



Our Reference: 9891.1 (FNDC)

18 July 2024

Resource Consents Department
Far North District Council
JB Centre
KERIKERI

Dear Sir/Madam

RE: Proposed Subdivision of land zoned Residential – 30 Butler Road, Kerikeri – Neo Family Trustee Company Ltd

I am pleased to submit application on behalf of Neo Family Trustee Company Ltd, for a proposed subdivision, and minor breach of impermeable surface coverage, on land at 30 Butler Road, Kerikeri, zoned Residential. The application is a controlled activity.

The application fee of \$2,967 has been paid separately via direct credit.

Regards

Lynley Newport
Senior Planner
THOMSON SURVEY LTD



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 Consent representative to discuss this application prior to lodgement? Yes/No

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

- Land Use (checked), Fast Track Land Use*, Subdivision (checked), Discharge
Extension of time (s.125), Change of conditions (s.127), Change of Consent Notice (s.221(3))
Consent under National Environmental Standard (e.g. Assessing and Managing Contaminants in Soil)
Other (please specify)

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

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

4. Applicant Details:

Name/s:

Laura Knox-Whyte + Darren Whyte

Electronic Address for Service (E-mail):

Phone Numbers:

Postal Address: (or alternative method of service under section 352 of the Act)

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

Name/s:

Lynley Newport; Thomson Survey Ltd

Electronic Address for Service (E-mail):

Phone Numbers:

Postal Address: (or alternative method of service under section 352 of the Act)

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

Name/s: Neo Family Trustee Company Ltd

Property Address/ Location: as per item 4

7. Application Site Details:

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

Site Address/ Location: 30 Butler Road
KERIKERI

Legal Description: Lot 5 DP 69124

Record of Title: NA25A/489

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.**

Steep bank at rear of property and vegetation.

Tenant in front house

8. Description of the Proposal:

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

Subdivision of land in the Residential Zone to create two lots (one additional); associated land use consent for breach of Stormwater Management rule relating to existing & small amount of additional impermeable surface coverage, to be within one of the lots.

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

9. Would you like to request Public Notification?

Yes/No

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

- Building Consent (BC ref # if known) Regional Council Consent (ref # if known)
- National Environmental Standard consent Other (please specify)

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

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

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

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

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

12. Assessment of Environmental Effects:

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

Please see attached AEE.

13. Billing Details:

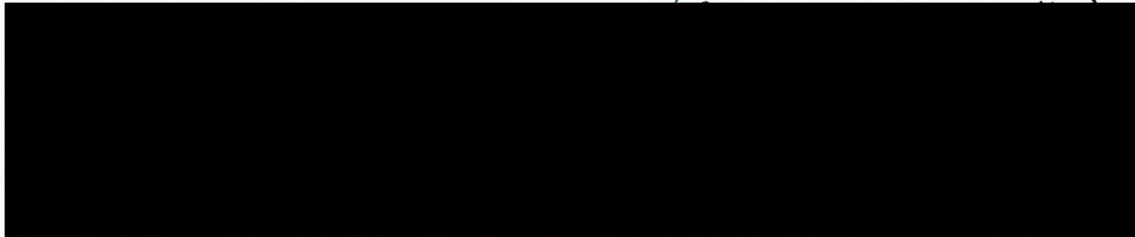
This identifies the person or entity that will be responsible for paying any invoices or receiving any refunds associated with processing this resource consent. Please also refer to Council's Fees and Charges Schedule.

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

Neo Family Trustee Company Ltd

Email:

Postal Address:




Phone Numbers:

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

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

Name: Lauva Knox-Whyte (please print)

Signature:  Signature of bill payer – mandatory) Date: 5/7/2024

14. 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.

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

Name: Lauva Knox-Whyte (please print)

Signature:  (signature)

Date: 5/4/2024

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

Checklist (please tick if information is provided)

- Payment (cheques payable to Far North District Council)
- A current Certificate of Title (Search Copy not more than 6 months old)
- 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.

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

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

UNBOUND

SINGLE SIDED

NO LARGER THAN A3 in SIZE

Neo Family Trustee Company Ltd

PROPOSED SUBDIVISION

30 Butler Road, Kerikeri

REPORT & ASSESSMENT OF ENVIRONMENTAL EFFECTS

**Thomson Survey Ltd
Kerikeri**

1.0 INTRODUCTION

1.1 The Proposal

The applicants propose to subdivide property at 30 Butler Road, Kerikeri, within the Kerikeri township, to create a total of two residential lots (one additional), involving land in one Title. Refer to *Appendix 1* for a copy of proposed Scheme Plan(s). Proposed Lot 1 is vacant land and it so be 619m² in area; proposed Lot 2 contains existing built development and is proposed to be 622m² in area.

The land is zoned Residential in the Operative District Plan, and General Residential in the Proposed District Plan. Both proposed Lots 1 and 2 will have individual access points off Butler Road. Butler Road is a formed and sealed public road. It is intended that both lots be fully serviced in terms of reticulated Council services.

Refer to *Appendix 2* for a location plan.

1.2 Scope of this Report

This assessment and report accompanies the Resource Consent Application made by our clients, and is provided in accordance with Section 88 and Schedule 4 of the Resource Management Act 1991. The application seeks consent to subdivide, as a controlled subdivision activity. The name and address of the owner of the property is contained in the Form 9 Application Form. There are no other activities that are a part of the proposal to which the application relates, and no other resource consents required other than that addressed in this application.

2.0 PROPERTY DETAILS

Location:	30 Butler Road, Kerikeri
Legal Description:	Lot 5 DP 69124
CT:	NA25A/1489 (dated 27 June 1973) (Copy attached as Appendix 3)
Land Area:	1241m ²

3.0 SITE DESCRIPTION

The site is zoned Residential in the Operative District Plan, and General Residential in the Proposed District Plan. The application site is a fully serviced site, connected to Council's reticulated water, wastewater and stormwater. It currently supports an existing single storey residential dwelling with attached carport and deck, along with a concrete driveway, all to be within proposed Lot 2.

The existing house is accessed off Butler Road via a driveway. The site features lawn area with some mature trees. The site is underlain by the Kerikeri Volcanics group. There is a stream approximately 150m northwest of the site but there are no surface water features within the site boundaries. There is an ephemeral stream within the adjacent Reserve land.

The site is relatively flat /level across the upper site (proposed Lot 2) within the boundary of the existing dwelling. A rock wall aligns with the proposed boundary between the lots. A proposed Lot 1 building platform will be located on the more moderate sloping eastern portion - filled to create a level area within the boundaries. There is then a very steep slope towards the southwestern boundary of the site.

The site is not identified as being prone to any natural hazard (NRC on-line hazard maps); and does not contain any high or outstanding natural character or landscape values.

3.1 Legal Interests

There is one existing easement in gross registered on the underlying Certificate of Title. Copy of document is attached as part of Appendix 3. These will remain and carry down on to the new Certificate of Titles.

3.2 Consent History

Building Consent History

BC2019-597 EXM-2020-10254	May 2019	Decommission Existing Onsite Effluent System and Connect to FNDC Reticulation KKWW
BC-2019-597-0 Lapsed	January 2019	Decommission Existing Onsite Wastewater System

BP806325	November 1975	Carport and Utility Room
BP780743	July 1975	New Dwelling
BP3002	June 1975	New Dwelling

Resource Consent History

No Resource Consents on property file.

4.0 SCHEDULE 4 – INFORMATION REQUIRED IN AN APPLICATION

Clauses 2 & 3: Information required in all applications

<i>(1) An application for a resource consent for an activity must include the following:</i>	
<i>(a) a description of the activity:</i>	Refer Sections 1 above and 5 (below) of this Planning Report.
<i>(b) an assessment of the actual or potential effect on the environment of the activity:</i>	Refer to Section 6 of this Planning Report.
<i>(b) a description of the site at which the activity is to occur:</i>	Refer to Section 3 of this Planning Report.
<i>(c) the full name and address of each owner or occupier of the site:</i>	This information is contained in the Form 9 attached to the application.
<i>(d) a description of any other activities that are part of the proposal to which the application relates:</i>	Refer to Sections 3 and 5 of this Planning Report for existing activities within the site. The application is for subdivision pursuant to the Operative District Plan.
<i>(e) a description of any other resource consents required for the proposal to which the application relates:</i>	No other consents are required other than that being applied for pursuant to the Far North Operative District Plan.
<i>(f) an assessment of the activity against the matters set out in Part 2:</i>	Refer to Section 7 of this Planning Report.
<i>(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):</i> <i>(a) any relevant objectives, policies, or rules in a document; and</i> <i>(b) any relevant requirements, conditions, or permissions in any rules in a document; and</i> <i>(c) any other relevant requirements in a document (for example, in a national environmental standard or other regulations).</i>	Refer to Sections 5 & 7 of this Planning Report.

<i>(3) An application must also include any of the following that apply:</i>	
<i>(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)):</i>	Refer sections 3 and 5. The site supports a legally established residential dwelling.
<i>(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)):</i>	There is no existing resource consent. Not applicable.
<i>(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)).</i>	The site is not within an area subject to a customary marine title group. Not applicable.

Clause 4: Additional information required in application for subdivision consent

<i>(4) An application for a subdivision consent must also include information that adequately defines the following:</i>	
<i>(a) the position of all new boundaries: (b) the areas of all new allotments, unless the subdivision involves a cross lease, company lease, or unit plan: (c) the locations and areas of new reserves to be created, including any esplanade reserves and esplanade strips: (d) the locations and areas of any existing esplanade reserves, esplanade strips, and access strips: (e) the locations and areas of any part of the bed of a river or lake to be vested in a territorial authority under section 237A: (f) the locations and areas of any land within the coastal marine area (which is to become part of the common marine and coastal area under section 237A): (g) the locations and areas of land to be set aside as new roads.</i>	Refer to Scheme Plans in Appendix 1.

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

Clause 6: Information required in assessment of environmental effects

<i>(1) An assessment of the activity's effects on the environment must include the following information:</i>	
<i>(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:</i>	Refer to Section 6 of this planning report. The activity will not result in any significant adverse effect on the environment.
<i>(b) an assessment of the actual or potential effect on the environment of the activity:</i>	Refer to Section 6 of this planning report.
<i>(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:</i>	Not applicable as the application does not involve hazardous installations.
<i>(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:</i>	The subdivision does not involve any discharge of contaminant.
<i>(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:</i>	Refer to Section 6 of this planning report.
<i>(f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted:</i>	Refer to Section 8 of this planning report.
<i>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:</i>	No monitoring is required as the scale and significance of effects does not warrant any.
<i>(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</i>	No protected customary right is affected.

is given by the protected customary rights group).	
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Clause 7: Matters that must be addressed by assessment of environmental effects (RMA)

<i>(1) An assessment of the activity’s effects on the environment must address the following matters:</i>	
<i>(a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects:</i>	Refer to Sections 6 and 8 of this planning report and also to the assessment of objectives and policies in Section 7.
<i>(b) any physical effect on the locality, including any landscape and visual effects:</i>	Refer to Section 6. The proposed activity will have no adverse effects on the physical environment and landscape and visual amenity values.
<i>(c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity:</i>	Refer to Section 6. The proposal will result in no adverse effects in regard to habitat and ecosystems.
<i>(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:</i>	Refer to Section 6, and above comments
<i>(e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants:</i>	The subdivision will not result in the discharge of contaminants, nor any unreasonable emission of noise.
<i>(f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or hazardous installations.</i>	The subdivision site is not subject to natural hazards and does not involve hazardous installations.

5.0 ACTIVITY STATUS

5.1 Operative District Plan

The property is zoned Residential and is a sewerred site. There are no resource features applying.

Table 13.7.2.1 Minimum Lot Sizes applies:

(v) RESIDENTIAL 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 sizes are 3,000m ² (unsewered) and 600m ² (sewered).		The minimum lot sizes are 2,000m ² (unsewered) and 300m ² (sewered).

The proposal creates two lots, both greater than 600m² in area. Therefore the subdivision is a controlled subdivision activity in terms of the above Table 13.7.2.1.

Zone Rules

7.6.5.1.6 Stormwater Management – The total estimated existing and proposed (driveway through to Lot 1) impermeable surface coverage to be within a reduced Lot 2 area is 360m². This is 58% of proposed Lot 2 total site area and breaches the zone's permitted threshold of 50% site coverage. **Consent is therefore sought for the existing and future impermeable surface coverage within Lot 2.** Proposed Lot 1 is currently vacant and will be restricted to 309m² impermeable surface coverage before requiring a land use consent. A future lot owner will be responsible for applying for any necessary land use consent at time of building consent, should impermeable surface coverage exceed 309m². It is noted that the Site Suitability Report supporting the application (refer to Appendix 5), uses a future 'concept' development impermeable coverage of 200m².

7.6.5.1.17 Building Coverage – The existing buildings on proposed Lot 2 comply with the permitted threshold of 45% building coverage. New buildings within Lot 1 will be restricted to 283m². As with impermeable coverage, a future lot owner will be responsible for applying for any necessary land use consent at time of building consent, should building coverage exceed 293m². It is noted that the Site Suitability Report supporting the application (refer to Appendix 5), uses a future 'concept' development building coverage of 150m².

The existing buildings within Lot 2 are more than 1.2m from the proposed new internal boundary. The buildings within Lot 2 are approximately 10m from proposed boundary. The height of the building at the nearest point (deck) is less than 4m, with the eave at under 6m in height. Compliance with the Sunlight rule in terms of the new boundary is therefore assured.

District Wide Rules

There are no rules in Chapter 12 of the Plan that are applicable, nor any in Chapter 14. The ODP requires controlled activity subdivisions to comply with rules in 15.1.6C (access). The new accessway and crossing is on reasonably level ground and can be constructed in compliance with Rules 15.1.6C.1.1 - 1.3 inclusive and 15.1.6C.1.6. The new crossing will be over footpath. Rule 15.1.6C.1.4 provides for two crossings per site (complies) and the crossing to be 6m wide or less (complies).

I have not identified any zone or district wide rule breaches. The subdivision remains a controlled activity subdivision.

5.2 Proposed District Plan

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

Rules HS-R2, R5, R6 and R9 in regard to hazardous substances on scheduled sites or areas of significance to Maori, significant natural areas or a scheduled heritage resource. As the application site and proposal does not involve hazardous substances, these rules are not relevant to the proposal.

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

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

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

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

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

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 ES-S5 are in regard to appropriate Erosion and Sediment Control measures being in place during any earthworks. Both aspects can be 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 Orongo Bay Zone.

There are no zone rules within the General Residential Zone with immediate legal effect that affect the proposal's activity status.

6.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS

The matters in 13.7.3 of the District Plan, to be used only for the purposes of determining appropriate conditions of consent, are considered below.

6.1 Allotment Sizes and Dimensions

Proposed Lot 2 supports existing built development. Proposed Lot 1 has no existing built development, and can provide the required 14m x 14m square building envelope complying with the zone's boundary setback requirements. Whilst the land is moderately sloping within Lot 1, the lot is of an appropriate size and dimension to accommodate a suitable building platform.

6.2 Natural and Other Hazards

The site is not identified to be risk of erosion/slippage on either the Far North District Council or Northland Regional Council on line maps, nor is identified as being subject to any flood hazard. The Site Suitability Report supporting the application (refer to Appendix 5) contains a Natural Hazard Assessment in its Section 10 – Table 14. The only hazards found to potentially affect the site are erosion and overland flow paths, flooding, inundation. The report found that there may be erosion potential at stormwater outlet and earthworks areas, but so long as mitigation is provided by means of suitable outlet device and erosion and sediment control measures, the effects will be less than minor. The report found that there is no indication of flooding hazard within the site boundaries. Flooding hazard is identified down stream with appropriate mitigation recommended such that the effects are less than minor.

The site is not subject to landslip; rockfall; alluvion; avulsion; subsidence; fire hazard or sea level rise. No evidence of unconsolidated fill or soil contamination was found.

6.3 Water Supply

The site is within the public water supply area and is located adjacent to a public 65mm MDPE water supply pipeline outside the eastern boundary. New water meter will be installed at the roadside boundary to service Lot 1. Proposed easements A & C include water supply. A private water pipeline through the easement, terminating within Lot 1 with an end cap (pending development of Lot 1 and connection) will be required.

There are two fire hydrants within Butler Road south of the site approximately 84m and 199m from the site. SNZ PAS 4509:2008 requires a minimum of two fire hydrants – one within 135m and the second within 270m to the entrance of the furthest property. The subdivision meets this standard.

6.4 Stormwater Disposal

Refer to the Geologix Consulting Engineers Site Suitability Report attached in *Appendix 5*, section 7. The report assumes permitted activity impermeable coverage for proposed Lot 1, but acknowledges a breach of the permitted activity threshold for coverage to be within proposed Lot 2, largely due to the need to construct a right of way driveway to the rear lot. The report recommends appropriate collection and attenuation mechanisms.

Noting the risk of downstream flooding, the report assesses stormwater management on the basis of providing attenuation up to and including 80% of the pre-development condition for the 1% AEP storm event.

For Lot 2, the report concludes that the minor attenuation requirements, as calculated in their report, are an impractical attenuation arrangement. The report therefore suggests that a more effective attenuation proposal would be to limit the 1% AEP post development discharge to the 50% AEP permitted activity which would “altogether satisfy the regulatory requirements with significant conservatism and present a practical tank and orifice arrangement”.

The report recommends that the stormwater attenuation design for proposed Lot 2 be considered and approved as part of the subdivision, and not require any further detailed design assessment, i.e. no ongoing requirement through a consent notice.

Whilst there is existing stormwater network in the vicinity the site's low position relative to the elevation of the public stormwater network, along with the site's direct proximity to a stream, means that the site's existing development stormwater is managed using the surrounding natural features downslope. This same method is recommended to continue for Lot 2, whilst amending some existing components.

6.5 Sanitary Sewage Disposal

Refer to the Geologix Consulting Engineers Site Suitability Report attached in *Appendix 5*, section 6. The property is connected to the Council's reticulated sewerage scheme, with the existing house on proposed Lot 2 having an existing connection. This is located to the east of the site and will remain in place to continue serving Lot 2.

It is proposed to install an additional valve chamber within the road reserve to serve proposed Lot 1. This will connect to a proposed private LPS macerator pump. The easement provides for private pipeline and new connection to the pressure main in road reserve.

6.6 Energy Supply & Telecommunications

Proposed Lot 2 has existing connections to both power and telecommunications. Both Chorus and Top Energy have been contacted for their requirements to connect proposed Lot 1. Correspondence is attached in *Appendix 4*.

6.7 Easements for any purpose

There are two new easements required for part of this subdivision. Easements A and C, (Easement C is already an existing easement in gross), for right of way access and services over proposed Lot 2 for proposed Lot 1.

6.8 Property Access

Refer to the Geologix Consulting Engineers Site Suitability Report attached in *Appendix 5*, section 11. A new vehicle crossing will be formed to provide access to proposed Lot 1 from Butler Road and will be constructed in accordance with the relevant Council standard. This will be at the northern boundary, with the existing crossing at the southern boundary to continue to serve Lot 2. No modifications are considered necessary for the latter.



Existing concrete crossing to remain for Lot 2



Crossing location for Lot 1

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

Heritage/Cultural Values

There are no archaeological, or Sites of Significance to Maori recorded in the District Plan or the NZAA Archaeological Site Recording Scheme. There are no notable trees or historic sites as scheduled or mapped in the Operative District Plan.

Flora & Fauna

The site is already developed for residential use with no significant areas of indigenous vegetation or habitat present on the site. The removal of some vegetation will be required to build a new dwelling on proposed Lot 1, but this will not be of indigenous species.

The site is in an urban area, zoned Residential. No restriction on the keeping of cats or dogs is considered necessary.

Areas set aside for Conservation Purposes

There are no statutory areas set aside for conservation purposes.

6.10 Access to reserves and waterbodies

The property does not adjoin any qualifying water body. The site is adjacent to a Council reserve (at lower, western boundary) but public access to that reserve is not required or desirable.

6.11 Land Use Compatibility

The subdivision is a controlled activity. It is for urban use within an urban zone. There is no risk of land use compatibility occurring.

6.12 Proximity to Airports

Not relevant.

7.0 STATUTORY ASSESSMENT

7.1 Far North Operative District Plan Objectives and Policies

Objectives and policies relevant to this proposal are considered to be primarily those listed in Chapters 7.6 (Residential Zone); and 13 (Subdivision).

Subdivision Objectives and Policies

The subdivision is compliant with the ODP's controlled activity minimum lot size and density level. It is considered to represent sustainable management, having minimal adverse effects on natural and physical resources.

No reverse sensitivity effects are generated and, subject to mitigation measures, the lots can be developed without exacerbating natural hazards. There are no identified outstanding landscape values and no heritage values or sites of significance.

Both lots can be connected to Council water and sewage reticulation. The subdivision is in keeping with the existing character. Access can be satisfactorily provided.

Relevant objectives and policies from Part 3 of the District Plan are considered below and the proposal is considered to be consistent with the purpose of the Residential Zone.

Residential Zone Objectives and Policies

Objectives and Policies applying to the Residential Zone are focused on sustainable management of urban areas, and avoiding, remedying and mitigating adverse effects. I believe the proposed subdivision to be capable of providing for development that will be in keeping with, and compatible with, the character and amenity of the area. The sites will be fully serviced.

The additional vacant lot has constraints, not in regard to its overall size, but because of its topography. However, Policy 7.6.4.4 encourages a range of housing types and forms of accommodation, therefore a small home, readily accommodated on the additional lot, is consistent with, and provided for by Policy 7.6.4.4.

At least 50% of the new lot will be left permeable and at least 55% left without building coverage. There will be at least a 10m gap between any building on the additional lot and the existing dwelling – well over the permitted setback distance of 1.2m. The existing house does not breach the sunlight rule on the new proposed lot's easement boundary.

In summary the proposed development is consistent with the zone's objectives and policies. I do not believe there are any district wide objectives and policies relevant to the proposal.

7.2 Far North Proposed District Plan Objectives and Policies

PDP Subdivision Objectives:

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 mitigated 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 be provided in an integrated, efficient, coordinated and future-proofed manner at the time of subdivision; and
- b. where no existing connection is available infrastructure should be planned and consideration be given to connections with the wider infrastructure network.

SUB-O4

Subdivision is accessible, connected, and integrated with the surrounding environment and provides for:

- a. public open spaces;
- b. esplanade where land adjoins the coastal marine area; and
- c. esplanade where land adjoins other qualifying water bodies.

The subdivision results in the efficient use of land and achieves the objectives of the zone. It contributes to the local character and sense of place and reverse sensitivity issues are not increased. The subdivision does not increase the risk from natural hazards, and manages adverse effects (SUB-O1). The site and surrounding area is not utilised for productive purposes and is not zoned for productive use, so the subdivision has no need to protect such land. The site contains none of the items listed in SUB-O2(b).

The site is connected to Council services, and has power and telecommunications (SUB-O3). The subdivision creates lots that are accessible, connected and integrated with the surrounding environment. There is existing reserve land in the area and there are no qualifying water bodies that require esplanade (SUB-O4).

SUB-P1 Enable boundary adjustments that:

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

Not relevant – application is not a boundary adjustment.

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

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

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

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

The lots are consistent with the purpose, characteristics and qualities of the zone. They are of adequate size to contain a building platform and have legal and physical access. The PDP's General Residential Zone provides for even smaller lot sizes than the ODP's residential zone, but are yet to have any legal effect.

SUB-P4

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

The site contains no waterbodies, areas of biodiversity, historical or cultural values or hazards.

SUB-P5

Manage subdivision design and layout in the General Residential, Mixed Use and Settlement zone to provide for safe, connected and accessible environments by:

- a. minimising vehicle crossings that could affect the safety and efficiency of the current and future transport network;
- b. avoid cul-de-sac development unless the site or the topography prevents future public access and connections;
- c. providing for development that encourages social interaction, neighbourhood cohesion, a sense of place and is well connected to public spaces;
- d. contributing to a well connected transport network that safeguards future roading connections; and
- e. maximising accessibility, connectivity by creating walkways, cycleways and an interconnected transport network.

Whilst a second crossing to road frontage is proposed, this is allowed (permitted) and does not, in my opinion adversely affect the safety and efficiency of the transport network.

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

The sites are / will be fully serviced.

SUB- P7

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

The site does not adjoin any waterbody.

SUB-P8 Avoid rural lifestyle subdivision in the Rural Production zone unless the subdivision:

Site is not zoned Rural Production.

SUB-P9

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

The site is not zoned either Rural Production or Rural Lifestyle and the subdivision is not a Management Plan.

SUB-P10

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

Not applicable. There no minor residential units.

SUB-P11

Manage subdivision to address the effects of the activity requiring resource consent including (but not limited to) consideration of the following matters where relevant to the application:

- a. consistency with the scale, density, design and character of the environment and purpose of the zone;
- b. the location, scale and design of buildings and structures;
- c. the adequacy and capacity of available or programmed development infrastructure to accommodate the proposed activity; or the capacity of the site to cater for on-site infrastructure associated with the proposed activity;
- d. managing natural hazards;
- e. Any adverse effects on areas with historic heritage and cultural values, natural features and landscapes, natural character or indigenous biodiversity values; and
- f. any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.

As the proposal does not require consent under the PDP, this policy is of limited relevance. In any event, I believe the proposal has adequately taken into account all of the matters listed above.

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

General Residential Zone Objectives:

GRZ-O1

The General Residential zone provides a variety of densities, housing types and lot sizes that respond to:

- a. housing needs and demand;
- b. the adequacy and capacity of available or programmed development infrastructure;
- c. the amenity and character of the receiving residential environment; and
- d. historic heritage.

GRZ-O2

The General Residential zone consolidates urban residential development around available or programmed development infrastructure to improve the function and resilience of the receiving residential environment while reducing urban sprawl.

GRZ-O3

Non-residential activities contribute to the well-being of the community while complementing the scale, character and amenity of the General Residential zone

GRZ-O4

Land use and subdivision in the General Residential zone is supported where there is adequacy and capacity of available or programmed development infrastructure.

GRZ-O5

Land use and subdivision in the General Residential zone provides communities with functional and high amenity living environments.

GRZ-O6

Residential communities are resilient to changes in climate and are responsive to changes in sustainable development techniques.

The proposal will provide for a small, affordable and comfortable home within easy working distance of amenities. The site is serviced. The proposal will not adversely impact on the amenity the area. The site has no heritage values (GRZ-O1). The site is within the Areas of Benefit for Council services and is effectively an example of sensible in-fill urban development (GRZ-O2 & GRZ-O4). GRZ-O3 is not relevant. The site is not in any area subject to hazard and is within a managed stormwater area (GRZ-O5).

GRZ-P1

Enable land use and subdivision in the General Residential zone where:

- a. there is adequacy and capacity of available or programmed development infrastructure to support it; and
- b. it is consistent with the scale, character and amenity anticipated in the residential environment.

The site is fully serviced and the outcome will be consistent with the scale of residential development provided for in the zone.

GRZ-P2

Require all subdivision in the General Residential zone to provide the following reticulated services to the boundary of each lot:

- a. telecommunications:
 - i. fibre where it is available; or
 - ii. copper where fibre is not available;
- b. local electricity distribution network; and

c. wastewater, potable water and stormwater where they are available.

The site is / can be fully serviced.

GRZ-P3

Enable multi-unit developments within the General Residential zone, including terraced housing and apartments, where there is adequacy and capacity of available or programmed development infrastructure.

GRZ-P4

Enable non-residential activities that:

GRZ-P5

Provide for retirement villages where they:

None of the above three policies are relevant to the proposal.

GRZ-P6

Encourage and support the use of on-site water storage to enable sustainable and efficient use of water resources.

If would be feasible, but need not be a requirement, for the additional lot to collect roof run off to tank to supplement town supply.

GRZ-P7

Encourage energy efficient design and the use of small-scale renewable electricity generation in the construction of residential development.

A small home is more energy efficient than a large one. The future owner may choose to utilise renewable electricity, e.g. solar, if they wish.

GRZ-P8

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. consistency with the scale, design, amenity and character of the residential environment;
- b. the location, scale and design of buildings or structures, potential for shadowing and visual dominance;
- c. for residential activities:
 - i. provision for outdoor living space;
 - ii. privacy for adjoining sites;
 - iii. access to sunlight;
- d. for non-residential activities:
 - i. scale and compatibility with residential activities
 - ii. hours of operation
- e. at zone interfaces, any setbacks, fencing, screening or landscaping required to address potential conflicts;
- f. the adequacy and capacity of available or programmed development infrastructure to accommodate the proposed activity, including:
 - i. opportunities for low impact design principles
 - ii. ability of the site to address stormwater and soakage;
- g. managing natural hazards; and
- h. 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 any event this policy simply covers matters already addressed.

7.3 Part 2 Matters

5 Purpose

- (1) *The purpose of this Act is to promote the sustainable management of natural and physical resources.*
- (2) *In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—*
 - (a) *sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
 - (b) *safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
 - (c) *avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

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

6 Matters of national importance

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

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

The application site does not contain or display any of the features, resources or values outlined in Section 6.

7 Other matters

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

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

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

8 Treaty of Waitangi

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

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

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

7.4 National and Regional Planning Documents

There are no National Policy Statements or Environmental Standards relevant to the proposal. However, in regard to the NPS on Urban Development 2020 – Updated May 2022 (NPS UD), whilst the Far North District Council is neither a Tier 1 nor Tier 2 local authority it is worth noting the NPS UD's objectives and policies. These focus on improving housing affordability and enabling more people to live close to amenities in urban centres, in a variety of homes, along with the necessary infrastructure planning to be carried out. In fill development such as that proposed is entirely consistent with the objectives and policies of the NPS UD.

The Regional Policy Statement for Northland contains objectives and policies related to infrastructure and regional form and economic development. These are enabling in promoting sustainable management in a way that is attractive for business and investment; but also focus on ensuring that reverse sensitivity effects are avoided, remedied or mitigated.

I believe the proposal is consistent with the objectives or policies in the Regional Policy Statement for Northland.

8.0 CONSULTATION & S95A-E ASSESSMENT

8.1 S95A Public Notification Assessment

A consent authority must follow the steps set out in s95A to determine whether to publicly notify an application for a resource consent. Step 1 specifies when public notification is mandatory in certain circumstances. None of these circumstances exist and public notification is not mandatory. Step 2 of s95A specifies the circumstances that preclude public notification. None of these exist, and public notification is therefore not precluded. Step 3 of s95A must then be considered. This specifies that public notification is required in certain circumstances. These include:

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

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

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

In overall summary, public notification of this application is not required.

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 groups or persons exist in this instance.

Step 2 of s95B specifies the circumstances that preclude limited notification. No such circumstances exist and therefore limited notification is not precluded.

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. No affected persons have been identified.

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

8.3 S95D Level of Adverse Effects

The AEE in this report assesses effects on the environment and concludes that these will be less than minor. As such public notification is not required.

8.4 S95E Affected Persons & Consultation

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 subdivision is a controlled activity and will have less than minor adverse effects on adjacent properties. I have not identified any adjacent properties as being affected.

The site does not contain any heritage or cultural sites or values, and does not contain any water body, and no earthworks are being proposed. The site does not contain any areas of indigenous vegetation or habitat. The site is not accessed off state highway. As such, no pre lodgement consultation has been considered necessary with tangata whenua, Heritage NZ, Department of Conservation or Waka Kotahi.

9.0 CONCLUSION

The site is considered suitable for the proposed subdivision. Effects on the wider environment are, I believe, capable of remedy and mitigation through conditions of consent, such that they will be less than minor. The proposal is considered consistent with the relevant objectives and policies of the Operative and Proposed District Plans, and relevant objectives and policies of the National and Regional Policy Statements, and consistent with Part 2 of the Resource Management.

There is no District Plan rule or national environmental standard that requires the proposal to be publicly notified. There are no affected persons.

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



Lynley Newport
Senior Planner
THOMSON SURVEY LTD

Date 18th July 2024

10.0 LIST OF APPENDICES

- Appendix 1** Scheme Plan(s)
- Appendix 2** Location Plan
- Appendix 3** Record of Title and Current Interests
- Appendix 4** Consultation with Top Energy and Chorus
- Appendix 5** Site Suitability Engineering Report

Appendix 1

Scheme Plan(s)



EXISTING EASEMENTS IN GROSS			
PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
DRAINAGE	(B)	LOT 1 HEREON	235708.1
	(C)	LOT 2 HEREON	

MEMORANDUM OF EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS, ELECTRICITY & WATER SUPPLY	(A)(C)	LOT 2 HEREON	LOT 1 HEREON

Lot 10
DP 62588
Recreation Reserve

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AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY
TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY AND SCALED FROM AERIAL PHOTOGRAPHY

Local Authority: Far North District Council
Comprised in: MA25A/1489
Total Area: 1241m²
Zoning: Residential
Resource features: NIL

Surveyors Ref. No: 9891
Sheet 1 of 1

Survey	Name	Date	ORIGINAL SCALE	SHEET SIZE
Design			1:250	A3
Drawn	KY	24.10.23		
Approved				
Reg	KY	03.05.24		

9891 Scheme 20240503

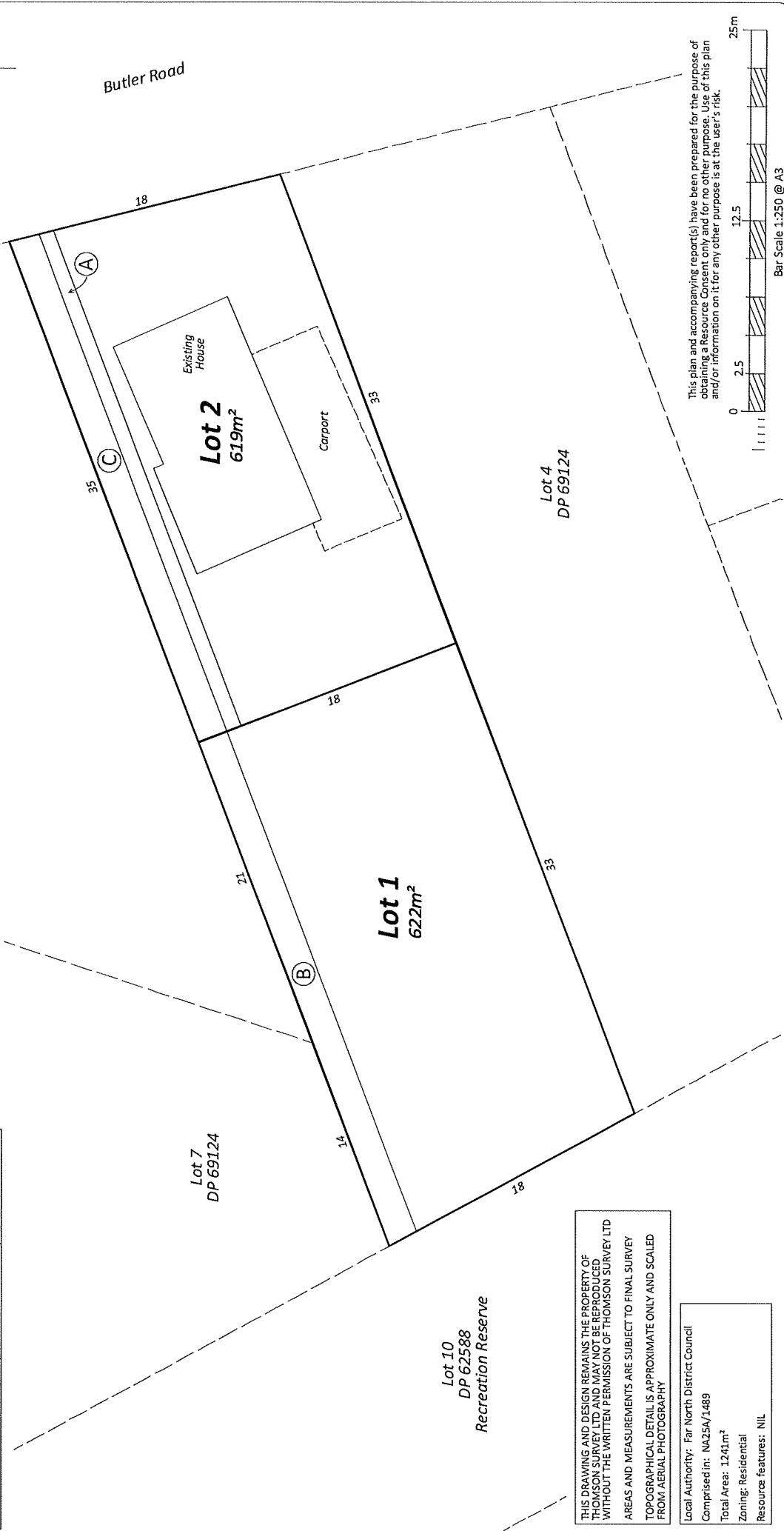
**PROPOSED SUBDIVISION OF
LOT 5 DP 69124**
30 BUTLER ROAD, KERIKERI
PREPARED FOR: L. KNOX-WHITE

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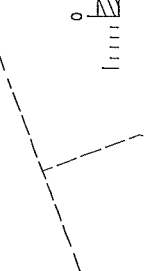
Registered Land Surveyors, Planners & Land Development Consultants

MEMORANDUM OF EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS, ELECTRICITY & WATER SUPPLY	(A) (C)	LOT 2 HEREON	LOT 1 HEREON

EXISTING EASEMENTS IN GROSS			
PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
DRAINAGE	(B)	LOT 1 HEREON	235708.1
	(C)	LOT 2 HEREON	



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Local Authority: Far North District Council
 Comprised in: NA25A/1489
 Total Area: 1241m²
 Zoning: Residential
 Resource: features: NIL

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 www.tsurvey.co.nz

**PROPOSED SUBDIVISION OF
 LOT 5 DP 69124**
 30 BUTLER ROAD, KERIKERI
 PREPARED FOR: L. KNOX-WHYTE

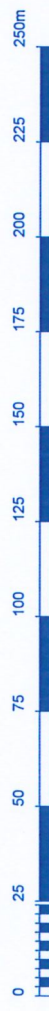
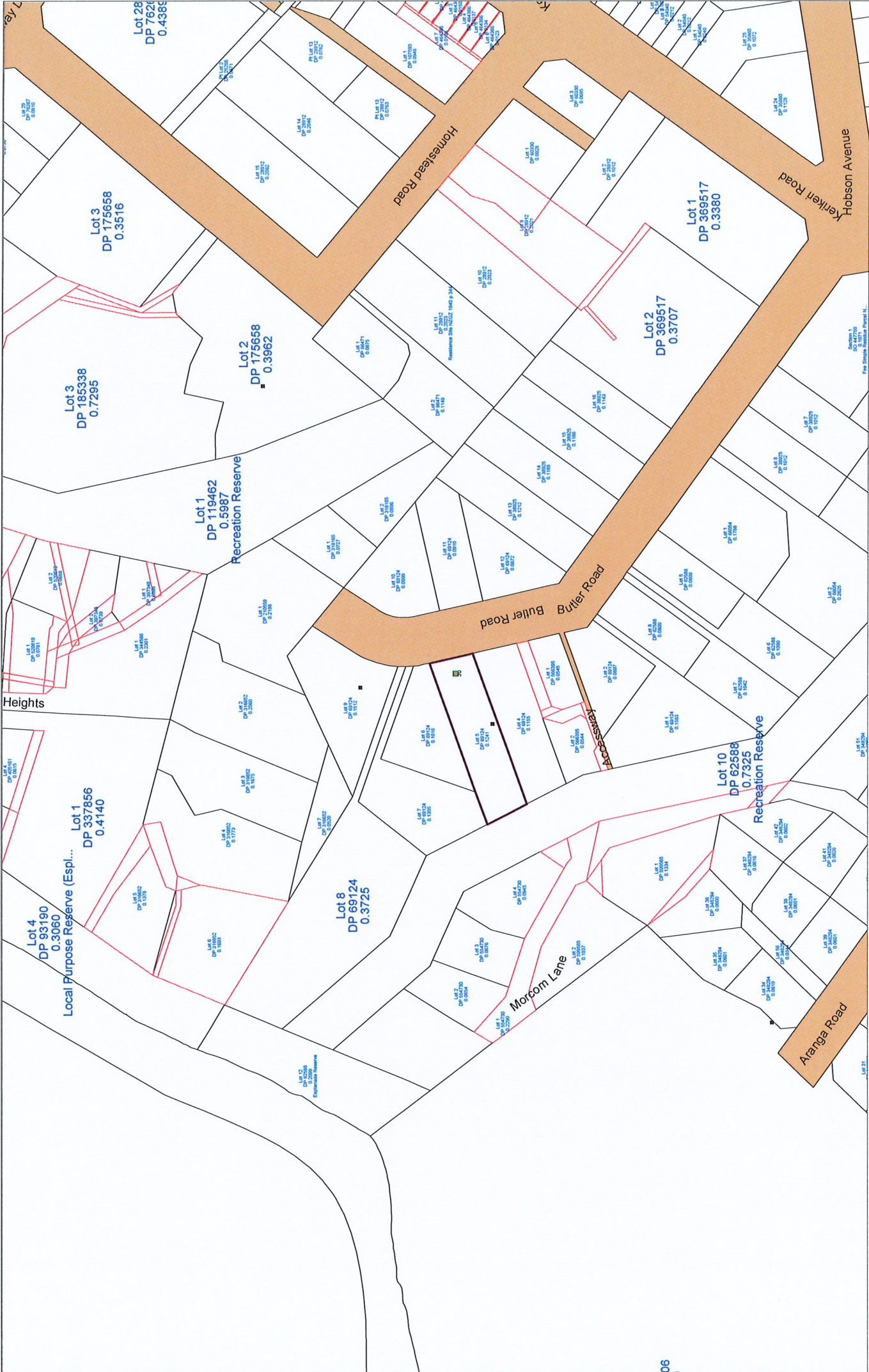
Survey	Name	Date	ORIGINAL SCALE	SHEET SIZE
Design	KY	24.10.23	1:250	A3
Approved	KY	05.05.24		
Rev	KY	05.05.24		

9891 Scheme 20240503

Surveyors Ref. No: **9891**
 Sheet 1 of 1

Appendix 2

Location Plan



Any person wishing to rely on the information shown on this map must independently verify the information
 Scale 1:2000 Topographical and Cadastral map derived from LINZ data. Printed: 05-Jul-2024 11:18.

Appendix 3

Record of Title and
Current Interests



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD**

Search Copy




R. W. Muir
Registrar-General
of Land

Identifier **NA25A/1489**
Land Registration District **North Auckland**
Date Issued 27 June 1973

Prior References
NA18D/447

Estate Fee Simple
Area 1241 square metres more or less
Legal Description Lot 5 Deposited Plan 69124

Registered Owners
Neo Family Trustee Company Limited

Interests

Subject to a drainage right (in gross) over part coloured blue on DP 69124 in favour of The Bay of Islands County Council created by Transfer 235708.1 - 27.6.1973

The easements created by Transfer 235708.1 are subject to Section 37 (1) (a) Counties Amendment Act 1961

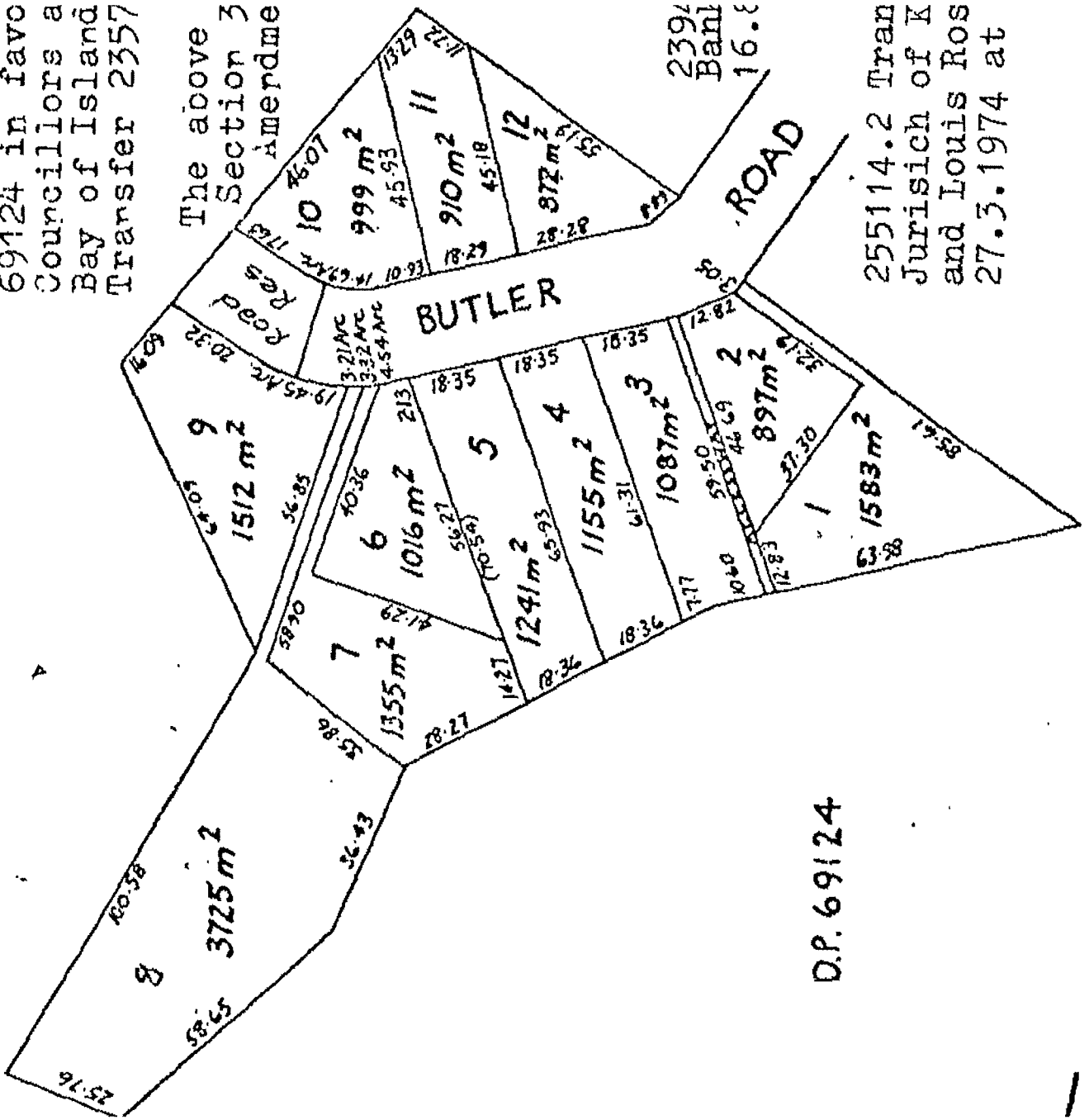
11926549.2 Mortgage to ASB Bank Limited - 24.11.2020 at 3:20 pm

69124 in favo
Councillors a
Bay of Island
Transfer 2357

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and Louis Ros
27.3.1974 at



D.P. 69124

235 708.1 TE

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C. G. GARDNER SURVEYOR

(Approved by the District Registrar, Auckland, No. 3360)

(New Zealand)

(C)

Under the Land Transfer Act, 1952

Memorandum of Transfer

CREATING DRAINAGE EASEMENT

W H E R E A S WINIFRED MURIEL GLASS of Kerikeri widow (hereinafter together with her executors administrators and assigns referred to and included in the term "the grantor")

being registered as proprietor

of an estate in fee simple

subject however to such encumbrances, liens and interests as are notified by memoranda underwritten or endorsed hereon in that piece of land situated in the Land District of North Auckland containing ONE ROD NINE DECIMAL ONE PERCHES (Oa. 1r. 9ilp.)

more or less being Lot 5 on Deposited Plan No. 69124 being part Old Land Claim 3 Block XI Kerikeri Survey District and being all of the land comprised and described in Certificate of Title Volume Folio (North Auckland Registry)

A N D W H E R E A S the grantor in consideration of the Corporation hereinafter mentioned approving the said Deposited Plan has agreed to transfer and grant to the Body Corporate called THE CHAIRMAN COUNCILLORS AND INHABITANTS OF THE BAY OF ISLANDS COUNTY (hereinafter with its successors and assigns referred to as and included in the term "the Corporation") an easement in and over that portion of the land above described coloured blue on the said Deposited Plan and therein marked "Drainage Easement 10 links wide" (hereinafter called "the said land") for the conveyance of water whether rain tempest spring soakage or seepage water for the disposal thereof in such manner as the Corporation shall determine

NOW THIS MEMORANDUM OF TRANSFER WITNESSETH that in pursuance of the said agreement and for the consideration aforesaid the grantor DOETH HEREBY TRANSFER AND GRANT unto the Corporation as an easement in gross full, free and uninterrupted right; liberty and privilege for all times hereafter to take convey lead drain and discharge water whether rain tempest spring soakage or seepage water in any quantities through in and under the said land and for such purposes and from time to time to construct lay place extend maintain alter repair and renew open drains or drains with a line or lines of pipes and conduits with or without manholes of such internal and external dimensions and with such valves and surface boxes as the Corporation shall think fit through or under the said land at such a depth as the Corporation shall think fit with power and authority for the Corporation its surveyors engineers employees contractors workmen agents servants and all persons authorised by it with or without horses carts and other vehicles and machinery implements tools pipes and materials of any kind from time to time and at all times to

enter and remain upon the said land for the purposes aforesaid including opening up the soil for inspection or cleaning the said open drains and pipes and generally to do and perform such acts and things in and upon the said land as may be necessary or proper for or in relation to any of the purposes aforesaid AND the grantor and the Corporation HEREBY COVENANT AND AGREE the one with the other of them as follows:-

1. THAT all works authorised to be carried out hereunder shall be carried out as expeditiously as possible and with as little disturbance to the surface of the said land as possible and immediately upon the completion of any such work the surface of the land shall be restored as nearly as possible to its original condition.
2. THAT the Corporation will from time to time repair and make good all damage to fences gates drains paths or driveways upon the said land caused by the carrying out by the Corporation of any of the works hereinbefore mentioned.
3. THAT the grantor will not place any buildings erections or fences on the said land or any part thereof and will not at any time hereafter do or permit or suffer any act whereby the rights powers licences and privileges hereby granted to the Corporation may be interfered with or affected or whereby the passage of water through the said pipes and conduits as aforesaid may be in any way interrupted or restricted PROVIDED ALWAYS this provision shall not affect any boundary fence between the land of the grantor and any adjoining land.
4. THAT nothing herein contained or implied shall be deemed to compel the Corporation to conduct water through the said open drains pipes or conduits and the Corporation may discontinue such drainage and recommence such drainage at will.
5. THAT nothing herein contained shall be deemed to abrogate limit restrict or abridge any of the rights powers and remedies vested in the Corporation by any statute and in particular by "The Counties Act 1956" and "The Public Works Act 1928" or any of them or any amendment thereof or any act or acts passed in substitution therefor.
6. THAT the grantor shall pay all legal fees of and incidental to this transfer and grant of easement.

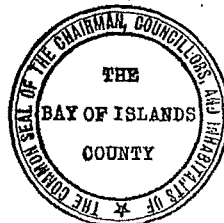
I N W I T N E S S W H E R E O F these presents have been executed this
18th day of June 1973.

SIGNED by the said WINIFRED MURIEL GLASS as grantor in the presence of: }

W. M. Glass

*Row
Winters
Whanganui*

THE COMMON SEAL of THE BODY CORPORATE
called THE MAYOR COUNCILLORS AND
INHABITANTS OF THE BAY OF ISLANDS
COUNTY was pursuant to a resolution of
the Bay of Islands County Council passed
on the 15th day of November 1972
hereunto affixed in the presence of:



..... *J. B. B. B.* Chairman

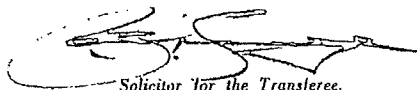
..... *[Signature]* County Clerk

Wells
12/1/73

No.

TRANSFER ~~XX~~
CREATING DRAINAGE EASEMENT
over Lot 5 D.P. 69124

Correct for the purposes of the Land Transfer Act.

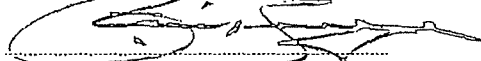


Solicitor for the Transferee.

WINIFRED MURIEL GLASS

Transferor

I HEREBY CERTIFY THAT THIS TRANSACTION DOES NOT CONTRAVENE THE PROVISIONS OF PART IIA OF THE LAND SETTLEMENT PROMOTION-AND LAND ACQUISITION ACT 1952.



SOLICITOR FOR THE TRANSFEEE
(OR LESSEE)

BAY OF ISLANDS COUNTY COUNCIL

Transferee

Particulars entered in the Register-Book Vol

Folio

the day of 19

at o'clock

Assistant Land Registrar
of the District of

The easement created by the within Transfer is subject to the provisions of section 37 (1) (a) of the Counties Amendment Act 1961.

L.R.



JUN 27 10 41 AM '73

DISTRICT LAND REGISTRY
AUCKLAND NO. 1

180/477

435708.1

RISHWORTH, KENNEDY & CO.
P.O. Box 80
Whangarei

Solicitors for the Transferee



Appendix 4

Consultation with
Top Energy and Chorus



3 November 2023

Karen Yerkovich
Thomson Survey
PO Box 372
KERIKERI 0245

Email: karen@tsurvey.co.nz

Top Energy Limited

Level 2, John Butler Centre
60 Kerikeri Road
P O Box 43
Kerikeri 0245
New Zealand
PH +64 (0)9 401 5440
FAX +64 (0)9 407 0611

To Whom It May Concern:

RE: PROPOSED SUBDIVISION

Laura Knox-Whyte, 30 Butler Road, Kerikeri. Lot 5 DP 69124.

Thank you for your recent correspondence with attached subdivision scheme plans.

Top Energy's requirement for this subdivision is that power be made available for the additional lot. Top Energy advises that proposed Lot 2 has an existing power supply. Costs to supply power to proposed Lot 1 would be provided after application and an on-site survey have been completed.

In order to get a letter from Top Energy upon completion of your subdivision, a copy of the resource consent decision must be provided.

If you have any further queries, please do not hesitate to contact the writer.

Yours sincerely

Aaron Birt
Planning and Design
T: 09 407 0685
E: aaron.birt@topenergy.co.nz

Chorus New Zealand Limited

26 June 2024

Chorus reference: 10895837

Attention: Lynley Newport

Quote: New Property Development

1 connections at 30 Butler Road, Kerikeri, Far North District, 0230

Your project reference: N/A



Thank you for your enquiry about having Chorus network provided for the above development.

Chorus is pleased to advise that, as at the date of this letter, we are able to provide reticulation for this property development based upon the information that has been provided:

Fibre network	\$0.00
Pre-built fibre	\$0.00

The total contribution we would require from you is **\$0.00 (including GST)**. This fee is a contribution towards the overall cost that Chorus incurs to link your development to our network. This quote is valid for 90 days from 26 June 2024. This quote is conditional on you accepting a New Property Development Contract with us for the above development.

If you choose to have Chorus provide reticulation for your property development, please log back into your account and finalise your details. If there are any changes to the information you have supplied, please amend them online and a new quote will be generated. This quote is based on information given by you and any errors or omissions are your responsibility. We reserve the right to withdraw this quote and requote should we become aware of additional information that would impact the scope of this letter.

Once you would like to proceed with this quote and have confirmed all your details, we will provide you with the full New Property Development Contract, and upon confirmation you have accepted the terms and paid the required contribution, we will start on the design and then build.

For more information on what's involved in getting your development connected, visit our website www.chorus.co.nz/develop-with-chorus

Kind Regards

Chorus New Property Development Team

Appendix 5

Site Suitability

Engineering Report



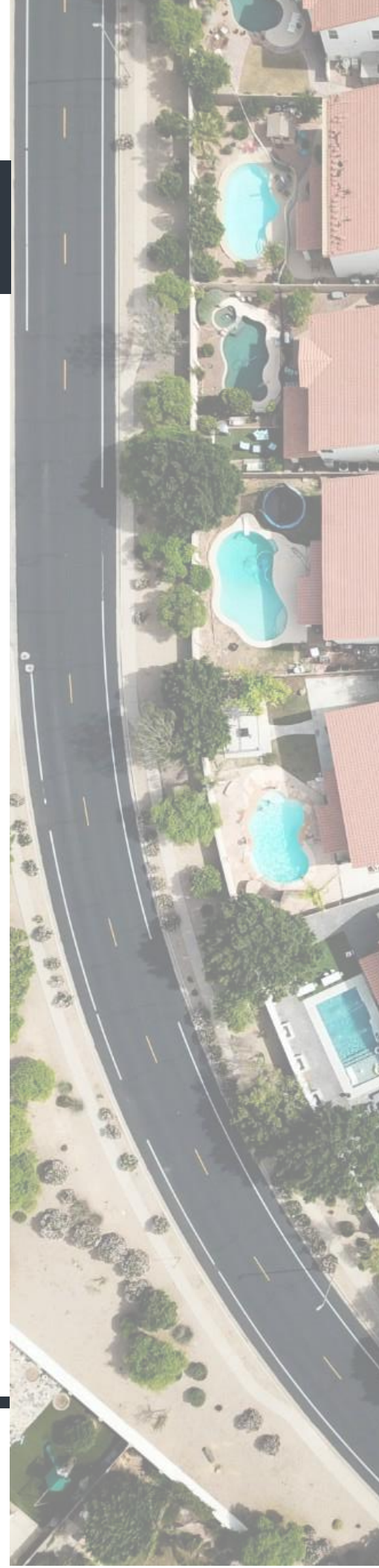
geologix
consulting engineers

SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

30 BUTLER ROAD,
KERIKERI


NEO FAMILY TRUSTEE COMPANY LTD

**C0437-S-01
MAY 2024
REVISION 1**





DOCUMENT MANAGEMENT

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Client	Neo Family Trustee Company Ltd
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Date	Issue	Prepared	Reviewed	Approved
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1 INTRODUCTION

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

The purpose of this report is to assist with Resource Consent application in relation to the proposed subdivision of an urban residential lot at 30 Butler Road, Kerikeri, the ‘site’ to create one new residential lot. Specifically, this assessment addresses engineering elements of geotechnical assessment, natural hazards, wastewater, stormwater, internal roading and associated earthwork requirements to provide safe and stable building platforms with less than minor effects on the environment as a result of the proposed activities outlined in Section 1.1.

1.1 Proposal

It is understood that the Client proposes to subdivide the site into two lots as outlined in Table 1 below.

This understanding has been established from a proposed scheme plan by Thomson Survey¹ supplied to Geologix at the time of writing and discussions with the client. Amendments to the referenced scheme plan may require an update to the recommendations of this report which are based on conservative, typical urban residential development concepts.

Table 1: Summary of Proposed Scheme

Proposed Lot	Size	Purpose
1	0.0622 ha	New Residential Lot
2	0.0619 ha	Existing Residential

2 DESKTOP APPRAISAL

The site is accessed at its north-eastern corner boundary from the west edge of Butler Road. The site is legally described as Lot 5 DP 69124 and designated as a “Residential” zone. Topographically, the site is located on a west-facing slope dipping slightly at the upper part then becoming steeper towards the lower half and towards an ephemeral stream which is adjacent to the site’s western boundary.

Existing structures are present on-site including a single-storey dwelling located near the eastern boundary as presented in the above-referenced Thomson Survey Scheme Plan.

The existing dwelling within upper proposed Lot 2 is supported by a rock retaining wall approximately one metre high. The lower western site (proposed Lot 1) appears partially excavated and retained by natural boulders. Beyond the boulders it drops into steep dense vegetation towards the stream.

¹ Thomson Survey Ltd, Proposed Subdivision of Lot 5 DP 69124, Ref No. 9891, dated 03/05/2024.



Figure 1: Site Setting²



2.1 Existing Reticulated Networks

Available information for existing infrastructure is provided by Far North District Council (FNDC) Far North Maps GIS system. The GIS mapping indicates that the site is within a well-established reticulated network area that comprises stormwater, wastewater, and water supply.

The subdivision proposal within this report aims to utilise the existing infrastructure to support the servicing to the proposed developments.

2.2 Geological Setting

Available geological mapping³ indicates the site to be underlain by the Kerikeri Volcanics group which occupies the wider Kerikeri area. The unit is typically consistent in nature across the local area and is commonly weathered to clay and silt residual soils. The geological mapping describes the strata as basalt lava flows with older flows and flow remnants.

A stream is located approximately 150m northwest of the site. It should not be discounted that some weaker alluvial soils may be present.

² Source: <https://app.grip.co.nz/>

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



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 surface water features and overland flow paths within the vicinity to the site.

3.1 Surface Water Features

According to available FNDC GIS data, there are no evident surface water features such as ponds or streams within the site boundaries.

There is an ephemeral stream adjacent to the site's western boundary. This stream flows south to north into the Puketotara stream approximately 140m away.

It is noted that there is mapped flood hazard within the Puketotara Stream which is a receiving watercourse from the site.

3.2 Sensitive Receptors

Based on available GIS data, there are no apparent sensitive receptors such as wetlands within the site boundaries.

3.3 Overland Flow Paths

Available GIS information showed that there is no indicated flood potential under the 1 % AEP event to influence the site and no clearly defined overland flow paths are evident within the site boundaries. In general, it is expected that surface water will move as sheet flow following the natural topography towards the southwest across the site.

4 GROUND INVESTIGATION

A site-specific walkover survey and intrusive ground investigation was undertaken by Geologix on 18 January 2024. The ground investigation was scoped to confirm the findings of the above desktop observations where possible and to provide parameters for geotechnical assessment. The ground investigation comprised:

- One hand augered borehole designated BH01, was formed across suitable future building site with a target depth of 5.0 m below ground level (bgl).
- Monitoring of groundwater levels with a groundwater dip meter on the day of drilling.

4.1 Site Walkover Survey

A visual walkover survey of the property confirmed:

- Topography is in general accordance with that outlined in Section 2 and the supplied contours on the scheme plan. The site is relatively flat level across upper site within the boundary of the existing dwelling supported by a rock wall. The wall aligns with the proposed boundary between lot 1 and 2. Proposed lot 1 building platform area looks to



be filled to create a level area within the boundaries, partially supported by rock boulders. This in turn creates a very steep slope towards the southwestern boundary.

- Existing structures present on site include a single-storey dwelling, a concrete driveway and carport on the eastern side of the site. There was a deck extending out to the west of the existing dwelling which is founded upon timber pole foundations.
- Stormwater infrastructure is established within Butler Road servicing road catchpits. Existing stormwater management from the existing dwelling is via duracoil pipe down to northwest corner of site. No attenuation is currently employed. Carport roof area water is directed to a separate collection pipe feed down the southern boundary till the proposed boundary, here it connects to a duracoil pipe further down the boundary. Note, this pipe is not in working condition and not contained in the proposed easements.
- Butler Road defines the eastern site boundary. Land in all directions includes similar urban residential properties of various sizes. Recent intensification development was not evident on adjacent lots.
- There were multiple retaining walls made of rocks around the site including some rock retaining along the downslope sides of the proposed building platform in lot 1. Another wall is adjacent to and below the existing dwelling.
- The public stormwater network manholes and catchpits within the road reserve immediately outside the site were observed on site in accordance with the mapped data.
- The alignment of existing FNDC pipelines are visible internally of manholes and stormwater catchpits located in the road reserve. However, the stormwater outlet structure that is indicated on FNDC GIS maps within the site boundary was unable to be located during our site inspection. Although, visual inspection of the manhole upstream confirmed a culvert pipe in the direction of the outlet. This is discussed further in Section 7.8.

4.2 Ground Conditions

Arisings recovered from the exploratory boreholes were logged by a suitably qualified geotechnical engineering professional in general accordance with New Zealand Geotechnical Society guidelines⁴. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 200 within Appendix A. Strata identified during the ground investigation can be summarised as follows:

- **Topsoil encountered to 0.2 m bgl.** Described as organic silt, brown, stiff, dry.
- **Kerikeri Volcanics Group Residual Soil to depths of >5.0m bgl.** The Kerikeri volcanic residual soil encountered are generally silty, low plasticity and high permeability. They

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



are brown to dark brown in colour. The upper 0.8m depth is mottled with minor fine basalt fragments and trace topsoil; between 0.8m to 3.0m depth the unit contains traces of clay; between 3.0m to 5.0m depth is predominantly silt.

In-situ field vane tests was taken at 0.3m depth intervals to determine soil strength within this layer. The in-situ tests recorded vane shear strengths ranging from 77 kPa to Unable to Penetrate (UTP). Characteristic unit vane shear strength has been determined to be 146+ kPa at 95% confidence, indicative of very stiff strengths.

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

Table 2: Summary of Ground Investigation

Hole ID	Proposed Lot	Hole Depth ¹	Topsoil Depth	Residual Soil Depth	Groundwater ²
BH01	1	5.0 m	0.2 m	>5.0 m	NE ³

1. All depths recorded in m bgl unless stated otherwise.
2. Groundwater measurements taken on day of drilling.
3. NE – Not Encountered.

5 GEOTECHNICAL ASSESSMENT

Geotechnical design parameters are presented in Table 3 below. They have been developed based on our ground investigation, the results of in-situ testing and experience with similar materials.

Table 3: Geotechnical Effective Stress Parameters

Geological Unit	Unit Weight, kN/m ³	Effective Friction Angle, °	Effective Cohesion, kPa	Undrained shear strength, kPa
Kerikeri volcanic ash	18	32	7	106*

* Adopting Bjerrum correction factor of 0.8 from the characteristic vane shear strength.

5.1 Seismic Hazard

New Zealand Standard NZS1170.5:2004 Clause 2.1.4 specifies that to meet the requirements of the New Zealand Building Code, design of structures is to allow for two earthquake scenarios:

1. *Ultimate Limit State (ULS) shall provide for... “avoidance of collapse of the structural system...or loss of support to parts... damage to non-structural systems necessary for emergency building evacuation that renders them inoperable”.*
2. *Serviceability Limit State (SLS) are to avoid damage to... “the structure and non-structural components that would prevent the structure from being used as originally intended without repair after the SLS earthquake...”.*



The seismic hazard in terms of Peak Ground Acceleration (PGA) has been assessed based on the NZGS Module 15. Table 4 presents the return periods for earthquakes with ULS and SLS ‘unweighted’ PGAs and design earthquake loads for the corresponding magnitude. The PGAs were determined using building Importance Level (IL) 2, defined by NZS1170.5:2004. Reference should be made to the structural designer’s assessment for the final determination of building importance level.

Table 4: Summary of Seismic Hazard Parameters

Limit State	Effective Magnitude	Return Period (years)	Unweighted PGA
ULS	6.5	500	0.19 g
SLS	5.8	25	0.03 g

5.2 Site Stability

At the time of writing, no obvious indications of major deep-seated instability were identified at the site, and the risk of such deep-seated instability developing as a result of the development proposal is low.

In addition, no obvious indications of shallow instability including relic, or more recent evidence was noted during the Geologix ground investigation. The majority of the proposed preliminary building platform is on gently sloping ground at approximately 9°, with the northwestern and southwestern corners onto moderately steep slope at approximately 22°.

It is considered the natural terrain to lie within the natural equilibrium balance of the very stiff volcanic soils. It is expected the earthworks to form proposed building platform is minor, and the surcharge from a potential one to two storey residential dwelling is minor. Global instability risks from proposed development are considered minor and within acceptable code limits. Local stability for foundation is to be designed by professional structural engineer during Building Consent stage.

A site specific quantitative slope stability model was outside the scope of this report.

5.3 Soil Expansivity

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

⁵ New Zealand Geotechnical Society, *Earthquake Geotechnical Engineering Practice, Module 1, November 2021, Appendix A, Table A1.*



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

Prior to a quantitative analysis of the soil, the underlying Greywacke Residual Soil is conservatively expected to meet the requirements of a highly expansive or Class H soil type. In accordance with AS2870:2011⁶ and New Zealand Building Code⁷, Class H or Highly Expansive soils typically have a soil stability index (I_{ss}) range of 3.8 to 6.5% and a 500-year design characteristic surface movement return (y_s) of 78 mm.

It is recommended that a quantification of the soil expansivity are made by a geotechnical laboratory analysis at the Building Consent stage.

5.4 Liquefaction Potential

Liquefaction occurs when excess pore pressures are generated within loose, saturated, and generally cohesionless soils (typically sands and silty sands with <30 % fines content) during earthquake shaking. The resulting high pore pressures can cause the soils to undergo a partial to complete loss of strength. This can result in settlement and/ or horizontal movement (lateral spread) of the soil mass.

The Geologix ground investigation indicates the site to be predominantly underlain by fine-grained volcanic ash with no groundwater. Based on the materials strength and consistency, and our experience with these materials, there is no liquefaction potential/ risk in a design level earthquake event.

5.5 Conceptual Foundations

5.5.1 Concept Shallow Foundation

Based on the natural volcanic has an average undrained shear strength exceeding 100 kPa, it is expected that shallow foundations such as timber pole foundations or standard raft/ strip footings can be adopted for the future dwelling. Such foundations may be designed by a professional structural engineer adopting an Ultimate Bearing Capacity of 300kPa for a highly expansive soil type.

Where shallow standard raft and/ or strip footing foundations are proposed, it is recommended that any non-engineered fill, underlying soft spots ($S_u < 60$ kPa) and any other unsuitable or deleterious materials (such as relic foundations, driveway hardstanding etc.) are sub-excavated and replaced with suitably selected and compacted materials such as GAP65 hard fill.

⁶ AS2870, Residential Slabs and Footings, 2011.

⁷ New Zealand Building Code, Structure B1/AS1 (Amendment 19, November 2019), Clause 7.5.13.1.2.



If piled foundations are proposed, it is recommended that all piled foundations are taken down to a minimum of 1.0 m bgl and designed by a professional structural engineer to take into account a highly expansive soil type and the locally deepened within moderately steep sloping terrain.

If groundwater is encountered within the pile holes, tremie concrete pour methodology will most likely be required to displace groundwater and an allowance should be made for this by the Contractor.

If filling is required within proposed dwelling footprint, the retaining of placed materials may be required, which could comprise of concrete block walls. It is recommended that all retaining walls are designed by a suitably qualified professional engineer familiar with the findings of this report. Blockwork retaining walls can be designed for an ultimate bearing capacity of 300 kPa for a highly expansive soil class.

5.6 Conceptual Earthworks and Methodology

It is recommended that all proposed excavations and fills at the site are retained by specifically engineered retaining walls subject to design at the Building Consent stage. Any permanent earthworks and batter slopes shall be subject to specific engineering assessment at Building Consent stage. Preliminary earthworks assessments please also refer to Section 9 of the report.

5.6.1 *Temporary Works*

To reduce the risk of temporary excavation instability, it is recommended that unsupported excavations have a maximum vertical height of 1.0 m. Temporary unsupported excavations above this height shall be battered at 1V:1H or 45°. It is expected that the above temporary works can be undertaken within the property boundaries.

Temporary excavations should not be left unsupported for a long period of time. Poles must be installed and backfilled against the excavated face immediately to ensure the slopes are not left unsupported.

Temporary batters should be covered with polythene sheets secured to the surface with pins or batons to prevent saturation. All works within proximity to excavations should be undertaken in accordance with Occupational Health and Safety regulations. In addition, it is recommended that all earthworks are conducted in periods of fine weather within the typical October to April earthwork season. Consent conditions commonly prescribe working restrictions.

5.6.2 *Fills*

Due to the moderately steep slope beneath the proposed preliminary building footprint, fill should be kept to a minimum. It is recommended that suitable selected GAP hard fill or certified earth filling is adopted at the site with fill batter slopes not exceeding 1V:3H or 18°. Filling over 1.0m high above existing ground level shall be geotechnically reviewed for stability control requirements.



It is recommended that proposed fills are subject to a specific engineering specification including compaction standards and construction monitoring at regular lift intervals (maximum 0.5 m).

In addition, any unsuitable and/ or deleterious materials such as organic pockets, nonengineered fill, relic foundations and/ or concrete hard standing and locally weaker spots ($S_u < 60$ kPa) shall be cut to waste and not adopted for filling.

6 WASTEWATER ASSESSMENT

The scope of this wastewater assessment comprised an assessment of anticipated wastewater flows from proposed lots and the suitability of connecting to the existing reticulated network. Relevant design guideline documents adopted include:

- Watercare, Water and Wastewater Code of Practice for Land Development and Subdivision, Version 1.5, dated May 2015.
- FNDC Engineering Standards, Version 0.6, Date Issued: May 2023.

6.1 Existing On-site Wastewater Systems

According to the current site condition, there is no evidence of any existing on-site dispersal type wastewater systems.

6.2 Existing Wastewater Reticulated Network

According to available information provided on the survey scheme plan and Far North District Council 3 water infrastructure GIS Map⁸, the site's surrounding wastewater network is as follows:

- A low-pressure sewer (LPS) pump station is located within the site southwest of the existing dwelling. (Asset ID: 20181016133759.)
- A 40 mm diameter PE service pipe connecting the LPS pump to a valve chamber in the road reserve. (Asset ID: 20180921134222.)
- A valve chamber is located just outside the eastern site boundary in the road reserve. (Asset ID: 20181001151323.)
- A 40 mm diameter PE service pipe connecting the valve chamber to the main pressure sewer. (Asset ID: 20180921134136.)
- A 65 mm diameter PE pressure sewer is in service and runs along the outside of the eastern boundary, in the Butler Road reserve, trending from north to south. (Asset ID: 20180921133153.)

⁸ <https://fndc.maps.arcgis.com/apps/webappviewer/index.html?id=9b351ce681e34ec29443ae1a6468cc2c>

6.3 Existing Wastewater Connection

Based on the and Far North District Council GIS Map⁹, there is an existing wastewater lateral connection in place that serves the site. This connection is located to the east of the site and is connected to the existing wastewater pressure sewer pipeline via a valve chamber. This connection services the existing dwelling in proposed lot 2 and will remain in place.

6.4 Proposed Wastewater Connection

It is proposed to install an additional valve chamber within the road reserve to serve proposed lot 1. This will connect to a proposed private LPS macerator pump from within the site. The location and details of the proposed wastewater connection are shown on Drawing No. 500 within Appendix A.

6.5 Wastewater Generation Volume

The existing receiving reticulated network from the site has been analysed in accordance with FNDC Engineering Standards. The focus of the analysis has been undertaken at receiving existing 150 mm uPVC gravity pipeline downstream of the site near Lot 9 DP 69124, off Butler Road. This is the pipeline referenced as Asset ID: SL1043_1041, where gravitational flows are expected to increase as a result of the application.

According to the FNDC Engineering Standards, Section 5.2.2.2, residential design flows have been taken as follows.

Table 5: Residential Wastewater Design Flows

Design Item	Criteria
Average dry weather flow	200 litres/ day/ person
Dry weather diurnal Peaking Factor	2.5
Wet weather diurnal Peaking Factor	5
Peak wet weather flow (PWWF)	1000 litres/ day/ person
No. of people per dwelling	4

The design criteria and potential wastewater flow is outlined by Table 5 above. This considers an existing wastewater network catchment above the point of analysis of **14** upstream households, increasing to **15** as a result of the application. Calculations are presented in full as Appendix D to this report and the results summarised below as Table 6.

Table 6: Summary of Wastewater Flow Calculations

Item	Calculated Wastewater Flow, l/s
Existing catchment, PWWF	0.65
Proposed catchment, PWWF	0.69
Increase PWWF from application	+0.04

⁹ Far North District Council 3 Water Infrastructure GIS Map

6.6 Wastewater Network Capacity Assessment

Our analysis has established that the proposed application within the scope of this report provides only a minor, 0.04 litre/ second increase in discharge to the reticulated wastewater network at the point of injection.

Adopting the Colebrook-White equation and design factors from FNDC Engineering Standards, a summary of design assumptions and the calculated pipeline capacity of the downstream network at the point of analysis is summarised below within Table 7.

Table 7: Summary of Wastewater Catchment Analysis

Item	Value
Design Criteria	
Roughness coefficient (Colebrook-White)	0.6 mm from FNDC Engineering Standards 5.2.2.4
Slope of Pipeline	7.3 % (Calculated between manhole Asset ID SS_06031 and Manhole Asset ID SP108)
Size of Pipeline	150 mm diameter
Calculation	
Existing Pipe Flow Capacity, 100 %	48.32 l/s
Existing Pipe Flow Capacity, 67 %	38.10 l/s
Existing Pipe Velocity (at 100% capacity)	3.12 m/s
Existing Catchment PWWF	0.65 l/s
Proposed Catchment PWWF	0.69 l/s

The capacity assessment demonstrates the existing reticulated wastewater network has sufficient capacity to cater for the additional discharge volumes from the application.

6.7 Considerations for Consenting of Wastewater Works:

The proposed wastewater infrastructure associated to the establishment of the subdivision includes the provision of the LPS pump station within Proposed Lot 1, the private pipeline through the RoW, and the new connection to the pressure main in the road reserve. These works will require a building consent application prior to construction, as well as a connection request to FNDC for a new boundary kit.

7 STORMWATER ASSESSMENT

Considering the nature of urban subdivision and residential development, increased storm water runoff occurs as pervious surfaces such as pasture are converted to impervious features such as internal roading or future on-lot building and driveway.

7.1 Regulatory Requirements

Stormwater management for the proposed activity is controlled by the FNDC Operative District Plan¹⁰. The requirement for subdivision and probable future development under this legislation is summarised below.

¹⁰ <https://www.fndc.govt.nz/Your-Council/District-Plan/Operative-plan>



7.1.1 District Wide Provisions

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

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

(b) The preferred means of disposal of collected stormwater in urban areas will be by way of piping to an approved outfall, each new allotment shall be provided with a piped connection to the outfall laid at least 600mm into the net area of the allotment. This includes land allocated on a cross lease or company lease. The connection should be at the lowest point of the site to enable water from driveways and other impervious surfaces to drain to it. Where it is not practical to provide stormwater connections for each lot then the application for subdivision shall include a report detailing how stormwater from each lot is to be disposed of without adversely affecting downstream properties or the receiving environment.

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

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

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

7.1.2 Environmental Zone Provisions

Permitted activity status for proposed impervious surface areas within the urban residential zone is determined by Rule 7.6.5.1.6 which is presented below.

The maximum proportion of the gross site area covered by buildings and other impermeable surfaces shall be 50%.

7.2 Impervious Surfaces and Activity Status

The proposed activity has been assessed in accordance with rules outlined by Sections 7.1.1 to 7.1.2. A summary of this is provided as Table 8 below which has been developed from the proposed scheme plan.

In our design concept for future development of proposed Lot 1, we have considered a typical urban residential roof of 150 m² and associated driveways/ car parking area of 50 m², resulting in a total impervious area of 200 m² which is roughly equivalent to complete development of a 14 m x 14 m building site area. This represents a 32.21% total impervious area of the gross Lot 1 site and is therefore considered as **Permitted Activity**.

Considering the proposed Right of Way (RoW) within proposed Lot 1 with an impervious area of 103 m², existing parking area/ driveway with an impervious area of 55 m², and the existing dwelling and carport with a total roof area of 202 m², it is anticipated that the total impervious area under post-development conditions will be 360 m², representing 58.16% of the proposed lot 1 site area of 619 m². This activity falls under the category of **Controlled Activity**, according to FNDC Operative District Plan Rule 7.6.5.2.

Based on FNDC Operative District Plan Rule 7.6.5.2.1, it is understood that the additional impervious area within proposed Lot 2 is in excess of permitted activity (by 8.16%) and is to be limited to the permitted threshold of buildings and other impermeable surface coverage, as outlined in Rule 7.6.5.1.6, by means of stormwater attenuation.

Table 8: Summary of Impervious Surfaces

Surface	Proposed Lot 1		Proposed Lot 2	
Existing Condition				(1241 m²)
Roof	0 m ²	0 %	202 m ²	13.94 %
Driveway	0 m ²	0 %	55 m ²	2.66 %
Right of Way	0 m ²	0 %	0 m ²	0 %
Total impervious	0 m ²	0 %	206 m ²	16.60 %
Proposed Condition		(621 m²)		(619 m²)
Roof	150 m ² (Concept)	24.15 %	202 m ²	32.6 %
Driveway	50 m ² (Concept)	8.05 %	55 m ²	8.89 %
Right of Way	0 m ²	0 %	103 m ²	16.64 %
Total impervious	200 m ²	32.21 %	360 m ²	58.16 % (>PA = 50%)
Activity Status		Permitted		Controlled

7.3 Stormwater Management Concept

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

- **Probable Future Development (Proposed Lot 1).** The proposed application includes subdivision development only and not lot specific residential development. A conceptual future on-lot development has been developed as presented in Section 7.2.
- **Existing On-site Development (Proposed Lot 2).** As indicated in Table 8, there is a requirement for attenuation of runoff from the proposed Lot 2 as the proposed impervious area (360m²) is more than the permitted activity threshold (50% of 619m² = 309.5m²).
- **Subdivision Development.** Access to the new proposed lot 1 will be via a proposed concrete driveway within the proposed lot 2 area. The proposed driveway will create additional impervious area of 103 m² and will be offset by a supplementary detention volume within a roof water tank providing attenuation in proposed lot 2. Stormwater runoff from the RoW surface will be collected by dish drain alongside the RoW driveway and discharged into a proposed piped system to outlet near the western boundary of proposed Lot 1 through an appropriate outlet structure such as rock spill (rip rap). An easement will cover the right to drain through Lot 1.

7.4 Design Storm Event

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

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

Furthermore, the Table 4-1 stipulates that flow attenuation controls reduce the post-development peak discharge to 80 % of the pre-development condition for the 50% and 20 % AEP storm event.

To be compliant with the above rules, the attenuation modelling within this report has been undertaken for all of the above storm events. The results are summarised in Table 9 and provided in full in Appendix C.

Correctly sized discharge devices would adopt the 1 % AEP event to reduce scour and erosion at discharge locations which may otherwise result in concentrated discharge.

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model¹¹. NIWA provides guidelines for modelling the effects of potential climate change effects of rainfall intensity increase by applying a potential change factor to historical data. This report has adopted potential change factors to account for a 2.1 °c climate change increase scenario. NIWA HIRDSv4 and climate change factor data is presented in full within Appendix C.

7.5 Probable Future Development Management (Proposed Lot 1)

As detailed above, it is required that future residential developments provide on-lot stormwater attenuation for all impervious surface areas to 80 % of pre-development peak runoff condition for the design storm event. This is achievable by installing specifically sized low-flow orifices into the roof runoff attenuation tank which will attenuate the post-development runoff volume to the pre-development condition as detention.

The concept assessment provided in this report should be subject to verification and an updated design at Building Consent stage once final development plans are available. This is typically applied as a notice to the applicable titles.

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards¹² to provide a suitable attenuation design to limit post-development peak flows to pre-development conditions. A summary of the concept design assumptions is presented as Table 9 and a typical schematic detention tank arrangement is presented as Drawing No. 401.

Table 9: Summary of Probable Future Development Concept

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
Proposed Lot 1 Future Concept Development			
Potential Buildings	0 m ²	150 m ²	Detention within roof water tanks.
Potential Driveway	0 m ²	50 m ²	Off-set detention in roof water tanks.
Total	0 m²	200 m²	

Calculations to support the concept design are presented as Appendix C to this report. A summary of the concept on-lot stormwater attenuation design is presented as Table 10. As mentioned above, it is recommended that this concept design is refined at the Building Consent stage once final development plans are available. A Consent notice may be required to be applied to each title to ensure this is undertaken.

¹¹ NIWA High Intensity Rainfall Data System v4, <https://hirds.niwa.co.nz>.

¹² FNDC Engineering Standards Version 0.6, Date Issued: May 2023.

Table 10: Probable Future Development Attenuation Concept

Design Parameter	Flow Attenuation: 50 % AEP (80% of pre dev)	Flow Attenuation: 20 % AEP (80% of pre dev)	Flood Control: 10 % AEP	Flood Control: 1 % AEP (80% of pre dev)
Proposed Lot 1				
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan Rule C6.4.2(2)	FNDC Engineering Standards Table 4-1
Pre-development peak flow	2.40 l/s	2.62 l/s	3.39 l/s	5.66 l/s
80 % pre-development peak flow	1.92 l/s	2.10 l/s	NA	4.53 l/s
Post-development peak flow	3.90 l/s	4.27 l/s	5.52 l/s	9.22 l/s
Total Storage Volume Required	1,306 litres	1,429 litres	1,276 litres	3,145 litres
Concept Summary:	<ul style="list-style-type: none"> - Attenuation storage calculation accounts for offset flow from driveway (not indicated explicitly in summary above. Refer Appendix C for calcs in full) - Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage. - 1 x 10,000 litre tank is sufficient for attenuation (3,145l) + domestic water storage (balance) - 1% AEP attenuation in isolation requires a 39 mm orifice 0.95 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. 			

7.6 Subdivision Development Management (i.e. Lot 2 including RoW)

The runoff from impervious areas within proposed Lot 2 will be managed in the following manner:

As indicated in Table 8, the impervious area within Lot 2 after construction of the RoW will be 360m² which is 58.16% of the gross Lot 2 area (619m²). The required attenuation is to limit the runoff to 50% impervious area (permitted activity) which is 309.5m². This will be provided within a proposed roof water tank, sized below.

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards¹³ to achieve the above.

A summary of the concept design assumptions is presented as Table 11 and a typical schematic detention tank arrangement is presented as Drawing No. 401.

¹³ FNDC Engineering Standards Version 0.6, Date Issued: May 2023.

Table 11: Summary of Subdivision Development Attenuation Method

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Attenuation Method
Proposed Lot 2 Development			
Existing Buildings	202 m ²	202 m ²	Roof water attenuated in tank to achieve permitted level of peak runoff.
Existing Driveway	55 m ²	55 m ²	Off-set detention in roof water tanks.
Proposed RoW	0 m ²	103 m ²	Off-set detention in roof water tanks.
Total	257 m²	360 m²	

Calculations to support this design are presented as Appendix C to this report. A summary of the proposed subdivision stormwater attenuation calculations is presented as Table 12.

Table 12: Subdivision Development Attenuation Storage

Design Parameter	Flow Attenuation: 50 % AEP	Flow Attenuation: 20 % AEP	Flood Control: 10 % AEP	Flood Control: 1 % AEP
Proposed Lot 1				
Regulatory Compliance	FNDC Engineering Standards Table 4-1, and ODP Rule 7.6.5.1.6	FNDC Engineering Standards Table 4-1, and ODP Rule 7.6.5.1.6	NRP Rule C6.4.2(2), and ODP Rule 7.6.5.1.6	FNDC Engineering Standards Table 4-1, and ODP Rule 7.6.5.1.6
Permitted threshold peak flow	9.74 l/s	10.67 l/s	13.78 l/s	23.03 l/s
Post-development peak flow	10.12 l/s	11.08 l/s	14.32 l/s	23.92 l/s
Total Storage Volume Required	228 litres	249 litres	322 litres	538 litres
Required Orifice arrangement	88mm with 0.09m potential head	90mm with 0.10m potential head	96mm with 0.13m potential head	110mm with 0.21m potential head

The minor attenuation requirements for this Lot 2, as indicated above in Table 12, present an impractical attenuation arrangement. Therefore, we propose that a more effective attenuation proposal would be to limit the 1% AEP post-development discharge to the 50% AEP permitted activity, which would altogether satisfy the regulatory requirements with significant conservatism and present a practical tank and orifice arrangement.

This design calculation is presented within Appendix C as *Detailed Design Attenuation Proposal* and is summarised as follows:



- Provide Ø44mm orifice @ 1.40m potential head i.e. 1.34m below overflow level. The corresponding tank storage requirement is 3566 litres. The balance of the tank volume may be used for rainwater retention (for domestic re-use).

It is thus recommended that this proposed stormwater attenuation design (for Proposed Lot 2) be met with engineering approval with the subdivision consent, and not require a further detailed design assessment.

7.7 Stormwater Quality

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

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

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

- Leaf guards on roof guttering/ first flush devices on roof guttering and downpipes.
- Room for sedimentation (minimum 150 mm according to Auckland Council GD01) within the base of the roof runoff tanks as dead storage volume.

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.

7.8 Existing Stormwater Network

According to available information provided on the survey scheme plan and Far North District Council 3 water infrastructure GIS Map¹⁴, the site's surrounding stormwater networks are as follows:

- An existing 225 mm diameter concrete gravity pipeline is in service and runs from catchpit (Asset ID: KK_SWP0043) towards the site servicing stormwater from Butler Road, trending north to south. (Asset ID: KK_SWL0246).
- An existing 225 mm diameter concrete gravity pipeline is in service and runs from catchpit (Asset ID: KK_SWP0044) towards the site servicing stormwater from Butler Road, trending southwest. (Asset ID: KK_SWL0247).
- An existing manhole located just beyond the northeast corner of the site. (Asset ID: KK_SWP0051).

¹⁴ <https://fndc.maps.arcgis.com/apps/webappviewer/index.html?id=9b351ce681e34ec29443ae1a6468cc2c>



- An existing 225 mm diameter concrete gravity culvert presumed to be in service, runs along the northern boundary beneath the property easement, trending southwest. (Asset ID: KK_SWL0233). It is noted that, according to the FNDC GIS map, the existing stormwater pipeline terminates 14.2 m within the site boundary of the site. However, based on our site walkover survey, the outlet was unable to be found.
- An existing outlet structure is shown located at the east end along the northern boundary within the easement on FNDC GIS maps. However, the structure was unable to be located and verified. (Asset ID: KK_SWP0050). There is no sign of discharge from the public system into the site.
- It is recommended that the location of the un located stormwater outlet be verified on-site during the EPA stage by using CCTV or other appropriate investigation and this be applied as a condition of consent.
- An existing cesspit (privately owned) is located at the lower end of the proposed RoW collecting roof water from existing building, (note not collecting water from carport). A novacoil pipe directs the stormwater down along the boundary towards the stream. Pipe is uncovered (on surface).
- Existing carport area is collected at by the southwestern corner down pipe and directed down along the southern boundary via a damaged novacoil pipe not in working condition, and outside the proposed easement.

7.9 Proposed Stormwater Connections and Management

Due to the site's low position relative to the elevation of the public stormwater network and the site's direct proximity to a stream, the existing development stormwater is managed using the surrounding natural features downslope. The proposed development in lot 2 will use the same method whilst amending some existing components within the whole subdivision to remedy compliance with FNDC and Engineering Standards.

A new lateral channel drain with accompanying rip rap will provide passage of stormwater runoff to the ephemeral stream located below the western boundary.

The existing damaged novacoil pipe along the southern boundary will be abandoned with the existing carport runoff being rerouted to water tank for attenuation and as to keep within easement.

Stormwater from existing development downpipes catering for roof catchment will be diverted to water tank.

Water tanks (on both lots) overflows will be conveyed to the channel drain down the northern boundary.

RoW runoff will be collected by catchpit within the RoW at the proposed boundary of the two lots.

These recommendations are indicated schematically as Drawing No. 400 within Appendix A.

7.10 Considerations for Consenting of Stormwater Works

The proposed private stormwater infrastructure associated to the establishment of the subdivision include the works listed in Section 7.9, these works will require a building consent application prior to construction.

Private works associated with Proposed Lot 1 development are only conceptual. A building consent application will be required to complete these works when future development is finalised.

It is recommended that the location of the un-located public stormwater outlet be verified on-site prior to the RoW being constructed (at subdivision) by using CCTV or other appropriate investigation and this be applied as a condition of the consent.

7.11 Assessment Criteria and Consent Status

7.11.1 District Plan

The proposed activity has been assessed as a **Discretionary Activity** according to Table 13.7.2.1(v). An assessment criterion according to Rule 13.9 is presented within the District Plan for this activity classification.

Furthermore, assessment criteria as per 13.10.4 for Stormwater Disposal has been prepared and presented in Appendix E.

8 POTABLE WATER & FIRE FIGHTING

8.1 Potable Water Reticulation

The site is located within a well-established public water supply area and is currently located adjacent to a public 65 mm MDPE water supply pipeline outside the eastern boundary. The existing water connection will be reused for serving proposed lot 2 and a new water meter will be installed at the roadside boundary of lot 2 within Butler Road berm area to service lot 1.

We note that the two proposed roof water tanks (on each of the lots) have reserve volume to hold water for domestic purposes as may be desired by the applicant, or future developer.

8.2 Fire Fighting

There are two fire hydrants within Butler Road south of the site approximately 84 m and 199 m from the site. These are indicated as

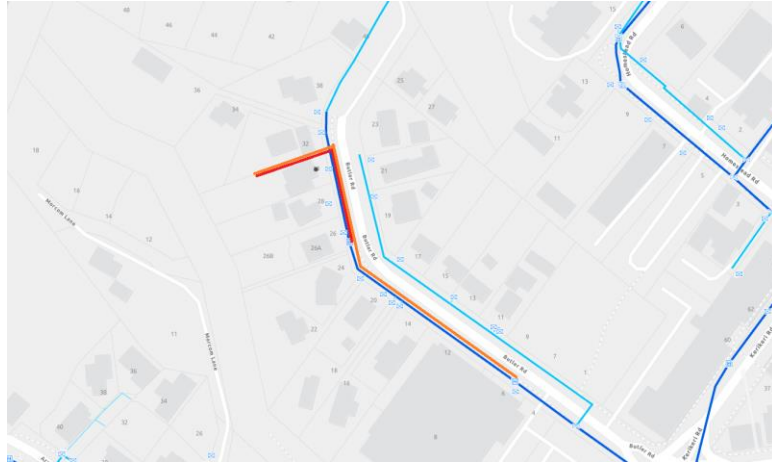
Figure 2 below.

The fire-fighting requirements for the proposed development are determined to be FW2 in accordance with the SNZ PAS 4509:2008, New Zealand Fire Service Firefighting Water Supplies Code of Practice. The standard requires a minimum of two fire hydrants – one within 135 m, and the second within 270m to the entrance of the furthest property.



According to above assumption, the proposed developments comply with the SNZ PAS 4509:2008, New Zealand Fire Service Firefighting Water Supply Code of Practice.

Figure 2: Fire Hydrant Mapping



8.3 Considerations for Consenting of Water Works:

The proposed water infrastructure associated to the establishment of the subdivision includes the provision of the private water pipeline through the RoW terminated within the Proposed Lot 1 boundary with an end cap (for future development connection) and the new water meter and connection to the pressure main in the road reserve. These works will require a building consent application prior to construction, as well as a connection request to FNDC for a new water meter.

9 EARTHWORKS

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

- **New accessway within Easement A.** Cut/ fill earthworks are required to create a suitable driveway for accessing proposed lot 2.
- **Level/ Stabilise building platform.** Cut/ fill earthworks are required to remove/ move mound of earth and rocks approximately located within the proposed building platform.

Table 13: Summary of Proposed Earthworks Volumes

Activity	Proposed Volume	Net	Max. Height
New RoW Accessway			
Cut	30.6 m ³		0.3 m
Fill (imported layerworks)	30.6 m ³		0.3 m
Level building platform			
Cut	6.0 m ³		1.0 m
Fill	6.0 m ³		0.5 m
Sub-total	73.2 m ³	0.0 m ³	

According to the above Table 13, proposed earthwork volumes are well within the 200 m³ Permitted Activity volume limit outlined by FNDC District Plan Rule 12.3.6.1.3(a) and the maximum cut and fill height is <3 m to comply with 12.3.6.1.3(b).

Rule C.8.3.1, Table 15 of the Proposed Regional Plan outlines a Permitted Activity as 5,000 m² of exposed earth at any time for 'other areas'. Proposed earthwork areas to form the subdivision, comply with the Permitted Activity standard for other areas. A full assessment according to the criteria is presented within Appendix E.

9.1 General Recommendations

Bulk fill with site-won earth can be moderately sensitive to disturbance when exposed to rain or runoff which may cause saturation or vehicle movements and trafficking during earthworks. Accordingly, care should be taken during construction, including probable future developments to minimise degradation of any earth fill due to construction traffic and to minimise machinery on site.

Any areas of proposed bulk fill which are required to meet specific subgrade requirements within should be subject to a specific earthwork specification prepared by a professional Engineer such as Geologix.

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

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

It is expected that there will be retaining walls, with a maximum height of 1.0 m to the north and 0.6 m to the south, to support the proposed accessway in terms of geotechnical aspects. It is proposed that a qualified geotechnical engineer undertake the detailed retaining wall design during the EPA stage, taking into account geotechnical stability control requirements.

9.2 Erosion and Sediment Control

Erosion and sediment control measures are required to control sediment runoff from areas of proposed earthworks within the scope of this application. Erosion and sediment control measures to form the subdivision are summarised as follows:

- Silt fences around the downslope face of the proposed accessway.
- Silt fences around the downslope face of any trenching for proposed pipework that is open or not suitably stabilised within a single day's work.
- Stabilised entrance to be put in place at site entrance.

10 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 Plan¹⁵, Northland Regional Council (NRC) Proposed Regional Plan for Northland¹⁶ 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 14.

Table 14: Summary of Natural Hazards

Natural Hazard	Applicability	Mitigation & Effect on Environment
Erosion	Yes	Erosion potential at stormwater outlet and earthworks areas. Mitigation provided by means of suitable outlet device and ESC controls. Resultant effects are less than minor.
Overland flow paths, flooding, inundation	Yes	No indication of flooding hazard within site boundaries. Flooding hazard identified downstream. Mitigation provided to suit FNDC standards. Resultant effects are less than minor.
Landslip	NA	No anticipated effects, less than minor.
Rockfall	NA	No anticipated effects, less than minor.
Alluvion	NA	No anticipated effects, less than minor.
Avulsion	NA	No anticipated effects, less than minor.
Unconsolidated fill	NA	No anticipated effects, less than minor.
Soil contamination	NA	No anticipated effects, less than minor.
Subsidence	NA	No anticipated effects, less than minor.
Fire hazard	NA	No anticipated effects, less than minor.
Sea level rise	NA	No anticipated effects, less than minor.

NA – Not Applicable.

11 INTERNAL ROADING AND VEHICLE CROSSINGS

It should be noted that we are not traffic engineers, and no specific Traffic Impact Assessment is included within the scope of these works.

11.1 Traffic Intensity Factor and Household Equivalents

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

- New vehicle crossing serving proposed accessway: TIF of 10 from one HE per vehicle crossing.

¹⁵ Operative District Plan Rule 13.7.3.2.

¹⁶ Proposed Regional Plan for Northland June 2023 – Appeals Version, Chapter D.6.

11.2 Vehicle Crossings

A new vehicle crossing will be formed to provide access to proposed lot 1 from Butler Road and will be constructed in accordance with Drawing Sheet No. 18 of the FNDC Engineering Standards.

An existing vehicle crossing provides access to proposed lot 2 from Butler Road. The existing consented vehicle crossing will remain and function in its current condition. No modifications are recommended.

11.3 Right of Ways (RoW)

Proposed RoW will provide internal access to the proposed lot 1 and will be constructed to the standards specified in Appendix 3B-1 of the Operative District Plan and in accordance with Drawing Sheet No. 7 of the FNDC Engineering Standards, as summarised in Table 15.

The anticipated gradient is between 7 % and 14 %.

Table 15 Summary of Proposed RoW specification

Location	Lot	Standard	Future H.E	Min. Legal Width	Min. Carriageway Width
Right of Way (Easement C)	1	Category A	1	-	3.0 m formed width with single crossfall to kerb and channel.

The proposed accessway within Easement C will be constructed as an urban private way with details shown on FNDC Engineering Standards Sheet No. 7 and in accordance with FNDC District Plan Appendix 3B with a carriageway width of 3.0 m.

The proposed RoW mentioned above is required with the establishment of the subdivision. It does not require a separate building consent approval. It is recommended that this aspect of the subdivision be accepted by way of this consent application, and not require further detailed design.

12 LIMITATIONS

This report has been prepared for Neo Family Trustee Company Limited. 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



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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.



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APPENDIX A

Drawings

GENERAL NOTES

- DRAWING REPRODUCED FROM THOMSON SURVEY LTD REF.9891, DATED 24/10/2023.
- HORIZONTAL CO ORDINATE SYSTEM = NZTM.
- VERTICAL DATUM = NZVD.
- MAJOR INTERVALS 2.5 m.
- MINOR INTERVALS 0.5 m.
- FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
- FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
- DO NOT SCALE FROM THIS DRAWING.

 GEOLOGIX HAND AUGER & DYNAMIC CONE PENETROMETER - JANUARY 2024

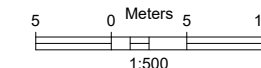
 PROPOSED BUILDING PLATFORM

 LOT BOUNDARY

 EASEMENT BOUNDARY

 EXISTING ROCK RETAINING WALL

 WATERCOURSE



A	CONSENT	03/05/2024
Revision	Issue	Date



AUCKLAND | NORTHLAND

Project Name and Address
30 BUTLER ROAD
KERIKERI
LOT 5 DP 69124

Project **C0437** Drawn By **SD**

Client
NEO FAMILY TRUSTEE COMPANY LTD

Sheet Title
PROPOSED ACCESSWAY PLAN

Sheet
300



FILE PATH: Z:\Projects\0400-C0495\30 Butler Road, Kerikeri - C0437\07 - Technical & Drawings\Drawings\0437-INF-01-R01.dwg

PLOTTED: 03/05/2024

GENERAL NOTES

- DRAWING REPRODUCED FROM THOMSON SURVEY LTD SUBDIVISION PLAN REF.9891, DATED 24/10/2023.
- HORIZONTAL CO ORDINATE SYSTEM = NZTM.
- VERTICAL DATUM = NZVD.
- CONTOURS: MAJOR INTERVALS 2.5 m.
- CONTOURS: MINOR INTERVALS 0.5 m.
- FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
- FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT NECESSARILY BEEN VERIFIED.
- PUBLIC ASSETS INDICATED ARE REFERENCED FROM FNDC GIS MAPS
- PRIVATE ASSETS INDICATED ARE OBSERVED ON SITE
- DO NOT SCALE FROM THIS DRAWING.

GEOLIGX HAND AUGER & DYNAMIC CONE PENETROMETER - JANUARY 2024

PROPOSED BUILDING PLATFORM

PROPOSED EASEMENT BOUNDARY

EXISTING ROCK RETAINING WALL

WATERCOURSE

PUBLIC STORMWATER ASSETS:

- SW— EXISTING STORMWATER PIPE
- EXISTING STORMWATER OUTLET STRUCTURE
- EXISTING STORMWATER CATCHPIT
- EXISTING STORMWATER MANHOLE CHAMBER

PRIVATE STORMWATER ASSETS:

- SW— EXISTING STORMWATER PIPE
- SW— PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER TANK
- EXISTING PUBLIC WATER SUPPLY PIPE
- ⊠ EXISTING PUBLIC WATER METER

5 0 Meters 5 10
1:500

A	CONSENT	03/05/2024
Revision	Issue	Date



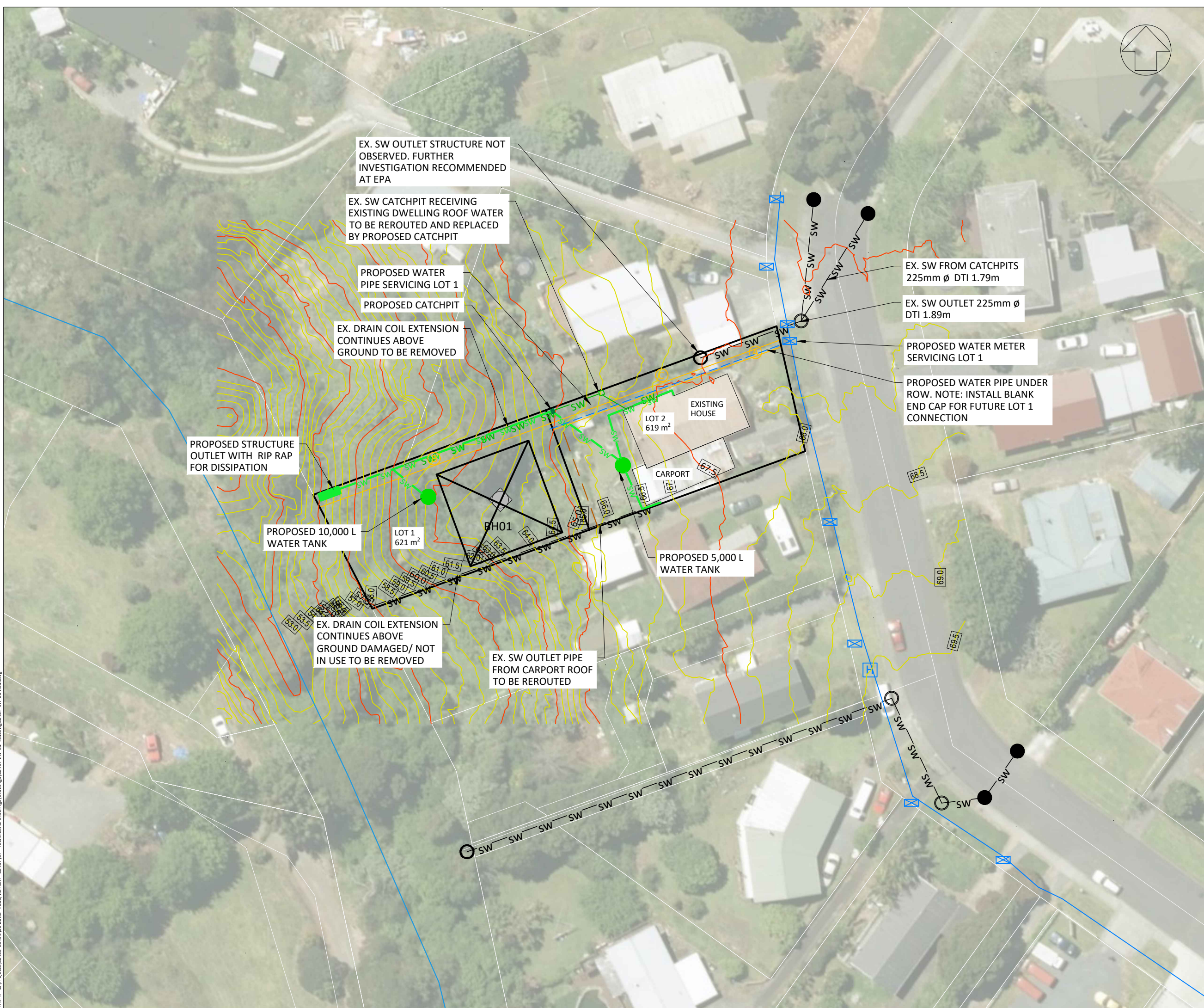
Project Name and Address
30 BUTLER ROAD
KERIKERI
LOT 5 DP 69124

Project **C0437** Drawn By **SD**

Client
NEO FAMILY TRUSTEE COMPANY LTD

Sheet Title
STORMWATER & WATER PLAN

Sheet
400



FILE PATH: Z:\Projects\0400-C0437\07 - Technical & Drawings\Drawings\0437-INF-01-RO1.dwg

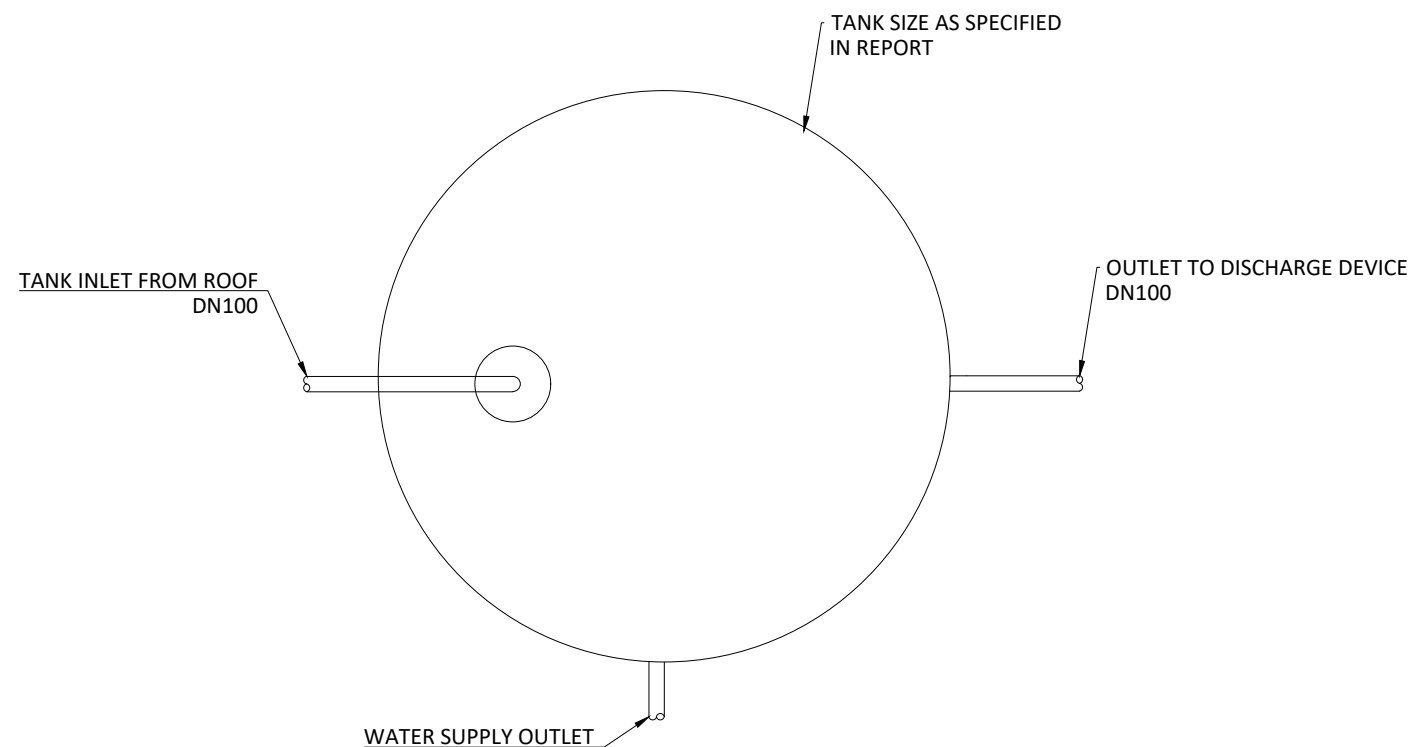
PLOTTED: 03/05/2024

GENERAL NOTES

1. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
2. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
3. DO NOT SCALE FROM THIS DRAWING.

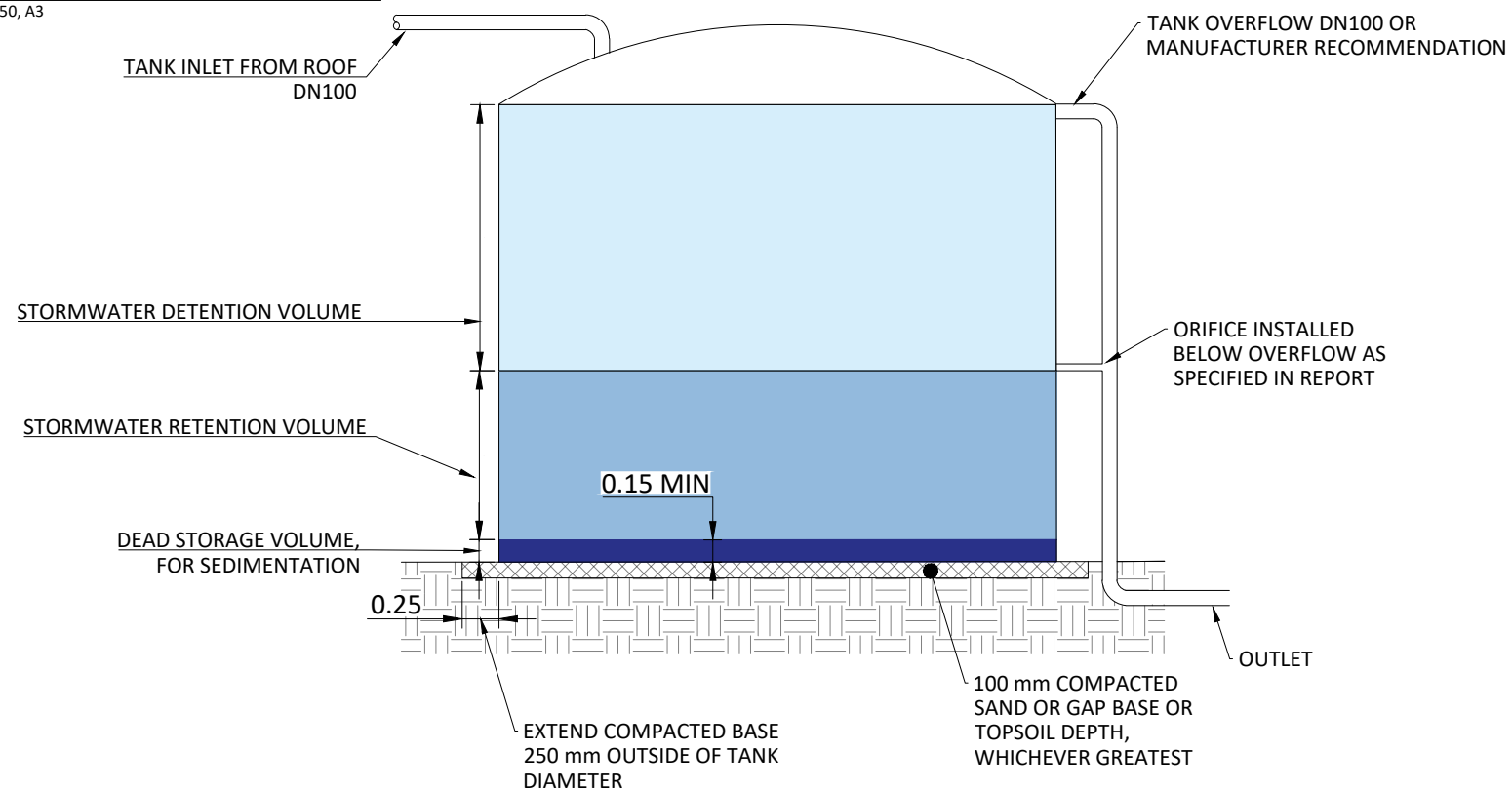
PROPOSED TANK PLAN VIEW

1:50, A3



PROPOSED TANK SIDE VIEW

1:50, A3



Revision	Issue	Date
A	CONSENT	03/05/2024



AUCKLAND | NORTHLAND

Project Name and Address

**30 BUTLER ROAD
KERIKERI
LOT 5 DP 69124**

Project
C0437

Drawn By
SD

Client
NEO FAMILY TRUSTEE COMPANY LTD

Sheet Title
TYPICAL SW TANK DETAIL











Sheet

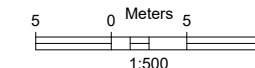
401



GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY LTD REF.9891, DATED 24/10/2023.
3. HORIZONTAL CO ORDINATE SYSTEM = NZTM.
4. VERTICAL DATUM = NZVD.
5. MAJOR INTERVALS 2.5 m.
6. MINOR INTERVALS 0.5 m.
7. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
8. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
9. DO NOT SCALE FROM THIS DRAWING.

-  GEOLOGIX HAND AUGER & DYNAMIC CONE PENETROMETER - JANUARY 2024
-  PROPOSED BUILDING PLATFORM
-  EASEMENT BOUNDARY
-  EXISTING ROCK RETAINING WALL
-  WATERCOURSE
-  EXISTING PRESSURE SEWER PIPE
-  EXISTING WASTEWATER LPS PUMP
-  EXISTING WASTEWATER ISOLATING VALVE
-  EXISTING WASTEWATER VALVE CHAMBER
-  PROPOSED WASTEWATER VALVE CHAMBER



A	CONSENT	03/05/2024
Revision	Issue	Date



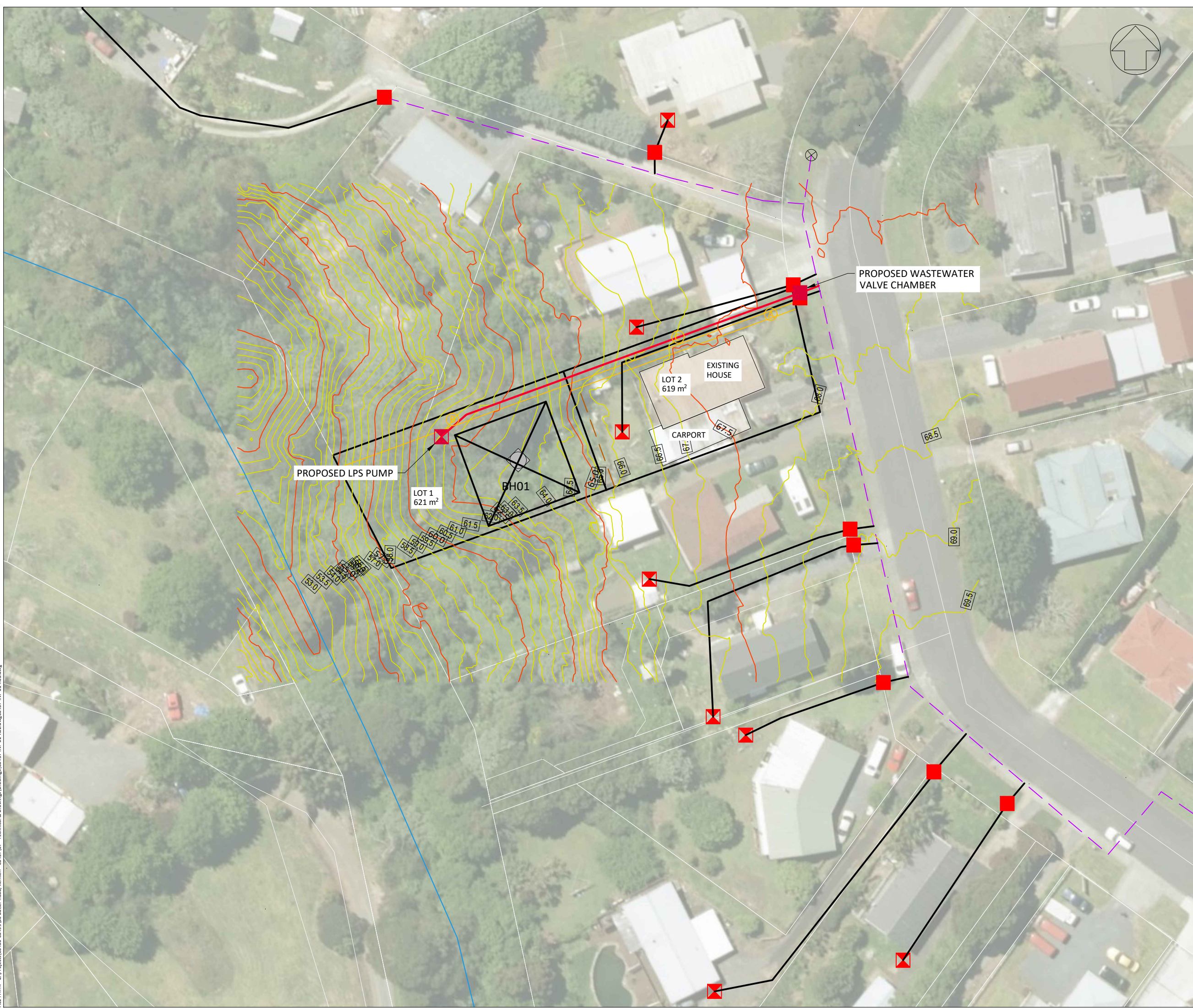
Project Name and Address
30 BUTLER ROAD
KERIKERI
LOT 5 DP 69124

Project C0437	Drawn By SD
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Client
NEO FAMILY TRUSTEE COMPANY LTD

Sheet Title
WASTEWATER PLAN

Sheet
500

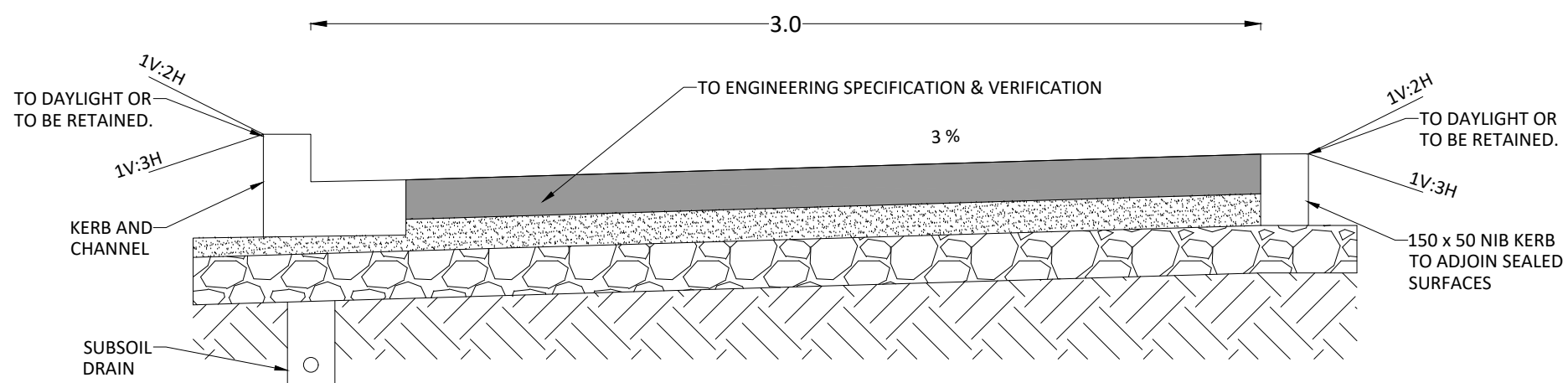


FILE PATH: Z:\Projects\0400-C049530 Butler Road, Kerikeri - C0437\07 - Technical & Drawings\Drawings\0437-INF-01-ROL.dwg\0437-INF-01-ROL.dwg

PLOTTED: 03/05/2024

GENERAL NOTES

1. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
2. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
3. DO NOT SCALE FROM THIS DRAWING.



PRIVATE ROAD TYPICAL DETAIL
 ACCORDING TO FNDC ENGINEERING STANDARDS SHEET NO. 7 & DISTRICT PLAN
 DETAILS, RESIDENTIAL ZONE FOR 1-2 HE.
 1:20 @ A3

Revision	Issue	Date
A	CONSENT	03/05/2024



AUCKLAND | NORTHLAND

Project Name and Address

30 BUTLER ROAD
 KERIKERI
 LOT 5 DP 69124

Project
 C0437

Drawn By
 SD

Client
 NEO FAMILY TRUSTEE COMPANY LTD

Sheet Title
 TYPICAL PRIVATE ROAD DETAIL

Sheet
 120



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APPENDIX B

Engineering Borehole Logs

INVESTIGATION LOG

HOLE NO.:
BH01

CLIENT: Neo Family Trustee Company Ltd
PROJECT: 30 Butler Road, Kerikeri

JOB NO.:
C0437

SITE LOCATION: North side of Butler Road

START DATE: 18/01/2024

CO-ORDINATES: 1685968.11mE, 6101251.19mN (NZTM)

ELEVATION: Ground

END DATE: 18/01/2024

CONTRACTOR: Internal

RIG: Hand

DRILLER: SD

LOGGED BY: SD

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)						VANE SHEAR STRENGTH (kPa) Vane: 3282				WATER				
				2	4	6	8	10	12	14	16	18	50		100	150	200	Values
[TOPSOIL] Organic silt, brown, stiff, dry		0.0																
[Kerikeri Volcanic Group] Gravelly organic cobbly SILT (ASH); brown silt, light yellow gravelly cobbles, dry, friable.		0.2																195+
		0.4																-
		0.6																195+
		0.8																-
SILT with trace clay; brown, mottled orange, moist, friable.		1.0																195+
		1.2																-
1.3m - 1.5m: traces of pumice.		1.4																106
		1.6																63
		1.8																195+
SILT with minor clay; dark brown, sporadic mottled orange, moist, low plasticity.		2.0																-
		2.2																77
		2.4																42
		2.6																180
		2.8																56
		3.0																184
		3.2																61
		3.4																154
		3.6																77
		3.8																77
SILT; dark brown/ black, moist-wet, high plasticity.		4.0																35
		4.2																128
		4.4																40
3.5m - 5.0m: contains small pockets of fine grey sand.		4.6																195+
		4.8																-
		5.0																140
End Of Hole: 5.00m																		57
																		195+
																		-
																		163
																		66
																		181
																		47
																		UTP

Groundwater Not Encountered

PHOTO(S)



REMARKS

- Hand auger terminated at target depth of 5.0m bgl.
- Groundwater not encountered at the time of drilling.
- No groundwater measured at EOD

WATER

- ▼ Standing Water Level
- ▽ Out flow
- ↖ In flow

INVESTIGATION TYPE

- Hand Auger
- Test Pit



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APPENDIX C

Stormwater Attenuation Design

Project Ref:	C0437	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	30 BUTLER ROAD, KERIKERI		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	6 May 2024 REV 1		

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

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

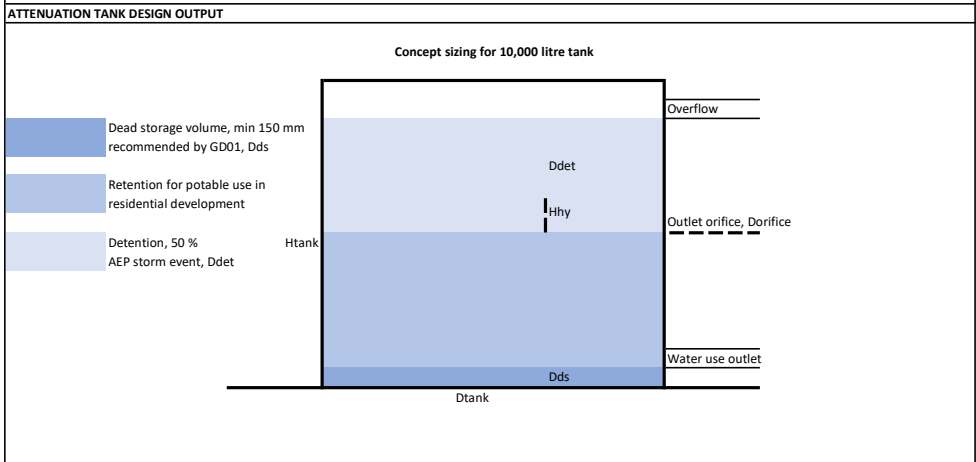
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	150	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	50	0.96	DRIVEWAY - SEALED
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	200	0.59	LAWN	EX. CONSENTED	0	0	
TOTAL	200		TYPE C	TOTAL	200		TYPE C

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION			
50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	60.9	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	%	
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	73.08	mm/hr	


PRE AND POST-DEVELOPMENT RUNOFF, 50%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Q, l/s	COMMENTS
10	60.90	1.2	73.08	3.90	2.40	1.92	Critical duration (time of concentration) for the catchments is 10min
20	42.30	1.2	50.76	2.71	1.66	1.33	
30	34.40	1.2	41.28	2.20	1.35	1.08	
60	24.30	1.2	29.16	1.56	0.96	0.76	
120	17.10	1.2	20.52	1.09	0.67	0.54	
360	9.45	1.2	11.34	0.60	0.37	0.30	
720	6.28	1.2	7.54	0.40	0.25	0.20	
1440	4.00	1.2	4.80	0.26	0.16	0.13	
2880	2.43	1.2	2.92	0.16	0.10	0.08	
4320	1.76	1.2	2.11	0.11	0.07	0.06	

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	COMMENTS
10	0.97	2.92	0.94	0.94	1.98	1189	select largest required storage, regardless of duration, to avoid overflow
20	0.68	2.03	0.65	0.94	1.09	1306	
30	0.55	1.65	0.53	0.94	0.71	1277	
60	0.39	1.17	0.38	0.94	0.22	808	
120	0.27	0.82	0.26	0.94	No Att. Req.	0	
360	0.15	0.45	0.15	0.94	No Att. Req.	0	
720	0.10	0.20	0.10	0.94	No Att. Req.	0	
1440	0.06	0.19	0.06	0.94	No Att. Req.	0	
2880	0.04	0.12	0.04	0.94	No Att. Req.	0	
4320	0.03	0.08	0.03	0.94	No Att. Req.	0	

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



SPECIFICATION		
TOTAL STORAGE REQUIRED	1.306 m ³	Select largest storage as per analysis
TANK HEIGHT, Htank	3 m	Concept sizing for 10,000 litre tank
TANK DIAMETER, Dtank	2.05 m	No. of Tanks
TANK AREA, Atank	3.30 m ²	Area of ONE TANK
TANK MAX STORAGE VOLUME, Vtank	9902 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.40 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.55 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00094 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.20 m	
AREA OF ORIFICE, Aorifice	7.71E-04 m ²	
ORIFICE DIAMETER, Dorifice	31 mm	
VELOCITY AT ORIFICE	2.79 m/s	At max. head level

Project Ref:	C0437	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	30 BUTLER ROAD, KERIKERI		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	6 May 2024 REV 1		

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

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

PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	150	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	50	0.96	DRIVEWAY - SEALED
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	200	0.59	LAWN	EX. CONSENTED	0	0	
TOTAL	200		TYPE C	TOTAL	200		TYPE C

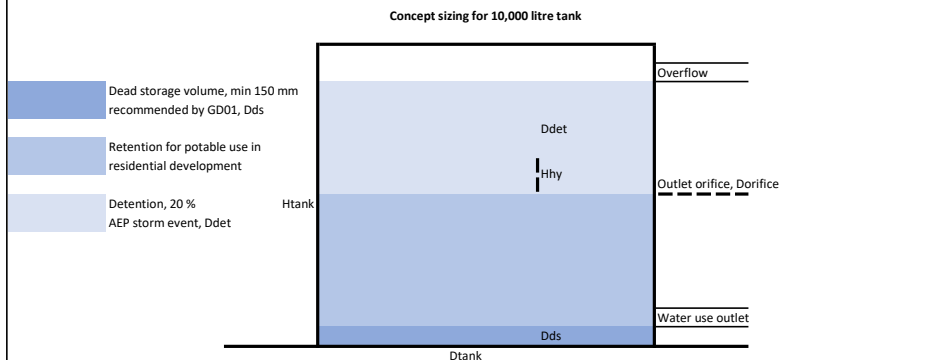
RAINFALL INTENSITY, 20% AEP, 10MIN DURATION			
20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	66.7	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	80.0	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Q _{post} , l/s	PRE DEV RUNOFF, Q _{pre} , l/s	80% OF PRE DEV RUNOFF, Q, l/s	COMMENTS
10	66.70	1.2	80.04	4.27	2.62	2.10	Critical duration (time of concentration) for the catchments is 10min
20	46.30	1.2	55.56	2.96	1.82	1.46	
30	37.70	1.2	45.24	2.41	1.48	1.19	
60	26.60	1.2	31.92	1.70	1.05	0.84	
120	18.70	1.2	22.44	1.20	0.74	0.59	
360	10.40	1.2	12.48	0.67	0.41	0.33	
720	6.90	1.2	8.28	0.44	0.27	0.22	
1440	4.40	1.2	5.28	0.28	0.17	0.14	
2880	2.67	1.2	3.20	0.17	0.11	0.08	
4320	1.94	1.2	2.33	0.12	0.08	0.06	

ATTENUATION ANALYSIS, VARIOUS DURATIONS						
DURATION, min	OFFSET FLOW, Q _{off} , l/s	TANK INFLOW, Q _{in} , l/s	ALLOWABLE TANK OUTFLOW, Q _{pre} - Q _{off} , l/s	SELECTED TANK OUTFLOW, Q _{out} , l/s	DIFFERENCE (Q _{in} - Q _{out}), l/s	Required Storage, litres
10	1.07	3.20	1.03	1.03	2.17	1302
20	0.74	2.22	0.72	1.03	1.19	1429
30	0.60	1.81	0.58	1.03	0.78	1400
60	0.43	1.28	0.41	1.03	0.25	883
120	0.30	0.90	0.29	1.03	No Att. Req.	0
360	0.17	0.50	0.16	1.03	No Att. Req.	0
720	0.11	0.33	0.11	1.03	No Att. Req.	0
1440	0.07	0.21	0.07	1.03	No Att. Req.	0
2880	0.04	0.13	0.04	1.03	No Att. Req.	0
4320	0.03	0.09	0.03	1.03	No Att. Req.	0


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

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	1.429 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	3 m	Concept sizing for 10,000 litre tank
TANK DIAMETER, D _{tank}	2.05 m	No. of Tanks 1
TANK AREA, A _{tank}	3.30 m ²	Area of ONE TANK
TANK MAX STORAGE VOLUME, V _{tank}	9902 litres	
REQUIRED STORAGE HEIGHT, D _{det}	0.43 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	GDO1 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.58 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00103 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.22 m	
AREA OF ORIFICE, A _{orifice}	8.07E-04 m ²	
ORIFICE DIAMETER, D _{orifice}	32 mm	
VELOCITY AT ORIFICE	2.91 m/s	At max. head level

Project Ref:	C0437	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	30 BUTLER ROAD, KERIKERI		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	16 May 2024 REV 1		
		1 % AEP STORM EVENT, TO PRE-DEVELOPMENT	

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

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

PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	150	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	50	0.96	DRIVEWAY - SEALED
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	200	0.59	LAWN	EX. CONSENTED	0	0	
TOTAL	200		TYPE C	TOTAL	200		TYPE C

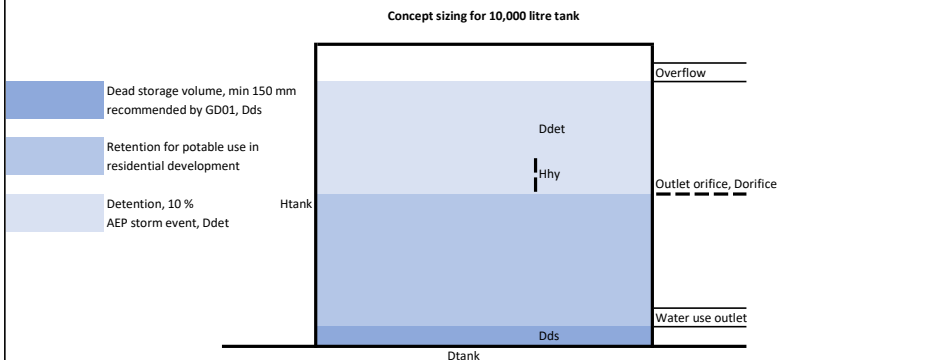
RAINFALL INTENSITY, 10% AEP, 10MIN DURATION			
10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	86.2	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	103.4	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 10%AEP WITH CC, VARIOUS DURATIONS						
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Q _{post} , l/s	PRE DEV RUNOFF, Q _{pre} , l/s	COMMENTS
10	86.20	1.2	103.44	5.52	3.39	Critical duration (time of concentration) for the catchments is 10min
20	60.00	1.2	72.00	3.84	2.36	
30	48.80	1.2	58.56	3.12	1.92	
60	34.50	1.2	41.40	2.21	1.36	
120	24.40	1.2	29.28	1.56	0.96	
360	13.50	1.2	16.20	0.86	0.53	
720	9.02	1.2	10.82	0.58	0.35	
1440	5.77	1.2	6.92	0.37	0.23	
2880	3.50	1.2	4.20	0.22	0.14	
4320	2.55	1.2	3.06	0.16	0.10	

ATTENUATION ANALYSIS, VARIOUS DURATIONS						
DURATION, min	OFFSET FLOW, Q _{off} , l/s	TANK INFLOW, Q _{in} , l/s	ALLOWABLE TANK OUTFLOW, Q _{pre} - Q _{off} , l/s	SELECTED TANK OUTFLOW, Q _{out} , l/s	DIFFERENCE (Q _{in} - Q _{out}), l/s	Required Storage, litres
10	1.38	4.14	2.01	2.01	2.13	1276
20	0.96	2.88	1.40	2.01	0.87	1042
30	0.78	2.34	1.14	2.01	0.33	596
60	0.55	1.66	0.81	2.01	No Att. Req.	0
120	0.39	1.17	0.57	2.01	No Att. Req.	0
360	0.22	0.65	0.32	2.01	No Att. Req.	0
720	0.14	0.43	0.21	2.01	No Att. Req.	0
1440	0.09	0.28	0.13	2.01	No Att. Req.	0
2880	0.06	0.17	0.08	2.01	No Att. Req.	0
4320	0.04	0.12	0.06	2.01	No Att. Req.	0


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

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	1.276 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	3 m	Concept sizing for 10,000 litre tank
TANK DIAMETER, D _{tank}	2.05 m	No. of Tanks 1
TANK AREA, A _{tank}	3.30 m ²	Area of ONE TANK
TANK MAX STORAGE VOLUME, V _{tank}	9902 litres	
REQUIRED STORAGE HEIGHT, D _{det}	0.39 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	GDD1 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.54 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00201 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.19 m	
AREA OF ORIFICE, A _{orifice}	1.67E-03 m ²	
ORIFICE DIAMETER, D _{orifice}	46 mm	
VELOCITY AT ORIFICE	2.75 m/s	At max. head level

Project Ref:	C0437	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	30 BUTLER ROAD, KERIKERI		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	16 May 2024 REV 1		

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

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

PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	150	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	50	0.96	DRIVEWAY - SEALED
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	200	0.59	LAWN	EX. CONSENTED	0	0	
TOTAL	200	TYPE C		TOTAL	200	TYPE C	

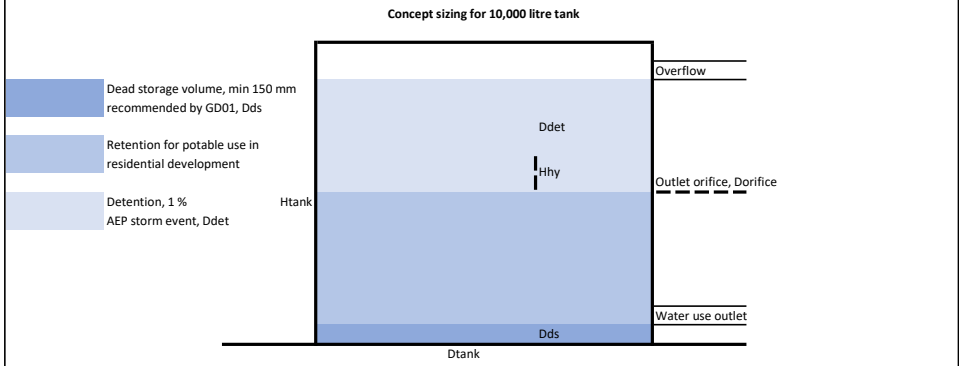
RAINFALL INTENSITY, 1% AEP, 10MIN DURATION			
1% AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	144.0	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
1% AEP RAINFALL INTENSITY, 10 MIN WITH CC	172.8	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 1%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Q _{post} , l/s	PRE DEV RUNOFF, Q _{pre} , l/s	80% OF PRE DEV RUNOFF, Q, l/s	COMMENTS
10	144.00	1.2	172.80	9.22	5.66	4.53	Critical duration (time of concentration) for the catchments is 10min
20	101.00	1.2	121.20	6.46	3.97	3.18	
30	82.30	1.2	98.76	5.27	3.24	2.59	
60	58.50	1.2	70.20	3.74	2.30	1.84	
120	41.50	1.2	49.80	2.66	1.63	1.31	
360	23.20	1.2	27.84	1.48	0.91	0.73	
720	15.60	1.2	18.72	1.00	0.61	0.49	
1440	9.99	1.2	11.99	0.64	0.39	0.31	
2880	6.10	1.2	7.32	0.39	0.24	0.19	
4320	4.45	1.2	5.34	0.28	0.18	0.14	

ATTENUATION ANALYSIS, VARIOUS DURATIONS						
DURATION, min	OFFSET FLOW, Q _{off} , l/s	TANK INFLOW, Q _{in} , l/s	ALLOWABLE TANK OUTFLOW, Q _{pre} - Q _{off} , l/s	SELECTED TANK OUTFLOW, Q _{out} , l/s	DIFFERENCE (Q _{in} - Q _{out}), l/s	Required Storage, litres
10	2.30	6.91	2.23	2.23	4.68	2811
20	1.62	4.85	1.56	2.23	2.62	3145
30	1.32	3.95	1.27	2.23	1.72	3102
60	0.94	2.81	0.90	2.23	0.58	2091
120	0.66	1.99	0.64	2.23	No Att. Req.	0
360	0.37	1.11	0.36	2.23	No Att. Req.	0
720	0.25	0.75	0.24	2.23	No Att. Req.	0
1440	0.16	0.48	0.15	2.23	No Att. Req.	0
2880	0.10	0.29	0.09	2.23	No Att. Req.	0
4320	0.07	0.21	0.07	2.23	No Att. Req.	0


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

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	3.145 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	3 m	Concept sizing for 10,000 litre tank
TANK DIAMETER, D _{tank}	2.05 m	No. of Tanks 1
TANK AREA, A _{tank}	3.30 m ²	Area of ONE TANK
TANK MAX STORAGE VOLUME, V _{tank}	9902 litres	
REQUIRED STORAGE HEIGHT, D _{det}	0.95 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	GDO1 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.10 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00223 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.48 m	
AREA OF ORIFICE, A _{orifice}	1.17E-03 m ²	
ORIFICE DIAMETER, Dorifice	39 mm	
VELOCITY AT ORIFICE	4.32 m/s	At max. head level

Project Ref:	C0437	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	30 BUTLER ROAD, KERIKERI		
Design Case:	EXISTING DEVELOPMENT, LOT 2		
Date:	6 May 2024 REV 1		

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

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

PERMITTED ACTIVITY (PA) CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
PA THRESHOLD	309.5	0.96	PA = 50% OF SITE	TO TANK	202	0.96	ROOF
IMPERVIOUS B	0	0					
IMPERVIOUS C	0	0		OFFSET	103	0.96	ROW - SEALED
EX. PERVIOUS	309.5	0.59	LAWN	OFFSET	55	0.96	DRIVEWAY - SEALED
				OFFSET	259	0.59	LAWN
TOTAL	619	TYPE C		TOTAL	619	TYPE C	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, 1, mm/hr	60.9	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	%	
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	73.08	mm/hr	

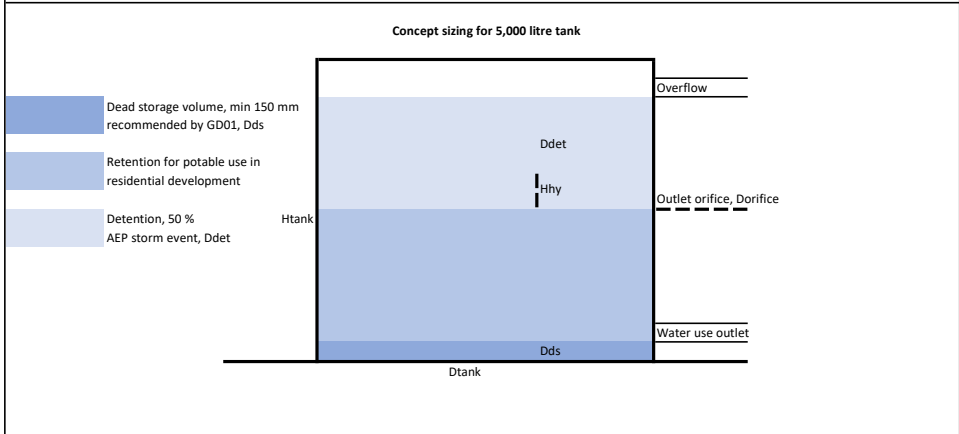
PRE AND POST-DEVELOPMENT RUNOFF, 50%AEP WITH CC, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PA RUNOFF, Qpa, l/s	COMMENTS
10	60.90	1.2	73.08	10.12	9.74	Critical duration (time of concentration) for the catchments is 10min
20	42.30	1.2	50.76	7.03	6.76	
30	34.40	1.2	41.28	5.72	5.50	
60	24.30	1.2	29.16	4.04	3.89	
120	17.10	1.2	20.52	2.84	2.73	
360	9.45	1.2	11.34	1.57	1.51	
720	6.28	1.2	7.54	1.04	1.00	
1440	4.00	1.2	4.80	0.66	0.64	
2880	2.43	1.2	2.92	0.40	0.39	
4320	1.76	1.2	2.11	0.29	0.28	

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	COMMENTS
10	6.18	3.94	3.56	3.56	0.38	228	select largest required storage, regardless of duration, to avoid overflow
20	4.29	2.73	2.47	3.56	No Att. Req.	0	
30	3.49	2.22	2.01	3.56	No Att. Req.	0	
60	2.47	1.57	1.42	3.56	No Att. Req.	0	
120	1.74	1.11	1.00	3.56	No Att. Req.	0	
360	0.96	0.61	0.55	3.56	No Att. Req.	0	
720	0.64	0.41	0.37	3.56	No Att. Req.	0	
1440	0.41	0.26	0.23	3.56	No Att. Req.	0	
2880	0.25	0.16	0.14	3.56	No Att. Req.	0	
4320	0.18	0.11	0.10	3.56	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	0.228 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	2 m	Concept sizing for 5,000 litre tank
TANK DIAMETER, D _{tank}	1.8 m	No. of Tanks 1
TANK AREA, A _{tank}	2.54 m ²	Area of ONE tank
TANK MAX STORAGE VOLUME, V _{tank}	5089 litres	
REQUIRED STORAGE HEIGHT, D _{det}	0.09 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.24 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00356 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.04 m	
AREA OF ORIFICE, A _{orifice}	6.13E-03 m ²	
ORIFICE DIAMETER, D _{orifice}	88 mm	
VELOCITY AT ORIFICE	1.32 m/s	At max. head level

Project Ref:	C0437	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	30 BUTLER ROAD, KERIKERI		
Design Case:	EXISTING DEVELOPMENT, LOT 2		
Date:	6 May 2024 REV 1		

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

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

PERMITTED ACTIVITY (PA) CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
PA THRESHOLD	309.5	0.96	PA = 50% OF SITE	TO TANK	202	0.96	ROOF
IMPERVIOUS B	0	0			0	0	
IMPERVIOUS C	0	0	LAWN	OFFSET	103	0.96	RoW - SEALED
EX. PERVIOUS	309.5	0.59		OFFSET	55	0.96	DRIVEWAY - SEALED
				OFFSET	259	0.59	LAWN
TOTAL	619	TYPE C		TOTAL	619	TYPE C	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	66.7	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	%	
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	80.0	mm/hr	

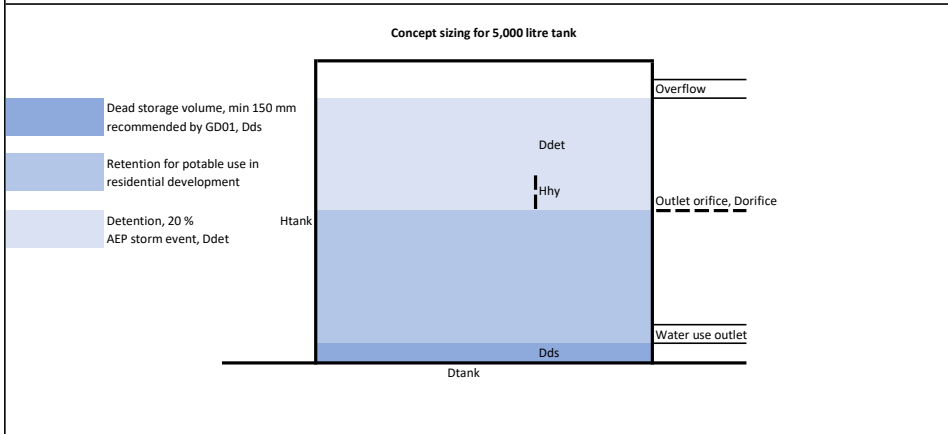
PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PA RUNOFF, Qpa, l/s	COMMENTS
10	66.70	1.2	80.04	11.08	10.67	Critical duration (time of concentration) for the catchments is 10min
20	46.30	1.2	55.56	7.69	7.40	
30	37.70	1.2	45.24	6.26	6.03	
60	26.60	1.2	31.92	4.42	4.25	
120	18.70	1.2	22.44	3.11	2.99	
360	10.40	1.2	12.48	1.73	1.66	
720	6.90	1.2	8.28	1.15	1.10	
1440	4.40	1.2	5.28	0.73	0.70	
2880	2.67	1.2	3.20	0.44	0.43	
4320	1.94	1.2	2.33	0.32	0.31	

ATTENUATION ANALYSIS, VARIOUS DURATIONS


DURATION, min	OFFSET FLOW, Q _{off} , l/s	TANK INFLOW, Q _{in} , l/s	ALLOWABLE TANK OUTFLOW, Q _{pre} - Q _{off} , l/s	SELECTED TANK OUTFLOW, Q _{out} , l/s	DIFFERENCE (Q _{in} - Q _{out}), l/s	Required Storage, litres	COMMENTS
10	6.77	4.31	3.90	3.90	0.42	249	select largest required storage, regardless of duration, to avoid overflow
20	4.70	2.99	2.70	3.90	No Att. Req.	0	
30	3.83	2.44	2.20	3.90	No Att. Req.	0	
60	2.70	1.72	1.55	3.90	No Att. Req.	0	
120	1.90	1.21	1.09	3.90	No Att. Req.	0	
360	1.06	0.67	0.61	3.90	No Att. Req.	0	
720	0.70	0.45	0.40	3.90	No Att. Req.	0	
1440	0.45	0.28	0.26	3.90	No Att. Req.	0	
2880	0.27	0.17	0.16	3.90	No Att. Req.	0	
4320	0.20	0.13	0.11	3.90	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	0.249 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	2 m	Concept sizing for 5,000 litre tank
TANK DIAMETER, D _{tank}	1.8 m	No. of Tanks 1
TANK AREA, A _{tank}	2.54 m ²	Area of ONE tank
TANK MAX STORAGE VOLUME, V _{tank}	5089 litres	
REQUIRED STORAGE HEIGHT, D _{det}	0.10 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	G001 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.25 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00390 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.05 m	
AREA OF ORIFICE, A _{orifice}	6.41E-03 m ²	
ORIFICE DIAMETER, D _{orifice}	90 mm	
VELOCITY AT ORIFICE	1.39 m/s	At max. head level

Project Ref:	C0437	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	30 BUTLER ROAD, KERIKERI		
Design Case:	EXISTING DEVELOPMENT, LOT 2		
Date:	6 May 2024 REV 1		

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

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

PERMITTED ACTIVITY (PA) CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
PA THRESHOLD	309.5	0.96	PA = 50% OF SITE	TO TANK	202	0.96	ROOF
IMPERVIOUS B	0	0			0	0	
IMPERVIOUS C	0	0		OFFSET	103	0.96	RoW - SEALED
EX. PERVIOUS	309.5	0.59	LAWN	OFFSET	55	0.96	DRIVEWAY - SEALED
	0	0		OFFSET	259	0.59	LAWN
TOTAL	619	TYPE C		TOTAL	619	TYPE C	

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	86.2	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	103.4	mm/hr	

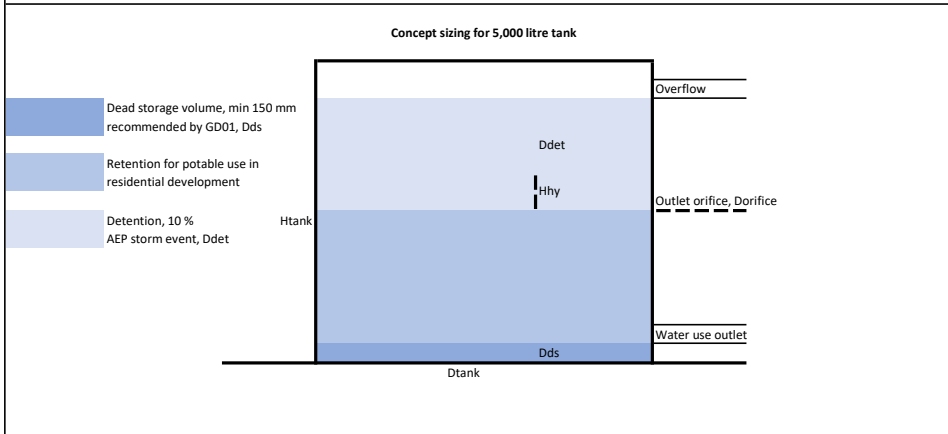
PRE AND POST-DEVELOPMENT RUNOFF, 10%AEP WITH CC, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PA RUNOFF, Qpa, l/s	COMMENTS
10	86.20	1.2	103.44	14.32	13.78	Critical duration (time of concentration) for the catchments is 10min
20	60.00	1.2	72.00	9.97	9.59	
30	48.80	1.2	58.56	8.11	7.80	
60	34.50	1.2	41.40	5.73	5.52	
120	24.40	1.2	29.28	4.05	3.90	
360	13.50	1.2	16.20	2.24	2.16	
720	9.02	1.2	10.82	1.50	1.44	
1440	5.77	1.2	6.92	0.96	0.92	
2880	3.50	1.2	4.20	0.58	0.56	
4320	2.55	1.2	3.06	0.42	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	COMMENTS
10	8.75	5.57	5.04	5.04	0.54	322	select largest required storage, regardless of duration, to avoid overflow
20	6.09	3.88	3.50	5.04	No Att. Req.	0	
30	4.95	3.15	2.85	5.04	No Att. Req.	0	
60	3.50	2.23	2.02	5.04	No Att. Req.	0	
120	2.48	1.58	1.43	5.04	No Att. Req.	0	
360	1.37	0.87	0.79	5.04	No Att. Req.	0	
720	0.92	0.58	0.53	5.04	No Att. Req.	0	
1440	0.59	0.37	0.34	5.04	No Att. Req.	0	
2880	0.36	0.23	0.20	5.04	No Att. Req.	0	
4320	0.26	0.16	0.15	5.04	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	0.322 m ³	Select largest storage as per analysis
TANK HEIGHT, Htank	2 m	Concept sizing for 5,000 litre tank
TANK DIAMETER, Dtank	1.8 m	No. of Tanks 1
TANK AREA, Atank	2.54 m ²	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	5089 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.13 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	G001 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.28 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00504 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.06 m	
AREA OF ORIFICE, Aorifice	7.29E-03 m ²	
ORIFICE DIAMETER, Dorifice	96 mm	
VELOCITY AT ORIFICE	1.58 m/s	At max. head level

Project Ref:	C0437	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	30 BUTLER ROAD, KERIKERI		
Design Case:	EXISTING DEVELOPMENT, LOT 2		
Date:	6 May 2024 REV 1		

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

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

PERMITTED ACTIVITY (PA) CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
PA THRESHOLD	309.5	0.96	PA = 50% OF SITE	TO TANK	202	0.96	ROOF
IMPERVIOUS B	0	0			0	0	
IMPERVIOUS C	0	0		OFFSET	103	0.96	RoW - SEALED
EX. PERVIOUS	309.5	0.59	LAWN	OFFSET	55	0.96	DRIVEWAY - SEALED
	0	0		OFFSET	259	0.59	LAWN
TOTAL	619	TYPE C		TOTAL	619	TYPE C	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1% AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	144.0	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	172.8	mm/hr	

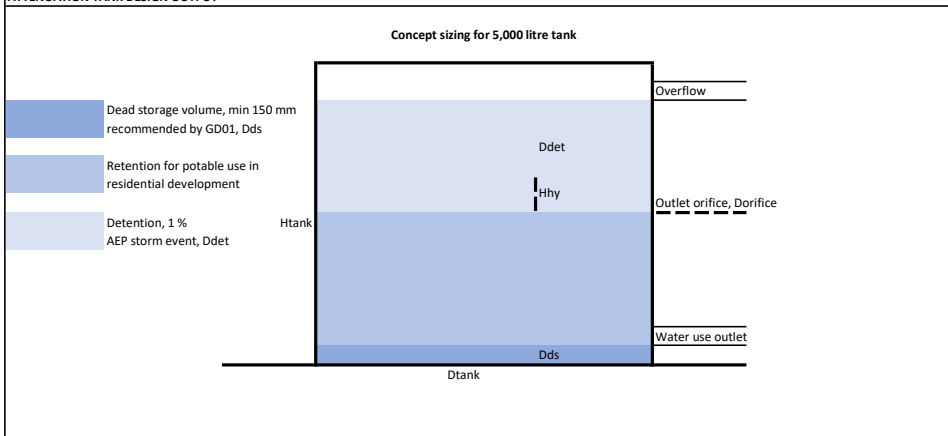
PRE AND POST-DEVELOPMENT RUNOFF, 1% AEP WITH CC, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PA RUNOFF, Qpa, l/s	COMMENTS
10	144.00	1.2	172.80	23.92	23.03	Critical duration (time of concentration) for the catchments is 10min
20	101.00	1.2	121.20	16.78	16.15	
30	82.30	1.2	98.76	13.67	13.16	
60	58.50	1.2	70.20	9.72	9.35	
120	41.50	1.2	49.80	6.89	6.64	
360	23.20	1.2	27.84	3.85	3.71	
720	15.60	1.2	18.72	2.59	2.49	
1440	9.99	1.2	11.99	1.66	1.60	
2880	6.10	1.2	7.32	1.01	0.98	
4320	4.45	1.2	5.34	0.74	0.71	

ATTENUATION ANALYSIS, VARIOUS DURATIONS


DURATION, min	OFFSET FLOW, Q _{off} , l/s	TANK INFLOW, Q _{in} , l/s	ALLOWABLE TANK OUTFLOW, Q _{pre} - Q _{off} , l/s	SELECTED TANK OUTFLOW, Q _{out} , l/s	DIFFERENCE (Q _{in} - Q _{out}), l/s	Required Storage, litres	COMMENTS
10	14.62	9.31	8.41	8.41	0.90	538	select largest required storage, regardless of duration, to avoid overflow
20	10.25	6.53	5.90	8.41	No Att. Req.	0	
30	8.35	5.32	4.81	8.41	No Att. Req.	0	
60	5.94	3.78	3.42	8.41	No Att. Req.	0	
120	4.21	2.68	2.42	8.41	No Att. Req.	0	
360	2.35	1.50	1.36	8.41	No Att. Req.	0	
720	1.58	1.01	0.91	8.41	No Att. Req.	0	
1440	1.01	0.65	0.58	8.41	No Att. Req.	0	
2880	0.62	0.39	0.36	8.41	No Att. Req.	0	
4320	0.45	0.29	0.26	8.41	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	0.538 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	2 m	Concept sizing for 5,000 litre tank
TANK DIAMETER, D _{tank}	1.8 m	No. of Tanks 1
TANK AREA, A _{tank}	2.54 m ²	Area of ONE tank
TANK MAX STORAGE VOLUME, V _{tank}	5089 litres	
REQUIRED STORAGE HEIGHT, D _{det}	0.21 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.36 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00841 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.11 m	
AREA OF ORIFICE, A _{orifice}	9.42E-03 m ²	
ORIFICE DIAMETER, D _{orifice}	110 mm	
VELOCITY AT ORIFICE	2.04 m/s	At max. head level

Project Ref:	C0437	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	30 BUTLER ROAD, KERIKERI		
Design Case:	EXISTING DEVELOPMENT, LOT 2		
Date:	6 May 2024 REV 1		
DETAILED DESIGN : LIMIT 1 % AEP TO 50% AEP PA THRESHOLD			

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

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

PERMITTED ACTIVITY (PA) CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
PA THRESHOLD	309.5	0.96	PA = 50% OF SITE	TO TANK	202	0.96	ROOF
IMPERVIOUS B	0	0			0	0	
IMPERVIOUS C	0	0		OFFSET	103	0.96	RoW - SEALED
EX. PERVIOUS	309.5	0.59	LAWN	OFFSET	55	0.96	DRIVEWAY - SEALED
	0	0		OFFSET	259	0.59	LAWN
TOTAL	619	TYPE C		TOTAL	619	TYPE C	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	144.0	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	172.8	mm/hr	

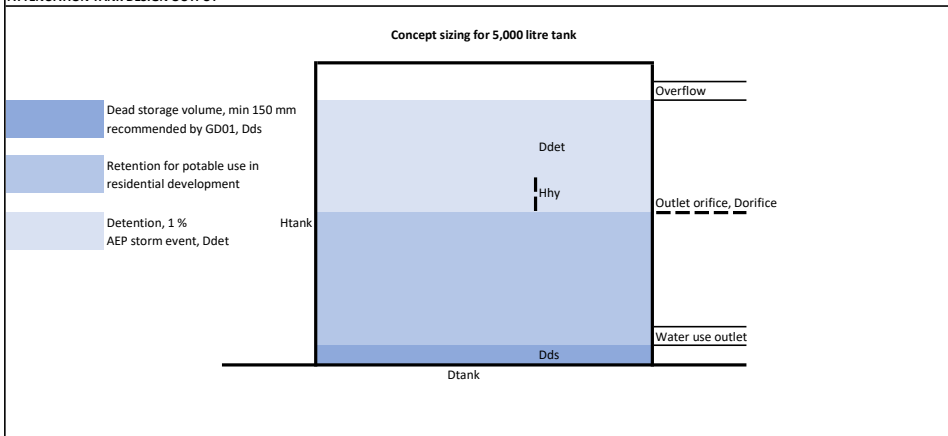
PRE AND POST-DEVELOPMENT RUNOFF, 1%AEP WITH CC, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PA RUNOFF, Qpa, l/s	COMMENTS
10	144.00	1.2	172.80	23.92	23.03	Critical duration (time of concentration) for the catchments is 10min
20	101.00	1.2	121.20	16.78	16.15	
30	82.30	1.2	98.76	13.67	13.16	
60	58.50	1.2	70.20	9.72	9.35	
120	41.50	1.2	49.80	6.89	6.64	
360	23.20	1.2	27.84	3.85	3.71	
720	15.60	1.2	18.72	2.59	2.49	
1440	9.99	1.2	11.99	1.66	1.60	
2880	6.10	1.2	7.32	1.01	0.98	
4320	4.45	1.2	5.34	0.74	0.71	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Q _{off} , l/s	TANK INFLOW, Q _{in} , l/s	ALLOWABLE TANK OUTFLOW, Q _{pre} - Q _{off} , l/s	SELECTED TANK OUTFLOW, Q _{out} , l/s	DIFFERENCE (Q _{in} - Q _{out}), l/s	Required Storage, litres	COMMENTS
10	14.62	9.31	3.56	3.56	5.75	3451	ALLOWABLE TANK OUTFLOW = 50% AEP PERMITTED ACTIVITY DISCHARGE select largest required storage, regardless of duration, to avoid overflow
20	10.25	6.53	2.47	3.56	2.97	3566	
30	8.35	5.32	2.01	3.56	1.76	3173	
60	5.94	3.78	1.42	3.56	0.22	807	
120	4.21	2.68	1.00	3.56	No Att. Req.	0	
360	2.35	1.50	0.55	3.56	No Att. Req.	0	
720	1.58	1.01	0.37	3.56	No Att. Req.	0	
1440	1.01	0.65	0.23	3.56	No Att. Req.	0	
2880	0.62	0.39	0.14	3.56	No Att. Req.	0	
4320	0.45	0.29	0.10	3.56	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	3.566 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	2 m	Concept sizing for 5,000 litre tank
TANK DIAMETER, D _{tank}	1.8 m	No. of Tanks 1
TANK AREA, A _{tank}	2.54 m ²	Area of ONE tank
TANK MAX STORAGE VOLUME, V _{tank}	5089 litres	
REQUIRED STORAGE HEIGHT, D _{det}	1.40 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.55 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00356 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.70 m	
AREA OF ORIFICE, A _{orifice}	1.55E-03 m ²	
ORIFICE DIAMETER, D _{orifice}	44 mm	
VELOCITY AT ORIFICE	5.24 m/s	At max. head level

HIRDS V4 Intensity-Duration-Frequency Results

Station: 30 BUTLER ROAD, KERIKERI

Site ID: AS5295

Coordinate system: NZGD1949

Longitude: 173.948

Latitude: -35.23

DDF Mode Parameters: c d e f r h i

Values: 0.00246862 0.49678147 -0.00347183 -0.00521928 0.2529269 -0.01184017 3.18952554

Example: Duration (hrs) ARI (yrs) x y Rainfall Rate (mm/hr)

24 100 3.17805383 4.600149227 10.34714863

Rainfall intensities (mm/hr) - Historical Data

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	201	42.3	34.4	24.3	17.1	9.45	6.28	4	2.43	1.76	1.38	1.14
2	0.5	66.7	46.3	37.7	26.6	10.4	6.9	4.4	2.67	1.94	1.52	1.25	
5	0.2	86.2	60	48.8	34.5	24.4	13.5	9.02	5.77	3.5	2.55	2	1.65
10	0.05	100	70	57	40.4	28.5	15.9	10.6	6.78	4.33	3	2.36	1.94
20	0.05	115	80.1	65.4	46.4	32.8	18.3	12.2	7.83	4.77	3.47	2.73	2.25
30	0.033	123	86.2	70.3	49.9	35.3	19.7	13.2	8.45	5.15	3.75	2.95	2.43
40	0.025	129	90.5	73.8	52.4	37.1	20.8	13.9	8.9	5.43	3.95	3.11	2.56
50	0.02	134	93.8	76.6	54.4	38.5	21.6	14.4	9.25	5.64	4.11	3.24	2.67
60	0.017	138	96.5	78.8	56	39.6	22.2	14.9	9.54	5.82	4.24	3.34	2.75
80	0.013	144	101	82.3	58.5	41.5	23.2	15.6	9.99	6.1	4.45	3.5	2.89
100	0.01	149	104	85.1	60.5	42.9	24	16.1	10.3	6.32	4.61	3.59	2.99
250	0.004	167	117	96	68.4	48.5	27.3	18.1	11.8	7.2	5.26	4.14	3.42

Intensity standard error (mm/hr) - Historical Data

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	4.7	3.3	2.4	2	1.4	0.81	0.75	4.17	2.51	1.81	1.42	1.17
2	0.5	5.1	3.5	2.5	2.2	1.5	0.89	0.82	4.14	2.51	1.81	1.42	1.17
5	0.2	7.7	5.4	4	3.3	2.2	1.3	1.1	0.24	0.26	0.3	0.14	0.13
10	0.1	11	7.6	5.7	4.4	3.2	1.7	1.4	0.36	0.33	0.36	0.19	0.17
20	0.05	15	10	7.8	5.9	3.9	2.3	1.8	0.52	0.42	0.44	0.24	0.21
30	0.033	17	12	9.3	7	4.7	2.8	2.1	0.64	0.49	0.49	0.28	0.25
40	0.025	19	14	11	7.9	5.3	3.2	2.4	0.74	0.54	0.52	0.31	0.27
50	0.02	21	15	12	8.7	5.8	3.5	2.6	0.82	0.59	0.56	0.34	0.3
60	0.017	23	16	12	9.3	6.3	3.8	2.8	0.88	0.63	0.58	0.36	0.32
80	0.013	26	18	14	11	7.1	4.4	3.2	1	0.69	0.63	0.4	0.35
100	0.01	28	20	15	12	7.8	4.8	3.4	1.1	0.75	0.67	0.43	0.38
250	0.004	39	28	21	17	11	7.1	4.9	1.6	1	0.85	0.6	0.52

Rainfall intensities (mm/hr) - RCP2.6 for the period 2031-2050

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	65.2	45.3	36.8	26	18.2	9.98	6.57	4.17	2.51	1.81	1.42	1.17
2	0.5	71.5	49.6	40.4	28.5	20	11	7.24	4.59	2.76	2	1.57	1.29
5	0.2	92.7	64.5	52.5	37.2	26.1	14.4	9.51	6.03	3.64	2.64	2.07	1.7
10	0.1	108	75.4	61.4	43.5	30.6	16.9	11.2	7.11	4.3	3.12	2.44	2.01
20	0.05	124	86.4	70.5	50	35.2	19.5	12.9	8.21	4.97	3.63	2.83	2.32
30	0.033	133	93	75.9	53.8	38	21	13.9	8.87	5.37	3.9	3.06	2.52
40	0.025	140	97.6	79.7	56.6	39.9	22.1	14.7	9.34	5.66	4.11	3.23	2.65
50	0.02	145	101	82.7	58.7	41.5	23	15.3	9.71	5.89	4.28	3.36	2.76
60	0.017	149	104	85.1	60.5	42.7	23.7	15.7	10	6.08	4.41	3.47	2.85
80	0.013	156	109	89	63.2	44.7	24.8	16.5	10.5	6.37	4.63	3.63	2.99
100	0.01	161	112	91.9	65.3	46.2	25.7	17.1	10.9	6.6	4.79	3.77	3.1
250	0.004	181	127	104	73.8	52.3	29.1	19.4	12.4	7.52	5.47	4.3	3.54

Rainfall intensities (mm/hr) - RCP2.6 for the period 2081-2100

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	65.2	45.3	36.8	26	18.2	9.98	6.57	4.17	2.51	1.81	1.42	1.17
2	0.5	71.5	49.6	40.4	28.5	20	11	7.24	4.59	2.76	2	1.57	1.29
5	0.2	92.7	64.5	52.5	37.2	26.1	14.4	9.51	6.03	3.64	2.64	2.07	1.7
10	0.1	108	75.4	61.4	43.5	30.6	16.9	11.2	7.11	4.3	3.12	2.44	2.01
20	0.05	124	86.4	70.5	50	35.2	19.5	12.9	8.21	4.97	3.63	2.83	2.32
30	0.033	133	93	75.9	53.8	38	21	13.9	8.87	5.37	3.9	3.06	2.52
40	0.025	140	97.6	79.7	56.6	39.9	22.1	14.7	9.34	5.66	4.11	3.23	2.65
50	0.02	145	101	82.7	58.7	41.5	23	15.3	9.71	5.89	4.28	3.36	2.76
60	0.017	149	104	85.1	60.5	42.7	23.7	15.7	10	6.08	4.41	3.47	2.85
80	0.013	156	109	89	63.2	44.7	24.8	16.5	10.5	6.37	4.63	3.63	2.99
100	0.01	161	112	91.9	65.3	46.2	25.7	17.1	10.9	6.6	4.79	3.77	3.1
250	0.004	181	127	104	73.8	52.3	29.1	19.4	12.4	7.52	5.47	4.3	3.54

Rainfall intensities (mm/hr) - RCP4.5 for the period 2031-2050

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	66.3	46	37.4	26.4	18.5	10.1	6.65	4.21	2.53	1.83	1.43	1.17
2	0.5	72.7	50.5	41.1	29.9	20.3	11.1	7.38	4.63	2.79	2.01	1.58	1.29
5	0.2	94.3	65.6	53.5	37.8	26.6	14.6	9.63	6.1	3.68	2.66	2.09	1.71
10	0.1	110	76.8	62.6	44.3	31.2	17.2	11.3	7.19	4.34	3.14	2.46	2.02
20	0.05	126	88	73.8	50.9	35.9	19.8	13.1	8.3	5.02	3.64	2.86	2.34
30	0.033	136	94.7	77.3	54.8	38.7	21.4	14.1	8.97	5.43	3.94	3.09	2.54
40	0.025	142	99.4	81.2	57.6	40.6	22.5	14.9	9.46	5.72	4.15	3.26	2.68
50	0.02	148	103	84.2	59.8	42.2	23.4	15.5	9.83	5.95	4.32	3.39	2.79
60	0.017	152	106	86.7	61.6	43.5	24.1	16	10.1	6.14	4.46	3.5	2.87
80	0.013	159	111	90.6	64.4	45.5	25.2	16.7	10.6	6.44	4.67	3.67	3.02
100	0.01	164	115	93.6	66.6	47	26.1	17.3	11	6.67	4.84	3.8	3.13
250	0.004	184	129	106	75.2	53.2	29.6	19.7	12.5	7.6	5.52	4.34	3.57

Rainfall intensities (mm/hr) - RCP4.5 for the period 2081-2100

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	69.7	48.4	39.3	27.8	19.4	10.5	6.89	4.34	2.6	1.87	1.46	1.2
2	0.5	76.5	53.1	43.2	30.5	21.4	11.6	7.61	4.78	2.86	2.06	1.61	1.32
5	0.2	99.5	69.3	56.4	39.9	28	15.3	10	6.31	3.79	2.74	2.14	1.75
10	0.1	116	81.1	66.1	46.8	33.8	18	11.8	7.45	4.48	3.24	2.53	2.08
20	0.05	133	93	75.9	53.8	37.8	20.8	13.6	8.61	5.18	3.75	2.93	2.41
30	0.033	143	100	81.7	58	40.8	22.4	14.7	9.3	5.61	4.05	3.18	2.6
40	0.025	150	105	85.8	60.9	42.9	23.6	15.5	9.81	5.91	4.28	3.35	2.75
50	0.02	156	109	89.1	63.3	44.6	24.5	16.1	10.2	6.15	4.45	3.49	2.86
60	0.017	161	112	91.7	65.3	46.9	25.3	16.7	10.5	6.34	4.59	3.6	2.95
80	0.013	168	117	95.9	68.2	48	26.5	17.4	11	6.65	4.87	3.7	3.1
100	0.01	173	121	99.1	70.4	49.7	27.4	18.1	11.4	6.89	4.99	3.91	3.21
250	0.004	195	137	112	79.6	56.2	31.1	20.5	13	7.86	5.69	4.47	3.67

Rainfall intensities (mm/hr) - RCP6.0 for the period 2031-2050

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h	
1.58	0.633	65.8	45.7	37.2	26.2	18.4	10.1	6.62	4.19	2.52	1.82	1.43	1.17
2	0.5	72.2	50.1	40.8	28.8	20.3	11.1	7.29	4.62	2.78	2.01	1.57	

HIRDS V4 Depth-Duration-Frequency Results
 Sitename: Custom Location
 Coordinate system: WGS84
 Longitude: 173.9451
 Latitude: -35.228
 LDD Model

BUTLER ROAD, KERIKERI

Parameters: c d e f g h i
 Values: 0.00249328 0.49730815 -0.00387256 -0.00516292 0.25290063 -0.01184595 3.191832
 Example: Duration (hrs) ARI (yrs) x y Rainfall Depth (mm)
 24 100 3.17805383 4.600149227 248.7936823

Rainfall depths (mm) : Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.2	14.1	17.2	24.3	34.2	56.8	75.5	96.2	117	127	133	137
2	0.5	11.1	15.5	18.9	26.7	37.5	62.4	82.9	106	128	140	146	150
5	0.2	14.4	20	24.5	34.6	48.8	81.5	108	139	168	184	192	198
10	0.1	16.7	23.4	28.6	40.5	57.2	95.6	127	163	198	216	227	234
20	0.05	19.1	26.7	33.7	45.5	65.7	110	147	188	229	250	263	270
30	0.033	20.6	28.7	35.2	50	70.7	119	158	203	248	271	284	292
40	0.025	21.6	30.2	37	52.5	74.4	125	167	214	261	285	299	308
50	0.02	22.4	31.3	38.3	54.5	77.2	130	173	222	271	296	311	321
60	0.017	23	32.2	39.5	56.1	79.5	134	179	229	280	305	321	331
80	0.013	24	33.6	41.2	58.7	83.1	140	187	240	293	321	337	347
100	0.01	24.8	34.7	42.6	60.6	85.9	145	194	249	304	332	349	360
250	0.004	27.9	39.2	48.1	68.5	97.3	164	220	283	346	379	399	411

Depth standard error (mm) : Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	0.81	1.1	1.2	2.1	2.7	5	8.6	3.2	7.7	14	9.3	10
2	0.5	0.87	1.2	1.3	2.3	2.9	5.5	9.5	3.4	8.6	16	10	11
5	0.2	1.4	1.9	1.9	3.4	4.2	8	13	5.7	12	22	15	16
10	0.1	1.9	2.6	2.7	4.5	5.7	11	17	8.5	16	27	19	20
20	0.05	2.6	3.5	3.8	5	7.7	14	21	12	20	32	24	26
30	0.033	3.1	4.1	4.5	7.1	9.2	17	25	15	25	36	28	30
40	0.025	3.5	4.6	5.1	8	10	19	28	17	25	39	31	34
50	0.02	3.8	5	5.6	8.7	11	21	31	19	27	41	33	36
60	0.017	4.1	5.4	6.1	9.4	12	23	33	20	29	43	35	39
80	0.013	4.6	6	6.9	10	14	26	37	23	32	47	39	43
100	0.01	5	6.5	7.5	11	15	28	40	25	35	50	42	46
250	0.004	6.9	9	11	16	22	41	57	36	47	64	57	63

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.9	15.1	18.4	26	36.5	60	79	100	121	131	137	140
2	0.5	11.9	16.6	20.2	28.6	40.1	66	87.1	110	133	144	151	155
5	0.2	15.4	21.5	26.3	37.2	52.4	86.5	114	145	175	190	199	204
10	0.1	18	25.2	30.8	43.6	61.4	102	135	171	207	225	235	241
20	0.05	20.6	28.8	35.3	50.1	70.6	117	155	197	239	260	272	280
30	0.033	22.2	31	38	54	76.1	126	168	213	258	281	295	303
40	0.025	23.3	32.6	39.9	56.7	80	133	177	225	272	297	310	319
50	0.02	24.1	33.8	41.4	58.8	83.1	138	183	234	283	308	323	332
60	0.017	24.8	34.8	42.6	60.6	85.6	143	189	241	292	318	333	343
80	0.013	25.9	36.3	44.5	63.4	89.5	149	198	252	306	334	350	360
100	0.01	26.8	37.5	46	65.5	92.6	154	205	261	317	346	362	373
250	0.004	30.1	42.3	51.9	74	105	175	233	298	362	395	414	426

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.9	15.1	18.4	26	36.5	60	79	100	121	131	137	140
2	0.5	11.9	16.6	20.2	28.6	40.1	66	87.1	110	133	144	151	155
5	0.2	15.4	21.5	26.3	37.2	52.4	86.5	114	145	175	190	199	204
10	0.1	18	25.2	30.8	43.6	61.4	102	135	171	207	225	235	241
20	0.05	20.6	28.8	35.3	50.1	70.6	117	155	197	239	260	272	280
30	0.033	22.2	31	38	54	76.1	126	168	213	258	281	295	303
40	0.025	23.3	32.6	39.9	56.7	80	133	177	225	272	297	310	319
50	0.02	24.1	33.8	41.4	58.8	83.1	138	183	234	283	308	323	332
60	0.017	24.8	34.8	42.6	60.6	85.6	143	189	241	292	318	333	343
80	0.013	25.9	36.3	44.5	63.4	89.5	149	198	252	306	334	350	360
100	0.01	26.8	37.5	46	65.5	92.6	154	205	261	317	346	362	373
250	0.004	30.1	42.3	51.9	74	105	175	233	298	362	395	414	426

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	15.4	18.7	26.5	37	60.8	80	101	122	132	138	141
2	0.5	12.1	16.8	20.6	29.1	40.8	66.9	88.1	111	134	145	152	156
5	0.2	15.7	21.9	26.8	37.9	53.7	87.8	115	147	177	192	201	206
10	0.1	18.4	25.6	31.3	44.4	62.5	103	136	173	209	227	237	243
20	0.05	21	29.4	36	51	71.9	119	157	200	241	262	275	283
30	0.033	22.6	31.6	38.7	55	77.5	128	170	216	261	284	297	305
40	0.025	23.7	33.2	40.6	57.7	81.5	135	179	227	275	299	313	322
50	0.02	24.6	34.4	42.2	59.9	84.6	140	186	236	286	311	326	335
60	0.017	25.3	35.4	43.4	61.7	87.1	145	192	244	295	321	336	346
80	0.013	26.4	37	45.4	64.6	90.5	150	200	254	307	334	350	361
100	0.01	27.3	38.2	46.9	66.7	94.3	157	208	265	321	349	366	376
250	0.004	30.7	43.1	52.9	75.4	107	178	236	301	366	398	418	429

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.6	16.1	19.7	27.8	38.8	63.3	82.8	104	125	135	140	144
2	0.5	12.7	17.7	21.7	30.6	42.8	69.8	91.4	115	138	149	155	159
5	0.2	16.6	23.1	28.2	40	56.1	91.8	121	152	182	197	206	211
10	0.1	19.4	27.1	33.1	46.9	65.9	108	142	179	215	233	243	250
20	0.05	22.2	31	38	53.9	75.8	125	164	207	249	270	282	289
30	0.033	23.9	33.4	40.9	58.1	81.8	135	177	224	270	292	306	314
40	0.025	25.1	35.1	43	61.1	86	142	187	236	284	309	322	331
50	0.02	26	36.4	44.6	63.4	89.3	147	194	245	296	321	335	344
60	0.017	26.8	37.5	45.9	65.3	92	152	200	253	305	331	346	355
80	0.013	28	39.2	48	68.3	96.3	159	210	265	320	347	363	373
100	0.01	28.9	40.5	49.6	70.6	99.6	165	217	275	331	360	376	386
250	0.004	32.5	45.6	56	79.8	113	187	247	313	378	411	430	441

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	15.3	18.6	26.3	36.8	60.5	79.6	101	121	131	137	141
2	0.5	12	16.7	20.4	28.9	40.5	66.6	87.7	111	134	145	151	155
5	0.2	15.6	21.8	26.6	37.5	52.9	87.3	115	146	176	191	200	205
10	0.1	18.2	25.4	31.1	44.1	62.1	103	136	172	208	226	236	243
20	0.05	20.9	29.2	35.7	50.7	71.4	118	157	199	240	261	274	281
30	0.033	22.4	31.4	38.4	54.6	76.9	128	169	215	260	283	296	304
40	0.025	23.5	32.9	40.3	57.3	80.9	134	178	226	274	298	312	321
50	0.02	24.4	34.2	41.9	59.5	84	140	185	235	285	310	325	334
60	0.017	25.1	35.2	43.1	61.3	86.5	144	191	243	294	320	335	344
80	0.013	26.2	36.7	45	64.1	90.5	151	200	254	308	336	352	361
100	0.01	27.1	37.9	46.5	66.2	93.6	156	207	263	319	348	364	375
250	0.004	30.5	42.8	52.5	74.8	106	177	235	300	364	397	416	428

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	12.1	16.9	20.6	29	40.5	65.5	85					

APPENDIX D

Wastewater Pipeline Analysis

Colebrook-White Calculation

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	Project:	30 Butler Road, Kerikeri	By:	SD
	Calculation:	Wastewater Pipe Analysis	Approved: EC	
	Colebrook-White Pipe Analysis			
Sheet Number:	1	Date:	6-May	

General Info	
Kinematic Viscosity (ν)	1.139 mm ² /s
Gravity (g)	9.80665 m/s ²

Pipe Info	
Roughness Coefficient (k_s)	0.6 mm
Hydraulic Gradient (S)	7.3 %
Internal Diameter (D)	150 mm

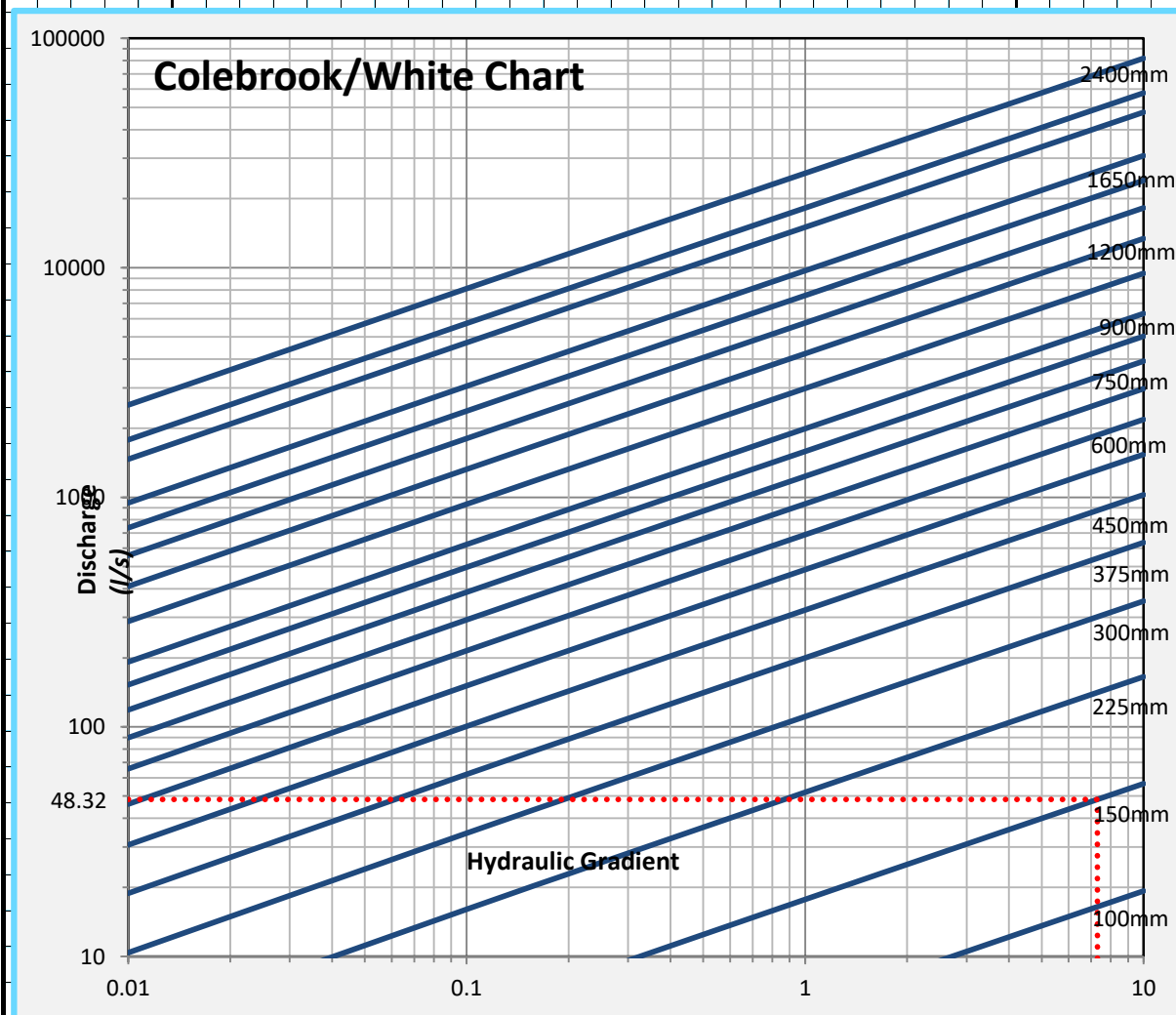
= 0.07 m/m
or 1 in 13.7

$$Q = -2\sqrt{2gDS} \times \log \left[\frac{k_s}{3.7D} + \frac{2.51\nu}{D\sqrt{2gDS}} \right] A$$

Results When Flowing Full

Velocity (v)	2.73 m/s
Flow (Q)	48.32 l/s

= 0.05 m³/s



Colebrook-White Calculation



Project:	30 Butler Road, Kerikeri	By:	SD
Calculation:	Wastewater Pipe Analysis	Approved:	EC
Sheet Number:	2	Date:	6-May

Results When Flowing Partially Full

Max Velocity at 81.4% Height

Vmax **3.12** m/s

Max Flow at 93.8% Height

Qmax **52.0** l/s = 0.05 m³/s

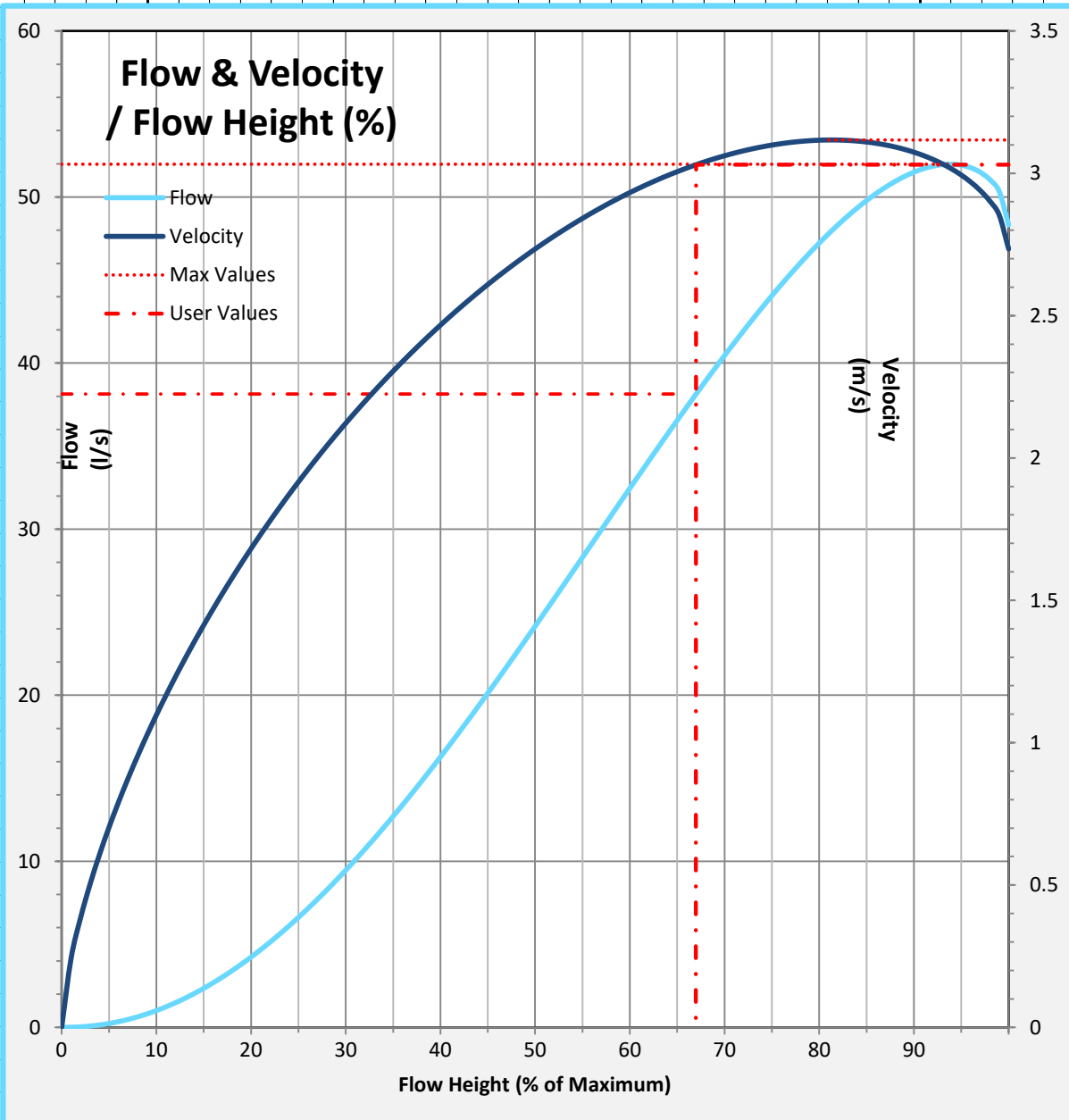
User Defined Height **67** %

= 0.101 m

Velocity (v) **3.03** m/s

Flow (Q) **38.1** l/s

= 0.04 m³/s





geologix
consulting engineers

APPENDIX E

Assessment of Environmental Effects and Assessment Criteria



Table 16: Proposed Northland Regional Plan Earthworks Assessment Criteria, to rule C.8.3.1

Assessment Criteria	Comments
the area and volume of earthworks at a particular location or associated with a project complies with the thresholds in Table 15.	Complies – classed as ‘other areas’.
the discharge is not within 20 metres of a geothermal surface feature.	Complies. No geothermal features are around the subject site.
except for coastal dune restoration activities, good management practice erosion and sediment control measures equivalent to those set out in the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016 (Auckland Council Guideline Document GD2016/005), are implemented for the duration of the activity	Complies. See specific erosion and sediment control details, concept plan and typical details.
batters and side castings are stabilised to prevent slumping	Complies.
exposed earth is stabilised upon completion of the earthworks to minimise erosion and avoid slope failure	Can comply. Proposed earthworks will require support of retaining wall. A specific retaining wall design and construction methodology will be provided at building consent stage to reduce the risk.
earth and debris are not deposited into, or in a position where they can enter, a natural wetland, a continually or intermittently flowing river, a lake, an artificial watercourse, or the coastal marine	Complies. Erosion and sediment control measures have been implemented to control this.
the earthworks activity does not: a) reduce the height of a dune crest in a coastal riparian and foredune management area, except where dunes are recontoured to remove introduced materials or to remediate dune blow-outs as part of coastal dune restoration work, or b) exacerbate flood or coastal hazard risk on any other property, or c) create or contribute to the instability or subsidence of land on other property, or d) divert flood flow onto other property, and 216	Complies provided recommendations in this report and any accompanying detailed design is adhered to.
any associated damming, diversion and discharge of stormwater does not give rise to any of the following effects in the receiving waters beyond the zone of reasonable mixing: a) any conspicuous change in colour or visual clarity, or b) the rendering of fresh water unsuitable for consumption by farm animals, or c) contamination which may render freshwater taken from a mapped priority drinking water abstraction point (refer I Maps Ngā mahere matawhenua) unsuitable for human consumption after existing treatment	Complies provided recommendations in this report and any accompanying detailed design is adhered to.
information on the source and composition of any clean fill material and its location within the disposal site are recorded and provided to the Regional Council on request	Can comply. Materials are anticipated to be either site won or imported from a registered quarry facility. Details TBC according to an earthworks specification completed during a detailed design phase.
the Regional Council’s Compliance Manager is given at least five working days’ notice (in writing or by email) of any earthworks activity being undertaken within a high-risk flood hazard area, flood hazard area, where contaminated land will be exposed, or in sand dunes within a coastal riparian and foredune management area.	Can comply, if required.



Table 17: FNDC District Plan Stormwater Assessment Criteria, to rule 13.10.4

Assessment Criteria	Comments
(a) Whether the application complies with any regional rules relating to any water or discharge permits required under the Act, and with any resource consent issued to the District Council in relation to any urban drainage area stormwater management plan or similar plan.	Complies
(b) Whether the application complies with the provisions of the Council's "Engineering Standards and Guidelines" (2004) - Revised March 2009 (to be used in conjunction with NZS 4404:2004).	Concept design complies and has adopted latest FNDC engineering standards (2023) for runoff curves and proposed area within lot 1 will be attenuated to 80 % of pre-development levels for specified design storms by FNDC standards and NRP. Lot 2 runoff limited to permitted activity in the ODP, for same design storms (FNDC Eng Standards 2023 and NRP)
(c) Whether the application complies with the Far North District Council Strategic Plan - Drainage.	Complies
(d) The degree to which Low Impact Design principles have been used to reduce site impermeability and to retain natural permeable areas.	Proposed impervious areas within subdivision proposal are limited to necessity only. Proposed impervious area (RoW Access) optimised to 3m wide straight access. All impervious areas to attenuated by on site storage devices.
(e) The adequacy of the proposed means of disposing of collected stormwater from the roof of all potential or existing buildings and from all impervious surfaces.	Low impact design adopted – attenuation within on-site tanks for proposed lot 1 and 2. Efficient and controlled discharge outlets.
(f) The adequacy of any proposed means for screening out litter, the capture of chemical spillages, the containment of contamination from roads and paved areas, and of siltation.	Stormwater quality devices included in design to accommodate a residential subdivision.
(g) The practicality of retaining open natural waterway systems for stormwater disposal in preference to piped or canal systems and adverse effects on existing waterways.	Surface drainage preferred and adopted where practical and safe. Subject site is within an urban environment with a waterway adjacent to site boundary. No adverse effects anticipated on downstream environment.
(h) Whether there is sufficient capacity available in the Council's outfall stormwater system to cater for increased run-off from the proposed allotments.	No connection to public stormwater proposed.
(i) Where an existing outfall is not capable of accepting increased run-off, the adequacy of proposals and solutions for disposing of run-off.	NA.
(j) The necessity to provide on-site retention basins to contain surface run-off where the capacity of the outfall is incapable of accepting flows, and where the outfall has limited capacity, any need to restrict the rate of discharge from the subdivision to the same rate of discharge that existed on the land before the subdivision takes place.	Attenuation provided through storage tanks. Furthermore, each tank will provide capacity for retention of rainwater to further mitigate effects of development.
(k) Any adverse effects of the proposed subdivision on drainage to, or from, adjoining properties and mitigation measures proposed to control any adverse effects.	No adverse effects anticipated on neighbouring properties or downstream environment.
(l) In accordance with sustainable management practices, the importance of disposing of stormwater by way of gravity pipelines.	All devices adopt and designed for gravity flows.



However, where topography dictates that this is not possible, the adequacy of proposed pumping stations put forward as a satisfactory alternative.

(m) The extent to which it is proposed to fill contrary to the natural fall of the country to obtain gravity outfall; the practicality of obtaining easements through adjoining owners' land to other outfall systems; and whether filling or pumping may constitute a satisfactory alternative.	No fill is required for the stormwater management purpose.
(n) For stormwater pipes and open waterway systems, the provision of appropriate easements in favour of either the registered user or in the case of the Council, easements in gross, to be shown on the survey plan for the subdivision, including private connections passing over other land protected by easements in favour of the user.	Easement of stormwater open channel across the proposed lot 2 within the proposed scheme plan.
(o) Where an easement is defined as a line, being the centre line of a pipe already laid, the effect of any alteration of its size and the need to create a new easement.	NA.
(p) For any stormwater outfall pipeline through a reserve, the prior consent of the Council, and the need for an appropriate easement.	NA
(q) The need for and extent of any financial contributions to achieve the above matters.	TBC
(r) The need for a local purpose reserve to be set aside and vested in the Council as a site for any public utility required to be provided.	NA
