Far North District Council

Office Use Only
Application Number:

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Email: ask.us@fndc.govt.nz
Website: www.fndc.govt.nz

APPLICATION FOR RESOURCE CONSENT OR FAST-TRACK RESOURCE CONSENT

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

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

1. Pre-Lodgement Meeting

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

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

- ☑ Land Use
- ○ Fast Track Land Use*
- ○ Subdivision
- ○ 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: Jack Chen

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

Phone Numbers:

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

_____ Post Code: _____

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

Name/s: Laura Bowman

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

Phone Numbers:

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

_____ Post Code: _____

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

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

Name/s: RUOLEI CHEN and XIN WANG

Property Address/: Location 37B MARAENUI DRIVE, KERIKERI, KERIKERI, FAR NORTH DISTRICT

7. Application Site Details:

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

Site Address/ Location: 37B MARAENUI DRIVE, KERIKERI, KERIKERI, FAR NORTH DISTRICT

Legal Description: Lot 8 Deposited Plan 370958 Val Number: 219/73619

Certificate of Title: 287354 (Freehold)

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? Y~~es~~ / 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.

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.

To construct a new residential unit in the Rural Living Zone.

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

Y~~es~~/No

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

O Building Consent (BC ref # if known)

O Regional Council Consent (ref # if known)

O National Environmental Standard consent

O Other (please specify)

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

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

Is the piece of land currently being used or has it historically ever been used for an activity or industry on the Hazardous Industries and Activities List (HAIL)

O yes Q no O don't know

Is the proposed activity an activity covered by the NES? (If the activity is any of the activities listed below, then you need to tick the 'yes' circle).

O yes Q no O don't know

O Subdividing land

O Changing the use of a piece of land

O Disturbing, removing or sampling soil

O Removing or replacing a fuel storage system

12. Assessment of Environmental Effects:

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

Please attach your AEE to this application.

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) Jack Chen

Email: [redacted]

Postal Address: [redacted]

Post Code: [redacted]

Phone Numbers: Work: _____ Home: _____ Fax: _____

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

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

Name: Ruolei (Jack) Chen (please print)

Signature: [redacted] (signature of bill payer – **mandatory**) Date: 06/06/2024

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: Laura Bowman (please print)

Signature: _____ (signature) Date: 05/06/2024

(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.

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**

Construction of a new Residential Unit

Land Use Consent

37B Maraenui Drive, Kerikeri

Assessment of Environmental Effects and Statutory Analysis

5 June 2024

B&A
Urban & Environmental

Prepared for:
Jack Chen

B&A Urban & Environmental

B&A Reference:

25164

Status:

Final Revision 1

Date:

5 June 2024

Prepared by:

[redacted]

Laura Bowman

Planner, Barker & Associates Limited

Reviewed by:

[redacted]

David Badham

Partner | Northland Manager, Barker & Associates Limited

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1.0 Applicant and Property Details

To:	Far North District Council
Site Address:	37B Maraenui Drive, Kerikeri
Applicant Name:	Jack Chen (Ruolei Chen)
Address for Service:	Barker & Associates Ltd PO Box 37, Whangārei 0140 Level 1, 136 Bank Street Whangārei 0112 Attention: Laura Bowman
Legal Description:	Lot 8 Deposited Plan 370958 (refer to Record of Title as **Appendix 1**)
Site Area:	3,453m^2
Site Owner:	Ruolei Chen & Xin Wang
District Plan:	Operative Far North District Plan (**ODP**) Proposed Far North District Plan (**PDP**)
Zoning:	**ODP**: Rural Living **PDP**: Rural Residential
Overlays & Controls:	**ODP**: None **PDP**: None
Designations:	None
Additional Limitations:	None
Locality Diagram:	Refer to **Figure 1**
Brief Description of Proposal:	To construct a new residential unit in the Rural Living Zone.
Summary of Reasons for Consent:	**ODP**: **Discretionary** consent is required pursuant to Rules 8.7.5.1.1 (residential Intensity), and 8.7.5.1.5 (stormwater management). A summary of reasons for consent is outlined in **Section 5** below.

2.0 Background

Barker and Associates (**B&A**) have been engaged by Jack Chen to prepare a land use application to the Far North District Council (**FNDC**) on their behalf. Our client seeks to establish a new residential unit within the application site located at 37B Maraenui Drive, Kerikeri and to undertake earthworks associated with the development.

This Assessment of Environmental Effects (**AEE**) has been prepared in accordance with the requirements of Section 88 and Schedule 4 of the Resource Management Act 1991 (**the Act**) and is intended to provide the information necessary for a full understanding of the activity for which consent is sought and any actual and potential effects the proposal may have on the environment.

2.1 Consenting History

2.1.1 2240127-RMALUC

Approved 16th January 2024, this land use consent provided for the construction of a residential unit in the Rural Living Zone. It breached the building coverage by 1.5% and stormwater management rule by 19.3% due to the scale of the building and associated impermeable surfaces. The activity also breached residential intensity in association with the amount of building coverage for a site of less than 4,000m^2. The earthworks to create the building platform and driveway areas exceeded the maximum of 300m^3 in a 12-month period. Overall, the activity was classed as a **Discretionary Activity**.

B&A prepared the application mentioned above, the site has since been sold to the new owner (Jack Chen) who seeks a new resource consent for the site. The new proposal is outlined in **Section 4** below with the reasons for consent outlined in **Section 5**.

It is considered that a new consent is required due to the increased infringements rather than a change of conditions to the existing application. Therefore, as part of this application, it is proposed to surrender 2240127-RMALUC.

3.0 Site Context

3.1 Site Description

The site is located and access of Maraenui Drive via Kerikeri Road, as shown in **Figure 1** below. It is bounded by residential properties to the east, south and west and an orchard to the north. The site is 3,453m^2 more or less in area. It is currently vacant of any buildings except the existing garden shed and is scattered with bush and trees around the boundary.

In terms of topography, from the property entry, the site falls towards the north at gentle gradients averaging less that 5^o, then falls at fairly uniform grades no greater than 10^o along the north-western facing flank of the main property area. Maraenui Drive has a road carriageway with of 20m and a formed width of 8m.

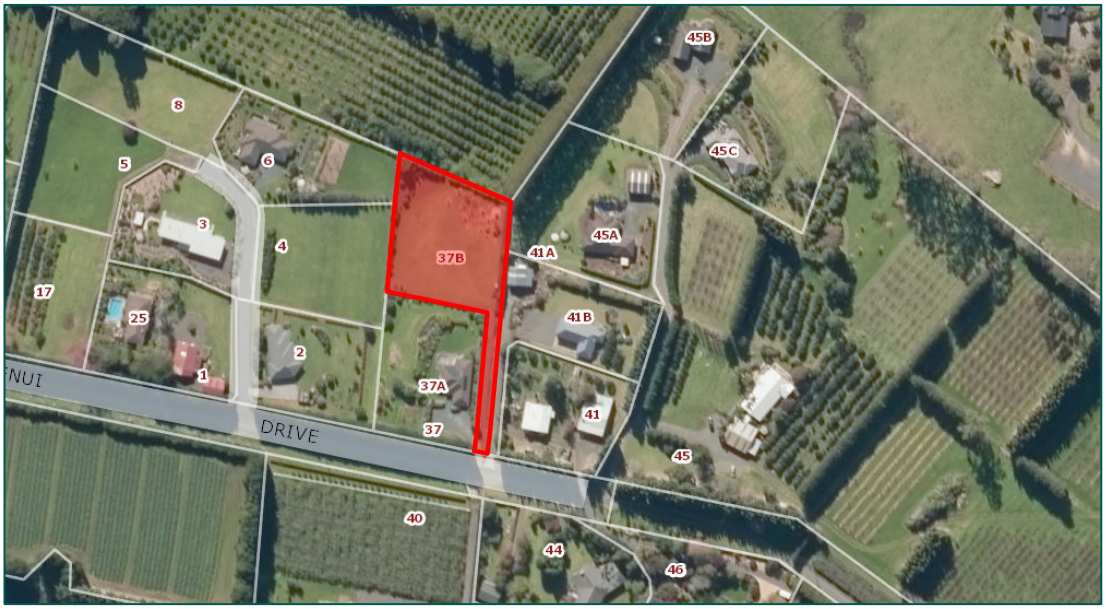


Figure 1: Locality plan. Source: Emap.

3.2 Surrounding Locality

The surrounding locality features a mix of both residential and rural activity but is predominantly characterised by residential type development comprising one to two story detached houses with variety in architecture style. The existing form is typically set back from the street by around 4-15m, with most front yards predominantly defined by low landscaping.

In the case of the surrounding Rural Living zoned land, lot sizes generally measure between 3,000m^2 to 5,000m^2, with a number of underdeveloped larger sites. Beyond this, the zoning extends into Rural Production to the south where lot sizes are generally larger and more rural in nature. To the north zoning extends into Residential where lot sizes are predominantly smaller.

The site is located 2km south of the Kerikeri town centre which provides supermarkets, takeaway outlets, dairy's, shops, restaurants and schools.

4.0 Proposal

The proposal seeks to establish a residential unit on the application site, and to undertake associated earthworks and retaining to create the building platform as indicated in **Figure 2** below.

More detailed descriptions on particular aspects of the proposal as set out in the specialist reports and plans accompanying the application.

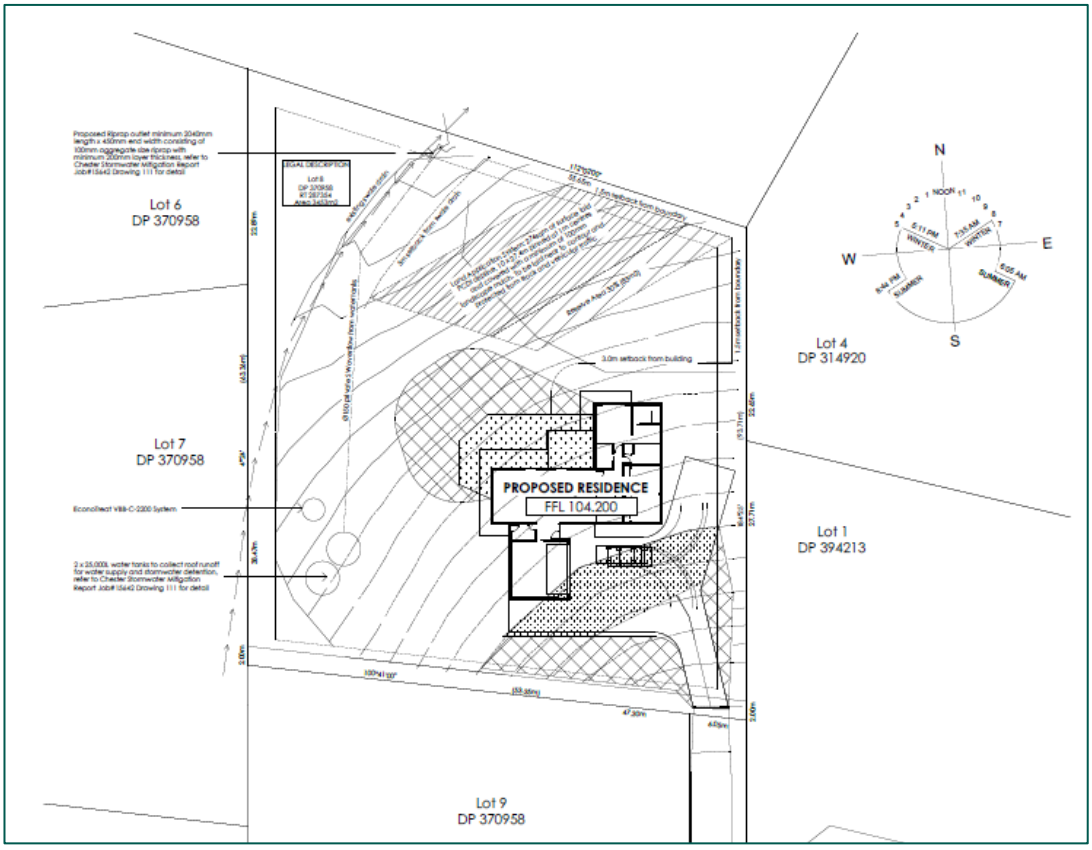


Figure 2: Site Layout- Refer to Appendix 2 for the full set of plans.

- **Residential Unit:** It is proposed to construct one stand alone single-story residential unit. It will comprise of four bedrooms, two bathrooms, living areas and an internal double garage.

  The site layout, including associated access, parking and outdoor amenity area are detailed on the Architectural Plans prepared by Absolute Build, included as **Appendix 2.**

- **Access and Parking:** The site is comprised of one vacant lot. A total of two parking spaces will be provided in the form of an internal access double garage. The site has an existing vehicle crossing. To service the proposed residential unit, a driveway will be finished in concrete to provide access into the garage.

- **Servicing:** The servicing strategy for the proposed residential unit is set out in the specialist reports by Waterflow NZ Ltd and Chester Consultants Ltd (**Chester**) included as **Appendix 3** and **Appendix 4**. In summary, it is concluded that the proposed residential unit can be appropriately serviced in terms of stormwater, wastewater, and water supply.

- **Earthworks:** A total of 238m^3 of cut and fill works are required to establish suitable levels for foundations and associated access arrangements. Cuts will be battered to stabilize the site, as shown on the site plans and in accordance with the recommendations provided by Wilton Joubert included as **Appendix 5**. The report also includes several recommendations which have informed the proposed site works and the building foundations.

Details of each element described above is provided in the relevant reports or plans.

5.0 Reasons for Consent

A rules assessment against the provisions of the Far North District Plan (**ODP**) is attached as **Appendix 6.**

A rules assessment against the provisions of the Proposed Far North District Plan (**PDP**) is attached as **Appendix 7.** No resource consents are triggered under the PDP noting that many of the rules under the PDP do not currently have legal effect.

The site is zones as Rural Living under the ODP and Rural Residential under the PDP . The proposal requires consent for the matters outlined below.

5.1 Operative Far North District Plan

Rural Living Zone

- **8.7.5.1.1 Residential Intensity**: As the proposed residential unit does not comply with rule 8.7.5.1.5 it will require consent pursuant to rule 8.7.5.4.1. As such resource consent as a **discretionary activity** is required; and
- **8.7.5.1.5 Stormwater Management**: The maximum percentage of impermeable surfaces shall be 12.5% or 3,000m^2, whichever is lesser. The current total of impermeable surface area is 22.8% hence an application for consent as a **discretionary activity** is sought to address the additional 10.3%.

5.2 National Environmental Standard – Contaminated Soils

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES Contaminated Soils) were gazetted on 13th October 2011 and took effect on 1st January 2012.

The standards are applicable if the land in question is, or has been, or is more likely than not to have been used for a hazardous activity or industry and the applicant proposes to subdivide or change the use of the land, or disturb the soil, or remove or replace a fuel storage system.

A review of historic aerial images and Northland Regional Councils 'Selected Land use' GIS database show nothing to suggest that the application site would be considered 'land covered' by the NES Contaminated Soil.

5.3 Activity Status

Overall, this application is for a **discretionary activity**.

6.0 Public Notification Assessment (Sections 95A, 95C and 95D)

6.1 Assessment of Steps 1 to 4 (Sections 95A)

Section 95A specifies the steps the council is to follow to determine whether an application is to be publicly notified. These are addressed in statutory order below.

6.1.1 Step 1: Mandatory public notification is required in certain circumstances

Step 1 requires public notification where this is requested by the applicant; or the application is made jointly with an application to exchange of recreation reserved land under section 15AA of the Reserves Act 1977.

The above does not apply to the proposal.

6.1.2 Step 2: If not required by step 1, public notification precluded in certain circumstances.

Step 2 describes that public notification is precluded where all applicable rules and national environmental standards preclude public notification; or where the application is for a controlled activity; or a restricted discretionary, discretionary or non-complying boundary activity.

In this case, the applicable rules do not preclude public notification, and the proposal is not a controlled activity or boundary activity. Therefore, public notification is not precluded.

6.1.3 Step 3: If not required by step 2, public notification required in certain circumstances.

Step 3 describes that where public notification is not precluded by step 2, it is required if the applicable rules or national environmental standards require public notification, or if the activity is likely to have adverse effects on the environment that are more than minor.

As noted under step 2 above, public notification is not precluded, and an assessment in accordance with section 95A is required, which is set out in the sections below. As described below, it is considered that any adverse effects will be less than minor.

6.1.4 Step 4: Public notification in special circumstances

If an application is not required to be publicly notified as a result of any of the previous steps, then the council is required to determine whether special circumstances exist that warrant it being publicly notified.

Special circumstances are those that are:

- Exceptional or unusual, but something less than extraordinary; or
- Outside of the common run of applications of this nature; or
- Circumstances which make notification desirable, notwithstanding the conclusion that the adverse effects will be no more than minor.

It is considered that there is nothing noteworthy about the proposal. It is for the construction of a new residential unit, in a zone that anticipates this kind of development. It is therefore considered that the application cannot be described as being out of the ordinary or giving rise to special circumstances.

6.2 Section 95D Statutory Matters

In determining whether to publicly notify an application, section 95D specifies a council must decide whether an activity will have, or is likely to have, adverse effects on the environment that are more than minor.

In determining whether adverse effects are more than minor:

- Adverse effects on persons who own or occupy the land within which the activity will occur, or any land adjacent to that land, must be disregarded.

  The land to be excluded from the assessment is listed in section 6.3 below.

- Adverse effects permitted by a rule in a plan or national environmental standard (the 'permitted baseline') may be disregarded.

  In this case, the permitted baseline of relevance to this proposal is as follows:

  - Impermeable surface coverage of 12.5%.

  The permitted baseline also allows consideration of unimplemented resource consent applications. In this instance the existing resource consent (2240127-RMALUC) is relevant. This allows a similar development to that proposed and provides a useful permitted baseline that can be applied to the proposal.

- Trade competition must be disregarded.

  This is not considered to be a relevant matter in this case.

- The adverse effects on those persons who have provided their written approval must be disregarded.

  No persons have provided their written approval for this proposal.

The sections below set out an assessment in accordance with section 95D, including identification of adjacent properties and an assessment of adverse effects.

6.3 Land Excluded from the Assessment

In terms of the tests for public notification (but not for the purposes of limited notification or service of notice), the adjacent properties to be excluded from the assessment are shown in **Figure 3** below, and include:

- 443 Kerikeri Road (north);
- 37, 37A, 40, 41, 41A, 41B, 44 and 45A Maraenui Drive (east and south); and
- 4 and 6 Crackerjack Crescent (west).

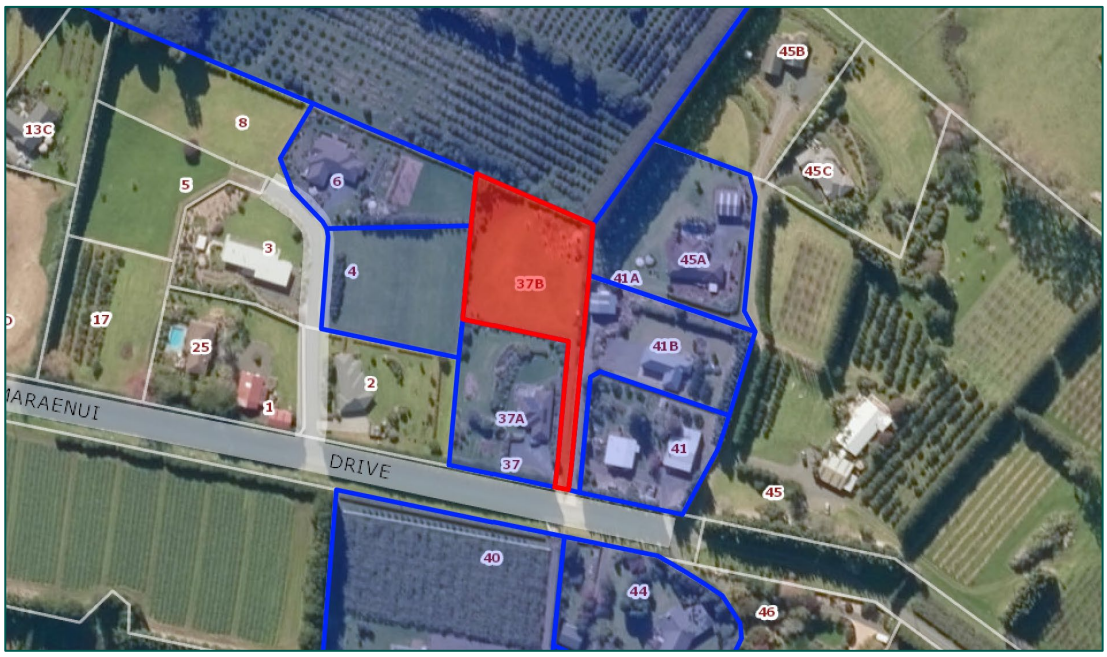


Figure 3: Adjacent properties in relation to the subject site. Source: Emap.

6.4 Assessment of Effects on the Wider Environment

The following sections set out an assessment of the wider effects of the proposal, and it is considered that effects in relation to the following matters are relevant:

- Built Character and Amenity; and
- Stormwater Effects

These matters are set out and discussed below.

6.4.1 Built Character and Amenity

As described in section 3.2 above, the immediate existing environment is residential in nature, and typically features one to two-story dwellings, with on variety in architectural style. Overall, the existing character of the area can be described as suburban.

It is considered that the design of the proposed residential unit incorporates a variety of materials and colours. The new residential unit is situated at the rear of an existing lot and building and therefore is largely hidden from view when viewed from the street. The proposed residential unit is in keeping with the character and scale of existing buildings within the surrounding environment and can comply with all the required setbacks from boundaries.

The entire boundary of the application site is lined with various bush, trees and plants species that will help soften any adverse amenity views.

While there are some exceedances with the impervious areas, these are small in extent. It is considered that any adverse effects generated by the non-compliance are adequately mitigated through the proposed onsite attenuation, and site layout such as any adverse effects on the wider environment will be less than minor and acceptable.

The combination of the above factors will ensure that the proposed scale of residential activity will not visually dominate the residential character of the locality. The proposal will enable the integration of the development with both the existing and future residential development within an area that is anticipated to experience ongoing change in accordance with the rural living and rural residential zoning of the site.

Overall, the proposal is considered to feature a carefully designed layout and any adverse amenity effects within the wider environment will be less than minor.

6.4.2 Stormwater Effects

The proposal will result in 22.8% of impermeable surface coverage. A Stormwater Management Assessment has been prepared by Chester (Appendix 4). In brief, the run off from all impervious areas will be captured by two 25,000L rain tanks that will direct out to existing swales to the northwestern portion of the site. The tanks will mitigate the roof area of 270 m^2 and driveway area of 86 m^2 back to pre-development / greenfield run-off levels.

Chester have provided an assessment against the assessment criteria found under the ODP at Section 11.3 'Stormwater Management' (refer to section 4.4 of the report), they have provided stormwater mitigation measures that have informed the design of the proposed residential unit.

There is no risk of flooding on the site as the NRC Hazard Maps indicate no natural hazards on the site. The Geotechnical Report prepared by Wilton Joubert included as Appendix 5 concludes that the soil and topography profile of the site do not present any issues in terms of stormwater management.

It is therefore considered that through the design of the mitigation measures proposed by Chester, any additional adverse effects resulting from the generation of stormwater within the wider environment will be less than minor.

6.5 Summary of Effects

Overall, it is considered that any adverse effects on the environment relating to this proposal will be less than minor

6.6 Public Notification Conclusion

Having undertaken the section 95A public notification tests, the following conclusions are reached:

- Under step 1, public notification is not mandatory;
- Under step 2, public notification is not precluded;
- Under step 3, public notification is not required as it is considered that the activity will result in less than minor adverse effects; and
- Under step 4, there are no special circumstances.

Therefore, based on the conclusions reached under steps 3 and 4, it is recommended that this application be processed without public notification.

7.0 Limited Notification Assessment (Sections 95B, 95E to 95G)

7.1 Assessment of Steps 1 to 4 (Sections 95B)

If the application is not publicly notified under section 95A, the council must follow the steps set out in section 95B to determine whether to limited notify the application. These steps are addressed in the statutory order below.

7.1.1 Step 1: Certain affected protected customary rights groups must be notified

Step 1 requires limited notification where there are any affected protected customary rights groups or customary marine title groups; or affected persons under a statutory acknowledgement affecting the land.

The above does not apply to this proposal.

7.1.1 Step 2: If not required by step 1, limited notification precluded in certain circumstances

Step 2 describes that limited notification is precluded where all applicable rules and national environmental standards preclude limited notification; or the application is for a controlled activity (other than the subdivision of land).

In this case, the applicable rules do not preclude limited notification and the proposal is not a controlled activity. Therefore, limited notification is not precluded.

7.1.2 Step 3: If not precluded by step 2, certain other affected persons must be notified

Step 3 requires that, where limited notification is not precluded under step 2 above, a determination must be made as to whether any of the following persons are affected persons:

- In the case of a boundary activity, an owner of an allotment with an infringed boundary;
- In the case of any other activity, a person affected in accordance with s95E.

The application is not for a boundary activity, and therefore an assessment in accordance with section 95E is required and is set out below.

Overall, it is considered that any adverse effects in relation to adjacent properties will be less than minor, and accordingly, that no persons are adversely affected.

7.1.3 Step 4: Further notification in special circumstances

In addition to the findings of the previous steps, the council is also required to determine whether special circumstances exist in relation to the application that warrant notification of the application to any other persons not already determined as eligible for limited notification.

In this instance, having regard to the assessment in section 6.1.4 above, it is considered that special circumstances do not apply.

7.2 Section 95E Statutory Matters

If the application is not publicly notified, a council must decide if there are any affected persons and give limited notification to those persons. A person is affected if the effects of the activity on that person are minor or more than minor (but not less than minor).

In deciding who is an affected person under section 95E:

- Adverse effects permitted by a rule in a plan or national environmental standard (the 'permitted baseline') may be disregarded;
- Only those effects that relate to a matter of control or discretion can be considered (in the case of controlled or restricted discretionary activities); and
- The adverse effects on those persons who have provided their written approval must be disregarded.

These matters were addressed in section 6.2 above, and no written approvals have been provided.

Having regard to the above provisions, an assessment is provided below.

7.3 Assessment of Effects on Adjacent Properties

Adverse effects in relation to visual dominance, shading and privacy on adjacent properties described in section 6.3 above are considered below.

Wider effects, such as built character and amenity and stormwater were considered in section 6.4 above, and considered to be less than minor.

7.3.1 443 Kerikeri Road (north)

This site is located to the north of the application site. The property measures 6.029ha and comprises of a dwelling situated approximately 270m away from the application site and an orchard between. As such, any visual dominance, shading and privacy resulting from the proposed residential unit is deemed to have less than minor effects on 433 Kerikeri Road.

7.3.2 41, 41A, 41B and 45A Maraenui Drive (east)

These sites have large expanding backyards and landscaping across the boundaries of the application site and the houses are set back approximately 40m from the proposed residential unit. As such, any visual dominance, shading and privacy resulting from the proposed residential unit is deemed to have less than minor effects on the eastern properties.

7.3.3 37, 37A, 40 and 44 Maraenui Drive (south)

37 and 37A Maraenui Drive adjoin the application site. The dwelling on 37 and 37A Maraenui Drive is set back approximately 32m from the proposed residential unit with a large lawn and landscaping between.

40 and 44 Maraenui Road are well separated from the proposed residential unit by Maraenui Drive, a road with a width of approximately 20m. Further, the dwellings on these sites are set back approximately 140m from the proposed residential unit.

As a result of these large setbacks, any visual dominance, shading and privacy resulting from the proposed residential unit is considered to have less than minor effects on the southern properties.

7.3.4 4 and 6 Crackerjack Crescent (west)

These sites have large expanding backyards, landscaping along the boundaries of the application site and the houses are set back approximately 40m from the proposed residential unit. As such, any visual dominance, shading and privacy resulting from the proposed residential unit is deemed to have less than minor effects on the western properties.

7.4 Summary of Effects

Taking the above into account, it is considered that any adverse effects on persons at the aforementioned properties will be less than minor in relation to visual dominance, shading and privacy effects. Wider effects, including built character and stormwater were assessed in section 6.4 above and are considered to be less than minor.

It is considered, therefore, that there are no adversely affected persons in relation to this proposal.

7.5 Limited Notification Conclusion

Having undertaken the section 95B limited notification tests, the following conclusions are reached:

- Under step 1, limited notification is not mandatory;
- Under step 2, limited notification is not precluded;
- Under step 3, limited notification is not required as it is considered that the activity will not result in any adversely affected persons; and
- Under step 4, there are no special circumstances.

Therefore, it is recommended that this application be processed without limited notification.

8.0 Consideration of Applications (Section 104)

8.1 Statutory Matters

Subject to Part 2 of the Act, when considering an application for resource consent and any submissions received, a council must, in accordance with section 104(1) of the Act have regard to:

- Any actual and potential effects on the environment of allowing the activity;
- Any relevant provisions of a national environmental standard, other regulations, national policy statement, a New Zealand coastal policy statement, a regional policy statement or proposed regional policy statement; a plan or proposed plan; and

- Any other matter a council considers relevant and reasonably necessary to determine the application.

As a discretionary activity, section 104B of the Act states that a council:

(a) may grant or refuse the application; and

(b) if it grants the application, may impose conditions under section 108.

8.2 Weighting of Proposed Plan Changes: Proposed Far North District Plan

On the 27th July 2022 FNDC notified their PDP. At the time of preparing this AEE, only rules identified as having immediate legal effect have been considered. This will remain the case until FNDC releases a decision on the PDP (this will occur once hearings have been completed). As such, it is considered that significantly more weight should be placed on the ODP provisions, which is how the assessment of the relevant objectives and policies has been undertaken below, although the conclusion is that the proposal comfortably accords with both the relevant ODP and PDP provisions.

9.0 Effects on the Environment (Section 104(1)(A))

Having regard to the actual and potential effects on the environment of the activity resulting from the proposal, it was concluded in the assessment above that any adverse effects relating to the proposal will be less than minor and that no persons would be adversely affected by the proposal.

Further, it is considered that the proposal will also result in positive effects including our clients being able to utilise the application site to establish a modest home for themselves in Kerikeri and contribute socially and economically to the local community.

Overall, it is considered that when taking into account the positive effects, any actual and potential adverse effects on the environment of allowing the activity are less than minor.

10.0 District Plan and Statutory Documents (Section 104(1)(B))

10.1 Objectives and Policies of the Operative Far North District Plan

10.1.1 Rural Living Zone

Given the application sites location in the Rural Living Zone, the objectives and policies of this chapter (8.7) have been considered to be of relevance. In particular, objectives 8.7.3.1 and 8.7.3.2 which seek to provide for low density development of different types on the urban periphery that retain the feel of the rural natural environment. The policies further seek to ensure that sufficient space is retained to ensure privacy and outdoor space and that development is compatible with the semi urban nature of the zone.

This proposal will see a residential unit that is comparable with the surrounding pattern of development. The surrounding lots are of similar size and have dwellings located in the centre of the sites with ample outdoor space and open areas and thus retain the semi-rural feel of this semi urban environment.

10.1.2 Soils and Minerals

The objectives and policies relating to soils and minerals are contained in sections 12.3.3 and 12.3.4 of the ODP. The objectives require that development avoid, remedy or mitigate any adverse effects which may arise from soil excavation or filling. The policies support these objectives by encouraging the development of buildings or impermeable surfaces in rural areas to be located away from areas where that activity would pose a significant risk of adverse effects to the environment.

The proposal is considered to be in accordance with these objectives because any excavation works will be temporary in nature and landscaped on completion.

10.2 Objectives and Policies of the Proposed Far North District Plan

10.2.1 Rural Residential Zone

RRZ-O1: *The Rural Residential zone is used predominantly for rural residential activities and small-scale farming activities that are compatible with the rural character and amenity of the zone.*

RRZ-O2: *The predominant character and amenity of the Rural Residential zone is maintained and enhanced, which includes:*

a. peri-urban scale residential activities;

b. small-scale farming activities with limited buildings and structures;

c. smaller lot sizes than anticipated in the Rural Production or Rural Lifestyle zones; and

d. a diverse range of rural residential environments reflecting the character and amenity of the adjacent urban area.

RRZ-O3: *The Rural Residential zone helps meet the demand for growth around urban centres while ensuring the ability of the land to be rezoned for urban development in the future is not compromised.*

RRZ-O4: *Land use and subdivision in the Rural Residential zone:*

a. maintains rural residential character and amenity values;

b. supports a range of rural residential and small-scale farming activities; and

c. is managed to control any reverse sensitivity issues that may occur within the zone or at the zone interface.

RRZ-P1: *Enable activities that will not compromise the role, function and predominant character and amenity of the Rural Residential zone, while ensuring their design, scale and intensity is appropriate, including:*

a. rural residential activities;

b. small-scale farming activities;

c. home business activities;

d. visitor accommodation; and

e. small-scale education facilities.

RRZ-P5: *Enable activities that will not compromise the role, function and predominant character and amenity of the Rural Residential zone, while ensuring their design, scale and intensity is appropriate, including:*

a. rural residential activities;

b. small-scale farming activities;

c. home business activities;

d. visitor accommodation; and

e. small-scale education facilities.

Objectives RRZ-O1, RRZ-O2 and RRZ-04 are similar to the objectives in the ODP Rural Living Zone objectives whereby they seek to provide for residential activity and low-density development of different types on the urban periphery that retain the feel of the rural natural environment. The policies seek to enable residential activity while ensuring that the scale and character of the rural residential environment is consistent.

As discussed in 10.1.1 above, the proposal will see a residential unit that is comparable with the surrounding pattern of development in size and position. The surrounding lots are of similar size and have dwellings located in the centre of the sites with ample outdoor space and open areas and thus retain the semi-rural feel of this semi urban environment.

While the proposed objectives and policies should be attributed minimal weight, it is considered that the proposal achieves the anticipated outcomes sought by the proposed zone.

10.3 Objectives and Policies of the Regional Policy Statement

Overall, it is considered that the proposal is consistent to the objectives and policies of the RPS which relate to rural lifestyle development such as that proposed.

10.4 Summary

It is considered that the proposed development is in accordance with the objectives and policies of the Operative Far North District Plan, the Proposed Far North District Plan and the Regional Policy Statement for Northland.

11.0 Part 2 Matters

Section 5 of Part 2 identifies the purpose of the RMA as being the sustainable management of natural and physical resources. This means managing the use, development and protection of natural and physical resources in a way that enables people and communities to provide for their social, cultural and economic well-being and health and safety while sustaining those resources for future generations, protecting the life supporting capacity of ecosystems, and avoiding, remedying or mitigating adverse effects on the environment.

Section 6 of the Act sets out a number of matters of national importance including (but not limited to) the protection of outstanding natural features and landscapes and historic heritage from inappropriate subdivision, use and development.

Section 7 identifies a number of "other matters" to be given particular regard by Council and includes (but is not limited to) Kaitiakitanga, the efficient use of natural and physical resources, the maintenance and enhancement of amenity values, and maintenance and enhancement of the quality of the environment.

Section 8 requires Council to take into account the principles of the Treaty of Waitangi.

Overall, as the effects of the proposal are considered to be less than minor, and the proposal accords with the relevant ODP and PDP objectives and policies, it is considered that the proposal will not offend against the general resource management principles set out in Part 2 of the Act.

12.0 Other Matters (Section 104(1)(C))

12.1 Record of Title Interests

The Record of Title for the site are subject to a number of interests (refer to **Appendix 1**). None of these are anticipated to affect the resource consent application as discussed in **Table 1** below:

Table 1: Record of Title interests

Interest	Comment
Land Covenant 6999831.3	Compliance with land covenants is not relevant as they are not within the bounds of Council jurisdiction and do not have resource consent implications.
Easement Instrument 6999831.4	This interest pertains to a right to drain water over part marked E, which are not affected by the proposal.
Easement Instrument 6999831.5	This interest pertains to a right of way and telecommunications, electricity, computer media. Water supply and drain water over part marked D, which are not affected by the proposal.

13.0 Conclusion

The proposal involves the construction of a new residential unit at 37B Maraenui Drive, Kerikeri.

Based on the above report it is considered that:

- Public notification is not required as adverse effects in relation to built character and amenity and stormwater are considered to be less than minor. There are also positive effects including social and economic benefits to the Kerikeri community;
- Limited notification is not required as no persons at adjacent properties are considered to be adversely affected by the proposal;
- The proposal accords with the relevant ODP objectives and policies; and
- The proposal is considered to be consistent with Part 2 of the Act.

It is therefore concluded that the proposal satisfies all matters the consent authority is required to assess, and that it can be granted on a non-notified basis.

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**287354**
Land Registration District	**North Auckland**
Date Issued	23 August 2006

Prior References
NA131A/546

Estate	Fee Simple
Area	3453 square metres more or less
Legal Description	Lot 8 Deposited Plan 370958
Registered Owners	

Xin Wang and Ruolei Chen

Interests

Land Covenant in Transfer 6999831.3 - 23.8.2006 at 9:00 am

Subject to a right to drain water over part marked E on DP 370958 created by Easement Instrument 6999831.4 - 23.8.2006 at 9:00 am

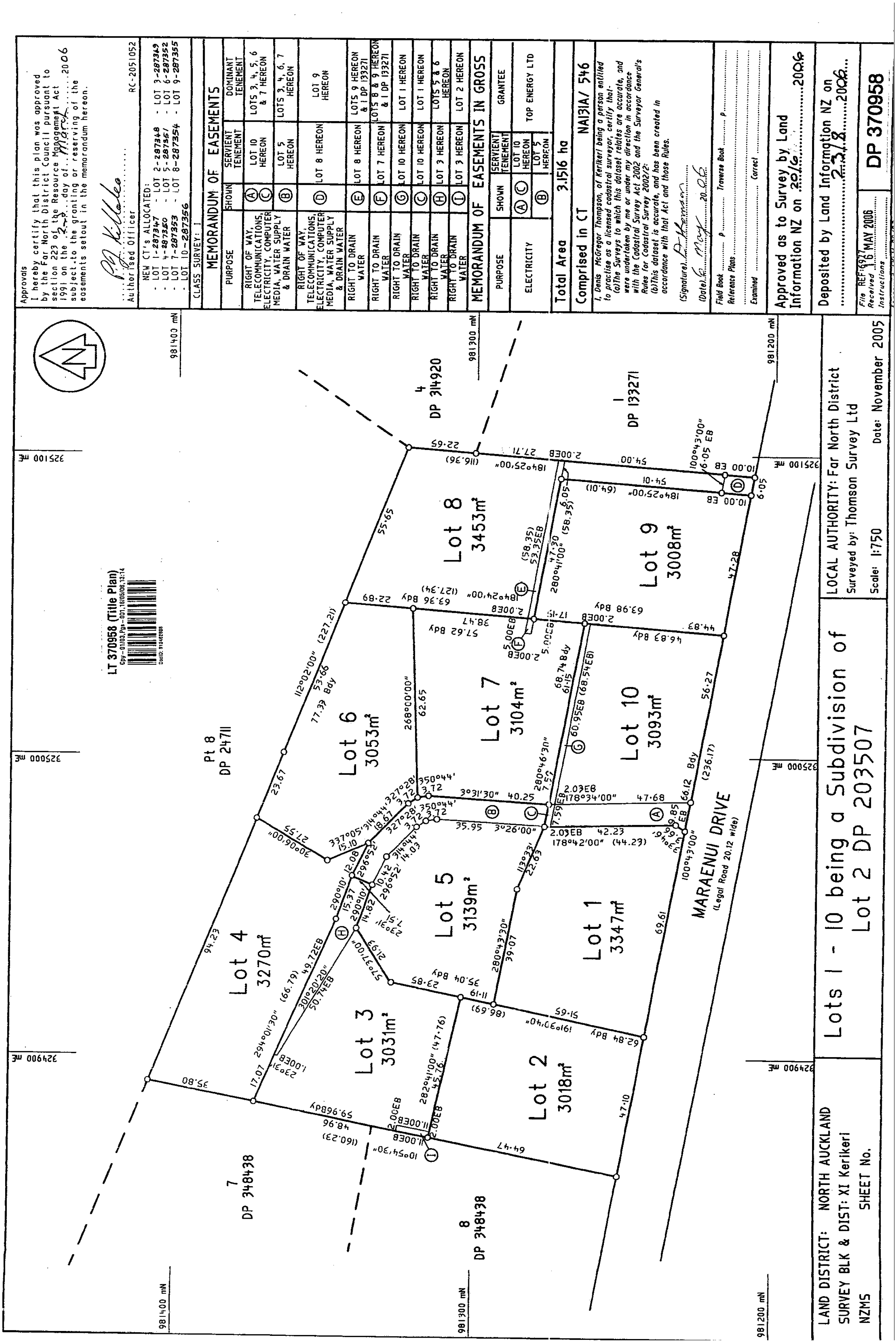
Appurtenant hereto is a right to drain water created by Easement Instrument 6999831.4 - 23.8.2006 at 9:00 am

The easements created by Easement Instrument 6999831.4 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right of way and telecommunications, electricity, computer media, water supply and drain water over part marked D on DP 370958 created by Easement Instrument 6999831.5 - 23.8.2006 at 9:00 am

The easements created by Easement Instrument 6999831.5 are subject to Section 243 (a) Resource Management Act 1991

12936617.2 Mortgage to ASB Bank Limited - 26.2.2024 at 1:51 pm


LT 370958 (Title Plan)
Approvals
I hereby certify that this plan was approved by the Far North District Council pursuant to section 223 of the Resource Management Act 1991 on the 2nd day of March 2006 subject to the granting or reserving of the easements setout in the memorandum hereon.
Authorised Officer
RC-2051052
NEW CT's ALLOCATED:
LOT 1-287347 · LOT 2-287348 · LOT 3-287349
LOT 4-287350 · LOT 5-287351 · LOT 6-287352
LOT 7-287353 · LOT 8-287354 · LOT 9-287355
LOT 10-287356
CLASS SURVEY: I
MEMORANDUM OF EASEMENTS
PURPOSE | SHOWN | SERVIENT TENEMENT | DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS, ELECTRICITY, COMPUTER MEDIA, WATER SUPPLY & DRAIN WATER | A C | LOT 10 HEREON | LOTS 3, 4, 5, 6 & 7 HEREON
| B | LOT 5 HEREON | LOTS 3, 4, 6, 7 HEREON
RIGHT OF WAY, TELECOMMUNICATIONS, ELECTRICITY, COMPUTER MEDIA, WATER SUPPLY & DRAIN WATER | D | LOT 8 HEREON | LOT 9 HEREON
RIGHT TO DRAIN WATER | E | LOT 8 HEREON | LOTS 9 HEREON & 1 DP 133271
RIGHT TO DRAIN WATER | F | LOT 7 HEREON | LOTS 8 & 9 HEREON & 1 DP 133271
RIGHT TO DRAIN WATER | G | LOT 10 HEREON | LOT 1 HEREON
RIGHT TO DRAIN WATER | C | LOT 10 HEREON | LOT 1 HEREON
RIGHT TO DRAIN WATER | H | LOT 3 HEREON | LOTS 5 & 6 HEREON
RIGHT TO DRAIN WATER | I | LOT 3 HEREON | LOT 2 HEREON
MEMORANDUM OF EASEMENTS IN GROSS
PURPOSE | SHOWN | SERVIENT TENEMENT | GRANTEE
ELECTRICITY | A C | LOT 10 HEREON | TOP ENERGY LTD
| B | LOT 5 HEREON |
Total Area 3.1516 ha
Comprised in CT NA131A/546
I, Denis McGregor Thompson, of Kerikeri being a person entitled to practise as a licensed cadastral surveyor, certify that- (a) The Surveys to which this dataset relates are accurate, and were undertaken by me or under my direction in accordance with the Cadastral Survey Act 2002 and the Surveyor General's Rules for Cadastral Survey 2002/2; (b) This dataset is accurate, and has been created in accordance with that Act and those Rules.
Approved as to Survey by Land Information NZ on 20/6 2006
Deposited by Land Information NZ on 23/8 2006
DP 370958
LOCAL AUTHORITY: Far North District
Surveyed by: Thomson Survey Ltd
Scale: 1:750
Date: November 2005
Lots 1 - 10 being a Subdivision of Lot 2 DP 203507
LAND DISTRICT: NORTH AUCKLAND
SURVEY BLK & DIST: XI Kerikeri
NZMS SHEET No.
MARAENUI DRIVE (Legal Road 20.12 wide)
Lot 1 3347m²
Lot 2 3018m²
Lot 3 3031m²
Lot 4 3270m²
Lot 5 3139m²
Lot 6 3053m²
Lot 7 3104m²
Lot 8 3453m²
Lot 9 3008m²
Lot 10 3093m²
Pt 8 DP 24711
4 DP 314920
1 DP 133271
7 DP 348438
8 DP 348438
981400 mN
981300 mN
981200 mN
325100 mE
325000 mE
324900 mE

Approved by Registrar-General of Land under No. 2002/1026

Transfer instrument

Section 90, Land Transfer Act 1952

Registrar-General of Land Approval 02/1026EF A.D.L.S.

T 6999831.3 Transfer
Cpy – 01/01, Pgs – 006, 22/08/06, 13:40
DocID: 312620433

Land registration district

NORTH AUCKLAND

Unique identifier(s) or C/T(s)	All/part	Area/description of part or stratum
NA131A/546	All	

Transferor *Surname(s) must be underlined or in CAPITALS.*

John WALLACE and Ann Margaret Soutar WALLACE

Transferee *Surname(s) must be underlined or in CAPITALS.*

John WALLACE and Ann Margaret Soutar WALLACE

Estate or interest to be transferred, or easement(s) or *profit(s) à prendre* to be created
State if fencing covenant imposed.

Fee Simple subject to a Land Covenant continued on pages 2& 3

Operative clause

The Transferor transfers to the Transferee the above estate or interest in the land in the above certificate(s) of title or computer register(s) and, if an easement or *profit à prendre* is described above, that easement or *profit à prendre* is granted or created.

Dated this 28th day of July 2006

Attestation *(If the transferee or grantee is to execute this transfer, include the attestation in an Annexure Schedule).*

[redacted]	**Signed in** [redacted] **by the Transferor**
	Signature of witness
	Witness to complete in BLOCK letters (unless legibly printed)
	Witness name
	Occupation JULIE SMITH LEGAL SECRETARY
Signature [common seal] of Transferor	**Address** KAEO

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

[redacted]

[Solicitor for] the Transferee

REF: 7002 – AUCKLAND DISTRICT LAW SOCIETY

ANNEXURE SCHEDULE

2003/5038EF
Approved
Registrar-General of land

Insert type of instrument
"Mortgage", "Transfer", "Lease" etc

Transfer

Dated 28th July 2006 Page 2 of 4 pages

(Continue in additional Annexure Schedule, if required.)

Attestation

[redacted]

Signature of Transferee

Signed in my presence by the Transferee

[redacted]

Signature of Witness

Witness to complete in BLOCK letters (unless legibly printed)

Witness name JULIE SMITH

Occupation LEGAL SECRETARY

Address KAEO

If this Annexure Schedule is used as an expansion of an instrument, all signing parties and either their witnesses or solicitors must sign or initial in this box.

ANNEXURE SCHEDULE

Insert type of instrument
"Mortgage", "Transfer", "Lease" etc

Transfer	Dated	28th July 2006	Page	3	of	4	pages

(Continue in additional Annexure Schedule, if required.)

The transferor is the registered proprietor of the land contained in Certificates of Title:-

Lot	Deposited Plan	Certificate of title
1	370958	287347
2	370958	287348
3	370958	287349
4	370958	287350
5	370958	287351
6	370958	287352
7	370958	287353
8	370958	287354
9	370958	287355
10	370958	287356

Which are the titles issued on subdivision of title NA131A/546, and shall be bound by the following restrictive covenants.

Terms and conditions of the Land Covenant:
For the purposes of the building covenants clauses:

(i) References to "accessory building" means garage, carport or shed.
(ii) References to "erect" include construct and place and "erected" shall be construed accordingly.
(iii) Covenants shall not apply to Lot 1, unless specifically stated.

1. The transferor (and any successors) shall not:

(a) Permit any second-hand dwelling unit or other structure or any prebuilt, transportable or relocatable dwelling or other structure to be moved onto or erected upon any lot. No second-hand materials, with the exception of bricks or native timber are to be used in the building of any dwelling unit or other structure erected on any lot, without the transferors (or any successors) written consent.

(b) Erect other than a single residential dwelling for private use, with a closed in floor area (all levels) of less than 120m² (measured so as to exclude garaging and decking). The Transferee acknowledges that this excludes multiple units, townhouses or any other such development.

(c) Construct any structure of more than two levels (including basement garaging), each level to be of the standard 2.44 metres height from floor to ceiling, (but not restricting the use of cathedral ceilings within the bounds of a normal pitched or peaked roofline).

(d) Construct any dwelling without quality exterior cladding such as: Kiln fired or concrete brick, stucco textured finish, stone or timber. Not to have an exterior finish in the form of flat cladding, concrete block, poured concrete or similar without the surface textured in such a manner as to fully cover the base material.

(e) Use corrugated iron as roofing material. Roofing material should be of long run colour bond steel, or tile, or other similar high quality roofing.

(f) Erect any building with exposed sub floor framing or exposed foundation pole system.

(g) Erect any perimeter fence that is higher than 1.5 metres.

If this Annexure Schedule is used as an expansion of an instrument, all signing parties and either their witnesses or solicitors must sign or initial in this box.

J.G.

ANNEXURE SCHEDULE

Insert type of instrument
"Mortgage", "Transfer", "Lease" etc

Transfer	Dated	28th July 2006	Page 4	of 4	pages

(Continue in additional Annexure Schedule, if required.)

(h) Permit any fence to be constructed of roofing iron, fibrolite board, or any other such materials.

(i) Erect more than one detached accessory building or any detached accessory building having a site coverage area exceeding 60m². The detached accessory building must be clad or finished in keeping with the main residential dwelling. Prior consent of the transferor's must be sought for any other accessory building, such as a small glasshouse or garden shed.

(j) Erect any water tank or other water storage vessel which is not either:-

1. installed underground or,
2. to maintain the aesthetic value of the property, screened from view of all adjoining neighbours and roadway by a deck/patio/fence/trellis or such like.

(k) Occupy the land prior to commencement of building works.

(l) Allow the period for completion of any building works being conducted on the property to exceed 18 months from the date of commencement of such works.

(m) Use the property or suffer it to be used other than for residential purposes, and in particular shall not permit any advertising, signage or boarding to be erected on the property without the transferors prior written approval.

(n) Permit any driveway or vehicle access way on the property to be left unsurfaced.

2. The transferees of lots 1, 2, 9 & 10 shall not remove the trees nor permit the trees planted on the Southern Boundary as shelterbelts to grow to a height of more than 15 metres.

3. The transferees of lots 2, 3 & 4 shall maintain the height of the trees planted on the Western Boundary between 15 metres (minimum height) and 20 metres (maximum height), and shall not remove the trees.

4. The transferees of lots 3, 4, 5, 6 & 7 and their successors will be liable for the maintenance and upkeep of the right of way, called Crackerjack Crescent, marked A & B on the plan, as to a 1/5th share each.

5. The transferee of Lot 5 shall not construct any construction whatsoever (except fencing) within 15 metres of the southern boundary, without the consent of the transferor.

If this Annexure Schedule is used as an expansion of an instrument, all signing parties and either their witnesses or solicitors must sign or initial in this box.

5-4

CONSENT BY MORTGAGEE

Date:

ANZ BANKING GROUP (NEW ZEALAND) LIMITED as mortgagee under Mortgage Number **C386542.4** and Variation of Mortgage number **6430513.1** hereby consents to the Transfer Instrument to register covenants on the following Certificate of titles of the North Auckland Registry:-

Lot	Deposited Plan	Certificate of title
1	370958	287347
2	370958	287348
3	370958	287349
4	370958	287350
5	370958	287351
6	370958	287352
7	370958	287353
8	370958	287354
9	370958	287355
10	370958	287356

This consent is given without prejudice to the ANZ Banking Group (New Zealand) Limited's rights, remedies and Powers held under Mortgage Number **C386542.4** and Variation of Mortgage number **6430513.1** which is to be registered against all new titles.

Signed for and on behalf of ANZ Banking Group (New Zealand) Limited's by its Attorneys: ANZ National Bank Limited by its Attorney KAPUA KATRINA GARDINER Attorney Signature: Attorney Name:	Signature of Witness: Witness Name: Address: VIKA FIFITA BANK OFFICER AUCKLAND OCCUPATION:

CERTIFICATE OF NON-REVOCATION OF POWER OF ATTORNEY

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

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

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

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

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

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

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

DATED at Auckland this 3rd day of August 2006

.....

KAPUA KATRINA GARDINER

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

Sections 90A and 90F, Land Transfer Act 1952

2003/6180EF
Approved
Registrar-General of Land

EI 6999831.4 Easemen
Cpy – 01/01, Pgs – 005, 12/09/06, 14:16
DocID: 312620434

Land registration district

North Auckland

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

John WALLACE and Ann Margaret Soutar WALLACE

Grantee *Surname(s) must be underlined or in CAPITALS.*

John WALLACE and Ann Margaret Soutar WALLACE
Graeme Walter SCHOFIELD

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

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

DATED this 18th day of July 2006

Attestation

[redacted]

Signature [Common Seal] of Grantor

Signed in my presence by the Grantor

[redacted]

Signature of Witness

Witness to complete in BLOCK letters (unless legibly printed)

Witness name:

Occupation: JULIE SMITH
LEGAL SECRETARY

Address: KAEO

[redacted]

Signature [Common Seal] of Grantee

Signed in my presence by the Grantee

[redacted]

Signature of Witness

Witness to complete in BLOCK letters (unless legibly printed)

Witness name:

Occupation: JULIE SMITH
LEGAL SECRETARY

Address: KAEO

Certified correct for the purposes of the Land Transfer Act 1952

[redacted]

[Solicitor for] the Grantee

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

Annexure Schedule 1

2003/6180EF
Approved
Registrar-General of Land

Schedule A *Continue in additional Annexure Schedule if required.*

Purpose (nature and extent) of easement, *profit*, or covenant	Shown (plan reference)	Servient tenement (Identifier/CT)	Dominant tenement (Identifier/CT *or* in gross)
Right to Drain water	E on DP 370958	287354	287355 & Lot 1 DP 133271
	F on DP 370958	287353	287354, 287355 & Lot 1 DP 133271
	G & C on DP 370958	287356	287347
	H on DP 370958	287349	287351 & 287352
	I on DP 370958	287349	287348

Easements or *profits à prendre* rights and powers (including terms, covenants, and conditions) *Delete phrases in [ ] and insert memorandum number as required.* *Continue in additional Annexure Schedule if required.*

Unless otherwise provided below, the rights and powers provided in specific classes of easement are those prescribed by the Land Transfer Regulations 2002 and/or the Ninth Schedule of the Property Law Act 1952.

~~The implied rights and powers are [varied] [negatived] [added to] or [substituted] by:~~

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

~~[The provisions set out in Annexure Schedule 2].~~

Covenant provisions

Delete phrases in [ ] and insert memorandum number as required.

Continue in additional Annexure Schedule if required

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

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

~~[The provisions set out in Annexure Schedule 2].~~

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

ANNEXURE SCHEDULE

Insert type of instrument
"Mortgage", "Transfer", "Lease" etc

Easement Instrument to grant easement or *profit á pendre* or create land covenant	Dated	28th July 2006	Page	3	of	3	pages

(Continue in additional Annexure Schedule, if required.)

Attestation

[redacted]	**Signed in my presence by the Grantee** [redacted]
Signature of Grantee – Graeme Walter Schofield	*Signature of Witness* *Witness to complete in BLOCK letters (unless legibly printed)* **Witness name** JULIE IRENE SMITH **Occupation** SECRETARY **Address** KAEO

If this Annexure Schedule is used as an expansion of an instrument, all signing parties and either their witnesses or solicitors must sign or initial in this box.

CONSENT BY MORTGAGEE

Date:

ANZ BANKING GROUP (NEW ZEALAND) LIMITED as mortgagee under Mortgage Number **C386542.4** and Variation of Mortgage number **6430513.1** hereby consents to the Easement Instrument to grant easement to be registered in the following Certificate of titles of the North Auckland Registry:-

Lot	Deposited Plan	Certificate of title
1	370958	287347
2	370958	287348
3	370958	287349
4	370958	287350
5	370958	287351
6	370958	287352
7	370958	287353
8	370958	287354
9	370958	287355
10	370958	287356

This consent is given without prejudice to the ANZ Banking Group (New Zealand) Limited's rights, remedies and Powers held under Mortgage Number **C386542.4** and Variation of Mortgage number **6430513.1** which is to be registered against all new titles.

Signed for and on behalf of ANZ Banking Group (New Zealand) Limited's by its Attorneys: ANZ National Bank Limited by its Attorney KAPUA KATRINA GARDINER [redacted] Attorney Signature: Attorney Name:	Signature of Witness: [redacted] Witness Name: VIKA FIFITA BANK OFFICER Address: AUCKLAND OCCUPATION:

CERTIFICATE OF NON-REVOCATION OF POWER OF ATTORNEY

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

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

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

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

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

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

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

DATED at Auckland this 3rd day of August 2006

.....[redacted].....

KAPUA KATRINA GARDINER

Easement instrument to grant easement or *profit à prendre* or create land covenant
Sections 90A and 90F, Land Transfer Act 1952

2003/6180EF
Approved
Registrar-General of Land

EI 6999831.5 Easemen
Cpy – 01/01, Pgs – 004, 22/08/06, 13:41
DocID: 312620437

Land registration district

North Auckland

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

John WALLACE and Ann Margaret Soutar WALLACE

Grantee *Surname(s) must be underlined or in CAPITALS.*

John WALLACE and Ann Margaret Soutar WALLACE

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

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

DATED this 29th day of July 2006

Attestation

[redacted] **Signature [Common Seal] of Grantor**	**Signed in my presence by the Grantor** [redacted] Signature of Witness Witness to complete in BLOCK letters (unless legibly printed) **Witness name:** **Occupation:** JULIE SMITH LEGAL SECRETARY **Address:** KAEO
[redacted] **Signature [Common Seal] of Grantee**	**Signed in my presence by the Grantee** [redacted] Signature of Witness Witness to complete in BLOCK letters (unless legibly printed) **Witness name:** **Occupation:** JULIE SMITH LEGAL SECRETARY **Address:** KAEO

Certified correct for the purposes of the Land Transfer Act 1952

[redacted]

[Solicitor for] the Grantee

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

Annexure Schedule 1

2003/6180EF
Approved
Registrar-General of Land

Easement instrument Dated 28th July 2006

Schedule A *Continue in additional Annexure Schedule if required.*

Purpose (nature and extent) of easement, *profit*, or covenant	Shown (plan reference)	Servient tenement (Identifier/CT)	Dominant tenement (Identifier/CT *or* in gross)
Right of Way, Telecommunications, Electricity, Computer Media, Water Supply and Drain water	A & C On Deposited plan 370958	287356	287349, 287350, 287351, 287352 & 287353
	B on Deposited plan 370958	287351	287349, 287350, 287352 & 287353
	D on Deposited Plan 370958	287354	287355

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

Delete phrases in [ ] and insert memorandum number as required.

Continue in additional Annexure Schedule if required.

Unless otherwise provided below, the rights and powers provided in specific classes of easement are those prescribed by the Land Transfer Regulations 2002 and/or the Ninth Schedule of the Property Law Act 1952.

The implied rights and powers are [varied] [negatived] [added to] or [substituted] by:

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

[The provisions set out in Annexure Schedule 2].

Covenant provisions

Delete phrases in [ ] and insert memorandum number as required.

Continue in additional Annexure Schedule if required

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

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

[The provisions set out in Annexure Schedule 2].

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

[redacted]

CONSENT BY MORTGAGEE

Date:

ANZ BANKING GROUP (NEW ZEALAND) LIMITED as mortgagee under Mortgage Number **C386542.4** and Variation of Mortgage number **6430513.1** hereby consents to the Easement Instrument to grant easement to be registered in the following Certificate of titles of the North Auckland Registry:-

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Signed for and on behalf of ANZ Banking Group (New Zealand) Limited's by its Attorneys: ANZ National Bank Limited by its Attorney KAPUA KATRINA GARDINER Attorney Signature: Attorney Name:	Signature of Witness: Witness Name: VIKA FIFITA Address: BANK OFFICER AUCKLAND OCCUPATION:

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Dunedin	as No.	911369	Nelson	as No.	359781
Gisborne	as No.	G.210991	New Plymouth	as No.	433509
Hamilton	as No.	B.355185	Wellington	as No.	B.530013.1

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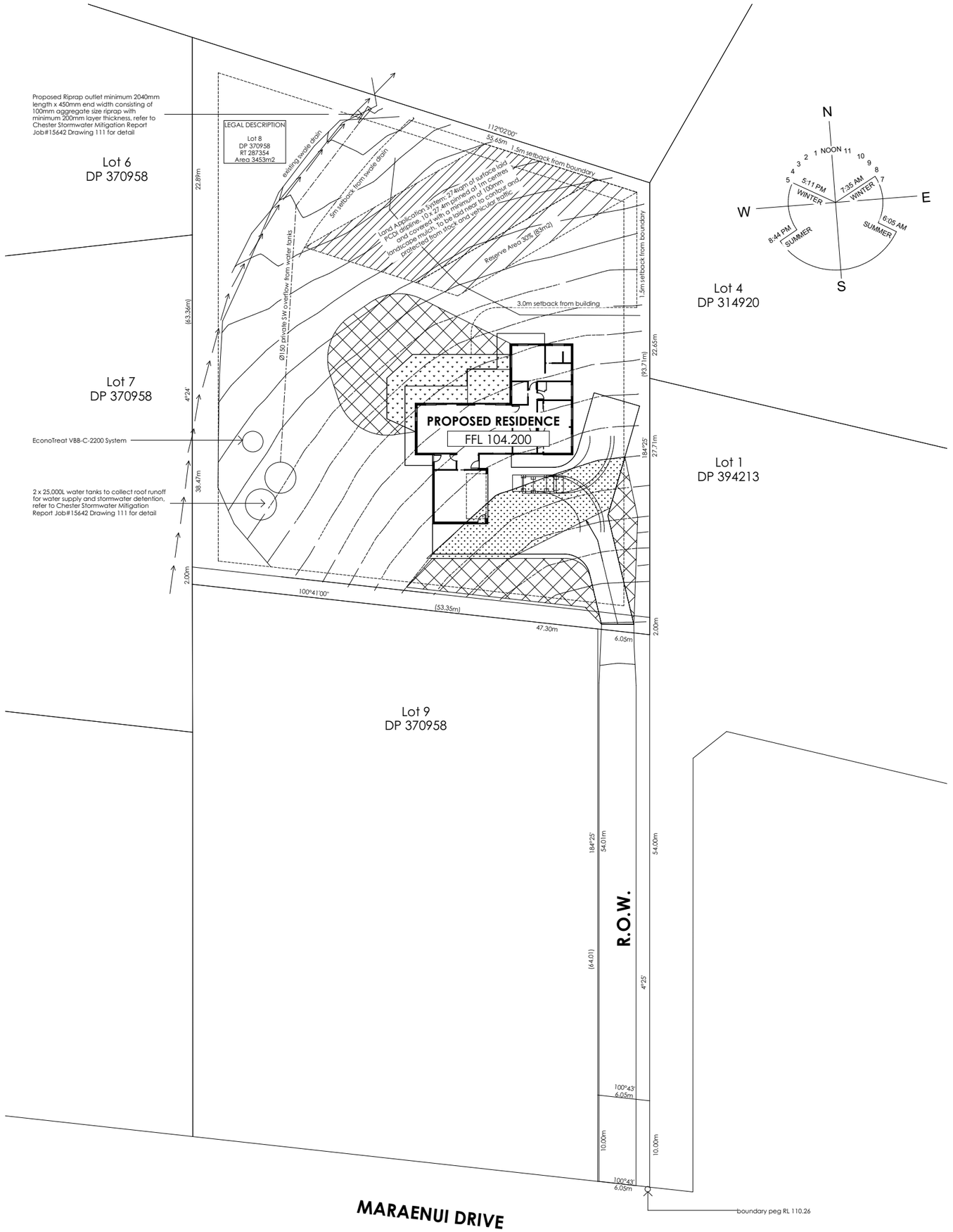
DATED at Auckland this 3rd day of August 2006

.....

KAPUA KATRINA GARDINER



SITE PLAN NOTES

1. Position of building must be pegged and certified by licensed cadastral surveyor
2. The earthworks must comply with Proposed District Plans rules EW-R12 Accidental Discovery Protocol & EW-R13 Erosion and Sediment Control

Operative District Plan Zone: Rural Living

Impermeable Surfaces

Site Area:	3453m2
Existing R.O.W.	276.0m2
Proposed Driveway:	242.0m2
Proposed House to eaves:	270.0m2
Proposed Water Tanks:	19.2m2
Water Tank dispensation	-19.2m2
Total Impermeable:	**788.00m2 (23%)**

Building Coverage

Site Area:	3453m2
Proposed House:	200.3m2
Total Building Coverage:	**200.3m2 (6%)**

absolute build
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PO Box 875, Kerikeri 0245 I absolutebuild.co.nz

Job
Proposed New Residence at 37B Maraenui Drive, Kerikeri

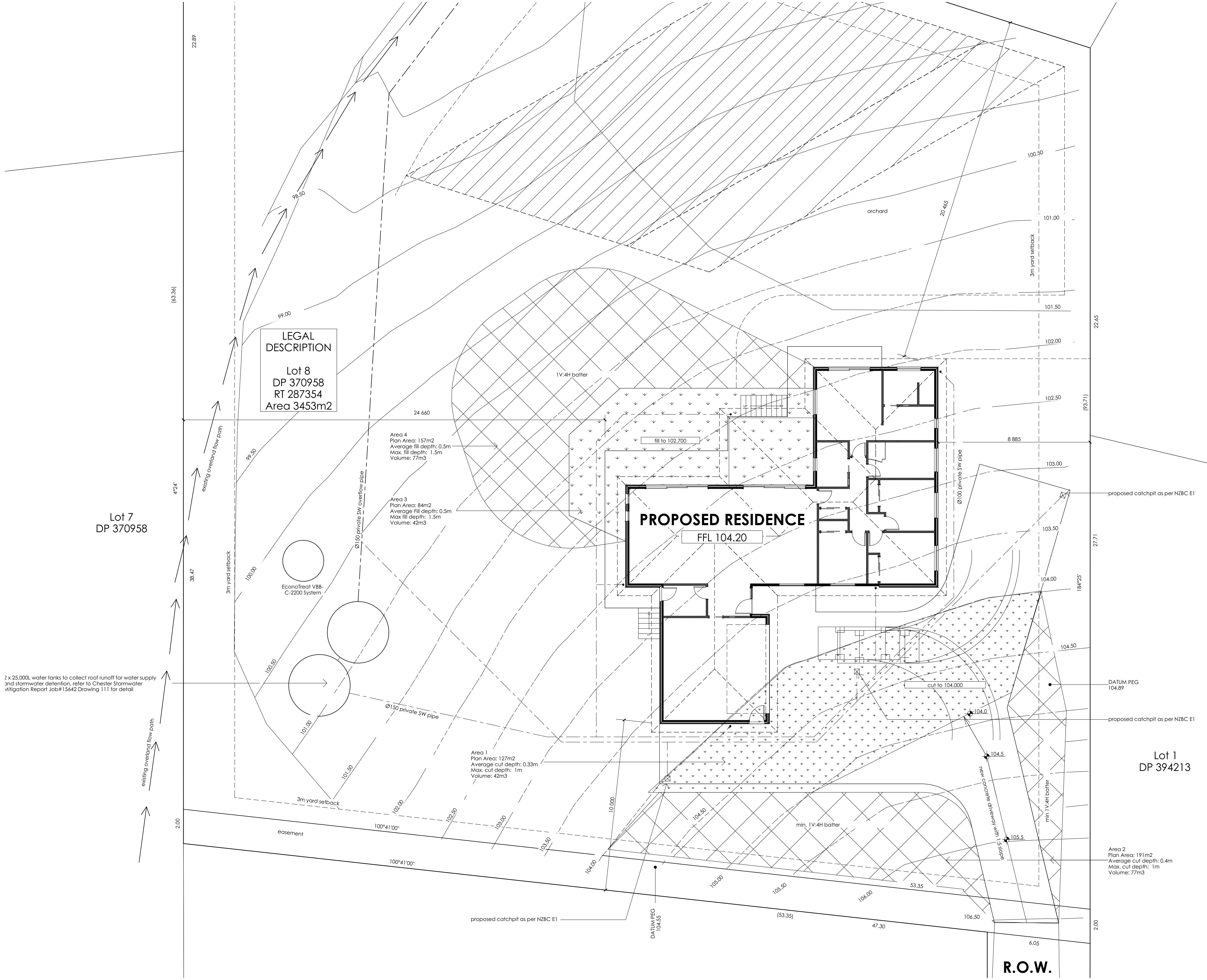
Client
Ruolei Chen & Xin Wang

Drawing
Overall Site Plan

Rev. No.	Description	Date

Designed N Todd	Job No. 2024334
Drawn N Todd	Drawing Number 1
Date April 2024	
Scale 1:250@A1 1:500@A3	Revision
	of 5

ORIGINAL DRAWING SIZE IS A1


LEGAL DESCRIPTION
Lot 8
DP 370958
RT 287354
Area 3453m2
Lot 7
DP 370958
Lot 1
DP 394213
PROPOSED RESIDENCE
FFL 104.20
orchard
3m yard setback
existing overland flow path
1V:4H batter
fill to 102.700
cut to 104.000
min. 1V:4H batter
min 1V:4H batter
new concrete driveway with 1:5 slope
easement
R.O.W.
Area 4
Plan Area: 157m2
Average fill depth: 0.5m
Max. fill depth: 1.5m
Volume: 77m3
Area 3
Plan Area: 84m2
Average Fill depth: 0.5m
Max fill depth: 1.5m
Volume: 42m3
Area 1
Plan Area: 127m2
Average cut depth: 0.33m
Max. cut depth: 1m
Volume: 42m3
Area 2
Plan Area: 191m2
Average cut depth: 0.4m
Max. cut depth: 1m
Volume: 77m3
Ø150 private SW overflow pipe
Ø150 private SW pipe
Ø100 private SW pipe
EconoTreat V88-C-2200 System
2 x 25,000L water tanks to collect roof runoff for water supply and stormwater detention, refer to Chester Stormwater Mitigation Report Job#15642 Drawing 111 for detail
proposed catchpit as per NZBC E1
DATUM PEG 104.89
DATUM PEG 104.55
24 660
8 885
20 465
10 000
100°41'00"
53.35
(53.35)
47.30
6.05
22.89
22.65
27.71
(63.36)
(93.71)
38.47
2.00

Operative District Plan Zone: Rural Living

Earthworks

Area 1:	42m3
Area 2:	77m3
Area 3:	42m3
Area 4:	77m3
Total Cut/Fill:	**238m3**

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Job
Proposed New Residence at 37B Maraenui Drive, Kerikeri

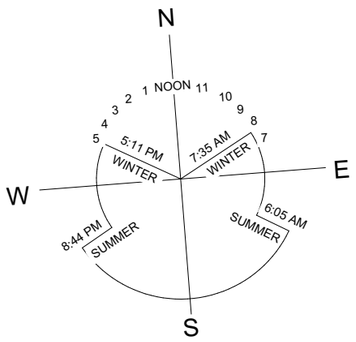
Client
Ruolei Chen & Xin Wang

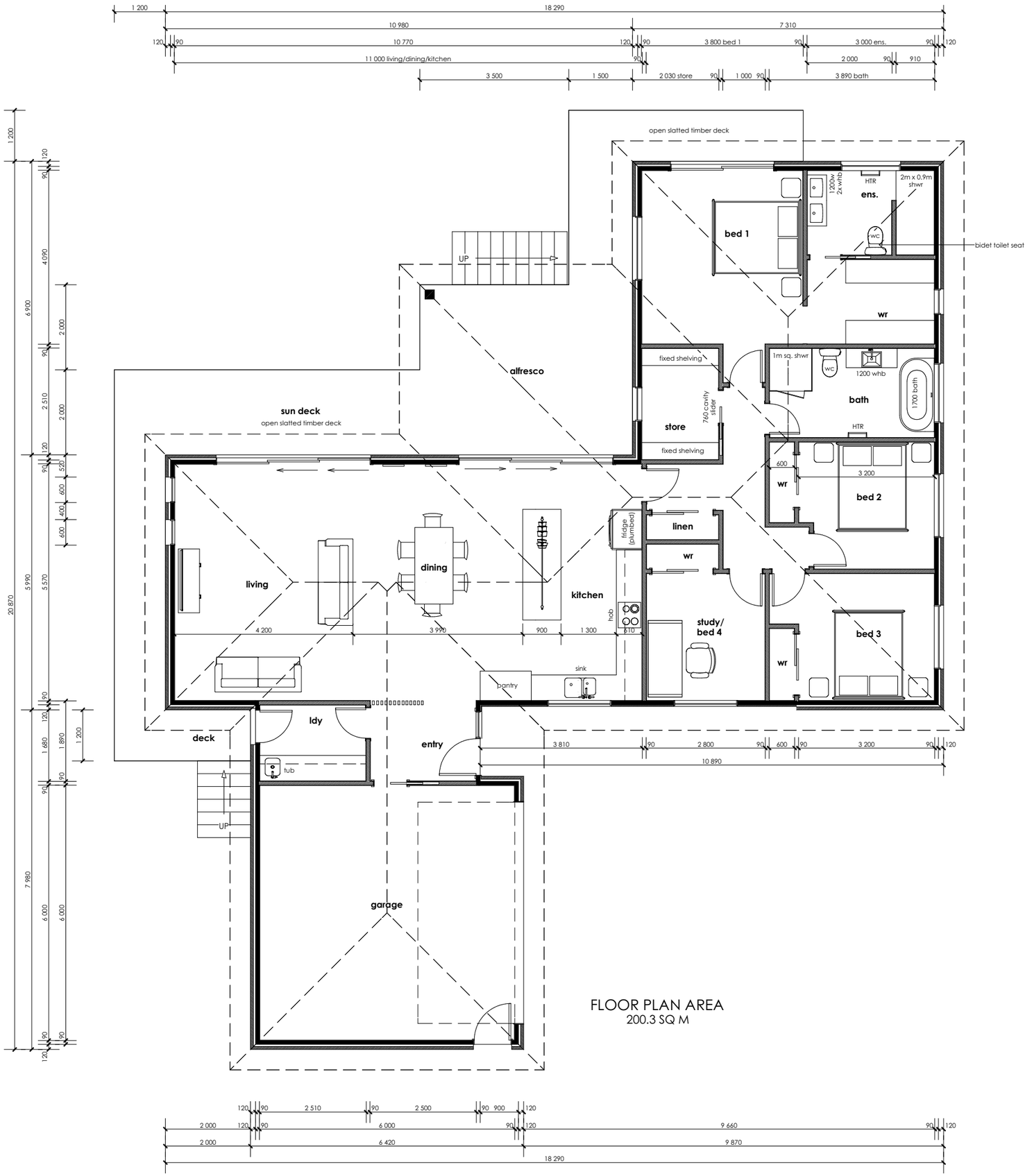
Drawing
Part Site Plan

Rev. No.	Description	Date

Designed: N Todd	Job No.: 2024334
Drawn: N Todd	Drawing Number: 2 of 5
Date: April 2024	
Scale: 1:100@A1 1:200@A3	Revision

ORIGINAL DRAWING SIZE IS A1





FLOOR PLAN AREA
200.3 SQ M

absolute build

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Job
Proposed New Residence at 37B Maraenui Drive, Kerikeri

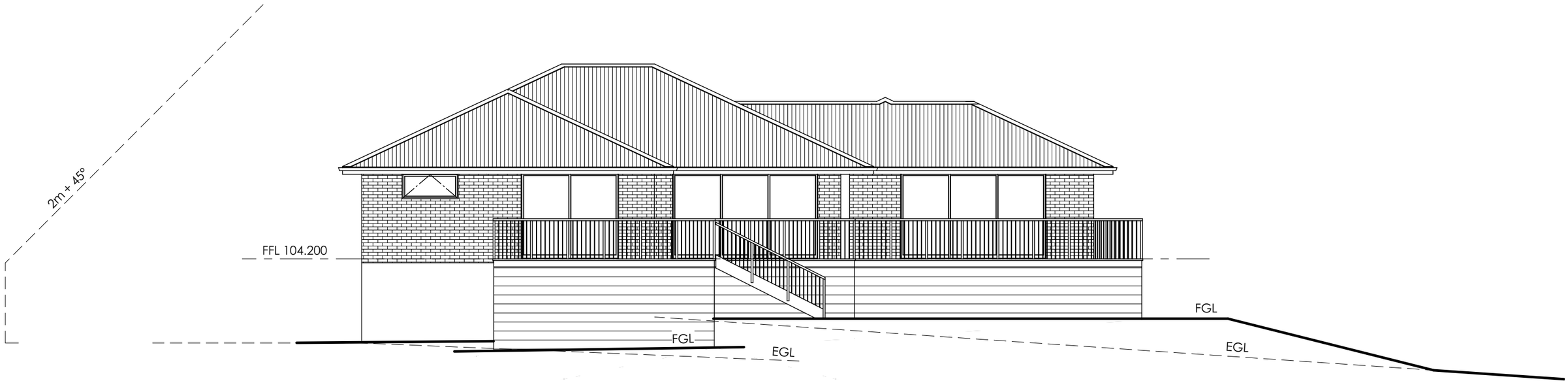
Client
Ruolei Chen & Xin Wang

Drawing
Proposed Floor Plan

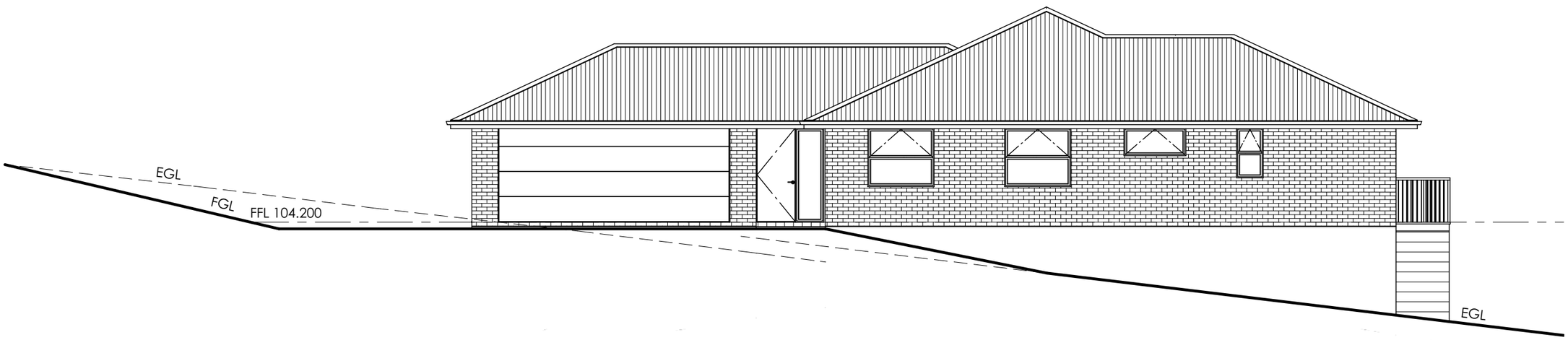
Rev. No.	Description	Date

Designed N Todd
Drawn N Todd
Date April 2024
Scale 1:50@A1 1:100@A3
Revision
Job No. 2024334
Drawing Number 3
of 5

ORIGINAL DRAWING SIZE IS A1



North Elevation



East Elevation

absolute build

p 09 407 4227 m 027 227 7543
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Job
Proposed New Residence at 37B Maraenui Drive, Kerikeri

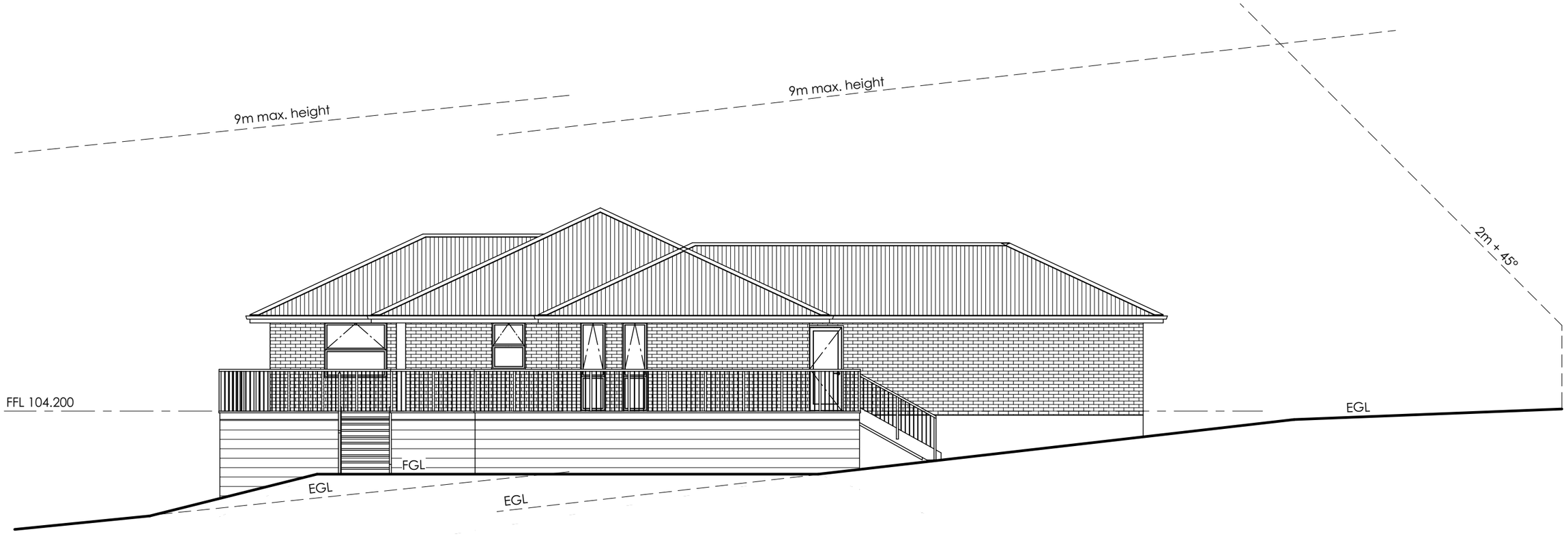
Client
Ruolei Chen & Xin Wang

Drawing
North and East Elevations

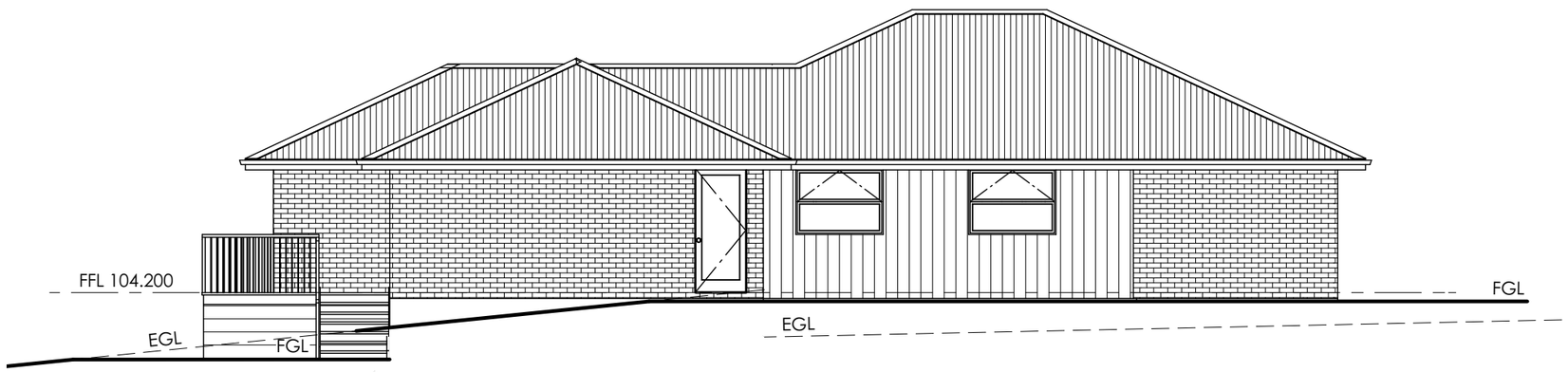
Rev. No.	Description	Date

Designed: N Todd	Job No.: 2024334
Drawn: N Todd	Drawing Number: 4 of 5
Date: April 2024	
Scale: 1:50@A1 1:100@A3	Revision:

ORIGINAL DRAWING SIZE IS A1



West Elevation



South Elevation

absolute build

p 09 407 4227 m 027 227 7543
PO Box 875, Kerikeri 0245 I absolutebuild.co.nz

Job
Proposed New Residence at 37B Maraenui Drive, Kerikeri

Client
Ruolei Chen & Xin Wang

Drawing
South and West Elevations

Rev. No.	Description	Date

Designed N Todd	Job No. 2024334
Drawn N Todd	Drawing Number 5
Date April 2024	
Scale 1:50@A1 1:100@A3 / Revision	of 5

ORIGINAL DRAWING SIZE IS A1

STATEMENT OF DESIGN - PS1

Issued by: Matt Riddell
To: Jack Chen
Copy to be supplied to: Far North District Council
In Respect of: Econotreat Domestic Onsite Wastewater and Sewage System Design
At: 37B Maraenui Drive , Kerikeri
Legal Description: Lot 8 DP 370958

Waterflow NZ Ltd has been engaged by Jack Chen to provide the technical design services and details in respect of the requirements of G13/VM4 and B2 Durability of the Building Code 2004, for an Onsite Wastewater and Sewage System for their building at the above location.

The Design has been carried out in accordance with Auckland Council TP-58 Guidelines and Clause B2, G13 and G14 of the Building Regulations 2004.

The proposed building work covered by this producer statement is described on the drawings titled: Jack Chen Onsite Wastewater Design Report, and numbered 1-42 together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:
(i) Site verification of the following design assumptions: correct installation of the system and drainage fields
(ii) All proprietary products meeting their performance specification requirements;

As an independent design professional covered by a current policy for Professional Indemnity Insurance, no less than $200,000*, I **believe on reasonable grounds** the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code.

Signed by: Matt Riddell - PS Author ‘2384’ Auckland Council, Approved Designer

Date: 30/04/2024

Signature: 

Waterflow NZ Ltd
4/525 Great South Road
Penrose, Auckland 1061

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

WaterFlow
Bringing Clarity to Wastewater

2024

Waterflow NZ Ltd

Certified Designer

Jack Chen
37B Maraenui Drive
Kerikeri
Lot 8 DP 370958

Reference Number: WF12167

Issued 30/04/2024

ONSITE WASTEWATER DESIGN REPORT

WaterFlow
Bringing Clarity to Wastewater

TABLE OF CONTENTS

Attachments

- PS1
- Land Application System Schematics
- Pump Specification
- Electrical Diagram
- Assessment of Environmental Effects
- System & Installation Specifications
- System & Installation Specifications
- Home Owners Care Guide

WaterFlow
Bringing Clarity to Wastewater

PART A: CONTACT AND PROPERTY DETAILS

A 1. Consultant / Evaluator

Name:	Leah Gigger
Company/Agency:	Waterflow New Zealand Ltd
Address:	166 Waipapa Road, Kerikeri
Phone:	09 431 0042
Fax:	
Email Address:	leah@waterflow.co.nz

A 2: Applicant Details

Applicant Name:	Jack Chen
Company Name:	
Property Owner:	Jack Chen
Owner Address:	37B Maraenui Drive , Kerikeri
Phone:	
Mobile:	0211 732914
Email Address:	chenruoleijack@gmail.com

A 3: Site Information

Sited Visited by:	Ken Hoyle		**Date:**	Tuesday, 23 April 2024		
Physical Address:	37B Maraenui Drive , Kerikeri					
Territorial Authority:	Far North District Council					
Regional Council:	Northland Regional Council					
Regional Rule	C.6.1.3					
Legal Status of Activity:	**Permitted:**	**x**	**Controlled:**		**Discretionary:**	
Total Property Area (m^2):	3453m^2					
Map Grid Reference:						
Legal Description of Land (as on Certificate of Title):						
Lot No:	8					
DP No:	370958					
CT No:						

A 4: Are there any previous existing discharge consents relating to this proposal or other waste discharge/disposal on the site?

Yes:		**No:**	**x**

If yes, give reference No's and description:

A 5: Dwelling(s) for which on-site wastewater service is to be provided

Status of dwelling(s) to be serviced:		**New**	**x**	**Existing**		**Multiple**	
How many dwellings on the property?		1					
Capacity of dwellings:	**Dwelling 1**	4					
(or number of bedrooms)	**Dwelling 2**						
	Dwelling 3						
	Other:						
Notes:							

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Bringing Clarity to Wastewater

PART B: SITE ASSESSMENT - SURFACE EVALUATION

B 1: Site Characteristics

Performance of adjacent systems:	**(Unknown)**			
Estimated annual rainfall (mm):	1500 - 2000 **(as per NIWA statistics)**			
Seasonal variation (mm):	300-400mm			
Vegetation cover:	Grass & Trees			
Slope shape:	Waxing Planar			
Slope angle:	8 °			
Surface water drainage characteristics:	Broad overland to northern Boundry			
Flooding potential?	**Yes:**		**No:**	**x**
If Yes, specify relevant flood levels relative to disposal area:				
Site characteristics:	**a rectangular shaped property. It is a fairly flat section with gentle fall to the North.The section is surrounded by other like properties.**			

B 2: Slope Stability

Has a slope stability assessment been carried out on the site?

Yes:	**x**	**No:**	

If no, why not?

Low slope:		**No signs of instability:**		**Other:**

If yes, give brief details of report:

Details:	Onsite Wastewater Disopsal Report
Author:	k.Mitchell
Company/Agency:	Wilton Joubert
Date of report:	13/03/2023

B 3: Site Geology

As per: Onsite Wastewater Disopsal Report by Wilton Joubert

B 4: Slope Direction

What aspect does the proposed disposal system face?

North	x	West	
North-West		South-West	
North-East		South-East	
East		South	

B 5: Site Clearances if applicable (also on site plan)

	Treatment Separation Distance (m)	Disposal Field Separation Distance (m)
Boundaries:	>1.5	>1.5
Surface Water:	>15	>15
Ground Water:	>1.2	>1.2
Stands of Trees / Shrubs:	n/a	n/a
Wells/Water Bores:	>20	>20
Embankments / Retaining Walls:	>3	>3
Buildings:	>3	>3
Other:		

B 6: Please identify any site constraints applicable for this property, and indicate how the design process is to deal with these.

Constraints	Explain how constraints are being dealt with
1 Site constraints: (a) (b)	n/a

WaterFlow
Bringing Clarity to Wastewater

PART C: SITE ASSESSMENT - SOIL INVESTIGATION

C 1: Soil Profile Determination Method

Test pit:		Depth (mm):		No. of Test pits:	
Bore hole:	x	Depth (mm):	1200	No. of Bore holes	2
Other:					

C 2: Fill Material

Was fill material intercepted during the subsoil investigation?

Yes:		No:	x

If yes, please specify the effect of the fill on wastewater disposal:

C 3: Permeability Testing

Has constant head Permeability Testing (Ksat) been carried out?

Yes:		No:	x

If yes, please indicate the details (test procedure, number of tests):

Test report attached?

Yes:		No:	x

C 4: SURFACE WATER CUT OFF DRAINS

Are surface water interception/diversion drains required?

Yes:		No:	x

C 5: DEPTH OF SEASONAL WATER TABLE:

Winter (m):	>1.2
Summer (m):	>1.2

Was this:

Measured:	✓ no sign of ground water or mottling in bore holes
Estimated:	

C 6: SHORT CIRCUITS

Are there any potential short circuit paths?

Yes:		No:	x

If yes, how have these been addressed?

WaterFlow
Bringing Clarity to Wastewater

C 7: SOIL CATEGORY

Is topsoil present?

Yes:	x	**No:**	

If yes, what is the topsoil depth & soil description?

400mm Topsoil over Clay loam

Indicate the disposal field soil category (as per AC TP-58, Table 5.1)

Category	Description	Drainage	(x)
1	Gravel, coarse sand	Rapid draining	
2	Coarse to medium sand	Free draining	
3	Medium-fine & loamy sand	Good draining	
4	Sandy loam, loam & silt loam	Moderate draining	
5	Sandy clay-loam, clay loam & silty clay-loam	Moderate to slow draining	x
6	Sandy clay, non-swelling clay & silty clay	Slow draining	
7	Swelling clay, grey clay & hardpan	Poorly or non-draining	

Reason for placing in stated category:

Result of bore hole/test pit sample	x
Profile from excavation	
Geotech report	
Other:	

C 8: SOIL STRUCTURE

Based on results of the in-situ soil profile investigation above (C7) please indicate the disposal (land application) field soil structure:

Massive	
Single grained	
Weak	
Moderate	x
Strong	

C 9: As necessary, provide qualifying notes on the relationship of Soil Category (C7) to Soil Structure (C8) and the effect this relationship will have on design loading rate selection:

WaterFlow
Bringing Clarity to Wastewater

PART D: DISCHARGE DETAILS

D 1: Water supply source for the property:

Rain water (roof collection)	x
Bore/well	
Public supply	

D 2: Are water reduction fixtures being used?

Yes:		No:	x	(according to our knowledge at time of design report)

If 'yes' Please state:

Standard Fixtures include dual flush 11/5.5 or 6.3 litre toilet cisterns, and includes standard automatic washing machine, but a low water use dishwasher, no garbage grinder.

D 3: Daily volume of wastewater to be discharged:

No. of bedrooms/people:	1:	4 Bedroom
	2:	
	3:	
Design occupance (people): (as per AC TP-58, Table 6.1)	1:	6 People
	2:	
	3:	
		Black / Grey water
Per capita wastewater production (litres/person/day): (as per ARC TP-58, Table 6.2)	1:	160 L/day
	2:	
	3:	
Total daily wastewater production (litres per day):		960 L/day

D 4: Is daily wastewater discharge volume more than 2000 litres?

Yes:		No:	x

D 5: Gross lot area to discharge ratio:

Gross lot area:	3453 m²
Total daily wastewater production (litres/day):	960 L
Lot area to discharge ratio:	3.60

D 6: Net Lot Area

Area of lot available for installation of the disposal (land application) field and reserve area:

Net lot area (m²):	2453 m²	
Reserve area (m²):	30%	82.2857142857143m²

WaterFlow
Bringing Clarity to Wastewater

PART E: LAND DISPOSAL METHOD

E 1: Indicate the proposed loading method:

	Black / Grey Water
Gravity Dose:	
Dosing Siphon:	
Pump:	Davy D42A-B

E 2: If a pump is being used please provide following information:

Total Design Head (m):	32
Pump Chamber Volume (litres):	1600
Emergency Storage Volume (litres):	2120

Is a high water level alarm being installed in pump chambers?

Yes:	**x**	**No:**	

E 3: Identify the type(s) of Land Disposal method proposed for this site:

	Black / Grey Water
P.C.D.I. Dripper Irrigation:	PCDI surface laid and mulched
L.P.E.D. System:	
Evapo-Transpiration Beds:	
Other:	
	(as per Schematics attached)

E 4: Identify the Loading Rate proposed for option selected in E3:

as per ARC TP-58, Table 9.2 & Table 10.3	**Black / Grey Water**
Loading Rate (litres/m²/day):	3.5
Disposal Area Basal (m²):	
Areal (m²):	274

E 6: Details and dimensions of the disposal (land application) field:

Length (m):	27.4	**No. Lines:**	10	**Hole Size:**	N/A
Width (m):	10.0	**Spacing (m):**	1.0	**Hole Spacing:**	N/A

Notes:	**274sqm of Surface laid PCDI dripline pinned at 1m centers and covered with a minimum covering of 100mm mulch. See schematic drawing attached.**

PART F: PROPOSED WASTEWATER TREATMENT SYSTEM

A Econotreat EconoTreat VBB-C-2200 System, fed through surface laid PCDI dripline is suitable for this site. The EconoTreat VBB-C-2200 System has enough capacity to accommodate 2200ltr per day, so will be well within its capacity. The land application system is designed to discharge a maximum volume of 960ltrs per day and if this is exceeded it could cause failure resulting in environmental and public harm.

PART G: OPERATION AND MAINTENANCE OF SYSTEM

The operation of this complete system will be explained verbally to the owner by the Installer or Agent on Completion of Installation; also provided with Waterflow's Home Owner's Manual.

Waterflow NZ Ltd encourages the Home Owner to monitor and care for your Econotreat system yourself, with our backing and support, and by doing so you will learn how your system works and operates and how to keep it in top working order.

It is also recommended that a Maintenance Program contract is in place at all times to ensure this system is maintained at top performance at all times.

All on site wastewater systems require regular maintenance; in this case once annually is suffice and may be specified within the consent process by the Building Department of Far North District Council. This Maintenance will be recorded on hard copy and supplied to both the Owner and Far North District Council Compliance Officer if requested.

NOTE TO OWNER: All written records pertaining to the wastewater system should be retained in a safe place. When a change of ownership occurs, a full and complete history is able to be passed to the new owners.

Animals are to be physically excluded from the installed effluent field to avoid damage, and to reduce the risk of soil compaction in the vicinity of the bed.

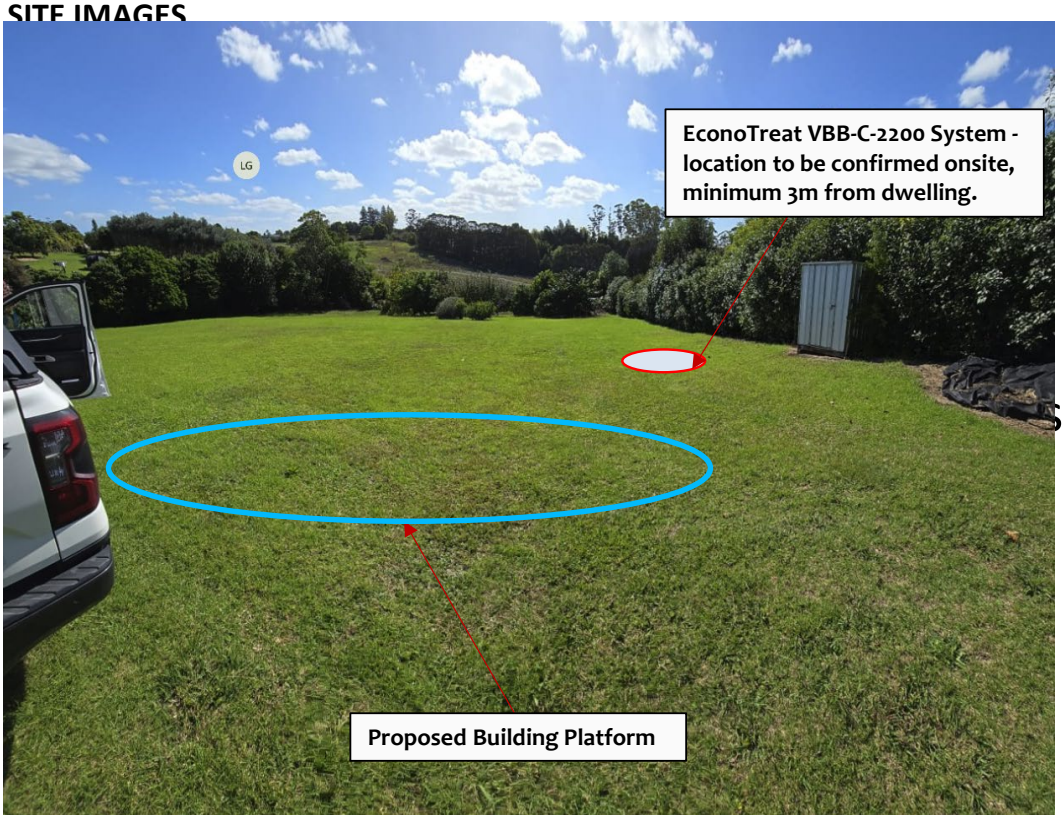
Planting within this area is encouraged to assist with evapotranspiration by plants.

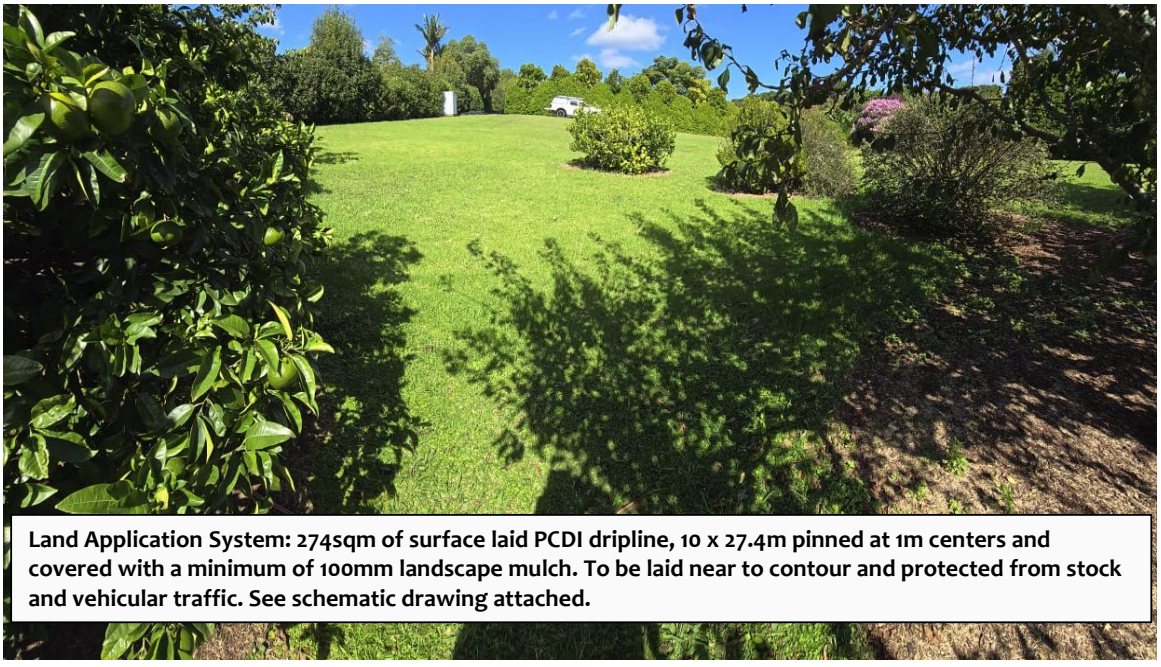
PART H: SOIL LOG PROFILE

400mm Topsoil over Clay loam Class 5, (as per AC TP-58, Table 5.1)

WaterFlow
Bringing Clarity to Wastewater

PART I: SITE IMAGES





DECLARATION

I, hereby certify that, to the best of my knowledge and belief, the information given in this application is true and complete.

Prepared By:	
Name:	**Leah Gigger - Approved Designer**
Signature:	
Date:	30/04/2024

Reviewed By:	
Name:	**Matt Riddell - PS Author '2384' Auckland Council, Approved Designer**
Signature:	
Date:	30/04/2024

NOTE: The Waterflow Systems are to be installed by a registered drainlayer to the designs supplied by Waterflow NZ Ltd. All work to comply with Regional Council Water and Soil Plans.

Comments/Summary:

The disposal field will need to be protected from traffic and animal grazing. Planting this area is recommended to increase Evapotranspiration.

Suitable plants for the disposal field can be found on our website www.naturalflow.co.nz

Waterflow Treatment systems to be installed by accredited installer unless other arrangements have been made by Waterflow NZ Ltd

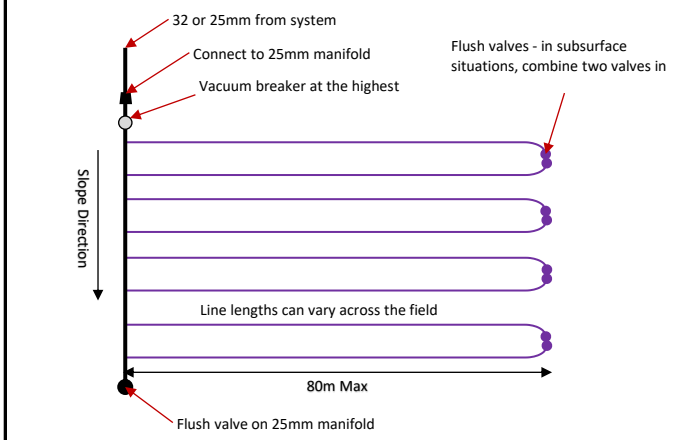
For more information do not hesitate to contact the team at Waterflow NZ Ltd on 0800 628 356

N	WaterFlow Bringing Clarity to Wastewater	**SITE LOCATION PLAN:** Jack Chen 37B Maraenui Drive Kerikeri Lot 8DP 370958 0.3453HA	**SCALE:** 1 : 282 @ A3

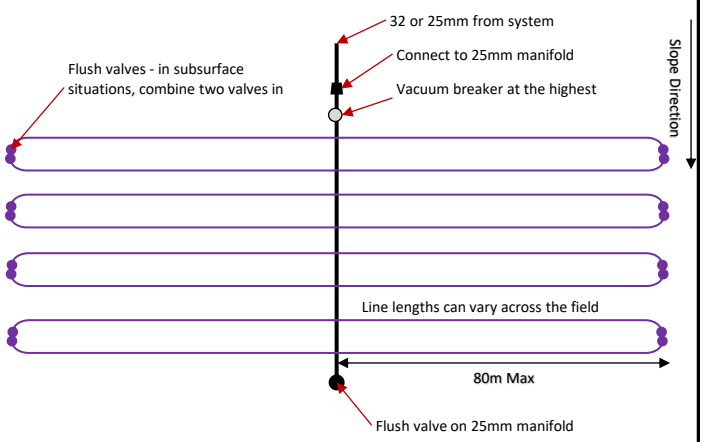
N	WaterFlow Bringing Clarity to Wastewater	DATE DRAW: 30/04/2024 PREPARED BY: Leah Gigger REVISED: Matt Riddell	SITE LAYOUT PLAN: Jack Chen 37B Maraenui Drive Kerikeri Lot 8 DP 370958 0.3453HA	SCALE: 1 : 59 @ A3

Common PCDI Layouts

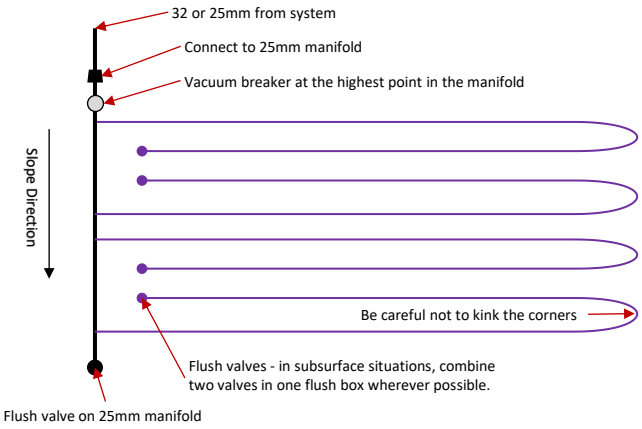
Single Side Manifold - straight



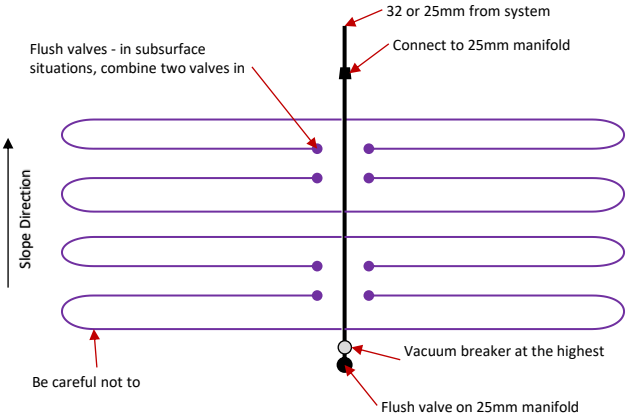
Single Center Manifold - straight



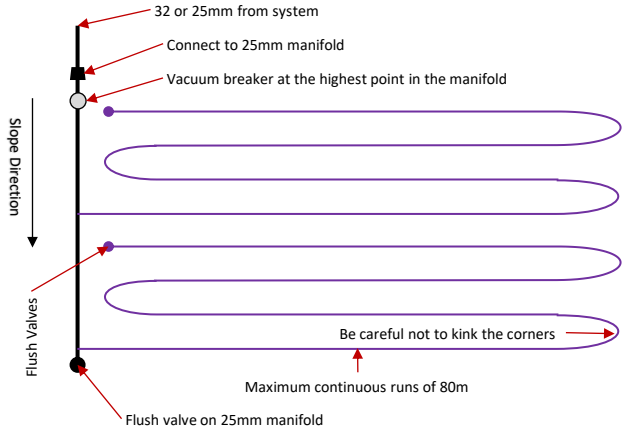
Single Side Manifold - curled



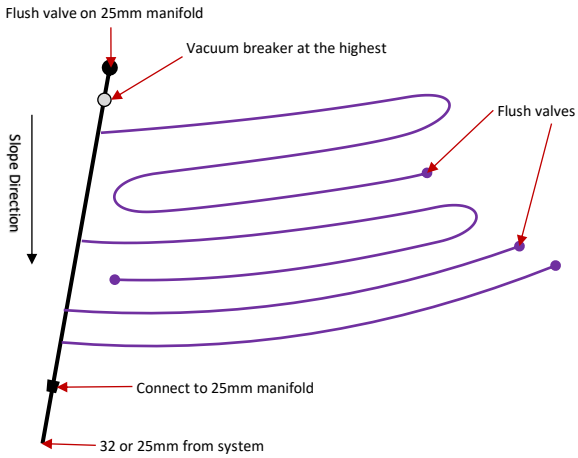
Single Center Manifold - curled



Long Single Runs



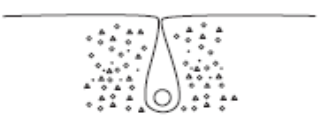
Custom Layout



Cross Sections of PCDi installation

150mm Mulch or Leaf Litter

Subsoil Buried @ 100-150mm

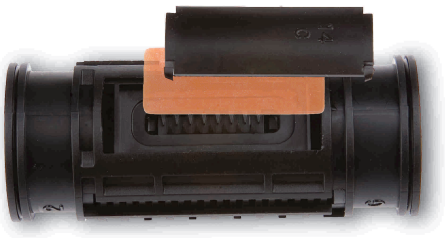


METZERPLAS

ADI

Cylindrical PC (Pressure Compensated) dripper.

- Cylindrical PC dripper, with unique regulating labyrinth with self-flushing operation at the beginning and the end of each irrigation cycle.
- Triple inlet filter with filtering area 10 times larger than any other dripper.
- High clog resistance.
- Suitable for poor quality and effluent water.
- Large pressure compensation range up to 4.3 bars.
- Dripline diameter: 16, 18 and 20 mm.
- Dripper flow rate: 1.6, 2.2 and 3.5 l/h.
- *Rootguard*® configuration available for extra root protection in SDI (Subsurface Drip Irrigation).



ADI Dripline Technical Data:

Model	Inside Diameter (mm)	Wall Thickness (mm)	Min. Working Pressure (bars)	Max. Working Pressure (bars)	KD
ADI 16	13.8	0.9	0.8	3.5	1.12
		1.15	0.8	4.3	0.95
ADI 18	15.8	1.2	0.8	4.3	0.95
ADI 20	17.4	1.0	0.8	3.5	0.85
		1.25	0.8	4.3	0.6

METZERPLAS IRRIGATION SYSTEMS

Kibbutz Metzer M.P. Heffer 38820 ISRAEL Tel: 972-4-6387001 Fax: 972-4-6385385
info@metzerplas.com • www.metzerplas.com

METZERPLAS

ADI

Cylindrical PC (Pressure Compensated) dripper.

ADI 16 mm. Maximum lateral length (I.D. 13.8 mm, W.T 0.9 mm, Inlet pressure 2.5 bars):

Nom. Flow Rate (l/h)	Spacing Between Drippers (m)						
	0.20	0.30	0.40	0.50	0.60	0.75	1.00
1.6	86	122	156	188	218	260	324
2.2	72	103	131	157	182	216	269
3.5	51	73	94	113	131	156	195

ADI 18 mm. Maximum lateral length (I.D. 15.8 mm, W.T 1.2 mm, Inlet pressure 2.5 bars):

Nom. Flow Rate (l/h)	Spacing Between Drippers (m)						
	0.20	0.30	0.40	0.50	0.60	0.75	1.00
2.0	93	134	171	205	238	284	355
3.5	65	92	118	142	166	198	247

ADI 20 mm. Maximum Lateral length (I.D. 17.4 mm, W.T 1.0 mm, Inlet pressure 2.5 bars):

Nom. Flow Rate (l/h)	Spacing Between Drippers (m)						
	0.20	0.30	0.40	0.50	0.60	0.75	1.00
1.6	128	182	234	281	325	388	484
2.2	113	159	202	242	279	331	409
3.5	76	109	140	168	196	233	291

For additional tables and data please contact Metzerplas Technical Department or visit our website: www.metzerplas.com

Packaging Data

Model	Roll Length (m)	Quantity Per Container (Rolls)		
		20	40	40 h
ADI 16	400	150	300	350
ADI 18	300	150	300	333
ADI 20	300	133	266	300

METZERPLAS IRRIGATION SYSTEMS

Kibbutz Metzer M.P. Heffer 38820 ISRAEL Tel: 972-4-6387001 Fax: 972-4-6385385
info@metzerplas.com • www.metzerplas.com

DAVEY

APPLICATIONS

> Non-potable rainwater applications
> Lawn and garden irrigation
> Sump emptying to higher heads
> Treated effluent disposal
> Water transfer from wells

D42A/B D53A/B

Submersible Drainage Pumps

Model Numbers: D42A/B, D53A/B

Submersible sump pump with two and three impeller designs for higher pressure, up to 45m head.

WHY CHOOSE DAVEY SUBMERSIBLE DRAINAGE PUMPS?

Double mechanical seal, one in oil bath on motor and extra mechanical seal on pump
- Superior reliability
- Long service life

Corrosion resistant 304 stainless steel shaft, motor shell and fasteners
- Long service life

Cast 316 stainless steel motor caps and super tough engineered thermo plastic pump casing
- Outstanding corrosion resistance
- Long life

Centrifugal multistage 2 and 3 impeller designs
- Higher pressures and increased efficiency

Closed vane impellers with long engagement “D” drives
- Positive operation
- Long service life

Patented independently floating neck rings
- Outstanding pump performance
- Long pump life

Corrosion resistant hard wearing polycarbonate impellers
- Long service life

Corrosion resistant stainless steel fine mesh suction strainer with large surface area
- Prevents blockages of the pump by solids

In-built automatic thermal overload
- Protects the motor in the event of blockage or voltage supply problems

HO7RNF oil resistant leads, 10 metres long with 3 pin power plug
- Easy to connect to power supply
- Longer life in dirty water

proudly australian since 1934

Sump Pumps

OPERATING LIMITS

Type	D42A/B	D53A/B
Capacities to	120 lpm	130 lpm
Maximum total head	32m	45m
Maximum submergence	12m	
Maximum pumped water temperature	40°C	
Maximum soft solids	1.9mm O.D.	
Outlet size (BSP)	1" F	

SUITABLE FLUIDS

Clean water of neutral pH containing up to 1% small solids. Some wear should be expected while pumping hard solids in suspension.

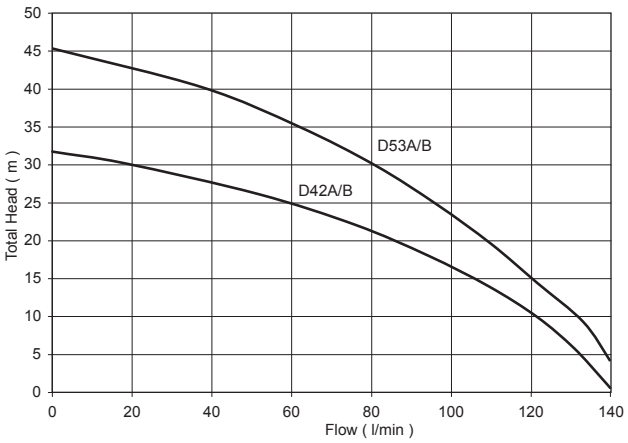
MATERIALS OF CONSTRUCTION

PART	MATERIAL
Impeller	Glass filled polycarbonate
Lock nut	304 stainless steel
Pump casing	Glass filled polycarbonate
Diffuser and blanking ring	Glass filled noryl
Mechanical seal – pump	Carbon / ceramic
Mechanical seal – motor	Silicon carbide / ceramic oil in bath
Shaft seal elastomer	Nitrile rubber
Pump shaft	304 stainless steel
O-rings	Nitrile rubber
Motor shell	304 stainless steel
Bottom bearing housing	Cast 316 stainless steel
Upper motor cover	Cast 316 stainless steel
Handle	304 stainless steel
Fasteners	304 stainless steel
Float and power supply leads	HO7RN-F oil resistant

ELECTRICAL DATA

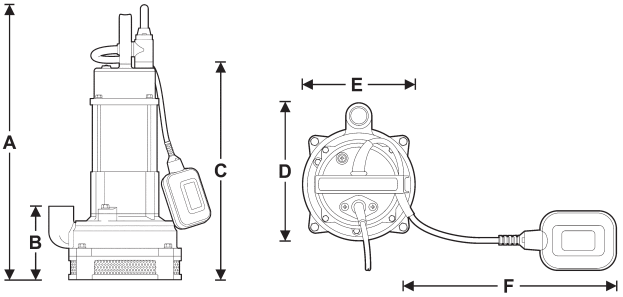
Type	D42A/B	D53A/B
Supply voltage	220-240V	
Supply frequency	50Hz single phase	
Speed	2 pole, 2850rpm	
Full load current (Run)	4.3A	5.7A
Locked rotor current (Start)	14A	
Input power (P_1)	1.00kW	1.31kW
Output power (P_2)	0.60kW	0.84kW
IP rating	X8	
Insulation class	Class F	
Starting	P.S.C.	
Lead	10m long	

HYDRAULIC PERFORMANCE



DIMENSIONS (MM)

Type	A	B	C	D	E	F	Outlet B.S.P.	Net Weight (kg)
D42A/B	475	130	370	235	195	330	1"F	10.8
D53A/B	535	170	430	235	195	330	1"F	16.5



INSTALLATION AND PRIMING

Use a rope to position and retrieve the pump. Do not lower or retrieve the pump using the power lead as this may damage the cable entry seals, causing water leaks and unsafe operation.

Do not use this product for recirculating or filtering swimming pools, spas, etc. While these pumps are built to high safety standards, they are not approved for installations where people will be in the water while they are operating.

Do not pump abrasive materials. Sand and grit in the water being pumped will accelerate wear, causing shortened pump life.

Keep your pump clean, particularly in situations where lint, hair or fibrous materials may get bound around the pump shaft. Regular inspection and cleaning will extend pump life.

Make room for the float switch to operate. Automatic models have a float switch to turn them on when the water level rises and turn them off again when it has been pumped down to the safe operating level of the pump. If the float switch is not free to rise and fall, correct pump operation may not be possible.

Do not run your pump dry. Non-automatic models must be switched off manually or by way of an external float/level switch when the water level is reduced to the top of the pump housing.

DWP0327-3/0818

Assessment of Environmental Effects

Jack Chen of 37B Maraenui Drive , Kerikeri
Lot 8 DP 370958

1.1 Description of Proposal

The owners of this site propose the construction of a new 4 bedroom dwelling.

1.2 Site Description

This site, located at 37B Maraenui Drive , is a a rectangular shaped property. It is a fairly flat section with gentle fall to the North.The section is surrounded by other like properties.

1.3 Wastewater Volume

In calculating the wastewater flows we have allowed for a maximum occupancy of 6 persons, based on the proposed 4 bedroom dwelling (as per AC TP-58, Table 6.1). Total wastewater production is based on an allowance of 160 litres per person per day (as per ARC TP-58, Table 6.2), which is conservative given that water supply is roof collected rain water and standard water fixtures will be used throughout the house.

1.4 Wastewater Volume

The EconoTreat VBB-C-2200 system that is proposed will treat the wastewater to a high standard prior to dispersal using a PCDI drip line, into a purpose-designed disposal field, where the removal of nutrient will continue, both in the receiving soils and by plant uptake.

The system will be capable of producing reductions in Biochemical Oxygen Demand, Total Suspended Solids, Nitrogen, and Coliforms to a standard that meets the requirements (see details below). The system will cater for the wastewater requirements of the private dwellings (domestic wastewater) and will not service any commercial or trade waste sources. Risk Minor to Nil.

1.5 Proposed Treatment System

The objective of the treatment system is to reduce and remove much of the contaminants from the wastewater prior to discharge into the receiving soil. This will improve the long-term performance of the disposal field as well as reducing the risk to the receiving environment. The system will consist of:

- Septic Tank Module
- EconoTreat VBB-C-2200
- Land Application System
-
-

The system is constructed using concrete tanks. The system produces treated effluent with BOD <20mg/l, Suspended solids <20mg/l.

1.6 Land Application System

The proposed irrigation system uses pressure-compensating dripper lines ensuring an even delivery of moisture over the entire irrigation field and a conservative DLR of 3.5mm. We propose the use of Metzerplas unibioline ADI16/2.2 @ 0.6m/c with the Dripline laid out at 1m centres. This Dripline will then be covered by 100mm landscape mulch. Densely planting this area will greatly enhance evapo-transpiration and be very beneficial especially in the wetter months of the year. This irrigation can be installed in conjunction with existing or proposed landscaping.

1.7 Surface & Ground Water

It is proposed to treat the water to a high standard prior to discharge and the proposed irrigation system will introduce the water into the topsoil horizon using PCDI irrigation. A low application rate of treated effluent into the topsoil will significantly reduce the likelihood of, any breakout or runoff or any risk of surface water contamination. With the ground water levels being >1.2m this conservative DLR also means the risk of ground water contamination is virtually nil. A majority of the undeveloped areas of this site are suitable for a PCDI disposal field when the necessary setbacks are observed. Risk Minor to Nil.

1.8 Air Quality

The proposed EconoTreat VBB-C-2200 system will produce no noticeable odour when functioning correctly. Any odour will be contained within the tanks. The PCDI irrigation system will load the soil at a rate that should not cause ponding, spraying or aerosol of the effluent that could potentially cause odours. Risk Minor to Nil.

1.9 Visual Impact

The tanks are installed wholly below ground level with only the lids being visible. The lids will protrude approximately 100mm to prevent egress of storm water into the system. The disposal field will be located in a purpose designed mulched and intensively planted disposal area. Warning signs may be installed to indicate the presence of the disposal area, although probably not necessary in a domestic situation, also the area may be fenced to restrict access.

1.10 Environmental Risks

Risks are associated with this proposal are minor. The treatment system will be automated, and the Home Owner will be given a 'Home Owners Care Guide' which explains the necessary visual checks to ensure no issues arise with the system, specifically – solids build-up - high water level – discharge failure – filter blockage.

Peak flow into the system are not expected to be significant and the system includes a large emergency storage volume.

1.11 Maintenance Requirements

The maintenance requirement of this system is minimal, with the system fully automated. The system requires little input from the operator apart from the regular cleaning of the outlet filter between the treatment system and the Dripline field. All other maintenance interventions must be carried out by service persons familiar with the operation of the system and approved by the manufacturer. Maintenance may include checking of the dissolved oxygen levels, cleaning of effluent outlet filter, removal of excess sludge volume, checking of control panel function, etc.…

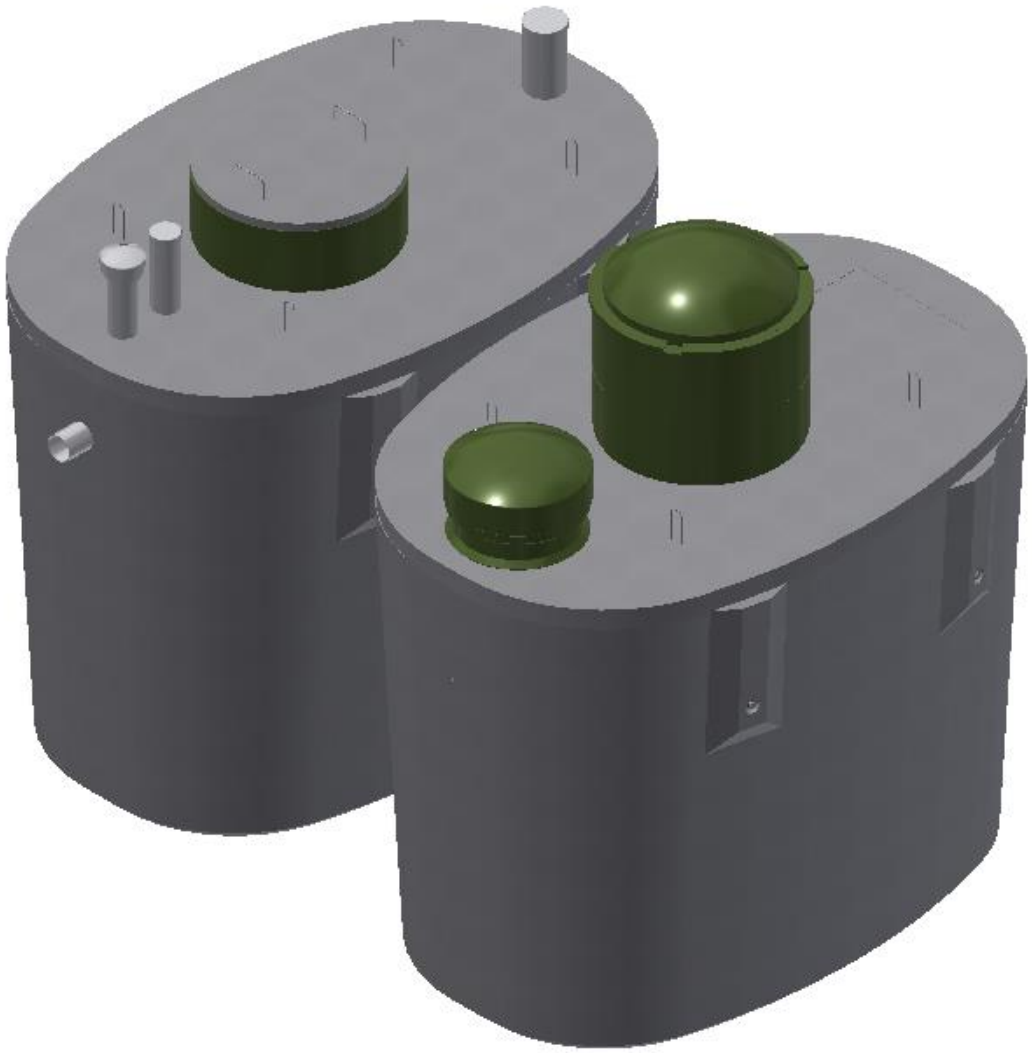
The disposal field is quite possibly the most important and sensitive part of the treatment system and requires a reasonable amount of maintenance to keep it functioning well. Any leaking or damaged Dripline must be fixed quickly using the appropriate materials, the planting must be maintained, weeds removed and grass kept cut. The Dripline should be kept covered with a suitable bark, mulch, or topsoil.

Warning signs such as ponding, odours, and signs of excessive growth act as an indicator to possible problems. A disk filter s fitted to help prevent blockage of the drippers and to protect the Dripline. This filter will require cleaning during servicing of the system.The owners will be verbally informed at the commissioning of this system of all maintenance requirements and strongly advised to have a service contract in place prior to final sign off of the system installation.

econo-treat

Econotreat VBB-C-2200 Treatment System

System Specifications & Installation Instructions



The Treatment Process

Primary Chamber / Tank

Influent enters the chamber via the source whereby scum and solids capable of settling are separated from the raw influent. Primary treated effluent flows through a transfer port to the aeration tank. This primary tank will also act as a storage chamber for sludge returned from the Clarification Chamber.

After primary settling, the sewage passes through a Reln outlet filter.

Aeration Chamber

Water enters from the Primary Chamber. Air is introduced into this chamber via an air blower to create an environment for aerobic bacteria and other helpful organisms to consume the organic matter present. The aeration tank is designed in a manner to help prevent short circuiting of the wastewater to ensure extended aeration. Media is present in the tank to support the growth of bacteria.

Clarification Chamber

The Clarification chamber is essentially a quiescent zone where suspended particles/solids are settled out of the water. These particles are returned to the Primary chambers via a sludge return which aids in further biological reduction, denitrification and providing a constant food supply rich in microbes supporting the system through periods of limited flows.

System Performance

The Econotreat VBB-C-2200 system is capable of treating up to 2200L per day peak flow to an advanced secondary standard. The effluent is suitable for UV disinfection where required.

Benchmark Ratings
The **Waipapa Tanks Econo-Treat® VBB C-2200-2** system **achieved** the following effluent quality ratings:

Indicator Parameters	Median	Std Dev.	Rating	Rating System				
				A+	A	B	C	D
BOD (g/m^3)	*3.4*	*1.5*	A+	*<5*	*<10*	*<20*	*<30*	*≥30*
TSS (g/m^3)	*4.98*	*3.49*	A+	*<5*	*<10*	*<20*	*<30*	*≥30*
Total nitrogen TN (g/m^3)	*13.6*	*1.3*	A	*<5*	*<15*	*<25*	*<30*	*≥30*
Ammonia Nitrogen NH4-N (g/m^3)	*1.1*	*1.8*	A	*<1*	*<5*	*<10*	*<20*	*≥20*
Total phosphorus TP (g/m^3)	*4.2*	*0.5*	B	*<1*	*<2*	*<5*	*<7*	*≥7*
Faecal Coliforms FC (cfu/100mL)	*11,200*	*50,196*	B-	*<10*	*<200*	*<10,000*	*<100,000*	*≥100,000*
Energy (kWh/d) (mean)	*1.8*	-	B	*0*	*<1*	*<2*	*<5*	*≥5*

ECONOTREAT VBB-C-2200

System Specification & Installation Instructions

New Zealand's Leaders in Advanced Secondary Treatment Systems

Compliance Requirements

All Econotreat Treatment Systems meet the requirements of the NZ Building Code G13-VM4.

Section 9 of AS/NZS 1546.1:2008 state that tanks constructed to these Standards will meet the requirements of the Code for Clauses B1 and B2, structure and durability.

Compliance with Section 9 of AS/NZS 1546.1:2008 and also Clauses G13.3.4 relating to on-site treatment and disposal systems and G14.3.1 and 14.3.2 relating to the control of foul water as an industrial waste.

Tank Specifications

Tanks are made of 50mpa Fiber Reinforced Concrete, which is suitable material for wastewater treatment containment meeting all the requirements of Section 4.3.3 of AS/NZS 1547:2012. These tanks have an expected lifespan of 50 years.

Dual Chamber Septic Tank
5200L Nominal Capacity
2500mm Long
1700mm Wide
1975mm High
- 3100kg

Aeration Tank
5200L Nominal Capacity
2500mm Long
1700mm Wide
1975mm High
- 2900kg

System Information
500L Pump Chamber
2120L Emergency Storage

Installation Location and Certification

These tanks are not designed for vehicle loads and shall be located no closer than 2m to a driveway, road frontage or a building. If for any reason the tank is located where vehicle traffic may drive over the tank or approach closer than 2m, or where it may be trampled on by farm stock then the tank should be protected by a concrete slab designed to support these loads. Surface water must also be diverted from flowing into the installation.

Installation must be certified to AS/NZS 1547:2012, the certificate to be issued and held by the regulatory authority.

High Water Table Installations

All tanks have been engineered and designed for maximum strength, in accordance with the NZC 3604. Clauses B1 and B2 for structure and durability, to withstand any hydraulic pressures, both lateral and uplift, created by high water table conditions.

In high water table installations, it is important to fill the tanks with water. This removes the hydraulic uplift and simplifies the installation. In extremely high-water tables, a concrete foot can be added to the tank during manufacture. Waterflow must be made aware of this early on in vies of supplying a tank that is fit for purpose.

Plumbing Pipes and Fittings

All internal plumbing is done with PVC pipes with appropriate connections according to AS/NZS 1260 and AS/NZS 4130.

Backfill and Bedding

Place and bed to NZBC G13/AS2, using compacted granular metal, in layers not exceeding 100mm.

Electrical

Where a pump is required on a flat site electrical connection must be installed according to AS/NZS 3000 and the control and alarm system must be in a weatherproof housing located in a readily visible position.

Warranty

WATERFLOW NZ LTD warrants that the Econotreat System will be free from defects in material and workmanship for the following periods of time from the date of installation as set out in the following conditions:

1. Concrete Tank 15yrs
2. Roto-Molded Tanks 15yrs
3. Nitto Blower 3yrs
4. Irrigation Pumps 2yrs
5. Warranty of Operation covers the performance of the Econotreat System as connected to the effluent inflow for which they are designed, and has been installed to the criteria as set out in the relative installation instructions and procedures, and has an assigned Service/Maintenance contract in place with Waterflow NZ Ltd or it's appointed agent/s.

Warranty excludes defects due to:

A) Failure to use the system in accordance with owner's manual.

B) A force majeure event outside the reasonable control of WATERFLOW NZ LTD such as (but not limited to) earthquake, fire, flood, soil subsidence, ground water table variations or plumbing fault.

C) Modifications to surrounding landscape contour after installation

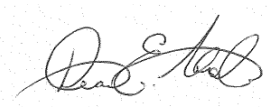
D) The actions of a third party

E) The system required to bear loads (either hydraulic or biological) greater than that for which it was designed

F) Any modifications or repairs undertaken without the consent of WATERFLOW NZ LTD

G) Failure, where applicable, to fence and plant disposal field.

1st June 2014
Dean Hoyle
Managing Director



ECONOTREAT VBB-C-2200

System Specification & Installation Instructions

Econotreat VBB-C-2200 Installation Instructions

The Econotreat system is to be installed or signed off by a registered Drain layer to the design specified by Waterflow NZ Ltd.

The following installation instructions and procedures followed correctly will ensure System performance is not compromised in any way.

1. Excavate two 3m x 2m level platforms at an appropriate depth to ensure adequate fall for inlet pipe from the source. This has to be installed on virgin ground. The two platforms are ideally on the same level and next to each other, either side-by-side or end-on-end.
2. Lay 100mm of bedding metal on platform and place the Septic and Aeration tanks next to each other. As close as practically possible to minimize the connection distance between the tanks.
3. Connect the two tanks with 100mm PVC. If the tanks are side-by-side the connection will need supporting. This is done by tying it back to the wire on the lids with a length of rope supplied. The rope can be found in the top of the treatment tank.

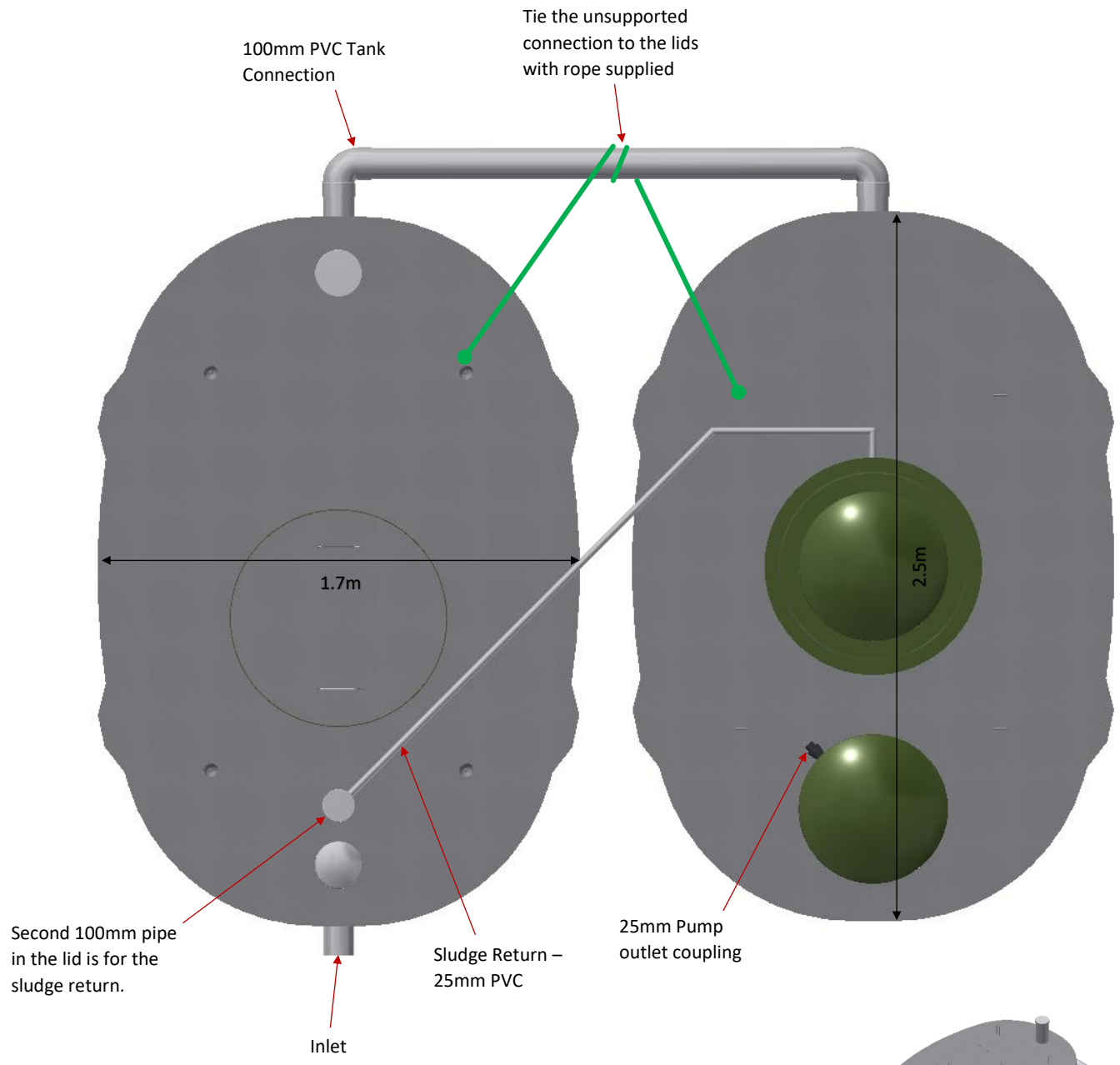
4. Next connect the sludge return. This is a 25mm PVC pipe that come out of the central riser on the treatment tank. This must be plumbed back to the second 100mm PVC at the start of the septic tank. It is important that this pipe is falling slightly or at minimum flat.
5. Trench from Dose Chamber outlet to disposal field and lay the 25mm alkathene feed line.
6. Take a minimum of 3 photos at this point to showing connections and back fill, to ensure correct installation for sign off.
7. Back fill around tanks. Using spoil from the excavation is fine, be aware that this will settle over time though.

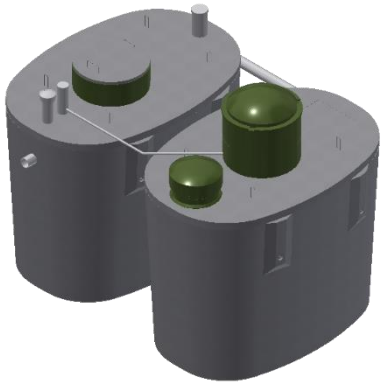
Caution: System must be protected from excessive super imposed loads both lateral and top loads. E.g. loads from vehicular traffic. There needs to be at least 2m of clearance maintained around system.

Econotreat VBB-C-2200 Schematic Drawings

Econotreat VBB-C-2200 Schematic Drawings

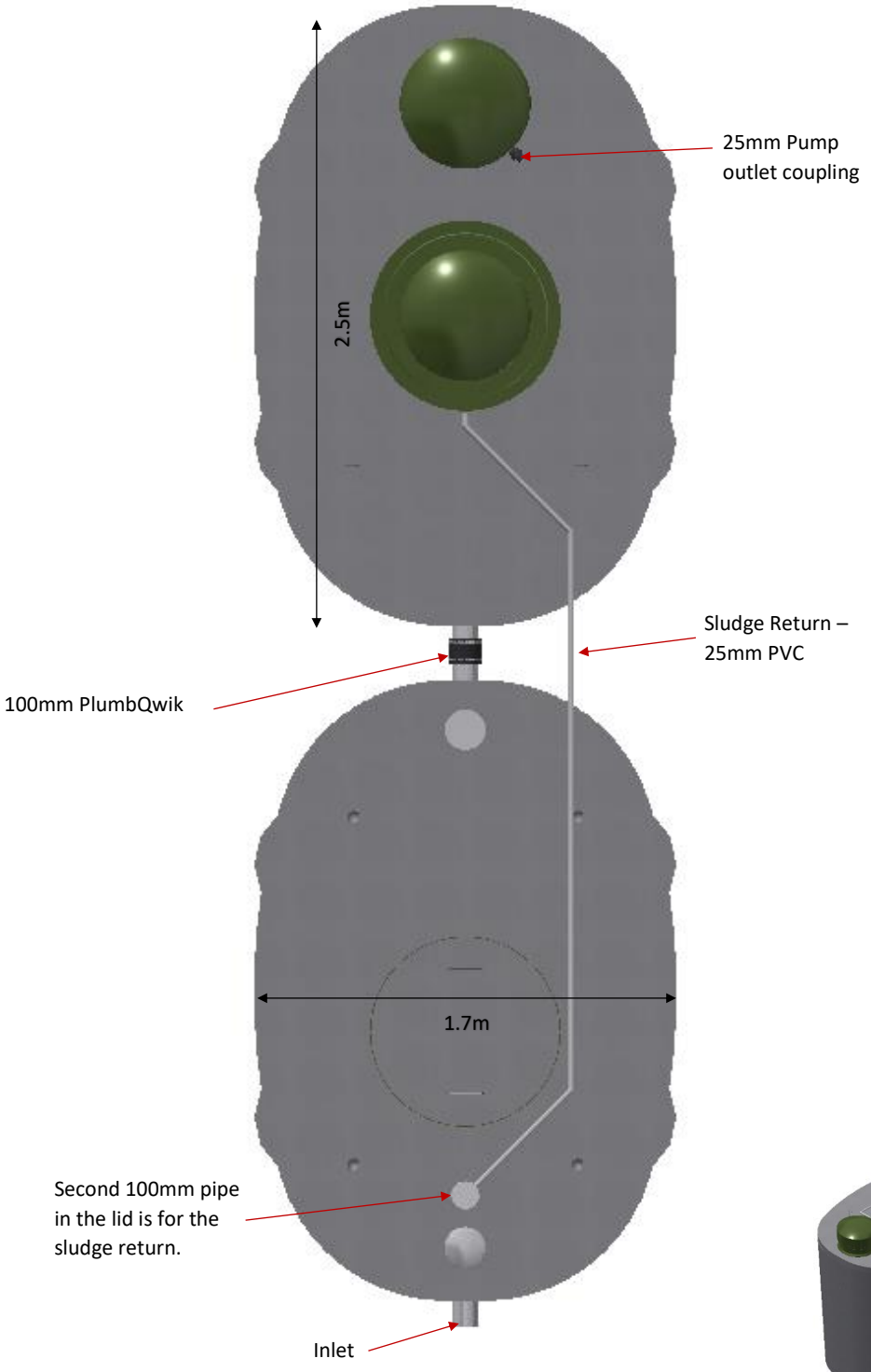
Side by Side Installation





Econotreat VBB-C-2200 Schematic Drawings

End on End Installation



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econo-treat

Advanced Secondary Treatment

Econotreat Aerated Wastewater Systems

Home Owners Guide

Contents

To the Home Owner

Thank you for choosing an Econotreat System to treat and care for your on-site sewage and wastewater.

Your Econotreat System is fully automatic in operation and requires little owner intervention to ensure years of service. It is useful that the owner/operator of the system understand some of the broad concepts of the system operation. This manual has been written to provide this simple explanation and to serve as a future reference so that you can ensure that the system is operating effectively at all times.

We would encourage you to monitor and care for your Econotreat system with our backing and support and by doing so you will learn how your system works and operates and how to keep it in top working order. Waterflow promises consistent results year after year.

Kind regards,
The Waterflow Team

Warranty

WATERFLOW NZ LTD warrants that the Econotreat System will be free from defects in material and workmanship for the following periods of time from the date of installation as set out in the following conditions:

1. Concrete Tank 15yrs
2. Roto-Molded Tanks 15yrs
3. Nitto Blower 2yrs
4. Irrigation Pumps 2yrs
5. Warranty of Operation covers the performance of the NaturalFlow System as connected to the effluent inflow for which they are designed, and has been installed to the criteria as set out in the relative installation instructions and procedures, and has an assigned Service/Maintenance contract in place with Waterflow NZ Ltd or it's appointed agent/s.

Warranty excludes defects due to:

A) Failure to use the system in accordance with owner's manual.

B) A force majeure event outside the reasonable control of WATERFLOW NZ LTD such as (but not limited to) earthquake, fire, flood, soil subsidence, ground water table variations or plumbing fault.

C) Modifications to surrounding landscape contour after installation

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F) Any modifications or repairs undertaken without the consent of WATERFLOW NZ LTD

G) Failure, where applicable, to fence and plant disposal field.

How it Works

Primary Chamber / Tank

Influent enters the chamber via the source whereby scum and solids capable of settling are separated from the raw influent. Primary treated effluent flows through a transfer port to the aeration tank. This tank will also act as a storage chamber for sludge returned via the Clarification Chamber.

Aeration Chamber

Water enters via the Primary Chamber. Air is introduced into this chamber via an air blower to create an environment for aerobic bacteria and other helpful organisms to consume the organic matter present. The aeration tank is designed in a manner to help prevent short circuiting of the wastewater to ensure extended aeration. Media is also present in the tank to support the growth of bacteria.

Clarification Chamber

The Clarification chamber is essentially a quiescent zone where suspended particles/solids are settled out of the water. These particles are returned to the Primary chambers via a sludge return which aids in further biological reduction, denitrification and providing a constant food supply rich in microbes supporting the system through periods of limited flows.

Servicing

Your Econotreat System requires annual service and maintenance inspections (this can vary depending on local council regulations). This will need to be done by our trained technicians. We will phone to arrange a suitable time to attend to your servicing needs.

A record sheet (in triplicate) will be completed by our technician at the time of service. One copy is for you the customer and available upon payment, another is sent off to Council and the third copy will be retained for our records.

Please call our office on the number listed at the back of this manual for the cost of servicing after the initial 12-month period.

1. A general inspection of tank area, irrigation and drainage.

2. Inspection of electrical equipment including timer, Low powered Blower, irrigation pump, warning lights and connections.

3. Inspection of Pump-out Chamber and septic tank, checking air lines, adjusting air supply (if necessary), operating de-sludging unit, resetting air control, operating submersible switch, checking bio-mass growth, checking sludge level.

4. Inspection of irrigation including lines, jets and outlets. Between 4 - 9 years the tank will need to be de-sludged (pumped out) as with any septic tank. We will notify you of this requirement, as the service technicians will be monitoring sludge depth annually.

Holiday Precautions

There are no precautions to take. Your Econotreat can be left to function automatically for 6 to 12 months. However, if you are likely to be away from home for more than six months you may like to contact our office, so we can make a routine check.

Responsibility

As the owner of the system, you are responsible for the correct operation and maintenance and to conform to Council's requirements.

Slowly remove irrigation cap (unscrew anti- clockwise). It is important to unscrew slowly to allow any built-up pressure to be relieved. Watch out for the O-ring inside the cap, be careful not to drop this in the tank.

Problem Solving

To ensure the most effective operation of your Econotreat System you should familiarize yourself with the contents of this manual. The Econotreat has been designed to include additional safety margins and minor mishaps and normal household usage will not usually affect the operation of the system.

However, if the alarm sounds or strong odors persist Please call your service agent.

Area of Concern	Potential Cause	Remedial Action
Alarm sounds	Irrigation pump not working Air supply not working No power at the tank	Check water levels Listen for the air compressor Check power supply source
Water around tank	Irrigation pump not working Irrigation lines blocked or kinked	Check water levels Check irrigation lines and clear sprinklers
Excessive foaming	Too much laundry detergent Too many washes	Use recommended quantities Spread wash loads over different days
Persistent odors	Too much water usage Excessive chemicals in use	Add biologic starter pack Install water saving devices System will recover
Irrigation system not working	Pump failure Irrigation lines blocked	Check water level Clear irrigation lines
Water ponding on irrigation field	Irrigation line blocked Excessive water use Broken irrigation pipe	Installation should comply with original approval Install water saving devices Repair irrigation pipe

Do not flush baby wipes down toilets

Caring for Your Wastewater System

Components of Your Complete Wastewater Septic System

A typical wastewater septic system has two main components: a Wastewater Treatment System and a Land Application System (or disposal field). This is simply treatment then discharge.

Efficient Water Use – 'it does make a difference'

Average indoor water use in the typical single-family home is approximately 180ltrs per person per day. The more water a household conserves, the less water enters the septic system. Efficient water use can improve the operation of the wastewater system and reduce any risk of disposal field overload.

High-efficiency toilets

Toilet use accounts for 25 to 30 percent of household water use.

Do you know how many liters of water your toilet uses to flush? Most older homes have toilets with 11+ liter reservoirs, while newer high-efficiency dual flush toilets use 6.3/5.5ltrs or down to 4.5/3ltrs of water per flush. N.B. Did you know leaky toilets can waste as much as 700ltrs each day.

Consider reducing the volume of water in the toilet tank with a volume displacer (fancy name for a brick, stone etc!) if you don't have a high-efficiency model or replacing your existing toilets with high efficiency models.

Check to make sure your toilet's reservoir isn't leaking into the bowl. Add five drops of liquid food coloring to the reservoir before bed. If the dye is in the bowl the next morning, the reservoir is leaking, and repairs are needed.

Water fixtures

A small drip from a faucet may add many liters of unnecessary water to your system every day. To see how much a leak adds to your water usage, place a cup under the drip for 10 minutes. Multiply the amount of water in the cup by 144 (the number of minutes in 24 hours, divided by 10). This is the total amount of clean water travelling to your septic system each day from that little leak.

Faucet aerators and high efficiency showerheads

Faucet aerators help reduce water use and the volume of water entering your septic system. High-efficiency showerheads also reduce water use.

Washing machines

By selecting the proper load size, you'll reduce wastewater. Washing small loads of laundry on the large-load cycle wastes precious water and energy. If you can't select load size, run only full loads of laundry. N.B. A new Energy Star washing machine uses 35 percent less energy and 50 percent less water than a standard model.

Watch your drains!

What goes down the drain can have a major impact on how well your wastewater system works.

What shouldn't you flush down your toilet?

Dental floss, feminine hygiene products, diapers, cotton swabs, cigarette butts, cat litter, and other kitchen and bathroom items that can clog and potentially damage septic system components if they become trapped. Flushing household chemicals, gasoline, oil, pesticides, antifreeze, and paint can also stress or destroy the biological treatment taking place in the system or might contaminate surface or ground waters.

Care for your Land Application System

Your land application system is an important part of your wastewater system. Here are a few things you should do to maintain it:

- Flush driplines regularly – every 3 months recommended
- Plant only recommended wetland plants over and near your wastewater system. Roots from nearby trees or shrubs might clog and damage the drain field
- Don't drive or park vehicles on any part of your wastewater system. Doing so can compact the soil
- in your drain field or damage the pipes, tank, or other septic system components
- Do not build any structures over it or seal it with concrete, asphalt etc.
- Keep roof drains, basement sump pump drains, and other rainwater or surface water drainage systems away from the drain field. Flooding the drain field with excessive water slows down or stops treatment processes and can cause plumbing fixtures to back up
- Trees with very aggressive roots, such as willows, should be kept well away from the disposal system, see page 11 for list of recommended planting
- A soggy drain field won't absorb and neutralize liquid waste. Plan landscaping, roof gutters and foundation drains so that excess water is diverted away from the Land Application System

Household Cleaning Chemicals

Effects on Wastewater and Disposal System Receiving Environments

Use of many cleaning chemicals in facilities served by on-site disposal systems, can result in high concentrations of the constituents in those cleaning agents being discharged into the receiving soils. These chemicals and constituents can have a massive impact on the quality and condition of the receiving soils over time.

Many of the chemicals can disrupt soil structure and decrease hydraulic conductivity while others can act as bactericides, destroying the essential micro-organisms required to achieve the high level of biodegradation in the treatment and disposal systems.

The following matters need to be considered when using cleaning agents in a domestic situation:

- Laundry powders are often extremely high in sodium which will destroy the salt balance in the soils. Check the labels for low sodium and phosphorous contents.

- Wastewater flow from dishwashing machines can have an impact on wastewater treatment systems, in terms of the strong cleaning chemicals used, so check labels for low sodium products

- Highly corrosive cleaners (such as toilet and drain cleaners) that have precautionary labels warning users to minimize direct contact, are an indication that they can adversely affect the wastewater treatment system. Up to 1 cup of bactericides such as bleach can be sufficient to impact on all the microorganisms/bugs in a septic system.

Recommended Cleaning Brands:

eco STORE

earthwise
caring for your world

Cleaning Substitutes

Substitutes for Household Cleaning Chemicals (Ref TP58)

Use of the following readily biodegradable substitutes for common potentially harmful household cleaning chemicals will reduce the stress on any wastewater system, significantly enhance the performance of the whole system and increase the life of the land application system, while reducing the potential effects of the receiving soils.

General Cleaners

Use soft soap cleaners and bio-degradable cleaners and those low in chlorine levels.

Ammonia-Based Cleaners

Instead sprinkle baking soda on a damp sponge.

Disinfectants

In preference use Borax (sold in most Bin Inn stores): ½ cup in 4-litres of water.

Drain De-Cloggers

Avoid using de-clogging chemicals. Instead use a plunger or metal snake or remove and clean trap.

Scouring Cleaners and Powders

Instead sprinkle baking soda on a damp sponge or add 4-Tbs baking soda to 1-Litre warm water. It's cheaper and won't scratch.

Toilet Cleaners

Sprinkle on baking soda, then scrub with toilet brush.

Laundry Detergent

Choose one with a zero-phosphate content and low in alkaline salts (in particular, a low sodium level) and no chlorine.

Oven Cleaners

Sprinkle salt on drips, then scrub. Use baking soda and scouring pads on older spills.

In a Nutshell

Because your system is fully automatic there is no need for the owner to be concerned. However, there are some simple precautions to observe:

DO

- Avoid using strong acids, alkalis, oils and chemicals in your toilet, bathroom, laundry and kitchen (too much can kill off the working “bugs”).
- Limit the use of water in the dwelling.
- Try to spread wash loads over different days.
- Try to avoid using the washing machine and shower at the same time.
- Front loader washing machines reduce water usage.
- If your system requires power supply make sure this remains on continuously, unless system is being serviced.
- Check faucets and toilets for leaks; make repairs if necessary.
- Use low flush toilets where possible.
- Use a ‘displacer’ to reduce the amount of water needed to flush older toilets.
- Use aerators on faucets and flow reducer nozzles on showers to help lower water consumption.
- Reduce water levels for small loads of laundry.
- Wait until the dishwasher is full to run it.
- Densely plant your field to maximize transpiration.
- Perform regular monthly visual checks of your system and field.
- Grass should be mowed or trimmed regularly to optimize growth and prevent the grass from becoming rank.
- Use signs, fences and/or plantings to prevent any vehicle or stock access.
- Keep records of all maintenance undertaken on the wastewater systems.
- Monitor and care for your Wastewater System as per instructions in the home owner’s manual.

DON’T

- Switch off power unless servicing
- Use chlorine-based disinfectant & cleaning products in the toilets or kitchen sink (Cleaners high in chlorine, phosphorous or ammonia must not be used)
- Over use heavy cleaners that kill beneficial bacteria in the septic system
- Pour any toxic/strong chemicals (paint, oil, grease, paint thinners or pesticides) down any drains
- Flush down your toilet – Dental floss, feminine hygiene products, diapers, cotton swabs, cigarette butts, cat litter, and other kitchen and bathroom items
- Discard any drugs down the sink or toilet
- Alter or add any part of your system without Waterflow NZ LTD’s approval
- Never turn the system off, even when away on holidays.

Plants Suitable for Onsite Wastewater Disposal Systems

Plantings that will soon have your field looking magnificent!

Below are some of the most common of native and other plant species that are tolerant or fond of moist conditions, such as those associated with wastewater disposal fields.

Cordyline australis

Apodasia similis

Alocasis nigrescens

Carexx secta

- Alocasia nigrescens (Black Taro)
- Apodasmia similis (Oioi)
- Arthropodium Matapouri Bay
- (Rengarenga Lily)
- Carex dispacea
- Carex dissita
- Carex maorica
- Carex secta
- Carex tenuiculmis
- Carex virgata
- Cordyline australis (Cabbage Tree)
- Cordyline Midnight Star
- Leptospermum Burgundy Queen
- (Flowering Ti Tree)
- Lomandra Tanika
- Phomium Surfer

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Stormwater Mitigation Report

Proposed Residence – 37b Maraenui Drive, Kerikeri

Prepared For:
Jack Chen

Chester Job Number:
15642

Date:
04/05/2024

Revision History

Revision No.	Prepared By	Description	Date
0	J. Chen	First Issue	

Action	Name	Signed	Date
Prepared by	J. Chen		04/05/2024
Reviewed by	N. Jull		06/05/2024

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1 Introduction

Chester Consultants Ltd has been engaged by the client to provide a Stormwater Mitigation Report with respect to the proposed development at 37b Maraenui Drive, Kerikeri.

This report has been prepared solely for the benefit of this specific project, and the Far North District Council. Chester Consultants Ltd accepts no liability whatsoever for inaccuracies in third party information used as part of this report. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

This report is based on development data provided by the client current to the development at the time of this document's production. Should alterations be made which impact upon the development not otherwise authorised by this report then the design / comments / recommendations contained within this report may no longer be valid.

In the event of the above, the property owner should immediately notify Chester Consultants Ltd to enable the impact to be assessed and, if required, the design and or recommendations shall be amended accordingly and as necessary.

2 Site Description

The subject site is a vacant lot zoned rural living and is located on the northern side of Maraenui Drive, Kerikeri. It is legally described as Lot 8 DP 370958 with a total site area of 3453m^2.

Other similar sized rural living lots neighbour the site to the south, east and west whereas the site neighbouring to the north is currently larger in size but is being subdivided into similar sized rural living lots.

The topography of the site is gently sloped from the highpoint in the south down towards the northwest of the site.

Figure 2-1 is an Aerial photograph and NRC contour data of the site from Far North Maps.

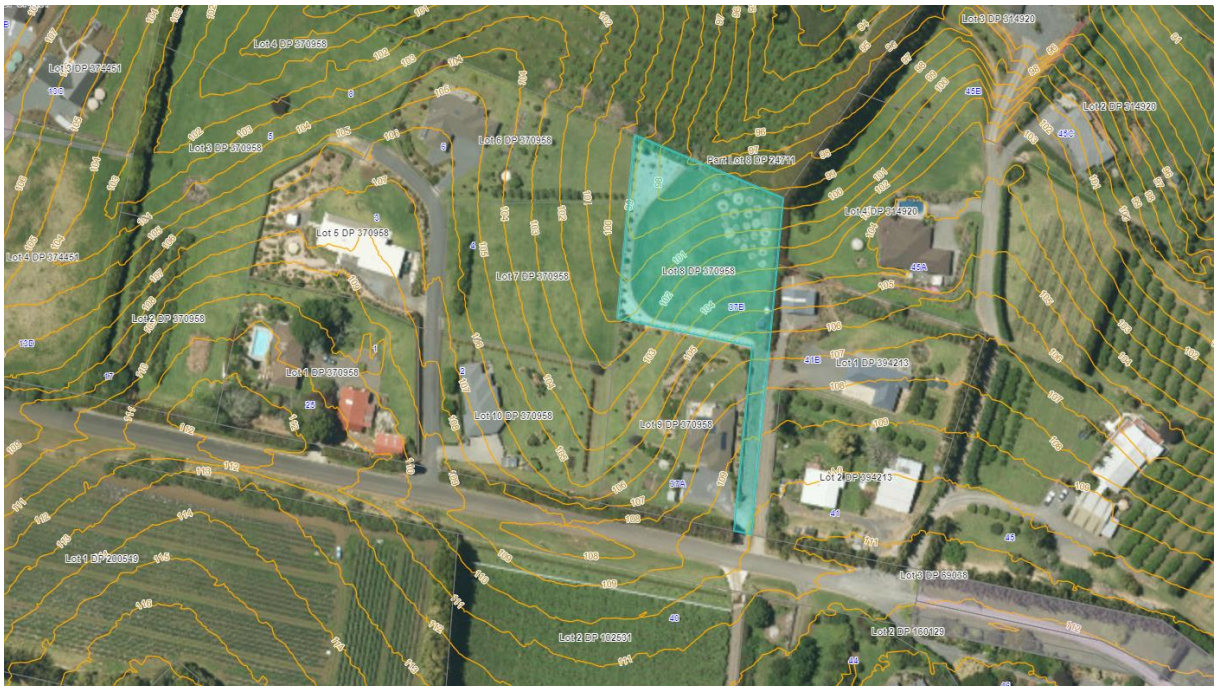

Figure 2-1: Aerial photograph of the site from Far North Maps (Accessed 21/04/2024)

3 Proposal

A new dwelling and driveway are proposed on the site. Figure 3-1 below is a screen shot of the proposed site plan.

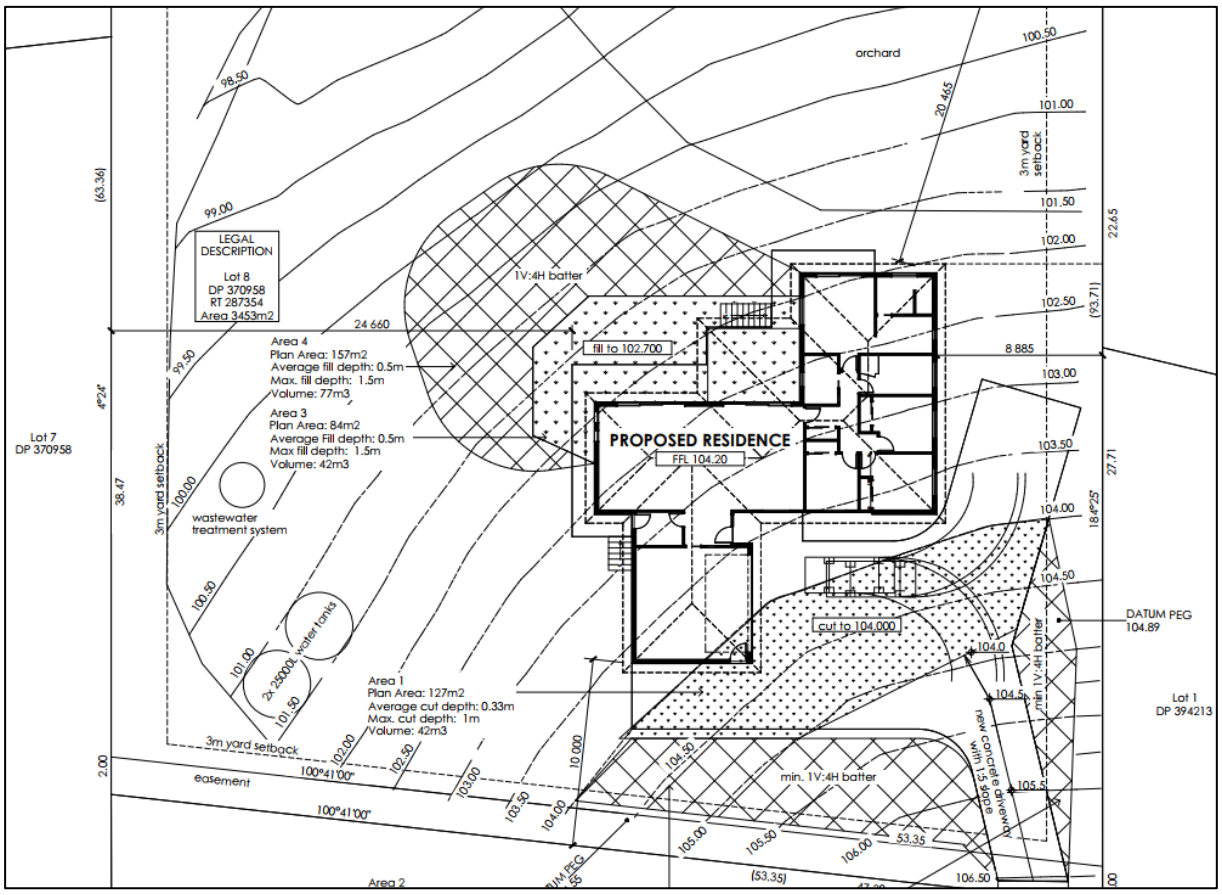

Figure 3-1: Screen shot of the proposed site plan completed by Absolute Build dated 18/04/2024

This report details the stormwater management and disposal proposed for the development. This report is intended to accompany a resource consent application.

4 Stormwater

This section of the report details how the proposed development is going to dispose of stormwater.

4.1 Proposed Impervious Area

Table 4-1 below shows the proposed developments impervious area.

Table 4-1: Post-Development Impervious Areas

Source		Area (m^2)
Gravel	Existing Driveway	276
Asphalt or Concrete	Proposed Driveway	242
Roof	Proposed Dwelling	270
Total Impervious Area (Post-Development):		788
Total Site Area:		3453
Impervious Percentage:		23%

4.2 Stormwater Management Requirements

The site is zoned 'Rural Living 'under the Far North District plan, below sets out the relevant stormwater management rules for this zone and the site:

4.2.1 Permitted Activity Criteria for Stormwater Management

RULE: 8.7.5.1.5 STORMWATER MANAGEMENT

> *The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 12.5% or 3,000m², whichever is the lesser*

4.2.2 Controlled Activity Criteria for Stormwater Management

RULE: 8.7.5.2.2 STORMWATER MANAGEMENT

> *The maximum proportion or amount of the gross site area covered by buildings and other Impermeable Surfaces shall be 20% or 3300m², whichever is the lesser.*

From the above we consider the proposal to be a **Discretionary Activity** and that stormwater mitigation is required to limit run-off to no more than the levels that would result from a total of 432 m^2 of impervious area which equivalent to 12.5% of the total site area. In effect, a minimum of 356 m^2 of the proposed impermeable surface needs to be mitigated back to pre-development / greenfield run-off levels.

4.3 Proposed Mitigation

We propose 2 x 25,000 L rain tanks in series to attenuate peak flow and allow for re-use of stored water collected from roof areas. The tanks will mitigate the roof area of 270 m^2 and driveway area of 86 m^2 back to pre-development / greenfield run-off levels.

The following sections summarise the design which has been completed in accordance with the following guideline documents:

- NZ Water Environment Research Foundation, "On-site Stormwater Management guideline"
- ARC Technical Publication No. 10 "Stormwater Treatment Devices"
- ARC Technical Publication No. 108 (ARC TP108)
- FNDC Engineering Standards 2023

A schematic of the proposed rain tanks can be found in Appendix A.

4.3.1 Hydrological Data

The post-development flow scenarios for the storm event must be increased to account for climate change. Therefore, the NIWA RCP6.0 rainfall data scenario for 2081-2100 has been used and we have selected the design storms set out in Table 4-2 below.

Table 4-2: Design Storms

Design Strom	24h Rainfall depths
10% AEP	204mm
1% AEP	314mm

4.3.1.1 HEC-HMS Model Input

The hydraulic modelling was completed using HEC-HMS in accordance with FNDC Engineering Standards 2023. Local geology at the property is noted on the GNS Science New Zealand Geology Web Map Scale 1:250,000, as: Kerikeri Volcanic Group, refer: 'GNS Science Website'. Kerikeri Volcanic Group soils are typically considered Type C in terms of the Far North District Council Engineering Standards 2023. Therefore, in accordance with Table 4-3 of the standards, the following input parameters have been adopted:

Lag:	6.7min (2/3 10min minimum T.O.C)
Pervious Initial Loss:	5mm (Pervious)
Pervious SCS Curve No:	74 (Group C Soils, Pasture)

Impervious Initial Loss:	0mm (Impervious)
Concrete Impervious SCS Curve No:	98 (Impervious)
Gravel Impervious SCS Curve No:	89 (Impervious)
Orifice Coefficients:	0.61

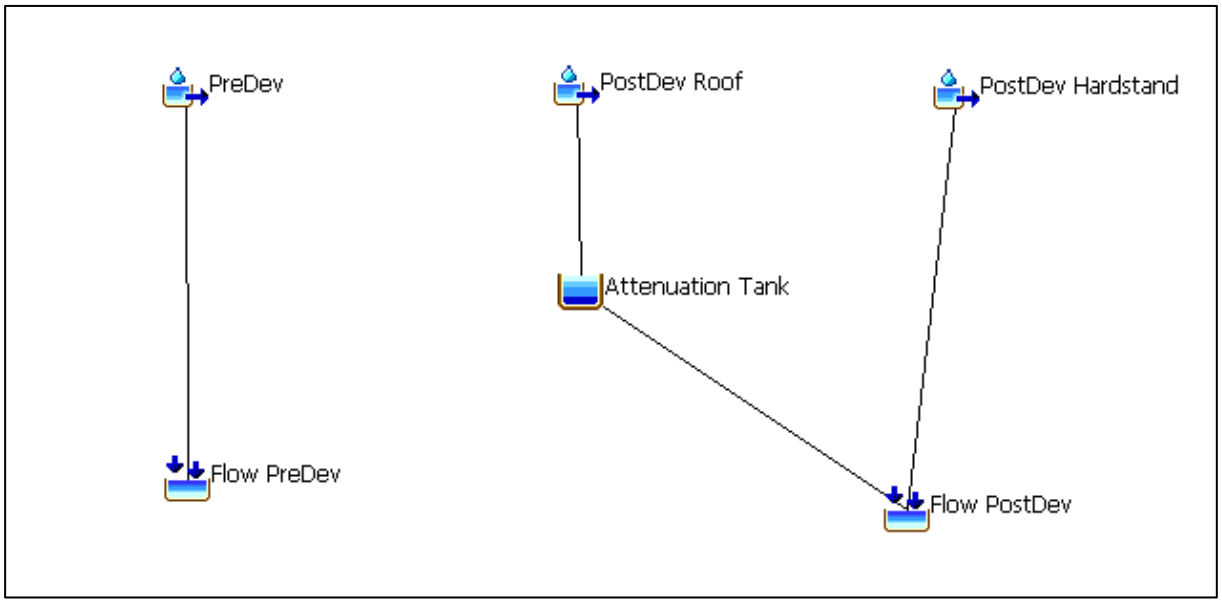

Figure 4-1: HEC-HMS attenuation model schematic

4.3.2 Peak Discharge Control

Using HEC-HMS in accordance with FNDC Engineering Standards 2023 we have run iterative models in order to select an appropriately sized control orifice to provide peak flow mitigation for the 10% and 1% AEP design storm. The following was selected:

Proposed tank:	2 x 25,000 litre Rainwater Tanks
Outlet orifice (10% AEP control):	50mmØ, located 333mm below the Overflow outlet
Outlet orifice (1% AEP control):	50mmØ, located 120mm below the Overflow outlet
Overflow outlet:	150mmØ, located at the top of the tank

4.3.3 Pre-Development vs Post-Development Discharge Rate

Table 4-3 below compares the pre and post development flow output from the HEC-HMS model. For further details please refer to Appendix G.

Table 4-3: Pre-Development vs Post-Development Discharge Rate

Design Storm	Area (m^2)	Rainfall (mm)	Pre-development Peak Flow (L/s)	Post-development Peak Flow (L/s)
10% AEP	356	204	3.34	3.29
1% AEP	356	314	5.96	5.87

As shown in Table 4-3 above the post-development peak discharge rates are less than that of pre-development discharge, therefore the proposed mitigation is sufficient.

4.3.4 Discharge Outlet

It is recommended that discharge from the potable water / detention tanks and hardstand/driveway catchpits be directed via sealed pipes to an outlet in the existing overland flow path near the lot's north-western boundary. It is recommended that discharge to the OLFP is via a minimum 2040mm long x 450mm wide x 200mm deep riprap apron outlet with minimum 100mm aggregate. See the appended Proposed Site Plan, Riprap Schematic, and calculation worksheet for details.

4.4 Planning Assessment

Table below contains our assessment of the stormwater proposal against the matters of discretion set out under rule 8.7.5.2.2 of the Far North District Plan.

Rule 8.7.5.2.2	Assessment/Comment
a) the extent to which building site coverage and Impermeable Surfaces contribute to total catchment impermeability and the provisions of any catchment or drainage plan for that catchment;	Impermeable surfaces resulting from the development increase site impermeability. Through tank attenuation, runoff resulting from the proposed impermeable areas exceeding the permitted activity coverage threshold is to be attenuated to pre-development conditions.
b) the extent to which Low Impact Design principles have been used to reduce site impermeability;	The proposed impermeable area has been kept as low as practical whilst enabling the proposed activity. Furthermore, water re-use and attenuation for the 10% AEP and 1% AEP storm event are proposed, and runoff resulting from proposed impermeable areas exceeding the permitted activity coverage threshold is to be attenuated to pre-development conditions.
c) any cumulative effects on total catchment impermeability;	Considering the proposed mitigation, it is our opinion that any cumulative effect will be less than minor.
d) the extent to which building site coverage and Impermeable Surfaces will alter the natural contour or drainage patterns of the site or disturb the ground and alter its ability to absorb water;	The proposed stormwater management and disposal approach works with the existing drainage patterns of the site.
e) the physical qualities of the soil type;	Kerikeri Volcanic Group. Moderate drainage.
f) any adverse effects on the life supporting capacity of soils;	Stormwater runoff from the proposed roof and hardstand areas is to be collected and directed to stormwater management devices via sealed pipes, mitigating the potential for contamination of surrounding soils and harm to life. It is not anticipated that runoff from the proposed residential development will contain contaminants in concentrations high enough to cause adverse effects on the life supporting capacity of soils.
g) the availability of land for the disposal of effluent and stormwater on the site without adverse effects on the water quantity and water quality of water bodies (including groundwater and aquifers) or on adjacent sites;	The site is large enough for on-site stormwater and eluent disposal to achieve setbacks between water sources and effluent disposal comply with Table 9 of the Proposed Regional Plan for Northland.
h) the extent to which paved, Impermeable Surfaces are necessary for the proposed activity;	The proposed impermeable area is necessary for the proposed activity.

i) the extent to which landscaping and vegetation may reduce adverse effects of run-off;	The lawn and vegetated garden areas within the site and trees along the property's boundaries lower the effective overall catchment impermeability, mitigating the adverse effects of runoff.
j) any recognised standards promulgated by industry groups;	Not applicable.
k) the means and effectiveness of mitigating stormwater runoff to that expected by permitted activity threshold.	Stormwater attenuation and re-use is proposed to reduce run-off to that expected by the permitted activity threshold.
l) the extent to which the proposal has considered and provided for climate change;	NIWA RCP6.0 rainfall data scenario for 2081-2100 has been used for the post-development flow scenario.
m) the extent to which stormwater detention ponds and other engineering solutions are used to mitigate any adverse effects.	The dwelling roof and paved areas have been accounted for in the attenuation system proposed, supplying outflow control for the 10% AEP & 1% AEP storm events. Given this, stormwater neutrality has been achieved for the 10% AEP & 1% AEP storm events across the cumulative impermeable surfaces in excess of the Permitted Activity threshold on-site.

5 Conclusion

In our opinion the subject site is suitable for the proposed development and we recommend that consent be granted. Stormwater management in line with the Far North District Plan rules can be achieved.

For the proposed development it is recommended that:

- The stormwater management system detailed in Section 4.3 is installed.

6 Limitations

This assessment contains the professional opinion of Chester Consultants as to the matters set out herein, in light of the information available to it during the preparation, using its professional judgement and acting in accordance with the standard of care and skill normally exercised by professional engineers providing similar services in similar circumstances. No other express or implied warranty is made as to the professional advice contained in this report.

We have prepared this report in accordance with the brief as provided and our terms of engagement. The information contained in this report has been prepared by Chester Consultants at the request of the client and is exclusively for its client use and reliance. It is not possible to make a proper assessment of this assessment without a clear understanding of the terms of engagement under which it has been prepared, including the scope of the instructions and directions given to and the assumptions made by Chester Consultants Ltd. The assessment will not address issues which would need to be considered for another party if that party's particular circumstances, requirements and experience were known and, further, may make assumptions about matters of which a third party is not aware. No responsibility or liability to any third party is accepted for any loss or damage whatsoever arising out of the use of or reliance on this assessment by any third party.

The assessment is also based on information that has been provided to Chester Consultants Ltd from other sources or by other parties. The assessment has been prepared strictly on the basis that the information that has been provided is accurate, completed, and adequate. To the extent that any information is inaccurate, incomplete or inadequate, Chester Consultants Ltd takes no responsibility and disclaims all liability whatsoever for any loss or damage that results from any conclusions based on information that has been provided to Chester Consultants Ltd.

7 Appendices

Appendix A: Chester Drawings

PRIVATE STORMWATER NOTES

1. PRIVATE STORMWATER TO COMPLY WITH NEW ZEALAND BUILDING CODE E1-SURFACE WATER AND, E1/AS1.
2. DRAINAGE PIPES TO BE 100mmØ uPVC SN8 UNLESS OTHERWISE NOTED.
3. MINIMUM GRADIENTS FOR 100mmØ DRAINS TO BE NO LESS THAN 1 IN 120 (0.8%).
4. TYPE 2 CATCHPIT LEADS TO BE 150mmØ uPVC SN8 UNLESS OTHERWISE NOTED.
3. MINIMUM GRADIENTS FOR 150mmØ DRAINS TO BE NO LESS THAN 1 IN 200 (0.5%).
4. SUB-SOIL DRAINAGE, INCLUDING RETAINING WALL DRAINAGE, TO BE 110mmØ NOVACOIL UNLESS OTHERWISE NOTED.
5. SUB-SOIL DRAINS TO DISCHARGE TO PRIVATE CATCHPITS WITHIN THE SITE BOUNDARY.
6. INSPECTION POINTS TO BE LOCATED AT CHANGES IN DIRECTION GREATER THAN 45° UNLESS OTHERWISE NOTED.
7. INSPECTION POINTS TO BE LOCATED AT JUNCTIONS OF DRAINS, UNLESS DRAIN SERVES A SINGLE DOWNPIPE LESS THAN 2m AWAY, OR UNLESS OTHERWISE NOTED.

EXISTING OVERLAND FLOW PATH

-6.5%

PROPOSED RIPRAP OUTLET MINIMUM 2040mm LENGTH x 450mm END WIDTH CONSIST OF 100mm AGGREGATE SIZE RIPRAP WITH MINIMUM 200mm LAYER THICKNESS, REFER DRAWING 112 FOR DETAIL

INDICATIVE PRIVATE STORMWATER 150mmØ @ >1.0% FROM TANKS AND CATCHPITS TO DISCHARGE POINT

37B MARAENUI DRIVE
LOT 8 DP 370958

INDICATIVE PRIVATE STORMWATER FROM GUTTER TO WATER TANKS

INDICATIVE PRIVATE STORMWATER 150mmØ @ >1.0% FROM CATCHPITS TO DISCHARGE POINT TO BY PASS WATER TANKS

2 X 25,000L WATER TANKS TO COLLECT ROOF RUNOFF FOR WATER SUPPLY AND STORWMATER DETENTION, REFER DRAWING 111 FOR DETAIL

PROPOSED DWELLING
ROOF COVERAGE 270m²

PROPOSED CATCHPIT AS PER E1

PROPOSED CONCRETE HARDSTAND 242m²

INDICATIVE PRIVATE STORMWATER 150mmØ @ >1.0% FROM GUTTER TO WATER TANKS

PROPOSED CATCHPIT AS PER E1

PROPOSED CATCHPIT AS PER E1

97.0 97.5 98.0 98.5 99.0 99.5 100.0 100.5 101.5 102.5 103.0 103.5 104.0 104.5 105.0 105.5

N

0 2.5 5 7.5 10 12.5

1:250 PLOT CONTAINS ELEMENTS IN COLOUR

Rev	Date	Amendments	By
0	04/05/2024	ISSUED FOR RESOURCE CONSENT	JC

Drafter:	J CHEN	Job Title:	STORMWATER DESIGN - PROPOSED RESIDENTIAL DEVELOPMENT
Designer:	J CHEN	Client:	JACK CHEN
Checker:	N JULL	Address:	37B MARAENUI DRIVE, KERIKERI, LOT 8 DP 370958
Date:	04/05/2024	Drawing Title:	PROPOSED SITE PLAN

Drawing:	110	Rev:	0
Scale:	1:250 @ A3		
Project:	15642		
Issue:	RC		

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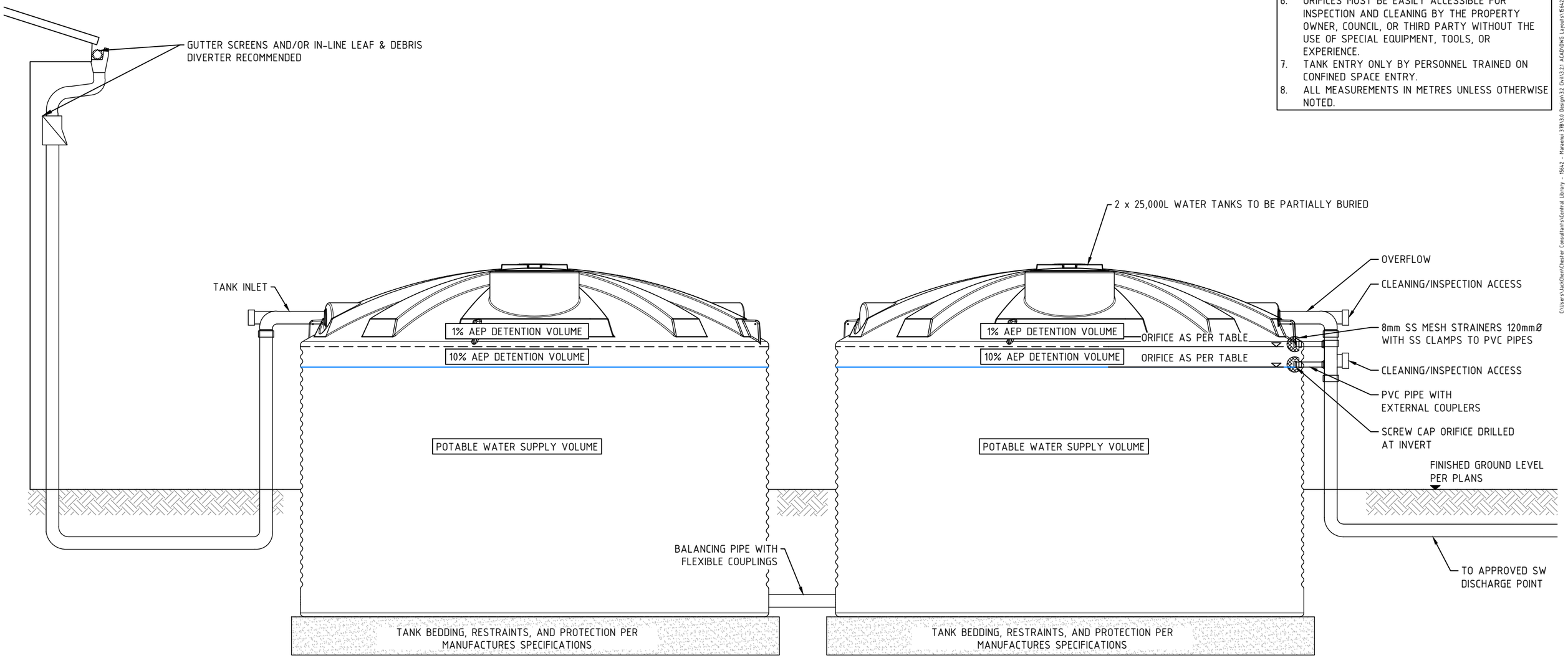
ATTENUATION TANK TABLE				
STORM EVENT	TANK VOLUME	ORIFICE	PRE-DEVELOPMENT BASELINE FLOW (L/s)	POST-DEVELOPMENT PEAK FLOW (L/s)
10% AEP	2 x 25,000L	50mm AT 333mm BELOW OVERFLOW OUTLET	3.34	3.29
1% AEP	2 x 25,000L	50mm AT 120mm BELOW OVERFLOW OUTLET	5.96	5.87

TANK NOTES:

1. REFER TO ARCHITECTURAL SITE PLAN FOR DETAILED TANK LOCATIONS.
2. TANK TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURES SPECIFICATIONS.
3. SYSTEM TO BE INSTALLED IN ACCORDANCE WITH THE NEW ZEALAND BUILDING CODE.
4. CONTRACTOR TO CHECK ALL LEVELS PRIOR TO CONSTRUCTION.
5. ORIFICE PROTECTION REQUIRED FOR FLOW CONTROL ORIFICE TO PREVENT BLOCKING.
6. ORIFICES MUST BE EASILY ACCESSIBLE FOR INSPECTION AND CLEANING BY THE PROPERTY OWNER, COUNCIL, OR THIRD PARTY WITHOUT THE USE OF SPECIAL EQUIPMENT, TOOLS, OR EXPERIENCE.
7. TANK ENTRY ONLY BY PERSONNEL TRAINED ON CONFINED SPACE ENTRY.
8. ALL MEASUREMENTS IN METRES UNLESS OTHERWISE NOTED.



PROPOSED ATTENUATION TANK SCHEMATIC

Rev	Date	Amendments	By
0	04/05/2024	ISSUED FOR RESOURCE CONSENT	JC

Drafter:	J CHEN	Job Title:	STORMWATER DESIGN - PROPOSED RESIDENTIAL DEVELOPMENT
Designer:	J CHEN	Client:	JACK CHEN
Checker:	N JULL	Address:	37B MARAENUI DRIVE, KERIKERI, LOT 8 DP 370958
Date:	04/05/2024	Drawing Title:	ATTENUATION TANK SCHEMATIC

Drawing:	111	Rev:	0
Scale:	NTS		
Project:	15642		
Issue:	RC		

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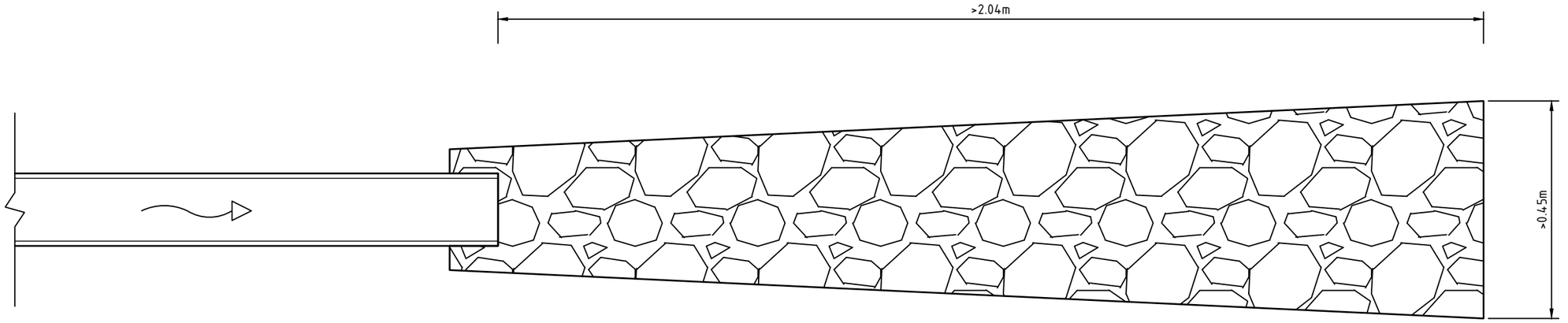

PROPOSED RIPRAP OUTLET SCHEMATIC

Rev	Date	Amendments	By
0	04/05/2024	ISSUED FOR RESOURCE CONSENT	JC

Drafter:	J CHEN	Job Title:	STORMWATER DESIGN - PROPOSED RESIDENTIAL DEVELOPMENT
Designer:	J CHEN	Client:	JACK CHEN
Checker:	N JULL	Address:	37B MARAENUI DRIVE, KERIKERI, LOT 8 DP 370958
Date:	04/05/2024	Drawing Title:	RIPRAP OUTLET SCHEMATIC

Drawing:	112	Rev:	0
Scale:	NTS		
Project:	15642		
Issue:	RC		

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Appendix B: Riprap Outlet Calculation Worksheet

RIPRAP DESIGN CALCULATION SHEET

SITE: 37b Maraenui Drive, Kerikeri
JOB #: 15642
DATE: 22/04/2024

Design calculations are in accordance with with Chapter 13 of Auckland Regional Councils TP10

Velocity Using the Manning's Equation *(considering pipe running full)*

Pipe Diameter (Do):	0.15	m
Pipe Grade:	6.5	%
Pipe Mannings (n):	0.011	
Design Velocity (m/s):	2.60	

Stone Diameter *using: ds = 0.25*Do*Fo*

Minimum Stone diameter: 80 mm

Depth *using: DA = 2ds*

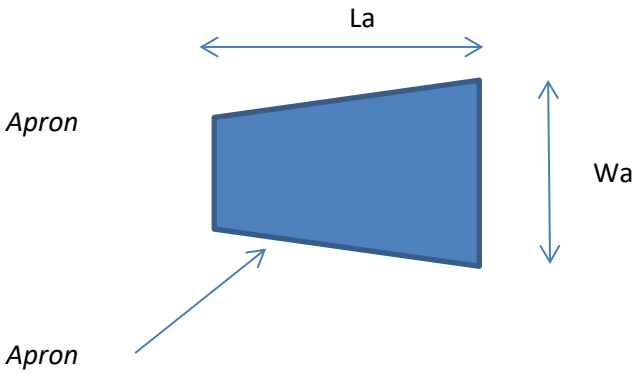
Minimum Thickness of Stone Layer: 161 mm

Width (Wa) *using: Wa = 3Do*

Minimum End Width of RipRap: 0.45 m

Length (La) *using: La = Do(8+17*LogFo)*

Minimum Apron Length: 2.04 m



Use	100mm	STONE DIAMETER
	200mm	THICKNESS OF STONE LAYER

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Level 1, Chester Building, 28 The Warehouse Way, Northcote,
Auckland 0627, PO Box 34405, Auckland 0746

Appendix C: HEC-HMS Model Output

Global Summary Results for Run "10% AEP"

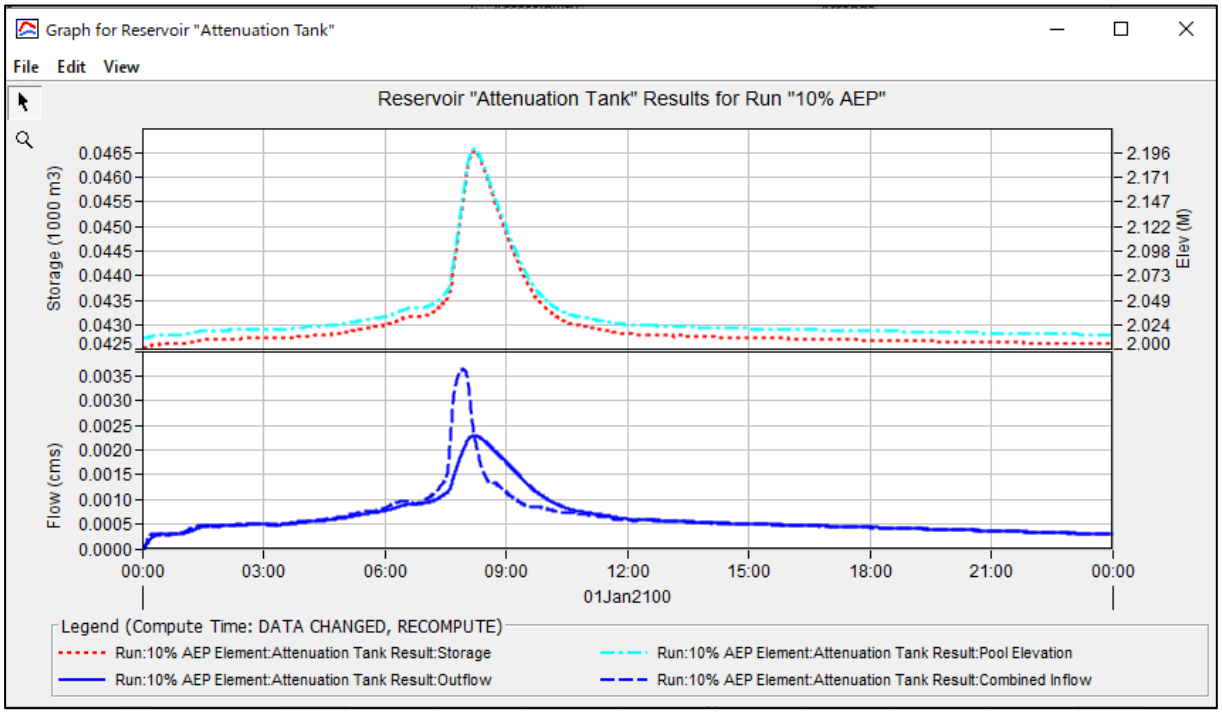
Project: 15642 Maraenui Dr Simulation Run: 10% AEP

Start of Run: 01Jan2100, 00:00
End of Run: 02Jan2100, 00:00
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Project Site
Meteorologic Model: 10%AEP
Control Specifications: Control 1

Show Elements: All Elements Volume Units: (•) MM ( ) 1000 M3 Sorting: Alphabetic

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
Attenuation Tank	0.00027	0.00229	1 January 2100, 08:13	204.08531
Flow PostDev	0.00036	0.00329	1 January 2100, 08:03	204.14393
Flow PreDev	0.00036	0.00334	1 January 2100, 07:58	137.68403
PostDev Hardstand	0.00009	0.00116	1 January 2100, 07:56	204.32797
PostDev Roof	0.00027	0.00363	1 January 2100, 07:56	204.32797
PreDev	0.00036	0.00334	1 January 2100, 07:58	137.68403



Global Summary Results for Run "1% AEP"

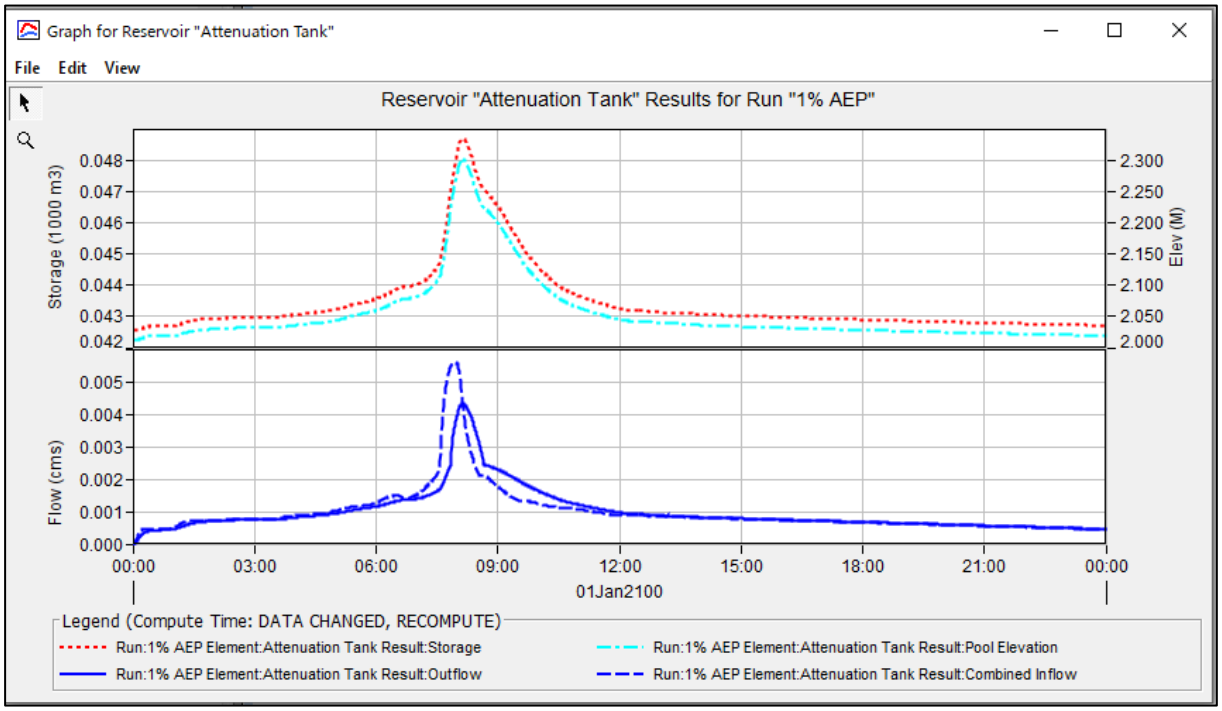
Project: 15642 Maraenui Dr Simulation Run: 1% AEP

Start of Run: 01Jan2100, 00:00
End of Run: 02Jan2100, 00:00
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Project Site
Meteorologic Model: 1%AEP
Control Specifications: Control 1

Show Elements: All Elements Volume Units: (•) MM ( ) 1000 M3 Sorting: Alphabetic

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
Attenuation Tank	0.00027	0.00431	1 January 2100, 08:08	313.92485
Flow PostDev	0.00036	0.00587	1 January 2100, 08:04	314.06598
Flow PreDev	0.00036	0.00596	1 January 2100, 07:58	240.23902
PostDev Hardstand	0.00009	0.00178	1 January 2100, 07:56	314.50904
PostDev Roof	0.00027	0.00559	1 January 2100, 07:56	314.50904
PreDev	0.00036	0.00596	1 January 2100, 07:58	240.23902



Wilton Joubert Limited
09 945 4188
185 Waipapa Road,
Kerikeri

SITE	**37B Maraenui Drive, Kerikeri**
LEGAL DESCRIPTION	**Lot 8 DP 370958**
PROJECT	**Proposed Residential Dwelling**
CLIENT	**Ruolei (Jack) Chen & Xin (Cici) Wang**
REFERENCE NO.	**133700**
DOCUMENT	**Site-Specific Geotechnical Report**
STATUS/REVISION NO.	**FINAL – Building Consent**
DATE OF ISSUE	**3 May 2024**

Report Prepared For	Attention	Email
Ruolei (Jack) Chen & Xin (Cici) Wang	**Absolute Build Limited**	chenruoleijack@gmail.com Natalie@absolutebuild.co.nz

Authored by	**S. Page** *Part Dip. (Civil)*	Engineering Technician	shaun@wjl.co.nz	
Reviewed by	**N. Ngaropo** *BSc (Geology)*	Engineering Geologist	nikora@wjl.co.nz	
Approved by	**D. Soric** *(BE, CMEngNZ, CPEng)*	Senior Geotechnical Engineer	damir@wjl.co.nz	

1. EXECUTIVE SUMMARY

The following table is intended to be a concise summary which must be read in conjunction with the relevant report sections as referenced herein.

Development Type:	Proposed residential dwelling.
Development Proposals Supplied:	Yes – Architectural drawings (5 sheets).
NZS3604 Type Structure/s:	Yes.
Geology Encountered:	Kerikeri Volcanic Group.
Overall Site Gradient in Proximity to Development:	Gently to moderately sloping (up to 10°).
Site Stability Risk:	Overall Low Risk of deep-seated global instability.
Liquefaction Risk:	Negligible risk of liquefaction susceptibility.
Suitable Shallow Foundation Type(s):	The architect has advised that foundations for the dwelling are to consist of either: • A combination of a stiffened raft slab (upslope garage) and timber subfloor, suspended on bored, concrete encased, tanalised timber pile foundations (downslope dwelling). A perimeter masonry block foundation wall with concrete strip footings will also be incorporated into the design to support brick cladding, or A full stiffened raft slab and perimeter masonry block foundation walls to support engineered hardfill and brick cladding.
Shallow Soil Bearing Capacity:	Yes – Natural Soils & Engineered Hardfill Only. • Geotechnical Ultimate Bearing Capacity = 300 kPa.
NZBC B1 Expansive Soils Classification:	Class M – Moderately Expansive (y_s = 44mm). Refer report text for design guidance.
Minimal Footing Depth:	0.60m below finished ground level and 0.30m into very stiff, natural ground, whichever is deeper.
NZS1170.5:2004 Site Subsoil Classification:	Class C – Shallow Soil stratigraphy.
Earthworks:	In facilitating the FFL, the following earthworks are proposed: • A battered cut, up to approximately 1.0m, along the southern portion of the development area, • For a combination of a stiffened raft slab and timber subfloor construction, buttressing landscape fill, up to approximately 2.2m, downslope of the north-western leading-edge of the masonry block foundation wall, and • For full raft slab construction, with engineered hardfill levelling, up to approximately 2.0m, along the northern portion of the building platform. All hardfill will be retained by a masonry block foundation wall. Refer report text for design guidance.
Further Geotechnical Review of Development Proposals:	Not anticipated unless development proposals have been revised.

2. INTRODUCTION

2.1. SCOPE OF WORK

Wilton Joubert Limited (WJL) was engaged by Ruolei (Jack) Chen and Xin (Cici) Wang (the Clients) to undertake a geotechnical assessment of ground conditions at the above site, where we understand, it is proposed to construct a new residential dwelling in the south-eastern portion of the main property area, legally titled Lot 8 DP 370958, at 37B Maraenui Drive.

For the purposes of this report, we have assumed the dwelling will comprise a lightweight, timber framed structure, designed and constructed generally in keeping with the requirements of NZS3604:2011.

2.2. SUPPLIED INFORMATION

At the time of preparing this report, we have been supplied with:

- An Existing Contour Survey Plan, prepared by Boundary Hunter Limited (dated 19 July 2021, ref: 9432), and
- A set of architectural drawings (5 sheets) of the proposed development, prepared by Absolute Build Limited, titled; 'Proposed New Residence at 37B Maraenui Drive, Kerikeri', dated April 2024 (Job No. 2024334).

Our geotechnical assessment is based on the abovementioned supplied drawings and correspondence with the architect.

Any revision of the supplied architectural drawings with Geotechnical implications should be referred to WJL for appropriate review.

3. SITE DESCRIPTION

The 3,452m2 is designated as Lot 8 DP 370958, located at 37B Maraenui Drive, Kerikeri. It is accessed via a shared driveway that extends off the northern side of Kerikeri Road. From the property entry, the site falls towards the north initially at gentle gradients averaging less than 5°, before increasing to fairly uniform grades of no greater than 10° along the north-western facing flank of the main property area. An overland flow path runs along the western property boundary and intersects the north-western corner of the site, ultimately draining away towards the northeast.

At the time of our site visit, there were no signs of soil cracking, hummocky ground, or surficial instability on the property.

The site is currently vacant with no structures. Vegetation at the site comprises of lawn, small to medium sized trees along most of the property boundaries, and a small garden area at the north-eastern corner of the site.

The property is not serviced by Far North District Council (FNDC) Wastewater, Stormwater and Potable Drinking Supply Services.

Figure 1: Screenshot aerial view of the subject site from the Far North District Council (FNDC) on-line GIS Property and Land Map. Subject property is highlighted in cyan. 1.0m contours are also overlaid in yellow.

Figure 2: Site photograph towards the proposed building platform area (northwest direction).

Figure 3: Site photograph towards the northern portion of the building platform area (east direction).

4. DEVELOPMENT PROPOSALS

Based on our review of the supplied architectural plans, it is our understanding that the clients propose to construct a new 200m² single-level residential dwelling, with attached garage, in the south-eastern portion of the main property area. The dwelling will comprise of lightweight timber framing, brick cladding, and longrun steel roofing, generally commensurate with the loadings of NZS3604:2011

The architect has advised that foundations for the dwelling are to consist of either:

- A combination of a stiffened raft slab (upslope garage) and timber subfloor, suspended on bored, concrete encased, tanalised timber pile foundations (downslope dwelling). A perimeter masonry block foundation wall with concrete strip footings will also be incorporated into the design to support brick cladding, or
- A full stiffened raft slab and perimeter masonry block foundation walls to support engineered hardfill and brick cladding.

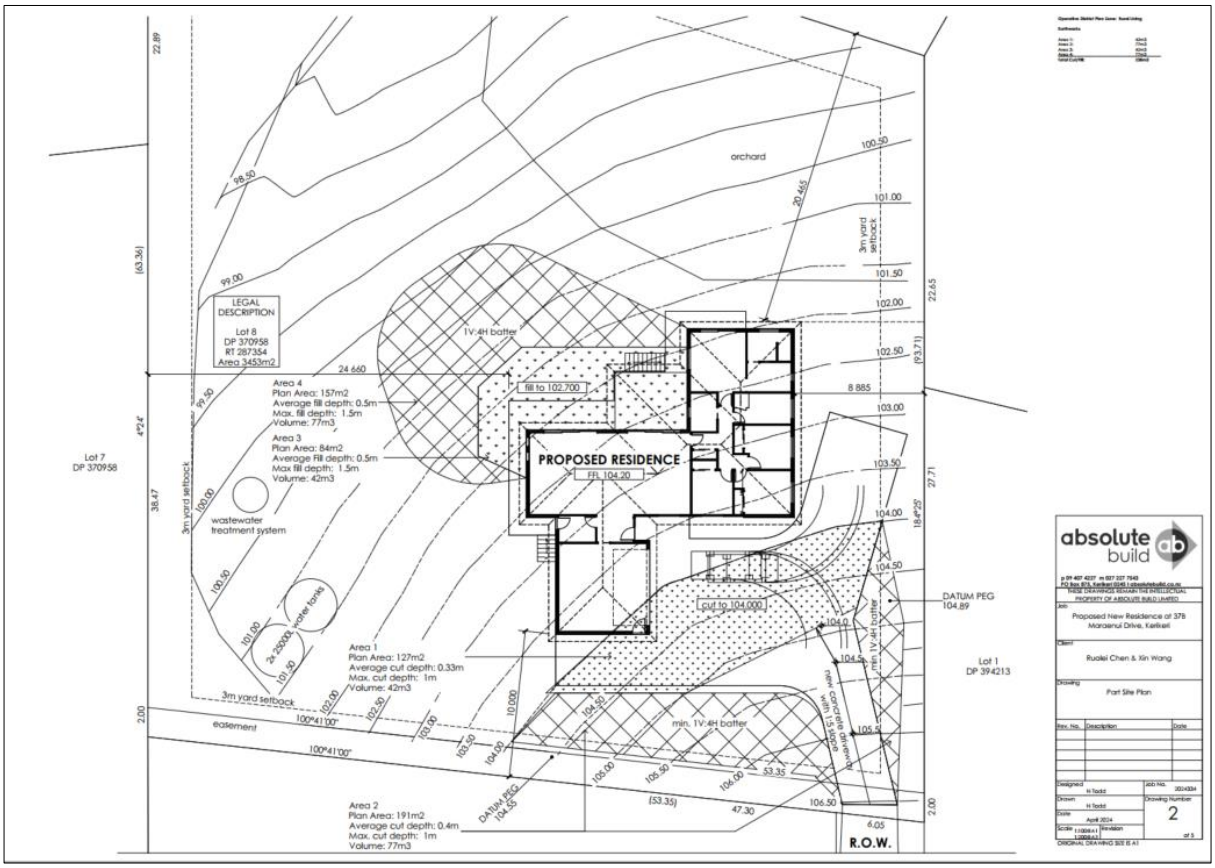


Figure 4: Screenshot of the Part Site Plan from the supplied architectural drawings.

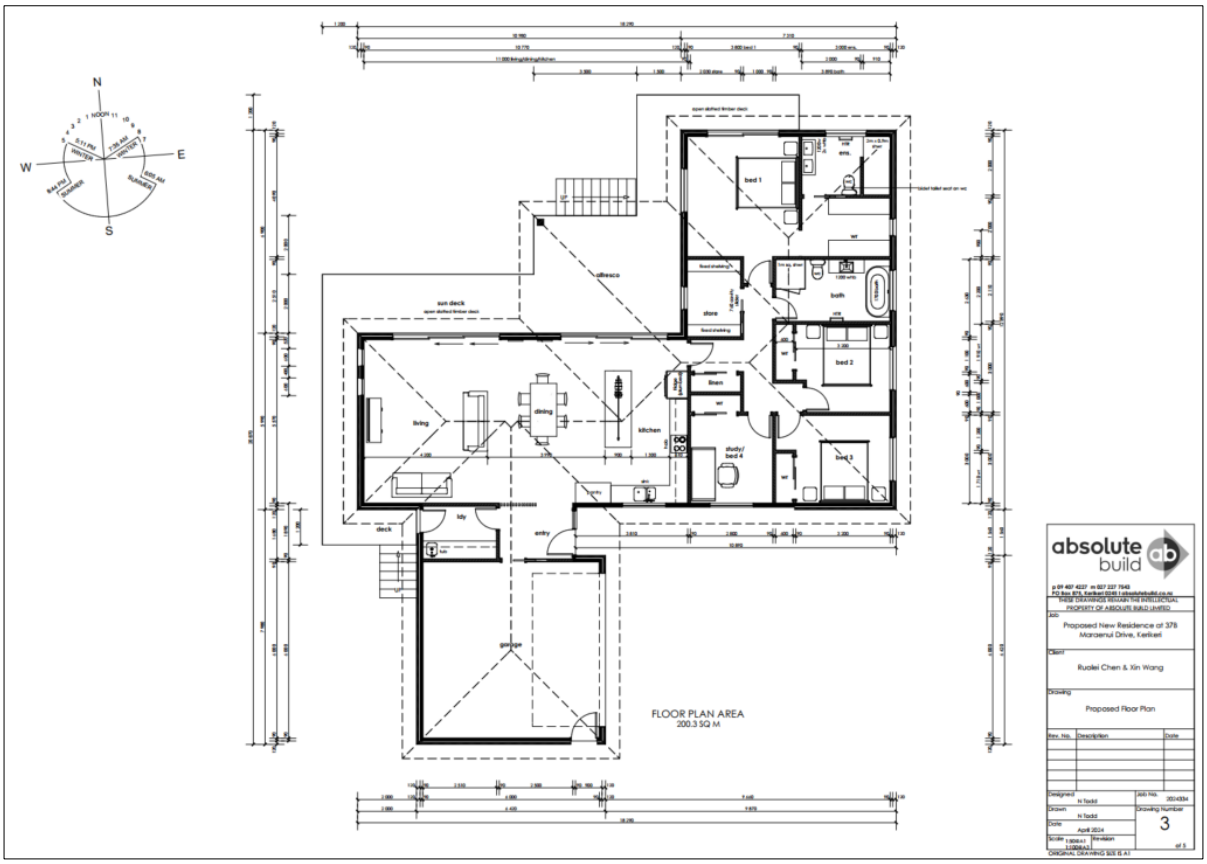


Figure 5: Screenshot of the Floor Plan from the supplied architectural drawings.

The finished floor level (FFL) of the dwelling is proposed at RL104.20. In facilitating the FFL, the following earthworks are proposed:

- A battered cut, up to approximately 1.0m, along the southern portion of the development area,
- For a combination of a stiffened raft slab and timber subfloor construction, buttressing landscape fill, up to approximately 2.2m, downslope of the north-western leading-edge of the masonry block foundation wall, and
- For full raft slab construction, with engineered hardfill levelling, up to approximately 2.0m, along the northern portion of the building platform. All hardfill will be retained by a masonry block foundation wall.

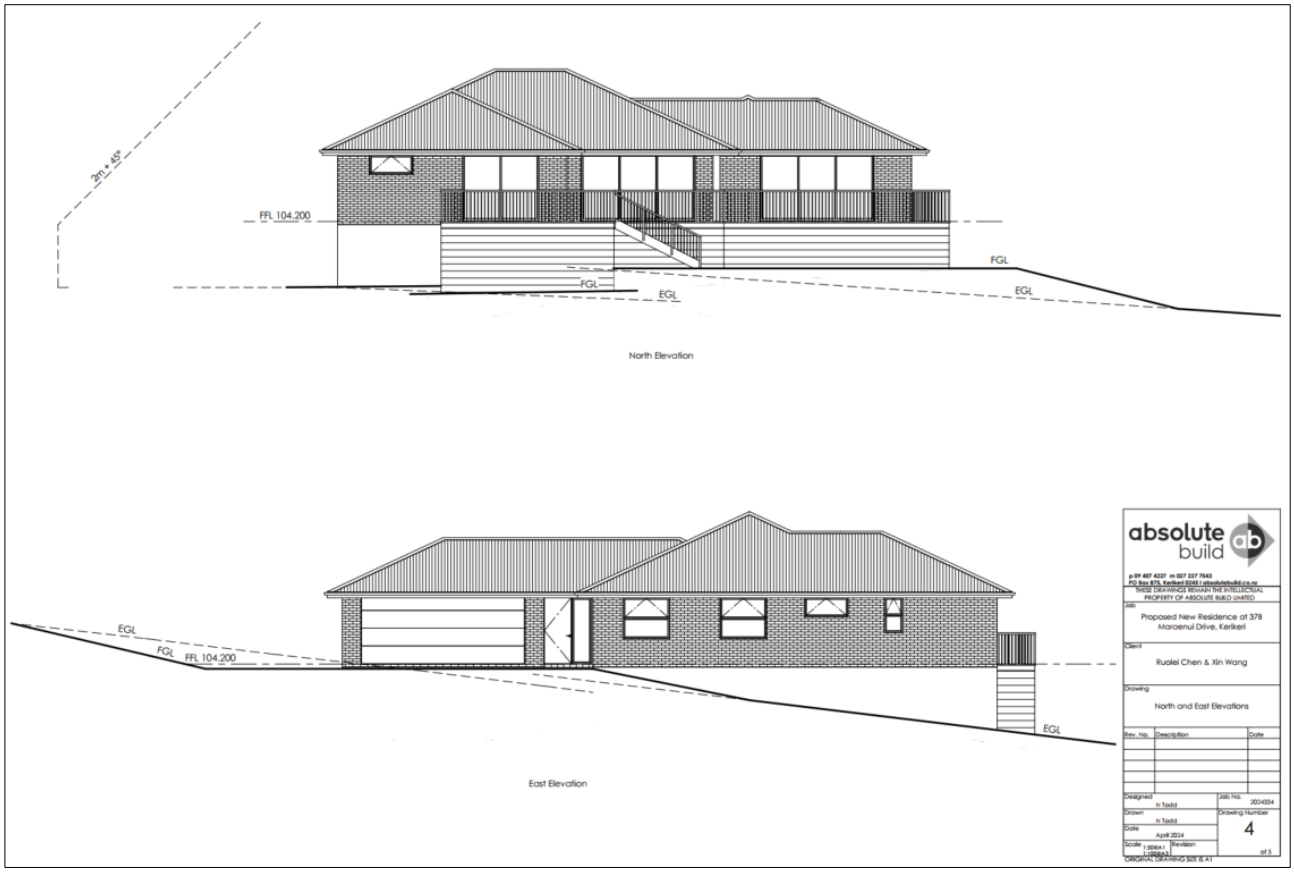


Figure 6: Screenshot of the North and East Elevation Plan from the supplied architectural drawings.

As a result, the principal objectives were to investigate and assess the suitability of potential foundation options for the site subsoils, not only primarily in terms of bearing capacity, but also for differential foundation movement.

5. GEOLOGY

Local geology across the property and wider surrounding area is noted on the GNS Science New Zealand Geology Web Map, Scale 1:250,000, as; Kerikeri Volcanic Group Late Miocene Basalt of Kaikohe (Bay of Islands Volcanic Field). These deposits are approximately 1.8 to 9.7 million years in age and described as; "*Basalt lava, volcanic plus, and minor tuff*" (refer: GNS Science Website).

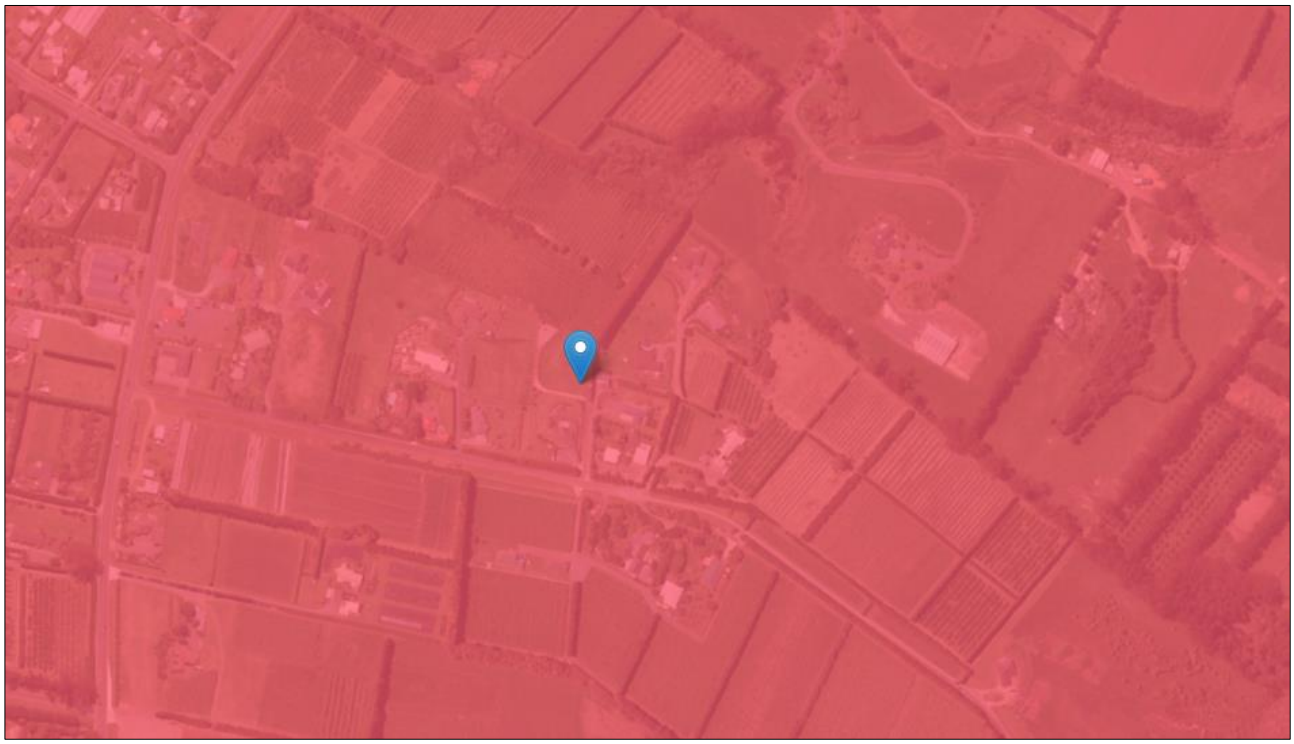


Figure 7: Screenshot aerial view of the subject site and wider surrounding area from the New Zealand Geology Web Map hosted by GNS Science. Blue marker depicts the subject site.

6. GEOTECHNICAL INVESTIGATION

Our fieldwork, as shown on the appended Site Plan (ref: 133700-G600), was undertaken on 11 November 2021, and involved:

- Two hand auger boreholes (HA) of 50mm diameter, to a maximum depth of 2.2m and 1.4m below ground level (bgl), in HA1 and HA2 respectively, and
- Dynamic Cone (Scala) Penetrometer Tests (DCP) were undertaken from the base of each HA and from the surface in three further locations, to a maximum depth of 1.8m bgl.

In supplementing our assessments, we have also draughted an appended cross-section (A-A') of the property slope, using the supplied Existing Contour Survey Plan. We have incorporated the proposed development ground modifications into the section.

The soil sample arisings from the boreholes were logged in accordance with the "Field Description of Soil and Rock", NZGS, December 2005.

In-situ undrained Vane Shear Strengths were measured at intervals of depth and then adjusted in accordance with the New Zealand Geotechnical Society (NZGS); Guidelines for Handheld Shear Vane Testing, August 2001, with strengths classified in accordance with the NZGS Field Classification Guidelines; Table 2.10, December 2005. The materials identified are described in detail on the appended records, together with the results of the various tests undertaken, plus the groundwater conditions as determined during time on-site.

7. GEOTECHNICAL FINDINGS

The following is a summary of the ground conditions encountered in our investigation. Please refer to the appended logs for greater detail.

7.1. TOPSOIL

Topsoil was encountered to a depth of 0.20m in HA1 and 0.25m in HA2.

7.2. NATURAL GROUND

The underlying natural deposits encountered at the site were indicative of Kerikeri Volcanic Group deposits, as mapped by GNS, comprising of very stiff to hard, Silty CLAY and Clayey SILT, with occasional to frequent clastic inclusions.

Measured in-situ, BS1377 adjusted peak shear strengths in the natural soils all exceeded 189kPa, where soil strength was excess of the shear vane capacity, or the vane was 'Unable to Penetrate' into the soil (UTP).

Ratios of peak to remoulded vane shear strength values within the natural soils were unable to be obtained. Our previous experience with Kerikeri Volcanic Group materials has found that they can generally be classified as Moderately Sensitive to Sensitive as per the NZGS Guidelines.

DCP's were undertaken from the ground surface at the locations shown on our appended Site Plan and from the base of each HA. Blow counts were noted as low as 1 per 0.10m (penetration through surficial topsoil), to a maximum of 30+ blows/0.10m, within the maximum tested depth of 1.8m.

Generally, the subsoils were found to be relatively dense/very stiff, with steadily increasing strength at depth overall, but with multiple horizons of very dense/hard material.

It should be noted that there were considerable variations between the five test locations, and as such, further unpredictable variations may occur throughout the building site.

Figure 8: Site photograph of the HA01 soil arisings.

Figure 9: Site photograph of the HA02 soil arisings.

7.3. GROUNDWATER

Groundwater was not encountered within either HA.

7.4. SUMMARY TABLE

The following table summarises our inferred stratigraphic profiling:

Investigation Hole ID	Termination Depth (m)	Depth of Topsoil (m)	Vane Shear Strength Range (kPa) within Natural Ground	Standing Groundwater Depth (m)
HA01	2.2	0.20	189+kPa / UTP	NE
HA02	1.4	0.25	189+kPa / UTP	NE

UTP = Unable to Penetrate, NE = Not Encountered

8. GEOTECHNICAL ASSESSMENTS

8.1. SITE STABILITY

In general terms, no evidence of significant land movement was observed on the subject building site, nor in the surrounding area of influence. Land across the proposed development area is gently to moderately sloping, with gradients of up to 10°. Slope gradients beyond the development area become slightly gentler as it approaches the downslope overland flow path.

On the basis of:

- No obvious evidence of deep-seated instability within the immediate vicinity of influence of the proposed development area,
- The gently to moderately sloping topography of the proposed development area and surrounding influential land,
- The high in-situ measured Vane Shear Strengths and DCP blow counts,
- Lack of groundwater evidence within our HA's, and
- Significant setback from steeper slopes,

we consider that the risk of deep-seated global slope instability impacting the proposed development to be significantly low.

In the long-term, provided that all of the recommendations within this report, or subsequent revisions, are adhered to, then we do not anticipate any significant risk of instability either within, or immediately beyond, the proposed building site.

8.2. LIQUEFACTION ASSESSMENT

At the time of preparing this report, we note that the FNDC on-line GIS Liquefaction Vulnerability Map indicates that the property lies within an '*Unlikely*' zone.

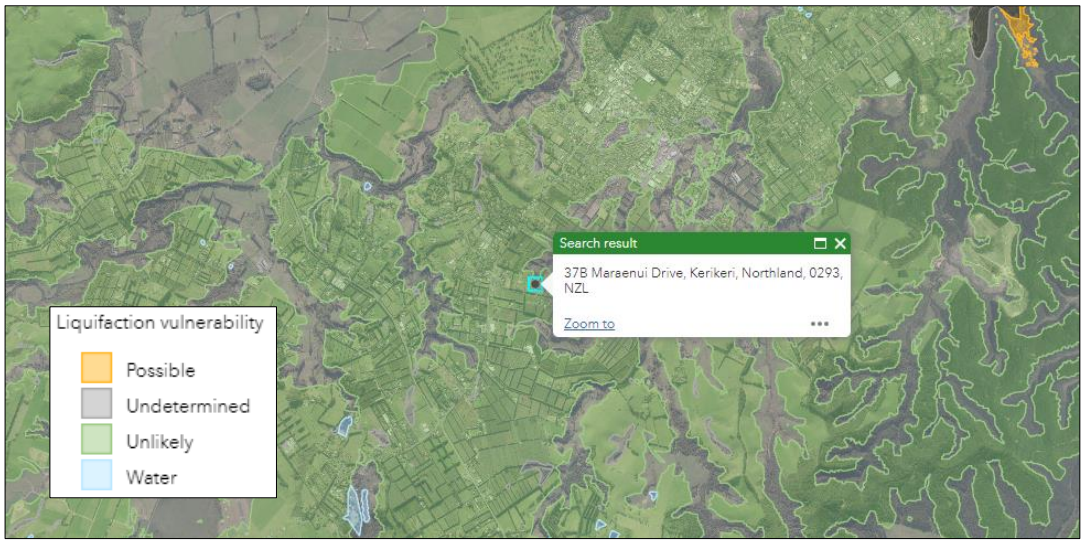


Figure 10: Screenshot aerial view of the subject site from the FNDC on-line GIS Liquefaction Vulnerability Map. Blue Marker depicts property location.

Liquefaction is a natural phenomenon where a loss of strength of sand-like soils is experienced following cyclic induced stress, which is typically a result of prolonged seismic shaking and the resultant increase in pore water pressure of saturated soils. Recent examples of this were experienced in Christchurch and the greater Canterbury Region during the Canterbury Earthquake Sequence between 2010-2011.

Cyclic loading during prolonged seismic shaking induces an increase in pore water pressure, which in turn decreases the effective stress of a sand-like deposit of soil. Excess pore water pressure (EPWP) can build to such an extent that the effective stress of the underlying soils is reduced to near zero, whereby the soils no longer carry shear strength and behave as a semi solid/fluid. In such a scenario, excess pore water pressures will follow the path of least resistance to eventual dissipation, which can lead to the manifestation of liquefied soils towards the surface, or laterally towards a free-face (edge of slope, riverbank, etc.) or layers that have not yet undergone liquefaction.

A screening procedure based on geological criteria was adopted to examine whether the proposed development might be susceptible to liquefaction, with observations as follows:

- There are no known active faults traversing through the development area or surrounding land,
- There is no historical evidence of liquefaction at the property,
- The site is situated on an elevated location with good water-shedding characteristics,
- Very stiff in-situ measured natural ground soils encountered during our investigation,
- The underlying natural soil deposits comprise of very stiff cohesive soils that are not generally considered susceptible to liquefaction, and
- The subsoils beneath the proposed building platforms are underlain by Kerikeri Volcanic Group deposits that are approximately 1.8 to 9.7 million years of age, allowing for adequate consolidation in comparison to Holocene age material (10,000 years).

Based on the above, we conclude that the subsoils across proposed development areas have a negligible risk of liquefaction susceptibility and liquefaction damage is therefore considered to be unlikely.

9. CONCLUSIONS AND RECOMMENDATIONS

On the basis of the above analyses, we consider that the risk of moderate to deep-seated slope instability impacting on the proposed development within the site to be satisfactorily low, provided all recommendations contained within our report are implemented in design and construction.

With regard to the Building Act 2004; Sections 71-72, we believe on reasonable grounds that:

i. The current proposed site development and associated building work within the relayed building platform should not accelerate, worsen, or result in slippage or subsidence on the land on which the building work is to be carried out or any other property, and

ii. The land beneath the building footprint and surrounding immediate amenity areas of the relayed building platform is neither subject nor likely to be subject to slippage or subsidence, provided the development is undertaken in accordance with the recommendations and guidance of this report.

9.1. FOUNDATIONS

The architect has advised that foundations for the dwelling are to consist of either:

- A combination of a stiffened raft slab (upslope garage) and timber subfloor, suspended on bored, concrete encased, tanalised timber pile foundations (downslope dwelling). A perimeter masonry block foundation wall with concrete strip footings will also be incorporated into the design to support brick cladding, or
- A full stiffened raft slab and perimeter masonry block foundation walls to support engineered hardfill and brick cladding.

Both of the above options are considered acceptable from the geotechnical point of view.

9.1.1. SHALLOW FOUNDATION BEARING CAPACITY

The following bearing capacity values are considered to be appropriate for the design of shallow foundations, subject to founding directly within or on competent natural ground and/or engineered hardfill, for which careful Geo-Professional inspections of the subgrade should be undertaken to check that underlying ground conditions are in keeping with our expectations:

Geotechnical Ultimate Bearing Capacity	300 kPa
ULS Dependable Bearing Capacity (Φ=0.5)	150 kPa

When finalising the development proposals, it should be checked that all foundations lie outside 45° envelopes rising up from 0.50m below the invert of service trenches and adjacent retaining walls, unless such foundation details are found by specific engineering design (SED) to be satisfactory. Deeper foundation embedment's may be required for any surcharging foundations.

During inspections, it is important to exercise caution to verify that the natural ground meets the recommended bearing capacity mentioned in this report. This is crucial for preserving stability and structural integrity.

9.1.2. SHALLOW FOUNDATIONS ON EXPANSIVE SOILS

In this instance, considering the high silt content and clastic nature of the volcanic subsoils from shallow depths, we recommend a primary classification of Class M (Moderately) expansive soils, as defined in clause 7.5.13.1.2, and introduced to NZS3604 by Amendment 19 of NZBC Structure B1/AS1.

- NZBC B1 Expansive Soil Class M
- Upper Limit of Characteristic surface movement (ys) 44mm

For shallow foundations, possessing sufficient lateral stability is crucial. Adequate lateral stability is essential to protect the foundation's integrity and prevent any potential damage to the structure and adjacent elements. It is also essential to ensure that the load from a foundation does not impose any additional stress or load on the surrounding features.

Soil expansiveness can be mitigated for foundations as follows:

- Raft Slab Foundation System:
  - Specifically designed reinforced, concrete raft slab designed for a Ys value of 44mm and founded on a minimum of 0.10m of engineered hardfill, extending a minimum of 1.0m beyond the building footprint.
- Timber Pile Foundations:
  - Bored, concrete-encased, tanalised timber pile foundations embedded a minimum of 0.60m below finished ground levels and 0.30m into very stiff, natural ground, whichever is deeper.

9.1.3. NZS1170.5:2004 SITE SUBSOIL CLASSIFICATION

We consider the proposed buildings to be underlain with a Class C – Shallow Soil stratigraphy.

9.2. SITE EARTHWORKS

The FFL of the dwelling is proposed at RL104.20. In facilitating the FFL, the following earthworks are proposed:

- A battered cut, up to approximately 1.0m, along the southern portion of the development area,
- For a combination of a stiffened raft slab and timber subfloor construction, buttressing landscape fill, up to approximately 2.2m, downslope of the north-western leading-edge of the masonry block foundation wall, and
- For full raft slab construction, with engineered hardfill levelling, up to approximately 2.0m, along the northern portion of the building platform. All hardfill will be retained by a masonry block foundation wall.
- The buttressing fill placed to the north and northwest of the proposed house must be engineered fill as defined by NZS4431:2020. Appropriate site preparation must be carried out such as: removal of all topsoil from the area to receive fill, cutting horizontal benches to key the fill into the slope, any groundwater seepages must be captured by drainage, compaction in lifts not exceeding 300mm loose thickness with padfoot roller of +6 tonne static weight, geotechnical engineer to test compaction at regular intervals.

Earthworks should be undertaken in accordance with the following standards:

- NZS4431:2022 “Code of Practice for Earth Fill Residential Development”,
- Section 2 “Earthworks & Geotechnical Requirements” of NZS4404:2010 “Land Development and Subdivision Infrastructure”, and
- Chapter 2 “Site Development Suitability (Geotechnical and Natural Hazards” of the Far North District Council Engineering Standards, (Version 0.6 issued May 2023).

9.3. SITE PREPARATION

The competency of the exposed subgrade underlying all proposed concrete slab foundations and structures should be confirmed by a Geo-Professional. In this regard, we recommend the stripping of all vegetation, topsoil, and all non-engineered fill deposits (if any), prior to requesting Geo-Professional inspection(s) of the stripped ground to confirm that the underlying natural subgrade conditions are in keeping with the expectations of this report. Without such inspections being undertaken, a Chartered Professional Geotechnical Engineer is unable to issue a Producer Statement - PS4 – Design Review which could result in the failure to meet Building Consent requirements as set by Council as conditions of consent.

9.4. SUBGRADE PROTECTION

The subgrade beneath proposed concrete slab building platforms should not be exposed for any prolonged period and should be covered with a 0.10m thick layer of granular fill such as GAP40 basecourse, as soon as possible.

Likewise, all timber pile footing inverts should be poured as soon as possible once inspected by a Geo-Professional or covered with a protective layer of site concrete.

If subgrade degradation occurs by:

- Excessive drying out resulting in desiccation shrinkage cracking, it will be necessary to either re-hydrate the subgrade or undercut the degraded material and replace with compacted hardfill, or
- Excessive subgrade softening after a period of wet weather resulting in weakened soils, it will be necessary to undercut the degraded material and replacement with compacted hardfill.

9.5. BUTRESSING LANDSCAPE FILL COMPACTION

The compaction of clay fill comes with the inherent risks of high-water content and inconsistency of soil, which can, more often than not, lead to poor quality compaction, especially if imported material is utilised. As a general guide, we recommend placing cohesive clay in loose lift thicknesses of around 0.15m to 0.20m subject to being compacted using a suitably sized pad-foot roller. Attempted compaction with tracked machines and/or loaded trucks is not acceptable. It is important that the moisture content of the material is at close to an optimum level, in order to achieve successful compaction. On the basis of our experience with similar materials, we anticipate the optimum moisture content for effective compaction to be between 30% to 40%. Although materials can still be compacted if wet or dry of this value, the results may not be acceptable and could require conditioning by drying or wetting as appropriate.

In order to provide the most flexibility for likely variations in soil types, it is recommended that earthworks compaction control use the maximum allowable air voids/minimum allowable shear strength criteria, as follows:

	Air Voids Percentage (as defined in NZS 4402:1986)		Undrained Shear Strength (Measured insitu by IANZ calibrated vane)	
	Maximum Average Value %	Maximum Single Value %	Minimum Average Value kPa	Minimum Single Value kPa
Residential Fill	10	12	140	110

Note: The average value shall be determined over any ten consecutive tests.

If the client wishes to have the buttressing landscape fill signed off as engineered fill, engineer monitoring by way of Nuclear Densometer Testing (NDM) or other approved methods and regular compaction tests should be carried out by a suitably qualified Geo-Professional.

9.6. ENGINEERED HARDFILL COMPACTION

The compaction of hardfill should be undertaken using either a heavy plate compactor or a steel wheeled roller with low frequency dynamic compaction. Hardfill layers should not exceed 0.15m at a time, and where the total depths exceed 0.60m, there is likely to be a Building Consent condition for observation/testing of the hardfill by a Geo-Professional. We recommend achieving the following compacted target values, with equivalence testing using either a Clegg Impact Hammer or DCP.

Foundation Support Type	CBR	Equivalent Clegg Impact Value (CIV)	Equivalent DCP Blows
Foundation Footings & Beams (Over a depth of no less than twice the foundation width)	≥ 10%	Minimum 15 Average 18	≥5 blows/100mm (NZS3604)
Floor Slabs	≥ 7%	Minimum 12 Average 15	≥3.5 blows/100mm (NZS3604)

9.7. RETAINING WALLS

For the design of cantilever and/or flexible diaphragm retaining walls that can deform sufficiently to mobilize active pressures (i.e., timber pole retaining walls not supporting critical structures and/or long-term traffic loads), we recommend calculating coefficients of active lateral earth pressure (Ka).

However, for stiff, inflexible retaining walls, which are unable to deflect sufficiently to generate active earth pressures (i.e., concrete and/or masonry block retaining walls supporting building loads and/or driveways/car-parking areas), we recommend calculating coefficients of at-rest lateral earth pressure (Ko).

We recommend assuming the following soils parameters for retaining wall design:

Material Type	Angle of Internal Friction ø'	Bulk Density, Gamma	Undrained Shear Strength (Su) for Pole/Pile Embedment*
Natural Soils	28°	18 kN/m3	80 kPa

*For the calculation of pole embedment depths, the Broms method as specified in B1/VM4 may be used provided that depths are not less than 4 pile diameters, for which the above stated undrained shear strength value may be assumed, provided an appropriate strength reduction factor is applied and is subject to confirmation by Engineering inspection during construction.

To the above figures please apply an appropriate strength reduction factor for satisfying Ultimate Limit State conditions.

Furthermore, the above figures make no allowances for any surcharges, be they ground slopes and/or applied loads, and hence, all retaining wall designs should also accommodate all anticipated upslope surcharges. Furthermore, reduced toe support by existing or proposed excavations and/or slopes must be taken into consideration.

To avoid build-up of hydrostatic pressures, retaining walls must be constructed with appropriate behind-wall drainage comprising:

- A perforated drain coil wrapped in Filtersok, located at the base of the walls, connected into an approved stormwater disposal system,
- Followed by backfilling behind all retaining walls lightly tamped, free draining granular backfill, such as scoria or 40/20 blue chip, extending up to within 0.30m of their full height with material.

9.8. TEMPORARY & LONG-TERM EARTHWORK BATTERS

We recommend that earthworks only be undertaken either during prolonged forecast dry weather conditions.

Earthwork sites should be shaped to assist in stormwater run-off. The toe of batter excavations should be shaped to direct stormwater run-off away from the building site, as saturating site soils could result in a reduction of bearing capacities.

All cuts up to a height of 1.0m should be battered no steeper than 1V:4H (18°). All cut faces should be dressed in a Geotextile fabric. Any proposed cuts outside the imposed limits noted above should be referred to a Geo-Professional prior to the finalisation of architectural drawings and commencement of construction works.

All buttressing landscape fills should be limited to a height of 2.2m and should be battered no steeper than 1V:4H (14°). Any proposed landscape fills outside the imposed limits noted above should be referred to a Geo-Professional prior to the finalisation of architectural drawings and commencement of construction works.

Site benching across landscape fill areas should be carried out generally in accordance with Section 4 of NZS4431:2022 and in following Figure 11. Any water seepages must also be drained in accordance with NZS4431:2022.

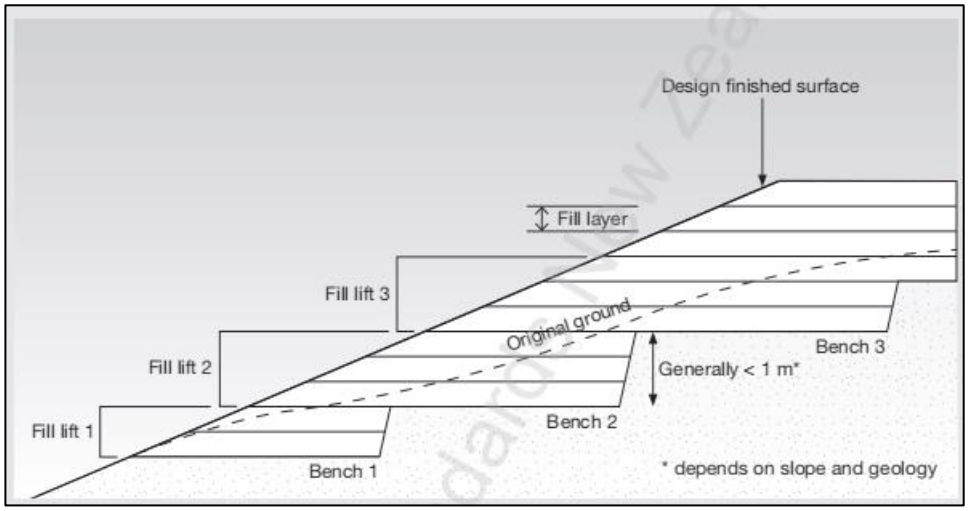


Figure 11: Typical benching detail, Figure 1 – Section C4.3.4 (NZS4431:2022).

All exposed soils should be covered with topsoil before being re-grassed and/or planted as soon as practicable to aid in stabilising local slopes.

The structural designer and building contractor should ensure that a satisfactory FoS against ground instability is available at all stages of the development.

9.9. GENERAL SITE WORKS

We stress that any and all future works should be undertaken in a careful and safe manner so that Health & Safety is not compromised, and that suitable Erosion & Sediment control measures be put in place. Any stockpiles placed should be done so in an appropriate manner so that land stability and/or adjacent structures are not compromised.

Furthermore:

- All works must be undertaken in accordance with the Health and Safety at Work Act 2015,
- Any open excavations should be fenced off or covered, and/or access restricted as appropriate,
- The location of all services should be verified at the site prior to the commencement of construction,
- The Contractor is responsible at all times for ensuring that all necessary precautions are taken to protect all aspects of the works, as well as adjacent properties, buildings and services, and
- Should the contractor require any site-specific assistance with safe construction methodologies, please contact WJL for further assistance.

9.10. LONG-TERM FOUNDATION CARE & MAINTENANCE

The recommendations given above to mitigate the risk of expansive soils, do not necessarily remove the risk of external influences affecting the moisture in the subgrade supporting the foundations.

All owners should also be aware of the detrimental effects that significant trees can have on building foundation soils, viz:

- Their presence can induce differential consolidation settlements beneath foundations through localised soil water deprivation, or conversely, and
- Foundation construction too soon after their removal can result in soil swelling and raising foundations as the soil rehydrates.

To this end, care should be taken to avoid:

- Having significant trees positioned where their roots could migrate beneath the house foundations, and
- Constructing foundations on soils that have been differentially excessively desiccated by nearby trees, whether still existing, or recently removed.

We recommend that homeowners make themselves familiar with the appended Homeowners' Guide published by CSIRO, with particular emphasis on maintenance of drains, water pipes, gutters, and downpipes.

10. STORMWATER CONTROL

Uncontrolled stormwater flows must not be allowed to run onto or over site slopes, or to saturate the ground, so as to adversely affect slope stability or foundation conditions.

Overland flows and similar runoff such as from any higher ground should be intercepted by means of shallow surface drains and be directed away from the building site to protect the building platform from both saturation and erosion. Water collected in interceptor drains should be diverted away from the building site to a stable disposal point that is well clear of the building site and not directly downslope. All stormwater runoff from roofs and paved areas should be collected in sealed pipes and be discharged in accordance with the above.

Under no circumstances should concentrated overflows from any source discharge into or onto the ground in an uncontrolled fashion.

11. UNDERGROUND SERVICES

The FNDC on-line GIS Water Services Maps indicates that reticulated services are not available to the property however, other underground services, public or private, mapped, or unmapped, of any type may be present, hence we recommend staying on the side of caution during the commencement of any work within the proposed development area.

12. FUTURE CONSTRUCTION MONITORING

The foregoing statements are Professional Opinion, based on a limited collection of information, some of which is factual, and some of which is inferred. Because soils are not a homogeneous, manufactured building component, there always exists a level of risk that inferences about soil conditions across the greater site, which have been drawn from isolated "pin-prick" locations, may be subject to localized variations. Generally, any investigation is deemed less complete until the applicability of its inferences and the Professional Opinions arising out of those are checked and confirmed during the construction phase, to an appropriate level.

It is increasingly common for the Building Consent Authorities to require a Producer Statement – Construction (PS4) which is an important document. The purpose of the PS4 is to confirm the Engineers' Professional Opinion to the BCA that specific elements of construction, such as the verification of design assumptions and soil parameters (NZBC clause B1/VM4 2.0.8), are in accordance with the approved Building Consent and its related documents, which should include the subject Geotechnical Report. Where site works will involve the placement of fill, the PS4 should reference NZBC clause B1/VM1 10.1.

For WJL to issue a PS4 to meet the above clauses of the NZBC, we will need to carry out the site inspections as per the Building Consent and Council requirements.

We require at least 48 hours' notice for site inspections.

Site inspections should be undertaken by a Chartered Professional Geotechnical Engineer or their Agent, who is familiar with both this site and the contents of this Geotechnical Report.

Prior to works commencement, the above Engineer should be contacted to confirm the construction methodologies, inspection, and testing frequency.

The primary purpose of the site inspections is to check that the conditions encountered are consistent with those expected from the investigations and adopted for the design as discussed herein. If anomalies or uncertainties are identified, then further Professional advice should be sought from the Geo-Professional, which will allow the timely provision of solutions and recommendations should any engineering problems arise.

Upon satisfactory completion of the above work aspects, WJL would then be in a position to issue the PS4 as required by Council.

At this time, the following Geotechnical site inspections and testing should include, but are not limited to:

- Site cut (concrete slab areas),
- Pre-pour masonry block foundation wall footings,
- Hardfill compaction testing at approximate 0.60m lifts (concrete slab areas), and
- Pre-pour timber pile footings (if required).

13. LIMITATIONS

We anticipate that this report is to be submitted to Council in support of a Building Consent application.

This report has been commissioned solely for the benefit of our client, Ruolei (Jack) Chen and Xin (Cici) Wang in relation to the project as described herein, and to the limits of our engagement, with the exception that the local Territorial Authority may rely on it to the extent of its appropriateness, conditions and limitations, when issuing the subject consent. Any variations from the development proposals as described herein as forming the basis of our appraisal should be referred to us for further evaluation. Copyright of Intellectual Property remains with WJL, and this report may NOT be used by any other entity, or for any other proposals, without our written consent. Therefore, no liability is accepted by this firm or any of its directors, servants, or agents, in respect of any other geotechnical aspects of this site, nor for its use by any other person or entity, and any other person or entity who relies upon any information contained herein does so entirely at their own risk. Where other parties may wish to rely on it, whether for the same or different proposals, this permission may be extended, subject to our satisfactory review of their interpretation of the report.

The recommendations provided in this geotechnical report are in accordance with the findings from our shallow investigation. However, it is important to acknowledge that additional refinement of the investigation and analysis may be necessary to meet the specific requirements set by the local council.

Although this report may be submitted to a local authority in connection with an application for a consent, permission, approval, or pursuant to any other requirement of law, this disclaimer shall still apply and require all other parties to use due diligence where necessary and does not remove the necessity for the normal inspection of site conditions and the design of foundations as would be made under all normal circumstances.

Thank you for the opportunity to provide our service on this project, and if we can be of further assistance, please do not hesitate to contact us.

Enclosures:

Site Plan (1 sheet)
Cross-Section A-A' (1 sheet)
HA and DCP Records (3 sheets)
'Foundation Maintenance & Footing Performance' sheet BTF18: A Homeowner's Guide, CSIRO (4 sheets)
Construction Monitoring (1 sheet)

SITE LOCATION

IMAGE SOURCE:
FAR NORTH DISTRICT COUNCIL LOCALMAPS

GENERAL NOTES

1. SITE PLAN IS ONLY INDICATIVE FOR CONCEPT DESIGN. NO MEASUREMENTS MAY BE TAKEN FROM DRAWING.
2. BACKGROUND INFORMATION, CONTOURS & LOCAL SERVICES PROVIDED BY THE CLIENT & EXTRACTED FROM LOCAL COUNCIL GIS.
3. ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.

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ISSUE / REVISION

No.	DATE	BY	DESCRIPTION
A	MAY 2024	NPN	ISSUED WITH GEOTECHNICAL MEMORANDUM

DESIGNED BY:
DRAWN BY: NPN
CHECKED BY:
SURVEYED BY:

SERVICES NOTE

WHERE EXISTING SERVICES ARE SHOWN, THEY ARE INDICATIVE ONLY AND MAY NOT INCLUDE ALL SITE SERVICES. WILTON JOUBERT LTD DOES NOT WARRANT THAT ALL, OR INDEED ANY SERVICES ARE SHOWN. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE AND PROTECT ALL EXISTING SERVICES PRIOR TO AND FOR THE DURATION OF THE CONTRACT WORKS.

BUILDING CONSENT

DESIGN / DRAWING SUBJECT TO ENGINEER'S APPROVAL

DRAWING TITLE: **SITE PLAN**

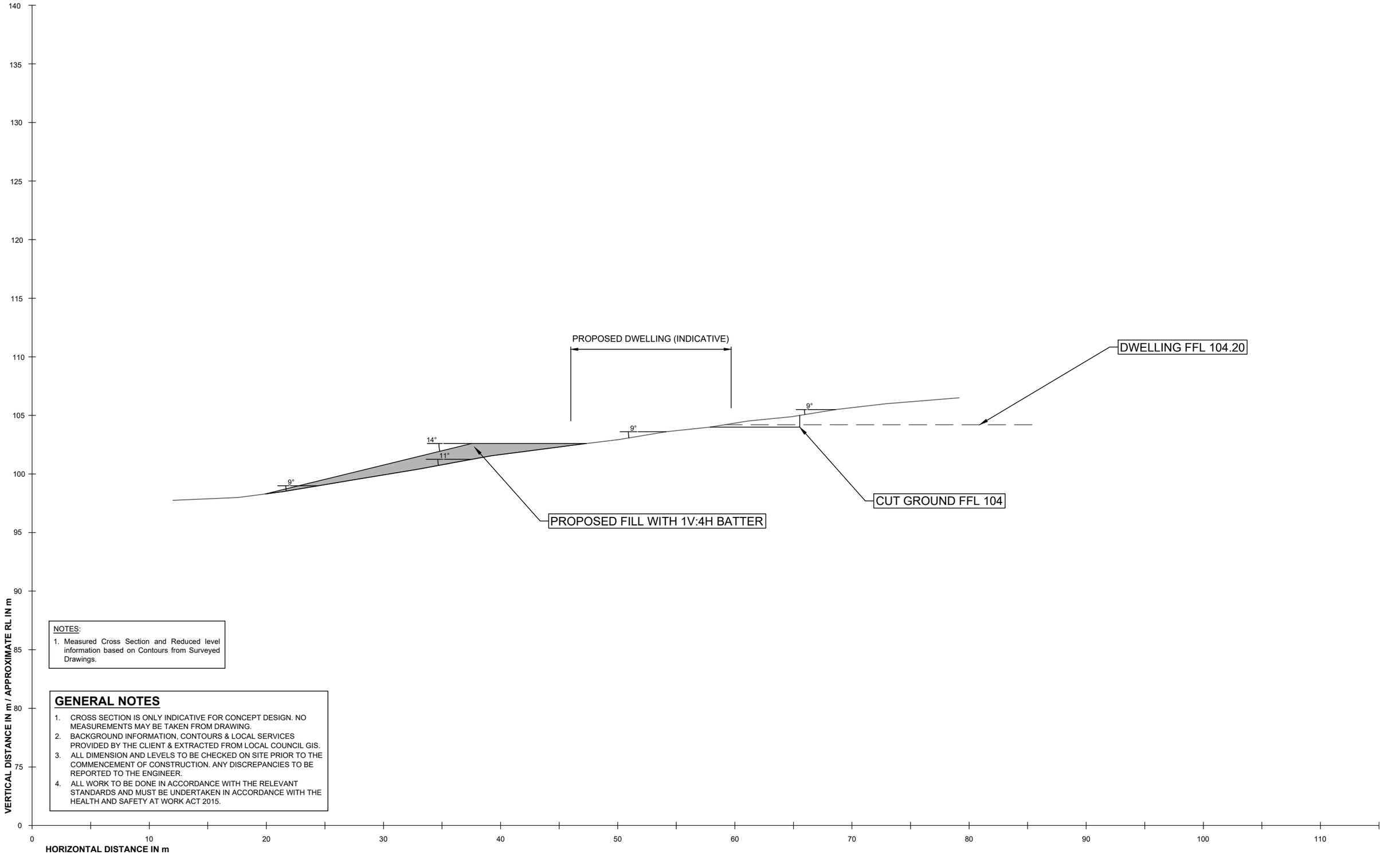
PROJECT DESCRIPTION: **PROPOSED DWELLING**

PROJECT TITLE:

LOT 8 DP 370958
37B MARAENUI DRIVE
KERIKERI
NORTHLAND

ORIGINAL DRAWING SIZE:	OFFICE:
A3	KERIKERI
DRAWING SCALE:	CO-ORDINATE SYSTEM:
1:400	NOT COORDINATED

DRAWING NUMBER: **133700-G600**
ISSUE: **A**



NOTES:

1. Measured Cross Section and Reduced level information based on Contours from Surveyed Drawings.

GENERAL NOTES

1. CROSS SECTION IS ONLY INDICATIVE FOR CONCEPT DESIGN. NO MEASUREMENTS MAY BE TAKEN FROM DRAWING.
2. BACKGROUND INFORMATION, CONTOURS & LOCAL SERVICES PROVIDED BY THE CLIENT & EXTRACTED FROM LOCAL COUNCIL GIS.
3. ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
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No.	DATE	BY	DESCRIPTION
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BUILDING CONSENT

DESIGN / DRAWING SUBJECT TO ENGINEER'S APPROVAL

DRAWING TITLE: **CROSS SECTION A-A'**

PROJECT DESCRIPTION: **PROPOSED GROUND MODIFICATIONS**

PROJECT TITLE: **LOT 8 DP 370958
37B MARAENUI DRIVE
KERIKERI
NORTHLAND**

ORIGINAL DRAWING SIZE:	OFFICE:
A3	KERIKERI
DRAWING SCALE:	CO-ORDINATE SYSTEM:
1:300	NOT COORDINATED
DRAWING NUMBER:	ISSUE:
133700-G610	A

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BOREHOLE LOG No. 1

JOB No. 133700

Hole Location: Refer to Site Plan

Client:	R. Chen & X. Wang	**Site:**	37B Maraenui Drive, Kerikeri		
Date Started:	10/08/2021	**Drilling Method:**	Hand Auger	**JSA No's:**	1
Date Completed:	10/08/2021	**Hole Diameter (mm):**	50mm	**Location:**	South-east of Building Site
H&S 'Take 5':	Completed	**Logged By:**	MS	**Slope Angle:**	<10°

Kerikeri Volcanic Group

Soil Description	Depth (m)	Graphic Log	Water Level	Sensitivity	Recovery	Vane Shear Strength (kPa)	Scala Penetrometer (blows/100mm drop)
TOPSOIL, dark brown, roots							
Silty **CLAY**, orangey dark brown, moist, very stiff, moderate plasticity Frequent weakly cemented light grey clasts/pockets Occasional strongly cemented black & grey clasts (1-6mm) subangular	0.5 1.0		Ground water not encountered			189+ 189+ UTP	
Clayey **SILT,** dark brownish grey, moist, very stiff, low plasticity Frequent strongly cemented black & grey clasts (1-4mm) subangular	1.5 2.0					189+ UTP UTP	
END OF BOREHOLE **Refusing @ 2.2m**	2.5 3.0 3.5 4.0 4.5						

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

In situ shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Average Scala Blows	17.5
Average Soil Sensitivity	1.0

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BOREHOLE LOG No. 2

JOB No. 133700

Hole Location: Refer to Site Plan

Client:	R. Chen & X. Wang	**Site:**	37B Maraenui Drive, Kerikeri		
Date Started:	10/08/2021	**Drilling Method:**	Hand Auger	**JSA No's:**	1
Date Completed:	10/08/2021	**Hole Diameter (mm):**	50mm	**Location:**	North-west of Building Site
H&S 'Take 5':	Completed	**Logged By:**	MS	**Slope Angle:**	<10°

Kerikeri Volcanic Group

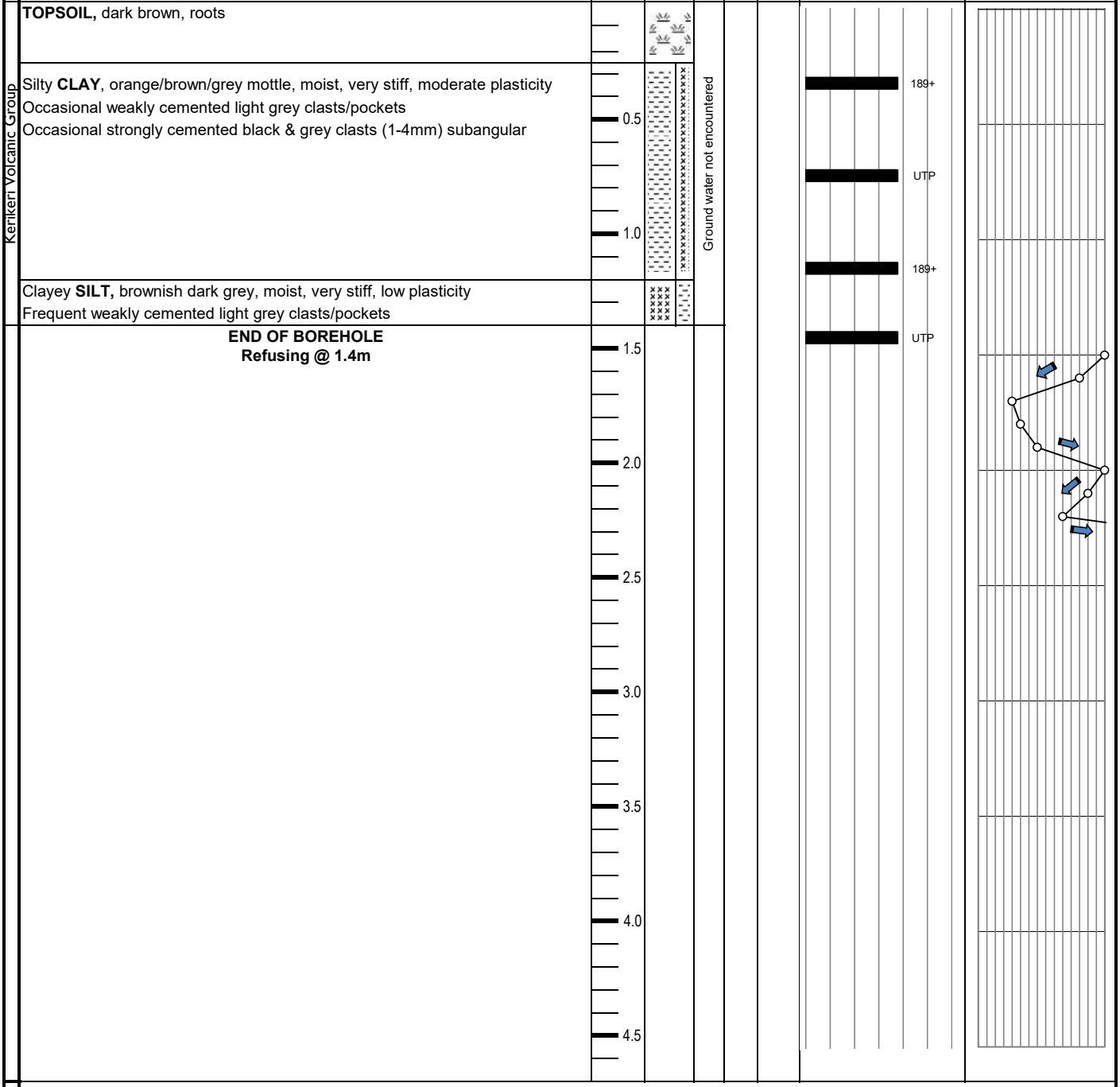
TOPSOIL, dark brown, roots

Silty **CLAY**, orange/brown/grey mottle, moist, very stiff, moderate plasticity
Occasional weakly cemented light grey clasts/pockets
Occasional strongly cemented black & grey clasts (1-4mm) subangular

Clayey **SILT,** brownish dark grey, moist, very stiff, low plasticity
Frequent weakly cemented light grey clasts/pockets

END OF BOREHOLE
Refusing @ 1.4m

Ground water not encountered



LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

In situ shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Average Scala Blows	12.33
Average Soil Sensitivity	1.0

DYNAMIC CONE PENETROMETER SHEET

Site:	37B Maraenui Drive, Kerikeri				
Job No.:	133700	**Initials:**	MRS	**Date:**	10/08/2021

Test No.	1	2	3							
DEPTH (m)	**Blows/100mm**									
0.1	2	2	1							
0.2	2	3	4							
0.3	2	3	3							
0.4	5	2	3							
0.5	5	3	4							
0.6	8	3	4							
0.7	9	4	8							
0.8	5	6	7							
0.9	7	8	10							
1.0	7	8	15							
1.1	5	6	19							
1.2	7	7	20							
1.3	10	6	30+							
1.4	8	8								
1.5	9	9								
1.6	14	7								
1.7	30+	10								
1.8		17								
1.9										
2.0										
2.1										
2.2										
2.3										
2.4										
2.5										
2.6										
2.7										
2.8										
2.9										
3.0										
3.1										
3.2										
3.3										
3.4										
3.5										
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6.2										
6.3										
6.4										
6.5										
6.6										
6.7										
6.8										
6.9										
7.0										
Total Depth	1.7	1.8	1.3							

Foundation Maintenance and Footing Performance:
A Homeowner's Guide

PUBLISHING

BTF 18-2011 replaces Information Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870-2011, the Residential Slab and Footing Code.

Causes of Movement

Settlement due to construction

There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

Erosion

All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

Saturation

This is particularly a problem in clay soils. Saturation creates a bog-like suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume, particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

Seasonal swelling and shrinkage of soil

All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

Shear failure

This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.

In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

GENERAL DEFINITIONS OF SITE CLASSES

Class	Foundation
A	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites, which may experience only slight ground movement from moisture changes
M	Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes
H1	Highly reactive clay sites, which may experience high ground movement from moisture changes
H2	Highly reactive clay sites, which may experience very high ground movement from moisture changes
E	Extremely reactive sites, which may experience extreme ground movement from moisture changes

Notes

1. Where controlled fill has been used, the site may be classified A to E according to the type of fill used.
2. Filled sites. Class P is used for sites which include soft fills, such as clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soil subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise.
3. Where deep-seated moisture changes exist on sites at depths of 3 m or greater, further classification is needed for Classes M to E (M-D, H1-D, H2-D and E-D).

Tree root growth
Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

Unevenness of Movement

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

Effects of Uneven Soil Movement on Structures

Erosion and saturation
Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpends).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

Seasonal swelling/shrinkage in clay
Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

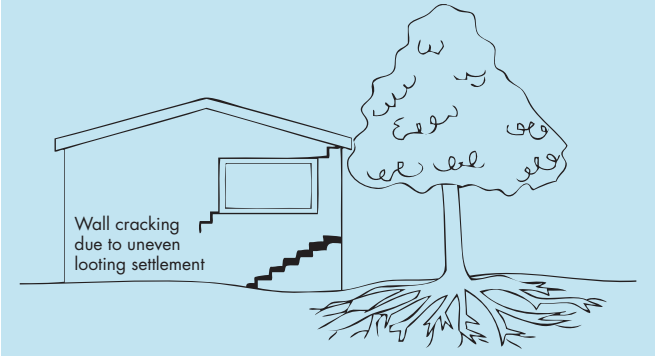
The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring.

As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

Trees can cause shrinkage and damage



Movement caused by tree roots
In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

Complications caused by the structure itself
Most forces that the soil causes to be exerted on structures are vertical – i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

Effects on full masonry structures
Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

Effects on framed structures
Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation causes a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

Effects on brick veneer structures
Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem. Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

- Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.
- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870-2011.

AS 2870-2011 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

Prevention/Cure

Plumbing
Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

Ground drainage
In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the stormwater collection system is usually an easy solution.

It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

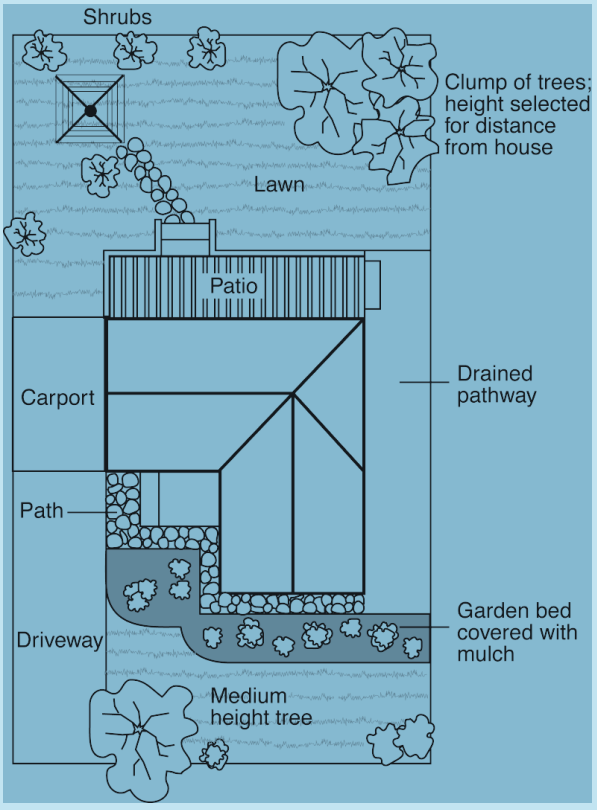
Protection of the building perimeter
It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving should

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS

Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows stick slightly.	<5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired.	5–15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted.	15–25 mm but also depends on number of cracks	4

Gardens for a reactive site



extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

Condensation

In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

Warning: Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

The garden

The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

Existing trees

Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

Information on trees, plants and shrubs

State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

Excavation

Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.

Distributed by

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CONSTRUCTION MONITORING SERVICES

Construction monitoring is a service, which provides the client with independent verification (to the extent of the consultant's engagement) that the works have been completed in accordance with specified requirements. Most construction projects are unique, and construction works are often complex in detail and skilled professional involvement is necessary for the successful execution of such projects.

The decision as to which level is appropriate will be project dependent, but factors influencing the level of construction monitoring for a project are the size and importance of the project, the complexity of the construction works, and the experience and demonstrated skill in quality management of the constructor. The primary responsibility for completing the contract works in accordance with the requirements of the plans and specifications is the constructor's.

The involvement of the consultants is important during the construction phase to ensure that the design is being correctly interpreted, the construction techniques are appropriate and do not reduce the effectiveness of the design and the work is completed generally in accordance with the plans and specifications. The risk of non-compliance can be reduced by increasing the involvement of the consultant.

Table 1 sets out the five levels of construction monitoring, describes the types of review and indicates where a particular level of monitoring is appropriate. Tables 2 and 3 provide rating values for various aspects of a project to enable an assessment of an appropriate monitoring level to be made.

Table 1

LEVEL	REVIEW	COMMENT
CM1	Monitor the outputs from another party's quality assurance programme against the requirements of the plans and specifications. Visit the works at a frequency agreed with the client to review important materials of construction critical work procedures and/or completed plant or components. Be available to advise the constructor on the technical interpretation of the plans and specifications.	This level is only a secondary service. It may be appropriate where:- For the design consultant when another party is engaged to provide a higher level of construction monitoring or review during the period of construction or:- When the project works are the subject of a performance based specification and performance testing is undertaken and monitored by others.
CM2	Review, preferable at the earliest opportunity, a sample of each important work procedure, material of construction and component for compliance with the requirements of the plans and specifications and review a representative sample of each important completed work prior to enclosure or completion s appropriate. Be available to provide the constructor with technical interpretation of the plans and specification.	This level of service is appropriate for smaller projects of a routine nature being undertaken by an experienced and competent constructor and where a higher than normal risk of non-compliance is acceptable. It provides for the review of a representative sample of work procedures and materials of construction. The assurance of compliance of the finished work is dependent upon the constructor completing the work to at least the same standard as the representative sample reviewed.
CM3	Review, to an extent agreed with the client, random samples of important work procedures, for compliance with the requirements of the plans and specifications and review important completed work prior to enclosure or on completion as appropriate. Be available to provide the constructor with technical interpretation of the plans and specifications.	This level of service is appropriate for medium sized projects of a routine nature being undertaken by an experienced constructor when a normal risk of non-compliance is acceptable.
CM4	Review, at a frequency agreed with the client, regular samples of work procedures, materials of construction and components for compliance with the requirements of the plans and specifications and review the majority of completed work prior to the enclosure or on completion as appropriate.	This level of service is appropriate for projects where a lower than normal risk of non-compliance is required.
CM5	Maintain personnel on site to constantly review work procedures, materials of construction and components for compliance with the requirements of the plans and specifications and review completed work prior to enclosure or on completion as appropriate.	This level of service is appropriate for Major projects -Projects where the consequences of failure are critical -Projects involving innovative or complex construction procedures. The level of service provides the client with the greatest assurance that the completed work complies with the requirements of the plans and specifications.

Source www.ipenz.org.nz/ipenz/practicesupport/endorsedinfo/codes

Table 2

CRITERIA	K	ASSESSMENT				SELECTED VALUE
Project Status		Small	Medium	Large	Major	
	KA	1	2	3	4	
Complexity of work procedures		Routine	Difficult	Complex		
	KB	2	4	6		
Constructor's relevant experience		Inexperienced	Experienced	Certified ISO 9000		
	KC	6	2	1		
Consequences of non-compliance		Minor	Moderate	Serious	Critical	
	KD	1	4	6	12	
					KTOTAL = KA + KB + KC + KD ->	

Table 3

	LEVEL OF CONSTRUCTION MONITORING				
KTOTAL	CM1	CM2	CM3	CM4	
5-6	-	Sampling only	-	-	-
7-8	-	N/A	Weekly	-	-
9-10	A	N/A	Twice Weekly	-	-
11-12	Secondary	N/A	N/A	Twice Weekly	-
13-14	Service	N/A	N/A	Every second day	-
15-16	-	N/A	N/A	Daily	-
17-	-	N/A	N/A	N/A	Constant

N/A = Not Appropriate

- Secondary Service - This level of service is only appropriate when another party is responsible for undertaking the primary review of construction standards.
- Table 3 indicates the frequency of review considered to be appropriate for the project concerned. Not indicated is the time input requirement at each review. The time on each occasion will increase with the increased size and complexity of the construction works and should be agreed with the consultant at the time of engagement.
- Frequency of inspection is intended to be indicative of involvement with actual frequency dependent on the rate of progress of the works.

Rules Assessment

Proposal: Construction of a new residential unit

Address: 37B Maraenui Drive, Kerikeri

District Plan: Operative Far North Plan

Site Zoning	
Zone	Rural Living Zone
Overlays/Controls	None
Designations	None

Rule	Compliance	Non-Compliance
Rural Living Zone - 8.7.5.1 PERMITTED ACTIVITIES		
8.7.5.1.1 RESIDENTIAL INTENSITY Residential development shall be limited to one unit per 4,000m² of land. In all cases the land shall be developed in such a way that each unit shall have at least 3,000m² for its exclusive use surrounding the unit plus a minimum of 1,000m² elsewhere on the property. Except that this rule shall not limit the use of an existing site or a site created pursuant to Rule 13.7.2.1 (Table 13.7.2.1), for a single residential unit for a single household, provided that all other standards for permitted activities are complied with.		**Does Not Comply** As the proposed residential unit does not comply with rules 8.7.5.1.5 it will require consent pursuant to rule 8.7.5.4.1. **Discretionary Activity.**
8.7.5.1.2 SCALE OF ACTIVITIES The total number of people engaged at any one period of time in activities on a site, including employees and persons making use of any facilities, but excluding people who normally reside on the site or are members of the household shall not exceed 1 person per 1,000m² of net site area. Provided that:	**Complies** As this land use is for a proposed development of a new residential unit (b) states that construction work is excluded from this rule. **Permitted Activity.**	

Rule	Compliance	Non-Compliance
(a) this number may be exceeded for a period totalling not more than 60 days in any 12-month period where the increased number of persons is a direct result of activities ancillary to the primary activity on the site; and (b) this number may be exceeded where persons are engaged in constructing or establishing an activity (including environmental enhancement) on the site; (c) this number may be exceeded where persons are visiting marae.		
8.7.5.1.3 BUILDING HEIGHT The maximum height of any building shall be 9m.	**Complies** Sheet 5/5 of Appendix 2 shows the proposed residential unit is under the 9m maximum building height. **Permitted Activity.**	
8.7.5.1.4 SUNLIGHT No part of any building shall project beyond a 45-degree recession plane as measured inwards from any point 2m vertically above ground level on any site boundary	**Complies** Sheet 4/5 and 5/5 of Appendix 2 shows that no part of the proposed residential unit will infringe the 45-degree recession plane. **Permitted Activity.**	
8.7.5.1.5 STORMWATER MANAGEMENT The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 12.5% or 3,000m², whichever is the lesser.		**Does Not comply** The areas of impermeable surfaces are below as outlined on sheet 1/5 of Appendix 2 • Existing ROW: 276m^2 • Proposed Driveway: 242m^2 • Roof Plan Area: 270m^2 Total: 788m^2 or 22.8%

Rule	Compliance	Non-Compliance
		Discretionary Activity as the impermeable surface area cannot meet the RDA standards.
8.7.5.1.6 SETBACK FROM BOUNDARIES (a) the minimum building setback from the boundary of any Rural Production Zone shall be 10m and from any boundary with the Minerals Zone the setback shall be 20m; (b) the minimum building setback from boundaries, apart from a boundary with any Rural Production and Minerals Zones, shall be 3m, and (c) a continuous shelter belt is to be established comprising species capable of growing to a height of 6m on any boundary which adjoins a Rural Production and Minerals Zone, provided that a break in this shelter belt is permitted where it is necessary in order to provide access to the site; (d) except that no building shall be erected within 12m of any road boundary with Kerikeri Road on properties with a road frontage with Kerikeri Road between its intersection with SH10 and Cannon Drive.	**Complies** (a) N/A (b) Sheet 2/5 of the Plans of Appendix 2 show the proposed residential unit is set back more that 3m from any boundary. (c) N/A (d) N/A **Permitted Activity.**	
8.7.5.1.7 SCREENING FOR NEIGHBOURS – NON-RESIDENTIAL ACTIVITIES	N/A – Residential Activity is proposed.	
8.7.5.1.8 TRANSPORTATION Refer to Chapter 15 – Transportation for Traffic, Parking and Access rules	See table below.	
8.7.5.1.9 HOURS OF OPERATION - NON-RESIDENTIAL ACTIVITIES	N/A – Residential Activity is proposed.	
8.7.5.1.10 KEEPING OF ANIMALS	N/A – No keeping of animals is proposed.	
8.7.5.1.11 NOISE	Will comply.	

Rule	Compliance	Non-Compliance
All activities shall be conducted so as to ensure that noise from the site shall not exceed the following noise limits as measured at or within the boundary of any other site in this zone or any site in the Coastal Residential, Residential or Russell Township Zones or at or within the notional boundary of any dwelling in any other rural or coastal zone: 0700 to 2200 hours: 55 dBA L10 2200 to 0700 hours 45 dBA L10 and 70 dBA Lmax		
8.7.5.1.12 HELICOPTER LANDING AREA	N/A No Helicopter pad is proposed	
8.7.5.1.13 BUILDING COVERAGE Any new building or alteration/addition to an existing building is a permitted activity if the total Building Coverage of a site does not exceed 10% or 2400m2, whichever is the lesser, of the gross site area.	**Complies** Sheet 1/5 of the Plans included as Appendix 2 provide the following breakdown of building coverage: • Building coverage: 270m^2 • Total: 8% **Permitted Activity.**	
Natural and Physical Resources		
12.3.6.1.2 EXCAVATION AND/OR FILLING IN THE RURAL LIVING ZONE Excavation and/or filling, excluding mining and quarrying, on any site in the Rural Living Zone is permitted, provided that: (a) it does not exceed 300m^3 in any 12-month period per site; and (b) it does not involve a cut or filled face exceeding 1.5m in height i.e., the maximum permitted cut and fill height may be 3m.	**Complies** Sheet 2/5 of the Plans in Appendix 2 show: (a) proposed excavation volume to be 238m^3. (b) maximum cut and fill faces are: • Cut: 1m • Fill: 1.5m Total 2.5m **Permitted activity**	
12.4.6.1.2 FIRE RISK TO RESIDENTIAL UNITS	**Complies**	

Rule	Compliance	Non-Compliance
(a) Residential units shall be located at least 20m away from the drip line of any trees in a naturally occurring or deliberately planted area of scrub or shrubland, woodlot or forest; (b) Any trees in a deliberately planted woodlot or forest shall be planted at least 20m away from any urban environment zone, Russell Township or Coastal Residential Zone boundary, excluding the replanting of plantation forests existing at July 2003.	(a) The proposed dwelling will be more than 20m from any dripline of any trees in a naturally occurring or deliberately planted area of scrub or shrubland, woodlot or forest. (b) N/A **Permitted Activity.**	
12.7.6.1.4 LAND USE ACTIVITIES INVOLVING DISCHARGES OF HUMAN SEWAGE EFFLUENT Land use activities which produce human sewage effluent (including grey water) are permitted provided that: (a) the effluent discharges to a lawfully established reticulated sewerage system; or (b) the effluent is treated and disposed of on-site such that each site has its own treatment and disposal system no part of which shall be located closer than 30m from the boundary of any river, lake, wetland or the boundary of the coastal marine area. Note: The discharge may also require consent under the Regional Water and Soil Plan.	**Complies** (a) N/A (b) The proposal has an on-site system and will be located more than 30m from any river, lake, wetland or boundary of the coastal marine area. **Permitted Activity**	
15.1.6.A.2.1 Maximum Daily One-way Movements 20 movements	N/A – First residential unit exempt	
15.1.6B.1.1 On Site Car Parking Spaces 2 per residential unit	**Complies** The plans included as Appendix 2 show a double garage is proposed. **Permitted Activity.**	
Rule 15.1.6B.1.5 Car Parking Space Standards Car parking spaces and manoeuvring areas shall be formed in accordance with the requirements of Appendix 3D and 3E of the District Plan.	**Complies** The plans provided show ample manoeuvring space on site. **Permitted Activity.**	

Rule	Compliance	Non-Compliance
Rule 15.1.6C.1.5 Vehicle Crossing Standards in Rural and Coastal Zones a). Private access off roads in the rural and coastal zones, the vehicle crossing is be to constructed in accordance with the Council's 'Engineering Standards and Guidelines' b). Where the access is off a sealed road, the vehicle crossing plus splays shall be surfaced with permeant impermeable surfacing for at least the first 5m from the road carriageway or up to the road boundary, whichever is lesser. c). Where the vehicle crossing services two or more properties the private accessway is to be 6m wide and is to extend a minimum distance of 6m from the edge of the carriageway.	**Complies** (a) The proposed access arrangements have been designed in accordance with Council's 'Engineering Standards and Guidelines'. (b) The vehicle crossings have already been constructed and consists of permeant impermeable surfaces. (c) N/A **Permitted Activity.**	

Rules Assessment

District Plan: Proposed Far North District Plan 'PDP'

Site Zoning	
Zone	**Rural Residential**
Overlays/Controls	None
Designations	None

Rule	Compliance	Non-Compliance
Rules and Standards That Have Immediate Legal Effect under the PDP		
Part 2 – District Wide Matters /Hazards and Risks / Hazardous Substances		
HS-R2 Establishment of a New Significant Hazardous Facility	N/A	
HS-R5 Significant Hazardous facility Within a Scheduled Site and Area of Significance to Māori	N/A	
HS-R6 Significant Hazardous facility Within a Significant Natural Area	N/A	
HS-R9 Significant Hazardous facility Within a Scheduled Heritage Resource	N/A	
Part 2 – District Wide Matters / Historical and Cultural Values / Heritage Area Overlays		
HA-R1 Maintenance and Repair of Buildings or Structures	N/A	
HA-R2 Additions or Alterations to Existing Buildings or Structures	N/A	
HA-R3 Strengthening or Fire Protection of Scheduled Heritage Resource	N/A	
HA-R4 New buildings or Structures	N/A	
HA-R5 Earthworks	N/A	
HA-R6 Infrastructure and Renewable Electricity Generation Infrastructure	N/A	
HA-R7 Buildings or Structures (including additions and alterations) Located within the Alderton Park Development	N/A	
HA-R8 New Buildings or Structures	N/A	
HA-R9 New Buildings or Structures	N/A	
HA-R10 Infrastructure and Renewable Electricity Generation Infrastructure	N/A	
HA-R11 Activities Not Otherwise Listed in this chapter	N/A	
HA-R12 Relocation of a Scheduled Heritage Resource	N/A	

Rule	Compliance	Non-Compliance
HA-R13 Demolition of a scheduled Heritage resource not otherwise listed in Rule HA-R13	N/A	
HA-R14 Demolition or relocation of a scheduled Heritage Resource	N/A N/A	
HA-S1 Setback From a scheduled heritage resource		
HA-S2 Heritage Colours	N/A	
HA-S3 Accidental Discovery Protocol	N/A	
Part 2 – District Wide Matters / Historical and Cultural Values / Historic Heritage		
HH-R1 Maintenance and Repair of Scheduled Heritage Resources Buildings or Structures	N/A	
HH-R2 Additions or Alterations of Scheduled Heritage Resources Buildings or Structures	N/A	
HH-R3 Strengthening or Fire Protection of Scheduled Heritage Resource Buildings or Structures	N/A	
HH-R4 New Buildings or Structures, Extensions or Alterations to Existing Buildings or Structures	N/A	
HH-R5 Earthworks	N/A	
HH-R6 Infrastructure and Renewable Electricity Generation Infrastructure Within a Site Containing a Scheduled Heritage Resource	N/A	
HH-R7 Relocation of a Scheduled Heritage Resource	N/A	
HH-R8 Activities Not Otherwise Listed in this Chapter	N/A	
HH-R9 Demolition of a scheduled Heritage resource not otherwise listed in Rule HH-R10	N/A	
HH-R10 Demolition or relocation of a scheduled Heritage Resource	N/A	
Part 2 – District Wide Matters / Historical and Cultural Values / Notable Trees		
NT-R1 Gardening, Mowing and Cultivation Within the Rootzone Area of a Notable Tree	N/A	
NT-R2 Maintenance, Pruning and Trimming of Branches of a Notable Tree	N/A	
NT-R3 Removal or Pruning of an Unsafe or Dead Notable Tree	N/A	

Rule	Compliance	Non-Compliance
NT-R4 Pruning of a Notable Tree Close to Existing Electricity Lines	N/A	
NT-R5 New Underground Infrastructure (including customer connections) and Upgrading of Existing Underground Infrastructure in the Rootzone Area of a Notable Tree	N/A	
NT-R6 Alterations to the Rootzone Area of a Notable Tree or Trees	N/A	
NT-R7 Earthworks, Impermeable Surfaces, Buildings or Structures within a Rootzone Area of a Notable Tree or Trees	N/A	
NT-R8 Removal or Relocation of a Notable Tree	N/A	
NT-R9 Activities Not Otherwise Listed in This Chapter	N/A	
NT-S1 Qualified Arborist – Level 4	N/A	
NT-S1 Qualified Arborist – Level 6	N/A	
Part 2 – District Wide Matters / Historical and Cultural Values / Sites and Areas of Significance to Māori		
SASM-R1 New Buildings or Structures, Extensions or Alterations to Existing Buildings or Structures, Earthworks or Indigenous Vegetation Clearance	N/A	
SASM-R2 New Buildings or Structures, Extensions or Alterations to Existing Buildings or Structures, Earthworks or Indigenous Vegetation Clearance	N/A	
SASM-R3 Activities Not Otherwise Listed in this Chapter	N/A	
SASM-R4 Commercial Activity	N/A	
SASM-R5 Plantation Forestry and Plantation Forestry Activity	N/A	
SASM-R6 Mineral Extraction Activity	N/A	
SASM-R7 Destruction or Demolition of a Scheduled Site and Area of Significance to Māori	N/A	
Part 2 – District Wide Matters / National Environment Values / Ecosystems and Indigenous Biodiversity		
IB-R1 Indigenous Vegetation Pruning, Trimming and Clearance and Any Associated Land Disturbance for Specified Activities Within and Outside a Significant Natural Area	N/A	
IB-R2 Indigenous Vegetation Clearance and Any Associated Land Disturbance	N/A	

Rule	Compliance	Non-Compliance
within a Significant Natural Area for Papakāinga		
IB-R3 Indigenous Vegetation Clearance and Any Associated Land Disturbance Within a Significant Natural Area	N/A	
IB-R4 Indigenous Vegetation Clearance and Any Associated Land Disturbance Outside a Significant Natural Area	N/A	
IB-R5 Plantation Forestry and Plantation Forestry Activities Within a Significant Natural Area	N/A	
Part 2 – District Wide Matters / Subdivision		
SUB-R6 Environmental Benefit Subdivision	N/A	
SUB-R13 Subdivision of a Site Within a Heritage Area Overlay	N/A	
SUB-R14 Subdivision of a Site That Contains a Scheduled Heritage Resource	N/A	
SUB-R15 Subdivision of a Site Containing a Scheduled Site and Area of Significance to Māori	N/A	
SUB-R17 Subdivision of a Site Containing a Scheduled SNA	N/A	
Part 2 – District Wide Matters / General District Wide Matters / Activities on the Surface of Water		
ASW-R1 The Use of Non-Motorised Craft	N/A	
ASW-R2 The Use of Motorised Craft	N/A	
ASW-R3 Structures	N/A	
ASW-R4 Any Activity Not Provided for as a Permitted or Discretionary in This Chapter	N/A	
Part 2 – District Wide Matters / General District Wide Matters / Earthworks		
EW-R12 Earthworks and the Discovery of Suspected Sensitive Material	Complies	
EW-R13 Earthworks and Erosion and Sediment Control	Complies	
EW-S3 Accidental Discovery Protocol	Complies	
EW-S5 Erosion and Sediment Control	Complies	
Part 2 – District Wide Matters / General District Wide Matters / Signs		
SIGN-R9 Signs on or Attached to a Scheduled Heritage Resource	N/A	
SIGN-R10 Signs in the Kororāreka Russell and Kerikeri Heritage Areas	N/A	
SIGN-S1 Maximum Sign Area Per Site	N/A	

Rule	Compliance	Non-Compliance
SIGN-S2 Maximum Height of Signage	N/A	
SIGN-S3 Maximum Number of Signs	N/A	
SIGN-S4 Traffic Safety	N/A	
SIGN-S5 Sign Design and Content	N/A	
SIGN-R6 Sign Setback and Design	N/A	
Part 3 – Area Specific Matters / Special Purpose Zones / Orongo Bay		
OBZ-R14 Comprehensive Development Plan	N/A	