0655N	B.NEL

Client

LV TRUST HOLDINGS LTD & KP TRUST HOLDINGS LTD

Sheet Title

STORMWATER TANK DETAILS

Sheet

401

geologix
consulting engineers

APPENDIX B

Engineering Borehole Records

INVESTIGATION LOG

HOLE NO.: HA01

CLIENT: LV Trust Holdings Ltd & KP Trust Holdings Ltd

PROJECT: State Highway 10, Puketona

JOB NO.: C0655 N

SITE LOCATION: IOT 1 & 2, State Highway 10, Puketona

START DATE: 08/07/2025

CO-ORDINATES:

ELEVATION: Ground

END DATE: 08/07/2025

CONTRACTOR: Internal

RIG: 50 mm Auger

DRILLER: FS & SH

LOGGED BY: FS & SH

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa)	WATER
Organic TOPSOIL; brownish grey. Moist; low plasticity.		0.0	TS	2 4 6 8 10 12 14 16 18	Vane: 50 100 150 200 Values	
Silty CLAY; brownish light orange. Moist; low plasticity; [Waipapa Group - Residual Soils].		0.2				
		0.4				
Clayey SILT; orange with light grey mottles. Moist; low plasticity; [Waipapa Group - Residual Soils].		0.6				
SILT, with some clay; light greyish orange. Moist to wet; low plasticity; [Waipapa Group - Waipapa Group].		0.8				
1.0m: Becoming saturated.		1.0				▼ 08/07/2025
End Of Hole: 1.20m		1.2				
		1.4				
		1.6				
		1.8				
		2.0				
		2.2				
		2.4				
		2.6				
		2.8				
		3.0				
		3.2				
		3.4				
		3.6				
		3.8				
		4.0				
		4.2				
		4.4				
		4.6				
		4.8				

PHOTO(S)

REMARKS

1. Hand auger drilled to target depth of 1.2 m bgl.
2. Groundwater encountered at 1.0 m bgl during drilling.

WATER

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

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: HA02

CLIENT: LV Trust Holdings Ltd & KP Trust Holdings Ltd

PROJECT: State Highway 10, Puketona

JOB NO.: C0655 N

SITE LOCATION: IOT 1 & 2, State Highway 10, Puketona

START DATE: 08/07/2025

CO-ORDINATES:

ELEVATION: Ground

END DATE: 08/07/2025

CONTRACTOR: Internal

RIG: 50 mm Auger

DRILLER: FS & SH

LOGGED BY: FS

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa)	WATER
Organic TOPSOIL; brownish grey. Moist; low plasticity.		0.0	TS	2 4 6 8 10 12 14 16 18	Vane: 50 100 150 200 Values	Groundwater Not Encountered
0.1m - 0.2m: Silty coarse sand; red.		0.2				
Clayey SILT; brownish orange with light grey specks. Moist; low plasticity; [Waipapa Group - Residual Soils].		0.4				
		0.6				
		0.8				
		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

INVESTIGATION LOG

HOLE NO.: HA03

CLIENT: LV Trust Holdings Ltd & KP Trust Holdings Ltd

PROJECT: State Highway 10, Puketona

JOB NO.: C0655 N

SITE LOCATION: IOT 1 & 2, State Highway 10, Puketona

START DATE: 08/07/2025

CO-ORDINATES:

ELEVATION: Ground

END DATE: 08/07/2025

CONTRACTOR: Internal

RIG: 50 mm Auger

DRILLER: FS & SH

LOGGED BY: FS

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa)	WATER
Organic TOPSOIL; brownish grey. Moist; low plasticity.		0.0	TS	2 4 6 8 10 12 14 16 18	50 100 150 200 Values	Groundwater Not Encountered
SILT, with some clay; orange with white specks. Moist; low plasticity; [Waipapa Group - Residual Soils].		0.2 0.4 0.6 0.8 1.0 1.2				
Silty sandy, with minor clay; pinkish red with white specks. Moist; low plasticity; sand, fine; [Waipapa Group - Residual Soils].		1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8				
End Of Hole: 1.20m						

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.: HA04

CLIENT: LV Trust Holdings Ltd & KP Trust Holdings Ltd

PROJECT: State Highway 10, Puketona

JOB NO.: C0655 N

SITE LOCATION: IOT 1 & 2, State Highway 10, Puketona

START DATE: 08/07/2025

CO-ORDINATES:

ELEVATION: Ground

END DATE: 08/07/2025

CONTRACTOR: Internal

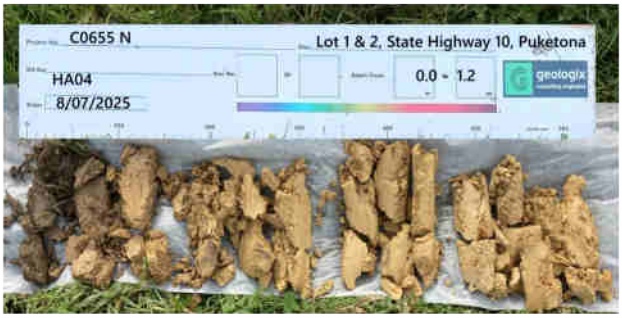
RIG: 50 mm Auger

DRILLER: FS & SH

LOGGED BY: SH

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa)	WATER
Organic TOPSOIL; brownish grey. Moist; low plasticity.		0.0	TS	2 4 6 8 10 12 14 16 18	50 100 150 200 Values	Groundwater Not Encountered
SILT, with some clay; yellow orange. Moist; low plasticity; [Waipapa Group - Residual Soils].		0.2 – 0.8				
Sandy SILT, with some clay; pale yellow with dark orange and white specks. Moist; low plasticity; [Waipapa Group - Residual Soils].		1.0 – 1.2				
End Of Hole: 1.20m		1.2 – 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

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APPENDIX C

Assessment of Environmental Effects and Assessment Criteria

Table 11: Wastewater Assessment of Environmental Effects

Item	NRC Separation Requirement[2]	FNDC Separation Requirement	Site Assessment[3]
Individual System Effects			
Flood Plains	Above 5 % AEP	NR	Complies according to available GIS data and visual assessment.
Stormwater Flowpath[4]	5 m	NR	Complies, see annotations on Drawing No. 101.
Surface water feature[5]	15 m	15 m (3x feature area in ha)	Complies.
Coastal Marine Area	15 m	30 m	Complies, see annotations on Drawing No. 101.
Existing water supply bore.	20 m	NR	Complies. None recorded within or within 20 m of the site boundaries.
Property boundary	1.5 m	1.5	Complies. Including proposed subdivision boundaries.
Winter groundwater table	0.6 m	0.6 m	Complies.
Topography			Ok – chosen disposal areas are flat and level to <10 °.
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. 101.
4. Including any formed road with kerb and channel, and water-table drain that is down-slope of the disposal area.
5. River, lake, stream, pond, dam, or natural wetland.

AEP Annual Exceedance Probability.
NR No Requirement.

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

Assessment Criteria	Comments
1) the discharge or diversion is not from: a) a public stormwater network, or b) a high-risk industrial or trade premises	Complies
2) the diversion and discharge does not cause or increase flooding of land on another property in a storm event of up to and including a 10 percent annual exceedance probability, or flooding of buildings on another property in a storm event of up to and including a one percent annual exceedance probability	Complies, attenuation conceptually sized for 1 % events for all new surfaces. To be applied as a condition of consent.
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. Lots 1-5 are proposed residential or rural.
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. Lots 1-5 are proposed residential or rural.
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 (the latter outside the scope of this engagement).
7) the discharge does not contain more than 15 milligrams per litre of total petroleum hydrocarbons	Complies.
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.

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APPENDIX D

Stormwater Calculations

Project Ref:	C0655		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	Puketona Junction			
Design Case:	CONCEPT DEVELOPMENT Lot 1		**50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	8 August 2025	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A			
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	Ex. Drive
EX. PERVIOUS	600	0.67	PASTURE
TOTAL	**600**	TYPE D	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	300	0.83	DRIVEWAY - METAL
PERVIOUS		0	
EX. CONSENTED	0	0	
TOTAL	**600**	TYPE D	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	71.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	85.80	mm/hr

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

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

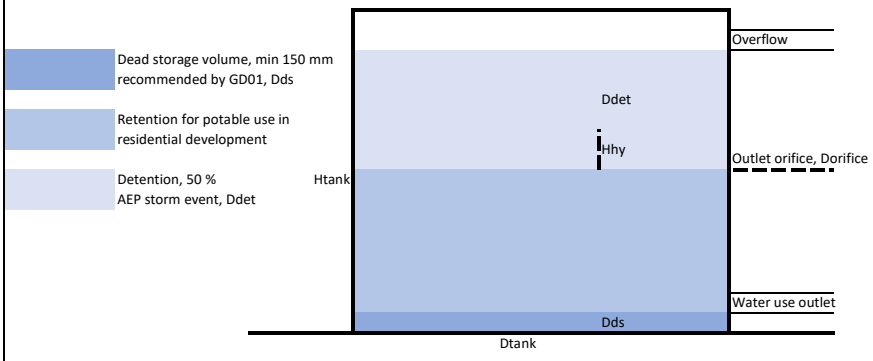
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	71.50	1.2	85.80	12.80	7.98	6.39	*Critical duration (time of concentration) for the catchments is 10min*
20	49.70	1.2	59.64	8.90	6.66	5.33	
30	40.40	1.2	48.48	7.23	5.41	4.33	
60	28.20	1.2	33.84	5.05	3.78	3.02	
120	19.60	1.2	23.52	3.51	2.63	2.10	*Pre-dev calculated on Intensity without CC factor*
360	10.60	1.2	12.72	1.90	1.42	1.14	
720	6.99	1.2	8.39	1.25	0.94	0.75	
1440	4.43	1.2	5.32	0.79	0.59	0.47	
2880	2.68	1.2	3.22	0.48	0.36	0.29	
4320	1.96	1.2	2.35	0.35	0.26	0.21	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	5.93	6.86	0.45	0.45	6.41	3847	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	4.13	4.77	1.20	0.45	4.32	5182	
30	3.35	3.88	0.98	0.45	3.43	6166	
60	2.34	2.71	0.68	0.45	2.25	8116	
120	1.63	1.88	0.47	0.45	1.43	10287	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	0.88	1.02	0.26	0.45	0.56	12199	
720	0.58	0.67	0.17	0.45	0.22	9427	
1440	0.37	0.43	0.11	0.45	No Att. Req.	0	
2880	0.22	0.26	0.06	0.45	No Att. Req.	0	
4320	0.16	0.19	0.05	0.45	No Att. Req.	0	

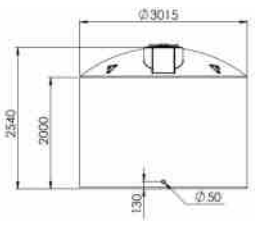
ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 15,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	12.199	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2	m	Concept sizing for 15,000 litre tank
TANK DIAMETER, Dtank	3.015	m	No. of Tanks 2
TANK AREA, Atank	14.28	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	28558	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.85	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.00	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00045	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.43	m	
AREA OF ORIFICE, Aorifice	2.52E-04	m2	
ORIFICE DIAMETER, Dorifice	18	mm	
VELOCITY AT ORIFICE	4.09	m/s	At max. head level



Project Ref:	C0655		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	Puketona Junction			
Design Case:	CONCEPT DEVELOPMENT Lot 1		**20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	8 August 2025	REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER 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. Drive
EX. PERVIOUS	600	0.67	PASTURE
TOTAL	**600**	TYPE D	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	300	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**600**	TYPE D	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	92.3	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	110.8	mm/hr

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

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

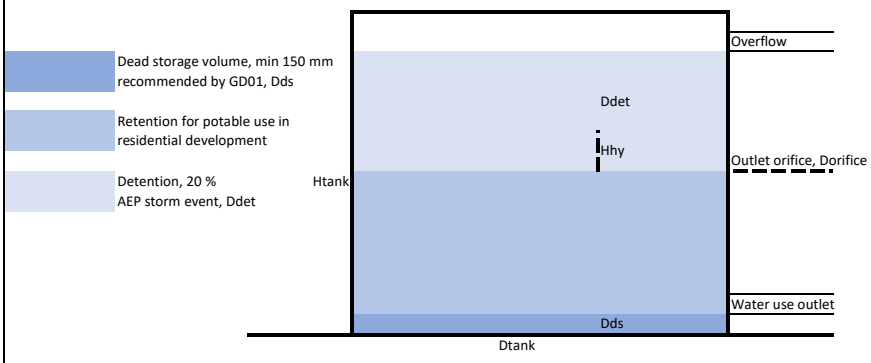
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	92.30	1.2	110.76	16.52	10.31	8.25	*Critical duration (time of concentration) for the catchments is 10min*
20	64.30	1.2	77.16	11.51	8.62	6.89	
30	52.30	1.2	62.76	9.36	7.01	5.61	
60	36.60	1.2	43.92	6.55	4.90	3.92	
120	25.50	1.2	30.60	4.56	3.42	2.73	*Pre-dev calculated on Intensity without CC factor*
360	13.90	1.2	16.68	2.49	1.86	1.49	
720	9.15	1.2	10.98	1.64	1.23	0.98	
1440	5.81	1.2	6.97	1.04	0.78	0.62	
2880	3.53	1.2	4.24	0.63	0.47	0.38	
4320	2.58	1.2	3.10	0.46	0.35	0.28	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	7.66	8.86	0.58	0.58	8.28	4966	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	5.34	6.17	3.28	0.58	5.59	6706	
30	4.34	5.02	2.67	0.58	4.44	7985	
60	3.04	3.51	1.87	0.58	2.93	10545	
120	2.12	2.45	1.30	0.58	1.86	13417	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	1.15	1.33	0.71	0.58	0.75	16196	
720	0.76	0.88	0.47	0.58	0.29	12694	
1440	0.48	0.56	0.30	0.58	No Att. Req.	0	
2880	0.29	0.34	0.18	0.58	No Att. Req.	0	
4320	0.21	0.25	0.13	0.58	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 15,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	16.196	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2	m	Concept sizing for 15,000 litre tank
TANK DIAMETER, Dtank	3.015	m	No. of Tanks 2
TANK AREA, Atank	14.28	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	28558	litres	
REQUIRED STORAGE HEIGHT, Ddet	1.13	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.28	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00058	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.57	m	
AREA OF ORIFICE, Aorifice	2.83E-04	m2	
ORIFICE DIAMETER, Dorifice	19	mm	
VELOCITY AT ORIFICE	4.72	m/s	At max. head level

Project Ref:	C0655		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	Puketona Junction			
Design Case:	CONCEPT DEVELOPMENT Lot 1		**10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW**	
Date:	8 August 2025	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	Ex. Drive
EX. PERVIOUS	600	0.67	PASTURE
0	0	0	
TOTAL	**600**	TYPE D	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	300	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**600**	TYPE D	

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	107.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	128.4	mm/hr

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

PRE AND POST-DEVELOPMENT RUNOFF, 10%AEP, VARIOUS DURATIONS

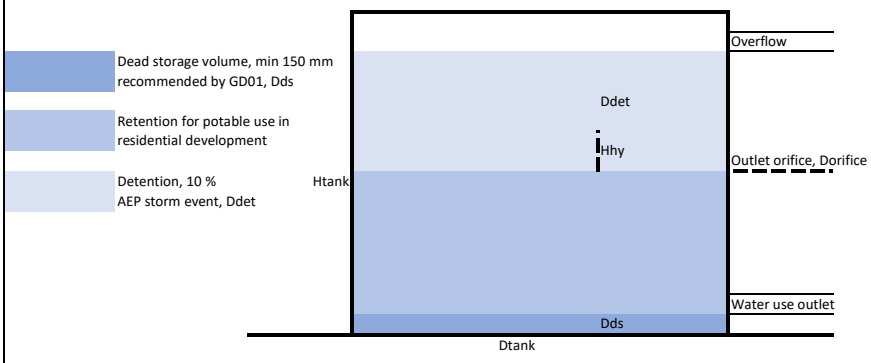
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s		COMMENTS
10	107.00	1.2	128.40	19.15	11.95		*Critical duration (time of concentration) for the catchments is 10min*
20	75.00	1.2	90.00	13.43	10.05		
30	61.00	1.2	73.20	10.92	8.17		
60	42.80	1.2	51.36	7.66	5.74		
120	29.90	1.2	35.88	5.35	4.01		*Pre-dev calculated on Intensity without CC factor*
360	16.30	1.2	19.56	2.92	2.18		
720	10.80	1.2	12.96	1.93	1.45		
1440	6.84	1.2	8.21	1.22	0.92		
2880	4.16	1.2	4.99	0.74	0.56		
4320	3.04	1.2	3.65	0.54	0.41		

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	8.88	10.27	3.07	3.07	7.20	4323	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	6.23	7.20	3.83	3.07	4.13	4959	
30	5.06	5.86	3.11	3.07	2.79	5020	
60	3.55	4.11	2.18	3.07	1.04	3749	
120	2.48	2.87	1.52	3.07	No Att. Req.	0	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	1.35	1.56	0.83	3.07	No Att. Req.	0	
720	0.90	1.04	0.55	3.07	No Att. Req.	0	
1440	0.57	0.66	0.35	3.07	No Att. Req.	0	
2880	0.35	0.40	0.21	3.07	No Att. Req.	0	
4320	0.25	0.29	0.16	3.07	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 15,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	5.020	m3	Select largest storage as per analysis	
TANK HEIGHT, Htank	2	m	Concept sizing for 15,000 litre tank	
TANK DIAMETER, Dtank	3.015	m	No. of Tanks	2
TANK AREA, Atank	14.28	m2	Area of ONE tank	
TANK MAX STORAGE VOLUME, Vtank	28558	litres		
REQUIRED STORAGE HEIGHT, Ddet	0.35	m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	0.50	m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00307	m3/s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	0.18	m		
AREA OF ORIFICE, Aorifice	2.66E-03	m2		
ORIFICE DIAMETER, Dorifice	58	mm		
VELOCITY AT ORIFICE	2.63	m/s	At max. head level	

Project Ref:	C0655		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	Puketona Junction			
Design Case:	CONCEPT DEVELOPMENT Lot 1		**1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	8 August 2025	REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER 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				**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		OFFSET	300	0.83	DRIVEWAY - METAL
IMPERVIOUS C	0	0	Ex. Drive	PERVIOUS	0	0	
EX. PERVIOUS	600	0.67	PASTURE	EX. CONSENTED	0	0	
0	0	0		0	0	0	
TOTAL	**600**	TYPE D		**TOTAL**	**600**	TYPE D	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	159.0	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	190.8	mm/hr	

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

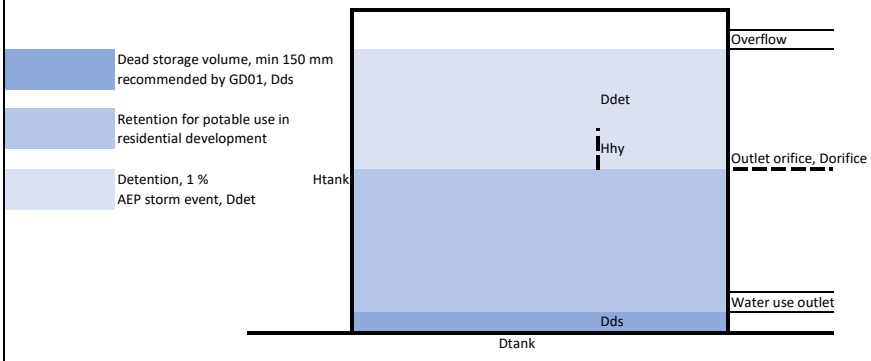
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	159.00	1.2	190.80	28.46	17.76	14.20	*Critical duration (time of concentration) for the catchments is 10min*
20	111.00	1.2	133.20	19.87	14.87	11.90	
30	90.70	1.2	108.84	16.24	12.15	9.72	
60	64.00	1.2	76.80	11.46	8.58	6.86	
120	44.90	1.2	53.88	8.04	6.02	4.81	*Pre-dev calculated on Intensity without CC factor*
360	24.70	1.2	29.64	4.42	3.31	2.65	
720	16.40	1.2	19.68	2.94	2.20	1.76	
1440	10.50	1.2	12.60	1.88	1.41	1.13	
2880	6.40	1.2	7.68	1.15	0.86	0.69	
4320	4.68	1.2	5.62	0.84	0.63	0.50	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	13.20	15.26	1.01	1.01	14.26	8554	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	9.21	10.66	2.69	1.01	9.65	11579	
30	7.53	8.71	2.19	1.01	7.70	13860	
60	5.31	6.14	1.55	1.01	5.14	18493	
120	3.73	4.31	1.09	1.01	3.30	23784	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	2.05	2.37	0.60	1.01	1.36	29467	
720	1.36	1.57	0.40	1.01	0.57	24512	
1440	0.87	1.01	0.25	1.01	0.00	86	
2880	0.53	0.61	0.15	1.01	No Att. Req.	0	
4320	0.39	0.45	0.11	1.01	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 15,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	29.467	m3	Select largest storage as per analysis	
TANK HEIGHT, Htank	2	m	Concept sizing for 15,000 litre tank	
TANK DIAMETER, Dtank	3.015	m	No. of Tanks	2
TANK AREA, Atank	14.28	m2	Area of ONE tank	
TANK MAX STORAGE VOLUME, Vtank	28558	litres		
REQUIRED STORAGE HEIGHT, Ddet	2.06	m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	2.21	m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00101	m3/s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	1.03	m		
AREA OF ORIFICE, Aorifice	3.61E-04	m2		
ORIFICE DIAMETER, Dorifice	21	mm		
VELOCITY AT ORIFICE	6.36	m/s	At max. head level	

Project Ref:	C0655		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	Puketona Junction			
Design Case:	CONCEPT DEVELOPMENT Lots 2 to 4		**50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	8 August 2025	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
TOTAL	**500**	TYPE D	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	71.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	85.80	mm/hr

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

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

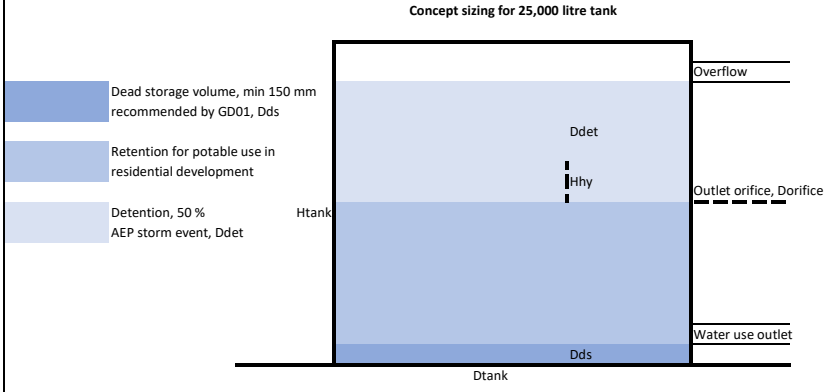
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	71.50	1.2	85.80	10.82	6.65	5.32	*Critical duration (time of concentration) for the catchments is 10min*
20	49.70	1.2	59.64	7.52	5.55	4.44	
30	40.40	1.2	48.48	6.11	4.51	3.61	
60	28.20	1.2	33.84	4.27	3.15	2.52	
120	19.60	1.2	23.52	2.97	2.19	1.75	*Pre-dev calculated on Intensity without CC factor*
360	10.60	1.2	12.72	1.60	1.18	0.95	
720	6.99	1.2	8.39	1.06	0.78	0.62	
1440	4.43	1.2	5.32	0.67	0.49	0.40	
2880	2.68	1.2	3.22	0.41	0.30	0.24	
4320	1.96	1.2	2.35	0.30	0.22	0.18	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	3.96	6.86	1.37	1.37	5.50	3299	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	2.75	4.77	1.69	1.37	3.40	4086	
30	2.24	3.88	1.37	1.37	2.51	4522	
60	1.56	2.71	0.96	1.37	1.34	4827	
120	1.08	1.88	0.67	1.37	0.52	3709	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	0.59	1.02	0.36	1.37	No Att. Req.	0	
720	0.39	0.67	0.24	1.37	No Att. Req.	0	
1440	0.25	0.43	0.15	1.37	No Att. Req.	0	
2880	0.15	0.26	0.09	1.37	No Att. Req.	0	
4320	0.11	0.19	0.07	1.37	No Att. Req.	0	

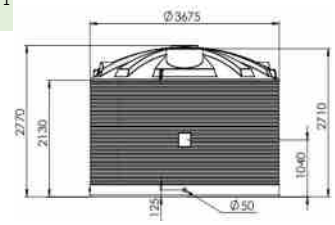
ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	4.827	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.345	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.675	m	No. of Tanks 1
TANK AREA, Atank	10.61	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	24874	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.46	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.61	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00137	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.23	m	
AREA OF ORIFICE, Aorifice	1.04E-03	m2	
ORIFICE DIAMETER, Dorifice	36	mm	
VELOCITY AT ORIFICE	2.99	m/s	At max. head level



Project Ref:	C0655		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	Puketona Junction			
Design Case:	CONCEPT DEVELOPMENT Lots 2 to 4		**20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	8 August 2025	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE D	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	92.3	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	110.8	mm/hr

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

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

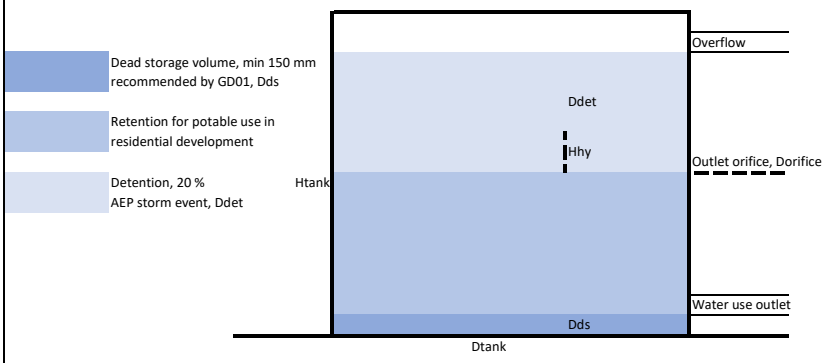
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	92.30	1.2	110.76	13.97	8.59	6.87	*Critical duration (time of concentration) for the catchments is 10min*
20	64.30	1.2	77.16	9.73	7.18	5.74	
30	52.30	1.2	62.76	7.91	5.84	4.67	
60	36.60	1.2	43.92	5.54	4.09	3.27	
120	25.50	1.2	30.60	3.86	2.85	2.28	*Pre-dev calculated on Intensity without CC factor*
360	13.90	1.2	16.68	2.10	1.55	1.24	
720	9.15	1.2	10.98	1.38	1.02	0.82	
1440	5.81	1.2	6.97	0.88	0.65	0.52	
2880	3.53	1.2	4.24	0.53	0.39	0.32	
4320	2.58	1.2	3.10	0.39	0.29	0.23	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	5.11	8.86	1.76	1.76	7.10	4258	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	3.56	6.17	3.62	1.76	4.41	5291	
30	2.89	5.02	2.95	1.76	3.26	5862	
60	2.03	3.51	2.06	1.76	1.75	6299	
120	1.41	2.45	1.44	1.76	0.68	4925	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	0.77	1.33	0.78	1.76	No Att. Req.	0	
720	0.51	0.88	0.52	1.76	No Att. Req.	0	
1440	0.32	0.56	0.33	1.76	No Att. Req.	0	
2880	0.20	0.34	0.20	1.76	No Att. Req.	0	
4320	0.14	0.25	0.15	1.76	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	6.299	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.345	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.675	m	No. of Tanks 1
TANK AREA, Atank	10.61	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	24874	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.59	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.74	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00176	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.30	m	
AREA OF ORIFICE, Aorifice	1.18E-03	m2	
ORIFICE DIAMETER, Dorifice	39	mm	
VELOCITY AT ORIFICE	3.41	m/s	At max. head level

Project Ref:	C0655		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	Puketona Junction			
Design Case:	CONCEPT DEVELOPMENT Lots 2 to 4		**10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW**	
Date:	8 August 2025	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE D	

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	107.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	128.4	mm/hr

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

PRE AND POST-DEVELOPMENT RUNOFF, 10%AEP, VARIOUS DURATIONS

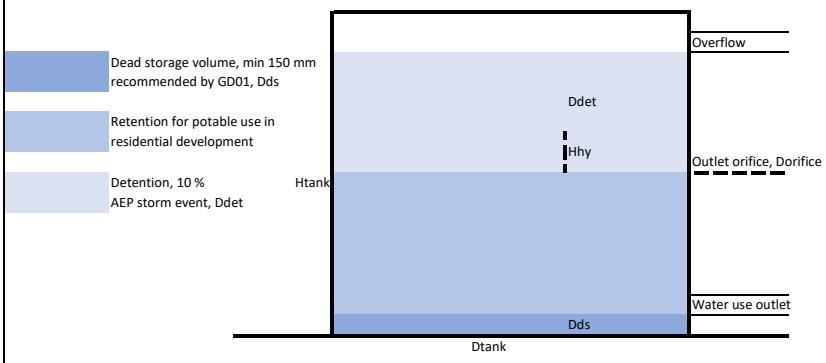
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s		COMMENTS
10	107.00	1.2	128.40	16.19	9.96		*Critical duration (time of concentration) for the catchments is 10min*
20	75.00	1.2	90.00	11.35	8.38		
30	61.00	1.2	73.20	9.23	6.81		
60	42.80	1.2	51.36	6.48	4.78		
120	29.90	1.2	35.88	4.52	3.34		*Pre-dev calculated on Intensity without CC factor*
360	16.30	1.2	19.56	2.47	1.82		
720	10.80	1.2	12.96	1.63	1.21		
1440	6.84	1.2	8.21	1.04	0.76		
2880	4.16	1.2	4.99	0.63	0.46		
4320	3.04	1.2	3.65	0.46	0.34		

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	5.92	10.27	4.04	4.04	6.24	3741	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	4.15	7.20	4.23	4.04	3.16	3796	
30	3.38	5.86	3.44	4.04	1.82	3276	
60	2.37	4.11	2.41	4.04	0.07	261	
120	1.65	2.87	1.68	4.04	No Att. Req.	0	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	0.90	1.56	0.92	4.04	No Att. Req.	0	
720	0.60	1.04	0.61	4.04	No Att. Req.	0	
1440	0.38	0.66	0.39	4.04	No Att. Req.	0	
2880	0.23	0.40	0.23	4.04	No Att. Req.	0	
4320	0.17	0.29	0.17	4.04	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	3.796	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.345	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.675	m	No. of Tanks 1
TANK AREA, Atank	10.61	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	24874	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.36	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.51	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00404	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.18	m	
AREA OF ORIFICE, Aorifice	3.47E-03	m2	
ORIFICE DIAMETER, Dorifice	67	mm	
VELOCITY AT ORIFICE	2.65	m/s	At max. head level

Project Ref:	C0655		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	Puketona Junction			
Design Case:	CONCEPT DEVELOPMENT Lots 2 to 4		**1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	8 August 2025	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE D	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	159.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	190.8	mm/hr

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

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

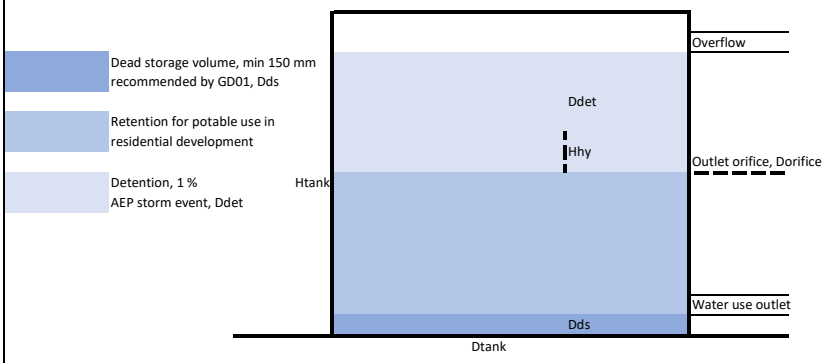
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	159.00	1.2	190.80	24.06	14.80	11.84	*Critical duration (time of concentration) for the catchments is 10min*
20	111.00	1.2	133.20	16.80	12.40	9.92	
30	90.70	1.2	108.84	13.73	10.13	8.10	
60	64.00	1.2	76.80	9.69	7.15	5.72	
120	44.90	1.2	53.88	6.79	5.01	4.01	*Pre-dev calculated on Intensity without CC factor*
360	24.70	1.2	29.64	3.74	2.76	2.21	
720	16.40	1.2	19.68	2.48	1.83	1.47	
1440	10.50	1.2	12.60	1.59	1.17	0.94	
2880	6.40	1.2	7.68	0.97	0.71	0.57	
4320	4.68	1.2	5.62	0.71	0.52	0.42	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	8.80	15.26	3.04	3.04	12.23	7335	*Selected Tank Outflow is selected for critical duration (time of concentration).*
20	6.14	10.66	3.77	3.04	7.62	9141	
30	5.02	8.71	3.08	3.04	5.67	10203	
60	3.54	6.14	2.18	3.04	3.11	11179	
120	2.48	4.31	1.53	3.04	1.27	9156	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	1.37	2.37	0.84	3.04	No Att. Req.	0	
720	0.91	1.57	0.56	3.04	No Att. Req.	0	
1440	0.58	1.01	0.36	3.04	No Att. Req.	0	
2880	0.35	0.61	0.22	3.04	No Att. Req.	0	
4320	0.26	0.45	0.16	3.04	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	11.179	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.345	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.675	m	No. of Tanks 1
TANK AREA, Atank	10.61	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	24874	litres	
REQUIRED STORAGE HEIGHT, Ddet	1.05	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.20	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00304	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.53	m	
AREA OF ORIFICE, Aorifice	1.52E-03	m2	
ORIFICE DIAMETER, Dorifice	44	mm	
VELOCITY AT ORIFICE	4.55	m/s	At max. head level

Project Ref:	C0655	**STORMWATER DISPERSION PIPE/ TRENCH**	geologix consulting engineers
Project Address:	Puketona Junction		
Design Case:	CONCEPT DEVELOPMENT 500m2	**DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH**	
Date:	8 August 2025 REV 1		

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

DESIGN STORM EVENT **1%** AEP EVENT

SLOPE BETWEEN SOURCE & DISPERSION DEVICE

ELEVATION	h	CHAINAGE, x	Δ x	h bar	Δ A
m	m	m	m	m	m2
72	0	0	0	0	0
70	2	30	30	1	30
	TOTALS	30	30		30
	SLOPE, Sc	0.067	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	15	0.009	0.000	0.0000	0.000	**0 % full**
0.100	0.050	5.381	0.0451	0.0001	0.003	15	0.009	0.630	0.0001	0.093	
0.100	0.100	4.996	0.0644	0.0004	0.006	15	0.009	0.984	0.0004	0.402	
0.100	0.150	4.692	0.0795	0.0007	0.009	15	0.009	1.268	0.0009	0.936	
0.100	0.200	4.429	0.0927	0.0011	0.012	15	0.009	1.509	0.0017	1.687	
0.100	0.250	4.189	0.1047	0.0015	0.015	15	0.009	1.719	0.0026	2.639	
0.100	0.300	3.965	0.1159	0.0020	0.017	15	0.009	1.904	0.0038	3.773	
0.100	0.350	3.751	0.1266	0.0024	0.019	15	0.009	2.068	0.0051	5.065	
0.100	0.400	3.544	0.1369	0.0029	0.021	15	0.009	2.213	0.0065	6.492	
0.100	0.450	3.342	0.1471	0.0034	0.023	15	0.009	2.341	0.0080	8.024	
0.100	0.500	3.142	0.1571	0.0039	0.025	15	0.009	2.453	0.0096	9.632	**50 % full**
0.100	0.550	2.941	0.1671	0.0044	0.026	15	0.009	2.549	0.0113	11.284	
0.100	0.600	2.739	0.1772	0.0049	0.028	15	0.009	2.630	0.0129	12.943	
0.100	0.650	2.532	0.1875	0.0054	0.029	15	0.009	2.696	0.0146	14.572	
0.100	0.700	2.319	0.1982	0.0059	0.030	15	0.009	2.747	0.0161	16.129	
0.100	0.750	2.094	0.2094	0.0063	0.030	15	0.009	2.780	0.0176	17.567	
0.100	0.800	1.855	0.2214	0.0067	0.030	15	0.009	2.796	0.0188	18.831	
0.100	0.850	1.591	0.2346	0.0071	0.030	15	0.009	2.790	0.0199	19.851	
0.100	0.900	1.287	0.2498	0.0074	0.030	15	0.009	2.758	0.0205	20.532	
0.100	0.950	0.902	0.2691	0.0077	0.029	15	0.009	2.686	0.0207	20.700	
0.100	1.000	0.000	0.3142	0.0079	0.025	15	0.009	2.453	0.0193	19.265	**Flowing full**

DISPERSION SPECIFICATION

INCOMING PIPE PROPERTIES:

TANK OUTFLOW, 1 % AEP	15.26 l/s		
MAXIMUM PIPE FLOW	20.70 l/s		
SUFFICIENT CAPACITY IN PIPE	YES		
LONGITUDINAL SLOPE	0.067 m/m		
DESIGN VELOCITY, Dv	2.796 m/s		

LEVEL SPREADER SPECIFICATIONS:

PIPE DIAMETER, m	0.20	m
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	48	No.
DIA. OF ORIFICE, D	23	mm
ORIFICE INTERVALS, C/C	175	mm
DISPERSION PIPE LENGTH, L	**8.2**	**m**

ORIFICE DESIGN FLOW CHECK:

AREA OF SINGLE ORIFICE, A	0.00042	m2		
FLOW OUT OF 1 ORIFICE	0.000360817	m3/s	0.36 l/s	
FLOW OUT OF ALL ORIFICES	0.01731921	m3/s	17.32 l/s	**DESIGN OK**
VELOCITY FROM SINGLE ORIFICE	0.87	m/s		

BROAD CRESTED WEIR DESIGN FLOW CHECK:

FLOW DEPTH, h	0.1	m		
BASE WIDTH = L	8.2	m		
FLOW AREA	0.82	m2		
WEIR FLOW	0.01530	m3/s	15.30 l/s	**DESIGN OK**
WEIR VELOCITY	0.019	m/s		

INCOMING PIPE & SPREADER SUMARY:

	LOT-	
INCOMING PIPE DIAMETER, m	0.100	m
SPREADER PIPE DIAMETER, m	0.150	m
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	48	No.
DIA. OF ORIFICE, D	23	mm
ORIFICE INTERVALS, C/C	175	mm
DISPERSION PIPE LENGTH, L	**8.225**	**m**

HIRDS V4 Intensity-Duration-Frequency Results
Sitename: Puketona Roundabout SH10
Coordinate system: WGS84
Longitude: 173.9626
Latitude: -35.3034

DDF Model Parameters:	c	d	e	f	g	h	i
Values:	0.00299961	0.48018256	-0.00722625	-0.00407649		0.25254191	-0.01189878	3.24935004

Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Rate (mm/hr)
	24	100	3.17805383	4.600149227	10.45726361

Rainfall intensities (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	65.4	45.4	36.9	25.8	17.9	9.69	6.36	4.03	2.44	1.78	1.4	1.16
2	0.5	71.5	49.7	40.4	28.2	19.6	10.6	6.99	4.43	2.68	1.96	1.54	1.28
5	0.2	92.3	64.3	52.3	36.6	25.5	13.9	9.15	5.81	3.53	2.58	2.04	1.68
10	0.1	107	75	61	42.8	29.9	16.3	10.8	6.84	4.16	3.04	2.4	1.99
20	0.05	123	85.8	69.9	49.1	34.3	18.8	12.4	7.9	4.82	3.52	2.79	2.31
30	0.033	132	92.2	75.1	52.9	37	20.2	13.4	8.53	5.21	3.81	3.01	2.5
40	0.025	138	96.8	78.8	55.5	38.8	21.3	14.1	8.99	5.49	4.01	3.18	2.63
50	0.02	143	100	81.8	57.6	40.3	22.1	14.6	9.35	5.71	4.18	3.31	2.74
60	0.017	147	103	84.1	59.3	41.5	22.8	15.1	9.64	5.89	4.31	3.41	2.83
80	0.013	154	108	87.9	62	43.4	23.9	15.8	10.1	6.17	4.52	3.58	2.97
100	0.01	159	111	90.7	64	44.9	24.7	16.4	10.5	6.4	4.68	3.71	3.08
250	0.004	178	125	102	72.3	50.8	28	18.6	11.9	7.3	5.35	4.24	3.52

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	7.2	4.8	3.6	2.6	1.7	1.1	0.77	0.61	0.38	0.29	0.23	0.2
2	0.5	7.9	5.2	3.9	2.8	1.9	1.2	0.85	0.68	0.42	0.33	0.26	0.22
5	0.2	11	7.5	5.6	3.9	2.7	1.7	1.2	0.91	0.57	0.44	0.35	0.3
10	0.1	14	9.9	7.5	5.1	3.5	2.1	1.4	1.1	0.68	0.53	0.42	0.36
20	0.05	18	13	9.8	6.6	4.6	2.7	1.8	1.3	0.81	0.63	0.5	0.42
30	0.033	21	15	11	7.8	5.4	3.1	2.1	1.4	0.89	0.7	0.54	0.47
40	0.025	23	17	13	8.7	6	3.5	2.3	1.5	0.95	0.75	0.58	0.5
50	0.02	25	19	14	9.5	6.6	3.8	2.5	1.6	1	0.79	0.61	0.53
60	0.017	27	20	15	10	7.1	4.1	2.7	1.7	1.1	0.82	0.64	0.55
80	0.013	29	22	16	11	7.9	4.6	3	1.8	1.1	0.88	0.68	0.59
100	0.01	32	24	18	12	8.6	5	3.2	1.9	1.2	0.93	0.72	0.62
250	0.004	43	33	24	18	12	7.1	4.5	2.3	1.5	1.2	0.88	0.76

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	70	48.6	39.4	27.6	19.1	10.2	6.66	4.19	2.52	1.83	1.44	1.19
2	0.5	76.7	53.3	43.3	30.3	21	11.3	7.34	4.62	2.78	2.02	1.59	1.31
5	0.2	99.3	69.2	56.2	39.4	27.4	14.8	9.65	6.08	3.67	2.67	2.1	1.74
10	0.1	116	80.8	65.7	46.1	32.1	17.3	11.4	7.17	4.34	3.16	2.49	2.06
20	0.05	132	92.6	75.3	53	36.9	20	13.1	8.28	5.02	3.66	2.89	2.39
30	0.033	142	99.5	81	57	39.8	21.6	14.2	8.95	5.43	3.96	3.13	2.58
40	0.025	149	104	85.1	59.9	41.8	22.7	14.9	9.44	5.72	4.18	3.3	2.73
50	0.02	155	108	88.3	62.2	43.4	23.6	15.5	9.81	5.96	4.34	3.43	2.84
60	0.017	159	111	90.8	64	44.7	24.3	16	10.1	6.15	4.49	3.54	2.93
80	0.013	166	116	94.9	66.9	46.8	25.5	16.7	10.6	6.45	4.7	3.72	3.07
100	0.01	171	120	98	69.2	48.3	26.4	17.3	11	6.68	4.87	3.85	3.19
250	0.004	192	135	110	78.1	54.7	29.9	19.7	12.5	7.62	5.57	4.41	3.65

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	70	48.6	39.4	27.6	19.1	10.2	6.66	4.19	2.52	1.83	1.44	1.19
2	0.5	76.7	53.3	43.3	30.3	21	11.3	7.34	4.62	2.78	2.02	1.59	1.31
5	0.2	99.3	69.2	56.2	39.4	27.4	14.8	9.65	6.08	3.67	2.67	2.1	1.74
10	0.1	116	80.8	65.7	46.1	32.1	17.3	11.4	7.17	4.34	3.16	2.49	2.06
20	0.05	132	92.6	75.3	53	36.9	20	13.1	8.28	5.02	3.66	2.89	2.39
30	0.033	142	99.5	81	57	39.8	21.6	14.2	8.95	5.43	3.96	3.13	2.58
40	0.025	149	104	85.1	59.9	41.8	22.7	14.9	9.44	5.72	4.18	3.3	2.73
50	0.02	155	108	88.3	62.2	43.4	23.6	15.5	9.81	5.96	4.34	3.43	2.84
60	0.017	159	111	90.8	64	44.7	24.3	16	10.1	6.15	4.49	3.54	2.93
80	0.013	166	116	94.9	66.9	46.8	25.5	16.7	10.6	6.45	4.7	3.72	3.07
100	0.01	171	120	98	69.2	48.3	26.4	17.3	11	6.68	4.87	3.85	3.19
250	0.004	192	135	110	78.1	54.7	29.9	19.7	12.5	7.62	5.57	4.41	3.65

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	71.2	49.5	40.1	28	19.4	10.4	6.74	4.24	2.54	1.84	1.45	1.2
2	0.5	78	54.2	44	30.8	21.3	11.4	7.43	4.66	2.81	2.04	1.6	1.32
5	0.2	101	70.4	57.2	40.1	27.8	15	9.77	6.15	3.71	2.69	2.12	1.75
10	0.1	118	82.3	66.9	47	32.7	17.6	11.5	7.25	4.38	3.19	2.51	2.07
20	0.05	135	94.3	76.7	54	37.6	20.3	13.3	8.38	5.07	3.69	2.91	2.41
30	0.033	145	101	82.6	58.1	40.5	21.9	14.4	9.06	5.49	4	3.15	2.61
40	0.025	152	106	86.7	61	42.5	23.1	15.1	9.55	5.78	4.22	3.33	2.75
50	0.02	158	110	89.9	63.4	44.2	24	15.7	9.93	6.02	4.39	3.46	2.86
60	0.017	162	114	92.5	65.2	45.5	24.7	16.2	10.2	6.21	4.53	3.58	2.95
80	0.013	169	119	96.7	68.2	47.6	25.9	17	10.7	6.52	4.75	3.75	3.1
100	0.01	175	122	99.9	70.5	49.2	26.8	17.6	11.1	6.75	4.92	3.89	3.22
250	0.004	196	138	113	79.6	55.7	30.4	20	12.7	7.7	5.63	4.45	3.68

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	74.8	52	42.2	29.5	20.3	10.8	6.97	4.37	2.61	1.89	1.48	1.22
2	0.5	82.1	57.1	46.3	32.4	22.4	11.9	7.71	4.81	2.88	2.09	1.64	1.35
5	0.2	107	74.3	60.4	42.3	29.3	15.7	10.2	6.36	3.82	2.77	2.18	1.79
10	0.1	124	86.9	70.7	49.6	34.4	18.4	12	7.51	4.52	3.28	2.58	2.13
20	0.05	143	99.7	81.1	57	39.6	21.3	13.9	8.68	5.24	3.8	2.99	2.47
30	0.033	153	107	87.3	61.4	42.7	23	15	9.39	5.67	4.12	3.24	2.67
40	0.025	161	112	91.6	64.5	44.9	24.2	15.8	9.9	5.97	4.35	3.42	2.82
50	0.02	167	117	95.1	67	46.6	25.1	16.4	10.3	6.22	4.52	3.56	2.94
60	0.017	171	120	97.9	69	48	25.9	16.9	10.6	6.42	4.67	3.68	3.03
80	0.013	179	125	102	72.2	50.3	27.1	17.7	11.1	6.73	4.9	3.86	3.19
100	0.01	185	130	106	74.6	52	28.1	18.4	11.5	6.98	5.08	4	3.3
250	0.004	207	146	119	84.2	58.8	31.9	20.9	13.2	7.96	5.8	4.58	3.78

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	70.7	49.1	39.8	27.8	19.2	10.3	6.71	4.22	2.54	1.84	1.45	1.19
2	0.5	77.5	53.9	43.7	30.6	21.2	11.3	7.39	4.64	2.8	2.03	1.6	1.32
5	0.2	100	69.9	56.8	39.8	27.7	14.9	9.72	6.12	3.69	2.69	2.12	1.75
10	0.1	117	81.7	66.4	46.7	32.4	17.5	11.4	7.22	4.36	3.18	2.5	2.07
20	0.05	134	93.6	76.2	53.6	37.3	20.2	13.2	8.34	5.05	3.68	2.9	2.4
30	0.033	144	101	81.9	57.7	40.2	21.8	14.3	9.02	5.47	3.98	3.14	2.6
40	0.025	151	106	86	60.6	42.2	22.9	15	9.5	5.76	4.2	3.31	2.74
50	0.02	156	110	89.3	62.9	43.9	23.8	15.6	9.88	5.99	4.37	3.45	2.85
60	0.017	161	113	91.8	64.7	45.2	24.6	16.1	10.2	6.18	4.51	3.56	2.94
80	0.013	168	118	96	67.7	47.3	25.7	16.9	10.7	6.49	4.73	3.74	3.09
100	0.01	173	122	99.1	69.9	48.9	26.6	17.5	11.1	6.72	4.9	3.88	3.2
250	0.004	195	137	112	79	55.3	30.2	19.9	12.6	7.67	5.6	4.43	3.67

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	78.1	54.3	44	30.8	21.1	11.2	7.19	4.49	2.67	1.92	1.51	1.24
2	0.5	85.7	59.6	48.4	33.8	23.3	12.3	7.96	4.95	2.95	2.13	1.67	1.38
5	0.2	112	77.8	63.2	44.3	30.6	16.3	10.5	6.55	3.92	2.84	2.23	1.83
10	0.1	130	91	74	52	36	19.2	12.4	7.74	4.64	3.36	2.64	2.17
20	0.05	149	104	85	59.8	41.5	22.2	14.4	8.96	5.38	3.9	3.07	2.52
30	0.033	161	112	91.5	64.4	44.7	23.9	15.5	9.69	5.83	4.22	3.32	2.74
40	0.025	168	118	96.1	67.7	47	25.2	16.4	10.2	6.14	4.46	3.51	2.89
50	0.02	175	122	99.7	70.3	48.9	26.2	17	10.6	6.4	4.64	3.65	3.01
60	0.017	180	126	103	72.3	50.3	27	17.6	11	6.6	4.79	3.77	3.1
80	0.013	188	132	107	75.7	52.7	28.3	18.4	11.5	6.93	5.03	3.95	3.26
100	0.01	194	136	111	78.2	54.4	29.3	19.1	11.9	7.18	5.21	4.1	3.38
250	0.004	218	153	125	88.3	61.6	33.3	21.7	13.6	8.19	5.95	4.69	3.87

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	72	50	40.6	28.4	19.6	10.5	6.79	4.27	2.56	1.85	1.46	1.2
2	0.5	78.9	54.9	44.5	31.2	21.6	11.5	7.49	4.7	2.82	2.05	1.61	1.33
5	0.2	102	71.3	58	40.6	28.2	15.1	9.86	6.2	3.73	2.71	2.13	1.76
10	0.1	119	83.4	67.8	47.6	33.1	17.8	11.6	7.31	4.41	3.21	2.53	2.09
20	0.05	137	95.5	77.8	54.7	38	20.5	13.4	8.45	5.11	3.72	2.93	2.42
30	0.033	147	103	83.7	58.9	41	22.2	14.5	9.14	5.53	4.02	3.18	2.62
40	0.025	154	108	87.8	61.9	43.1	23.3	15.3	9.63	5.83	4.25	3.35	2.77
50	0.02	160	112	91.1	64.2	44.8	24.2	15.9	10	6.07	4.42	3.49	2.88
60	0.017	164	115	93.8	66.1	46.1	25	16.4	10.3	6.26	4.56	3.6	2.97
80	0.013	171	120	98	69.1	48.2	26.2	17.1	10.8	6.57	4.79	3.78	3.12
100	0.01	177	124	101	71.4	49.9	27.1	17.8	11.2	6.8	4.96	3.92	3.24
250	0.004	199	140	114	80.7	56.4	30.7	20.2	12.8	7.76	5.67	4.48	3.7

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	85.5	59.4	48.2	33.7	23	12	7.67	4.75	2.8	2.01	1.57	1.29
2	0.5	94	65.4	53.1	37.1	25.5	13.3	8.52	5.25	3.11	2.23	1.75	1.43
5	0.2	123	85.6	69.5	48.8	33.6	17.7	11.3	6.98	4.14	2.99	2.34	1.92
10	0.1	144	100	81.6	57.3	39.6	20.8	13.4	8.27	4.92	3.55	2.78	2.28
20	0.05	165	115	93.8	66	45.6	24.1	15.5	9.57	5.71	4.12	3.23	2.65
30	0.033	177	124	101	71.1	49.3	26.1	16.8	10.4	6.19	4.47	3.5	2.88
40	0.025	186	130	106	74.7	51.8	27.5	17.7	10.9	6.52	4.72	3.7	3.04
50	0.02	193	135	110	77.7	53.8	28.6	18.4	11.4	6.8	4.91	3.85	3.16
60	0.017	199	139	113	80	55.4	29.5	19	11.8	7.01	5.08	3.98	3.27
80	0.013	208	146	119	83.7	58.1	30.9	19.9	12.3	7.37	5.33	4.17	3.44
100	0.01	214	150	123	86.5	60	32	20.6	12.8	7.63	5.52	4.33	3.56
250	0.004	241	169	138	97.7	67.9	36.3	23.4	14.6	8.71	6.3	4.96	4.07

HIRDS V4 Depth-Duration-Frequency Results
Sitename: Puketona Roundabout SH10
Coordinate system: WGS84
Longitude: 173.9626
Latitude: -35.3034
DDF Model

Parameters:	c	d	e	f	g	h	i
Values:	0.00299961	0.48018256	-0.00722625	-0.00407649		0.25254191	-0.01189878	3.24935

Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Depth (mm)
	24	100	3.17805383	4.600149227	250.9743266

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.9	15.1	18.4	25.8	35.8	58.1	76.3	96.6	117	128	135	139
2	0.5	11.9	16.6	20.2	28.2	39.2	63.8	83.9	106	129	141	148	153
5	0.2	15.4	21.4	26.1	36.6	51	83.4	110	139	170	186	195	202
10	0.1	17.9	25	30.5	42.8	59.7	97.8	129	164	200	219	231	239
20	0.05	20.5	28.6	34.9	49.1	68.6	113	149	190	231	253	267	277
30	0.033	22	30.7	37.6	52.9	73.9	121	161	205	250	274	289	300
40	0.025	23	32.3	39.4	55.5	77.7	128	169	216	263	289	305	316
50	0.02	23.9	33.4	40.9	57.6	80.6	133	176	224	274	301	318	329
60	0.017	24.5	34.4	42.1	59.3	83	137	181	231	283	310	328	339
80	0.013	25.6	35.9	43.9	62	86.8	143	190	242	296	325	344	356
100	0.01	26.4	37.1	45.4	64	89.7	148	196	251	307	337	356	369
250	0.004	29.7	41.8	51.1	72.3	102	168	223	286	350	385	407	422

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	1.5	1.7	2.5	3.6	6.3	9.6	15	19	22	23	24
2	0.5	1.3	1.7	1.9	2.7	3.9	6.9	11	17	21	24	25	26
5	0.2	1.8	2.4	2.8	3.9	5.5	9.7	15	23	28	32	34	35
10	0.1	2.3	3.2	3.8	5.1	7.1	13	18	27	34	39	41	42
20	0.05	3	4.3	5.1	6.7	9.1	16	23	32	41	46	48	50
30	0.033	3.5	5	6	7.9	11	19	27	35	45	51	53	54
40	0.025	3.8	5.6	6.8	8.9	12	22	30	38	48	54	56	58
50	0.02	4.1	6.1	7.4	9.7	13	24	32	40	51	57	59	61
60	0.017	4.4	6.5	8	10	14	25	34	42	53	60	62	64
80	0.013	4.9	7.2	8.9	12	15	28	38	44	57	64	66	68
100	0.01	5.3	7.8	9.7	13	17	31	41	47	60	67	69	72
250	0.004	7.3	11	14	18	24	44	57	58	74	83	86	88

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.7	16.2	19.7	27.6	38.1	61.3	79.9	101	121	132	138	143
2	0.5	12.8	17.8	21.6	30.3	41.9	67.5	88.1	111	133	145	153	158
5	0.2	16.5	23.1	28.1	39.4	54.7	88.5	116	146	176	192	202	209
10	0.1	19.3	26.9	32.9	46.1	64.2	104	136	172	208	227	239	247
20	0.05	22.1	30.9	37.7	53	73.8	120	157	199	241	263	277	286
30	0.033	23.7	33.2	40.5	57	79.5	129	170	215	261	285	300	310
40	0.025	24.9	34.8	42.5	59.9	83.6	136	179	226	275	301	316	327
50	0.02	25.8	36.1	44.1	62.2	86.8	142	186	235	286	313	330	340
60	0.017	26.5	37.1	45.4	64	89.4	146	192	243	295	323	340	351
80	0.013	27.7	38.8	47.5	66.9	93.5	153	201	255	309	339	357	369
100	0.01	28.5	40.1	49	69.2	96.7	158	208	264	321	351	370	382
250	0.004	32.1	45.1	55.2	78.1	109	179	236	300	366	401	423	438

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.7	16.2	19.7	27.6	38.1	61.3	79.9	101	121	132	138	143
2	0.5	12.8	17.8	21.6	30.3	41.9	67.5	88.1	111	133	145	153	158
5	0.2	16.5	23.1	28.1	39.4	54.7	88.5	116	146	176	192	202	209
10	0.1	19.3	26.9	32.9	46.1	64.2	104	136	172	208	227	239	247
20	0.05	22.1	30.9	37.7	53	73.8	120	157	199	241	263	277	286
30	0.033	23.7	33.2	40.5	57	79.5	129	170	215	261	285	300	310
40	0.025	24.9	34.8	42.5	59.9	83.6	136	179	226	275	301	316	327
50	0.02	25.8	36.1	44.1	62.2	86.8	142	186	235	286	313	330	340
60	0.017	26.5	37.1	45.4	64	89.4	146	192	243	295	323	340	351
80	0.013	27.7	38.8	47.5	66.9	93.5	153	201	255	309	339	357	369
100	0.01	28.5	40.1	49	69.2	96.7	158	208	264	321	351	370	382
250	0.004	32.1	45.1	55.2	78.1	109	179	236	300	366	401	423	438

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.9	16.5	20.1	28	38.7	62.2	80.8	102	122	133	139	144
2	0.5	13	18.1	22	30.8	42.6	68.4	89.1	112	135	147	154	159
5	0.2	16.8	23.5	28.6	40.1	55.7	89.8	117	148	178	194	204	210
10	0.1	19.6	27.4	33.5	47	65.3	106	138	174	210	229	241	249
20	0.05	22.5	31.4	38.4	54	75.1	122	159	201	243	266	280	289
30	0.033	24.1	33.8	41.3	58.1	81	132	172	217	263	288	303	313
40	0.025	25.3	35.5	43.3	61	85.1	138	181	229	278	304	319	330
50	0.02	26.3	36.8	45	63.4	88.4	144	189	238	289	316	333	343
60	0.017	27	37.8	46.3	65.2	91	148	195	246	298	326	343	354
80	0.013	28.2	39.5	48.3	68.2	95.2	155	204	258	313	342	360	372
100	0.01	29.1	40.8	49.9	70.5	98.4	161	211	267	324	354	373	386
250	0.004	32.7	46	56.3	79.6	111	182	240	304	370	405	427	441

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	12.5	17.3	21.1	29.5	40.6	64.7	83.7	105	125	136	142	147
2	0.5	13.7	19	23.2	32.4	44.8	71.4	92.5	116	138	150	157	162
5	0.2	17.8	24.8	30.2	42.3	58.6	94	122	153	183	199	209	215
10	0.1	20.7	29	35.3	49.6	68.9	111	144	180	217	236	248	255
20	0.05	23.8	33.2	40.6	57	79.3	128	166	208	251	274	287	296
30	0.033	25.5	35.7	43.6	61.4	85.4	138	180	225	272	296	311	321
40	0.025	26.8	37.5	45.8	64.5	89.8	145	189	238	287	313	328	339
50	0.02	27.8	38.9	47.6	67	93.3	151	197	247	298	325	342	353
60	0.017	28.6	40	48.9	69	96.1	156	203	255	308	336	353	364
80	0.013	29.8	41.8	51.2	72.2	101	163	213	267	323	353	370	382
100	0.01	30.8	43.2	52.8	74.6	104	169	220	277	335	365	384	396
250	0.004	34.6	48.6	59.5	84.2	118	191	250	316	382	418	439	454

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.8	16.4	19.9	27.8	38.5	61.8	80.5	101	122	132	139	143
2	0.5	12.9	18	21.9	30.6	42.3	68.1	88.7	111	134	146	153	158
5	0.2	16.7	23.3	28.4	39.8	55.3	89.3	117	147	177	193	203	210
10	0.1	19.5	27.2	33.2	46.7	64.9	105	137	173	209	229	240	248
20	0.05	22.3	31.2	38.1	53.6	74.6	121	159	200	242	265	279	288
30	0.033	24	33.5	41	57.7	80.4	131	171	216	262	287	302	312
40	0.025	25.1	35.2	43	60.6	84.5	138	180	228	276	302	318	329
50	0.02	26.1	36.5	44.6	62.9	87.7	143	188	237	288	315	331	342
60	0.017	26.8	37.6	45.9	64.7	90.4	147	193	245	297	325	342	353
80	0.013	28	39.2	48	67.7	94.5	154	203	256	311	341	359	371
100	0.01	28.9	40.5	49.6	69.9	97.7	160	210	266	323	353	372	384
250	0.004	32.4	45.6	55.9	79	111	181	238	303	368	403	425	440

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	13	18.1	22	30.8	42.3	67	86.3	108	128	139	145	149
2	0.5	14.3	19.9	24.2	33.8	46.7	74	95.5	119	142	153	161	165
5	0.2	18.6	25.9	31.6	44.3	61.3	97.6	126	157	188	204	214	220
10	0.1	21.7	30.3	37	52	72	115	149	186	223	242	253	261
20	0.05	24.9	34.8	42.5	59.8	82.9	133	172	215	258	281	294	303
30	0.033	26.8	37.5	45.8	64.4	89.4	144	186	233	280	304	319	328
40	0.025	28.1	39.3	48	67.7	94	151	196	245	295	321	336	347
50	0.02	29.1	40.8	49.9	70.3	97.7	157	204	255	307	334	351	361
60	0.017	29.9	42	51.3	72.3	101	162	211	263	317	345	362	373
80	0.013	31.3	43.9	53.7	75.7	105	170	221	276	333	362	380	392
100	0.01	32.3	45.3	55.4	78.2	109	176	229	286	345	375	394	406
250	0.004	36.3	51	62.5	88.3	123	200	260	326	393	429	451	464

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	12	16.7	20.3	28.4	39.2	62.8	81.5	102	123	133	140	144
2	0.5	13.2	18.3	22.3	31.2	43.1	69.1	89.9	113	136	147	155	159
5	0.2	17.1	23.8	29	40.6	56.4	90.8	118	149	179	195	205	211
10	0.1	19.9	27.8	33.9	47.6	66.1	107	139	176	212	231	243	250
20	0.05	22.8	31.8	38.9	54.7	76.1	123	161	203	245	268	281	290
30	0.033	24.5	34.2	41.8	58.9	82	133	174	219	265	290	305	315
40	0.025	25.7	35.9	43.9	61.9	86.2	140	183	231	280	306	321	332
50	0.02	26.6	37.3	45.6	64.2	89.5	145	190	240	291	318	335	346
60	0.017	27.4	38.4	46.9	66.1	92.2	150	196	248	300	328	346	357
80	0.013	28.6	40.1	49	69.1	96.5	157	206	260	315	345	362	375
100	0.01	29.5	41.4	50.6	71.4	99.7	163	213	269	327	357	376	388
250	0.004	33.1	46.6	57	80.7	113	184	242	307	373	408	430	444

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	14.2	19.8	24.1	33.7	46.1	72.2	92.1	114	135	145	151	155
2	0.5	15.7	21.8	26.5	37.1	51.1	80	102	126	149	161	168	172
5	0.2	20.5	28.5	34.8	48.8	67.2	106	136	168	199	215	224	230
10	0.1	24	33.5	40.8	57.3	79.2	125	161	199	236	256	267	274
20	0.05	27.5	38.4	46.9	66	91.3	145	186	230	274	297	310	318
30	0.033	29.6	41.4	50.5	71.1	98.5	157	201	249	297	322	336	345
40	0.025	31	43.4	53.1	74.7	104	165	212	263	313	340	355	365
50	0.02	32.2	45.1	55.1	77.7	108	171	221	273	326	353	370	380
60	0.017	33.1	46.4	56.7	80	111	177	228	282	337	366	382	392
80	0.013	34.6	48.5	59.3	83.7	116	185	239	296	354	383	401	412
100	0.01	35.7	50.1	61.3	86.5	120	192	247	307	366	397	416	427
250	0.004	40.1	56.4	69.1	97.7	136	218	281	349	418	454	476	489