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

Office Use Only
Application Number:

Application for resource consent or fast-track resource consent

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

1. Pre-Lodgement Meeting

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

2. Type of Consent being applied for

(more than one circle can be ticked):

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

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

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

◯ **Yes** ✔ **No**

4. Consultation

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

If yes, which groups have you consulted with?	Ngapuhi and Te Uri O Hua
Who else have you consulted with?	Heritage NZ Pouhere Taonga

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

5. Applicant Details

Name/s: Prospect Estate Ltd c/- Peter Giesbers

Email: [redacted]

Phone number:

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

6. Address for Correspondence

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

Name/s: Northland Planning & Development 2020 Ltd

Email: [redacted]

Phone number:

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

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

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

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

Name/s: Prospect Estate Limited

Property Address/ Location: 93 Station Road, Kaikohe

Postcode 0474

8. Application Site Details

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

Name/s: Prospect Estate Limited

Site Address/ Location: 93 Station Road, Kaikohe

Postcode 0474

Legal Description: Pt Rangihamama A2, Tuhuna A & B **Val Number:** 00523-77500

Certificate of title: NA314/202, NA269/58 & NA269/56

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

Site visit requirements:

Is there a locked gate or security system restricting access by Council staff? ◯ **Yes** ✔ **No**

Is there a dog on the property? ◯ **Yes** ✔ **No**

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

Please contact applicant to organise site visit.

9. Description of the Proposal:

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

Proposed two staged subdivision in the Rural Production Zone.
Stage 1 - subdivision of Pt Rangihamama A2 Blk to create four additional allotments as a Restricted Discretionary Subdivision under the ODP.
Stage 2 - Controlled Activity boundary adjustment of Lot 5 of Stage 1, Tuhuna A & B. No additional titles will be created as part of this stage. Stage 2 also involves the creation of an assessment to adjoining lot Pt Kohewhata 11C2.

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

10. Would you like to request Public Notification?

◯ **Yes** ✔ **No**

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

(more than one circle can be ticked):

- ◯ **Building Consent** Enter BC ref # here (if known)
- ◯ **Regional Council Consent (ref # if known)** Ref # here (if known)
- ◯ **National Environmental Standard consent** Consent here (if known)
- ◯ **Other (please specify)** Specify 'other' here

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

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

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

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

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

13. Assessment of Environmental Effects:

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

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

13. Draft Conditions:

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

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

14. Billing Details:

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

Name/s: (please write in full) Prospect Estate Limited

Email: [redacted]

Phone number:

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

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

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

Name: (please write in full) Peter Giesbers

Signature: [redacted]
(signature of bill payer MANDATORY

Date 12-Jun-2025

15. Important Information:

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

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

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

15. Important information continued...

Declaration

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

Name: (please write in full) Peter Giesbers

Signature: [redacted] Date 12-Jun-2025

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

Checklist (please tick if information is provided)

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

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

Subdivision Resource Consent Proposal

Prospect Estate Limited

Thorpe Road, Kaikohe

Date: 24/06/2025

Attention: Liz Searle and Whitney Peat – Team Leaders Resource Consents

Please find attached:

- an application form for a Subdivision Resource Consent to create a two staged subdivision on a site zoned ***Rural Production*** under the Operative District Plan*;* and
- an Assessment of Environmental Effects indicating the potential and actual effects of the proposal on the environment.

The subdivision requires consent under the Operative District Plan as a **Restricted Discretionary Activity for Stage 1** and as a **Controlled Activity Boundary Adjustment for Stage 2**. The subdivision is a **Permitted Activity** under the Proposed District Plan.

If you require further information, please do not hesitate to contact me.

Regards

Alex Billot

Resource Planner

Reviewed by:

Rochelle Jacobs

Director/Senior Planner

NORTHLAND PLANNING & DEVELOPMENT 2020 LIMITED

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Appendices

1. **Far North District Council Application Form**
2. **Certificate of Title NA314/202** – *LINZ*
3. **Certificate of Title NA269/58 –** *LINZ*
4. **Certificate of Title NA269/56** - *LINZ*
5. **Scheme Plan Stage 1 –** *Williams & King*
6. **Scheme Plan Stage 2 –** *Williams & King*
7. **Site Suitability Report –** *Geologix*
8. **Correspondence –** *Te Hono Support*
9. **Correspondence –** *Heritage NZ Pouhere Taonga*
10. **Correspondence –** *Iwi*

Assessment of Environment Effects Report

1.0 Description of the Proposed Activity

Stage 1 - Subdivision

1.1 The proposal is to undertake a two staged subdivision within the Rural Production zone. Stage 1 will consist of subdividing Pt Rangihamama A2 block to create four additional allotments as well as the creation of easements to provide legal access to adjoining allotments Tuhuna A & B, which currently utilise an informal access (these sites technically have no legal access rights at present).

1.2 The proposed lot sizes for Stage 1 are as follows:

- Proposed Lot 1 – 2.0101ha
- Proposed Lot 2 – 2.1771ha
- Proposed Lot 3 – 2.0388ha
- Proposed Lot 4 – 2.0114ha
- Proposed Lot 5 – 7.6090ha

Areas and measurements are subject to final survey.

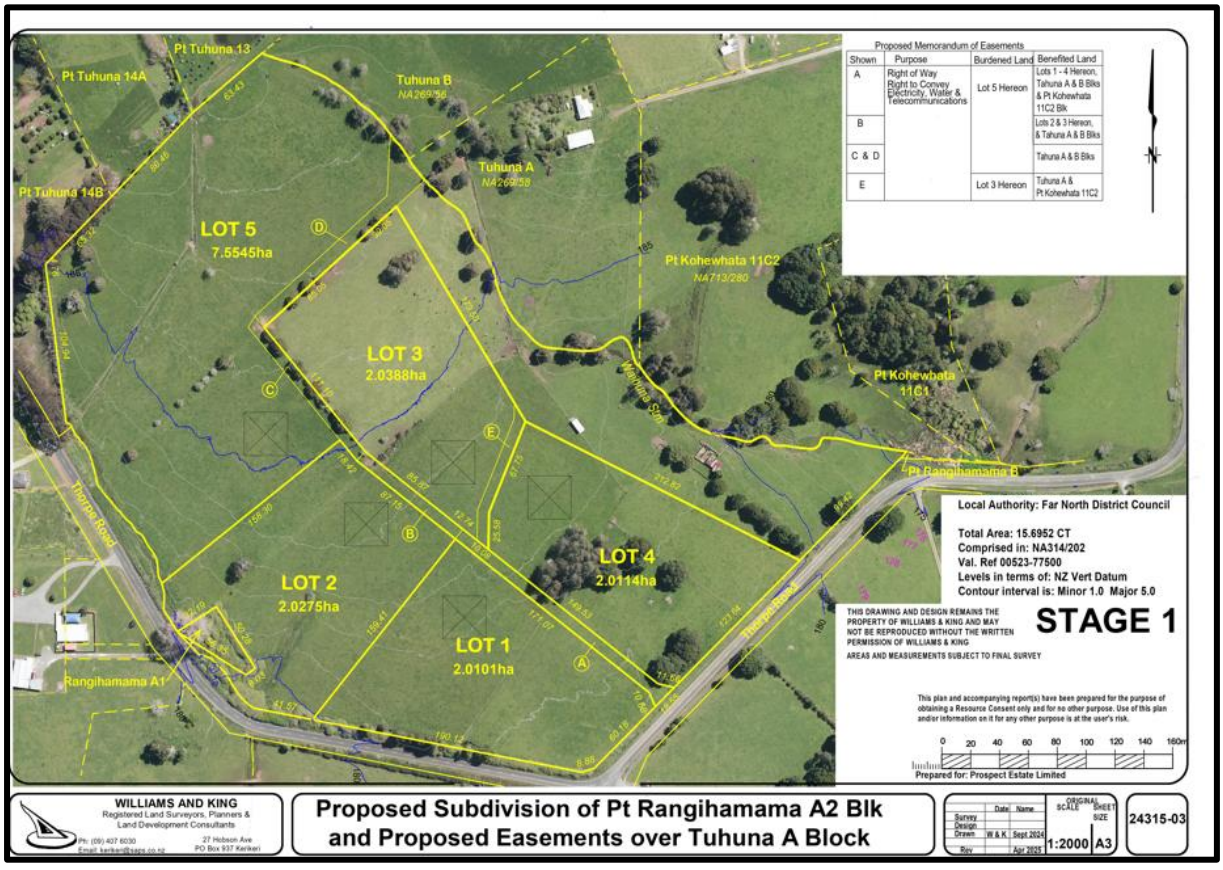


Figure 1: Proposed Stage 1 scheme plan.

1.3 Stage 1 has been assessed as a **Restricted Discretionary** subdivision in accordance with Section 13.7.2.1(i) of the ODP.

Stage 2 – Boundary Adjustment

1.4 Stage 2 will consist of a boundary adjustment between Lot 5 of Stage 1 as well as adjoining lots Tuhuna A & B. As part of Stage 2, no additional titles will be created, the boundaries of the three lots will be reconfigured to create three new shaped lots. The proposed lots will enable more effective and practical use of the land by providing a consistent balance lot along the eastern side, with the two hectare allotments congregated to the western side of the site. This will enable effective and efficient use of the site and the access, whilst maximising the potential of the balance lot. This is shown in ***Figure 2*** below. Easement D will also be created to provide access to adjoining lot Pt Kohewhata 11C2.

1.5 The proposed lot sizes for Stage 2 are as follows:

- Proposed Lot 6 – 2.2834ha
- Proposed Lot 7 – 2.2779ha
- Proposed Lot 8 – 7.5622ha

Areas and measurements are subject to final survey.

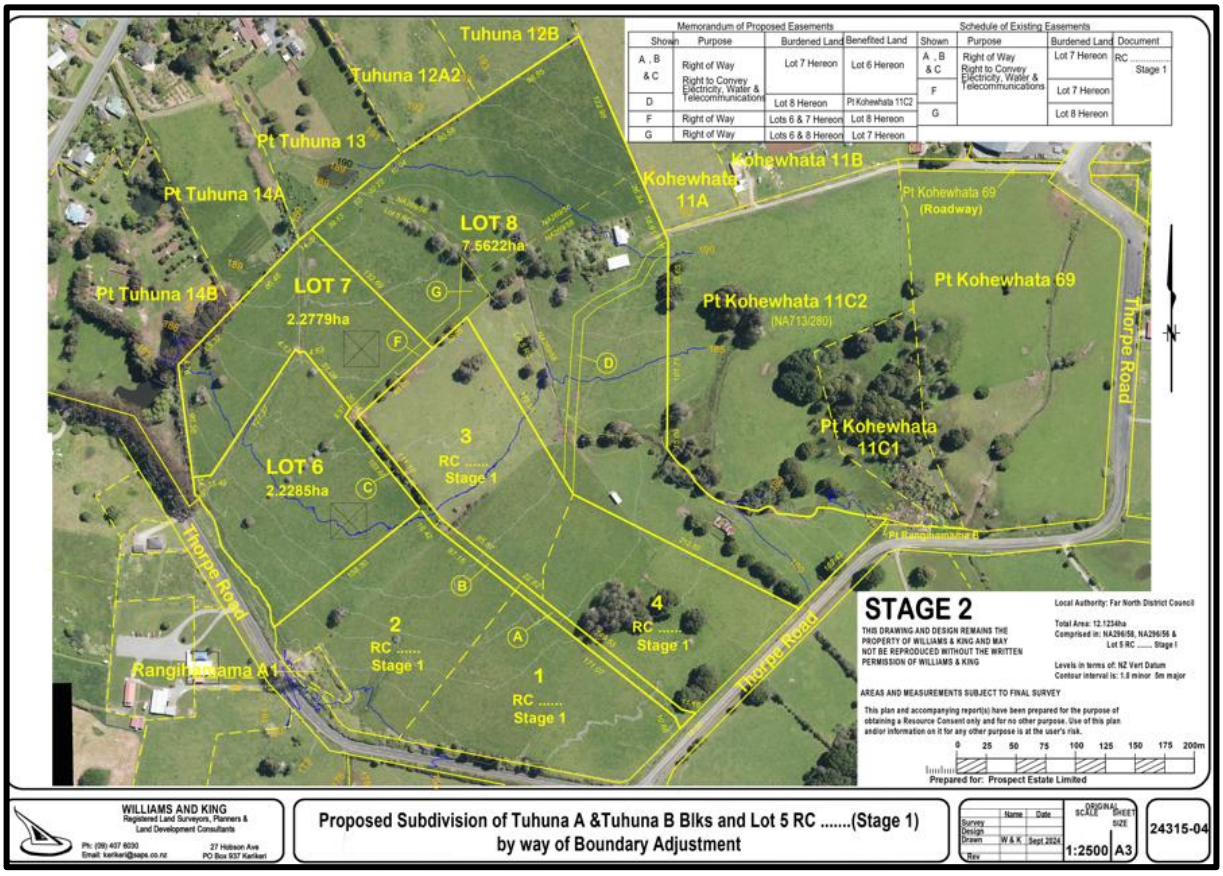


Figure 2: Proposed Stage 2 scheme plan.

1.6 Stage 2 has been assessed as **Controlled Activity Boundary Adjustment** in accordance with Section 13.7.1 of the Operative District Plan.

Site Suitability Report

1.7 A Site Suitability Report (SSR) has been completed by Geologix in support of the proposal. This is attached within **Appendix 7** of this application. The SSR also includes neighbouring developments, which will also be completed by the Applicant. The stages relevant to this proposal within the SSR are described as 'Stages 2 & 3'. It is therefore requested that only the relevant sections which refer to Stages 2 & 3 within the SSR are referred to as part of this proposal, however reference to the other stages can be reviewed to provide a full picture of the developments.

1.8 The SSR has been prepared generally in accordance with the FNDC 2023 Engineering Standards (stormwater, drainage and wastewater). However, to ensure that the application does not result in technical infringements to the ODP rules for property access, the 2009 Engineering Standards have been utilised. This ensures the proposal remains a Restricted Discretionary Activity rather than becoming a Discretionary Activity.

2.0 The site and surrounding environment

2.1 The subject sites are located on the outskirts of the Kaikohe township. Lindvart Park, which is a recreational area is located to further east of the site, with Industrial zoned lots to the north-east. To the south are Rural Production zoned lots, as well as to the west. Many lots in the surrounding environment to the west and south of the site have been rezoned as Māori Purpose - Rural under the Proposed District Plan (PDP).

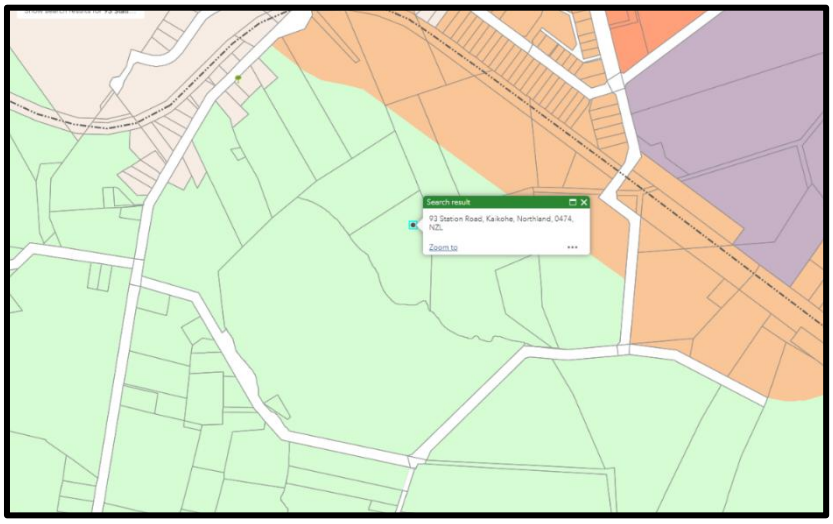


Figure 3: FNDC Operative District Plan Zoning

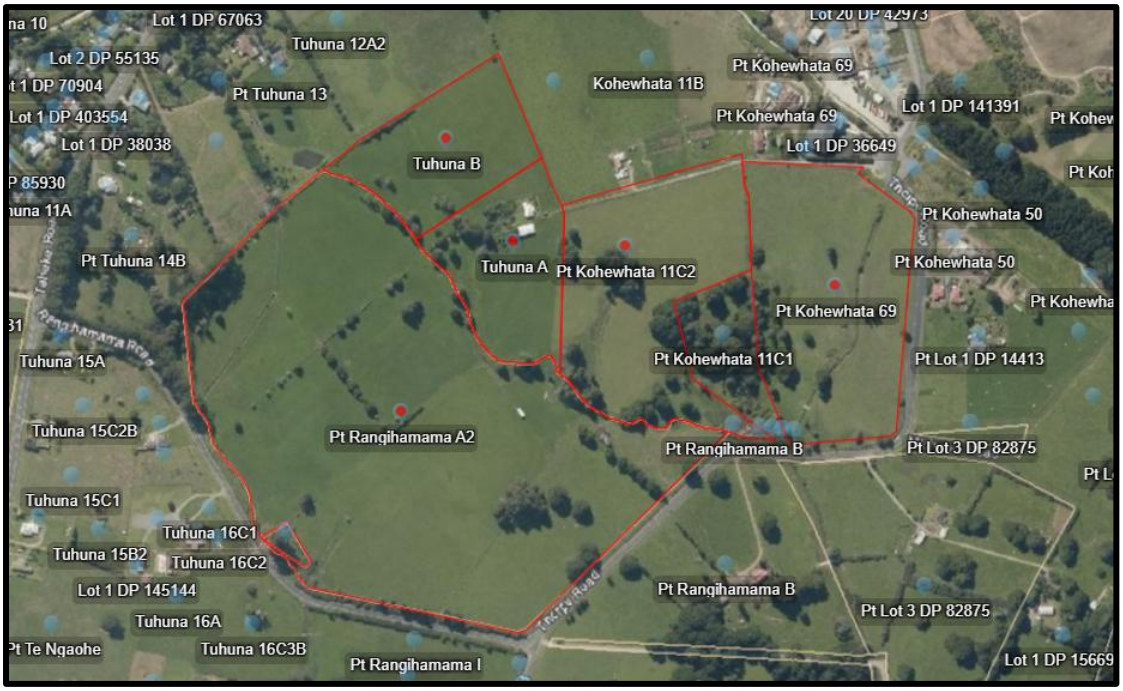


Figure 4: Aerial view of the subject site, adjoining allotments in same ownership and the surrounding environment.

2.2 As shown in **Figure 4** above, Pt Rangihamama A2 is currently vacant land and is utilized for grazing of livestock. The site is currently accessed via an existing farm crossing from Thorpe Road. Tuhuna B is also vacant land, which is utilized for grazing of livestock, with Tuhuna A containing an existing dwelling. It is noted that there is currently no legal access to Tuhuna A & B, which will be created as part of Stage 1 via easements as shown on the Stage 1 scheme plan. At present, the applicant has ownership of the sites subject of this application as well as adjoining sites which are also subject to subdivision approval. To ensure access to these sites is not jeopardised in the future, legal access will be enabled as part of Stage 1 of this application.

2.3 As discussed above, the surrounding environment consists of a range of lot sizes and land use activities. The subject sites are located within an area which is usually seen as a transition area between town and country. Although the site and surrounding lots to the south and west are zoned as Rural Production, the existing lot sizes in the area as well as land use activities are more rural lifestyle in nature. This is a common occurrence for lots which are located on the outskirts or buffer of townships, like Kaikohe.

Site Photos

2.4 A site visit was undertaken in March 2024, with a compilation of the photos below.

Figure 5: Existing dwelling on Tuhuna A taken from Pt Kohewhata 11C2.

Figure 6: Proposed Lots 2 & 6 of Stage 2.

Figure 7: Lots 1, 3 & 4 of Stage 1.

Figure 8: Existing shed on Lot 8.

Figure 9 - Waihuna Stream on Lot 8

Figure 10 - Widest extent of Waihuna Stream within the site, near road boundary

3.0 Background

Land Holdings in ownership of the Applicant

3.1. As illustrated in ***Figure 4*** above and reiterated in ***Figure 11*** below, the Applicant has ownership of the subject three sites and an additional two adjoining allotments. Each of these allotments is proposed to be subject to future subdivision with the proposed subdivision of Pt Kohewhata 69 being the first application and the subdivision of Pt Kohewhata 11C2 being subject of a latter subdivision proposal. The Site Suitability Report provided by Geologix and attached with this application, covers the multiple subdivisions across the sites, however it is imperative to note that only Pt Rangihamama A2, Tuhuna A & B are subject of this application and therefore no assessment of the future subdivision of the adjoining lots has been taken into consideration as part of this assessment.

3.2. Due to the nature and location of the future subdivisions on adjoining sites, assessment will be made of the overall effects at times as well as independently. However, in this case, the subdivision of the subject sites will be assessed independently, such that no effects of the future subdivisions on adjoining lots will be taken into consideration.

3.3. It is intended that this subdivision will occur second, with the subdivision of Pt Kohewhata 69 being completed first and the subdivision of Pt Kohewhata 11C2 being completed last. If necessary, consent conditions can be imposed referencing these other applications.

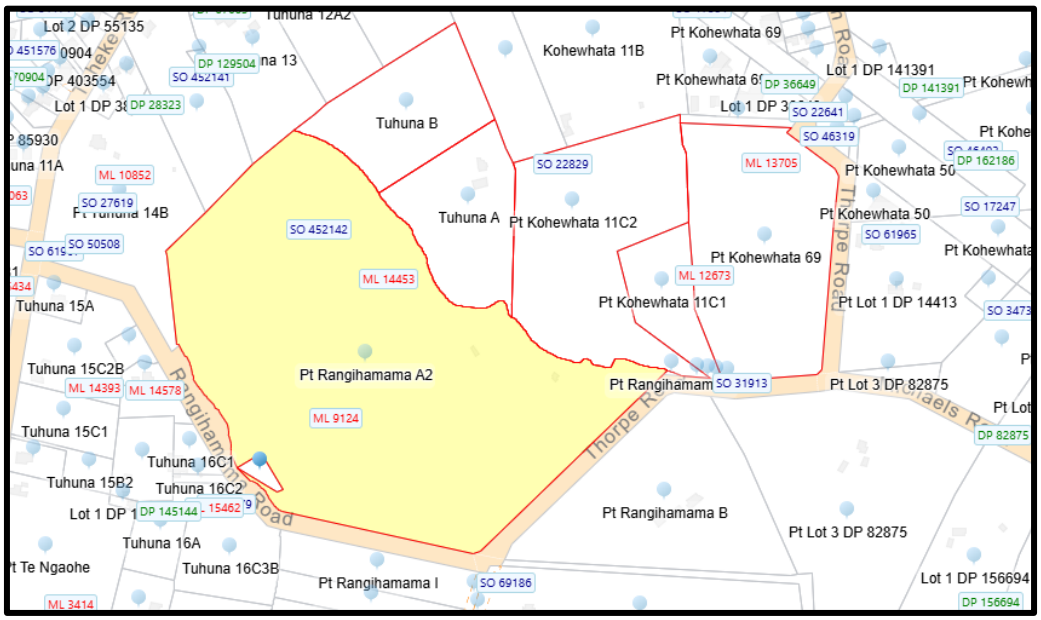


Figure 11: Image indicating lots in the Applicants ownership.

Title

3.4. Stage 1 will consist of the subdivision of Pt Rangihamama A No 2 Block which has a legal area of 17.0853ha. The title identifier is NA314/202 and is dated 15 September 1902. There are no consent notices or easements registered on the title.

3.5. Stage 2 will consist of the boundary adjustment subdivision of Lot 5 of Stage 1 as well as Tuhuna A and Tuhuna B. Tuhuna A is held within Title NA269/58, which is dated 20 June 1917 with a

land area of 2.2258ha. Tuhuna B is held within Title NA269/56 which is also dated 20 June 1917 with a land area of 2.2764ha. There are no consent notices or easements registered on either title.

Site Features

3.6. The sites are located within the Rural Production zone under the ODP as well as under the PDP.

3.7. The sites do not have existing connections to reticulated water, wastewater or stormwater. Onsite infrastructure catering for these services will be provided on site at the time of built development within the lots. Tuhuna A has existing built development with existing onsite servicing.

3.8. The NRC Hazard Maps do not indicate that the sites are susceptible to flooding.

3.9. NZAA has not mapped any archaeological sites within the property.

3.10. Waihuna Stream runs along the boundary of Pt Rangihamama A2. Waihuna Stream is considered to be less than 3 metres in width and will form the eastern boundary of Proposed Lot 5 of Stage 1, and will form part of the boundary and be partially contained within Lot 8 of Stage 2. There are no known significant areas of indigenous vegetation of habitats of fauna within the subject sites.

3.11. The subject sites are not located within an area where kiwi are present.

3.12. The sites are also not known to contain any areas of Outstanding Natural Landscapes or Features or areas of High Natural Character under the Regional Policy Statement for Northland (RPSN).

3.13. The subject sites are shown to have soils which are classified as LUC 2. These are classified as highly versatile soils. As per the Land Implementation Guide for the National Policy Statement for Highly Productive Land (NPS-HPL), consideration on the productive capacity of the land is not provided for within the discretion for activities with Controlled or Restricted Discretionary Activity statuses. However, consideration of the effect of the activity on existing land use activities must be provided for.

3.14. The site is not known to be located within a Statutory Acknowledgement Area.

4. Activity Status of the Proposal

Weighting of Plans

4.1. The sites are zoned as Rural Production under the Proposed District Plan.

4.2. The Council notified its' PDP on 27 July 2022. The period for public submissions closed on the 21 October 2022. A summary of submissions was notified on the 4 August 2023. The further

submission period closed on the 5 September 2023. It is apparent from the summary of submissions relating to the applicable zone that a large number relate to the application of these provisions. Based on the volume and comprehensive nature of these submissions, the Council has confirmed that no other rules will have legal effect until such time as a decision is made on those provisions.

4.3. District Plan hearings on submissions are currently underway and are scheduled to conclude in October 2025. No decision on the PDP has been issued. For this reason, little weight is given to the PDP provisions.

Operative District Plan

4.4. The sites are zoned Rural Production and therefore will be assessed against the criteria relevant to the Rural Production zone, including subdivision, zone and district wide rules.

ASSESSMENT OF THE APPLICABLE SUBDIVISION RULES FOR THE RURAL PRODUCTION ZONE:		
	PERFORMANCE STANDARDS	
Plan Reference	**Rule**	**Performance of Proposal**
13.7.1	**BOUNDARY ADJUSTMENTS**	Boundary adjustments may be carried out as a controlled subdivision activity provided that the following criteria are met. Stage 1 cannot be assessed as a boundary adjustment, however as Stage 2 will not create any additional titles or lots, assessment of Stage 2 against the boundary adjustment criteria has been undertaken below. To provide clarity, the lots which will be reconfigured as part of Stage 2 are: - Lot 5 of Stage 1 (to become Lot 8 of Stage 2) - Tuhuna A (to become Lot 6 of Stage 2) - Tuhuna B (to become Lot 7 of Stage 2) **(a) There is no change in the number and location of any access to the lots involved.** It is proposed that Stage 1 Lot 5 (while owning Easements A, B, C and D) will have its primary access via Easements A and E. This allotment becomes Stage 2 Lot 8. Lot 8 will continue to be accessed via easement A & E. At time of Stage 1 Tuhuna A will be provided with a legal access from Thorpe Road via a series of ROWs. Tuhuna A will be accessed via Easements A, B, C & D. At time of Stage 2 this allotment will become Lot 6. The ROWs providing access will remain the same except that it now will not

require access over Easement D. While access will not be required over Easements D for Lot 6, it is not considered that there will be a change to the location of the access as this will still be via the series of ROWs from Thorpe Road established at time of Stage 1.

At time of Stage 1 Tuhuna B will be provided with legal access from Thorpe Road via the same series of Easements as Tuhuna A; these being Easements A, B, C & D. At time of Stage 2 this allotment will become Lot 7, which will utilise access via the same series of Easements, A, B & C. Lot 7 will own the access from Thorpe Road. So, while the boundaries have changed to incorporate the access into this allotment the legal location remains the same. Access via Easement D will not be required however Easement D will remain to ensure there is no change in the location or number of accesses. Overall, it is considered that there will be no change to the location of the access as this will still be via the series of ROWs from Thorpe Road established at time of Stage 1.

Given that the access arrangements are not changing with access remaining off Thorpe Road via legal ROWs it is considered that the proposal is able to meet this standard.

(b) there is no increase in the number of certificates of title; and

There will not be an increase in the number of certificates of titles. The boundary adjustment subdivision will contain three certificates of title and will result in three certificates of titles. Therefore, there is no increase.

(c) the area of each adjusted lot complies with the allowable minimum lot sizes specified for the relevant zone, as a controlled activity in all zones except for General Coastal or as a restricted discretionary activity in the General Coastal Zone (refer Table 13.7.2.1); except that where an existing lot size is already non-complying the degree of non-compliance shall not be increased as a result of the boundary adjustment; and

The subdivision will involve the following lots –
Lot 5 of Stage 1 – 7.6090ha
Tuhuna A – 2.2258ha
Tuhuna B – 2.2764ha

		The resultant lots will be as follows: Lot 6 – 2.2834ha Lot 7 – 2.2779ha Lot 8 – 7.5622ha Therefore, the degree of non-compliance will not be increasing as two lots will remain over 2 hectares in area with the third lot remaining over 7 hectares in area. **(d) the area affected by the boundary adjustment is within or contiguous with the area of the original lots; and** The proposed lots will be within the areas of the existing three allotments. The boundaries will be reconfigured to enable more practical and effective lot sizes. **(e) all boundary adjusted sites must be capable of complying with all relevant land use rules (e.g building setbacks, effluent disposal); and** Only Lot 8 of Stage 2 will contain existing built development which can comply with the relevant land use rules. Lots 6 & 7 will be vacant land and have ample area to comply with the relevant land use rules once developed. **(f) all existing on-site drainage systems (stormwater, effluent disposal, potable water) must be wholly contained within the boundary adjusted sites.** As above. Therefore, it is determined that Stage 2 of this application can comply with the rules for boundary adjustments under this section. **As such, Stage 2 will be assessed as a Controlled Activity Boundary Adjustment.**
13.7.2.1 (i)	**MINIMUM LOT SIZES**	Stage 1 will be assessed against the relevant criteria under 13.7.2.1(i). The title is dated 1902. The proposal will create four additional allotments each over 2 hectares in area, with a balance lot of 7.6 hectares. The proposal can therefore meet the criteria within subclause (4) of this rule which allows for a maximum of 5 lots (including the parent lot) where the minimum size of the lots is 2ha. **Stage 1 – Restricted Discretionary Activity**

13.7.2.2	**ALLOTMENT DIMENSIONS**	**Stages 1 & 2 - Permitted** The minimum dimension is 30m x 30m taking into account the 10m setback. Stage 1 will create five allotments all of which are vacant and can adequately contain the 30m x 30m concept building envelope whilst meeting the setback provisions for the zone. Stage 2 will result in two vacant allotments and one allotment with built development. The two vacant allotments and developed allotment can adequately contain the 30m x 30m concept building envelope whilst meeting the setback provisions for the zone.
13.7.2.3 - 13.7.2.9	Not Applicable for this application.	

4.5. Stage 1 is able to meet the **Restricted Discretionary** provisions for the Rural Production zone and Stage 2 will be assessed as a **Controlled Activity Boundary Adjustment.**

Rural Production zone

4.6. Pt Rangihamama A2 Block does not currently contain any impermeable surfaces as the site is vacant land utilised for grazing of livestock. As part of Stage 1, no additional buildings or land use activities are proposed. New private accessways will be constructed within Lots 3 & 5. The only applicable rule considered under Section 8.6.5.1 to Stage 1 would be *8.6.5.1.3 Stormwater Management* which permits a maximum gross site are covered by buildings and impermeable surfaces of 15%.

4.7. Geologix have completed a Site Suitability Report (SSR) which included a summary of impervious surfaces post development for the proposed stages, which is shown below for clarity. It was determined that the impervious surfaces within the proposed lots as part of Stage 1 would be permitted in terms of Rule 8.6.5.1.3. As such, it is considered that Stage 1 is Permitted in terms of the rules under Section 8.6.5.1 of the ODP. Assessment of the Transportation Chapter will be undertaken in the table in the below section *District Wide Matters.*

Table 9: Summary of Impervious Surfaces, Stage 2

Parameter	Area					
Lot		1	2	3	4	5
Lot Area	m^2	20101	21771	20388	20114	76090
Existing						
Impervious	m^2	0	0	0	0	0
	%	0.00	0.00	0.00	0.00	0.00
Future (Concept)						
Roof	m^2	300	300	300	300	300
	%	1.49	1.38	1.47	1.49	0.39
Driveway	m^2	200	200	200	200	200
	%	0.99	0.92	0.98	0.99	0.26
RoW	m^2	0	0	335	0	2080
	%	0.00	0.00	1.64	0.00	2.73
Total	m^2	500	500	835	500	2580
	%	2.49	2.30	4.10	2.49	3.39
Activity Assessment						
Threshold	15 %	3015 m^2	3266 m^2	3058 m^2	3017 m^2	11414 m^2
Permitted		Yes	Yes	Yes	Yes	Yes

Figure 12 - Extract from the SSR report detailing proposed impermeable surface coverages at time of subdivision

4.8. As part of Stage 2, Lots 6 & 7 will not contain any residential dwellings. Lot 7 will contain the existing private accessway created as part of Stage 1 within Easements A, B & C. The impermeable surface coverage of Lot 7 has been calculated to be within the permitted threshold, as determined in the table below from Geologix. Lot 8 will contain an existing dwelling as well as proposed private accessway within Easement D. Geologix have calculated that the impermeable surface coverage within the site is within the permitted threshold, given the site area is over 7.5 hectares. The existing dwelling on the site will not infringe the permitted thresholds in terms of setback, sunlight and building coverage, given that the lot size is increasing. As such, it is considered that Stage 2 is also **Permitted** in terms of the rules under Section 8.6.5.1 of the Operative District Plan.

Table 10: Summary of Impervious Surfaces, Stage 3

Parameter	Area			
Lot		6	7	8
Lot Area	m^2	22834	22779	75622
Existing				
Impervious	m^2	0	2080 (RoW Stage 2, easements A & B)	358
	%	0.00	9.14	0.47
Future (Concept)				
Roof	m^2	300	300	307
	%	1.31	1.32	0.41
Driveway	m^2	200	200	51
	%	0.88	0.88	0.07
RoW	m^2	0	727 (RoW Stage 3, easements C)	1829
	%	0.00	3.20	2.42
Total	m^2	500	3312	2187
	%	2.19	14.54	2.89
Activity Assessment				
Threshold	15 %	3425 m^2	3417 m^2	11343 m^2
Permitted		Yes	Yes	Yes

Figure 13 - - Extract from the SSR report detailing proposed impermeable surface coverages at time of subdivision

4.9. Overall, Stages 1 & 2 have been determined to be permitted in terms of the rules under Section 8.6.5.1 of the ODP and further assessment of relevant rules in other sections/chapters within the ODP have been undertaken below.

District Wide Matters

Plan Reference	Rule	Performance of Proposal
Chapter 12 – Natural and Physical Resources		
12.1	**LANDSCAPES AND NATURAL FEATURES**	**Not Applicable.**
12.2	**INDIGENOUS FLORA AND FAUNA**	**Not Applicable.**
12.3	**SOILS AND MINERALS**	**Stages 1 & 2 – Permitted.**

<table>
<tr><td>12.3.6.1.1 (P)</td><td></td><td>The permitted volume of excavation within the Rural Production zone is no more than 5,000m^3 in any 12 month period per site, with a continuous cut or filled face that does not exceed an average of 1.5m in height over the length of the face.
Geologix have completed an assessment of the Earthworks within their SSR. The calculations table is shown below (as well as within Section 7.1 of the SSR).

<table>
<tr><td>Stage 2</td><td></td><td></td></tr>
<tr><td>Total Area of Earthworks</td><td>4,244.07 m^2</td><td></td></tr>
<tr><td>RoW Cut Volume</td><td>722.9 m^3</td><td>0.8 m</td></tr>
<tr><td>RoW Fill Volume</td><td>53.92 m^3</td><td>0.5 m</td></tr>
<tr><td>Stormwater Pond 1 Volume (5 m W x 15 m L x 1.34 m D</td><td>237.11 m^3</td><td>1.34 m</td></tr>
<tr><td>Stormwater Pond 2 Volume</td><td>31.72 m^3</td><td>0.63 m</td></tr>
<tr><td>Total Volume (Net)</td><td>1,045.65 m^3 (937.81 m^3 cut)</td><td></td></tr>
<tr><td>Stage 3</td><td></td><td></td></tr>
<tr><td>Total Area of Earthworks</td><td>726.84 m^2</td><td></td></tr>
<tr><td>RoW Cut Volume</td><td>132.1 m^3</td><td>0.8 m</td></tr>
<tr><td>RoW Fill Volume</td><td>4.51 m^3</td><td>0.5 m</td></tr>
<tr><td>Total Volume (Net)</td><td>136.61 m^3 (127.6 m^3 cut)</td><td></td></tr>
</table>

Therefore, even if the two stages were completed within the same 12-month period, the excavations are not anticipated to infringe the permitted thresholds for the zone.</td></tr>
<tr><td>12.4</td><td>NATURAL HAZRADS</td><td>Stages 1 & 2 – Permitted
The sites are not located within a coastal hazard zone and there is ample area within each allotment for any future residential units to be located at least 20m from any drip line of trees within a naturally occurring or deliberately planted area of scrub, shrubland, woodlot or forest.</td></tr>
<tr><td>12.5</td><td>HERITAGE PRECINCTS</td><td>Not Applicable.</td></tr>
<tr><td>12.6</td><td>AIR</td><td>Deleted Chapter</td></tr>
<tr><td>12.7</td><td>LAKES, RIVERS, WETLANDS AND THE COASTLINE</td><td>Stages 1 & 2 - Permitted
It is noted that there is a wetland feature located within the adjoining Pt Kohewhata 11C2 Block, to the east of the site.
This will be nearest to the eastern most corner of Lot 5 as part of Stage 1 (easternmost corner of Lot 8 of Stage 2), which is the balance lot in both stages. No impermeable surfaces are proposed which would be within the permitted 30m setback of the wetland feature.
Both stages are considered to be permitted in terms of this Chapter.</td></tr>
<tr><td>12.8</td><td>HAZARDOUS SUBSTANCES</td><td>Not Applicable</td></tr>
<tr><td>12.9</td><td>RENEWABLE ENERGY AND ENERGY EFFICIENCY</td><td>Not Applicable.</td></tr>
<tr><td colspan="3">Chapter 14 – Financial Contributions</td></tr>
<tr><td>14.6</td><td>ESPLANADE AREAS</td><td>Stages 1 & 2 - Permitted</td></tr>
</table>

14.6.1		(a)(i) & (ii) – Not applicable. While the site includes the Waihuna Stream, on average its width where it passes through the site is less than 3 metres. It is noted that there is a small area of the stream, which is wider, downstream of a small waterfall. This is near the old shed close to Thorpe Road. However, the remainder of the stream is much narrower. (a)(iii) – Not applicable as the proposal does not include resource consent for a land use activity. (a)(iv) – Not applicable. (b) & (c) – Not applicable.
Chapter 15 - Transportation		
15.1.6A	**TRAFFIC**	**Stages 1 & 2 - Permitted Activity** The first residential unit on a site and farming activities are exempt from this rule. As part of Stage 1, Lots 1 – 5 will be vacant land. As part of Stage 2, only Lot 8 will contain one existing dwelling, which is exempt.
15.1.6B	**PARKING**	**Stages 1 & 2 - Permitted Activity** The proposed lots are considered of adequate area to provide for any future parking, if the lots are developed in the future. The parking will remain unchanged to the dwelling on Lot 8 as part of Stage 2.
15.1.6C.1.1	**PRIVATE ACCESSWAY IN ALL ZONES**	**Stage 1 – Permitted Activity** As part of Stage 1, multiple easements will be created for the purpose of private accessways. These are listed below for ease of reference: - Easement A - will service Lots 1-5 as well as Tuhuna A & B (7 HEs in total). - Easement B – will service Lots 2 & 5 and Tuhuna A & B (4 HEs in total) - Easement C – will service Lot 5 & Tuhuna A & B (3 HEs in total) - Easement D – will service Tuhuna A & B (2 HE in total) - Easement E – will service Lot 3 and Lot 5 (2 HEs in total) Geologix have included an assessment of the proposed accessways within their SSR. Below is a summary of the proposed accessway construction, however, please refer to the SSR for further detail. Easement A is proposed to be constructed to a metalled carriageway width of 5.5m, up to the boundary of Easement E, where it decreases to a 4m wide metalled carriageway width. This is the point of the accessway which will see a drop in users from 7 HEs to 4HEs. **Complies with Appendix 3B-1 given the number of users across the private accessway (5m wide carriageway**

		width for 5-8 users and 3m carriageway width for 3-4 users). The first portion of Easement B to the proposed vehicle crossing into Lot 2, is to be constructed to a carriageway width of 4m metalled, where it then drops to 3m metalled carriageway width as the number of users at this point will be 3 HEs. **Complies with Appendix 3B-1 given the number of users across the private accessway (3m carriageway width for 2-4 users).** Easement E is proposed to be constructed to a 4m metalled carriageway width to the proposed crossing location for Lot 3, where it then reduces to 3 metres wide, due to the number of users reducing to 1. **Complies with Appendix 3B-1 given the number of users across the private accessway (3m carriageway width for 2-4 users).** The required legal width will be provided for in accordance with Appendix 3B-1. It is requested that Easements C & D of Stage 1 are not required to be constructed given that Easement C is proposed to be constructed at time of Stage 2 and Easement D will become redundant at time of Stage 2. Easements C & D provide access to Lot 5 (balance lot) of Stage 1 and Tuhuna A & B. As part of Stage 2, the boundaries of these lots will be configured such that Easement D will become redundant. The part of Easement C which will be utilised for access as part of Stage 2 will be constructed at time of Stage 2. The dwelling on Tuhuna A will become incorporated into Lot 8 of Stage 2 which will be accessed via Easements A & E. Therefore, to avoid redundant construction of accessways which will serve no purpose as part of Stage 2, it is requested that these accessways are not required to be constructed at the time of Stage 1. It is worth reiterating that all lots are currently held within the ownership of the Applicant and rights for access to the lots are being provided for, which is a superior outcome to what is currently in existence, as Tuhuna B has no legal rights. Easement A will contain the largest number of users which is 7. As the number of users does not exceed 8 access is not required to be by public road. **Stage 2 – Permitted Activity**

		The proposal will see Easements A, B & C change to the ownership of Lot 7. Easement D of Stage 1 will become Easements F & G (these accesses will become redundant and therefore are requested to not be required to be constructed to the required engineering standards. Easement D of Stage 2 will be introduced which will provide access to the dwelling on Lot 8 as well as provide access to adjoining lot Pt Kohewhata 11C2. Due to Pt Kohewhata 11C2 having access rights via Easements A & E of Stage 1, these easements will see an increase of one user. It is noted that the accessways as part of Stage 1 are offered to be constructed to account for this such that no additional upgrading is considered necessary. Easement A will result in a total of 8 users, and have a 5.5m wide carriageway width, such that it complies with Appendix 3B-1. Easement E will service three users and is offered to be constructed to a 4m metalled carriageway width to the proposed crossing location for Lot 3, where it then reduces to 3 metres wide, where the number of users reduces to 2. This carriageway width also complies with Appendix 3B-1. Easement C will provide access to Lot 6 & 7. Easement C will be constructed to a 3m wide metalled carriageway. **Complies with Appendix 3B-1 given the number of users across the private accessway (3m carriageway width for 2-4 users).** **Easement D** will provide access to Lot 8 and Pt Kohewhata 11C2. Easement D will be constructed to a 3m wide metalled carriageway. **Complies with Appendix 3B-1 given the number of users across the private accessway (3m carriageway width for 2-4 users).** Overall, Easements A, B & E would have been constructed as part of Stage 1. The construction of Easements A & E has taken account of the additional one user (Pt Kohewhata 11C2) during the design phase such that no additional upgrading is required. Easement C will be constructed to the standard stated above, as well as Easement D. Easements F & G will become redundant, however will remain to ensure compliance with the boundary adjustment rules set out under the ODP. It is requested the accessways within these easements are not required to be

		constructed, given that the use of these accessways will become redundant.
15.1.6C.1.2	**PRIVATE ACCESSWAYS IN URBAN ZONES**	**Not applicable.**
15.1.6C.1.3	**PASSING BAYS ON PRIVATE ACCESSWAYS IN ALL ZONES**	**Stage 1 – Permitted Activity** The majority of the accessway width of Easement A will be 5.5m. The width reduces to 4m at the boundary of Easement E, where the number of users reduces to four. Easement B will have an accessway width of 3m, where the number of users reduces to three. The portion of Easement A which is 4m in width combined with Easement B which is 85 metres in length, equates to 107 metres in length. Easement E will have a 4m carriageway width where the number of users are three. This then reduces to a 3 metre width where the number of users reduces to 2. Easement E is less than 100m in length. **Stage 2 – Permitted Activity** As part of Stage 2, Easement C will only provide access to two allotments. Easement C is 131 metres in length. Easement D (Stage 2) is proposed to have a 3m carriageway width due to the number of users being 2. The length of Easement D is 243m. It is noted that Easements C & D of Stage 2 are more than 100 metres in length. Geologix have advised that the point at which the accessway reduces to a 3m wide carriageway width is where it only services two allotments, and therefore it is the opinion of the SSR Report Writer that passing bays are not required. The SSR Report Writer also refers to the *FNDC Engineering Standards 3.2.28.3 Rural Private Accessways, where it states that on accessways more than 200m long and less than 4.5m in carriageway width, passing bays shall be provided.* If it is deemed passing bays are required to ensure that the proposal remains as a Restricted Discretionary Activity and a Controlled Activity, then passing bays can be added where necessary to ensure the activity status remains as presented.
15.1.6C.1.4	**ACCESS OVER FOOTPATHS**	**Not applicable.** The footpath is located on the opposite side of the road from the property such that this standard is not applicable.
15.1.6C.1.5	**VEHICLE CROSSING STANDARDS IN RURAL AND COASTAL ZONES**	**Stages 1 & 2 - Permitted Activity.** Vehicle crossings will be formed at the subdivision stage in accordance with the relevant standards. Please refer to the SSR for further details on the crossings proposed.

15.1.6C.1.6	**VEHICLE CROSSING STANDARDS IN URBAN ZONES**	**Not applicable.**
15.1.6C.1.7	**GENERAL ACCESS STANDARDS**	**Stages 1 & 2 - Permitted** (a) Vehicle manoeuvring will be addressed at the time the sites are developed. There is adequate area within the sites to accommodate this. (b) Complies. (c) The sides of the driveway will remain in grass. (d) Stormwater will be managed on site.
15.1.6C.1.8	**FRONTAGE TO EXISTING ROADS**	(a) The site has access from Thorpe Road, which is considered to meet the legal road width standards. (b) Thorpe Road is considered to be constructed to the required standards. (c) All lots will be accessed via the proposed right of way easements. (d) There are no known encroachments of the carriageway into the proposed lots.
15.1.6C.1.9 – 15.1.6C..11 are not applicable to this application		

4.10. It is therefore determined that the proposal does not result in any land use infringements.

Overall status of the proposal under the Operative District Plan

4.11. The subdivision proposal will be completed as a two staged development, where the Applicant has advised that both stages may be completed concurrently if this is deemed to be preferred at the time of development.

4.12. Stage 1 is able to meet the **Restricted Discretionary** provisions for the Rural Production zone as per the requirements within 13.7.2.1(i). Stage 2 will be completed as a **Controlled Activity Boundary Adjustment** in accordance with 13.7.1.

4.13. An assessment of the relevant criteria within Chapter 13 of the ODP will be undertaken as part of this application.

Proposed District Plan

4.14. The proposal is also subject to the Proposed District Plan process. Within the Proposed District Plan, all sites subject of this application are zoned Rural Production. Assessment of the matters relating to the Proposed District Plan that have immediate legal effect, have been undertaken below:

Chapter	Rule Reference	Compliance of Proposal
Hazardous Substances	The following rules have immediate legal effect: Rule HS-R2 has immediate legal effect but only for a new significant hazardous facility.	**Not applicable.** The site does not contain any hazardous substances to which these rules would apply.

	HS -R5 relates to a hazardous facility within a scheduled site and area of significance to Maori. HS-R6 relates to a hazardous facility within an SNA. HS-R9 relates to a hazardous facility within a scheduled heritage resource.	
Heritage Area Overlays	All rules have immediate legal effect (HA-R1 to HA-R14) All standards have immediate legal effect (HA-S1 to HA-S3)	**Not applicable.** The site is not located within a Heritage Area Overlay.
Historic Heritage	All rules have immediate legal effect (HH-R1 to HH-R10) Schedule 2 has immediate legal effect	**Not applicable.** The site does not contain any areas of mapped historic heritage.
Notable Trees	All rules have immediate legal effect (NT-R1 to NT-R9) All standards have legal effect (NT-S1 to NT-S2) Schedule 1 has immediate legal effect	**Not applicable.** The site does not contain any notable trees.
Sites and Areas of Significance to Maori	All rules have immediate legal effect (SASM-R1 to SASM-R7) Schedule 3 has immediate legal effect.	**Not applicable.** The site does not contain any sites or areas of significance to Māori.
Ecosystems and Indigenous Biodiversity	All rules have immediate legal effect (IB-R1 to IB-R5)	**Not applicable.** The proposal does not include any indigenous vegetation pruning trimming, clearance or associated land disturbance. No plantation forestry activities are proposed. Therefore, the proposal is not in breach of rules IB-R1 to IB-R5.
Subdivision	The following rules have immediate legal effect: SUB-R6, SUB-R13, SUB-R14, SUB-R15, SUB-R17	**Not applicable.** The subdivision is not an Environmental Benefit Subdivision (SUB-R6), Subdivision of a site with heritage area overlay (SUB-R13), Subdivision of site that contains a scheduled heritage resource (SUB-R14), Subdivision of a site containing a scheduled site and area of significance to Māori (SUB-R15) or Subdivision of a site

		containing a scheduled SNA (SUB-R17).
Activities on the Surface of Water	All rules have immediate legal effect (ASW-R1 to ASW-R4)	**Not applicable.** The proposal does not involve activities on the surface of water.
Earthworks	The following rules have immediate legal effect: EW-R12, EW-R13 The following standards have immediate legal effect: EW-S3, EW-S5 As stated above the mapping system records the subject site as containing the Ratana Temple which is located on the adjoining site. Schedule 3 lists the legal description of MS07-18 as being P Ahipara A32A which is the adjoining site.	**Permitted.** All earthworks will proceed under the guidance of an ADP and will be in accordance with the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016, in accordance with Rules EW-12, EW-R13, EW-S3 and EW-S5.
Signs	The following rules have immediate legal effect: SIGN-R9, SIGN-R10 All standards have immediate legal effect but only for signs on or attached to a scheduled heritage resource or heritage area	**Not applicable.** No signs are proposed as part of this application.
Orongo Bay Zone	Rule OBZ-R14 has partial immediate legal effect because RD-1(5) relates to water	**Not applicable.** The site is not located in the Orongo Bay Zone.

4.15. The assessment above indicates that the proposal is determined to be a **Permitted Activity** in regard to the Proposed District Plan. Therefore, no further assessment of these rules will be undertaken.

National Environmental Standards

National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health 2011

4.16. The subject sites are considered to be lifestyle blocks utilized for the grazing of livestock. A site visit and review of aerials did not indicate that the sites were HAIL. Although there are listed HAIL sites in the industrial areas to the northeast of the sites. These are sites which contain a Waste Management Resource Recovery Centre and Transfer Station and a Car Yard and are a considerable distance from the boundaries of the subject sites. The activities undertaken within these sites are confined within their relevant site boundaries and do not impact the subject site. As such, the application has been considered **Permitted** in terms of this regulation.

National Environmental Standard for Freshwater 2020

4.17. The neighbouring allotments Pt Kohewhata 11C1 and 11C2 contain an area of wetland (circled in red in **Figure 12** below). No development is sought within 100m of this area such that the subdivision is compliant with this regulation.

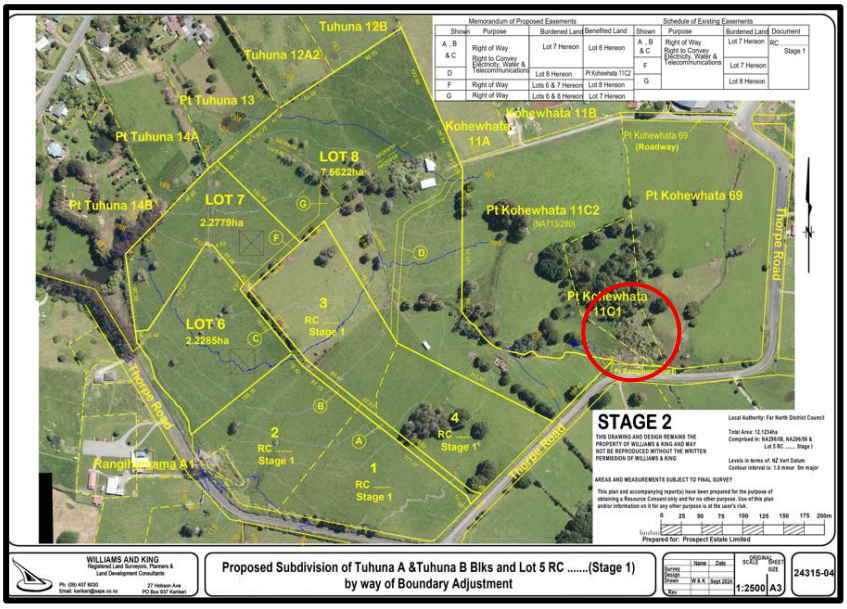


Figure 14: Image showing location of wetland on adjoining sites, relative to the subject site.

4.18. No other National Environmental Standards are considered applicable to this development. The proposal is permitted in terms of these above-mentioned documents.

5. Statutory Assessment

Section 104A of the Act

5.1. Section 104A governs the determination of applications for Controlled Activities. With respect to Controlled Activities, a consent authority may not refuse an application, unless s106 applies. Council may impose conditions under s108 only for those matters which control is reserved in a national environmental standard, an operative or proposed plan or other regulations. This relates to Stage 2 of the proposal, which is a subdivision by way of boundary adjustment.

Section 104C of the Act

5.2. Section 104C governs the determination of applications for Restricted Discretionary Activities. When considering an application for resource consent, a consent authority must consider only those matters over which a discretion is restricted in national environmental standards or other regulations, or it has restricted the exercise of its discretion in its plan or proposed plan. The consent authority can grant or refuse the application. If the application is granted, the consent authority may impose conditions under Section 108 only for those matters listed above. This relates to Stage 1 of the proposal, which is a subdivision to create four two-hectare allotments, with one balance lot over 7 hectares in area.

Section 104(1) of the Act

5.3. Section 104(1) of the Act states that when considering an application for resource consent –

"the consent authority must, subject to Part II, have regard to –

(a) Any actual and potential effects on the environment for allowing the activity; and

(ab) any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment that will or may result from allowing the activity; and

(b) Any relevant provisions of –
- *(i) A national environmental standard*
- *(ii) Other regulations*
- *(iii) A national policy statement.*
- *(iv) A New Zealand Coastal Policy Statement*
- *(v) A regional policy statement or proposed regional policy statement.*
- *(vi) A plan or proposed plan; and*

(c) Any other matter the consent authority considers relevant and reasonable necessary to determine the application.'

5.4. Actual and potential effects arising from a development as described in 104(1)(a) can be both positive and adverse (as described in section 3 of The Act). The proposal is considered to have actual and potential effects that are acceptable. In addition, the proposal is considered to have positive effects on the environment as the proposed allotments are capable of containing future residential development without adversely affecting the surrounding allotments. The sites are located on the periphery of the Kaikohe township, and will enhance the transition between town and country, providing lots which can provide for a residential dwelling and also small-scale productive activities. The proposal will also create legal access to lots which currently utilise informal access arrangements.

5.5. Section 104(1)(ab) requires that the consent authority consider 'any measure proposed or agreed to by the applicant for the purposes of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity'. It is considered the proposal is not of a scale or nature that would require specific offsetting or environmental compensation measures to ensure positive effects on the environment. It is considered that all effects can be managed within the proposed lot boundaries. As noted above, the proposed development itself will generate positive effects that are consistent with the intent of the Rural Production zone.

5.6. Section 104(1)(b) requires the consent authority to consider the relevant provisions of the above listed documents. An assessment of the relevant statutory documents that corresponds with the scale and significance of the effects that the activity may have on the environment has been provided in section 6.

5.7. Section 104(1)(c) states that consideration must be given to 'any other matters that the consent authority considers relevant and reasonable, necessary to determine the application'. There are no other matters relevant to this application.

6. Environmental Effects Assessment

6.1. Having reviewed the relevant plan provisions and taking into account the matters that must be addressed by an assessment of environmental effects as outlined in Clause 7 of Schedule 4 of the Act, the following environmental effects warrant consideration as part of this application.

6.2. Stage 1 of the proposal is considered to be a Restricted Discretionary activity as per rule 13.8.1. In considering whether to impose conditions on applications for restricted discretionary subdivision activities, the Council will restrict the exercise of its discretion to the following matters listed in 13.8.1 & 13.7.3. An assessment that corresponds with the scale and significance of the effects on the environment is provided below.

Subdivision within the Rural Production Zone

6.3. As per Section 13.8.1 of the District Plan, in considering whether or not to grant consent on applications for restricted discretionary subdivision activities, the Council will restrict the exercise of its discretion to the following matters:

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

6.4. The subject sites are not located within the coastal environment.

6.5. The subject sites are not located within 500 metres of land administered by the Department of Conservation (DOC).

6.6. There are no known areas of significant indigenous flora or fauna within the sites, and the proposal is not considered to have any such effects on these features.

6.7. It is considered that the standard consent notice condition for the vacant lots will be applied to ensure that tanks are supplied for fire mitigation purposes at the building consent stage for any development within the lot.

Subdivision

6.8. Stage 1 is to be assessed as a Restricted Discretionary subdivision, with Stage 2 being assessed as a Controlled Activity Boundary Adjustment. The assessment criteria for Controlled and Restricted Discretionary Activity subdivisions are listed within Section 13.7.3 of the ODP. As such, assessment of both stages will be made below, rather than having an independent section for each stage. It is worth reiterating that the two stages may be completed concurrently or independently and as such it is considered imperative to assess each stage as a standalone subdivision and also as a whole, to determine the intended outcome for the allotments and the overall effects.

6.9. An assessment has been undertaken in accordance with Section 13.7.3 Assessment Criteria of the ODP below:

PROPERTY ACCESS

6.10. As part of Stage 1, a new crossing place will be constructed from Thorpe Road, as shown on the scheme plan and the roading plan within the SSR. This crossing place will provide access to all lots as part of this subdivision. Easements will also be created to provide access to adjoining lots, Tuhuna A & B, which currently do not have legal access rights and utilise informal access via the Māori Roadway and ROW easements.

6.11. Geologix have completed an assessment of the proposed access to the lots, which is within Section 8 of the SSR included with this application. Please refer to the SSR for more detailed information on the proposed construction of the accessways within each of the easements. As determined earlier in this report, it is considered that the proposed accessways do not infringe any of the permitted rules within Chapter 15 of the ODP.

6.12. New crossing places will be constructed to Lots 1-4 as indicated within the roading plan within the SSR. These will be constructed to the required engineering standards. Easement A will contain the largest number of users which is 7 as part of Stage 1 and 8 as part of Stage 2 and therefore access is not required to be by public road.

6.13. It is requested that Easements C & D of Stage 1 are not required to be constructed given that Easement D will become redundant as part of Stage 2 and Easement C will be constructed at the time of Stage 2. Easements C & D provide access to Lot 5 (balance lot) of Stage 1 and Tuhuna A & B, and it is not the intention of the applicant to build on Tuhuna B. As part of Stage 2, the boundaries of these lots will be configured such that all of Easement D will become redundant. Easement C which will be utilised for access as part of Stage 2 will be constructed at time of Stage 2. Therefore, to ensure efficiency and effectiveness, it is requested that the accessways within Easements C & D, are not required to be constructed at the time of Stage 1. It is worth reiterating that all lots are currently held within the ownership of the Applicant and legal rights for access to the lots are being provided for, which is a superior outcome to what is currently in existence, as Tuhuna A & B have no legal access.

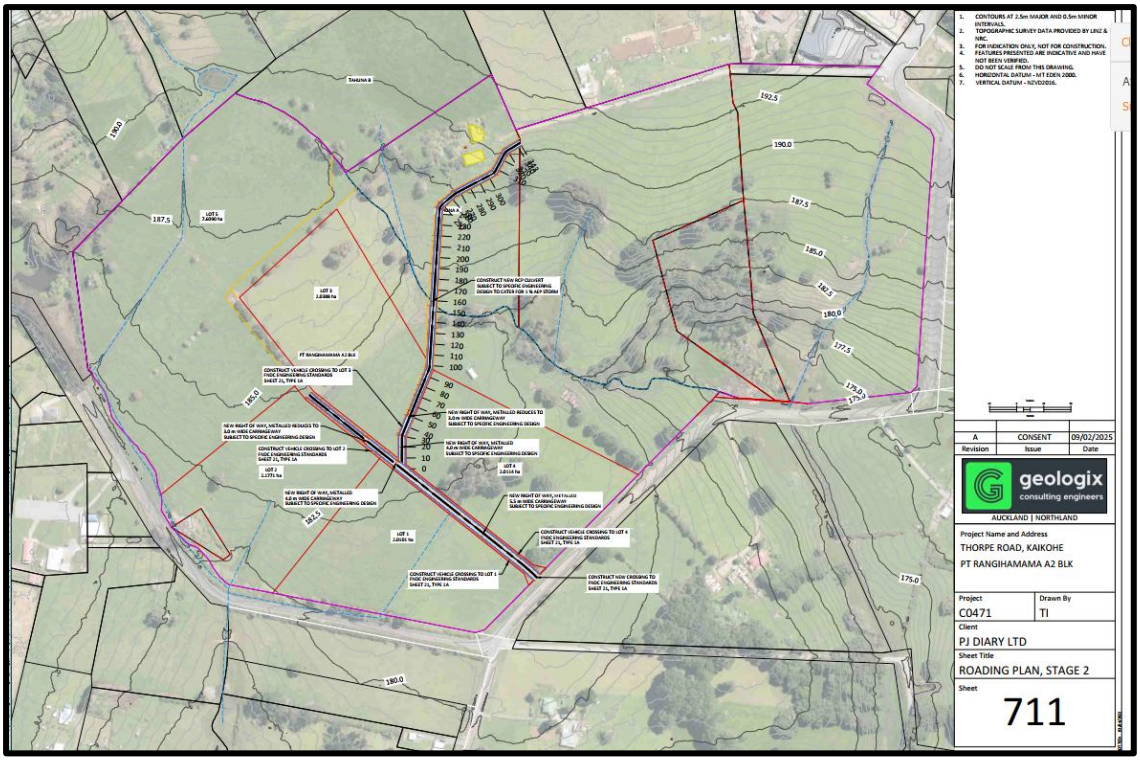


Figure 15: Roading Plan for Stage 1.

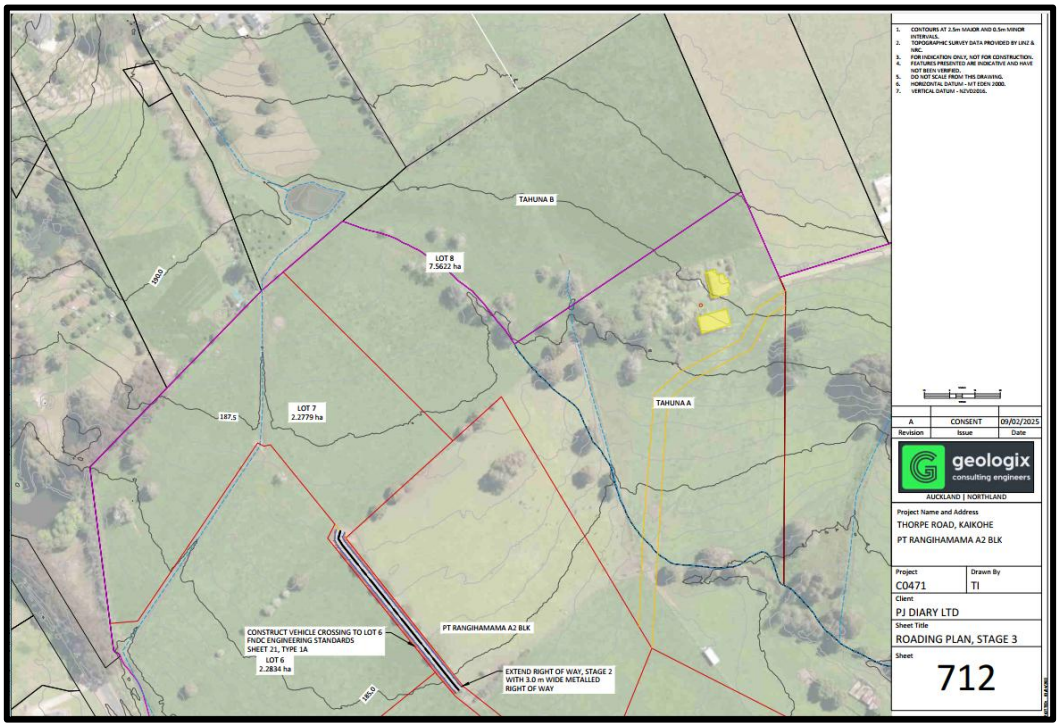


Figure 16: Roading Plan Stage 2.

6.14. Stage 2 will see Easements A, B & C change to be in the ownership of Lot 7. Easement D will also be introduced which will provide rights for access to adjoining lot Pt Kohewhata 11C2. Due to the introduction of Easement D, the number of users of Easements A & E will increase by

one, however this was already accounted for as part of Stage 1, such that the accessways were constructed to the required width for the required number of users. Therefore, no upgrade of Easements A & E are required. Easement B will not see a change in the number of users.

6.15. Easement C will provide access to Lot 6 & 7. Easement C will be constructed to a 3m wide metalled carriageway.

6.16. Easement D will provide access to Lot 8 and Pt Kohewhata 11C2 and will be constructed to a 3m wide metalled carriageway.

6.17. An assessment of Chapter 15 was made in Section 4 of this report, which found that the proposal meets the permitted standards.

NATURAL AND OTHER HAZARDS

6.18. There are no matters listed under 13.7.3.2 which are applicable to the proposed subdivision, as determined within the Site Suitability Report from Geologix.

6.19. It is therefore considered that the proposal does not create any adverse effects in relation to natural and other hazards.

6.20. In terms of section 106 of the Act, the likelihood of natural hazards occurring is low. The subject sites are not shown to be susceptible to natural hazards. No material damage is expected, and the proposal is not considered to accelerate or worsen natural hazards. It is therefore considered that there are no matters under s106 of the Act which would cause the Council to refuse the subdivision consent.

WATER SUPPLY

6.21. The only allotment which contains existing residential development is Lot 5 of Stage 2. The remainder of the proposed lots do not contain any residential development, and it is considered the standard consent notice condition will apply for the lots to provide water supply for potable use and firefighting purposes at the time the site is developed with a residential dwelling.

STORMWATER DISPOSAL

6.22. A stormwater assessment has been included within the SSR from Geologix. As mentioned previously, the proposed subdivision will see private accessways constructed which will increase the amount of impermeable surfaces within certain proposed allotments. Geologix have confirmed that the amount of impermeable surfaces within each lot, post-subdivision, will be within the permitted threshold for the zone.

6.23. Attenuation for the private accessways has been proposed within Section 5.5 of the SSR. Two stormwater ponds have been proposed that can be fed by gravity flows, which will provide attenuation of the proposed private accessways. Gravity flows have been directed to the south of the site to ensure there are no downstream effects on the wetland in the adjoining site.

Details on the proposed pond locations and design are provided within the SSR from Geologix, please refer to the SSR for more detail.

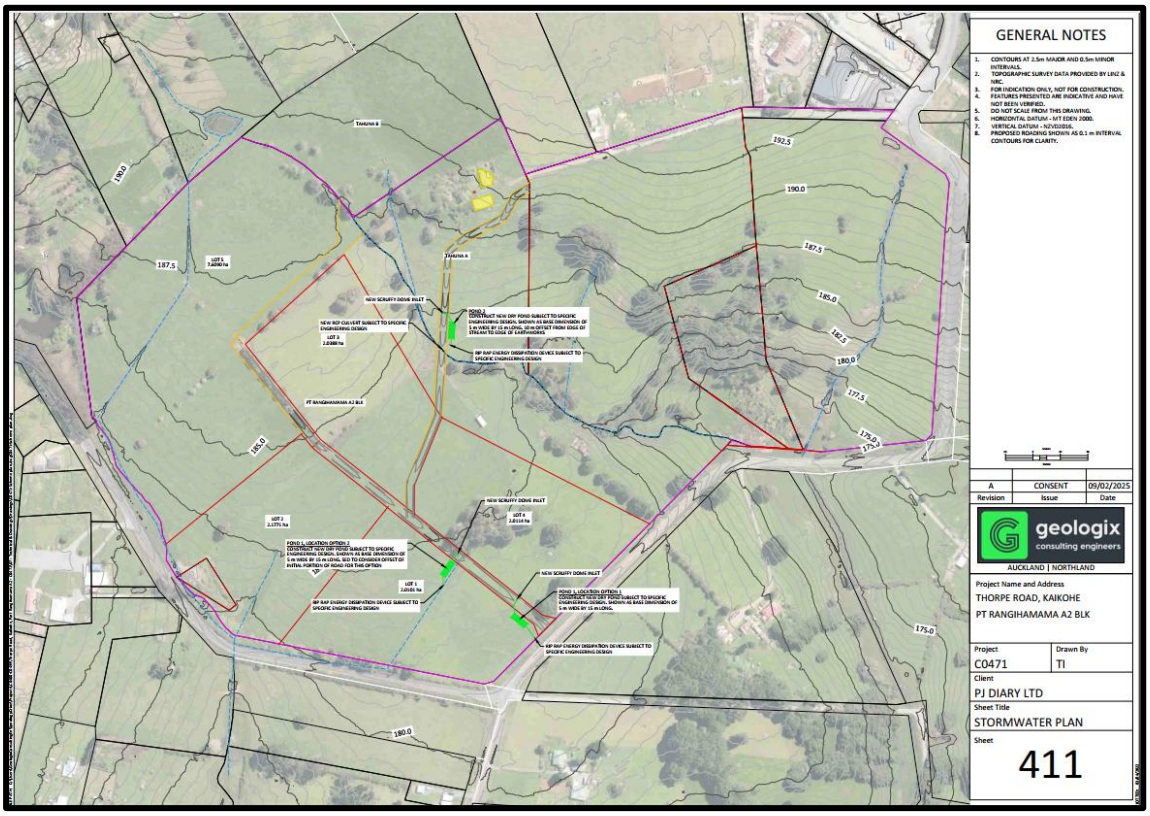


Figure 17: Stormwater Plan

6.24. In terms of future built development on the lots, Geologix have recommended that a site-specific stormwater report is completed at the Building Consent stage. It is anticipated that the standard consent notice condition will be imposed on the undeveloped lots in regards to this.

6.25. Overall, it is considered that with the recommendations of the SSR being adhered to, effects from stormwater disposal/runoff will be less than minor, with no adverse effects created on the downstream environment or adjoining lots.

SANITARY SEWAGE DISPOSAL

6.26. Council's infrastructure is not available to this rural site.

6.27. There is an existing wastewater system within Tuhuna A, which will become Lot 8 of Stage 2. Geologix assessed the existing wastewater system and stated that it '*comprises of a conventional septic tank and trenches to the west of the dwelling which appeared to be functioning adequately at the time of inspection.*'

6.28. Lots 1-5 of Stage 1 will be vacant as well as Lots 6 & 7 of Stage 2. Geologix prepared a wastewater assessment as part of the SSR which concluded that a concept onsite wastewater system could be provided within each of the proposed vacant lots. Geologix have

recommended that *'each lot is subject to Building Consent specific review and design amendment according to final development plans by a suitably qualified professional.'*

6.29. It is therefore considered that the proposal will not create any adverse or cumulative effects in relation to wastewater disposal. It is anticipated that a consent notice condition will be imposed for Lots 1-5 of Stage 1 and Lots 6 & 7 of Stage 2 which will require a site specific TP58 report to be submitted at the Building Consent Stage, for any building that requires effluent disposal, with reference back to the Geologix report.

ENERGY SUPPLY & TELECOMMUNICATIONS

6.30. The provision for power supply and telecommunications is not a requirement for the Rural Production zone.

6.31. The provision of energy supply and telecommunications is not anticipated to be a condition of consent for this proposal.

EASEMENTS FOR ANY PURPOSE

6.32. There is an array of easements proposed as part of the two staged subdivision.

6.33. Stage 1 will include various easements to cover right of way, rights to convey electricity and telecommunications as well as water. The Proposed Memorandum of Easements for Stage 1 is shown below.

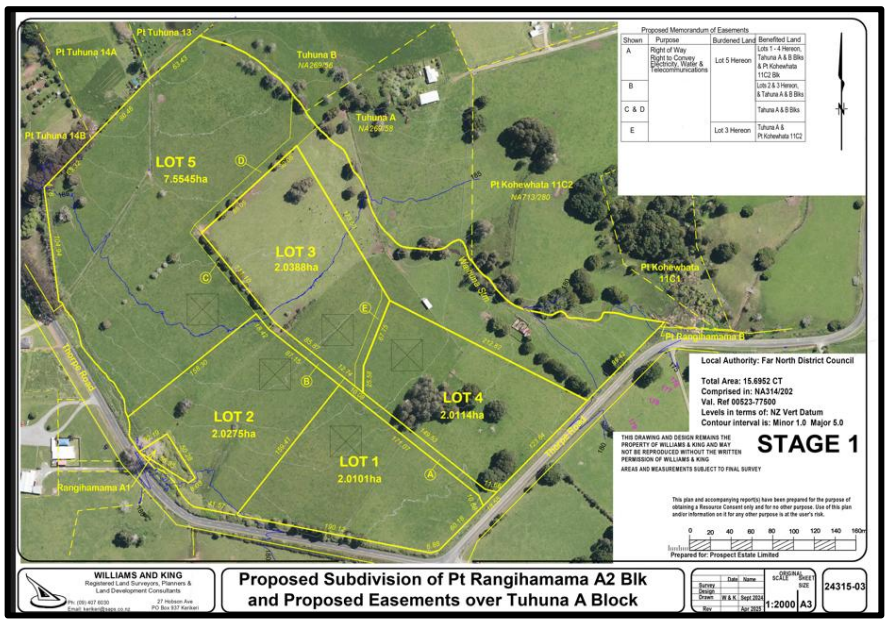


Figure 18: Stage 1 Scheme Plan showing Proposed Easement Table and location of easements.

6.34. As part of Stage 2, there will be existing easements from Stage 1 as well as proposed easements. As previously mentioned, all of Easement D which was created at time of Stage 1 will be redundant, however is shown to remain to ensure compliance with the boundary adjustment criteria. In the event Council is satisfied that this easement can be cancelled and

still meet the boundary adjustment criteria we would be happy to cancel this easement at time of Stage 2.

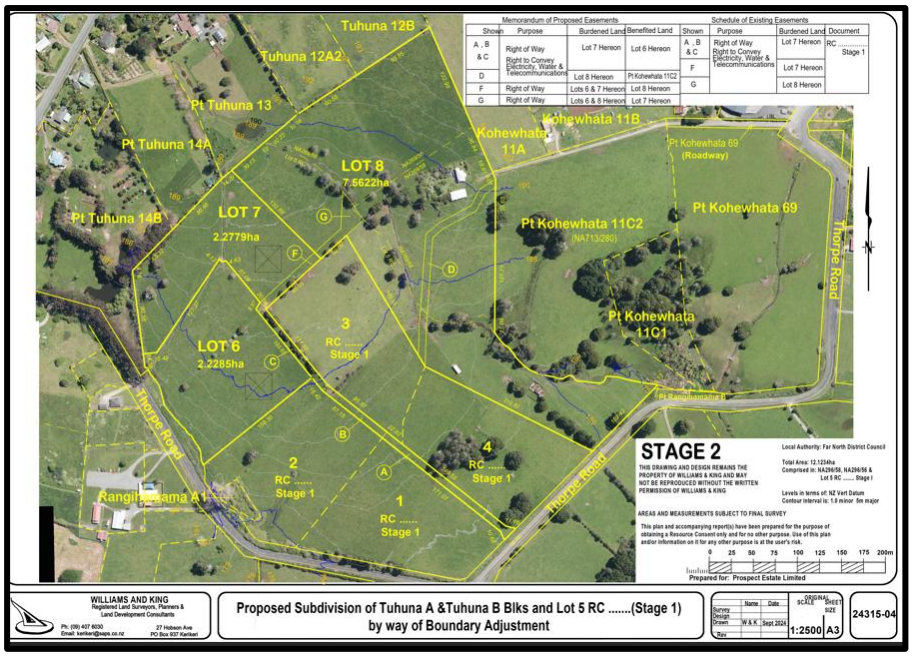


Figure 19: Stage 2 scheme plan showing location of easements.

PRESERVATION AND ENHANCEMENT OF HERITAGE RESOURCES, VEGETATION, FAUNA AND LANDSCAPE, AND LAND SET ASIDE FOR CONSERVATION PURPOSES

6.35. The subject sites do not contain any notable trees, historic sites, buildings or objects. The sites are not known to contain any sites of historical or cultural significance. The sites are not shown as containing an Outstanding Natural Feature or Landscape Feature. There are no archaeological sites listed on the properties.

6.36. The site is not shown to contain any areas of PNA or protected indigenous vegetation. There are some Totara trees scattered throughout Lot 4 of Stage 1 and Lot 8 of Stage 2 (balance lot), however as the use of the sites can remain as rural lifestyle, it is considered that no adverse effects will be created. As stated within the report from Geologix, there are multiple building envelopes on site which are suitable for development.

6.37. The sites are not located in an area which is shown to have kiwi present.

6.38. Heritage NZ Pouhere Taonga were contacted as part of the pre-application process, and we are yet to receive a response.

6.39. It is therefore considered that the proposed subdivision does not have any adverse effects on any indigenous vegetation or fauna habitats, heritage resources or landscapes.

ACCESS TO RESERVES AND WATERWAYS

6.40. The site does not have any access to public reserves, waterways or esplanade reserves. Waihuna Stream does traverse through the balance lot on both stages, however this stream has an average width of less than 3 metres, and it is not considered that public access is warranted.

6.41. It is therefore considered that the provision for public access is not applicable to this proposal.

LAND USE COMPATIBILITY

6.42. The sites are bounded by the Rural Production zone, with lots slightly east and north zoned as Industrial and lots north/northwest zoned as Residential, which reflects the township of Kaikohe.

6.43. The site is in a location where it is on the periphery of the Industrial zone of the Kaikohe township, which then directly adjoins the residential zone. Sites in the buffer zones of small townships are usually a transition zone between commercial/industrial/residential and larger productive lots.

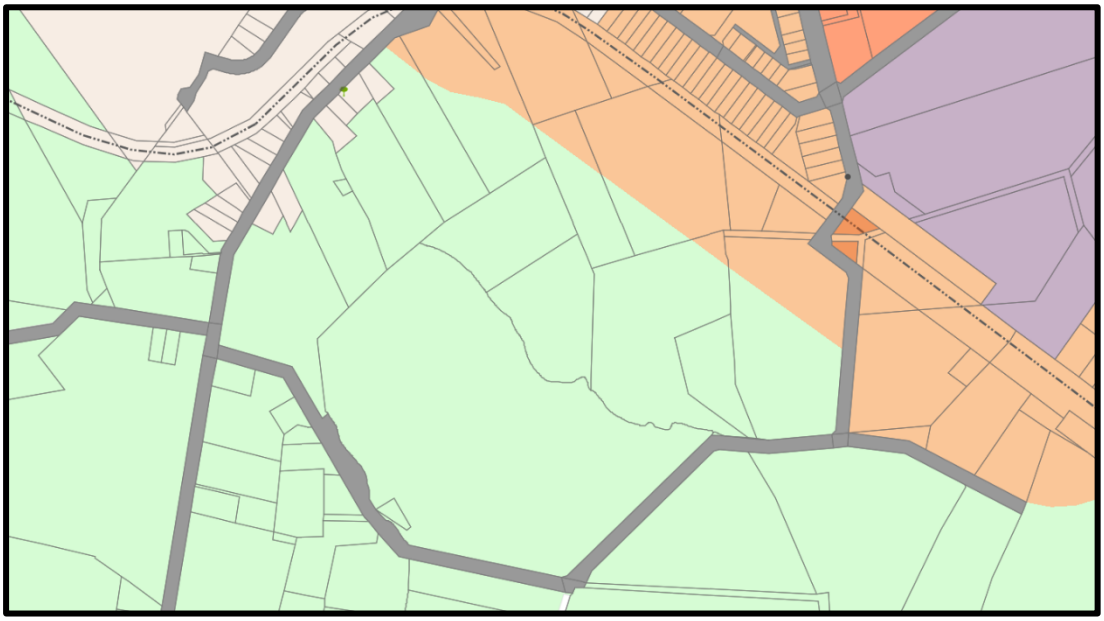


Figure 20: FNDC ODP Zoning showing zoning in the area surrounding the sites.

6.44. The proposal will see four additional lots created at the time of Stage 1, with no additional titles being created at the time of Stage 2, due to this being a boundary adjustment of three existing allotments. Lot 5 of Stage 1 and Lot 8 of Stage 2 will be the balance lot, which will remain over 7 hectares in area. The intended land use activities for the balance lot will be the same as what is currently in existence, which will be rural-lifestyle use.

6.45. The two hectare allotments (Lots 1-4 of Stage 1 and Lots 6 & 7 of Stage 2), will also be rural-lifestyle allotments with the intention being for a residential dwelling and small-scale productive activities like a home garden etc. The proposed land use activities are not

considered to create any incompatible land use activities, as it will not create any land use activities which are not already in existence in the surrounding environment.

6.46. Lots directly adjoining the northern boundary of the sites are zoned as Rural Production under the ODP, with some lots changing to Māori Purpose – Rural under the PDP. These lots are predominantly just under 2 hectares in area and contain existing residential development to the north of the lots, with the area of land directly adjoining the subject sites being open space. As part of Stage 1, the balance lot, Lot 5 will adjoin these allotments, such that the existing use of the site as seen from these adjoining lots will remain unchanged. As part of Stage 2, Tuhuna B will be reconfigured as Lot 7 and Lot 8 will be the balance lot, such that the use along this subject boundary with the adjoining lots will remain unchanged. The proposal will not result in a change of use along the dividing boundary to the north of the site, with it continuing to adjoin a balance lot and a two-hectare allotment. The development on the lots to the north is located over 120 metres from the boundary such that no reverse sensitivity effects are anticipated. The remainder of the two hectare allotments will be located over 300 metres from any existing development to the north and given the fact these allotments will be of similar size to those already in the surrounding environment, no reverse sensitivity effects on lots to the north are anticipated.

Figure 21: Aerial view of the lots to the north with existing development.

6.47. Thorpe Road adjoins the western and southern boundary of the site, which provides a physical and visual buffer from allotments to the west and south. Lots to the West and South range in size from 1500m^2 to 3 hectares, which reflects a higher density than what is proposed. These lots are currently zoned as Rural Production but change to Māori Purpose – Rural under the PDP. Some lots to the south are slightly larger of around 4-5 hectares. The use of these lots varies, with some containing residential development and some being vacant land.

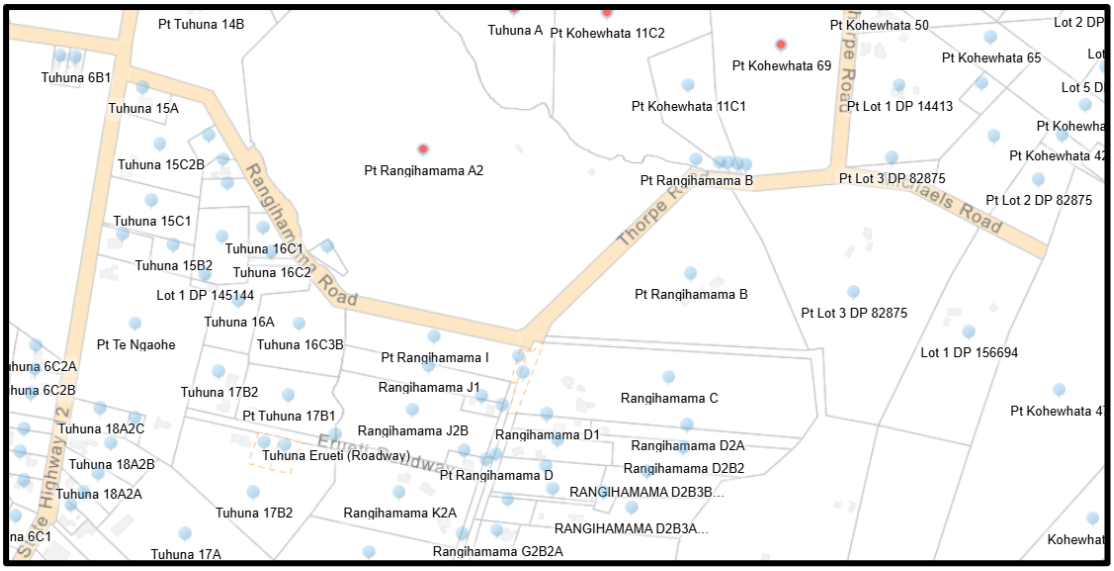


Figure 22: Image showing lot sizes to the west and south of the site.

Figure 23: PDP zoning of the site and surrounding allotments. Grey shade is Māori Purpose - Rural zone.

6.48. Part Tuhuna 16C 1 Block is located directly opposite Lot 2 of Stage 1 and Lot 6 of Stage 2, which is the location of Kotahitanga Marae. There is also a small lot legally described as Rangihamama A1, which is predominantly bounded by Lot 2 of Stage 1, which is an area of scrub. Comments from the relevant Iwi and Hapu have been sought however no response has been received to date.

Figure 24: Image of the site and location of Kotahitanga Marae and Rangihamama A1.

6.49. Given that the proposed lots will be consistent with lots in the surrounding environment and that the site is physically separated from lots to the west and south by Thorpe Road, it is considered that there are no reverse sensitivity effects created on these allotments. The lots are of a size which can adequately accommodate a residential dwelling and onsite services, as well as the Rural Production zone having a permitted setback distance of 10 metres from boundaries, which will ensure that development is adequately setback from the road. Access to the lots will be via the one accessway, which will be located to the east of Lots 2 & 6. To ensure the shortest internal driveways within the sites, it is anticipated that most built development would occur to the east of Lots 2 & 6, furthest form the Thorpe Road boundary which will provide additional separation distance between any development to the west and south of the site.

6.50. Lots to the east of the site are owned by the Applicant. This lot will adjoin the balance lot in both stages, such that no reverse sensitivity effects are anticipated.

6.51. Overall, it is considered that the proposal does not result in any incompatible land use activities or reverse sensitivity effects. The proposal will see four additional rural-lifestyle lots created as part of Stage 1, with a balance lot and no additional titles created as part of Stage 2, due to this being a boundary adjustment between existing lots. The proposed lot sizes are consistent

with those in the surrounding environment and are compatible with lots created in areas which are a transition zone between town and country. Each lot is capable of containing residential development and onsite servicing and the entire subdivision will be serviced by the one crossing place, ensuring cumulative effects are minimised.

6.52. It is therefore considered that the proposal is not objectionable with lots in the surrounding environment and does not set a precedence given it is an application enabled as a Restricted Discretionary activity and Controlled Boundary Adjustment within the plan.

6.53. The proposal is not considered to create incompatible land uses, as the existing use of the site can continue within the balance lot and the proposed lot sizes are not objectionable to the surrounding environment.

PROXIMITY TO AIRPORTS

6.54. The subject site is not located in proximity to any airport boundaries.

7. Policy Documents

7.1. In accordance with section 104(1)(b) of the Act the following documents are considered relevant to this application.

National Environmental Standards

National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS)

7.2. In terms of the National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), it is considered that the proposal does not trigger the requirement for investigation under the NES as detailed within Section 4 of this report.

National Environmental Standard for Freshwater

7.3. The proposed subdivision and its associated physical works sit outside of the 100m setback from wetlands.

Other National Environmental Standards

7.4. No other National Environmental Standards are considered applicable to this development.

National Policy Statements

7.5. There are currently 8 National Policy Statements in place. These are as follows:

- National Policy Statement on Urban Development.
- National Policy Statement for Freshwater Management.
- National Policy Statement for Renewable Electricity Generation.
- National Policy Statement on Electricity Transmission.
- New Zealand Coastal Policy Statement.
- National Policy Statement for Highly Productive Land 2022
- National Policy Statement for Indigenous Biodiversity.

- National Policy Statement for Greenhouse Gas Emissions from Industrial Process Heat 2023

7.6. The only applicable NPS documents specific to this proposal are the NPS-HPL and NPS-FM which will be assessed below.

National Policy Statement for Highly Productive Land 2022

7.7. As per the Land Guide to Implementation for the National Policy Statement for Highly Productive Land (NPS-HPL), consideration on the productive capacity of the land is not provided for within the discretion for activities with Controlled or Restricted Discretionary Activity statuses. However, consideration of the effect of the activity on existing land use activities must be provided for.

7.8. As has been discussed within this report, no reverse sensitivity or incompatible land uses are anticipated. The proposal will result in allotments which can accommodate a residential dwelling as well as productive activities within each lot. This is consistent with lots in the surrounding environment and the Rural Production zone in general. The lots are also capable of managing wastewater and stormwater within each of the lot boundaries such that no downstream effects are anticipated. The proposal is not considered to create any reverse sensitivity effects as detailed within this report.

7.9. As such, it is considered that the proposal will not create any reverse sensitivity effects or incompatible land uses and is consistent with the productive intent for the zone

National Policy Statement for Freshwater Management

7.10. The proposal involves activities that will be setback more than 100m from a wetland area. The proposed lots are located such that future development can be designed such that buildings and impermeable surfaces do not impact upon the wetland environment.

Regional Policy Statement

7.11. The role of the Regional Policy Statement is to promote sustainable management of Northland's natural and physical resources by providing an overview of the regions resource management issues and setting out policies and methods to achieve integrated management of Northland's natural and physical resources.

7.12. An assessment of this subdivision in terms of relevant objectives and policy documents has been undertaken below:

Objective 3.2 Region-wide water quality
Improve the overall quality of Northland's fresh and coastal water with a particular focus on:
(a) Reducing the overall Trophic Level Index status of the region's lakes;
(b) Increasing the overall Macroinvertebrate Community Index status of the region's rivers and streams;
(c) Reducing sedimentation rates in the region's estuaries and harbours;

(d) Improving microbiological water quality at popular contact recreation sites, recreational and cultural shellfish gathering sites, and commercial shellfish growing areas to minimise risk to human health; and
(e) Protecting the quality of registered drinking water supplies and the potable quality of other drinking water sources.

Policy 4.2.1 Improving overall water quality
Improve the overall quality of Northland's water resources by:
(a) Establishing freshwater objectives and setting region-wide water quality limits in regional plans that give effect to Objective 3.2 of this regional policy statement.
(b) Reducing loads of sediment, nutrients, and faecal matter to water from the use and development of land and from poorly treated and untreated discharges of wastewater; and
(c) Promoting and supporting the active management, enhancement and creation of vegetated riparian margins and wetlands.

7.13. The proposal is not considered to adversely affect any fresh and coastal waters as the subject site is not located near any rivers or coastal waters. The proposal is not considered to have any effects on freshwater areas as the proposal is of low density which does not contain nor is in proximity to any freshwater areas. The balance lot can continue with the existing activities. Wastewater will be managed on site at the time of built development within the lots, as detailed in the Site Suitability Report from Geologix. The requirement for a site-specific wastewater report at the time of built development on each of the lots is anticipated to be a consent notice condition on the titles. The sites do not contain any riparian margins or wetlands.

3.5 Enabling Economic Wellbeing
Northland's natural and physical resources are sustainably managed in a way that is attractive for business and investment that will improve the economic wellbeing of Northland and its communities.

7.14. The natural and physical resources on the sites will be sustainably managed and the allotments will provide for the economic wellbeing of Northland and its communities. The proposed lots for Stage 1 will be two hectares in area and will comply with the RDA requirements for the zone. The balance lot has been kept to a larger size to continue to enable rural productive activities. Stage 2 will not result in an increase in titles as this will be a boundary adjustment between existing lots resulting in a much better layout. The economic wellbeing will be enhanced by engaging professionals to carry out the work such as surveying to complete the subdivision.

3.6 Economic activities – reverse sensitivity and sterilisation
The viability of land and activities important for Northland's economy is protected from the negative impacts of new subdivision, use and development, with particular emphasis on either:
(a) Reverse sensitivity for existing:
(i) Primary production activities;
(ii) Industrial and commercial activities;
(iii) Mining*; *Includes aggregates and other minerals. or

(iv) Existing and planned regionally significant infrastructure; or
(b) Sterilisation of:
(i) Land with regionally significant mineral resources; or
(ii) Land which is likely to be used for regionally significant infrastructure

7.15. The proposal is not considered to create any reverse sensitivity effects on the industries listed. The proposal will see four two hectare lots created at time of Stage 1 and a boundary adjustment between three lots at the time of Stage 2. The proposed lot sizes are not out of character within the area with many rural lifestyle lots in proximity due to the location of the site being on the peripheral of the Kaikohe township. The proposal will not inhibit the existing primary production activities in the area as the proposal is not objectionable to the surrounding environment. The proposal is not considered to create any reverse sensitivity effects. The balance lot has been kept to a maximum size to ensure that the existing activities on the site can remain. The proposed two hectare vacant allotments are consistent with lots in the surrounding environment and will be located a sufficient distance from existing development on adjoining allotments.

7.16. The site is not located in proximity to mining activities nor any existing or planned regionally significant infrastructure.

7.17. The proposal does not result in the sterilisation of land with regionally significant mineral resources nor land which is likely to be used for regionally significant infrastructure.

3.15 Active Management
Maintain and / or improve;
(a) The natural character of the coastal environment and fresh water bodies and their margins;
(b) Outstanding natural features and outstanding natural landscapes;
(c) Historic heritage;
(d) Areas of significant indigenous vegetation and significant habitats of indigenous fauna (including those within estuaries and harbours);
(e) Public access to the coast; and
(f) Fresh and coastal water quality by supporting, enabling and positively recognising active management arising from the efforts of landowners, individuals, iwi, hapū and community groups.

7.18. The subject site is not located within the coastal environment. The site is not shown to contain any outstanding natural features or landscapes nor any areas of historic heritage. The site also does not contain any known areas of significant indigenous vegetation or habitats of indigenous fauna. The site does contain some freshwater bodies. The management of these water bodies will be maintained as part of this development.

5.1.1 Planned and coordinated development
Subdivision, use and development should be located, designed and built in a planned and co-ordinated manner which:
(a) Is guided by the 'Regional Form and Development Guidelines' in Appendix 2;

(b) Is guided by the 'Regional Urban Design Guidelines' in Appendix 2 when it is urban in nature;
(c) Recognises and addresses potential cumulative effects of subdivision, use, and development, and is based on sufficient information to allow assessment of the potential long-term effects;
(d) Is integrated with the development, funding, implementation, and operation of transport, energy, water, waste, and other infrastructure;
(e) Should not result in incompatible land uses in close proximity and avoids the potential for reverse sensitivity;
(f) Ensures that plan changes and subdivision to / in a primary production zone, do not materially reduce the potential for soil-based primary production on land with highly versatile soils10, or if they do, the net public benefit exceeds the reduced potential for soil-based primary production activities; and
(g) Maintains or enhances the sense of place and character of the surrounding environment except where changes are anticipated by approved regional or district council growth strategies and / or district or regional plan provisions.
(h) Is or will be serviced by necessary infrastructure.

7.19. Throughout this application we have covered the issues listed within Part A Regional form and development guidelines. Part B Urban Design guidelines and Part C Māori Urban Design principles are not applicable to this rural subdivision. The cumulative effects of the proposal are considered to be less than minor. All effects can be managed within the site boundaries, with a Site Suitability Report prepared which is in support of the proposal. The subdivision complies with the RDA provisions for the zone and as such is considered to be anticipated by the plan. Infrastructure will be provided for on site. No incompatible land use activities or reverse sensitivity effects are anticipated as the proposal is compliant with the RDA provisions for the zone as well as being compatible with other land use activities in the area and lot sizes. The site does contain highly versatile soils however, as per the Land Guide to Implementation for the National Policy Statement for Highly Productive Land, consideration on the productive capacity of the land is not provided for within the discretion for activities with Controlled or Restricted Discretionary Activity statuses. However, consideration of the effect of the activity on existing land use activities must be provided for. Consideration of reverse sensitivity effects has been undertaken in detail within this report, and it has been determined that the proposal does not result in reverse sensitivity effects.

7.20. The sense of place and character of the surrounding environment is considered to be maintained. The subject site is located on the periphery of the Kaikohe township, which is usually a transition area between town and country. The proposal will see four additional 2 hectare allotments created, which is considered to be of low density and consistent with development on the outskirts of smaller townships. The proposal has ensured that the area of the balance lot is maximised, whilst ensuring the RDA requirements for the zone are met. This ensures that the existing activities within the site can continue within the balance lot, mitigating any reverse sensitivity effects. Stage 2 will see three existing allotments reconfigured to provide lots which are more appealing and consistent with the surrounding environment. As such, it is considered that the proposal will maintain the sense of place and character of the surrounding environment.

Summary

7.21. It can be concluded from the above that the proposal is generally compatible with the intent of the Regional Policy Statement. The proposal is not considered to create any reverse sensitivity effects.

Far North Operative District Plan

Relevant objectives and policies

7.22. The relevant objectives and policies of the Plan are those related to the Subdivision Chapter, the Rural Environment and the Rural Production Zone. The proposal is considered to create no more than minor adverse effects on the rural environment. The proposal is considered to be consistent with the rural character of the surrounding area and is considered to have negligible effects on the rural amenity value of the area, as the lot sizes in the locality already reflect the size of the lots proposed. The proposal is considered to be consistent with the objectives and policies of the Plan.

Assessment of the objectives and policies within the Subdivision Chapter

7.23. The following assessment is based upon the objectives and policies contained within section 13.3 and 13.4 of the District Plan.

Objectives

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

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

13.3.3 To ensure that the subdivision of land does not jeopardise the protection of outstanding landscapes or natural features in the coastal environment.

13.3.4 To ensure that subdivision does not adversely affect scheduled heritage resources through alienation of the resource from its immediate setting/context.

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

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

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

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

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

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

13.3.11 To ensure that the operation, maintenance, development and upgrading of the existing National Grid is not compromised by incompatible subdivision and land use activities.

7.24. The subdivision will be consistent with the purpose of the Rural Production zone as the allotments can comply with the allotment sizes for Restricted Discretionary Activity as well as Stage 2 being able to comply with the requirements for a Controlled Boundary Adjustment. The proposed new allotments will enable *small scale farming and activities ancillary to rural production whilst maintaining and enhancing amenity values associated with the rural environment, and at minimising the likelihood and risk of incompatible land uses establishing in proximity to each other.* The subdivision is not considered to compromise the life supporting capacity of air, water, soil or ecosystems as the proposal will see allotments created where all effects can be managed within the site boundaries as determined within the SSR provided with this application. No reverse sensitivity effects are anticipated as has been discussed in detail within this report. The site is not shown to be susceptible to natural hazards, and the proposal is not considered to accelerate natural hazards. The site does not contain any outstanding landscapes or features and is not located within the coastal environment. The site is not shown to contain any heritage resources. On site water storage will be provided for at the time of built development on the lots. Stormwater will also be managed at the time of built development on the lots, with stormwater management of the proposed accessways being managed at the time of construction as per the detail within the SSR. The subject site is located on the peripheral of the Kaikohe township, and the proposal will result in four additional allotments which can comply with the RDA provisions for the zone as part of Stage 1, with Stage 2 being a boundary adjustment between existing lots. The proposal will maximise the area of the balance lot to ensure that the existing use of the site can remain, mitigating reverse sensitivity effects to a less than minor degree. This is considered to result in a superior outcome compared to other forms of subdivision which could be undertaken on the site. The proposal is not considered to affect the relationship between Māori and their ancestral lands, water, sites, waahi tapu and other taonga. Electricity supply is not a requirement of the Rural Production zone. Energy efficient layout of any new building will be at the discretion of the new owners. Infrastructure will be provided for onsite. The National Grid will not be compromised.

Policies

13.4.1That the sizes, dimensions and distribution of allotments created through the subdivision process be determined with regard to the potential effects including cumulative effects, of the use of those allotments on:

- *natural character, particularly of the coastal environment;*
- *ecological values;*
- *landscape values;*
- *amenity values;*
- *cultural values;*
- *heritage values; and*
- *existing land uses.*

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

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

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

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

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

13.4.7 That the need for a financial contribution be considered only where the subdivision would:

(a) result in increased demands on car parking associated with non-residential activities; or

(b) result in increased demand for esplanade areas; or

(c) involve adverse effects on riparian areas; or

(d) depend on the assimilative capacity of the environment external to the site.

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

13.4.9 That bonus development donor and recipient areas be provided for so as to minimise the adverse effects of subdivision on Outstanding Landscapes and areas of significant indigenous flora and significant habitats of fauna.

13.4.10 The Council will recognise that subdivision within the Conservation Zone that results in a net conservation gain is generally appropriate.

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

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

13.4.13 Subdivision, use and development shall preserve and where possible enhance, restore and rehabilitate the character of the applicable zone in regards to s6 matters. In addition subdivision, use and development shall avoid adverse effects as far as practicable by using techniques including:

(a) clustering or grouping development within areas where there is the least impact on natural character and its elements such as indigenous vegetation, landforms, rivers, streams and wetlands, and coherent natural patterns;

(b) minimising the visual impact of buildings, development, and associated vegetation clearance and earthworks, particularly as seen from public land and the coastal marine area;

(c) providing for, through siting of buildings and development and design of subdivisions, legal public right of access to and use of the foreshore and any esplanade areas;

(d) through siting of buildings and development, design of subdivisions, and provision of access that recognise and provide for the relationship of Maori with their culture, traditions and taonga including concepts of mauri, tapu, mana, wehi and karakia and the important contribution Maori culture makes to the character of the District (refer Chapter 2 and in particular Section 2.5 and Council's "Tangata Whenua Values and Perspectives" (2004);

(e) providing planting of indigenous vegetation in a way that links existing habitats of indigenous fauna and provides the opportunity for the extension, enhancement or creation of habitats for indigenous fauna, including mechanisms to exclude pests;

(f) protecting historic heritage through the siting of buildings and development and design of subdivisions.

(g) achieving hydraulic neutrality and ensuring that natural hazards will not be exacerbated or induced through the siting and design of buildings and development.

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

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

(a) development of energy efficient buildings and structures;

(b) reduced travel distances and private car usage;

(c) encouragement of pedestrian and cycle use;

(d) access to alternative transport facilities;

(e) domestic or community renewable electricity generation and renewable energy use.

13.4.16 When considering proposals for subdivision and development within an existing National Grid Corridor the following will be taken into account:

(a) the extent to which the proposal may restrict or inhibit the operation, access, maintenance, upgrading of transmission lines or support structures;

(b) any potential cumulative effects that may restrict the operation, access, maintenance, upgrade of transmission lines or support structures; and

(c) whether the proposal involves the establishment or intensification of a sensitive activity in the vicinity of an existing National Grid line.

7.25. The proposed subdivision will not have any adverse impacts on the character, ecological, landscape, amenity, cultural, heritage or existing land uses. Vehicular access has been assessed within this report which is considered the most suitable and practical for the proposed allotments. Legal access has also been provided to Tuhuna A & B as part of Stage 1 due to these lots currently utilising informal access. The site is not shown to be susceptible to natural hazards. Connection to utility services is not a requirement of the Rural Production zone. No adverse effects are anticipated on neighbouring properties, public roads and the natural and physical resources of the site. No vegetation removal is proposed as part of this application. The sites are not known to contain any heritage resources or significant indigenous vegetation or habitats of fauna. The sites are not located within the coastal environment, nor do they contain any riparian margins or areas of outstanding landscapes and features. Financial contribution is not considered necessary in this case. Water storage will be provided for onsite at the time of built development on the lots. Bonus development and recipient areas are not considered relevant. The site is not located within the conservation area. The proposal is not considered to affect the relationship of Māori and their culture and traditions. The proposal is not considered to be an intensive subdivision, and a management plan is not considered relevant.

7.26. In regards to Policy 13.4.13, the two staged proposal will result in the two hectare allotments being contained to one area of the site, with the balance lot being located to the east. This is considered the most appropriate layout for the site and will ensure that the balance lot can maximise productive use. The vacant lots will be over two hectares in area and given the accessway will run through the middle of the development, this is anticipated to entice future owners to build closest to the private accessway and furthest from the road boundary, which will reduce visual effects from the road. Given that the sites are in an area where residential development is common, the proposed lots are considered suitable for the surrounding environment. The site is not located near the coastal marine area. The proposal is not considered to have effects on the relationship of Māori and their culture, traditions or taonga. No planting of indigenous vegetation is proposed nor considered necessary as the site does not link existing habitats of indigenous vegetation or fauna. The site is not known to contain any areas of historic heritage. The site is not shown to be susceptible to natural hazards, nor will it accelerate or worsen natural hazards.

7.27. The objectives and policies of the Rural Production Environment will be undertaken below. Due to Stage 1 meeting the RDA provisions for the zone and Stage 2 meeting the controlled provisions, it is considered consistent with the intent of the zone. Built development on the site will be at the discretion of future owners. The proposal is not located within the National Grid.

Assessment of the objectives and policies within the Rural Environment.

7.28. The following assessment is based upon the objectives and policies contained within sections 8.3 and 8.4.

Objectives

8.3.1 To promote the sustainable management of natural and physical resources of the rural environment.

8.3.2 To ensure that the life supporting capacity of soils is not compromised by inappropriate subdivision, use or development.

8.3.3 To avoid, remedy or mitigate the adverse and cumulative effects of activities on the rural environment.

8.3.4 To protect areas of significant indigenous vegetation and significant habitats of indigenous fauna

8.3.5 To protect outstanding natural features and landscapes.

8.3.6 To avoid actual and potential conflicts between land use activities in the rural environment.

8.3.7 To promote the maintenance and enhancement of amenity values of the rural environment to a level that is consistent with the productive intent of the zone.

8.3.8 To facilitate the sustainable management of natural and physical resources in an integrated way to achieve superior outcomes to more traditional forms of subdivision, use and development through management plans and integrated development.

8.3.9 To enable rural production activities to be undertaken in the rural environment.

8.3.10 To enable the activities compatible with the amenity values of rural areas and rural production activities to establish in the rural environment.

7.29. The proposal will promote the sustainable management of natural and physical resources by providing a balance lot which can continue the existing activities which are currently undertaken on the site. The proposal is of low density, creating four additional 2 hectares allotments, where effects can be managed within the site boundaries. The life supporting capacity of soils is not considered to be compromised as has been discussed within this report. No adverse or cumulative effects are anticipated. The sites do not contain any known areas of significant vegetation nor any areas of outstanding natural features or landscapes. Conflicts between land use activities are not anticipated as the surrounding environment already contains allotments which are utilised for rural-residential and lifestyle activities. As the balance lot is of a size where the existing activities can continue, this will further ensure that no conflicting land use activities are created. The proposed two hectare lots are located a sufficient distance from any other activities such that no reverse sensitivity effects are anticipated. The maintenance and enhancement of the amenity values of the zone will be promoted as the proposal can comply with the RDA and Controlled provisions for the zone and is therefore considered to be anticipated within the zone. The balance lot is of a size where the existing activities can continue. Management plans are not considered applicable to this low-density development. Rural production activities can continue within the site and surrounding environment. Amenity values will be maintained.

Policies

8.4.1 That activities which will contribute to the sustainable management of the natural and physical resources of the rural environment are enabled to locate in that environment.

8.4.2 That activities be allowed to establish within the rural environment to the extent that any adverse effects of these activities are able to be avoided, remedied or mitigated and as a result the life supporting capacity of soils and ecosystems is safeguarded, and rural productive activities are able to continue.

8.4.3 That any new infrastructure for development in rural areas be designed and operated in a way that safeguards the life supporting capacity of air, water, soil and ecosystems while protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna, outstanding natural features, and landscapes.

8.4.4 That development which will maintain or enhance the amenity value of the rural environment and outstanding natural features and outstanding landscapes be enabled to locate in the rural environment.

8.4.5 That plan provisions encourage the avoidance of adverse effects from incompatible land uses, particularly new developments adversely affecting existing land-uses (including by constraining the existing land-uses on account of sensitivity by the new use to adverse affects from the existing use – i.e. reverse sensitivity).

8.4.6 That areas of significant indigenous vegetation and significant habitats of indigenous fauna habitat be protected as an integral part of managing the use, development and protection of the natural and physical resources of the rural environment.

8.4.7 That Plan provisions encourage the efficient use and development of natural and physical resources, including consideration of demands upon infrastructure.

8.4.8 That, when considering subdivision, use and development in the rural environment, the Council will have particular regard to ensuring that its intensity, scale and type is controlled to ensure that adverse effects on habitats (including freshwater habitats), outstanding natural features and landscapes on the amenity value of the rural environment, and where appropriate on natural character of the coastal environment, are avoided, remedied or mitigated. Consideration will further be given to the functional need for the activity to be within rural environment and the potential cumulative effects of non-farming activities.

7.30. The proposal promotes the sustainable management of natural and physical resources by utilizing the land in a more efficient way. Furthermore, the proposal will see the balance lot maintained so that the existing activities can occur on the site. The proposal is not considered to create any adverse effects. Infrastructure will be provided for on site at the time of built development within the lots as per the recommendations contained within the Site Suitability Report. The sites do not contain any outstanding landscapes or features. Amenity values will be maintained. No incompatible land uses are anticipated nor any reverse sensitivity effects, as has been discussed in detail within this report. The sites are not known to contain any areas of significant indigenous vegetation or fauna. The proposal includes one point of access from Thorpe Road, which will reduce cumulative effects from multiple crossing places and ensure that traffic is located at one point for the site. No other demands on infrastructure will be created. The intensity, scale and type of the proposal is considered to be consistent with other lots in the area and no adverse effects are anticipated. The proposal is considered to have a functional need to be located in the environment as the site is located on the periphery of the Kaikohe township so will enable additional lots which are in close proximity to places of employment, schools and social activities. No cumulative effects are anticipated with the

introduction of the proposed lots. All effects are anticipated to be managed within the proposed lot boundaries.

Assessment of the objectives and policies within the Rural Production Zone

7.31. The following assessment is based upon the objectives and policies contained within sections 8.6.3 and 8.6.4

Objectives

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

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

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

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

8.6.3.5 To protect and enhance the special amenity values of the frontage to Kerikeri Road between its intersection with SH10 and the urban edge of Kerikeri.

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

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

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

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

7.32. The proposal will promote the sustainable management of natural and physical resources by creating a balance lot which can continue on with the existing productive activities within the site. The two hectare lots are also of a size which can cater for residential development and small-scale productive use. This will also ensure that the amenity values of the zone and surrounding environment are maintained. Social, economic and cultural wellbeing will be provided for by providing lots which can be utilised for rural-lifestyle living on the outskirts of the Kaikohe township. The proposal is considered to be of low density, consistent with the plan. Significant natural values of the zone will be protected as the balance lot is of a size that can continue to provide for productive activities. The two-hectare allotments can also providing opportunity for small scale productive activities. Due to the location of the sites being on the periphery of the Kaikohe township, lots of the proposed size are not considered uncommon.

7.33. The site is not located along Kerikeri Road. Reverse sensitivity effects are not anticipated. The addition of the two-hectare allotments in the Rural Production zone is not considered out of the ordinary in the surrounding environment or within the zone. The Stage 1 subdivision can

be provided for as a Restricted Discretionary Activity and the Stage 2 boundary adjustment can meet the controlled provisions and are considered to therefore be anticipated by the plan. Incompatible uses are not anticipated. The balance lot across both stages will be of a size where the existing productive activities can continue. The two-hectare allotments are intended to be utilised for rural-lifestyle use which is not uncommon in the surrounding environment, considering the close location to the Kaikohe township, nor is development of this size and density uncommon within the Rural Production zone itself. The proposal is considered to have a functional need within the rural environment as it will provide additional housing whilst being in close proximity to the Kaikohe township which allows less travel distance for schools, places of employment and social events/activities. The balance lot will provide a buffer around the proposed two hectare lots, whilst enabling the existing productive activities to continue. The proposal provides a transition zone between the adjoining dense industrial and residential zones and the larger rural productive lots further afield. The proposal will not alter the ability of rural production activities to be undertaken in the zone, as the balance lot is of a sufficient size to enable the continuation of the existing activities on the site and the 2ha allotments can continue to provide for smaller scale production activities.

Policies

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

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

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

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

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

8.6.4.6 That the built form of development allowed on sites with frontage to Kerikeri Road between its intersection with SH10 and Cannon Drive be maintained as small in scale, set back from the road, relatively inconspicuous and in harmony with landscape plantings and shelter belts.

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

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

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

7.34. The proposal is not considered to create any adverse effects on the environment nor any reverse sensitivity effects, as has been discussed throughout this report. There are no offsite effects anticipated. The proposed lot sizes are able to accommodate a buildable platform as well as area for onsite services as determined within the Site Suitability report from Geologix. No conflicting land uses are anticipated. The balance lot across both stages are of a size that can cater for the existing productive activities on the site. The remainder of the allotments will be just over 2 hectares and are intended to be utilised for rural-lifestyle use which is not uncommon in the surrounding environment nor the Rural Production zone in general. The proposal is considered to be of low density and will be easily absorbed into the surrounding environment. The proposal is not considered to have adverse effects on natural and physical resources.

7.35. The proposal will see Stage 1 create four additional allotments as a Restricted Discretionary Activity and Stage 2 completed as a Controlled Boundary Adjustment. It is considered that the proposed scale, type and intensity of the development is consistent with the surrounding environment and Rural Production zone in general.

7.36. The site does not have frontage to Kerikeri Road.

7.37. As discussed, no conflicting land uses are anticipated. As the balance lot will be of a size to continue the existing productive activities on the site, no adverse or reverse sensitivity effects are anticipated. The two hectare allotments are large enough to accommodate future residential development and small scale productive activities, which is consistent with lots in the surrounding environment. The lots are located a sufficient distance from adjoining lots that no reverse sensitivity effects are anticipated. The proposal is not considered to compromise the continued operation of lawfully established existing activities in the surrounding environment.

Proposed District Plan

7.38. Under the Proposed District Plan, the site is zoned Rural Production, and therefore an assessment of the objectives and policies within this chapter have been included below. The proposal is considered to create no more than minor adverse effects on the rural environment and is consistent with the rural intent of the surrounding environment and the zone. The proposal is considered to be consistent with the objectives and policies of the Proposed District Plan.

Rural Production Zone

7.39. An assessment on the relevant objectives and policies within the Rural Production Zone has been addressed below.

Objectives

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

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

RPROZ-O3 - Land use and subdivision in the Rural Production zone:

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

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

7.40. The proposal will see Stage 1 create four additional two-hectare allotments and a balance lot, all of which can contain some form of productive activity. Stage 2 will see a boundary adjustment completed with no additional titles being created. The proposal therefore ensures the long-term protection for current and future generations. The proposed lots are considered to have a functional need to be located in the rural environment as the proposal will ensure that the balance lot remains of a size where productive activities occur, whilst enabling additional lots which can be utilised for rural-lifestyle use. The site is quite unique where it is zoned as Rural Production however is located in a transition zone, on the buffer of the Kaikohe township, which usually is defined as rural lifestyle, to enable smaller allotments in closer proximity to small townships to enable ease of access and living for schools, places of employment and social events/activities. As mentioned, the proposal will still enable primary production activities to occur within the balance lot and smaller scale productive activities in the two hectare lots.

7.41. The proposal is considered to protect the land from sterilisation as it is of low density and will enable a larger balance lot to continue the existing productive activities. No reverse sensitivity effects are anticipated. Natural hazards will not be exacerbated. As per the Site Suitability Report, the allotments are capable of containing future onsite infrastructure.

7.42. As has been discussed throughout this report, the character and amenity of the rural environment is maintained.

Policies

RPROZ-P1 - Enable primary production activities, provided they internalise adverse effects onsite where practicable, while recognising that typical adverse effects associated with primary production should be anticipated and accepted within the Rural Production zone.

RPROZ-P2 - Ensure the Rural Production zone provides for activities that require a rural location by:

(a)enabling primary production activities as the predominant land use;

(b)enabling a range of compatible activities that support primary production activities, including ancillary activities, rural produce manufacturing, rural produce retail, visitor accommodation and home businesses.

RPROZ-P3 - Manage the establishment, design and location of new sensitive activities and other non-productive activities in the Rural Production Zone to avoid where possible, or otherwise mitigate, reverse sensitivity effects on primary production activities.

RPROZ-P4 - Land use and subdivision activities are undertaken in a manner that maintains or enhances the rural character and amenity of the Rural Production zone, which includes:

(a)a predominance of primary production activities;

(b)low density development with generally low site coverage of buildings or structures;

(c)typical adverse effects such as odour, noise and dust associated with a rural working environment; and

(d)a diverse range of rural environments, rural character and amenity values throughout the District.

RPROZ-P5 - Avoid land use that:

(a)is incompatible with the purpose, character and amenity of the Rural Production zone;

(b)does not have a functional need to locate in the Rural Production zone and is more appropriately located in another zone;

(c)would result in the loss of productive capacity of highly productive land;

(d)would exacerbate natural hazards; and

(e)cannot provide appropriate on-site infrastructure.

RPROZ-P6 - Avoid subdivision that:

(a)results in the loss of highly productive land for use by farming activities.

(b)fragments land into parcel sizes that are no longer able to support farming activities, taking into account:

1. *the type of farming proposed; and*
2. *whether smaller land parcels can support more productive forms of farming due to the presence of highly productive land.*

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

RPROZ-P7 - Manage land use and subdivision to address the effects of the activity requiring resource consent, including (but not limited to) consideration of the following matters where relevant to the application:

(a)whether the proposal will increase production potential in the zone;

(b)whether the activity relies on the productive nature of the soil;

(c)consistency with the scale and character of the rural environment;

(d)location, scale and design of buildings or structures;

(e)for subdivision or non-primary production activities:

i. scale and compatibility with rural activities;

ii. potential reverse sensitivity effects on primary production activities and existing infrastructure;

iii. the potential for loss of highly productive land, land sterilisation or fragmentation

(f)at zone interfaces:

i. any setbacks, fencing, screening or landscaping required to address potential conflicts;

ii. the extent to which adverse effects on adjoining or surrounding sites are mitigated and internalised within the site as far as practicable;

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

(h)the adequacy of roading infrastructure to service the proposed activity;

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

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

7.43. The proposal is considered to enable productive activities within the balance lots and smaller scale productive activities in the two hectare lots. No adverse effects are anticipated. The two-hectare allotments are intended for rural-lifestyle use, which is not uncommon in the surrounding environment. As mentioned, the site is located on the periphery of the Kaikohe township and is more of a transition zone between town and country. The rural character is considered to be maintained as the proposal is of low density.

7.44. The proposal is considered to enable land use activities which are compatible with the existing environment. Productive capacity of the site is not considered applicable to this Controlled and Restricted Discretionary subdivision as it is not a discretion provided for within the plan. Natural hazards will not be exacerbated, and each site can cater for onsite infrastructure.

7.45. As mentioned, the productive capacity of the lots is not a consideration of this Controlled and Restricted Discretionary subdivision as it is not a discretion of the plan. Therefore, assessment of the loss of highly productive land within RPROZ-P6 is not considered applicable.

7.46. No adverse effects on historic heritage, cultural values, natural features, landscapes or indigenous biodiversity are anticipated.

Summary

7.47. The above assessment demonstrates that the proposal will be consistent with the relevant objectives and policies and assessment criteria of the relevant statutory documents.

8. Section 125 – Lapsing of consent

8.1. The Act prescribes a standard consent period of five years in which all works must be undertaken, but this may be amended as determined by the Council. It is requested that the standard five-year provision be applied in this case.

9. Notification Assessment – Sections 95A to 95G of The Act

Public Notification Assessment

9.1. Section 95A requires a council to follow specific steps to determine whether to publicly notify an application. The following is an assessment of the application against these steps:

Step 1 Mandatory public notification in certain circumstances
(2) Determine whether the application meets any of the criteria set out in subsection (3) and,—
(a)if the answer is yes, publicly notify the application; and
(b) if the answer is no, go to step 2.
(3)The criteria for step 1 are as follows:
(a)the applicant has requested that the application be publicly notified:
(b)public notification is required under section 95C:
(c)the application is made jointly with an application to exchange recreation reserve land under section 15AA of the Reserves Act 1977.

9.2. It is not requested the application be publicly notified and the application is not made jointly with an application to exchange reserve land. Therefore Step 1 does not apply and Step 2 must be considered.

Step 2: Public Notification precluded in certain circumstances.
(4) Determine whether the application meets either of the criteria set out in subsection (5) and,—
(a) if the answer is yes, go to step 4 (step 3 does not apply); and
(b)if the answer is no, go to step 3.
(5) The criteria for step 2 are as follows:
(a) the application is for a resource consent for 1 or more activities, and each activity is subject to a rule or national environmental standard that precludes public notification:
(b)the application is for a resource consent for 1 or more of the following, but no other, activities:
(i)a controlled activity:
(ii)[Repealed]
(iii) a restricted discretionary, discretionary, or non-complying activity, but only if the activity is a boundary activity.
(iv)[Repealed]
(6)[Repealed]

9.3. The application is for a Controlled Boundary Adjustment and Restricted Discretionary activity subdivision but not a boundary activity. No preclusions apply in this instance. Therefore, Step 3 must be assessed.

Step 3: If not precluded by Step 2, public notification required in certain circumstances

(7) Determine whether the application meets either of the criteria set out in subsection (8) and,—

(a)if the answer is yes, publicly notify the application; and

(b)if the answer is no, go to step 4.

(8)The criteria for step 3 are as follows:

(a)the application is for a resource consent for 1 or more activities, and any of those activities is subject to a rule or national environmental standard that requires public notification:

(b)the consent authority decides, in accordance with section 95D, that the activity will have or is likely to have adverse effects on the environment that are more than minor.

9.4. No applicable rules require public notification of the application. The proposal is not considered to have a more than minor effect on the environment as detailed in the sections above.

Step 4; Public notification in special circumstances

(9) Determine whether special circumstances exist in relation to the application that warrant the application being publicly notified and,—

(a) if the answer is yes, publicly notify the application; and

(b)if the answer is no, do not publicly notify the application, but determine whether to give limited notification of the application under section 95B.

9.5. There are no special circumstances that exist to justify public notification of the application because the proposal is for a subdivision within the rural environment where allotments will be created which are consistent with lots in the surrounding environment. There are many allotments in the immediate vicinity which are of similar or smaller size to the proposed allotments and hence the proposal is not considered to be exceptional or unusual.

Public Notification Summary

9.6. From the assessment above it is considered that the application does not need to be publicly notified, but assessment of limited notification is required.

Limited Notification Assessment

9.7. If the application is not publicly notified, a consent authority must follow the steps of section 95B to determine whether to give limited notification of an application.

Step 1: Certain affected groups and affected persons must be notified.

(2) Determine whether there are any—

(a) affected protected customary rights groups; or

(b)affected customary marine title groups (in the case of an application for a resource consent for an accommodated activity).

(3) Determine—

(a)whether the proposed activity is on or adjacent to, or may affect, land that is the subject of a statutory acknowledgement made in accordance with an Act specified in Schedule 11; and

(b)whether the person to whom the statutory acknowledgement is made is an affected person under section 95E.

(4) Notify the application to each affected group identified under subsection (2) and each affected person identified under subsection (3).

9.8. There are no protected customary rights groups or customary marine title groups or statutory acknowledgement areas that are relevant to this application.

Step 2: Limited notification precluded in certain circumstances.
(5) Determine whether the application meets either of the criteria set out in subsection (6) and,—
(a)if the answer is yes, go to step 4 (step 3 does not apply); and
(b)if the answer is no, go to step 3.
(6) The criteria for step 2 are as follows:
(a)the application is for a resource consent for 1 or more activities, and each activity is subject to a rule or national environmental standard that precludes limited notification:
(b) the application is for a controlled activity (but no other activities) that requires a resource consent under a district plan (other than a subdivision of land).

9.9. There is no rule in the plan or national environmental standard that precludes notification. The application is not for a prescribed activity but is for a subdivision proposal. Therefore Step 2 does not apply and Step 3 must be considered.

Step 3: Certain other affected persons must be notified
(7) In the case of a boundary activity, determine in accordance with section 95E whether an owner of an allotment with an infringed boundary is an affected person.
(8) In the case of any other activity, determine whether a person is an affected person in accordance with section 95E.
(9) Notify each affected person identified under subsections (7) and (8) of the application.
The proposal is not for a boundary activity nor is it a prescribed activity.

9.10. The proposal is not for a boundary activity.

9.11. In deciding who is an affected person under section 95E, a council under section 95E(2):

(2) The consent authority, in assessing an activity's adverse effects on a person for the purpose of this section,—

(a) may disregard an adverse effect of the activity on the person if a rule or a national environmental standard permits an activity with that effect; and

(b) must, if the activity is a controlled activity or a restricted discretionary activity, disregard an adverse effect of the activity on the person if the effect does not relate to a matter for which a rule or a national environmental standard reserves control or restricts discretion; and

(c) must have regard to every relevant statutory acknowledgement made in accordance with an Act specified in Schedule 11.

9.12. A Council must not consider that a person is affected if they have given their written approval, or it is unreasonable in the circumstances to seek that person's approval.

9.13. With respect to section 95B(8) and section 95E, the permitted baseline was considered as part of the assessment of environmental effects undertaken in Section 6 of this report, which found that the potential adverse effects on the environment will be no more than minor. In regard to effects on persons, the assessment in Sections 5, 6 & 7 are also relied on, and the following comments made:

- The size of the proposed allotments is consistent with the character of the allotments in the locality. Therefore, the proposed allotment sizes are not objectionable with the surrounding environment.
- Rural productive use of the balance lot can be maintained, and smaller scale productive activities can be undertaken within the two-hectare allotments.
- The proposal is not considered to create any reverse sensitivity effects.
- Stage 1 will see four additional allotments created each of which can accommodate a dwelling and associated onsite infrastructure. Access will be provided for the new lots as well as the two adjoining lots (Tuhuna A & B) which currently do not have legal access rights. The proposal has been assessed as a Restricted Discretionary Activity and is therefore anticipated by the plan.
- Stage 2 will see a boundary adjustment carried out between the balance of Lot 5 and Tuhuna A & B lots. This will not result in any additional titles and will see the lots reconfigured to maximise the potential of the balance lot, whilst enabling effective use of the access created as part of this subdivision. The proposed configuration will result in lots which can be more effectively and efficiently utilised whilst ensuring that it complies with the Controlled provisions for boundary adjustments. As such, it is considered that boundary adjustments of this type are anticipated by the plan.
- The development is not considered to be contrary to the objectives and policies under the Operative District Plan or Proposed District Plan.
- All other persons are sufficiently separated from the proposed development and works, such that there will be no effects on these people.

9.14. Therefore, no persons will be affected to a minor or more than minor degree.

9.15. Overall, the adverse effects on any persons are considered to be less than minor. Therefore Step 3 does not apply and Step 4 must be considered.

Step 4: Further notification in special circumstances

(10) whether special circumstances exist in relation to the application that warrant notification of the application to any other persons not already determined to be eligible for limited notification under this section (excluding persons assessed under section 95E as not being affected persons),

9.16. The proposal is to subdivide the site to create four additional allotments as part of Stage 1. Stage 2 will not result in an increase in titles. No reverse sensitivity effects or incompatible land use activities are anticipated. It is considered that no special circumstances exist in relation to the application.

Limited Notification Assessment Summary

9.17. Overall, from the assessment undertaken Steps 1 to 4 do not apply and there are no affected persons.

Notification Assessment Conclusion

9.18. Pursuant to sections 95A to 95G it is recommended that the Council determine the application be non-notified for the above-mentioned reasons.

10. Part 2 Assessment

10.1. The application must be considered in relation to the purpose and principles of the Resource Management Act 1991 which are contained in Section 5 to 8 of the Act inclusive.

10.2. The proposal will meet Section 5 of the RMA as the proposal will sustain the potential of natural and physical resources whilst meeting the foreseeable needs of future generations as the proposal is considered to retain the productive use of the land while still providing for their social, economic and cultural well-being. In addition, the proposal will avoid adverse effects on the environment and will maintain the rural character of the site and surrounding environment.

10.3. Section 6 of the Act sets out a number of matters of national importance. These matters of national importance are considered relevant to this application. The proposal is not located within the coastal environment nor are there any known lakes, or wetlands located within the site. The sites do not contain any areas of Outstanding Natural Features and Landscapes. The proposal is not anticipated to affect any areas of indigenous vegetation. The sites are not located along the coastal marine area or near lakes or rivers where public access would be required. The sites are not known to contain any areas of cultural significance, and the proposal is not considered to affect the relationship of Māori and their culture and traditions. The sites are not known to contain any sites of historical significance or be within an area subject to customary rights. The proposal does not increase the risk of natural hazards and will not accelerate, exacerbate or worsen the effects from natural hazards. It is therefore considered that the proposal is consistent with Section 6 of the Act.

10.4. Section 7 identifies a number of “other matters” to be given particular regard by a Council in the consideration of any assessment for resource consent, including the maintenance and enhancement of amenity values. The proposal maintains amenity values in the area as the proposal is in keeping with the existing character of the surrounding environment.

10.5. Section 8 requires Council to take into account the principals of the Treaty of Waitangi. It is considered that the proposal raises no Treaty issues. The subject site is not known to be located within an area of significance to Māori. The proposal has taken into account the principals of the Treaty of Waitangi and is not considered to be contrary to these principals.

10.6. Overall, the application is considered to be consistent with the relevant provisions of Part 2 of the Act, as expressed through the objectives, policies and rules reviewed in earlier sections of this application. Given that consistency, we conclude that the proposal achieves the purposes of sustainable management set out by Sections 5-8 of the Act.

11. Conclusion

11.1. The proposal is to undertake a two staged subdivision where Stage 1 will see four additional 2-hectare allotments created and a 7-hectare balance lot as well as easements for the purpose of access to service two adjoining allotments which currently have no legal access. Stage 2 will see a boundary adjustment completed between the balance lot of Stage 1 and the adjoining two allotments, Tuhuna A & B. Stage 2 will not see an increase in titles, nor will access locations change as the access provided as part of Stage 1 will continue to service the boundary adjusted lots. The proposal is considered to be of low density and will not create any reverse sensitivity effects on existing land use activities in the area.

11.2. Due to the existing pattern of development in the area it is not considered that there are any adverse cumulative effects, and that the proposal does not result in degradation of the character of the surrounding rural environment.

11.3. In terms of section 104(1)(b) of the Act, the actual and potential effects of the proposal will be less than minor.

11.4. It is also considered that the proposal will have less than minor adverse effects on the wider environment; no persons will be adversely affected by the proposal and there are no special circumstances.

11.5. As Controlled and Restricted Discretionary Activities, the proposal has been assessed against the specific matters and limitations imposed by the District Plan. In accordance with sections 104, 104A, 104C, 105 and 106 of the Act in relation to Controlled and Restricted Discretionary activities, it is considered appropriate for consent to be granted on a non-notified basis.

12. Limitations

12.1. This report has been commissioned solely for the benefit of our client, in relation to the project as described above, and to the limits of our engagement, with the exception that the Far North District Council or Northland Regional Council may rely on it to the extent of its appropriateness, conditions and limitations, when issuing their subject consent.

12.2. Copyright of Intellectual Property remains with Northland Planning and Development 2020 Limited, 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 information contained within this report.

12.3. 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.

12.4. 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.

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017

R.W. Muir
Registrar-General
of Land

Identifier **NA314/202**

Part-Cancelled

Land Registration District **North Auckland**

Date Issued 15 September 1902

Prior References

NA237/258 NA251/166

Estate Fee Simple

Area 17.0853 hectares more or less

Legal Description Rangihamama A No 2 Block

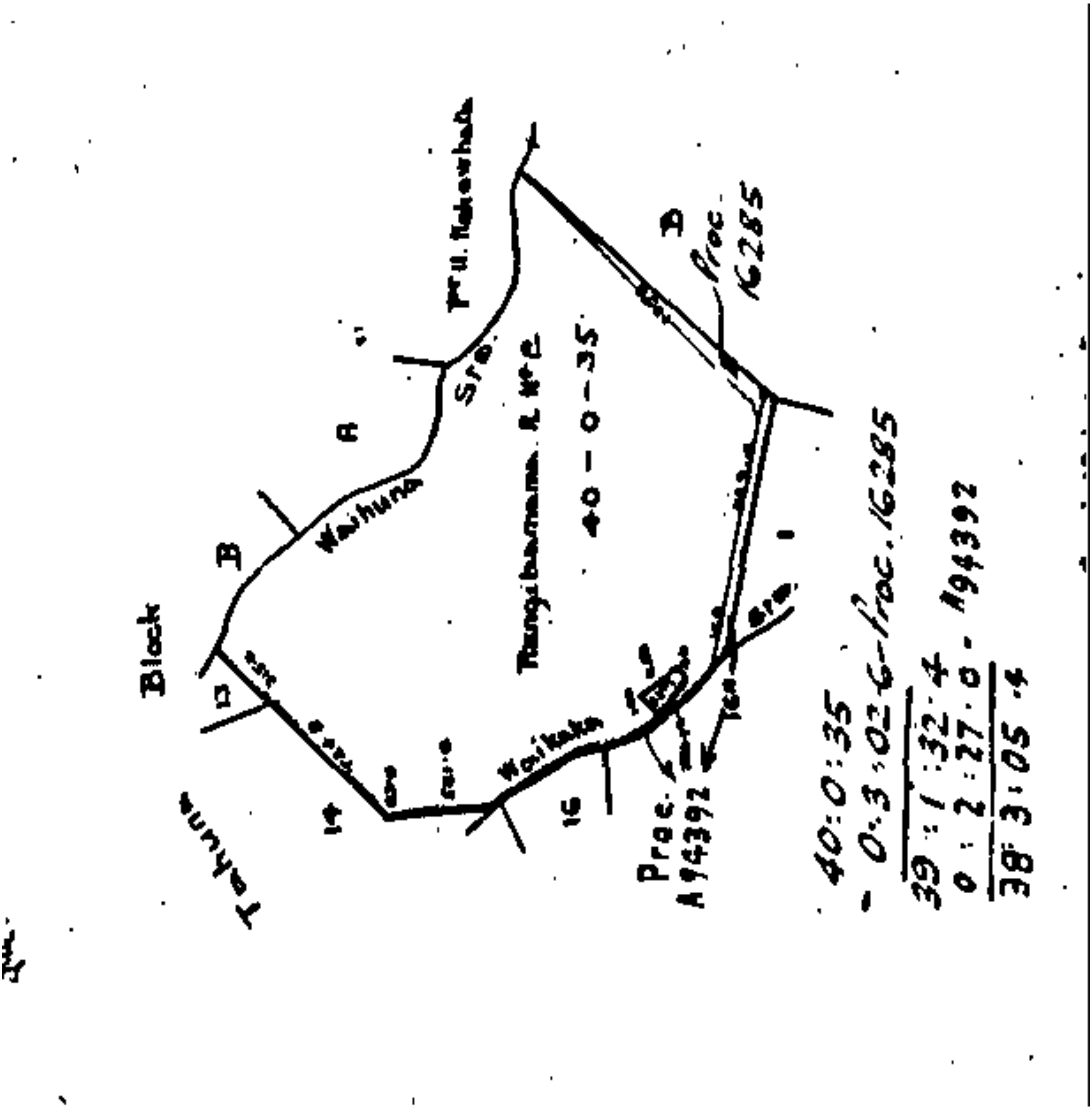
Registered Owners

Prospect Estate Limited

Interests

Proclamation 16285 proclaiming part as street - 22.7.1958 at 2.00 pm

A94392 Proclamation proclaiming part as street - 4.8.1965 at 9.04 am


Block
Tahuna
Waihuna
Waikaka
40 - 0 - 35
Proc. A94392
Proc. 16285
40:0:35
- 0:3:02.6 - Proc. 16285
39:1:32.4
0:2:27.0 - A94392
38:3:05.4

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017

R.W. Muir
Registrar-General
of Land

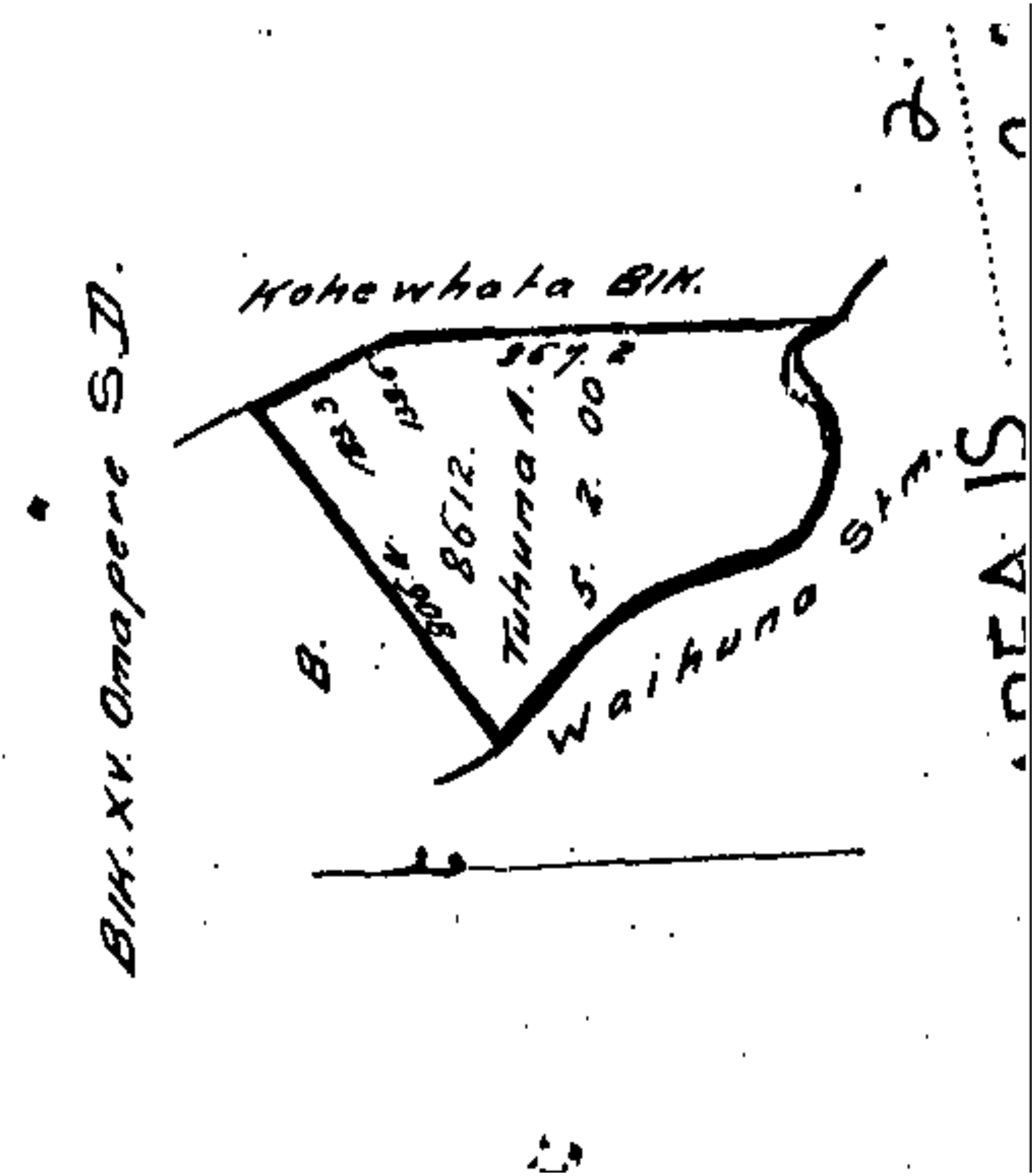
Identifier	**NA269/58**
Land Registration District	**North Auckland**
Date Issued	20 June 1917

Prior References
NAPR107/51

Estate	Fee Simple
Area	2.2258 hectares more or less
Legal Description	Tuhuna A Block
Registered Owners	

Prospect Estate Limited

Interests


Kohewhata Blk.
Blk. XV. Omapere S.D.
Tuhuna 1.
8612.
Waihuna Str.

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017

R.W. Muir
Registrar-General
of Land

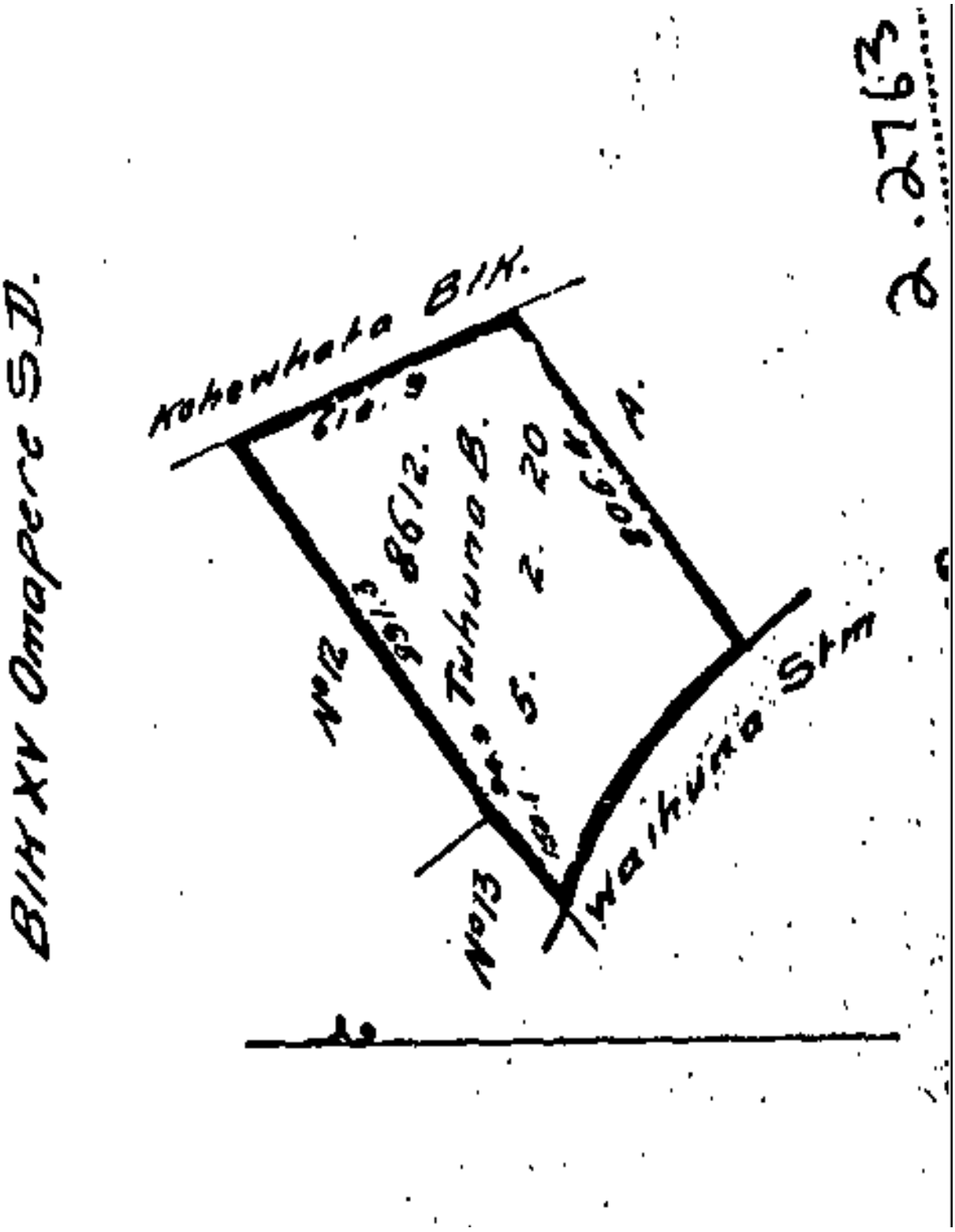
Identifier	**NA269/56**
Land Registration District	**North Auckland**
Date Issued	20 June 1917

Prior References
NAPR167/52

Estate	Fee Simple
Area	2.2764 hectares more or less
Legal Description	Tuhuna B Block
Registered Owners	

Prospect Estate Limited

Interests


Kohewhata Blk.
Waihuka Stm
Blk XV Omapere S.D.

Proposed Memorandum of Easements

Shown	Purpose	Burdened Land	Benefited Land
A	Right of Way Right to Convey Electricity, Water & Telecommunications	Lot 5 Hereon	Lots 1 - 4 Hereon, Tahuna A & B Blks & Pt Kohewhata 11C2 Blk
B			Lots 2 & 3 Hereon, & Tahuna A & B Blks
C & D			Tahuna A & B Blks
E		Lot 3 Hereon	Tuhuna A & Pt Kohewhata 11C2

Pt Tuhuna 13
Pt Tuhuna 14A
Pt Tuhuna 14B
Tuhuna B
NA269/56
Tuhuna A
NA269/58
Pt Kohewhata 11C2
NA713/280
Pt Kohewhata 11C1
Pt Rangihamama B
Rangihamama A1
Thorpe Road
Waihuna Stm

LOT 5
7.5545ha

LOT 3
2.0388ha

LOT 2
2.0275ha

LOT 4
2.0114ha

LOT 1
2.0101ha

63.43 80.46 65.32 47.76 185 104.94 89.05 85.05 111.10 18.42 85.87 87.15 158.30 12.74 10.08 25.58 67.15 173.50 212.82 99.42 175 176 177 178 179 180 185 123.64 11.66 10.68 18.55 60.18 190.12 8.88 41.57 8.09 36.35 50.28 32.19 159.41 171.07 149.53

Local Authority: Far North District Council

Total Area: 15.6952 CT
Comprised in: NA314/202
Val. Ref 00523-77500
Levels in terms of: NZ Vert Datum
Contour interval is: Minor 1.0 Major 5.0

AREAS AND MEASUREMENTS SUBJECT TO FINAL SURVEY

STAGE 1

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

0 20 40 60 80 100 120 140 160m

Prepared for: Prospect Estate Limited

WILLIAMS AND KING
Registered Land Surveyors, Planners & Land Development Consultants
Ph: (09) 407 6030
Email: kerikeri@saps.co.nz
27 Hobson Ave
PO Box 937 Kerikeri

Proposed Subdivision of Pt Rangihamama A2 Blk and Proposed Easements over Tuhuna A Block

	Date	Name
Survey		
Design		
Drawn	W & K	Sept 2024
Rev		Apr 2025

ORIGINAL SCALE 1:2000 SHEET SIZE A3

24315-03

Memorandum of Proposed Easements

Shown	Purpose	Burdened Land	Benefited Land
A , B & C	Right of Way Right to Convey Electricity, Water & Telecommunications	Lot 7 Hereon	Lot 6 Hereon
D		Lot 8 Hereon	Pt Kohewhata 11C2
F	Right of Way	Lots 6 & 7 Hereon	Lot 8 Hereon
G	Right of Way	Lots 6 & 8 Hereon	Lot 7 Hereon

Schedule of Existing Easements

Shown	Purpose	Burdened Land	Document
A , B & C	Right of Way Right to Convey Electricity, Water & Telecommunications	Lot 7 Hereon	RC ..... Stage 1
F		Lot 7 Hereon	
G		Lot 8 Hereon	

Tuhuna 12B
Tuhuna 12A2
Pt Tuhuna 13
Pt Tuhuna 14A
Pt Tuhuna 14B
Kohewhata 11B
Kohewhata 11A
Pt Kohewhata 69
(Roadway)
LOT 8
7.5622ha
LOT 7
2.2779ha
LOT 6
2.2285ha
3
RC .....
Stage 1
2
RC .....
Stage 1
1
RC .....
Stage 1
4
RC .....
Stage 1
Pt Kohewhata 11C2
(NA713/280)
Pt Kohewhata 69
Pt Kohewhata
11C1
Pt Rangihamama B
Rangihamama A1
Thorpe Road
Thorpe Road
Thorpe Road
NA269/56
NA269/58
Lot 5 RC .....
A
B
C
D
F
G

STAGE 2

Local Authority: Far North District Council

Total Area: 12.1234ha
Comprised in: NA296/58, NA296/56 &
Lot 5 RC ..... Stage I

Levels in terms of: NZ Vert Datum
Contour interval is: 1.0 minor 5m major

AREAS AND MEASUREMENTS SUBJECT TO FINAL SURVEY

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

0 25 50 75 100 125 150 175 200m

Prepared for: Prospect Estate Limited

WILLIAMS AND KING
Registered Land Surveyors, Planners & Land Development Consultants
Ph: (09) 407 6030
Email: kerikeri@saps.co.nz
27 Hobson Ave
PO Box 937 Kerikeri

Proposed Subdivision of Tuhuna A &Tuhuna B Blks and Lot 5 RC .....(Stage 1) by way of Boundary Adjustment

	Name	Date
Survey		
Design		
Drawn	W & K	Sept 2024
Rev		

ORIGINAL SCALE 1:2500 | SHEET SIZE A3

24315-04

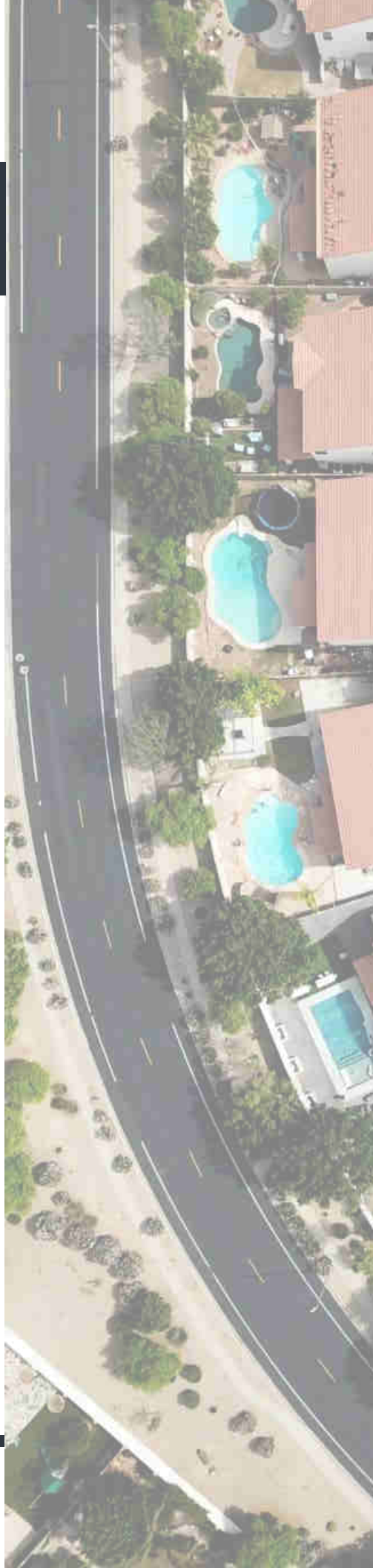
geologix
consulting engineers

SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

THORPE ROAD, KAIKOHE
STAGES 1 TO 5

P J DAIRY LTD

C0471-S-02
MAY 2025
REVISION 2



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DOCUMENT MANAGEMENT

Document Title	Subdivision Site Suitability Engineering Report
Site Reference	Thorpe Road, Kaikohe. Stages 1 to 4
Client	P J Dairy Ltd
Geologix Reference	C0471-S-02
Issue Date	May 2025
Revision	02
Prepared	Edward Collings Managing Director, CPEng, CMEngNZ, CEnvP, MPhys (Hons)
Reviewed	Sebastian Hicks Principal Civil Engineer, CPEng Reg. 1168062, CMEngNZ, IntPE(NZ) /APEC Engineer
Approved	Edward Collings Managing Director, CPEng, CMEngNZ, CEnvP, MPhys (Hons)
File Reference	*Z:\Geologix Files\Projects\C0400-C0499\Thorpe Road, Kaikohe, Part Rangihamama A2 - C0471\06 - Reports\C0471-S-01-R02.docx*

REVISION HISTORY

Date	Issue	Prepared	Reviewed	Approved
February 2025May 2025	First Issue – For Consent	EC	SH	EC
May 2025	Second Issue – For Consent	EC	SH	EC

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TABLE OF CONTENTS

TABLES

1 INTRODUCTION

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

Our scope of works has been undertaken to assist with Resource Consent application in relation to the proposed subdivision of a rural property over multiple titles, off Thorpe Road, Kaikohe, the 'site'. Specifically, this assessment provides a civil engineering assessment for the management of wastewater, stormwater, potable water and firefighting, internal access and associated earthwork requirements.

The purpose of this report, if adopted in practice will enable new building sites with less than minor effects on the environment as a result of the proposed activities outlined below.

1.1 Proposal

Multiple proposed scheme plans were presented to Geologix at the time of writing, prepared by Williams and King Ltd[1] and are reproduced as Drawing Nos. 010 to 014, inclusive, within Appendix A.

It is understood the Client proposes to subdivide the legal title Pt Kohewhata 69 Block to create two rural residential lots, Pt Rangihamama A2 within Stage 2 to create four new rural residential lots and a balance lot. Stage 3 subdivides Tahuna A, Tahuna B Block and proposed lot 5 of stage 3 to create two new residential lots and a balance site by way of a boundary adjustment. Pt Kohewhata 11C2 Block within stage 4 is subdivided to create another two rural residential lots, before finally, within stage 5, lot 8 of stage 3 and lots 1 and 2 of stage 4 are subject to a boundary adjustment. The above assumptions are summarised in Table 1.

Amendments to the referenced scheme plan may require an update to the recommendations of this report which are based on conservative, typical rural residential development concepts. Where alterations of the referenced scheme plans are proposed Geologix should be consulted.

Table 1: Summary of Proposed Scheme

Proposed Lots	Size Range	Purpose
Stage 1 (Pt Kohewhata 69 Block)		
1	4.0442 ha	Balance/ rural residential
2	0.6010 ha	New rural residential
Stage 2 (Pt Rangihamama A2)		
1	2.0101 ha	New rural residential
2	2.1771 ha	New rural residential
3	2.0114 ha	New rural residential
4	2.0388 ha	New rural residential
5	7.6090 ha	Balance/ rural residential

[1] *Williams and King Ltd, Proposed Scheme Plans Ref. 24315-03 (Stage 3) and 24315-04 (Stage 4)*

Stage 3 (Tahuna A, Tahuna B, Stage 2 Proposed Lot 5)		
6	2.2834 ha	Proposed Lot 5 Stage 1
7	2.2779 ha	New rural residential
8	7.5622 ha	Existing rural residential (Boundary Adjustment)
Stage 4 (Pt Kohewhata 11C2 Blk)		
1	0.4647 ha	New rural residential
2	4.0498 ha	Balance/ rural residential
Stage 5 (Lot 8, Stage 3 and Lots 1 and 2, Stage 4		
9	7.1107 ha	Balance/ rural residential
10	0.4514 ha	Existing residential
11	4.4743 ha	Boundary adjustment

Access to the proposed new lots will be established from Thorpe Road and Station Road as summarised in Table 2. A specific traffic engineering assessment and/ or road safety assessment is outside the scope of this report.

Table 2: Summary of Proposed Access

Benefitted Lots	Location	Status
Stage 1, Lot 1	Station Road	New proposed RoW
Stage 1, Lot 2	Thorpe Road	New vehicle crossing
Stage 2, Lots 1 to 5	Thorpe Road	New proposed RoW A to C
Stage 3, Lots 6 to 8	Thorpe Road	RoW A to C formed in Stage 2
Stage 4, Lots 1 and 2	Thorpe Road	New Row D and E
Stage 5, Lots 9 to 11	Thorpe Road	Repurpose of RoW D and E

2 DESKTOP APPRAISAL

The site is located to the south of Kaikohe Township, with the stages formed over five existing parent titles legally described as Part Kohewhata 69 Block, Part Kohewhata 11C2, Part Rangihamama A2 Block, Tahuna A and B Blocks. The proposal will also provide easements over Part Kohewhata 11C2 Block.

The site covers a combined total site area of approximately 27.83 ha and is mostly utilised as rural pasture, generally interspersed with occasional mature tree cover and an existing residential development within Tahuna A Block (93 Station Road).

Topographically the site is generally formed over gentle terrain with broad slopes facilitating drainage to defined overland flow paths and a stream.

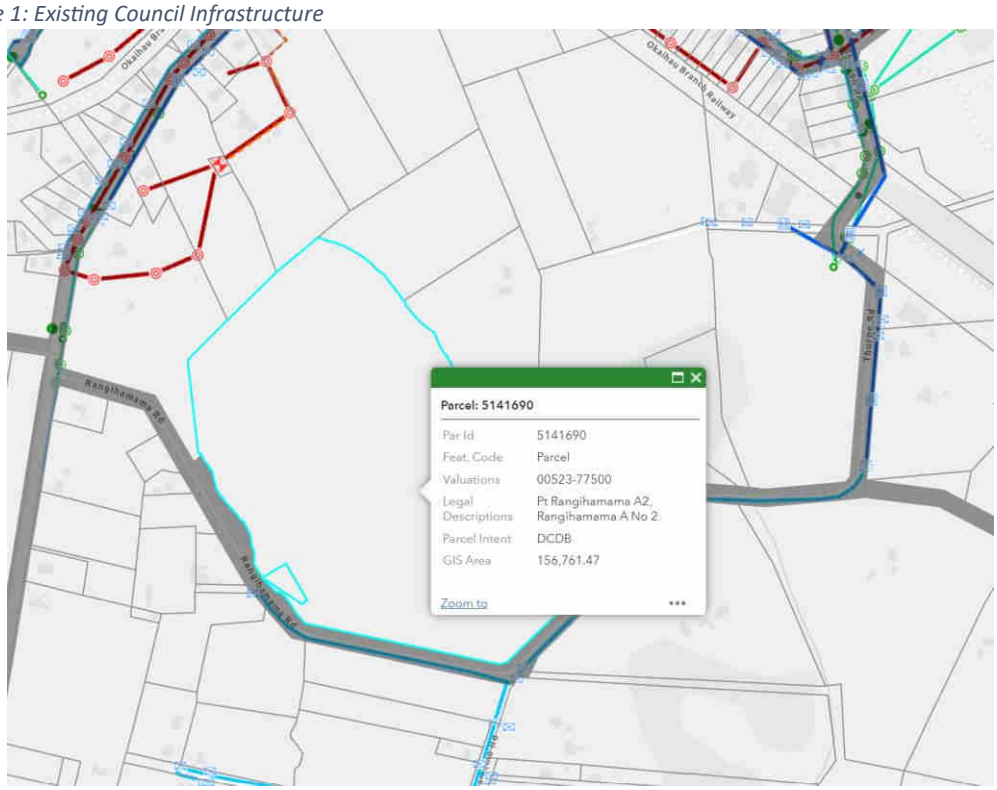
The site is generally consistent with the surrounding land uses. However, the site is bound to the north and northeast by semi-urban residential and industrial/ commercial uses, respectively

2.1 Existing Reticulated Networks

The site is generally not benefitted by reticulated networks. Potable water and stormwater networks are available at Thorpe Road. However, this report has been prepared with the basis of the proposal being self-sufficient for 3 water servicing.

The existing reticulated networks are shown schematically below as Figure 1.

Figure 1: Existing Council Infrastructure



2.2 Hydrological Setting

Desktop GIS information available from NIWA[2] has been reviewed to understand the sites hydrological setting. The developed understanding is summarised as Figure 2 and Table 3 below.

[2] *NIWA Hydrological Flow Path Explorer V2*

Figure 2: NIWA Hydrological Flow Path Explorer

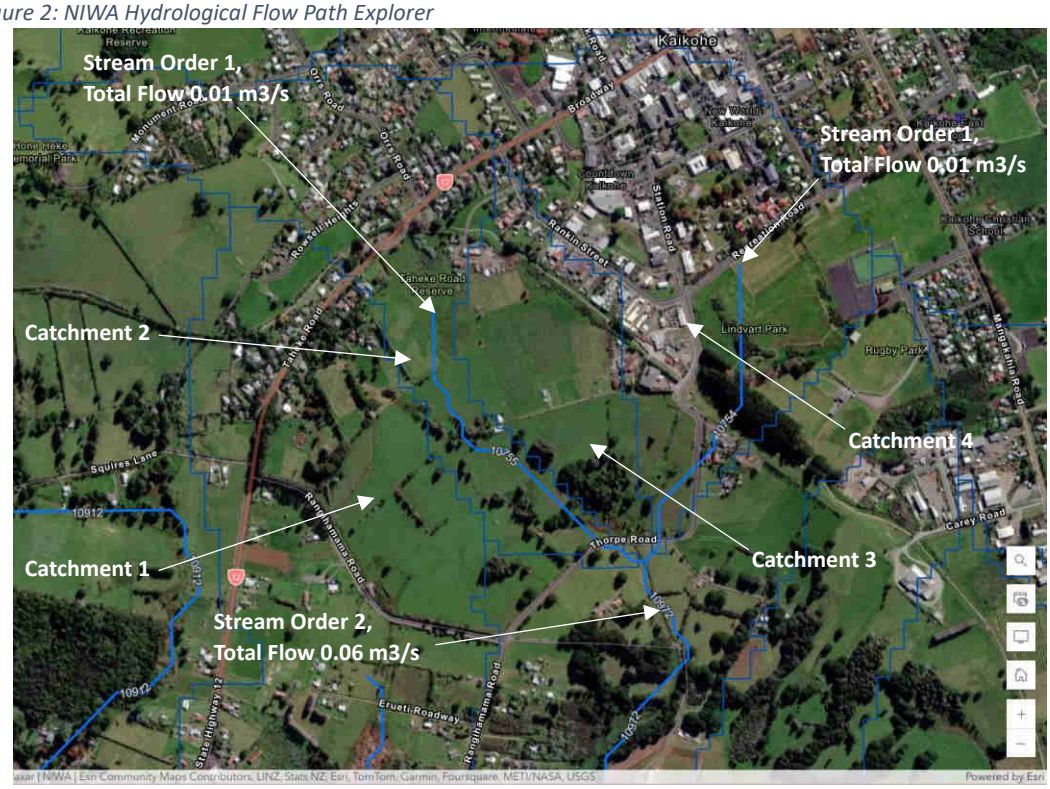


Table 3: Summary of Influencing Surface Water Features

Feature	Influencing	Location/ Comments
Overland Flow Paths	Yes	**Lot 7.** Existing farm drain trending north/ south. **Lot 8.** Shallow overland flow paths trend south to southeast, flowing offsite.
Streams/ Rivers	Yes	Two stream order 1 recorded within the site, forming ephemeral bodies.
Wetlands	Yes	Within a land covenant marked X within Pt Kohewhata 11C2 Blk. Refer to scheme plan.
Coastal Marine Area (CMA)	No	Not applicable

2.3 Mapped Flood Hazard

The site is covered by the Northland Regional Council (NRC) 2-dimensional flood hazard model. The mapped GIS data does not indicate flood potential to influence the site.

3 SITE WALKOVER SURVEY

A visual walkover survey of the property confirmed:

- Topography is in general accordance with that outlined in Section 2 and the available LiDAR dataset. The proposed building envelopes are proposed on generally gently sloping topography.

- The site is defined to the east and south by Thorpe Road, and is bound by similar pasture or rural properties in all directions. A waste processing industrial property is located immediately to the north of Stage 1.
- Surface water features are consistent with the information presented within Section 2 of this report.
- An existing residential development comprising a single storey timber framed dwelling with maintained private gardens was identified within Stage 5, lot 10.

4 WASTEWATER ASSESSMENT

The scope of this wastewater assessment comprises a ground investigation and establishment of minimum wastewater treatment and disposal to cater for probable future rural residential development. Relevant design guideline documents adopted include:

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

4.1 Geological Setting

Available geological mapping[3] indicates the site to be directly underlain by Pliocene-aged Kerikeri Volcanics Group, described as basalt lava flows and volcanic plugs. This geology typically comprises a cohesive residual soil layer.

4.2 Ground Investigation

A site walkover survey and intrusive ground investigation was undertaken by Geologix on 12 March 2024. The ground investigation was scoped to ascertain a soil loading category. The ground investigation comprised:

- Six hand augered boreholes designated BH01 to BH06 inclusive, formed at suitable wastewater disposal field areas and scheduled for a target depth of 1.2 m below ground level (bgl). Refusals were accepted due to hard strata, potentially boulders between 0.6 and 1.0 m bgl.
- Monitoring of groundwater levels with a groundwater dip meter on the day of drilling.

Arisings recovered from the exploratory boreholes were logged by a suitably qualified geotechnical engineering professional in general accordance with New Zealand Geotechnical Society guidelines[4]. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 500 within Appendix A.

---

[3] Geological & Nuclear Science, 1:250,000 scale Geological Map, Sheet 1, Kaitaia, 1996.

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

Strata identified during the ground investigation can be summarised as follows:

- **Topsoil to depths of 0.4 m bgl.** The overlying topsoil was described as a light brown silt with trace fine gravel, dry to moist and friable.
- **Kerikeri Volcanics Group residual soils to depths >0.6 to >1.0 m bgl.** The shallow residual soil was typically cohesive, described as silt with some clay or silty clay. The unit was similarly light brown and occasionally with a trace of sand and gravel. Generally the horizon was light brown, moist and of low plasticity. The exploratory holes refused upon gravel to cobble size fragments which are commonplace in the unit.
- **Groundwater.** No groundwater was encountered on the day of drilling.

A summary of ground investigation data is presented below as Table 4.

Table 4: Summary of Ground Investigation

Hole ID	Lot	Hole Depth	Topsoil Depth	Fill Depth	Groundwater[2]	Refusal	Wastewater Category[4]
BH01	1	1.0 m	0.4 m	NE	NE	1.0 m	5 – moderate to slow draining
BH02	2	1.0 m	0.4 m	NE	NE	1.0 m	5 – moderate to slow draining
BH03	3	1.0 m	0.4 m	NE	NE	1.0 m	5 – moderate to slow draining
BH04	4	1.0 m	0.4 m	NE	NE	1.0 m	5 – moderate to slow draining
BH05	5/6	0.6 m	0.2 m	NE	NE	0.6 m	5 – moderate to slow draining
BH06	7	0.7 m	0.4 m	NE	NE	0.4 m	5 – moderate to slow draining

1. All depths recorded in m bgl unless stated. 2. Groundwater measurements taken on day of drilling. 3. NE – Not Encountered. 4. Wastewater category in accordance with Auckland Council TP58[5].

4.3 Existing Wastewater Systems

A single wastewater treatment and disposal system is expected within proposed lot 10. The system comprises a conventional septic tank and trenches to the west of the existing dwelling which appeared to be functioning adequately at the time of inspection. The existing wastewater system and associated disposal fields were measured within the boundaries of proposed lot 10 with adequate offset.

4.4 Concept Future Development and Wastewater Generation Volume

The concept rural residential developments within this report assume that the proposed new lot may comprise up to a five-bedroom dwelling with a peak occupancy of eight people[6]. This considers the uncertainty of potential future Building Consent design. The number of usable bedrooms within a residential dwelling must consider that proposed offices, studies, gyms, or other similar spaces may be considered a potential bedroom by the Consent Authority.

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

[6] TP58 Table 6.1.

The design water volume for roof water tank supply is estimated at 160 litres/ person/ day[7]. This assumes standard water saving fixtures[8] being installed within the proposed future developments. This should be reviewed for each proposed lot at the Building Consent stage within a development specific wastewater design by a suitably qualified professional.

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

4.5 Treatment Standard and System

Selection of a wastewater treatment system will be provided by future developers at Building Consent stage. This will be a function of a refined design peak occupancy according to final development plans. No specific treatment system design restrictions and manufacturers are currently in place. Future developers will be required to elect a treatment system and provide system specifications at Building Consent.

It is recommended that to meet suitable minimum treated effluent output quality, secondary treatment systems are accounted for within future developments. Secondary treatment has been elected to provide compliance as a permitted activity of the proposed Northland Regional Plan considering the site topography, surface water features and disposal characteristics.

In Building Consent design, considering final disposal field topography and proximity to controlling site features, a higher treated effluent output standard such as UV disinfection to tertiary quality may be required.

4.6 Soil Loading Rate

Based on the results of the ground investigation, conservatively the shallow soils are generally inferred to meet the drainage characteristics of TP58 Category 5, moderate to slow draining, described as sandy clay-loam, clay-loam, and silty clay-loam. This correlates to NZS1547 Category 4, imperfectly drained, described as clay loams. For a typical PCDI system, a soil loading rate of 3.5 mm/ day is recommended within NZS1547 Table 5.2.

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

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

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

[8] *Low water consumption dishwashers and no garbage grinders.*

4.7 Concept Land Disposal System

To provide even distribution, evapotranspiration assistance and to minimise effluent runoff it is recommended that suitably treated effluent is conveyed to land disposal via Pressure Compensating Dripper Irrigation (PCDI) systems, a commonplace method of wastewater disposal.

The proposed PCDI systems may be surface laid, covered with minimum 150 mm mulch and planted with specific evapotranspiration species to provide a minimum of 80 % species canopy cover. Alternatively, lines could be subsurface laid to topsoil with minimum 200 mm thickness and planted with lawn grass. Clean, inert site-won topsoil sourced during development from building and/ or driveways footprints may be used in the land disposal system to increase minimum thicknesses.

Specific requirements of a concept land disposal system to be confirmed during Building Consent include the following.

Table 5: Disposal Field Design Criteria

Design Criteria	Site Conditions and Compliance
Topography at the disposal areas shall not exceed 25°. Exceedances will require a Discharge Consent.	Concept design complies, refer Drawing No. 500.
On shallower slopes >10 ° compliance with Northland Regional Plan (NRP) rule C.6.1.3(6) is required.	Concept design complies, proposed wastewater disposal fields are proposed on land <10 ° and do not require cutoff drains.
On all terrain irrigation lines should be laid along contours.	Concept design complies, refer Drawing No. 500.
Disposal system situated no closer than 600 mm (vertically) from the winter groundwater table for secondary treated effluent.	Concept design complies, groundwater not encountered within 0.6 to 1.0 m of the ground surface within our investigation.
Separation from surface water features such as stormwater flow paths (including road and kerb channels), rivers, lakes, ponds, dams, and natural wetlands according to Table 9, Appendix B of the NRP.	Concept design complies. Wastewater disposal fields can be designed to accommodate setbacks from on-site and adjacent surface water features.
Secondary treated effluent disposal is to be set at the 20-year ARI (5 % AEP) flood inundation height.	Concept design complies, no mapped flood hazard within the boundaries up to the 100-year ARI (1 % AEP) event.

4.7.1 Concept Disposal Field Sizing

The sizing of wastewater system disposal areas is a function of the design peak flow volumes, the SLR and topographic relief. For each proposed lot a concept primary and reserve disposal field is required as follows, to be refined at the Building Consent stage. The recommendations below are presented on Drawing No. 500.

- **Concept Primary Disposal Field.** A minimum PCDI primary disposal field of 366 m^2 laid parallel to the natural contours.
- **Concept Reserve Disposal Field.** A minimum reserve disposal field equivalent to 30 % of the primary disposal field is required under NRP rule C.6.1.3(9)(b) for secondary or

tertiary treatment systems. It is recommended each proposed lot provides a 110 m^2 reserve disposal area.

- **Available Disposal Field Area.** For concept design, the available disposal field area outside of applicable offsets has been indicated on Drawing No. 500. Available disposal field areas are summarised as Table 6.

Table 6: Summary of Required and Available Disposal Field Areas

Lot	Required Primary & Reserve Field Area	Available Area
	Stage 1	
1	476 m^2	28,870 m^2
2	476 m^2	5,120 m^2
	Stage 2	
1	476 m^2	14,072 m^2
2	476 m^2	15,200 m^2
3	476 m^2	18,507 m^2
4	476 m^2	19,032 m^2
5	476 m^2	39,938 m^2
	Stage 3	
6	476 m^2	18,058 m^2
7	476 m^2	11,765 m^2
8	NA – Existing system	NA
	Stage 4	
1	476 m^2	3,955 m^2
2	476 m^2	29,371 m^2
	Stage 5	
9	476 m^2	49,352 m^2
10	NA – Existing system	NA
11	476 m^2	34,055 m^2

4.8 Summary of Concept Wastewater Design

Based on the above concept design assumptions a summary of the concept wastewater design is presented as Table 7. It is recommended that each lot is subject to Building Consent specific review and design amendment according to final development plans by a suitably qualified professional.

The concept design has been prepared with no Discharge Consent requirement. These requirements should be reviewed at the Building Consent stage and may be subject to an alternative solution.

Table 7: Concept Wastewater Design Summary

Design Element	Specification
Concept development	Five-bedroom, peak occupancy of 8 (per lot)
Concept Design generation volume	160 litres/ person/ day – 1,280 litres/ day/ lot
Water saving measures	Standard. Combined use of 11 litre flush cisterns, automatic washing machine & dishwasher, no garbage grinder[1]
Water meter required?	No
Min. Treatment Quality	Secondary
Soil Drainage Category	TP58 Category 5, NZS1547 Category 4
Soil Loading Rate	3.5 mm/ day

Concept primary disposal field size	Surface/ subsurface laid PCDI. Min. 366 m^2
Concept reserve disposal field size	Surface/ subsurface laid PCDI. Min. 30 %, or 110 m^2
Concept Disposal Field Level	Sited above 5 % AEP event.
Dosing Method	Pump with high water level visual and audible alarm. Minimum 24-hour emergency storage volume.
Concept Stormwater Control	Divert surface/ stormwater drains away from disposal fields. Contour drains not required. Stormwater management discharges downslope of all disposal fields.

1. Unless further water saving measures are included.

4.9 Assessment of Environmental Effects

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

It is recommended that the AEE is reviewed at the time of Building Consent once specific development plans, final disposal field locations and treatment systems are established. The TP58 guideline document provides a detailed AEE for Building Consent application. Based on the proposed scheme plan, ground investigation, walkover inspection and Drawing No. 500, a site-specific AEE is presented as Appendix C to demonstrate the proposed wastewater disposal concept will have a less than minor effect on the environment.

5 STORMWATER ASSESSMENT

Increased storm water runoff occurs as pervious surfaces such as pasture are converted to impervious features such as future roof, driveway and/ or internal roading.

5.1 Impervious Surfaces and Activity Status

The proposed activity has been assessed as a **Permitted Activity**. A summary of this is provided as

Table 8 below which has been developed from our observations and AutoCAD drawings in lieu of specific survey. This has been taken as conceptual, maximum probable development of typical rural residential scenarios. Refer Section 0.

Table 8: Summary of Impervious Surfaces, Stage 1

Parameter	Area		
Lot		1	2
Lot Area	m^2	40442	6010
Existing			
Impervious	m^2	0	0
	%	0.00	0.00
Future (Concept)			
Roof	m^2	300	300
	%	0.74	4.99
Driveway	m^2	200	200
	%	0.49	3.33
RoW	m^2	0	0
	%	0.00	0.00
Total	m^2	1	8
	%	0.00	0.13
Activity Assessment			
Threshold	15 %	6066 m^2	902 m^2
Permitted		Yes	Yes

Table 9: Summary of Impervious Surfaces, Stage 2

Parameter	Area					
Lot		1	2	3	4	5
Lot Area	m^2	20101	21771	20388	20114	76090
Existing						
Impervious	m^2	0	0	0	0	0
	%	0.00	0.00	0.00	0.00	0.00
Future (Concept)						
Roof	m^2	300	300	300	300	300
	%	1.49	1.38	1.47	1.49	0.39
Driveway	m^2	200	200	200	200	200
	%	0.99	0.92	0.98	0.99	0.26
RoW	m^2	0	0	335	0	2080
	%	0.00	0.00	1.64	0.00	2.73
Total	m^2	500	500	835	500	2580
	%	2.49	2.30	4.10	2.49	3.39
Activity Assessment						
Threshold	15 %	3015 m^2	3266 m^2	3058 m^2	3017 m^2	11414 m^2
Permitted		Yes	Yes	Yes	Yes	Yes

Table 10: Summary of Impervious Surfaces, Stage 3

Parameter	Area			
Lot		6	7	8
Lot Area	m^2	22834	22779	75622
Existing				
Impervious	m^2	0	2080 (RoW Stage 2, easements A & B)	358
	%	0.00	9.14	0.47
Future (Concept)				
Roof	m^2	300	300	307
	%	1.31	1.32	0.41
Driveway	m^2	200	200	51
	%	0.88	0.88	0.07
RoW	m^2	0	727 (RoW Stage 3, easements C)	1829
	%	0.00	3.20	2.42
Total	m^2	500	3312	2187
	%	2.19	14.54	2.89
Activity Assessment				
Threshold	15 %	3425 m^2	3417 m^2	11343 m^2
Permitted		Yes	Yes	Yes

Table 11: Summary of Impervious Surfaces, Stage 4

Parameter	Area			
Lot			1	2
Lot Area	m^2		4647	40498
Existing				
Impervious	m^2		30	138
	%		0.65	0.34
Future (Concept)				
Roof	m^2		300	300
	%		6.46	0.74
Driveway	m^2		200	200
	%		4.30	0.49
RoW	m^2		30	138
	%		0.65	0.34
Total	m^2		530	638
	%		11.41	1.58
Activity Assessment				
Threshold	15 %		697 m^2	6075 m^2
Permitted			Yes	Yes

Table 12: Summary of Impervious Surfaces, Stage 5

Parameter	Area			
Lot		9	10	11
Lot Area	m^2	71107	4514	44743
Existing				
Impervious	m^2	0	358	168
	%	0.00	7.93	0.38
Future (Concept)				

Roof	m^2	300	307	300
	%	0.42	6.80	0.67
Driveway	m^2	200	51	200
	%	0.28	1.13	0.45
RoW	m^2	540	0	168
	%	0.76	0.00	0.38
Total	m^2	1040	358	668
	%	1.46	7.93	1.49
Activity Assessment				
Threshold	15 %	10666 m^2	677 m^2	6711 m^2
Permitted		Yes	Yes	Yes

5.2 Stormwater Management Concept

Based on the assessments within

Table 8 to Table 12, the proposed development meets the provisions of a Permitted Activity. The stormwater management concept considered in this report has been prepared to meet the requirements of the local and regional consent authorities considering the design storm event as follows:

- **Probable Future Development (New Rural Residential Lots).** The proposed application includes subdivision formation only and not lot specific residential development at this stage. As such a conservative model of probable future on-lot development has been developed for this assessment considering variation of scale in typical rural residential development. The probable future on-lot development concept includes up to 300 m^2 potential roof area and up to 200 m^2 potential driveway or parking areas.

  The concept has been prepared with attenuation provided within roof water tanks as combined retention/ detention systems.

- **Existing Development (Lot 8, Stage 3 becoming Lot 10, Stage 5).** The existing development meets the Permitted Activity standard based on the reduced size of the title once subdivision has occurred and no additional impervious surfaces are proposed for this lot. Therefore, no attenuation is proposed.

- **Subdivision Development.** Increased runoff from subdivision development is expected and additional attenuation is proposed to avoid an adverse environmental effect.

  The concept adopts two stormwater ponds, one within Stage 2 and one within Stage 3. The stormwater pond shall be subject to specific engineering design at the EDA stage and has conceptually been modelled adopting gravity flows.

5.3 Design Storm Event

It has been identified that development of the site does not pose an increase to flooding hazard on the downstream properties as flood hazard potential is not mapped. Therefore, in order to provide flow attenuation only in lieu of flood control in compliance with FNDC Engineering Standard Table 4-1, the concept design attenuates the post-development stormwater runoff peak discharge to 80 % of the pre-development condition for the 50 and 20 % AEP storm events.

Impermeable surfaces which contribute to the wetland catchment within Area X (Lots 9 to 11 and RoW E to G) have been modelled to the 1 % AEP storm event to mitigate any potential effect under the NES:FW.

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

Correctly sized discharge devices have adopted the 1 % AEP event to reduce scour and erosion at discharge locations which may otherwise result in concentrated discharge. These are detailed further in Section 6.4.1 of this report.

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model[9]. The NIWA HIRDS rainfall data is presented in full within Appendix D. Provision for climate change has been adopted by means of applying a factor of 20 % to rainfall intensities, in accordance with FNDC Engineering Standards 2023[10].

5.4 Concept Attenuation Model

Based on the design storm events indicated above and the corresponding modelling results (in Appendix D) an attenuation concept to suit the maximum storage requirement has been provided. This is achievable by installing specifically sized low-flow orifices into the attenuation devices.

5.4.1 Roof Runoff Tanks

Conceptual storage and outlet requirements within the tanks are included in Appendix D and a typical schematic retention/ detention tank arrangement detail is presented as Drawing No. 401 within Appendix A.

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards[10] to provide a suitable attenuation design to limit post-development peak flows to 80 % of pre-development conditions.

Table 13: Probable Future Development Attenuation Concept

Design Parameter	Flow Attenuation: 50 % AEP	Flow Attenuation: 20 % AEP	Flood Control: 10 % AEP	Flood Control: 1 % AEP
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan	NES:FW & FNDC Engineering Standards Table 4-1
Criteria	80 % Pre-development	80 % Pre-development		
Applicable Lots	1 – 8	1 – 8	9 – 11	9 – 11
Pre-development peak flow (l/s)	5.16	6.68	7.79	11.55
80 % pre-development peak flow (l/s)	4.13	5.34	NA	9.24
Post-development peak flow (l/s)	9.41	12.17	14.20	21.06

[9] *NIWA High Intensity Rainfall Data System, https://hirds.niwa.co.nz.*
[10] *FNDC Engineering Standards 2021, Version 0.6, Issued May 2023.*

Total Storage Volume Required (m^3)	6.828	8.933	4.485	16.000
Concept Summary, Lots 1 – 8:	- Attenuation storage calculation accounts for offset flow from driveway (not indicated explicitly in summary above. Refer Appendix D for calcs in full). - Attenuation to 80 % of pre-development condition for 20 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage. - 1 x 9,000 litre tank is sufficient for attenuation (8,933 l) - 20% AEP attenuation in isolation requires a 27 mm orifice 0.85 m below overflow. However regulatory requirements are to consider an additional orifice/s to control the 50% and 20 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.			
Concept Summary, Lots 9 – 11:	- Attenuation storage calculation accounts for offset flow from driveway (not indicated explicitly in summary above. Refer Appendix D for calcs in full). - Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage. - 1 x 16,000 litre tank is sufficient for attenuation (16,000 l) - % AEP attenuation in isolation requires a 30 mm orifice 1.52 m below overflow. However regulatory requirements are to consider an additional orifice/s to control the 50% and 20 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.			

5.4.2 On-Lot Discharge

The direct discharge of rainwater tank overflow in a concentrated manner can cause scour and erosion in addition to saturation of shallow soils. It is recommended that overflow from rainwater detention tanks is conveyed in sealed pipes to a designated discharge point with suitable dispersion devices downslope of proposed building footprints and wastewater disposal fields.

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

Typical rural residential developments construct either above or below ground discharge dispersion pipes. Feeding pipes can be either buried or pinned to the surface as desired. It is recommended that all pipes are designed to accommodate the design storm event peak flows from the attenuation tank and including minimum 100 mm dia. PVC piping. A concept dispersion pipe or trench length is presented in Table 14. Calculations to derive this are presented within Appendix D, based on the NIWA HIRDS Depth-Duration data and TR2013/018 document.

Table 14: Summary of Concept Dispersion Devices

Concept Impervious Area to Tank	Tank Outlet Velocity (at spreader orifices)	Tank outlet pipe diameter	Spreader pipe diameter	Dispersion Pipe/ Trench Length	Spreader orifice size	Concept
Proposed Lots 1 to 11						

500 m^2	0.75 m/s	0.1 m	0.15 m	17.67 m	20 mm @ 310 mm c/c	Above ground dispersion device or in-ground dispersion trench.

5.5 Internal Roading Stormwater Management

It is recommended that once Resource Consent has been granted that the proposed subdivision attenuation devices are revisited in a detailed design phase to specifically size and provide construction details.

It is proposed to construct two stormwater ponds that can be fed by gravity flows, refer Drawing No. 411. The stormwater ponds shall provide attenuation of proposed Right of Way surfaces to less than 80 % of the pre-development condition for the design storm event. The design storm event differs based on the pond design case as the bulk of RoW E to G (from CH75 onwards) discharges into a watercourse and ultimately a suspected natural inland wetland area (Catchment 2). Where possible, as defined by the catchments indicated on Drawing No. 410, gravity flows have been routed within Catchment 1 to the south of the site where no wetlands are known to exist.

A summary of increased runoff from the pre-development condition is presented below as Table 15.

Table 15: Summary of Increased Impermeable Surfaces

Item	Pre-development Impervious	Post development Impervious	Difference
Catchment 1			
RoW A & B	0 m^2	2080 m^2	+2080 m^2
RoW E, F, G (CH0–77m)	0 m^2	467 m^2	+467 m^2
		Catchment 1 Total Difference	+2547 m^2
Catchment 2			
RoW D, E (CH77 – 343m)	0 m^2	1697 m^2	+1697 m^2
		Catchment 2 Total Difference	+1697 m^2

1. *Refer to Drawing 410 for catchment definition.*
2. *Measured from 1 m NRC LiDAR model, subject to confirmation during detailed design phase.*
3. *Based on concept modelled roading surfaces including carriageway and shoulders.*

Based on the above catchment and proposed impermeable areas, Geologix have developed a detailed stormwater runoff modelling adopting proprietary software HEC-HMS by the U.S. Army Corps, Version 4.12 for each proposed pond. The model has been developed adopting the SCS curve number method to estimate the increased runoff from impermeable surfaces from the proposed subdivision development only. Parameters adopted in the model have

been derived from FNDC Engineering Standards[11] 2023. A summary of the adopted runoff parameters is presented below as Table 16.

Table 16: SCS Curve Number Runoff Parameters

Surface	Soil Type	SCS Curve Number
Pasture	Kerikeri Volcanics Group Type C	74
RoW Sealed		92
RoW Unsealed (Aggregate with swale drains)		89

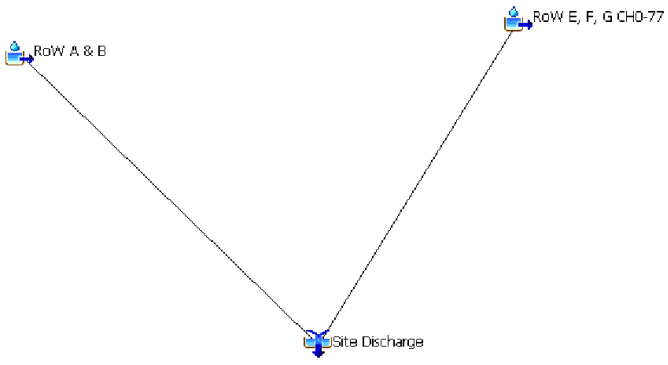
5.5.1 *Runoff Modelling*

Based on the above areas and parameters, the following increased runoff for the associated storm events has been calculated by our conceptual model. A schematic of the un-attenuated model to derive this is presented below as Figure 3 and the design criteria are presented as follows:

- **Pond 1** – Attenuation of catchment 1 elements, providing attenuation of peak flow to 80% of 50 and 20 % storm events with provision of climate change.
- **Pond 2** – Attenuation of catchment 2 elements, providing attenuation of peak flow to 80% of 1 % storm events with provision of climate change.

Figure 3: Pre Development Models

Pond 1



Pond 2

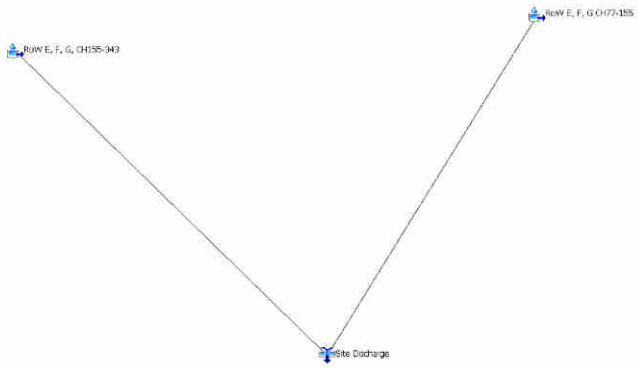


Table 17: Summary of Increased Runoff from to Ponds

Model	Storm Event	Condition	Peak Flow	Comments
Pond 1	50 % AEP	Pre-development	20 l/s	Peak flow, no climate change adopted.
		80 % Pre-development Target	16 l/s	80 % reduction of pre-development peak flow.
		Post development Unattenuated	35 l/s	

[11] *Far North District Council Working Draft Engineering Standards 2021, Issue 0.3 – May 2021.*

		Post development Attenuated Concept	**13.5 l/s**	**Achieves and provides additional benefit to target**
Pond 1	20 % AEP	Pre-development	43 l/s	Peak flow, no climate change adopted.
		80 % Pre-development Target	34.4 l/s	80 % reduction of pre-development peak flow.
		Post development Unattenuated	68 l/s	
		Post development Attenuated	**33 l/s**	**Achieves and provides additional benefit to target**
Pond 2	1 % AEP	Pre-development	37 l/s	Peak flow, no climate change adopted.
		80 % Pre-development Target	29.6 l/s	80 % reduction of pre-development peak flow.
		Post development Unattenuated	53 l/s	
		Post development Attenuated	**28 l/s**	**Achieves and provides additional benefit to target**

5.5.2 Stormwater Pond Concept

Based on the above calculation, dry ponds are required to provide attenuation of road surfaces to the above design criteria. A concept dry pond design has been undertaken by Geologix based on the above and available information according to Auckland Council GD01[12].

Preliminary design criteria presented within GD01 adopted for conceptual modelling are summarised as follows. It is important to note that the concept design does not present the level of rigour required for construction and the preliminary model shall be advanced by specific engineering design to prepare construction drawings backed by a Producer Statement.

- Pond to be formed with a grassed base.
- Inlet piping and rip-rap sized to accommodate the 1 % AEP peak flows from the RoW area subject to specific engineering design.
- Outlet from pond via scruffy dome manhole with orifice inlet and RCP pipeline to rip-rap outlet downstream of pond.
- No specific forebay but treatment achieved through gravity flow inlets (grassed swales) and grass/ vegetation in the base of the pond.

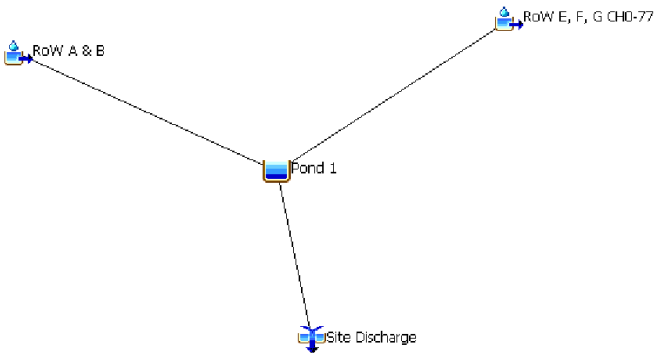
[12] *Auckland Council Guideline Document 2017/001, Stormwater Management Devices in the Auckland Region, December 2017, Incorporating Amendment 2.*

- Spillway constructed to provide controlled management above the design storm. According to GD01, spillway shall have an invert level of 100 mm above the design storm event storage height.
- Top of bank constructed with 300 mm freeboard above the design storm event (200 mm above the spillway invert). Pond banks are to be confirmed during detailed design. It is expected the pond will be partially or fully in-ground.
- Pond conceptually sized to achieve shallow pond depth to increase safety in design considering rural residential setting and positioning within proposed lot.

A schematic of the updated HEC-HMS model with allowance for the stormwater pond is presented below as Figure 4.

Figure 4: Attenuated Post Development Model

Pond 1



Pond 2

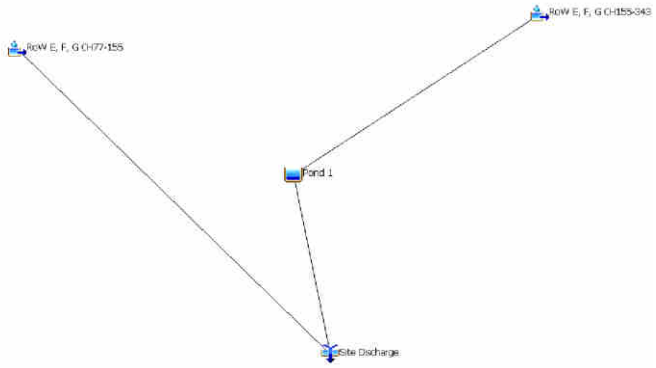


Table 18: Summary of Concept Stormwater Pond Design

Element	Design	Notes
Concept Pond base dimension	5 x 15 m	(Ratio of 1:3 W:L) with 1:3 side slopes
Pond 1		
50 % AEP +CC Attenuation		
Concept Orifice Diameter	100 mm	
Concept Orifice Invert Level	0.1 m	Above base of pond
Concept Storage Provided	70 m^3	
Concept Storage Height	570 mm	Above base of pond
20 % AEP +CC Attenuation		
Concept Orifice Diameter	140 mm	
Concept Orifice Invert Level	700 mm	Above base of pond
Concept Storage Provided	120 m^3	
Concept Storage Elevation	1890	Above base of pond
Pond 2		
1 % AEP +CC Attenuation		
Concept Orifice Diameter	90 mm	
Concept Orifice Invert Level	0.105 m	Above base of pond
Concept Storage Provided	33 m^3	
Concept Storage Height	330 mm	Above base of pond

The above measures are indicated, on the drawing set included within Appendix A. It is recommended that all stormwater infrastructure is subject to specific engineering design at the EPA stage.

5.6 Stormwater Quality

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

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

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

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

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

6 POTABLE WATER & FIRE FIGHTING

In the absence of potable water infrastructure within this development or within the site it is recommended that roof runoff water tanks are adopted for potable water supply with appropriate filtration and UV disinfection at point of use. The volume of potable water supply on each lot should consider the required stormwater detention volume identified within Table 13.

On-lot roof water supply tanks to be used for firefighting purposes. Specific analysis and calculation for firefighting is outside the scope of this report and may require specialist input. Supply for firefighting should be made in accordance with SNZ PAS4509:2008.

7 EARTHWORKS

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

- **Construction of the RoW.** This is proposed by conventional cut and fill with imported GAP hard fill and/ or site-won earth fill subject to specific engineering design.

- **Construction of new or upgrade of existing vehicle crossings.** Due to the minor volume, this has been excluded from our earthwork estimates below.
- **Construction of stormwater pond.** Expected to be formed as a balance of cut/ fill to avoid excess site-won material. Total volume has therefore been taken as 50 % cut, 50 % fill.

7.1 Earthwork Volumes

Earthwork volumes have been conceptually sized as outlined in Table 19.

Table 19: Summary of Earthworks

Item	Area/ Volume	Height (maximum)
Stage 1		
Vehicle Crossings	<10 m^3	0.3 m
Stage 2		
Total Area of Earthworks	4,244.07 m^2	
RoW Cut Volume	722.9 m^3	0.8 m
RoW Fill Volume	53.92 m^3	0.5 m
Stormwater Pond 1 Volume (5 m W x 15 m L x 1.34 m D	237.11 m^3	1.34 m
Stormwater Pond 2 Volume	31.72 m^3	0.63 m
Total Volume (Net)	1,045.65 m^3 (937.81 m^3 cut)	
Stage 3		
Total Area of Earthworks	726.84 m^2	
RoW Cut Volume	132.1 m^3	0.8 m
RoW Fill Volume	4.51 m^3	0.5 m
Total Volume (Net)	136.61 m^3 (127.6 m^3 cut)	
Stage 4		
No earthworks proposed	NA	NA
Stage 5		
No earthworks proposed	NA	NA
Application Total		
Total Volume (Net)	1,182.26 m^3 (1,065.41 m^3 cut)	

7.2 General Earthworks Recommendations

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

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

To reduce the risk of instability of excavations during construction of the subdivision, it is recommended that **temporary** unsupported excavations have a maximum vertical height of 1.0 m. Excavations >1.0 m are generally not expected but should be battered at 1V:1H or 45°.

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

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

7.3 Erosion and Sediment Control

Specific erosion and sediment control measures are required to control sediment runoff from areas of proposed earthworks within the scope of this application. It is recommended that specific on-lot development is assessed at the time of Building Consent by the future developer. To form the subdivision the following erosion and sediment control measures are recommended:

- Silt fences along the downslope face of the RoW.
- Adoption of the proposed stormwater pond as a temporary sediment retention pond.
- Clean and/ or dirty water diversion bunds.

A site specific erosion and sediment control plan shall be provided to Council at the time of EDA.

8 INTERNAL ROADING AND VEHICLE CROSSINGS

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

8.1 Traffic Intensity Factor and Household Equivalents

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

Table 20: Summary of Existing Vs Proposed TIF

Stage	Location	Existing TIF	Proposed TIF
2	RoW A (Thorpe Road)	10	50
3	RoW A-B (Thorpe Road)	50	80
4	93 Station Road	50	No change
5	RoW A-E, Thorpe Road	80	No change
5	93 Station Road	50	No change

8.2 Right of Way

A new private access RoW will provide internal access to proposed lots 1 to 11 within the ultimate development and will be constructed to the standards specified in Appendix 3B-1 of the Operative District Plan and FNDC Engineering Standards Table 3-16, as summarised in Table 21.

The current FNDC Engineering Standards details a requirement for an enlarged 4 m wide access for 3 to 5 lot roads to allow for fire truck access in accordance with New Zealand Building Code Clause C1, Part 6 where a distance >75 m from the nearest hydrant is required. However, this Building Code Clause applies where a multi-unit development is proposed.

As the proposed subdivision does not trigger the Building Act and no multi-unit development is expected at this stage, the 'alt' option from FNDC Engineering Standards Table 3-16 has not been adopted for this assessment. However, to cover the possibility of a multi-unit development being proposed (such as a dwelling and a minor dwelling) a Consent notice would be required to upgrade the 3 m wide portion of the RoW to a 4 m carriageway width by the future developer.

Table 21: Summary of Proposed RoW Specification

Location	Standard	Min. Legal Width	Min. Carriageway Width	Surface Type
RoW A CH0 – 25	Category E	10 m	6.0 m with 5.5 m wide 'surfacing' and 2x 0.25 m wide shoulders	Seal
RoW A CH25 – 165	Category E	10 m	6.0 m with 5.5 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW A&B CH165 – 200	Category D	6 m	4.5 m with 4.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW B CH200 – 268	Category C	4 m	3.5 m with 3.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW E, F, G CH0 - 50	Category D	6 m	4.5 m with 4.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW E, F, G CH50 – 343	Category C	4 m	3.5 m with 3.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate

The proposed RoW shall be graded with a 3 % cross fall where sealed and a 4 % cross fall where in aggregate to direct stormwater runoff and to comply with FNDC Engineering Standards Sheet 9.

Concept RoW plans are presented within Appendix A, complying with Austroads Standards for vertical curvature and FNDC Engineering Standards Sheet 27. The enclosed plans are conceptual only and shall be subject to specific engineering design prior to construction.

8.3 Vehicle Crossings

Vehicle crossings will be formed at subdivision stage. A summary of proposed vehicle crossing standards is presented as Table 22.

Table 22: Summary of Proposed Vehicle Crossings

Location	Type	Detail	Formation
Thorpe Road/ RoW A	FNDC Type 1A, Light Vehicles	1x new crossing with 5.5 m width at boundary. Curvature of radius = 5.0 m, a new 375 mm Dia RCP Class 4 culvert and seal.	Subdivision
RoW A/ RoW E	FNDC Type 1A, Light Vehicles	1x new crossing with 4.0 m width at boundary. Curvature of radius = 5.0 m, a new 375 mm Dia RCP Class 4 culvert and seal.	Subdivision
All lots	FNDC Type 1A, Light Vehicles	New crossing with 3.0 m width at boundary. Curvature of radius = 5.0 m, a new 375 mm Dia RCP Class 4 culvert and concrete sealed or aggregate, as required to the boundary.	Subdivision
Station Road RoW	Not Required	No upgrade to vehicle crossing proposed as no change to traffic volume/ use of road.	Subdivision

RCP – Reinforced Concrete Pipe

8.4 Sight Distances

Proposed new vehicle crossings, including lot access within the new RoW will need to comply with FNDC Engineering Standards 2023, in particular Sheet 4. The National Speed Limit Register was reviewed for the site through the Waka Kotahi open data portal[13]. Public road speed limits can be summarised as follows:

- Thorpe Road – 50 km/h.

A 3d sight line assessment has been undertaken as part of our concept road modelling to determine the available sight distances at each vehicle crossing and to demonstrate compliance with FNDC Engineering Standards, as set out below in Table 23.

Table 23: Summary of Sight Distances

Vehicle Crossing	Speed Limit	Minimum Sight Distance	Available Distance	Complies
Thorpe Road RoW	50 km/h	70 m	>70 m both directions	Yes
Thorpe Road Lot 8	50 km/h	70 m	>70 m both directions	Yes
Station Road RoW	50 km/h	70 m	>70 m both directions	Yes

The above sight distances have been calculated at a height of 1.15 m above ground level, setback by 3.5 m from the primary road carriageway. Indication of modelled vehicle crossing locations are indicated on our drawings. Key findings in the above modelling are:

- Low risk with minimum line of sight achieved in both directions.

An existing vehicle crossing currently services the existing development at 93 Station Road. Following the proposal, no changes in traffic intensity will occur at this crossing point and the

[13] *https://opendata-nzta.opendata.arcgis.com/datasets/NZTA::national-speed-limit-register-nslr/explore*

vehicle crossing is not required to access any additional proposed household equivalent. As such the vehicle crossing while not meeting current Council standards does not require upgrading as part of this application.

9 NATURAL HAZARD ASSESSMENT

To satisfy the Resource Management Act, 1991 the proposed subdivision must plan for and manage the risk from natural hazards to reduce the potential adverse effects to less than minor. Regulatory assessment of natural hazards at the site location are managed under the jurisdiction of the FNDC District Plan[14], NRC Proposed Regional Plan for Northland[15] and Regional Water and Soil Plan for Northland. A summary of the proposed activities against defined natural hazards is presented as Table 24.

Table 24: Summary of Natural Hazards

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

NA – Not Applicable.

10 LIMITATIONS

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

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

[14] *Operative District Plan Rule 13.7.3.2.*

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

The recommendations and opinions in this report are based on arisings extracted from exploratory boreholes at discrete locations and any available existing borehole records. The nature and continuity of subsurface conditions, interpretation of ground condition and models away from these specific ground investigation locations are inferred. It must be appreciated that the actual conditions may vary from the assumed ground model. Differences from the encountered ground conditions during subdivision construction may require an amendment to the recommendations of this report.

APPENDIX A

Drawings

GENERAL NOTES

1. CONTOURS AT 2.5m MAJOR AND 0.5m MINOR INTERVALS.
2. TOPOGRAPHIC SURVEY DATA PROVIDED BY LINZ & NRC.
3. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
4. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
5. DO NOT SCALE FROM THIS DRAWING.
6. HORIZONTAL DATUM - MT EDEN 2000.
7. VERTICAL DATUM - NZVD2016.

25 0 Meters 25 50

1:2500

Revision	Issue	Date
A	CONSENT	09/02/2025

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

THORPE ROAD, FAR NORTH

PT KOHEWHATA 69 BLOCK

Project	Drawn By
C0471	TI

Client

PJ DIARY LTD

Sheet Title

SCHEME PLAN, STAGE 1

Sheet

010

FILE PATH: C:\Users\GeologixConsulting\Synology Drive\Projects\C0400-C0499\Thorpe Road, Kaikohe, Part Rangihamama A2 - C0471\07 - Technical & Drawings\Drawings\C0471-Scheme plan.dwgC0471-Scheme plan.dwg

PLOTTED: 09/04/2022

TAHUNA B

TAHUNA A

LOT 5
7.6090 ha

LOT 3
2.0388 ha

LOT 2
2.1771 ha

LOT 4
2.0114 ha

LOT 1
2.0101 ha

PT RANGIHAMAMA A2 BLK

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

GENERAL NOTES

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Revision	Issue	Date
A	CONSENT	09/02/2025

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Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
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Sheet Title
SCHEME PLAN, STAGE 2

Sheet
011

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PLOTTED: 03/04/2022

TAHUNA B

LOT 8
7.5622 ha

TAHUNA A

LOT 7
2.2779 ha

PT RANGIHAMAMA A2 BLK

LOT 6
2.2834 ha

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

GENERAL NOTES

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Project Name and Address
THORPE ROAD, KAIKOHE
TAHUNA A & TAHUNA B BLKS &
STAGE 2 LOT 5

Project	Drawn By
C0471	TI

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Sheet Title
SCHEME PLAN, STAGE 3

Sheet
012

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A	CONSENT	09/02/2025
Revision	Issue	Date

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Project Name and Address

THORPE ROAD, KAIKOHE

PT KOHEWHATA 11C2 BLK

Project	Drawn By
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Sheet Title

SCHEME PLAN, STAGE 4

Sheet

013

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TAHUNA B

LOT 9
7.1107 ha

LOT 10
0.4514 ha

LOT 11
4.4743 ha

TAHUNA A

PT RANGIHAMAMA A2 BLK

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

GENERAL NOTES

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A	CONSENT	09/02/2025
Revision	Issue	Date

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Project Name and Address
THORPE ROAD, KAIKOHE
BOUNDARY ADJUSTMENT OF
LOT 8, STAGE 3 & LOTS 1 & 2, STAGE 4

Project	Drawn By
C0471	TI

Client
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Sheet Title
SCHEME PLAN, STAGE 5

Sheet
014

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5. DO NOT SCALE FROM THIS DRAWING.
6. HORIZONTAL DATUM - MT EDEN 2000.
7. VERTICAL DATUM - NZVD2016.
8. ALL AVAILABLE LOT BOUNDARIES SHOWN FROM ALL STAGES

NO INCREASE OF TRAFFIC VOLUMES TO EXISTING ROAD, NO PROPOSED UPGRADES AS PART OF THIS APPLICATION

NO PROPOSED UPGRADES TO EXISTING VEHICLE CRO DUE TO NO INCREASED TR

TAHUNA B

TAHUNA A

LOT 9
7.1107 ha

LOT 1
0.4647 ha

LOT 2
4.0498 ha

LOT 10
0.4514 ha

LOT 11
4.4743 ha

PT KOHEWHATA 11C2

CATCHMENT 1

CATCHMENT 2

CATCHMENT 3

PT RANGIHAMAMA A2 BLK

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

Meters
25 0 25 50
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A	CONSENT	09/02/2025
Revision	Issue	Date

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Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

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Sheet Title
CATCHMENT PLAN

Sheet
410

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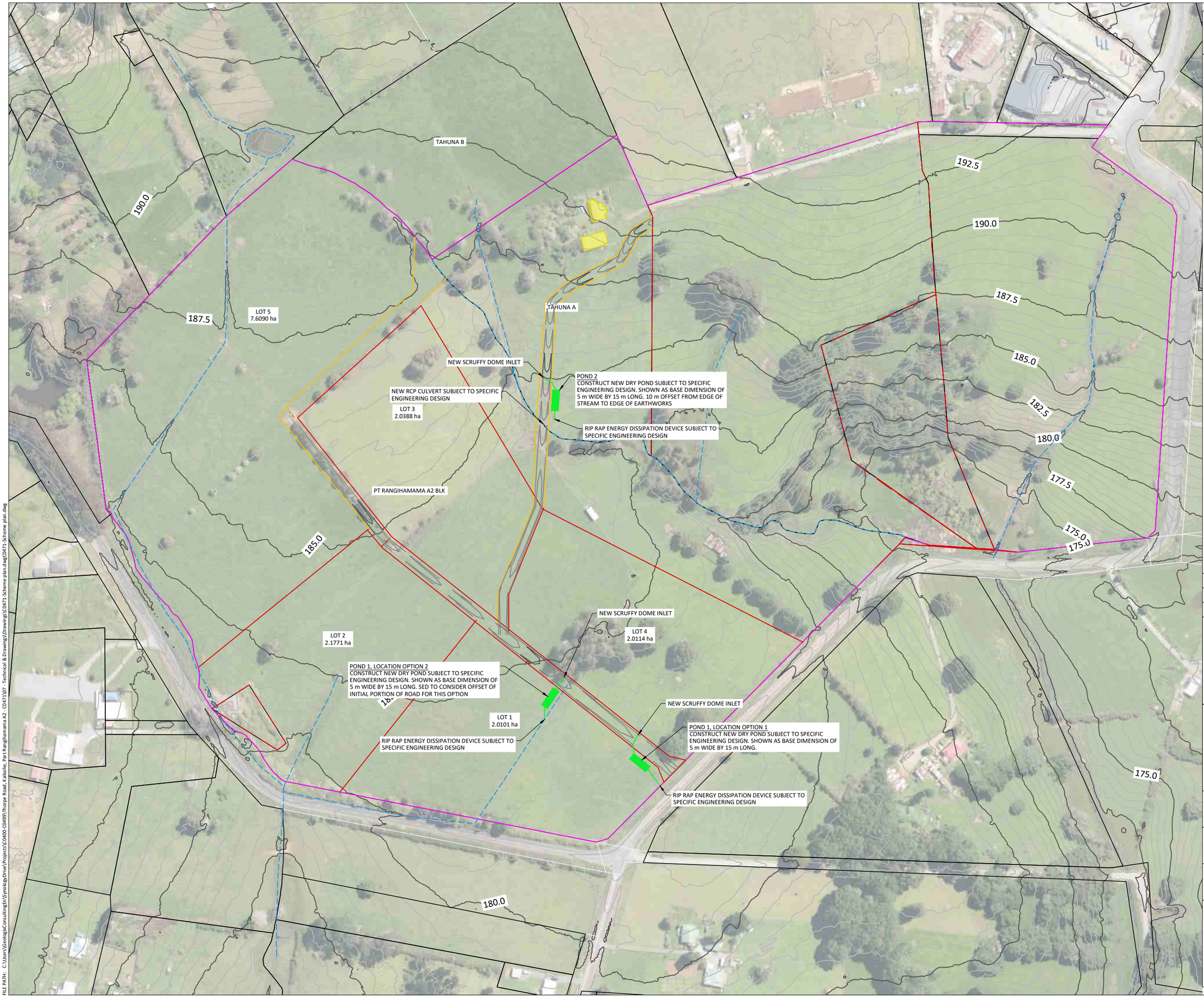
PLOTTED: 09/04/2025



GENERAL NOTES

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5. DO NOT SCALE FROM THIS DRAWING.
6. HORIZONTAL DATUM - MT EDEN 2000.
7. VERTICAL DATUM - NZVD2016.
8. PROPOSED ROADING SHOWN AS 0.1 m INTERVAL CONTOURS FOR CLARITY.

Meters
25 0 25 50
1:2500

A	CONSENT	09/02/2025
Revision	Issue	Date

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Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

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Sheet Title
STORMWATER PLAN

Sheet
411

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PLOTTED: 03/04/2022

GENERAL NOTES

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7. VERTICAL DATUM - NZVD2016.

CONCEPT WASTEWATER DESIGN

CONCEPT DEVELOPMENT	5 BEDROOM
CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT QUALITY	SECONDARY
PRIMARY DISPOSAL AREA	367 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

EXISTING LOT BOUNDARY
PROPOSED LOT BOUNDARY
OVERLAND FLOWPATH
AVAILABLE DISPOSAL AREA

Revision	Issue	Date
A	CONSENT	09/02/2025

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Project Name and Address
THORPE ROAD, FAR NORTH
PT KOHEWHATA 69 BLOCK

Project	Drawn By
C0471	TI

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Sheet Title
WASTEWATER PLAN, STAGE 1

Sheet
510

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PLOTTED: 09/04/2022

TAHUNA B

TAHUNA A

LOT 5
7.6090 ha

LOT 3
2.0388 ha

LOT 2
2.1771 ha

LOT 4
2.0114 ha

LOT 1
2.0101 ha

PT RANGIHAMAMA A2 BLK

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

GENERAL NOTES

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CONCEPT WASTEWATER DESIGN

CONCEPT DEVELOPMENT	5 BEDROOM
CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT QUALITY	SECONDARY
PRIMARY DISPOSAL AREA	367 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

EXISTING LOT BOUNDARY

PROPOSED LOT BOUNDARY

OVERLAND FLOWPATH

AVAILABLE DISPOSAL AREA

Meters
25 0 25 50
1:2500

Revision	Issue	Date
A	CONSENT	09/02/2025

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consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
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Sheet Title
WASTEWATER PLAN, STAGE 2

Sheet
511

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PLOTTED: 03/04/2022

TAHUNA B

LOT 8
7.5622 ha

EXISTING SYSTEM

TAHUNA A

LOT 7
2.2779 ha

PT RANGIHAMAMA A2 BLK

LOT 6
2.2834 ha

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

GENERAL NOTES

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CONCEPT WASTEWATER DESIGN

CONCEPT DEVELOPMENT	5 BEDROOM
CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT QUALITY	SECONDARY
PRIMARY DISPOSAL AREA	367 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

EXISTING LOT BOUNDARY

PROPOSED LOT BOUNDARY

OVERLAND FLOWPATH

AVAILABLE DISPOSAL AREA

Revision	Issue	Date
A	CONSENT	09/02/2025

geologix
consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

THORPE ROAD, KAIKOHE

TAHUNA A & TAHUNA B BLKS &

STAGE 2 LOT 5

Project	Drawn By
C0471	TI

Client

PJ DIARY LTD

Sheet Title

WASTEWATER PLAN, STAGE 3

Sheet

512

FILE PATH: C:\Users\GeologixConsulting\Synology Drive\Projects\C0400-C0499\Thorpe Road, Kaikohe, Part Rangihamama A2 - C0471\07 - Technical & Drawings\Drawings\C0471-Scheme plan.dwg

PLOTTED: 03/04/2022

LOT 1
0.4647 ha

LOT 2
4.0498 ha

PT KOHEWHATA 11C2

192.5
190.0
187.5
185.0
182.5
180.0
177.5
175.0

GENERAL NOTES

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4. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
5. DO NOT SCALE FROM THIS DRAWING.
6. HORIZONTAL DATUM - MT EDEN 2000.
7. VERTICAL DATUM - NZVD2016.

CONCEPT WASTEWATER DESIGN

CONCEPT DEVELOPMENT	5 BEDROOM
CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT QUALITY	SECONDARY
PRIMARY DISPOSAL AREA	367 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

EXISTING LOT BOUNDARY
PROPOSED LOT BOUNDARY
OVERLAND FLOWPATH
AVAILABLE DISPOSAL AREA

25 0 Meters 25 50
1:2500

Revision	Issue	Date
A	CONSENT	09/02/2025

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT KOHEWHATA 11C2 BLK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
WASTEWATER PLAN, STAGE 4

Sheet
513

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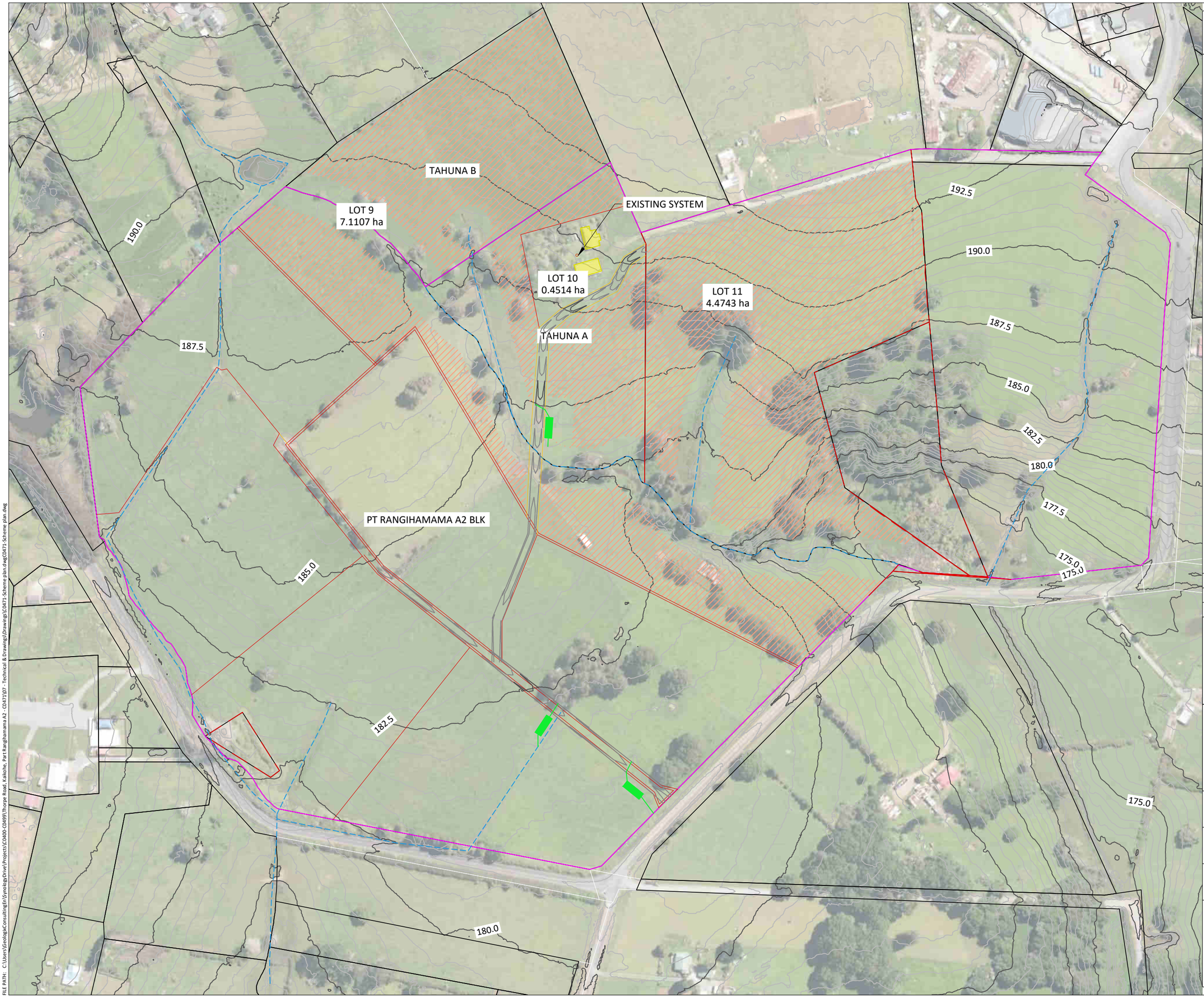
PLOTTED: 03/04/2022



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CONCEPT WASTEWATER DESIGN

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CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT QUALITY	SECONDARY
PRIMARY DISPOSAL AREA	367 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

EXISTING LOT BOUNDARY
PROPOSED LOT BOUNDARY
OVERLAND FLOWPATH
AVAILABLE DISPOSAL AREA

Revision	Issue	Date
A	CONSENT	09/02/2025

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
BOUNDARY ADJUSTMENT OF
LOT 8, STAGE 3 & LOTS 1 & 2, STAGE 4

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
WASTEWATER PLAN, STAGE 5

Sheet
514

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PLOTTED: 03/04/2022

CONSTRUCT NEW CROSSING TO FNDC ENGINEERING STANDARDS SHEET 21, SINGLE TYPE 1A

LOT 1
4.0442 ha

PT KOHEWHATA 11C2

PT KOHEWHATA 69

PT KOHEWHATA11C1

CONSTRUCT NEW CROSSING TO FNDC ENGINEERING STANDARDS SHEET 18, SINGLE RESIDENTIAL

LOT 2
0.6010 ha

190.0
187.5
185.0
182.5
177.5
175.0
180.0

GENERAL NOTES

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7. VERTICAL DATUM - NZVD2016.

Meters
40 0 40 80
1:2500

Revision	Issue	Date
A	CONSENT	09/02/2025

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Project Name and Address
THORPE ROAD, FAR NORTH
PT KOHEWHATA 69 BLOCK

Project	Drawn By
C0471	TI

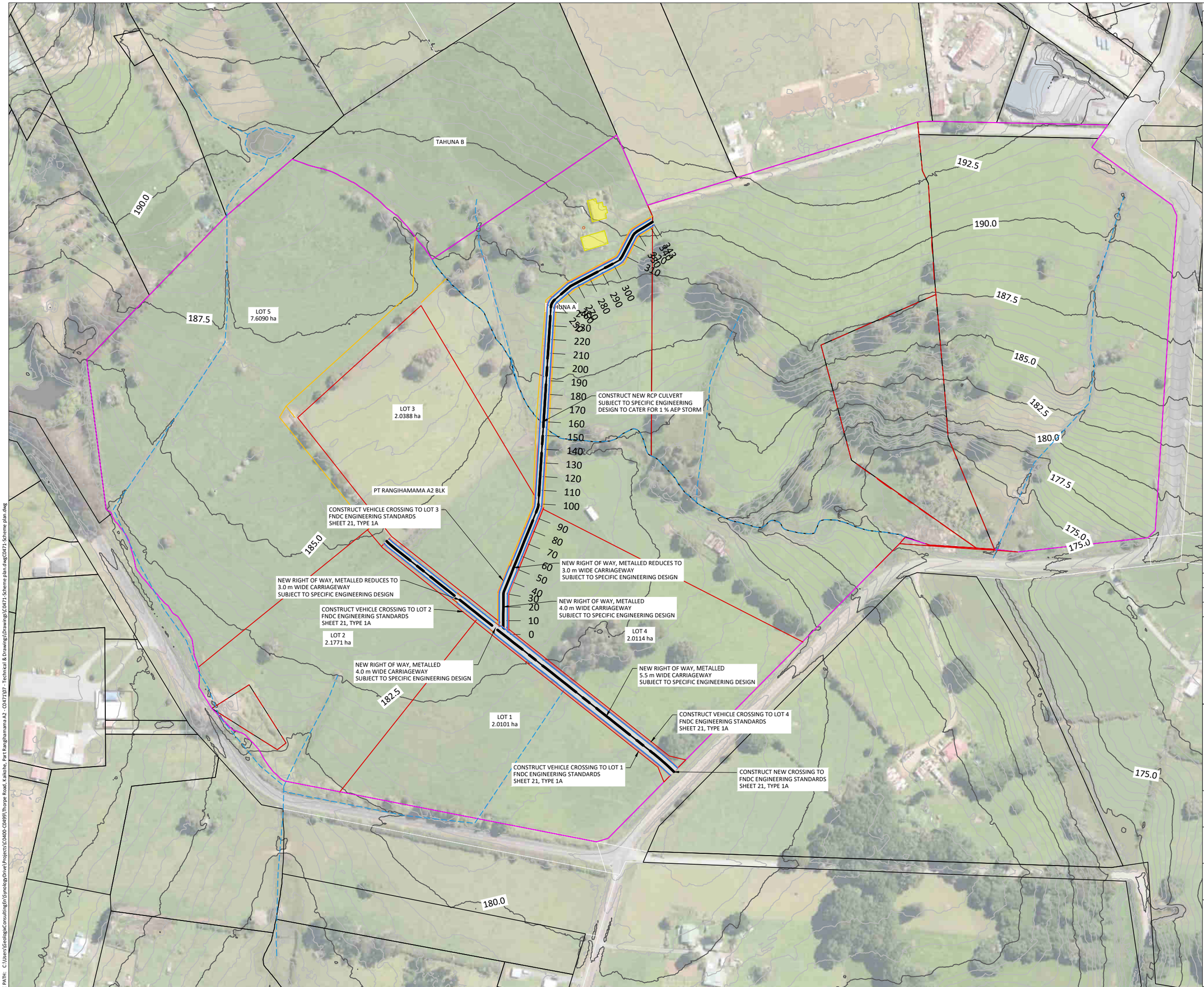
Client
PJ DIARY LTD

Sheet Title
ROADING PLAN, STAGE 1

Sheet
710

FILE PATH: C:\Users\GeologixConsulting\Synology Drive\Projects\C0400-C0499\Thorpe Road, Kaikohe, Part Rangihamama A2 - C0471\07 - Technical & Drawings\Drawings\C0471-Scheme plan.dwg C0471-Scheme plan.dwg

PLOTTED: 09/04/2022



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7. VERTICAL DATUM - NZVD2016.

Meters
25 0 25 50
1:2500

A	CONSENT	09/02/2025
Revision	Issue	Date

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
ROADING PLAN, STAGE 2

Sheet
711

FILE PATH: C:\Users\GeologixConsulting\SynologyDrive\Projects\C0400-C0499\Thorpe Road, Kaikohe, Part Rangihamama A2 - C0471\07 - Technical & Drawings\Drawings\C0471-Scheme plan.dwgC0471-Scheme plan.dwg

PLOTTED: 09/04/2022

TAHUNA B

LOT 8
7.5622 ha

190.0

187.5

LOT 7
2.2779 ha

TAHUNA A

CONSTRUCT VEHICLE CROSSING TO LOT 6
FNDC ENGINEERING STANDARDS
SHEET 21, TYPE 1A

LOT 6
2.2834 ha

PT RANGIHAMAMA A2 BLK

EXTEND RIGHT OF WAY, STAGE 2
WITH 3.0 m WIDE METALLED
RIGHT OF WAY

185.0

GENERAL NOTES

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7. VERTICAL DATUM - NZVD2016.

Meters
15 0 15 30
1:1500

A	CONSENT	09/02/2025
Revision	Issue	Date

geologix
consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
ROADING PLAN, STAGE 3

Sheet
712

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PLOTTED: 03/04/2022

NO INCREASE OF TRAFFIC VOLUMES
TO EXISTING ROAD, NO PROPOSED UPGRADES
AS PART OF THIS APPLICATION

NO PROPOSED UPGRADES
TO EXISTING VEHICLE CROSSING
DUE TO NO INCREASED TRAFFIC VOLUME

LOT 10
0.4514 ha

LOT 11
4.4743 ha

TAHUNA A

192.5
190.0
187.5
185.0
182.5
180.0
177.5
175.0
175.0

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Meters
40 0 40

1:1500.0001

Revision	Issue	Date
A	CONSENT	09/02/2025

geologix
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AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
ROADING PLAN, STAGES 4&5

Sheet
713

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PLOTTED: 03/04/2022

ROW A&B

Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	2D Area (m^2)	Volume (m^3)
1		-0.700	-0.500	45.9	2.6
2		-0.500	-0.300	252.4	30.0
3		-0.300	-0.100	774.4	129.1
4		-0.100	0.100	850.0	163.3
5		0.100	0.300	150.5	14.5
6		0.300	0.500	6.6	0.1

ROW E, F & G

Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	2D Area (m^2)	Volume (m^3)
1		-0.800	-0.600	19.6	1.0
2		-0.600	-0.400	253.4	23.2
3		-0.400	-0.200	628.6	109.8
4		-0.200	0.000	1100.8	295.6
5		0.000	0.200	160.3	7.6
6		0.200	0.400	1.6	0.1

HUNA A

LOT 3
2.0388 ha

PT RANGIHAMAMA A2 BLK

185.0

LOT 2
2.1771 ha

LOT 4
2.0114 ha

182.5

LOT 1
2.0101 ha

GENERAL NOTES

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Meters
15 0 15 30
1:1500

Revision	Issue	Date
A	CONSENT	09/02/2025

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Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

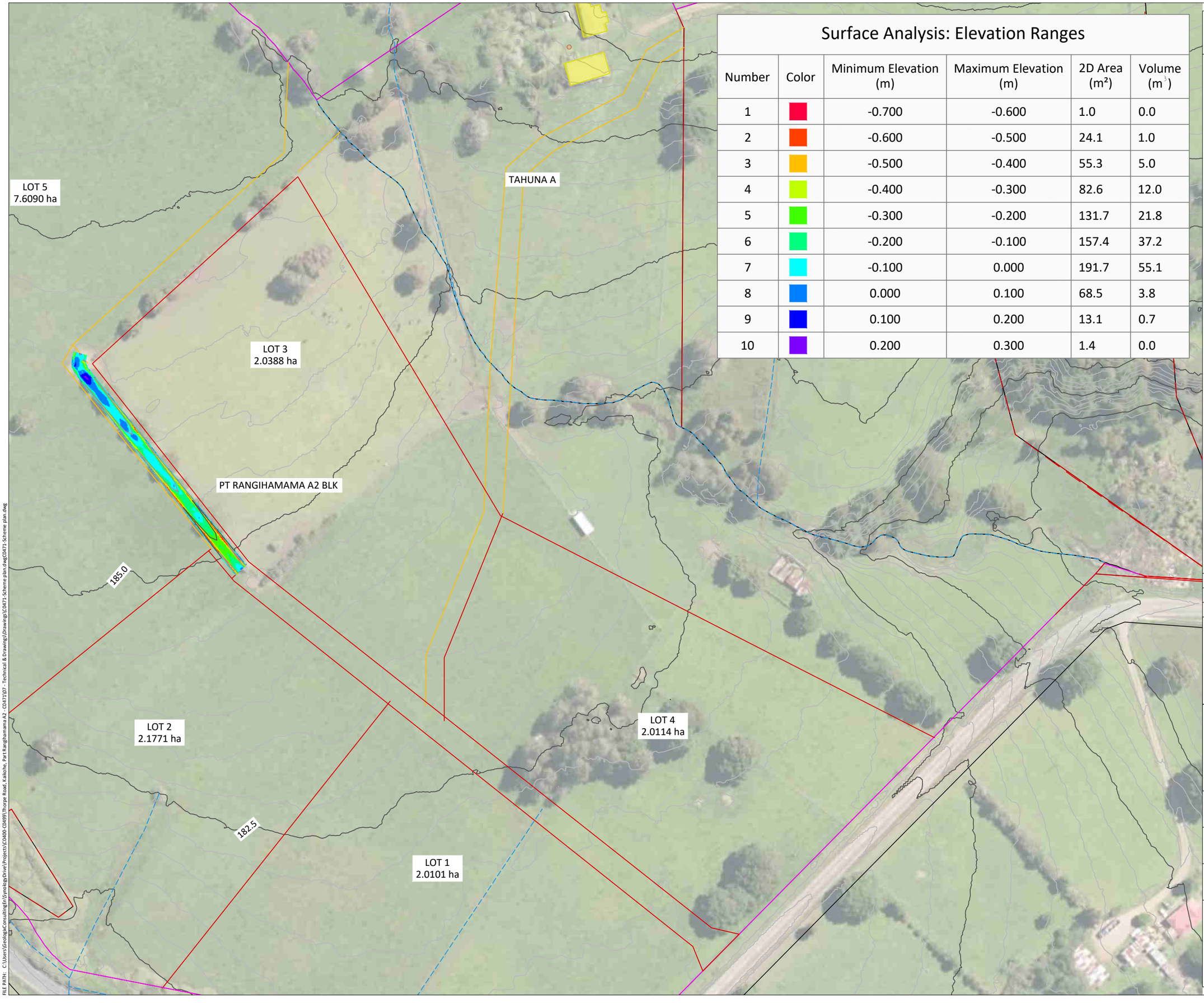
Client
PJ DIARY LTD

Sheet Title
EARTHWORKS PLAN, STAGE 2

Sheet
810

FILE PATH: C:\Users\GeologixConsultingEn\SynologyDrive\Projects\C0400-C0499\Thorpe Road, Kaikohe, Part Rangihamama A2 - C0471\07 - Technical & Drawings\Drawings\C0471-Scheme plan.dwgC0471-Scheme plan.dwg

PLOTTED: 03/04/2022



Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	2D Area (m^2)	Volume (m^3)
1		-0.700	-0.600	1.0	0.0
2		-0.600	-0.500	24.1	1.0
3		-0.500	-0.400	55.3	5.0
4		-0.400	-0.300	82.6	12.0
5		-0.300	-0.200	131.7	21.8
6		-0.200	-0.100	157.4	37.2
7		-0.100	0.000	191.7	55.1
8		0.000	0.100	68.5	3.8
9		0.100	0.200	13.1	0.7
10		0.200	0.300	1.4	0.0

GENERAL NOTES

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7. VERTICAL DATUM - NZVD2016.

Meters
15 0 15 30
1:1500

A	CONSENT	09/02/2025
Revision	Issue	Date

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
EARTHWORKS PLAN, STAGE 3

Sheet
811

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PLOTTED: 03/04/2022

APPENDIX B

Engineering Borehole Records

INVESTIGATION LOG

HOLE NO.: BH01

CLIENT: P J Dairy Ltd

PROJECT: Thrope Road, Kaikohe

JOB NO.: C0471

SITE LOCATION:

START DATE: 01/08/2024

CO-ORDINATES:

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: HAND AUGER

DRILLER: NT

LOGGED BY: NT

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm) 2 4 6 8 10 12 14 16 18	VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200 Values	WATER
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.0	TS			Groundwater Not Encountered
Clayey SILT; brownish red. Moist; friable.		0.2				
		0.4				
End Of Hole: 0.60m		0.6				
		0.8				
		1.0				
		1.2				

PHOTO(S)

REMARKS

1. Hand auger terminated at 0.6m bgl due to dense strata.
2. Groundwater not encountered at the time of drilling.

WATER

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

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: BH02

CLIENT: P J Dairy Ltd

PROJECT: Thrope Road, Kaikohe

JOB NO.: C0471

SITE LOCATION:

START DATE: 01/08/2024

CO-ORDINATES:

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: HAND AUGER

DRILLER: NT

LOGGED BY: NT

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm) 2 4 6 8 10 12 14 16 18	VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200 Values	WATER
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.0	TS			Groundwater Not Encountered
Clayey SILT; brownish red. Moist; friable.		0.2 0.4 0.6 0.8				
End Of Hole: 0.90m		1.0 1.2				

PHOTO(S)

REMARKS

1. Hand auger terminated at 0.9m bgl due to dense strata.
2. Groundwater not encountered at the time of drilling.

WATER

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

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: BH03

CLIENT: P J Dairy Ltd
PROJECT: Thrope Road, Kaikohe
JOB NO.: C0471

SITE LOCATION:
CO-ORDINATES:
CONTRACTOR: Internal **RIG:** HAND AUGER
ELEVATION: Ground **DRILLER:** NT
START DATE: 01/08/2024 **END DATE:** 01/08/2024 **LOGGED BY:** NT

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm) 2 4 6 8 10 12 14 16 18	VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200 Values	WATER
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0	TS			Groundwater Not Encountered
SILT; reddish brown.. Moist; friable.		0.2				
		0.4				
		0.6				
		0.8				
End Of Hole: 0.80m		1.0				
		1.2				

PHOTO(S)

REMARKS

1. Hand auger terminated at 0.8m bgl due to dense strata.
2. Groundwater not encountered at the time of drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

INVESTIGATION LOG

HOLE NO.: BH04

CLIENT: P J Dairy Ltd

PROJECT: Thrope Road, Kaikohe

JOB NO.: C0471

SITE LOCATION:

START DATE: 01/08/2024

CO-ORDINATES:

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: HAND AUGER

DRILLER: NT

LOGGED BY: NT

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm) 2 4 6 8 10 12 14 16 18	VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200 Values	WATER
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.0	TS			Groundwater Not Encountered
Clayey SILT; reddish brown. Moist; low plasticity.		0.2				
		0.4				
		0.6				
		0.8				
		1.0				
End Of Hole: 1.20m		1.2				

PHOTO(S)

REMARKS

1. Hand auger terminated at 1.2m bgl due to dense strata.
2. Groundwater not encountered at the time of drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

APPENDIX C

Assessment of Environmental Effects and Assessment Criteria

Table 25: Wastewater Assessment of Environmental Effects

Item	NRC Separation Requirement[2]	FNDC Separation Requirement	Site Assessment[3]
Individual System Effects			
Flood plains	Above 5 % AEP	NR	Complies. Disposal field well above mapped flood hazard.
Stormwater flowpath[4]	5 m	NR	Complies, see annotations on Drawing No. 500.
Surface water feature[5]	15 m	15 – 30 m	Complies.
Coastal Marine Area	15 m	30 m	Complies.
Existing water supply bore.	20 m	NR	Complies.
Property boundary	1.5 m	1.5	Complies. Including proposed subdivision boundaries.
Winter groundwater table	0.6 m	0.6 m	Complies.
Topography			Complies, <10 °.
Cut off drain required?			No.
Discharge Consent Required?			No.
	TP58	**NZS1547**	
Cumulative Effects			
Biological Oxygen Demand	≤20 g/m^3		Complies – secondary treatment.
Total Suspended Solids	≤30 g/m^3		Complies – secondary treatment.
Total Nitrogen	10 – 30 g/m^3	15 – 75 g/m^3	Complies – secondary treatment.
Phosphorous	NR	4 – 10 g/m^3	Complies – secondary treatment.
Ammonia	NR	Negligible	Complies – secondary treatment.
Nitrites/ Nitrates	NR	15 – 45 g/m^3	Complies – secondary treatment.
Conclusion: Effects are less than minor on the environment.			

1. AEE based on proposed secondary treated effluent.
2. Northland Regional Plan Table 9.
3. Based on the recommendations of this report and Drawing No. 500.
4. Including any formed road with kerb and channel, and water-table drain that is down-slope of the disposal area.
5. River, lake, stream, pond, dam, or natural wetland.
AEP Annual Exceedance Probability.
NR No Requirement.

APPENDIX D

Stormwater Calculations

Project Ref:	C0471		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**50 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2024	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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

POST DEVELOPMENT CATCHMENT PARAMETERS

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

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	63.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	75.60	mm/hr

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

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

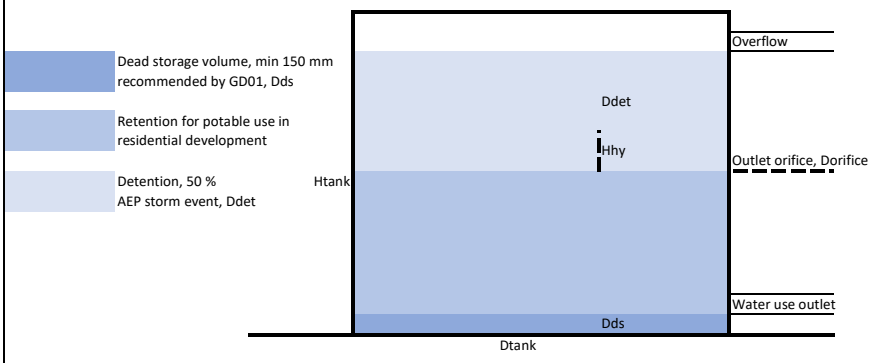
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	63.00	1.2	75.60	9.41	5.16	4.13	*Critical duration (time of concentration) for the catchments is 10min*
20	44.00	1.2	52.80	6.57	4.33	3.46	
30	35.80	1.2	42.96	5.35	3.52	2.82	
60	25.40	1.2	30.48	3.79	2.50	2.00	
120	17.90	1.2	21.48	2.67	1.76	1.41	*Pre-dev calculated on Intensity without CC factor*
360	10.00	1.2	12.00	1.49	0.98	0.79	
720	6.74	1.2	8.09	1.01	0.66	0.53	
1440	4.36	1.2	5.23	0.65	0.43	0.34	
2880	2.70	1.2	3.24	0.40	0.27	0.21	
4320	1.99	1.2	2.39	0.30	0.20	0.16	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	3.36	6.05	0.77	0.77	5.28	3167	*select largest required storage , regardless of duration, to avoid overflow*
20	2.35	4.22	1.11	0.77	3.45	4145	
30	1.91	3.44	0.91	0.77	2.67	4800	
60	1.35	2.44	0.64	0.77	1.67	6006	
120	0.95	1.72	0.45	0.77	0.95	6828	
360	0.53	0.96	0.25	0.77	0.19	4104	
720	0.36	0.65	0.17	0.77	No Att. Req.	0	
1440	0.23	0.42	0.11	0.77	No Att. Req.	0	
2880	0.14	0.26	0.07	0.77	No Att. Req.	0	
4320	0.11	0.19	0.05	0.77	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	6.828	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 1
TANK AREA, Atank	10.52	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	26302	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.65	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.80	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00077	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.32	m	
AREA OF ORIFICE, Aorifice	4.92E-04	m2	
ORIFICE DIAMETER, Dorifice	25	mm	
VELOCITY AT ORIFICE	3.57	m/s	At max. head level

Project Ref:	C0471		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**20 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2024	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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

POST DEVELOPMENT CATCHMENT PARAMETERS

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

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	81.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	97.8	mm/hr

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

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

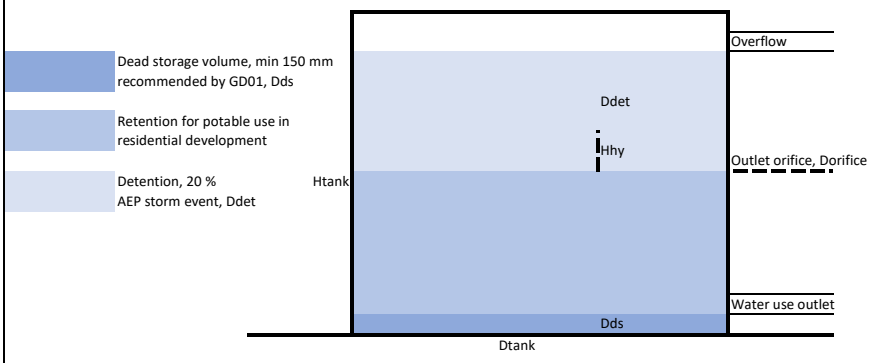
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	81.50	1.2	97.80	12.17	6.68	5.34	*Critical duration (time of concentration) for the catchments is 10min*
20	57.00	1.2	68.40	8.51	5.61	4.48	
30	46.50	1.2	55.80	6.94	4.57	3.66	
60	33.00	1.2	39.60	4.93	3.25	2.60	
120	23.30	1.2	27.96	3.48	2.29	1.83	*Pre-dev calculated on Intensity without CC factor*
360	13.10	1.2	15.72	1.96	1.29	1.03	
720	8.81	1.2	10.57	1.32	0.87	0.69	
1440	5.71	1.2	6.85	0.85	0.56	0.45	
2880	3.54	1.2	4.25	0.53	0.35	0.28	
4320	2.61	1.2	3.13	0.39	0.26	0.21	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	4.35	7.82	1.00	1.00	6.83	4097	*select largest required storage , regardless of duration, to avoid overflow*
20	3.04	5.47	2.57	1.00	4.48	5371	
30	2.48	4.46	2.09	1.00	3.47	6242	
60	1.76	3.17	1.49	1.00	2.17	7819	
120	1.24	2.24	1.05	1.00	1.24	8933	
360	0.70	1.26	0.59	1.00	0.26	5648	
720	0.47	0.85	0.40	1.00	No Att. Req.	0	
1440	0.30	0.55	0.26	1.00	No Att. Req.	0	
2880	0.19	0.34	0.16	1.00	No Att. Req.	0	
4320	0.14	0.25	0.12	1.00	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	8.933	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 1
TANK AREA, Atank	10.52	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	26302	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.85	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.00	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00100	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.42	m	
AREA OF ORIFICE, Aorifice	5.57E-04	m2	
ORIFICE DIAMETER, Dorifice	27	mm	
VELOCITY AT ORIFICE	4.08	m/s	At max. head level

Project Ref:	C0471		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW**	
Date:	14 July 2024	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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

POST DEVELOPMENT CATCHMENT PARAMETERS

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

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	95.1	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	114.1	mm/hr

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

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

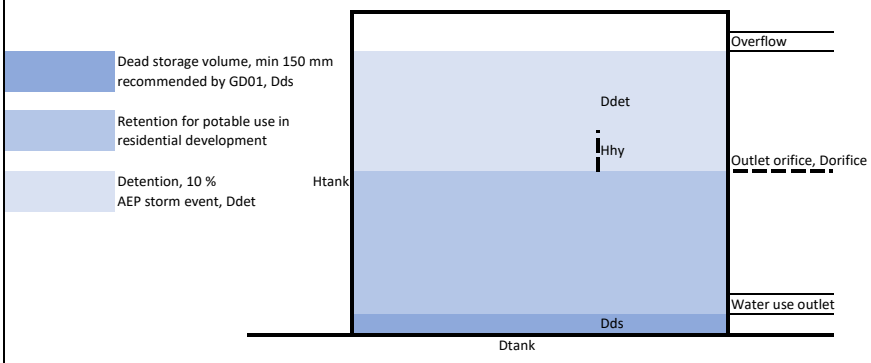
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s		COMMENTS
10	95.10	1.2	114.12	14.20	7.79		*Critical duration (time of concentration) for the catchments is 10min*
20	66.50	1.2	79.80	9.93	6.54		
30	54.30	1.2	65.16	8.11	5.34		
60	38.60	1.2	46.32	5.76	3.80		
120	27.30	1.2	32.76	4.08	2.68		*Pre-dev calculated on Intensity without CC factor*
360	15.40	1.2	18.48	2.30	1.51		
720	10.30	1.2	12.36	1.54	1.01		
1440	6.72	1.2	8.06	1.00	0.66		
2880	4.17	1.2	5.00	0.62	0.41		
4320	3.08	1.2	3.70	0.46	0.30		

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	5.07	9.13	2.72	2.72	6.41	3845	*select largest required storage , regardless of duration, to avoid overflow*
20	3.55	6.38	2.99	2.72	3.66	4396	
30	2.90	5.21	2.44	2.72	2.49	4485	
60	2.06	3.71	1.74	2.72	0.98	3545	
120	1.46	2.62	1.23	2.72	No Att. Req.	0	
360	0.82	1.48	0.69	2.72	No Att. Req.	0	
720	0.55	0.99	0.46	2.72	No Att. Req.	0	
1440	0.36	0.65	0.30	2.72	No Att. Req.	0	
2880	0.22	0.40	0.19	2.72	No Att. Req.	0	
4320	0.16	0.30	0.14	2.72	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	4.485	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 1
TANK AREA, Atank	10.52	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	26302	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.43	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.58	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00272	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.21	m	
AREA OF ORIFICE, Aorifice	2.15E-03	m2	
ORIFICE DIAMETER, Dorifice	52	mm	
VELOCITY AT ORIFICE	2.89	m/s	At max. head level

Project Ref:	C0471		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**1 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2024	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

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

POST DEVELOPMENT CATCHMENT PARAMETERS

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

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	141.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	169.2	mm/hr

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

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

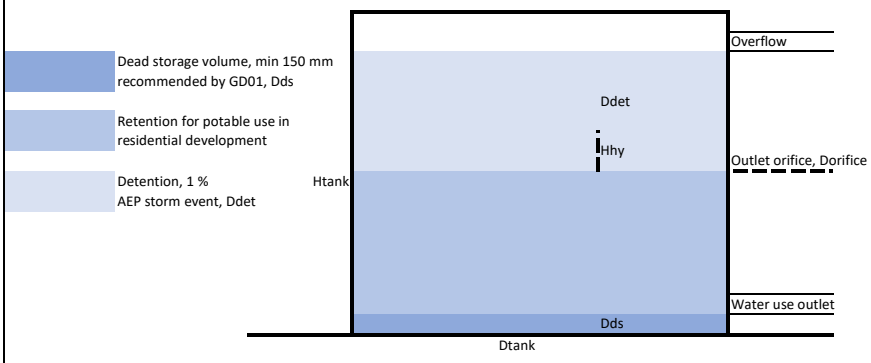
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	141.00	1.2	169.20	21.06	11.55	9.24	*Critical duration (time of concentration) for the catchments is 10min*
20	99.20	1.2	119.04	14.81	9.75	7.80	
30	81.20	1.2	97.44	12.13	7.98	6.39	
60	57.90	1.2	69.48	8.65	5.69	4.55	
120	41.10	1.2	49.32	6.14	4.04	3.23	*Pre-dev calculated on Intensity without CC factor*
360	23.30	1.2	27.96	3.48	2.29	1.83	
720	15.70	1.2	18.84	2.34	1.54	1.24	
1440	10.30	1.2	12.36	1.54	1.01	0.81	
2880	6.39	1.2	7.67	0.95	0.63	0.50	
4320	4.73	1.2	5.68	0.71	0.47	0.37	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	7.52	13.54	1.72	1.72	11.81	7088	*Selected Tank Outflow is selected for critical duration (time of concentration). In this case = 10min*
20	5.29	9.52	2.51	1.72	7.80	9360	
30	4.33	7.80	2.06	1.72	6.07	10929	
60	3.09	5.56	1.47	1.72	3.84	13806	
120	2.19	3.95	1.04	1.72	2.22	16000	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	1.24	2.24	0.59	1.72	0.51	11091	
720	0.84	1.51	0.40	1.72	No Att. Req.	0	
1440	0.55	0.99	0.26	1.72	No Att. Req.	0	
2880	0.34	0.61	0.16	1.72	No Att. Req.	0	
4320	0.25	0.45	0.12	1.72	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	16.000	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 1
TANK AREA, Atank	10.52	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	26302	litres	
REQUIRED STORAGE HEIGHT, Ddet	1.52	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.67	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00172	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.76	m	
AREA OF ORIFICE, Aorifice	7.20E-04	m2	
ORIFICE DIAMETER, Dorifice	30	mm	
VELOCITY AT ORIFICE	5.46	m/s	At max. head level

Project Ref:	C0471	STORMWATER DISPERSION PIPE/ TRENCH	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE		
Design Case:	CONCEPT FUTURE DEVELOPMENT	WEIGHTED RUNOFF	
Date:	14 July 2024 REV 1		

TP108 Worksheet 1 - Runoff curve number & Initial Abstraction

Soil Class	Cover description	Curve Number, CN	Area	Product of CN * Area
TYPE C	TO TANK	98	300	29400
TYPE C	PERVIOUS	89	0	0
TYPE C	EX. CONSENTED	80	0	0
TYPE C	#REF!	98	#REF!	#REF!
		Total	**#REF!**	**#REF!**
		Total Pervious	0	m2
		Total Impervious	#REF!	m2
		Weighted Runoff, CN	**#REF!**	
		Weighted Initial Abstraction, Ia	**#REF!**	mm

TP108, FIGURE 5.1

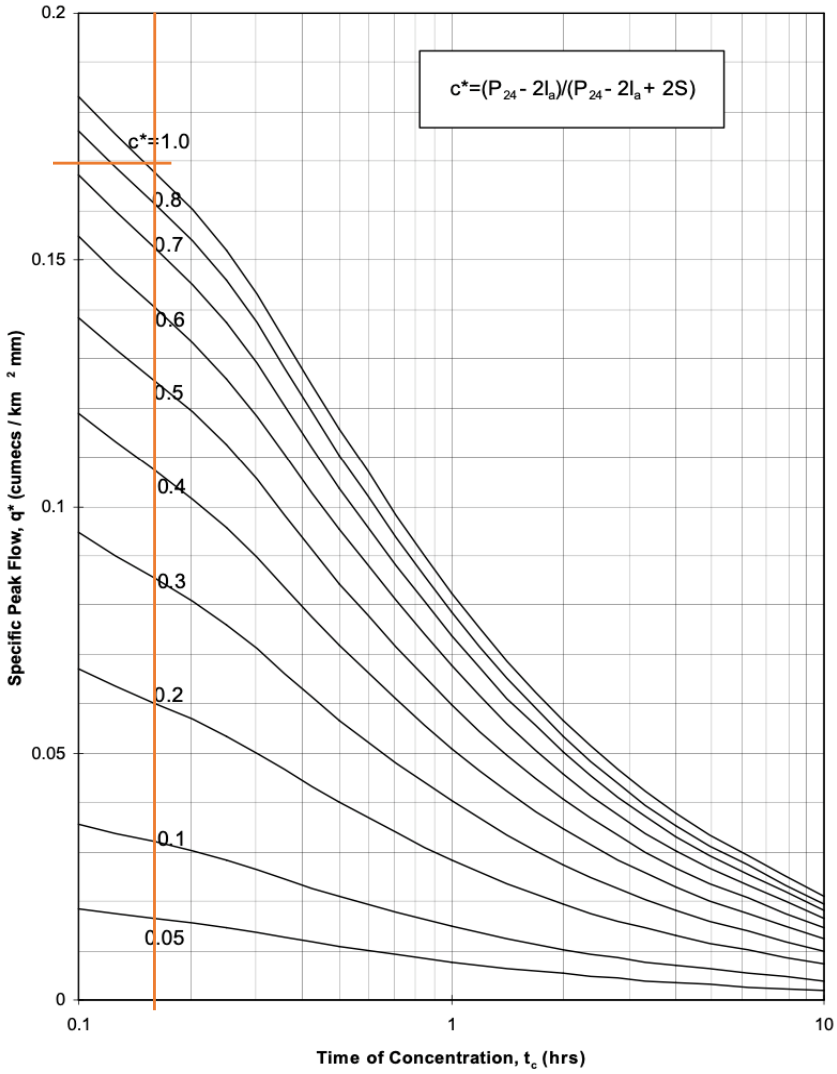


Figure 5.1 Specific Peak Flow Rate

Project Ref:	C0471	**STORMWATER DISPERSION PIPE/ TRENCH**	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE		
Design Case:	CONCEPT FUTURE DEVELOPMENT	**DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH**	
Date:	14 July 2024 REV 1		

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

DESIGN STORM EVENT **1%** AEP EVENT

SLOPE BETWEEN SOURCE & DISPERSION DEVICE

ELEVATION	h	CHAINAGE, x	Δ x	h bar	Δ A
m	m	m	m	m	m2
31.1	0	0	0	0	0
30	0.1	6	6	0.05	0.3
	TOTALS	6	6		0.3
	SLOPE, Sc	0.017	m/m		

MANNINGS PIPE FLOW - INCOMING PIPE

Dia, m	d/D	α, rad	P, m	A, m^2	R	1:S	n	V, m/s	Q, m^3/s	Q, l/s	
0.15	0.000	6.283	0.0000	0.0000	0.000	60	0.009	0.000	0.0000	0.000	**0 % full**
0.150	0.050	5.381	0.0677	0.0003	0.005	60	0.0090	0.413	0.0001	0.136	
0.150	0.100	4.996	0.0965	0.0009	0.010	60	0.0090	0.645	0.0006	0.593	
0.150	0.150	4.692	0.1193	0.0017	0.014	60	0.0090	0.831	0.0014	1.380	
0.150	0.200	4.429	0.1391	0.0025	0.018	60	0.0090	0.988	0.0025	2.487	
0.150	0.250	4.189	0.1571	0.0035	0.022	60	0.0090	1.126	0.0039	3.890	
0.150	0.300	3.965	0.1739	0.0045	0.026	60	0.0090	1.247	0.0056	5.561	
0.150	0.350	3.751	0.1899	0.0055	0.029	60	0.0090	1.355	0.0075	7.467	
0.150	0.400	3.544	0.2054	0.0066	0.032	60	0.0090	1.450	0.0096	9.570	
0.150	0.450	3.342	0.2206	0.0077	0.035	60	0.0090	1.534	0.0118	11.829	
0.150	0.500	3.142	0.2356	0.0088	0.038	60	0.0090	1.607	0.0142	14.200	**50 % full**
0.150	0.550	2.941	0.2506	0.0100	0.040	60	0.0090	1.670	0.0166	16.634	
0.150	0.600	2.739	0.2658	0.0111	0.042	60	0.0090	1.723	0.0191	19.080	
0.150	0.650	2.532	0.2813	0.0122	0.043	60	0.0090	1.767	0.0215	21.482	
0.150	0.700	2.319	0.2973	0.0132	0.044	60	0.0090	1.800	0.0238	23.777	
0.150	0.750	2.094	0.3142	0.0142	0.045	60	0.0090	1.822	0.0259	25.897	
0.100	0.800	1.855	0.2214	0.0067	0.030	60	0.0090	1.398	0.0094	9.415	
0.100	0.850	1.591	0.2346	0.0071	0.030	60	0.0090	1.395	0.0099	9.926	
0.100	0.900	1.287	0.2498	0.0074	0.030	60	0.0090	1.379	0.0103	10.266	
0.100	0.950	0.902	0.2691	0.0077	0.029	60	0.0090	1.343	0.0104	10.350	
0.100	1.000	0.000	0.3142	0.0079	0.025	60	0.0090	1.226	0.0096	9.632	**Flowing full**

DISPERSION SPECIFICATION

INCOMING PIPE PROPERTIES:

TANK OUTFLOW, 1 % AEP	13.54	l/s		
MAXIMUM PIPE FLOW	25.90	l/s		
SUFFICIENT CAPACITY IN PIPE	YES			
LONGITUDINAL SLOPE	0.017	m/m		
DESIGN VELOCITY, Dv	1.822	m/s		

LEVEL SPREADER SPECIFICATIONS:

PIPE DIAMETER, m	0.15	m		
MANNINGS PIPE ROUGHNESS	0.009			
NUMBER OF ORIFICES	58	No.		
DIA. OF ORIFICE, D	20	mm		
ORIFICE INTERVALS, C/C	310	mm		
DISPERSION PIPE LENGTH, L	**17.67**	**m**		

ORIFICE DESIGN FLOW CHECK:

AREA OF SINGLE ORIFICE, A	0.00031	m2		
FLOW OUT OF 1 ORIFICE	0.000236277	m3/s	0.24 l/s	
FLOW OUT OF ALL ORIFICES	0.01370407	m3/s	13.70 l/s	**DESIGN OK**
VELOCITY FROM SINGLE ORIFICE	0.75	m/s		

BROAD CRESTED WEIR DESIGN FLOW CHECK:

FLOW DEPTH, h	0.075	m		
BASE WIDTH = L	17.67	m		
FLOW AREA	1.33	m2		
WEIR FLOW	0.01390	m3/s	13.90 l/s	**DESIGN OK**
WEIR VELOCITY	0.010	m/s		

INCOMING PIPE & SPREADER SUMARY:

	LOT 1 - 11	
INCOMING PIPE DIAMETER, m	0.100	m
SPREADER PIPE DIAMETER, m	0.150	m
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	58	No.
DIA. OF ORIFICE, D	20	mm
ORIFICE INTERVALS, C/C	310	mm
DISPERSION PIPE LENGTH, L	**17.67**	**m**

Project Ref:	C0471	STORMWATER ATTENUATION TANK DESIGN	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE		
Design Case:	CONCEPT FUTURE DEVELOPMENT	CLIMATE CHANGE FACTORS	
Date:	14 July 2024 REV 1		

CLIMATE CHANGE PROJECTIONS

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

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

HIRDS V4 Intensity-Duration-Frequency Results
Sitename: Thorpe Road
Coordinate system: WGS84
Longitude: 173.7976
Latitude: -35.4176

DDF Mode Parameters:	c	d	e	f	g	h	i
Values:	0.00228788	0.50126823	-0.00280378	-0.00468173		0.25281537	-0.01167968	3.14262444
Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Rate (mm/hr)		
	24	100	3.17805383	4.600149227	10.26060378		

Rainfall intensities (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	57.6	40.2	32.7	23.2	16.3	9.14	6.13	3.97	2.45	1.81	1.44	1.19
2	0.5	63	44	35.8	25.4	17.9	10	6.74	4.36	2.7	1.99	1.58	1.31
5	0.2	81.5	57	46.5	33	23.3	13.1	8.81	5.71	3.54	2.61	2.08	1.73
10	0.1	95.1	66.5	54.3	38.6	27.3	15.4	10.3	6.72	4.17	3.08	2.45	2.04
20	0.05	109	76.2	62.3	44.3	31.4	17.7	11.9	7.76	4.82	3.56	2.83	2.36
30	0.033	117	82	67	47.7	33.8	19.1	12.9	8.38	5.21	3.85	3.06	2.55
40	0.025	123	86.1	70.4	50.1	35.6	20.1	13.6	8.82	5.49	4.05	3.23	2.69
50	0.02	127	89.3	73	52	36.9	20.9	14.1	9.17	5.71	4.22	3.36	2.8
60	0.017	131	91.9	75.2	53.6	38	21.5	14.5	9.46	5.89	4.35	3.47	2.89
80	0.013	137	96.1	78.6	56	39.8	22.5	15.2	9.91	6.17	4.56	3.64	3.03
100	0.01	141	99.2	81.2	57.9	41.1	23.3	15.7	10.3	6.39	4.73	3.77	3.14
250	0.004	159	112	91.8	65.5	46.6	26.5	17.9	11.7	7.29	5.4	4.31	3.59

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	5.3	3.4	2.6	1.7	1.2	0.73	0.53	0.22	0.18	0.12	0.1	0.1
2	0.5	5.7	3.7	2.7	1.9	1.3	0.8	0.58	0.24	0.2	0.13	0.11	0.12
5	0.2	8.1	5.6	4.2	2.7	1.9	1.1	0.83	0.35	0.28	0.2	0.15	0.16
10	0.1	11	7.8	5.9	3.7	2.6	1.5	1.1	0.48	0.35	0.25	0.2	0.2
20	0.05	14	11	8.3	4.9	3.5	2.1	1.5	0.65	0.45	0.33	0.25	0.25
30	0.033	16	13	9.9	5.8	4.2	2.5	1.7	0.78	0.52	0.38	0.29	0.28
40	0.025	18	14	11	6.5	4.7	2.8	1.9	0.87	0.57	0.42	0.32	0.31
50	0.02	20	16	12	7.1	5.1	3.1	2.1	0.95	0.62	0.46	0.35	0.33
60	0.017	21	17	13	7.7	5.5	3.4	2.3	1	0.66	0.49	0.38	0.35
80	0.013	24	19	15	8.6	6.2	3.8	2.6	1.1	0.72	0.54	0.42	0.39
100	0.01	26	21	16	9.3	6.7	4.2	2.9	1.2	0.78	0.59	0.45	0.42
250	0.004	36	29	23	13	9.5	6.1	4.1	1.7	1.1	0.8	0.62	0.55

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	61.7	43	35	24.8	17.4	9.65	6.42	4.13	2.54	1.86	1.48	1.22
2	0.5	67.6	47.1	38.4	27.2	19.2	10.6	7.07	4.55	2.8	2.05	1.63	1.35
5	0.2	87.7	61.3	50	35.5	25	13.9	9.29	5.98	3.68	2.71	2.15	1.78
10	0.1	102	71.7	58.5	41.5	29.3	16.3	10.9	7.04	4.34	3.2	2.54	2.11
20	0.05	117	82.2	67.2	47.8	33.8	18.9	12.6	8.13	5.02	3.7	2.94	2.44
30	0.033	126	88.5	72.3	51.4	36.4	20.3	13.6	8.79	5.43	4	3.18	2.64
40	0.025	133	92.9	76	54.1	38.3	21.4	14.3	9.26	5.72	4.22	3.35	2.78
50	0.02	137	96.4	78.9	56.1	39.8	22.2	14.9	9.63	5.96	4.39	3.49	2.9
60	0.017	141	99.3	81.2	57.8	41	22.9	15.4	9.93	6.14	4.53	3.6	2.99
80	0.013	148	104	84.9	60.5	42.9	24	16.1	10.4	6.44	4.75	3.77	3.14
100	0.01	153	107	87.7	62.5	44.3	24.9	16.7	10.8	6.67	4.92	3.91	3.25
250	0.004	172	121	99.1	70.8	50.2	28.2	19	12.3	7.61	5.62	4.47	3.71

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	61.7	43	35	24.8	17.4	9.65	6.42	4.13	2.54	1.86	1.48	1.22
2	0.5	67.6	47.1	38.4	27.2	19.2	10.6	7.07	4.55	2.8	2.05	1.63	1.35
5	0.2	87.7	61.3	50	35.5	25	13.9	9.29	5.98	3.68	2.71	2.15	1.78
10	0.1	102	71.7	58.5	41.5	29.3	16.3	10.9	7.04	4.34	3.2	2.54	2.11
20	0.05	117	82.2	67.2	47.8	33.8	18.9	12.6	8.13	5.02	3.7	2.94	2.44
30	0.033	126	88.5	72.3	51.4	36.4	20.3	13.6	8.79	5.43	4	3.18	2.64
40	0.025	133	92.9	76	54.1	38.3	21.4	14.3	9.26	5.72	4.22	3.35	2.78
50	0.02	137	96.4	78.9	56.1	39.8	22.2	14.9	9.63	5.96	4.39	3.49	2.9
60	0.017	141	99.3	81.2	57.8	41	22.9	15.4	9.93	6.14	4.53	3.6	2.99
80	0.013	148	104	84.9	60.5	42.9	24	16.1	10.4	6.44	4.75	3.77	3.14
100	0.01	153	107	87.7	62.5	44.3	24.9	16.7	10.8	6.67	4.92	3.91	3.25
250	0.004	172	121	99.1	70.8	50.2	28.2	19	12.3	7.61	5.62	4.47	3.71

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	62.7	43.7	35.6	25.2	17.7	9.77	6.5	4.17	2.56	1.88	1.49	1.23
2	0.5	68.7	47.9	39.1	27.7	19.5	10.8	7.16	4.59	2.82	2.07	1.64	1.36
5	0.2	89.3	62.4	50.9	36.1	25.4	14.1	9.41	6.04	3.72	2.73	2.17	1.8
10	0.1	104	73	59.6	42.3	29.9	16.6	11.1	7.12	4.39	3.23	2.56	2.12
20	0.05	120	83.7	68.4	48.6	34.4	19.1	12.8	8.23	5.08	3.73	2.96	2.46
30	0.033	129	90.1	73.7	52.4	37.1	20.7	13.8	8.89	5.49	4.04	3.21	2.66
40	0.025	135	94.7	77.4	55.1	39	21.8	14.5	9.37	5.78	4.26	3.38	2.81
50	0.02	140	98.2	80.3	57.2	40.5	22.6	15.1	9.74	6.02	4.43	3.52	2.92
60	0.017	144	101	82.7	58.9	41.7	23.3	15.6	10.1	6.21	4.57	3.63	3.01
80	0.013	151	106	86.5	61.6	43.6	24.4	16.3	10.5	6.51	4.79	3.81	3.16
100	0.01	156	109	89.4	63.7	45.1	25.3	16.9	10.9	6.75	4.97	3.95	3.28
250	0.004	175	123	101	72.1	51.2	28.7	19.2	12.4	7.7	5.67	4.51	3.75

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	65.9	45.9	37.4	26.5	18.6	10.2	6.73	4.31	2.63	1.92	1.52	1.26
2	0.5	72.3	50.5	41.1	29.1	20.5	11.2	7.43	4.74	2.9	2.12	1.68	1.39
5	0.2	94.2	65.8	53.7	38.1	26.8	14.8	9.79	6.25	3.83	2.81	2.22	1.84
10	0.1	110	77.1	62.9	44.7	31.5	17.4	11.5	7.38	4.52	3.32	2.63	2.18
20	0.05	126	88.5	72.3	51.4	36.3	20.1	13.3	8.53	5.24	3.84	3.05	2.52
30	0.033	136	95.3	77.9	55.4	39.1	21.7	14.4	9.22	5.67	4.16	3.3	2.73
40	0.025	143	100	81.8	58.2	41.1	22.8	15.2	9.72	5.97	4.39	3.48	2.88
50	0.02	148	104	85	60.5	42.7	23.7	15.8	10.1	6.22	4.56	3.62	3
60	0.017	152	107	87.5	62.3	44	24.5	16.3	10.4	6.41	4.71	3.74	3.1
80	0.013	159	112	91.5	65.2	46.1	25.6	17	10.9	6.73	4.94	3.92	3.25
100	0.01	165	116	94.6	67.4	47.7	26.5	17.7	11.3	6.97	5.12	4.06	3.37
250	0.004	186	131	107	76.3	54	30.1	20.1	12.9	7.95	5.85	4.64	3.85

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	62.3	43.4	35.4	25	17.6	9.72	6.47	4.16	2.55	1.87	1.48	1.23
2	0.5	68.3	47.6	38.8	27.5	19.3	10.7	7.12	4.57	2.81	2.06	1.64	1.36
5	0.2	88.6	61.9	50.5	35.8	25.3	14	9.36	6.02	3.7	2.72	2.16	1.79
10	0.1	104	72.4	59.1	42	29.7	16.5	11	7.09	4.37	3.21	2.55	2.12
20	0.05	119	83.1	67.9	48.3	34.1	19	12.7	8.19	5.05	3.72	2.95	2.45
30	0.033	128	89.5	73.1	52	36.8	20.5	13.7	8.85	5.47	4.02	3.2	2.65
40	0.025	134	94	76.8	54.7	38.7	21.6	14.5	9.33	5.76	4.24	3.37	2.8
50	0.02	139	97.5	79.7	56.8	40.2	22.5	15	9.69	5.99	4.41	3.51	2.91
60	0.017	143	100	82.1	58.5	41.4	23.2	15.5	10	6.18	4.55	3.62	3
80	0.013	150	105	85.9	61.2	43.3	24.2	16.2	10.5	6.48	4.78	3.79	3.15
100	0.01	154	108	88.7	63.2	44.8	25.1	16.8	10.9	6.72	4.95	3.93	3.27
250	0.004	174	122	100	71.6	50.8	28.5	19.1	12.4	7.66	5.65	4.5	3.73

Rainfall intensities (mm/hr) :: RCP6.0 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	68.8	47.9	39.1	27.6	19.3	10.5	6.93	4.42	2.69	1.96	1.55	1.28
2	0.5	75.6	52.7	43	30.4	21.3	11.6	7.67	4.87	2.97	2.17	1.71	1.42
5	0.2	98.5	68.9	56.2	39.8	28	15.3	10.1	6.44	3.93	2.88	2.27	1.88
10	0.1	115	80.7	65.9	46.8	32.9	18.1	11.9	7.61	4.65	3.4	2.69	2.23
20	0.05	132	92.8	75.8	53.9	37.9	20.9	13.8	8.79	5.38	3.94	3.12	2.58
30	0.033	143	99.9	81.7	58.1	40.9	22.6	14.9	9.51	5.83	4.27	3.38	2.79
40	0.025	150	105	85.8	61.1	43	23.8	15.7	10	6.14	4.5	3.56	2.95
50	0.02	155	109	89.1	63.4	44.7	24.7	16.4	10.4	6.39	4.68	3.71	3.07
60	0.017	160	112	91.7	65.3	46.1	25.5	16.9	10.8	6.6	4.84	3.83	3.17
80	0.013	167	117	96	68.4	48.3	26.7	17.7	11.3	6.92	5.07	4.02	3.33
100	0.01	173	121	99.2	70.7	49.9	27.6	18.3	11.7	7.17	5.26	4.17	3.45
250	0.004	195	137	112	80	56.6	31.4	20.9	13.3	8.18	6	4.76	3.94

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	63.4	44.2	36	25.5	17.9	9.87	6.55	4.2	2.58	1.89	1.49	1.24
2	0.5	69.6	48.5	39.6	28	19.7	10.9	7.22	4.63	2.84	2.08	1.65	1.37
5	0.2	90.4	63.2	51.5	36.6	25.8	14.3	9.5	6.09	3.74	2.75	2.18	1.81
10	0.1	106	73.9	60.4	42.9	30.2	16.8	11.2	7.18	4.42	3.25	2.57	2.14
20	0.05	121	84.8	69.3	49.3	34.8	19.4	12.9	8.3	5.11	3.76	2.98	2.47
30	0.033	130	91.3	74.7	53.1	37.5	20.9	13.9	8.97	5.53	4.07	3.23	2.68
40	0.025	137	95.9	78.4	55.8	39.5	22	14.7	9.45	5.83	4.29	3.4	2.83
50	0.02	142	99.6	81.4	58	41	22.9	15.3	9.83	6.06	4.46	3.54	2.94
60	0.017	146	102	83.8	59.7	42.2	23.6	15.8	10.1	6.26	4.61	3.66	3.03
80	0.013	153	107	87.7	62.5	44.2	24.7	16.5	10.6	6.56	4.83	3.83	3.18
100	0.01	158	111	90.6	64.6	45.7	25.6	17.1	11	6.8	5	3.98	3.3
250	0.004	178	125	102	73.1	51.8	29	19.4	12.5	7.76	5.71	4.54	3.77

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	75.3	52.5	42.8	30.3	21.1	11.4	7.4	4.69	2.82	2.04	1.61	1.33
2	0.5	82.9	57.8	47.1	33.4	23.3	12.6	8.21	5.17	3.12	2.27	1.79	1.48
5	0.2	108	75.8	61.8	43.9	30.7	16.6	10.9	6.86	4.15	3.03	2.38	1.97
10	0.1	127	89	72.7	51.6	36.2	19.6	12.9	8.13	4.92	3.59	2.83	2.34
20	0.05	146	102	83.7	59.5	41.8	22.8	14.9	9.4	5.71	4.16	3.29	2.71
30	0.033	157	110	90.2	64.2	45.1	24.6	16.1	10.2	6.19	4.51	3.56	2.94
40	0.025	165	116	94.7	67.4	47.4	25.9	17	10.7	6.52	4.77	3.76	3.1
50	0.02	172	120	98.5	70.1	49.3	26.9	17.7	11.2	6.8	4.96	3.92	3.23
60	0.017	177	124	101	72.2	50.8	27.8	18.3	11.5	7.01	5.12	4.04	3.33
80	0.013	185	130	106	75.6	53.2	29.1	19.1	12.1	7.36	5.37	4.24	3.5
100	0.01	191	134	110	78.2	55.1	30.2	19.8	12.5	7.63	5.57	4.4	3.63
250	0.004	215	151	124	88.5	62.4	34.3	22.6	14.3	8.7	6.36	5.03	4.15

HIRDS V4 Depth-Duration-Frequency Results
Sitename: Thorpe Road
Coordinate system: WGS84
Longitude: 173.7976
Latitude: -35.4176
DDF Model

Parameters:	c	d	e	f	g	h	i
Values:	0.00228788	0.50126823	-0.00280378	-0.00468173		0.25281537	-0.01167968	3.142624

Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Depth (mm)
	24	100	3.17805383	4.600149227	246.2544906

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.6	13.4	16.4	23.2	32.7	54.8	73.6	95.3	118	130	138	143
2	0.5	10.5	14.7	17.9	25.4	35.8	60.2	80.8	105	130	143	152	158
5	0.2	13.6	19	23.2	33	46.6	78.6	106	137	170	188	199	207
10	0.1	15.8	22.2	27.2	38.6	54.6	92.2	124	161	200	222	235	244
20	0.05	18.1	25.4	31.1	44.3	62.8	106	143	186	231	256	272	283
30	0.033	19.5	27.3	33.5	47.7	67.7	114	154	201	250	277	294	306
40	0.025	20.5	28.7	35.2	50.1	71.1	120	163	212	263	292	310	323
50	0.02	21.2	29.8	36.5	52	73.8	125	169	220	274	304	323	336
60	0.017	21.8	30.6	37.6	53.6	76.1	129	174	227	283	313	333	346
80	0.013	22.8	32	39.3	56	79.6	135	182	238	296	328	349	363
100	0.01	23.6	33.1	40.6	57.9	82.3	140	189	246	307	340	362	376
250	0.004	26.6	37.4	45.9	65.5	93.3	159	215	281	350	389	413	430

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	0.9	1.2	1.3	1.7	2.4	4.6	6.3	5.1	8.9	9.1	9.5	12
2	0.5	0.96	1.3	1.4	1.9	2.7	5.1	6.9	5.5	9.8	10	11	14
5	0.2	1.4	1.9	2.1	2.8	4	7.2	9.6	8.2	14	15	15	19
10	0.1	1.8	2.5	3	3.8	5.5	9.5	13	11	17	19	20	24
20	0.05	2.5	3.4	4.1	5.1	7.5	13	17	15	22	24	25	29
30	0.033	2.9	4.1	4.9	6	8.9	15	20	18	26	28	30	33
40	0.025	3.3	4.6	5.6	6.8	10	17	22	20	28	31	33	36
50	0.02	3.6	5	6.1	7.5	11	19	25	22	31	33	36	39
60	0.017	3.8	5.4	6.6	8.1	12	20	27	24	33	36	38	41
80	0.013	4.3	6	7.4	9.1	13	23	30	26	36	39	42	45
100	0.01	4.6	6.6	8.1	9.9	15	25	33	29	39	42	46	49
250	0.004	6.5	9.2	12	14	21	37	48	40	54	58	63	65

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.3	14.3	17.5	24.8	34.8	57.9	77.1	99.2	122	134	142	147
2	0.5	11.3	15.7	19.2	27.2	38.3	63.7	84.9	109	134	148	156	162
5	0.2	14.6	20.4	25	35.5	50	83.4	111	143	177	195	206	214
10	0.1	17.1	23.9	29.3	41.5	58.7	98.1	131	169	208	230	243	253
20	0.05	19.6	27.4	33.6	47.8	67.5	113	151	195	241	266	282	293
30	0.033	21	29.5	36.2	51.4	72.8	122	163	211	261	288	305	317
40	0.025	22.1	31	38	54.1	76.5	129	172	222	275	304	322	334
50	0.02	22.9	32.1	39.4	56.1	79.5	133	179	231	286	316	335	347
60	0.017	23.6	33.1	40.6	57.8	81.9	138	184	238	295	326	345	359
80	0.013	24.6	34.6	42.4	60.5	85.7	144	193	250	309	342	362	376
100	0.01	25.4	35.7	43.9	62.5	88.7	149	200	259	320	354	376	390
250	0.004	28.7	40.4	49.6	70.8	100	169	228	295	366	404	429	446

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.3	14.3	17.5	24.8	34.8	57.9	77.1	99.2	122	134	142	147
2	0.5	11.3	15.7	19.2	27.2	38.3	63.7	84.9	109	134	148	156	162
5	0.2	14.6	20.4	25	35.5	50	83.4	111	143	177	195	206	214
10	0.1	17.1	23.9	29.3	41.5	58.7	98.1	131	169	208	230	243	253
20	0.05	19.6	27.4	33.6	47.8	67.5	113	151	195	241	266	282	293
30	0.033	21	29.5	36.2	51.4	72.8	122	163	211	261	288	305	317
40	0.025	22.1	31	38	54.1	76.5	129	172	222	275	304	322	334
50	0.02	22.9	32.1	39.4	56.1	79.5	133	179	231	286	316	335	347
60	0.017	23.6	33.1	40.6	57.8	81.9	138	184	238	295	326	345	359
80	0.013	24.6	34.6	42.4	60.5	85.7	144	193	250	309	342	362	376
100	0.01	25.4	35.7	43.9	62.5	88.7	149	200	259	320	354	376	390
250	0.004	28.7	40.4	49.6	70.8	100	169	228	295	366	404	429	446

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.4	14.6	17.8	25.2	35.4	58.6	77.9	100	123	135	143	148
2	0.5	11.5	16	19.5	27.7	38.9	64.6	85.9	110	135	149	157	163
5	0.2	14.9	20.8	25.4	36.1	50.9	84.7	113	145	178	197	208	216
10	0.1	17.4	24.3	29.8	42.3	59.7	99.6	133	171	211	232	246	255
20	0.05	19.9	27.9	34.2	48.6	68.7	115	153	197	244	269	285	295
30	0.033	21.4	30	36.8	52.4	74.1	124	166	213	263	291	308	319
40	0.025	22.5	31.6	38.7	55.1	77.9	131	175	225	278	307	325	337
50	0.02	23.3	32.7	40.2	57.2	81	136	181	234	289	319	338	350
60	0.017	24	33.7	41.4	58.9	83.4	140	187	241	298	329	349	362
80	0.013	25.1	35.2	43.2	61.6	87.3	146	196	253	313	345	366	380
100	0.01	25.9	36.4	44.7	63.7	90.3	152	203	262	324	358	379	393
250	0.004	29.2	41.1	50.5	72.1	102	172	231	298	369	408	433	450

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11	15.3	18.7	26.5	37.1	61.1	80.7	103	126	138	146	151
2	0.5	12.1	16.8	20.6	29.1	40.9	67.3	89.1	114	139	153	161	167
5	0.2	15.7	21.9	26.8	38.1	53.6	88.5	117	150	184	202	213	221
10	0.1	18.4	25.7	31.5	44.7	63	104	138	177	217	239	252	261
20	0.05	21.1	29.5	36.2	51.4	72.5	120	160	205	251	277	292	303
30	0.033	22.7	31.8	38.9	55.4	78.2	130	173	221	272	299	317	328
40	0.025	23.8	33.4	40.9	58.2	82.2	137	182	233	287	316	334	346
50	0.02	24.7	34.6	42.5	60.5	85.5	142	189	242	298	329	348	360
60	0.017	25.4	35.7	43.7	62.3	88	147	195	250	308	339	359	371
80	0.013	26.6	37.3	45.8	65.2	92.2	154	205	262	323	356	376	390
100	0.01	27.4	38.5	47.3	67.4	95.3	159	212	272	335	369	390	404
250	0.004	30.9	43.5	53.4	76.3	108	181	241	310	382	421	446	462

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.4	14.5	17.7	25	35.2	58.3	77.6	99.8	122	135	142	148
2	0.5	11.4	15.9	19.4	27.5	38.7	64.2	85.5	110	135	148	157	163
5	0.2	14.8	20.6	25.3	35.8	50.5	84.2	112	144	178	196	207	215
10	0.1	17.3	24.1	29.6	42	59.3	99	132	170	210	231	245	254
20	0.05	19.8	27.7	34	48.3	68.3	114	153	197	243	268	283	294
30	0.033	21.3	29.8	36.6	52	73.6	123	165	212	262	290	307	318
40	0.025	22.3	31.3	38.4	54.7	77.4	130	174	224	276	305	323	336
50	0.02	23.2	32.5	39.9	56.8	80.4	135	180	233	288	318	337	349
60	0.017	23.8	33.5	41	58.5	82.8	139	186	240	297	328	347	360
80	0.013	24.9	35	42.9	61.2	86.7	145	195	252	311	344	364	378
100	0.01	25.7	36.1	44.4	63.2	89.6	151	202	261	322	356	378	392
250	0.004	29	40.8	50.1	71.6	102	171	230	297	368	407	432	448

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.5	16	19.5	27.6	38.6	63.2	83.2	106	129	141	148	154
2	0.5	12.6	17.6	21.5	30.4	42.7	69.8	92	117	142	156	164	170
5	0.2	16.4	23	28.1	39.8	56	92	122	155	189	207	218	225
10	0.1	19.2	26.9	33	46.8	65.8	108	143	183	223	245	258	267
20	0.05	22.1	30.9	37.9	53.9	75.9	125	166	211	258	284	300	310
30	0.033	23.8	33.3	40.8	58.1	81.9	135	179	228	280	307	324	335
40	0.025	24.9	35	42.9	61.1	86.1	143	189	241	295	324	342	354
50	0.02	25.9	36.3	44.6	63.4	89.5	148	196	250	307	337	356	368
60	0.017	26.6	37.4	45.9	65.3	92.2	153	203	258	317	348	368	380
80	0.013	27.9	39.1	48	68.4	96.6	160	212	271	332	365	385	399
100	0.01	28.8	40.4	49.6	70.7	99.9	166	220	281	344	379	400	414
250	0.004	32.4	45.6	56.1	80	113	188	250	320	393	432	457	473

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.6	14.7	18	25.5	35.8	59.2	78.6	101	124	136	143	149
2	0.5	11.6	16.2	19.8	28	39.4	65.2	86.7	111	136	150	158	164
5	0.2	15.1	21.1	25.8	36.6	51.5	85.6	114	146	180	198	209	217
10	0.1	17.6	24.6	30.2	42.9	60.5	101	134	172	212	234	247	256
20	0.05	20.2	28.3	34.7	49.3	69.6	116	155	199	245	271	286	297
30	0.033	21.7	30.4	37.3	53.1	75.1	125	167	215	265	293	310	321
40	0.025	22.8	32	39.2	55.8	78.9	132	176	227	280	309	327	339
50	0.02	23.7	33.2	40.7	58	82	137	183	236	291	321	340	353
60	0.017	24.3	34.2	41.9	59.7	84.5	141	189	243	300	332	351	364
80	0.013	25.4	35.7	43.8	62.5	88.4	148	198	255	315	348	368	382
100	0.01	26.3	36.9	45.3	64.6	91.5	153	205	264	326	360	382	396
250	0.004	29.6	41.7	51.2	73.1	104	174	233	301	372	411	436	453

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	12.5	17.5	21.4	30.3	42.1	68.1	88.8	112	135	147	155	160
2	0.5	13.8	19.3	23.6	33.4	46.6	75.4	98.5	124	150	163	172	177
5	0.2	18.1	25.3	30.9	43.9	61.4	99.8	131	165	199	218	229	236
10	0.1	21.2	29.7	36.3	51.6	72.4	118	155	195	236	259	272	280
20	0.05	24.4	34.1	41.8	59.5	83.5	137	179	226	274	300	316	325
30	0.033	26.2	36.8	45.1	64.2	90.2	148	194	244	297	325	342	352
40	0.025	27.5	38.6	47.4	67.4	94.8	156	204	258	313	343	361	372
50	0.02	28.6	40.1	49.2	70.1	98.6	162	212	268	326	357	376	388
60	0.017	29.4	41.3	50.7	72.2	102	167	219	277	336	369	388	400
80	0.013	30.8	43.3	53.1	75.6	106	175	230	290	353	387	407	420
100	0.01	31.8	44.7	54.9	78.2	110	181	238	301	366	401	422	436
250	0.004	35.9	50.5	62	88.5	125	206	271	343	418	458	483	498

Project: Pond1
Simulation Run: Pre Dev 50 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 08 May 2025, 00:30

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW A & B	0
RoW E, F, G CHo - 77	0

Downstream

Element Name	Downstream
RoW A & B	Site Discharge
RoW E, F, G CHo - 77	Site Discharge

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW A & B	0	74	5
RoW E, F, G CHo - 77	0	74	5

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW A & B	10	Standard
RoW E, F, G CHo - 77	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW A & B	0	0.02	01Jan2000, 12:20	52.47
RoW E, F, G CHo - 77	0	0	01Jan2000, 12:20	52.47
Site Discharge	0	0.02	01Jan2000, 12:20	52.47

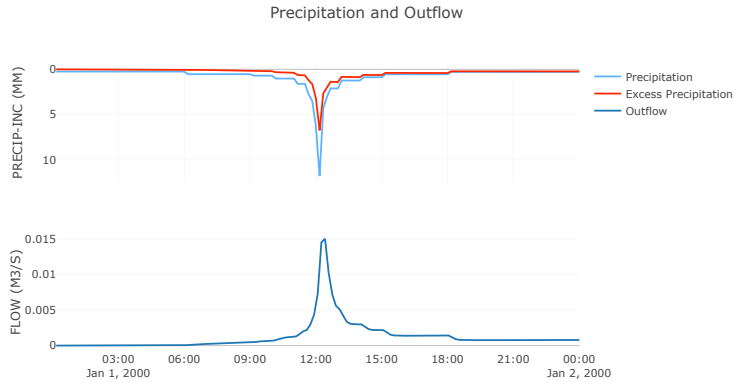
Subbasin: RoW A & B

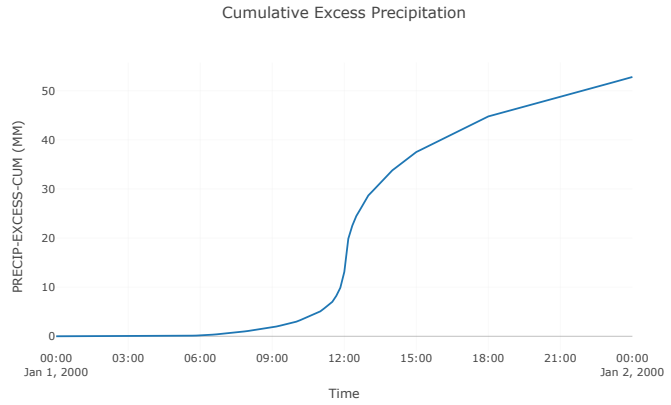
Area (KM2) : 0
Downstream : Site Discharge

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

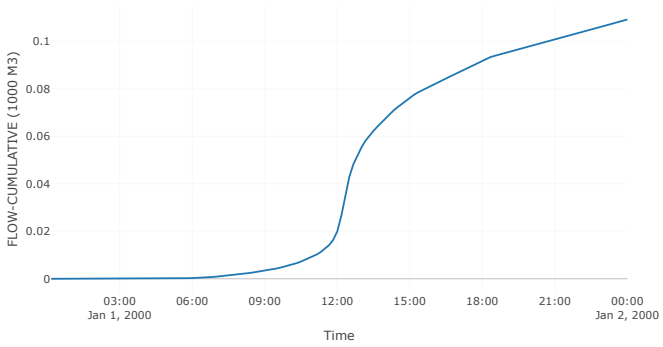
Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW A & B	
Peak Discharge (M3/S)	0.02
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	52.47
Precipitation Volume (M3)	218.28
Loss Volume (M3)	108.46
Excess Volume (M3)	109.82
Direct Runoff Volume (M3)	109.15
Baseflow Volume (M3)	0

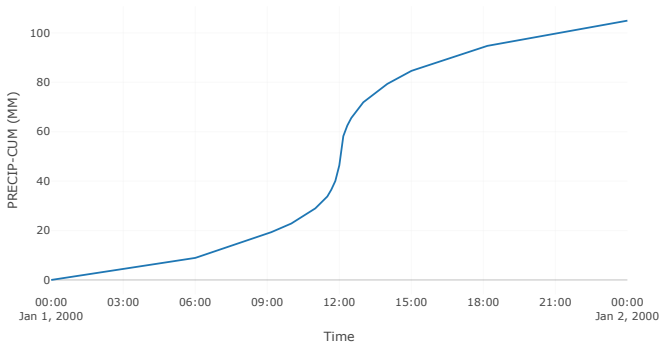


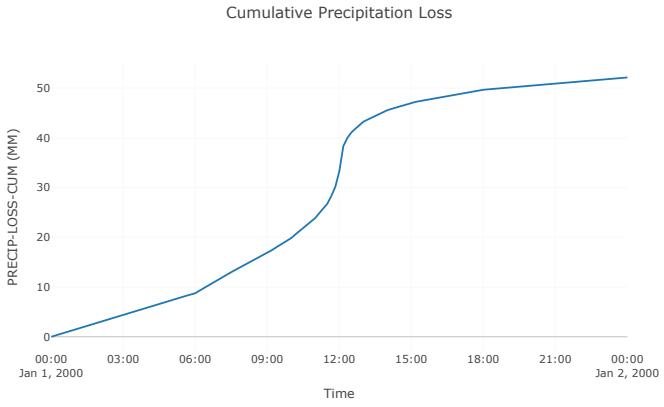


Cumulative Outflow



Cumulative Precipitation

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PRECIP-LOSS-CUM (MM)
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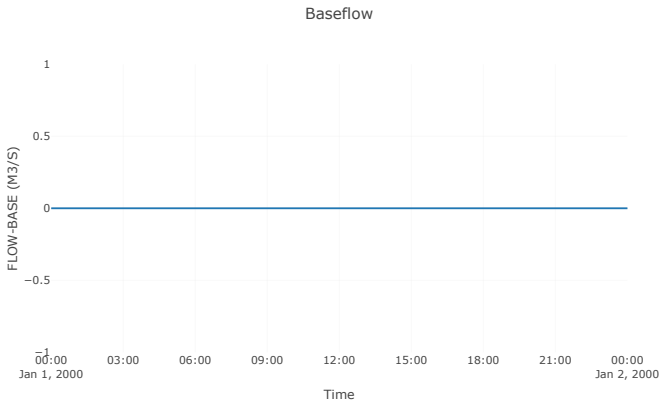
40
30
20
10
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
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−0.5
−1
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Jan 1, 2000
03:00
06:00
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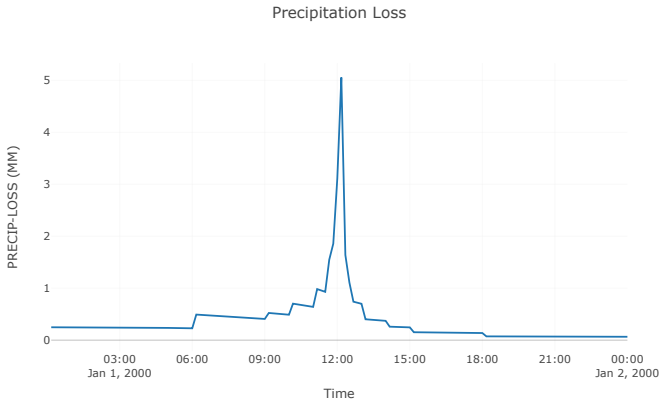
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
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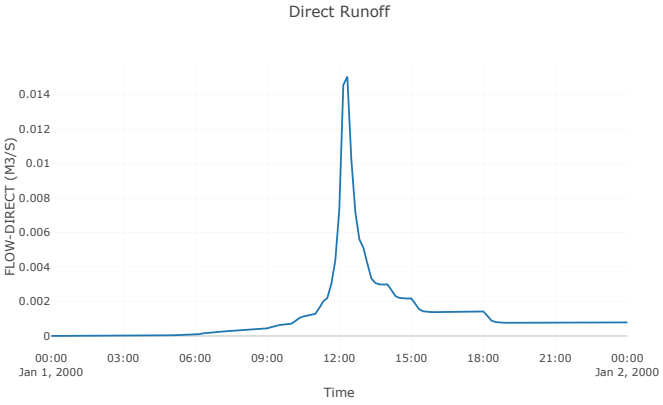
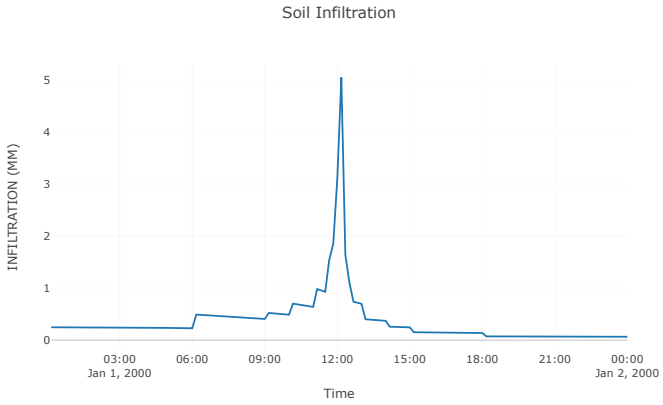
4
3
2
1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Direct Runoff
FLOW-DIRECT (M3/S)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Soil Infiltration
INFILTRATION (MM)
0
1
2
3
4
5
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

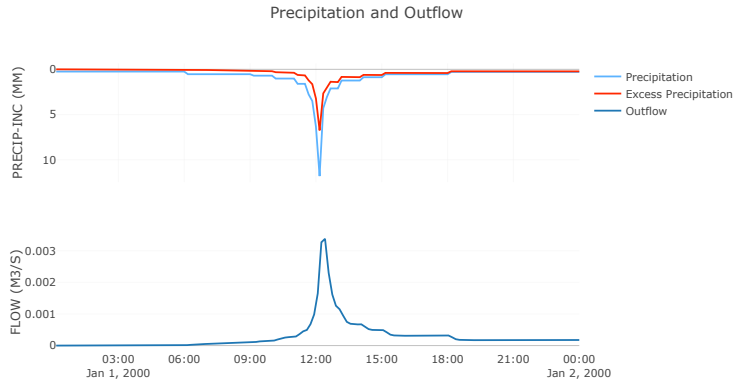
Subbasin: RoW E, F, G CHo-77

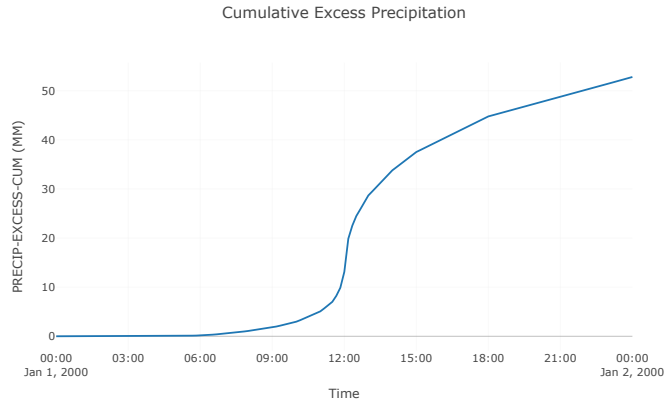
Area (KM2) : 0
Downstream : Site Discharge

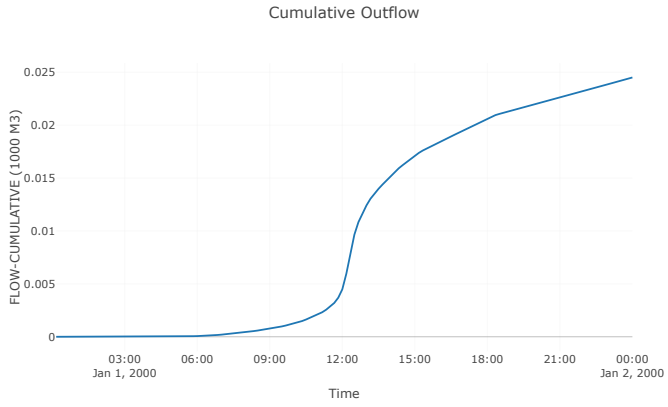
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

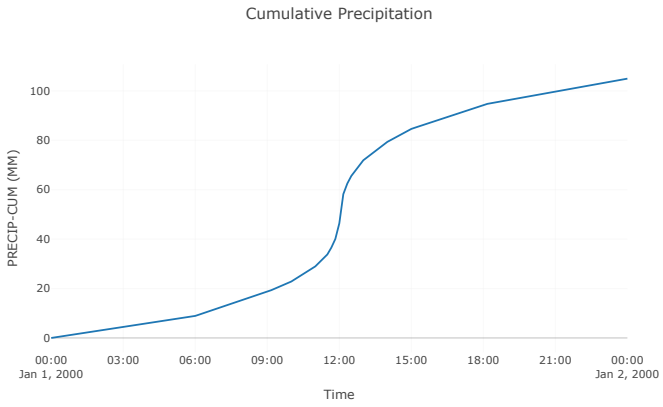
Transform: Scs	
Lag	10
Unitgraph Type	Standard

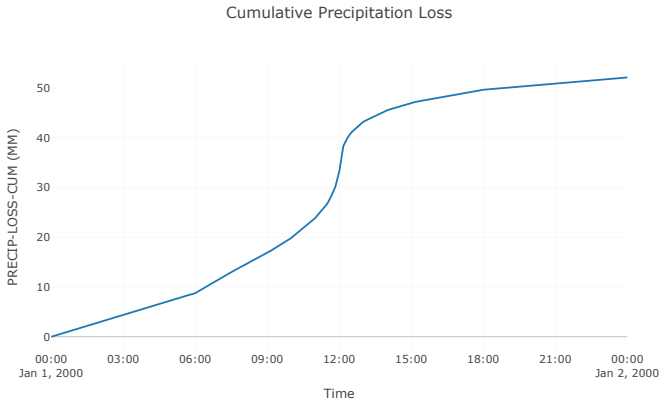
Results: RoW E, F, G CHo-77	
Peak Discharge (M3/S)	0
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	52.47
Precipitation Volume (M3)	49.01
Loss Volume (M3)	24.35
Excess Volume (M3)	24.66
Direct Runoff Volume (M3)	24.51
Baseflow Volume (M3)	0

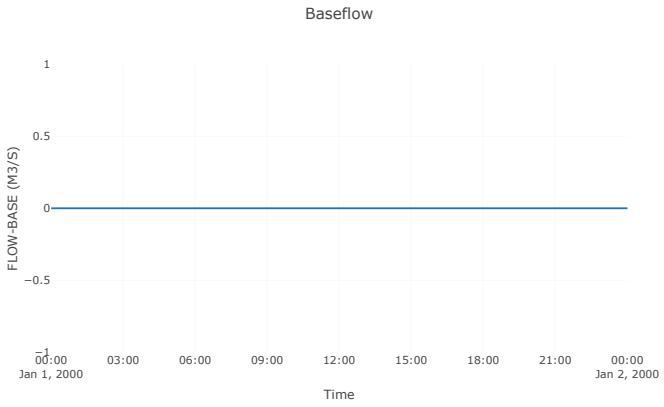


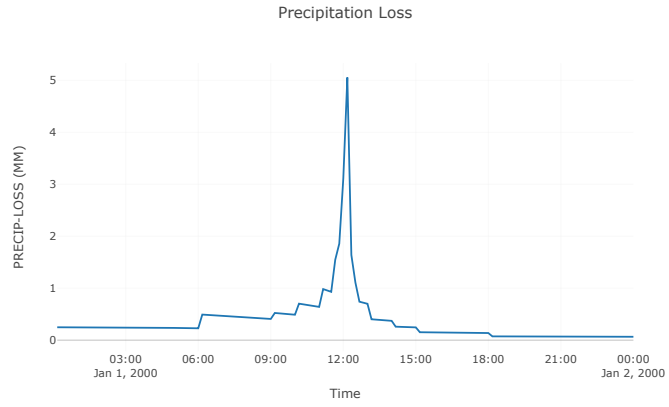


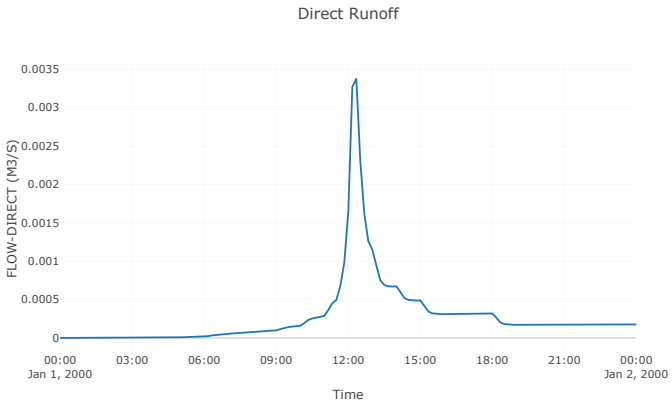

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.025
0.02
0.015
0.01
0.005
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

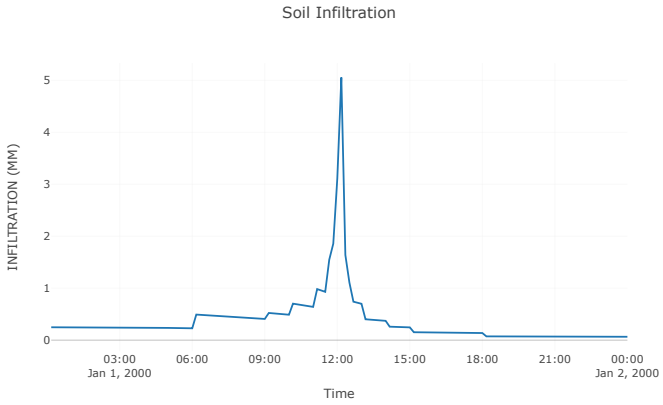

Cumulative Precipitation
PRECIP-CUM (MM)
100
80
60
40
20
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
50
40
30
20
10
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

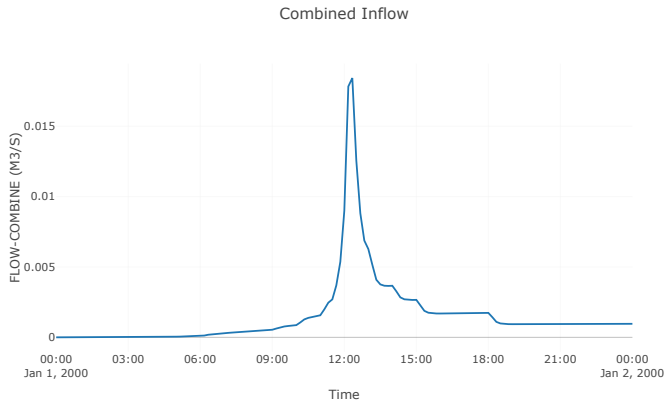

Precipitation Loss
PRECIP-LOSS (MM)
5
4
3
2
1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

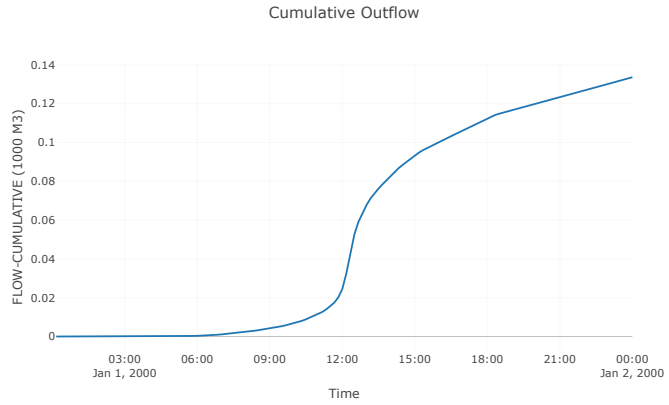

Direct Runoff
FLOW-DIRECT (M3/S)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

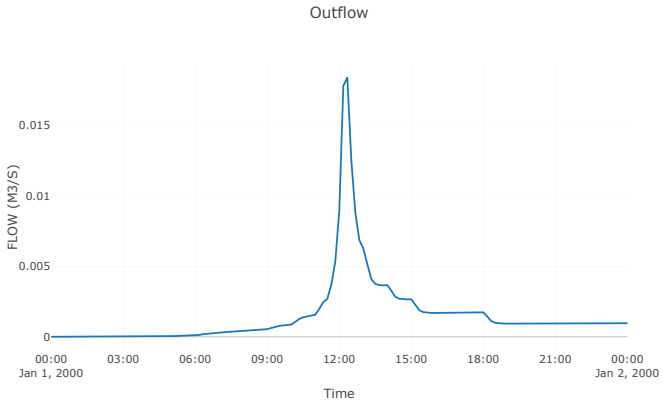

Soil Infiltration
INFILTRATION (MM)
0
1
2
3
4
5
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.02
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	52.47






Outflow
FLOW (M3/S)
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Project: Pond1
Simulation Run: Post Dev Att 50 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 08 May 2025, 01:06

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW A & B	0
RoW E, F, G CHo - 77	0

Downstream

Element Name	Downstream
RoW A & B	Pond 1
RoW E, F, G CHo - 77	Pond 1

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW A & B	0	92	0
RoW E, F, G CHo - 77	0	89	0

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW A & B	10	Standard
RoW E, F, G CHo - 77	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW A & B	0	0.03	01Jan2000, 12:10	101.65
RoW E, F, G CHo - 77	0	0.01	01Jan2000, 12:10	95.42
Pond 1	0	0.01	01Jan2000, 12:50	100.3
Site Discharge	0	0.01	01Jan2000, 12:50	100.3

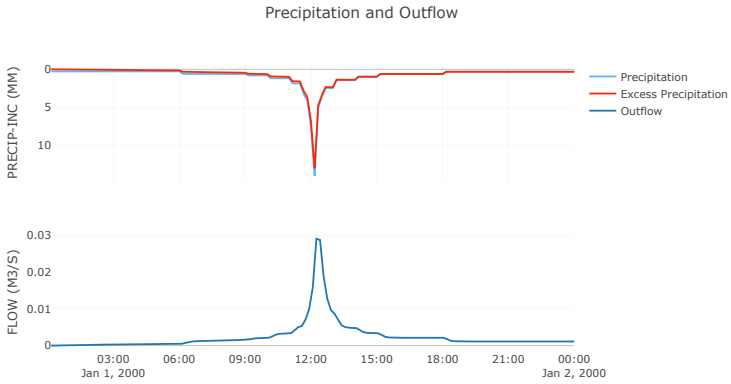
Subbasin: RoW A & B

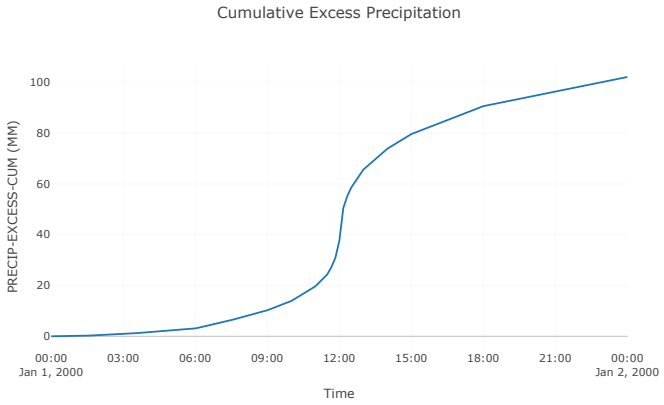
Area (KM2) : 0
Downstream : Pond 1

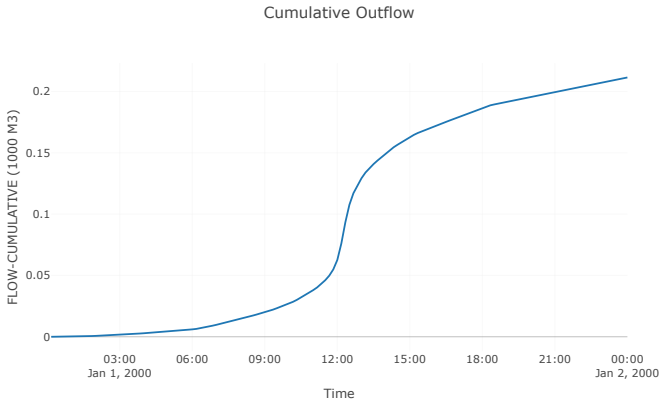
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	92
Initial Abstraction	0

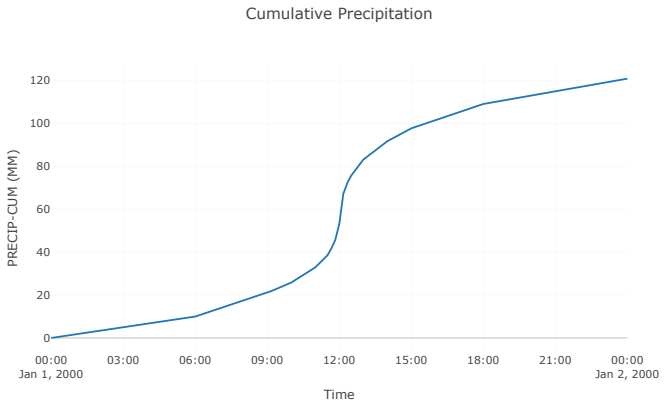
Transform: Scs	
Lag	10
Unitgraph Type	Standard

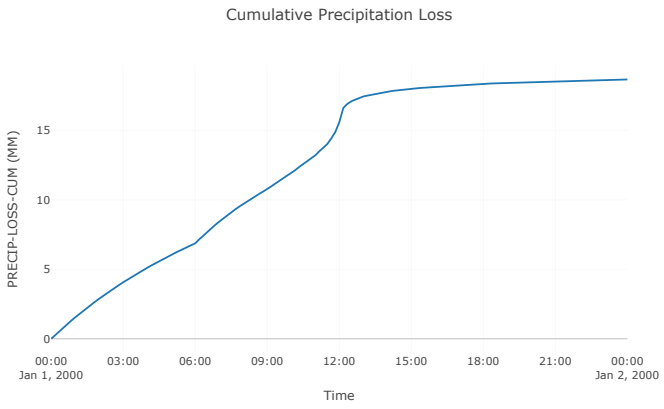
Results: RoW A & B	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	101.65
Precipitation Volume (M3)	251.23
Loss Volume (M3)	38.84
Excess Volume (M3)	212.39
Direct Runoff Volume (M3)	211.44
Baseflow Volume (M3)	0

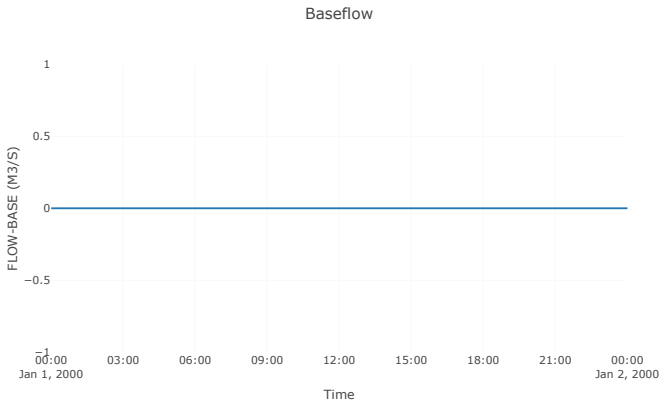


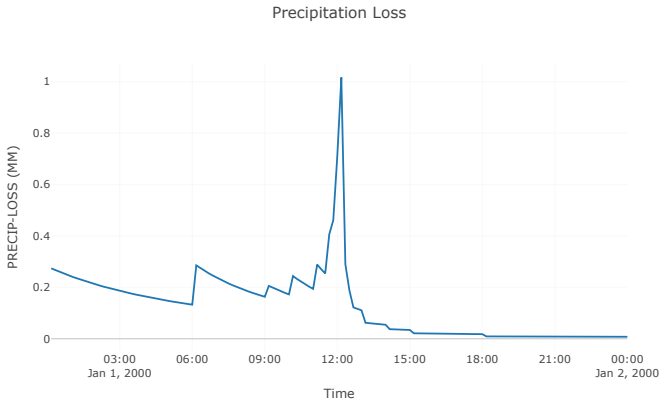


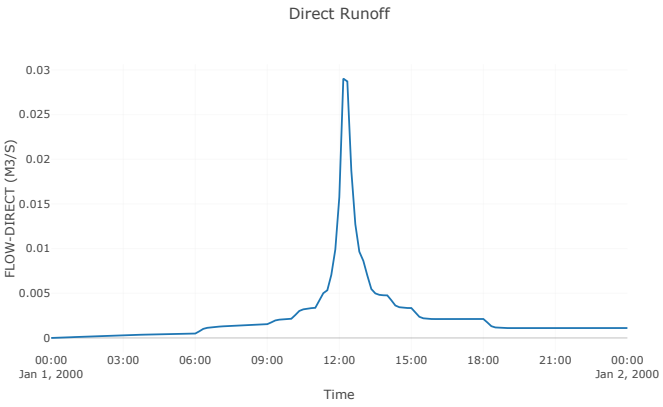

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.2
0.15
0.1
0.05
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

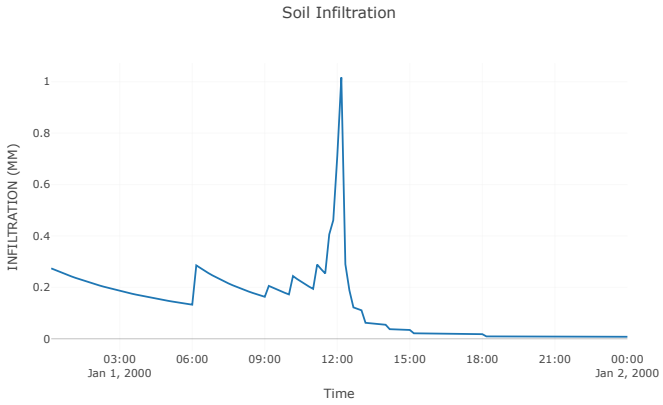

Cumulative Precipitation
PRECIP-CUM (MM)
120
100
80
60
40
20
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Direct Runoff
FLOW-DIRECT (M3/S)
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Soil Infiltration
INFILTRATION (MM)
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

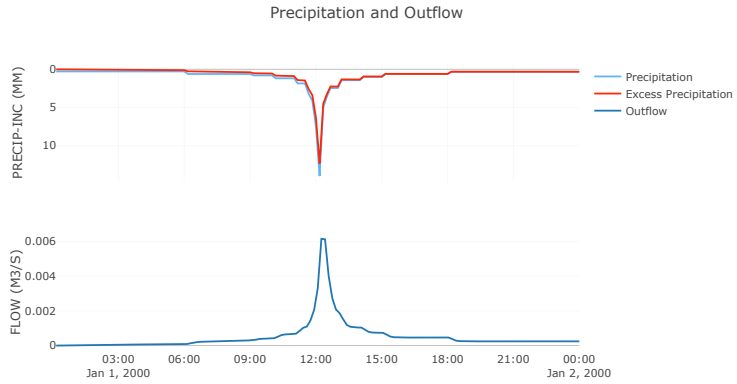
Subbasin: RoW E, F, G CHo-77

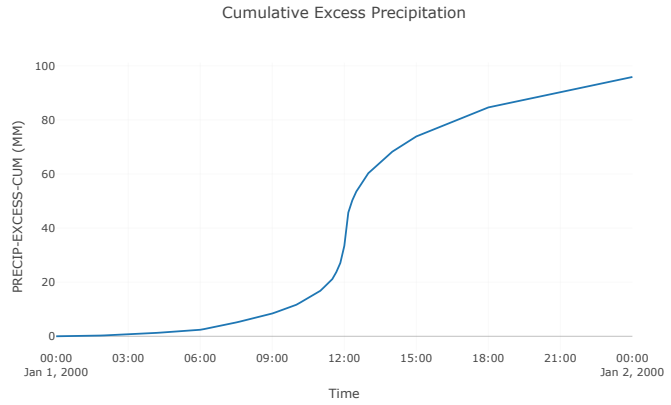
Area (KM2) : 0
Downstream : Pond 1

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	89
Initial Abstraction	0

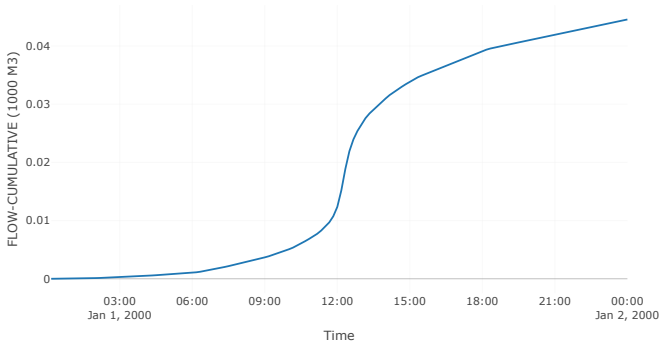
Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW E, F, G CHo-77	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	95.42
Precipitation Volume (M3)	56.41
Loss Volume (M3)	11.64
Excess Volume (M3)	44.77
Direct Runoff Volume (M3)	44.56
Baseflow Volume (M3)	0

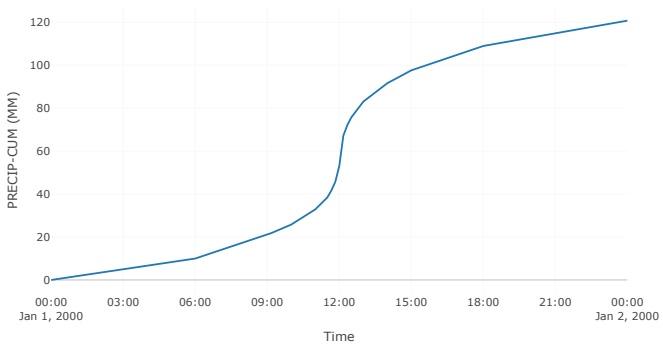


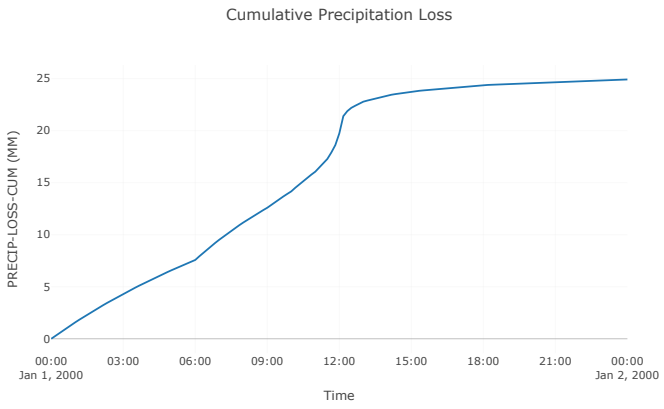


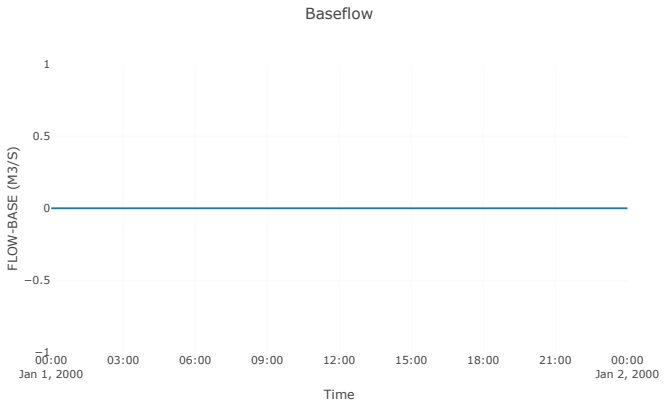
Cumulative Outflow

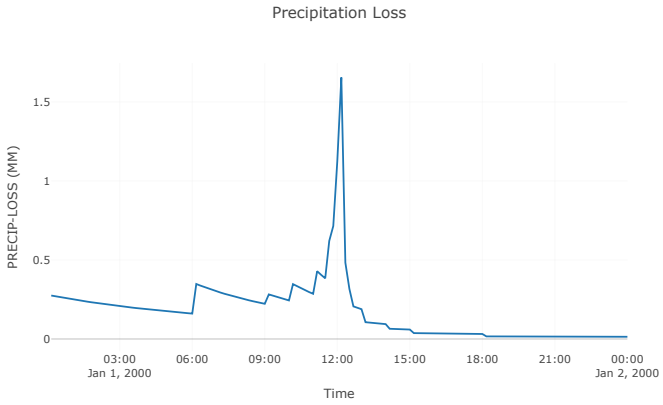


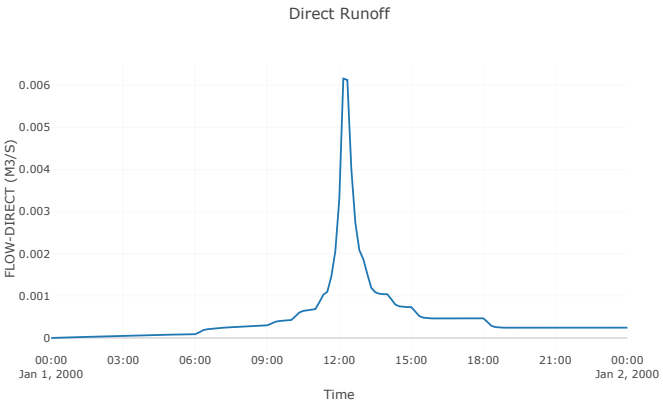
Cumulative Precipitation

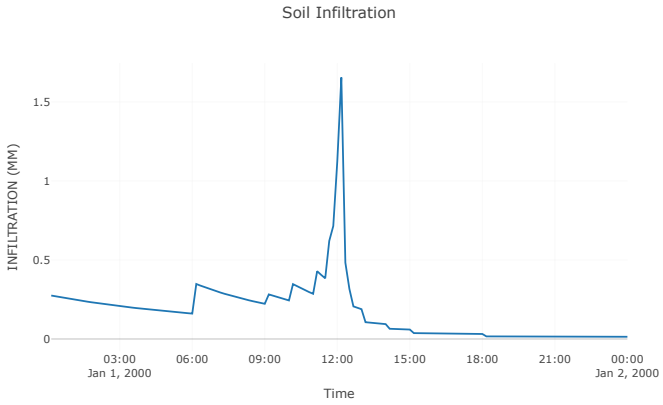



Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
25
20
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
1.5
1
0.5
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

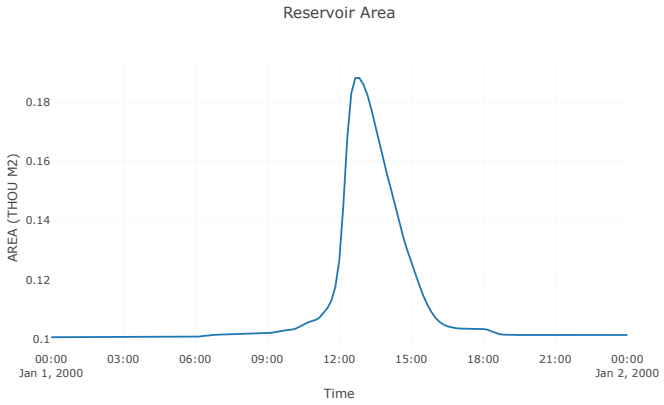

Direct Runoff
FLOW-DIRECT (M3/S)
0.006
0.005
0.004
0.003
0.002
0.001
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

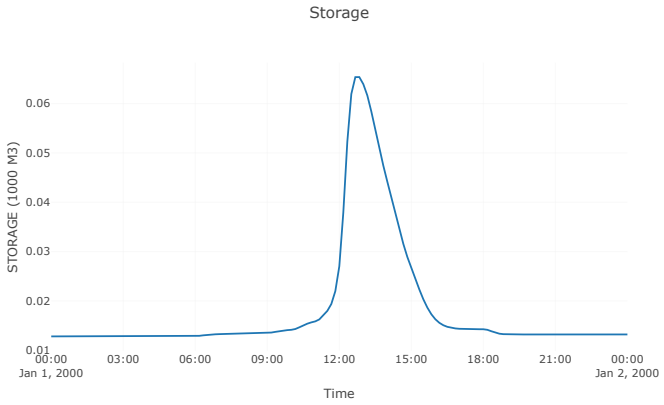

Soil Infiltration
INFILTRATION (MM)
1.5
1
0.5
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

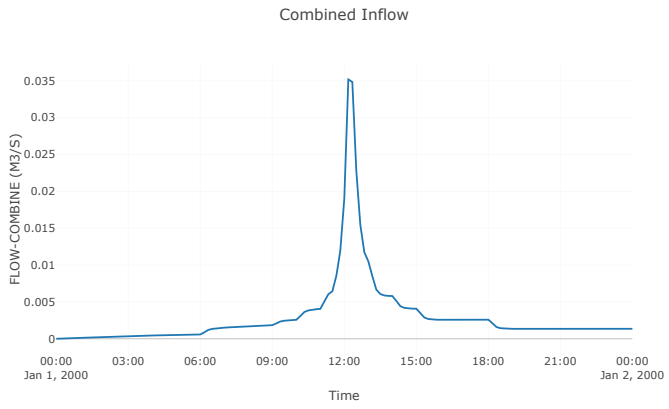
Reservoir: Pond 1

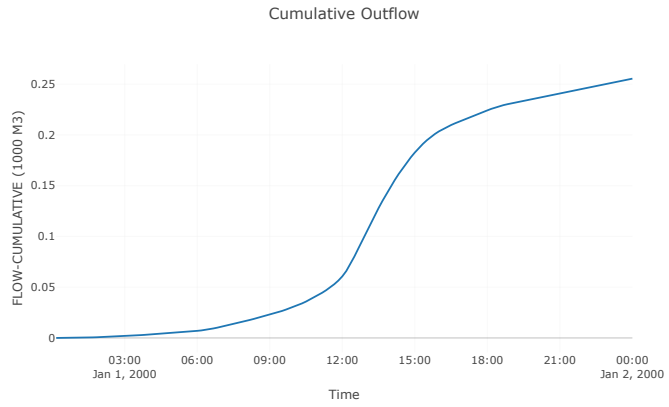
Downstream : Site Discharge

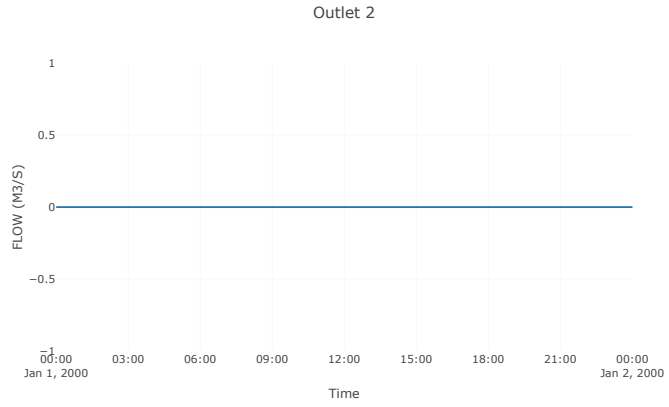
Results: Pond 1	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:50
Volume (MM)	100.3
Peak Inflow (M3/S)	0.04
Time of Peak Inflow	01Jan2000, 12:10
Inflow Volume (M3)	256
Maximum Storage (M3)	65.36
Peak Elevation (M)	0.57
Discharge Volume (M3)	255.46

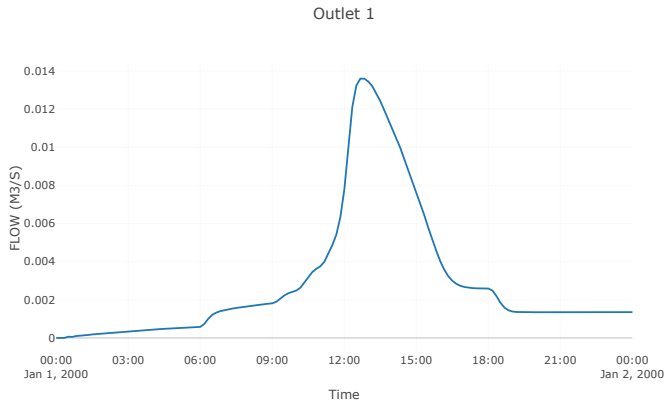


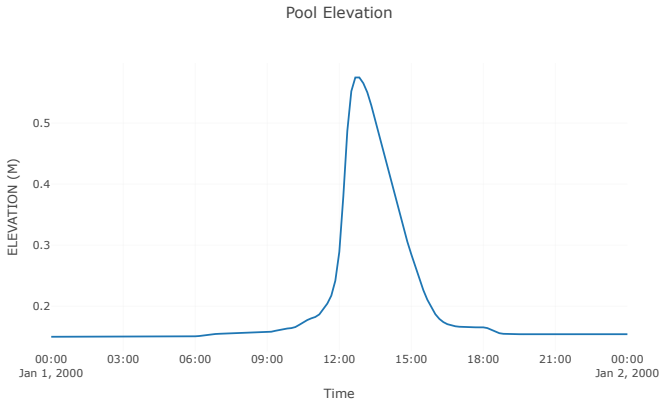


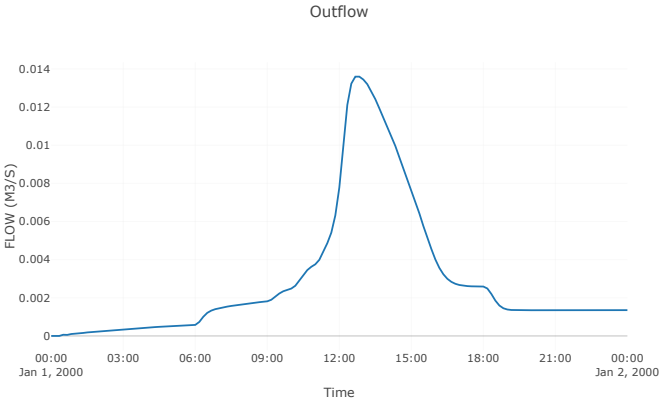

Combined Inflow
FLOW-COMBINE (M3/S)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.25
0.2
0.15
0.1
0.05
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Outlet 2
1
0.5
0
−0.5
−1
FLOW (M3/S)
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

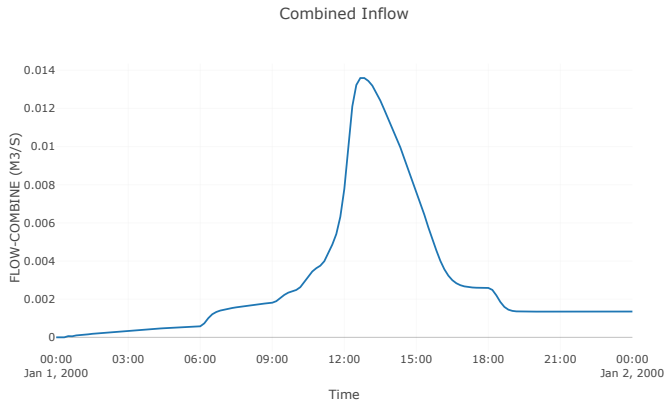

Outlet 1
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
FLOW (M3/S)
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

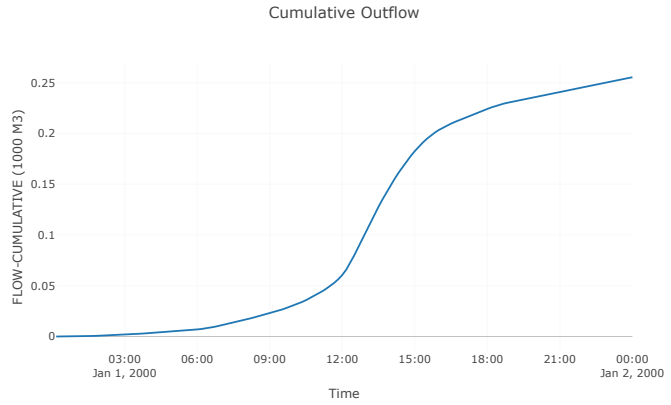

Pool Elevation
ELEVATION (M)
0.5
0.4
0.3
0.2
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

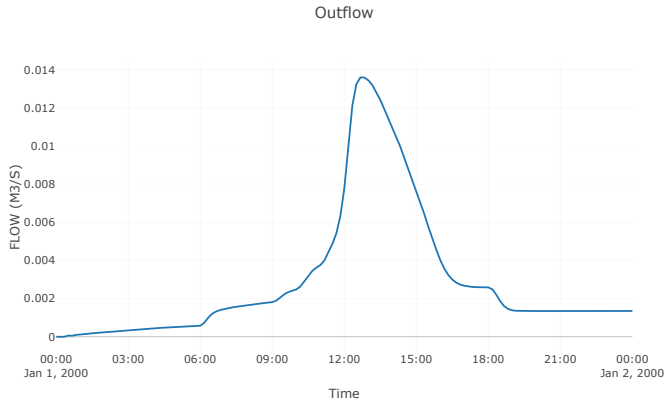

Outflow
FLOW (M3/S)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:50
Volume (MM)	100.3






Outflow
FLOW (M3/S)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Project: Pond1
Simulation Run: Pre Dev, 20 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 08 May 2025, 01:06

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW A & B	0
RoW E, F, G CHo - 77	0

Downstream

Element Name	Downstream
RoW A & B	Site Discharge
RoW E, F, G CHo - 77	Site Discharge

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW A & B	0	74	5
RoW E, F, G CHo - 77	0	74	5

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW A & B	10	Standard
RoW E, F, G CHo - 77	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW A & B	0	0.03	01Jan2000, 12:20	120.48
RoW E, F, G CHo - 77	0	0.01	01Jan2000, 12:20	120.48
Site Discharge	0	0.04	01Jan2000, 12:20	120.48

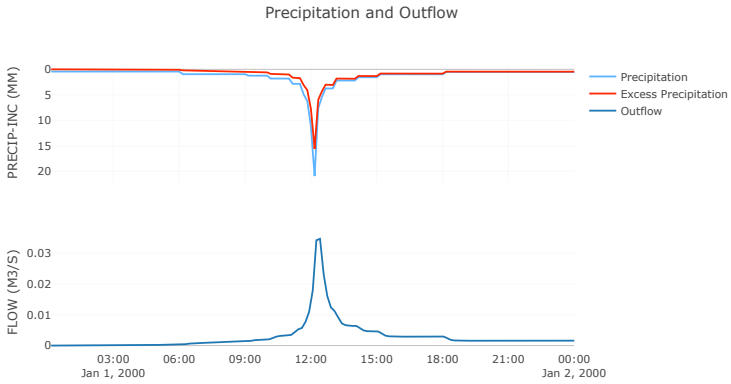
Subbasin: RoW A & B

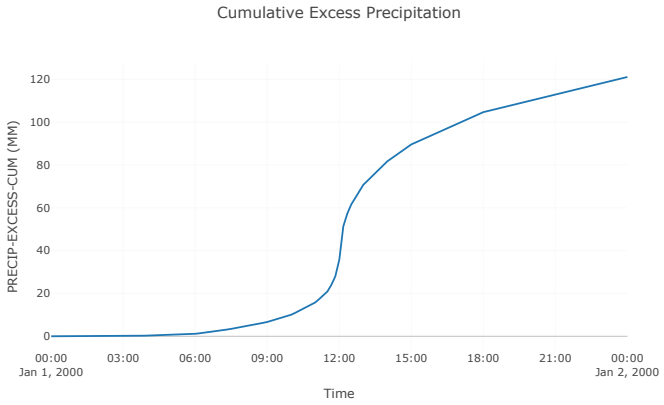
Area (KM2) : 0
Downstream : Site Discharge

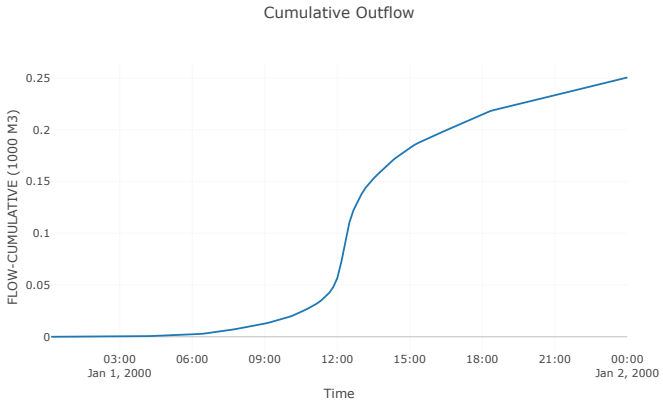
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

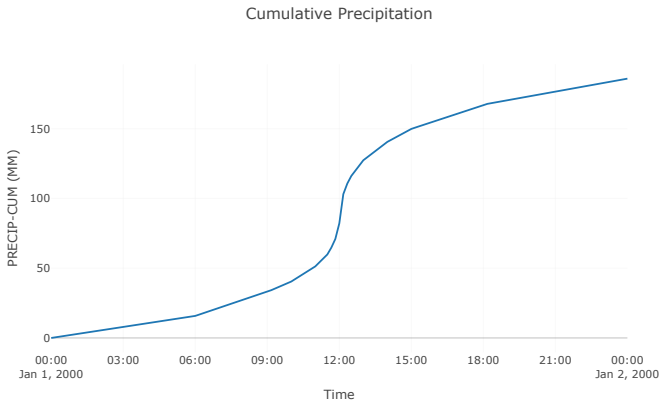
Transform: Scs	
Lag	10
Unitgraph Type	Standard

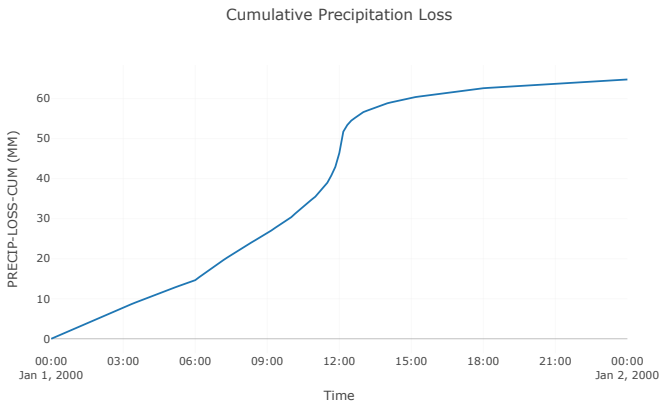
Results: RoW A & B	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	120.48
Precipitation Volume (M3)	386.67
Loss Volume (M3)	134.7
Excess Volume (M3)	251.97
Direct Runoff Volume (M3)	250.6
Baseflow Volume (M3)	0

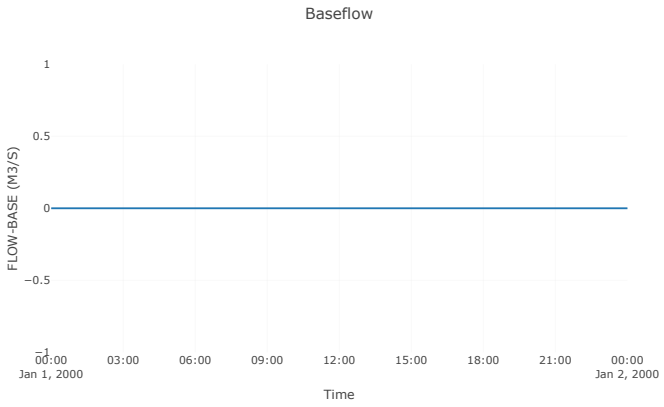


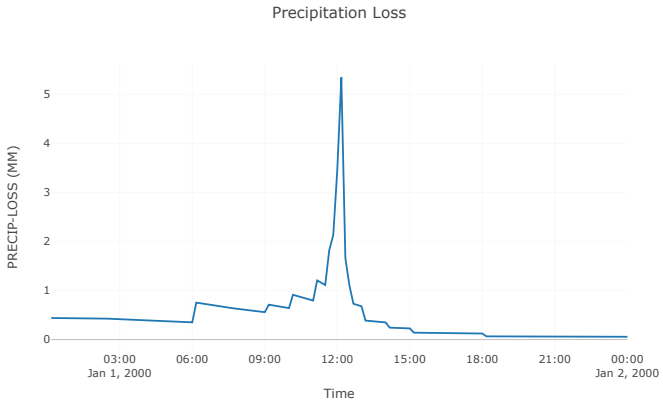


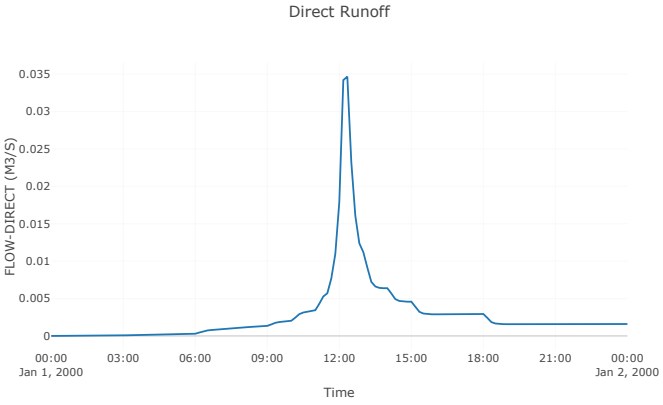

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.25
0.2
0.15
0.1
0.05
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

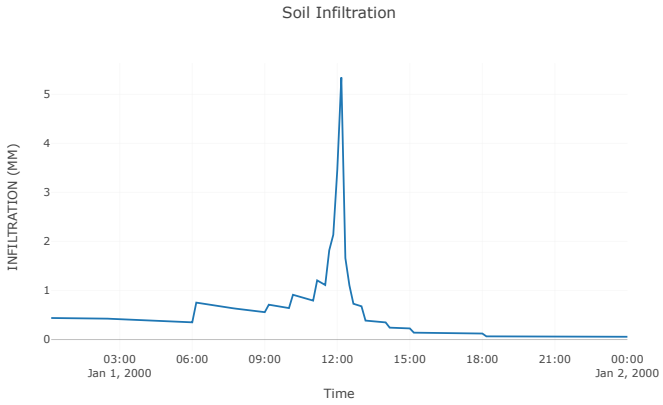

Cumulative Precipitation
PRECIP-CUM (MM)
150
100
50
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
60
50
40
30
20
10
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
5
4
3
2
1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Direct Runoff
FLOW-DIRECT (M3/S)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Soil Infiltration
INFILTRATION (MM)
0
1
2
3
4
5
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

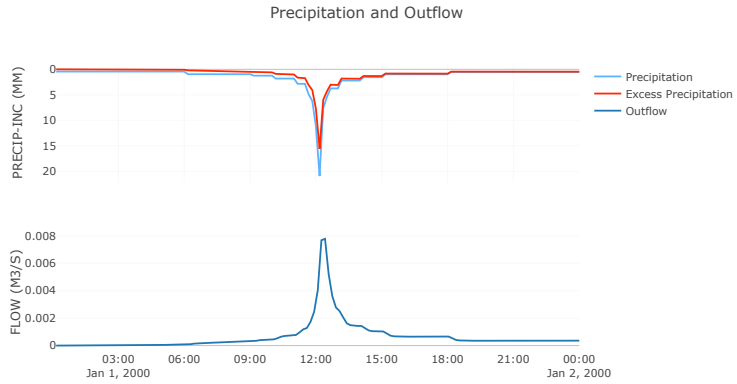
Subbasin: RoW E, F, G CHo-77

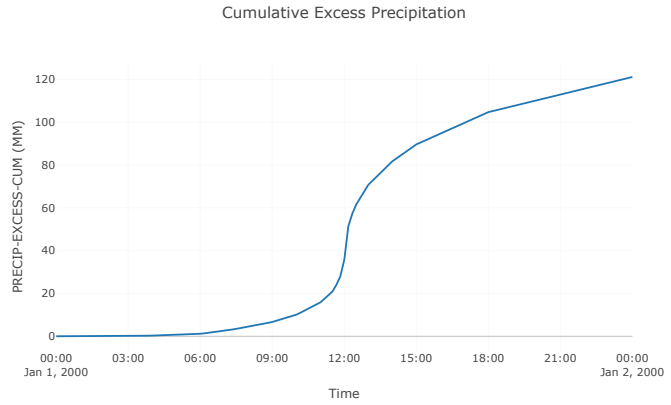
Area (KM2) : 0
Downstream : Site Discharge

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

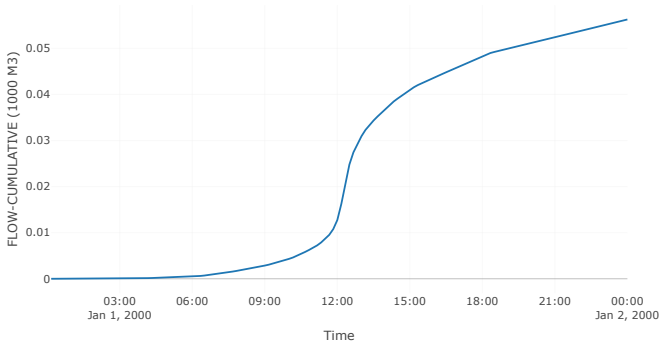
Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW E, F, G CHo-77	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	120.48
Precipitation Volume (M3)	86.81
Loss Volume (M3)	30.24
Excess Volume (M3)	56.57
Direct Runoff Volume (M3)	56.26
Baseflow Volume (M3)	0

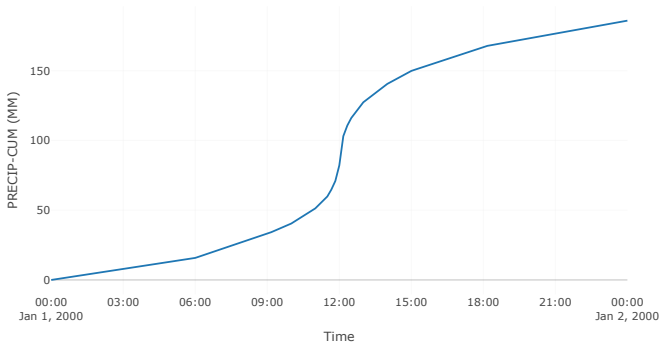


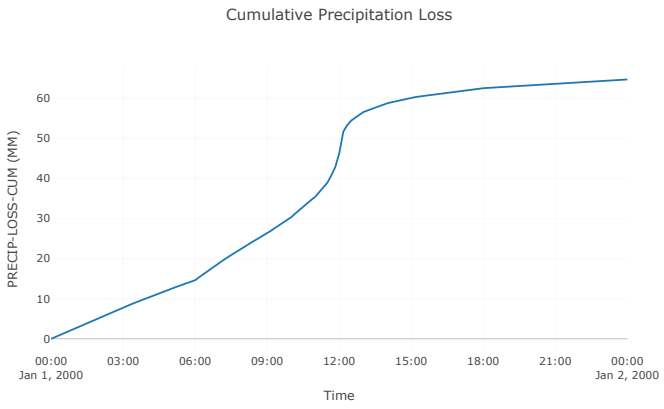


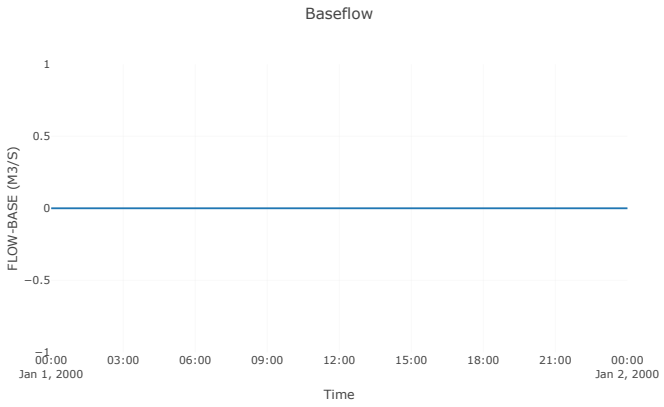
Cumulative Outflow

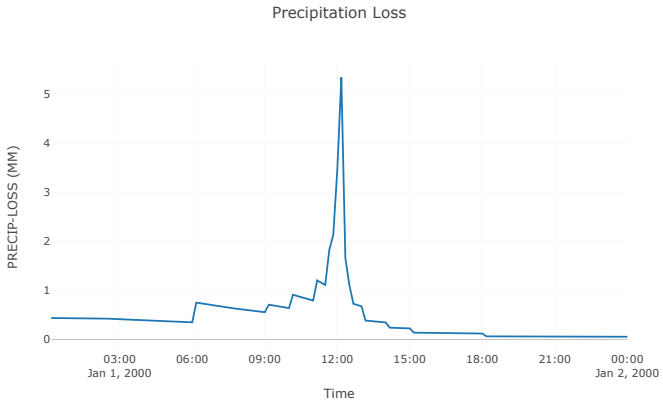


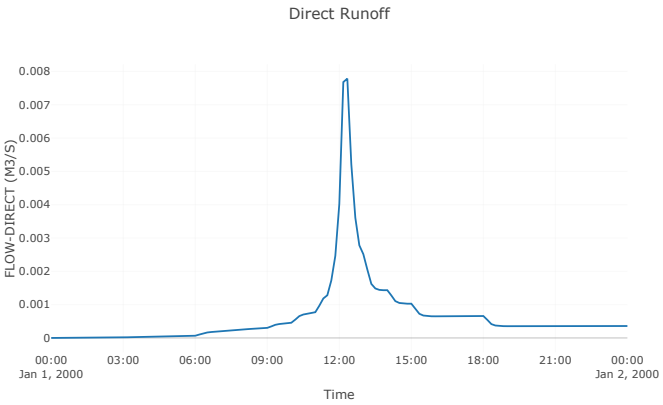
Cumulative Precipitation

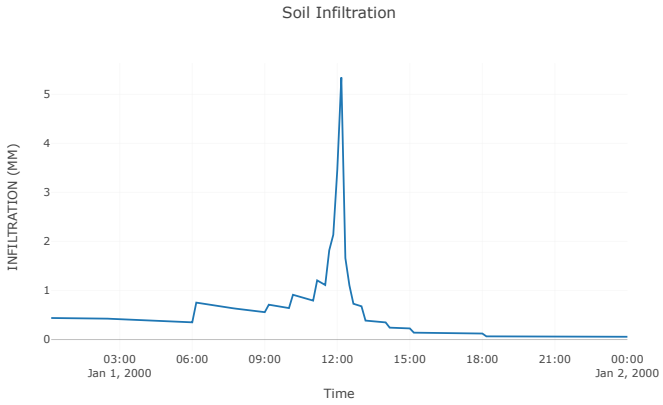



Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
60
50
40
30
20
10
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

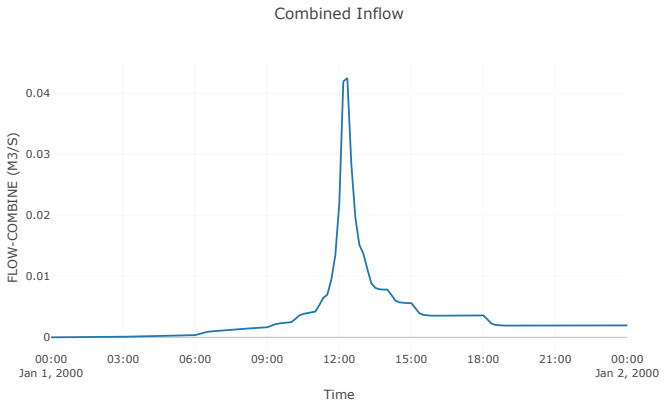

Precipitation Loss
PRECIP-LOSS (MM)
0
1
2
3
4
5
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

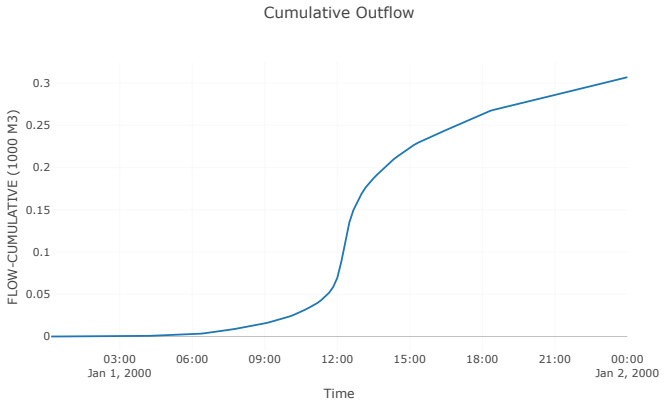

Direct Runoff
FLOW-DIRECT (M3/S)
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

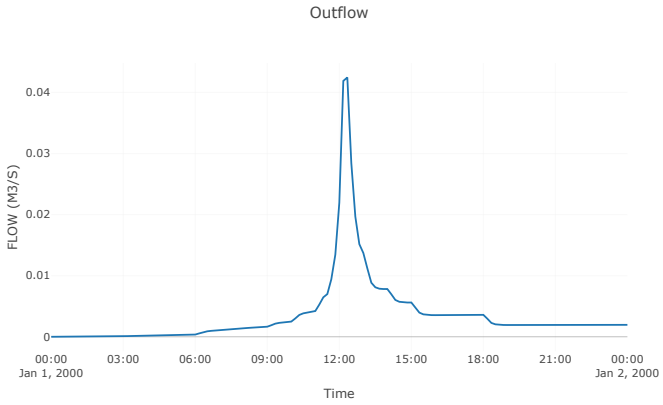

Soil Infiltration
INFILTRATION (MM)
0
1
2
3
4
5
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.04
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	120.48






Outflow
FLOW (M3/S)
0.04
0.03
0.02
0.01
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Project: Pond1
Simulation Run: Post Dev Att 20 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 08 May 2025, 01:06

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW A & B	0
RoW E, F, G CHo - 77	0

Downstream

Element Name	Downstream
RoW A & B	Pond 1
RoW E, F, G CHo - 77	Pond 1

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW A & B	0	92	0
RoW E, F, G CHo - 77	0	89	0

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW A & B	10	Standard
RoW E, F, G CHo - 77	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW A & B	0	0.06	01Jan2000, 12:10	196.72
RoW E, F, G CHo - 77	0	0.01	01Jan2000, 12:10	189.34
Pond 1	0	0.03	01Jan2000, 12:40	195.26
Site Discharge	0	0.03	01Jan2000, 12:40	195.26

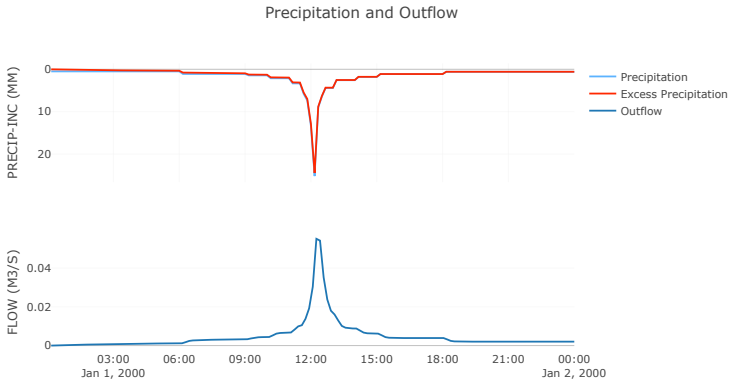
Subbasin: RoW A & B

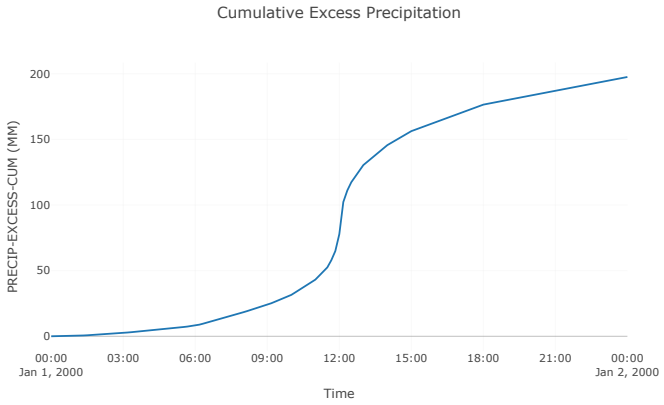
Area (KM2) : 0
Downstream : Pond 1

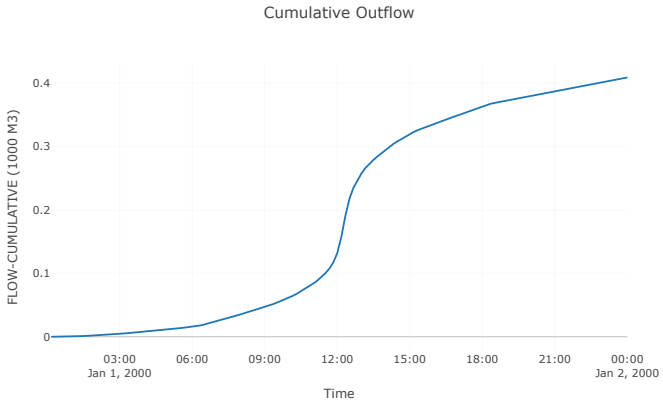
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	92
Initial Abstraction	0

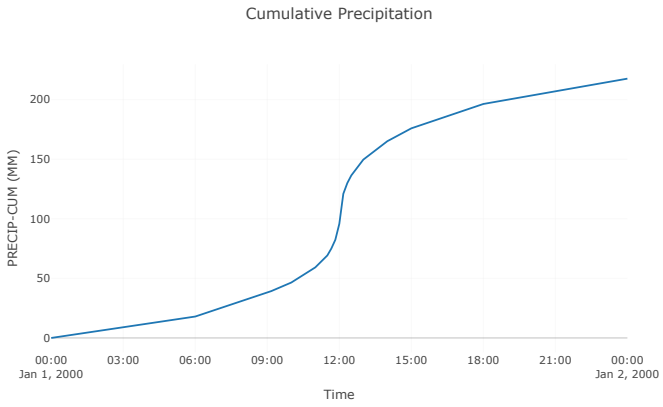
Transform: Scs	
Lag	10
Unitgraph Type	Standard

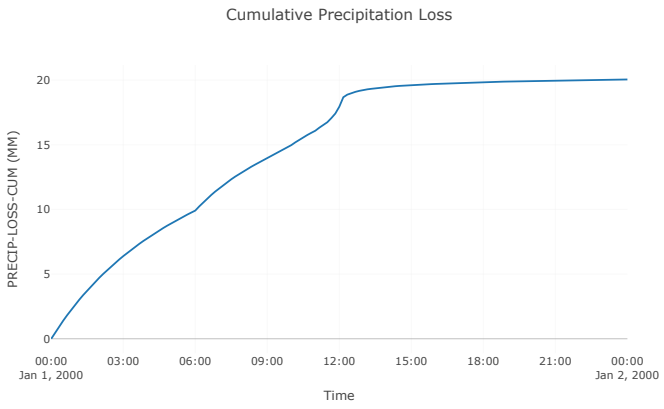
Results: RoW A & B	
Peak Discharge (M3/S)	0.06
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	196.72
Precipitation Volume (M3)	452.62
Loss Volume (M3)	41.71
Excess Volume (M3)	410.91
Direct Runoff Volume (M3)	409.17
Baseflow Volume (M3)	0

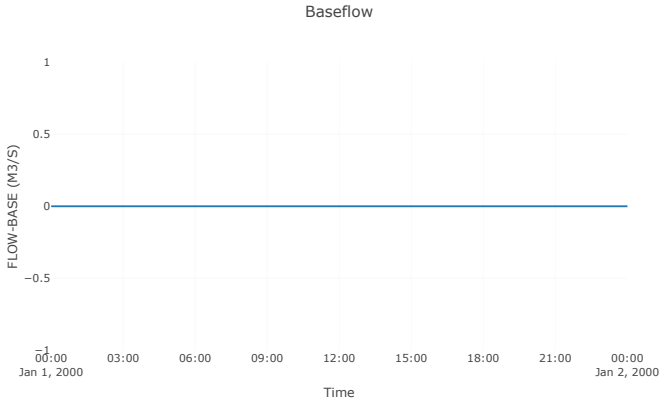




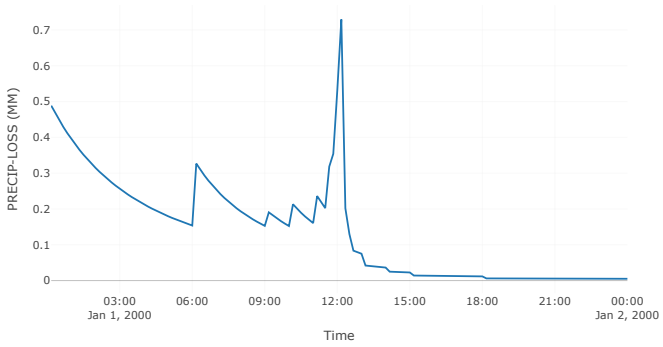

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.4
0.3
0.2
0.1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation
PRECIP-CUM (MM)
200
150
100
50
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

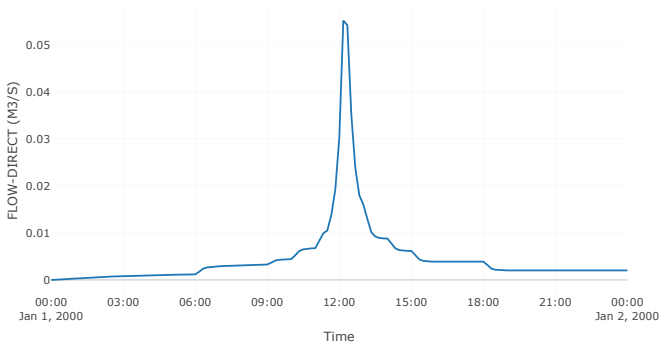

Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
20
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

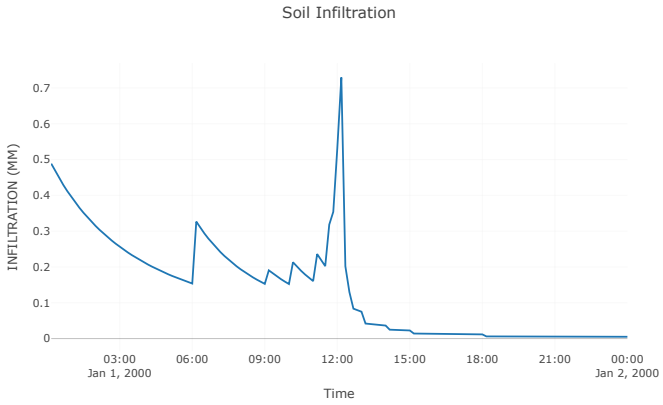

Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Precipitation Loss



Direct Runoff




Soil Infiltration
INFILTRATION (MM)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

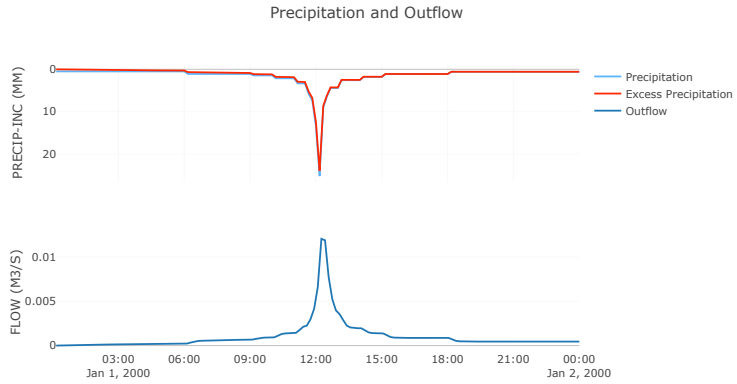
Subbasin: RoW E, F, G CHo-77

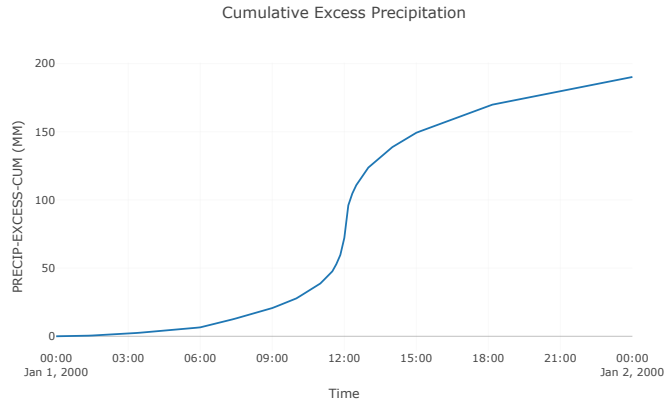
Area (KM2) : 0
Downstream : Pond 1

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	89
Initial Abstraction	0

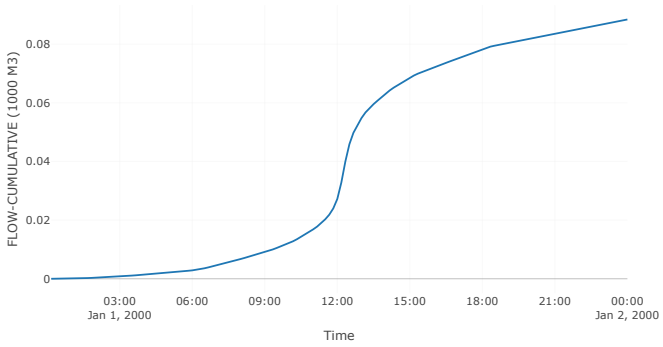
Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW E, F, G CHo-77	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	189.34
Precipitation Volume (M3)	101.62
Loss Volume (M3)	12.81
Excess Volume (M3)	88.81
Direct Runoff Volume (M3)	88.42
Baseflow Volume (M3)	0

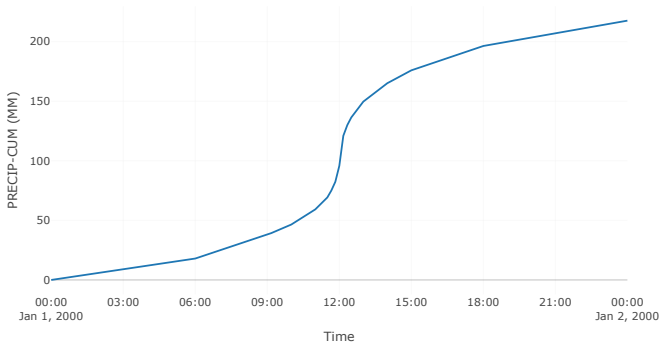


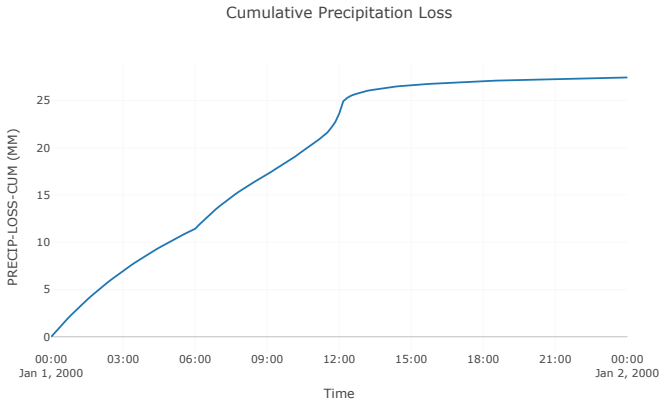


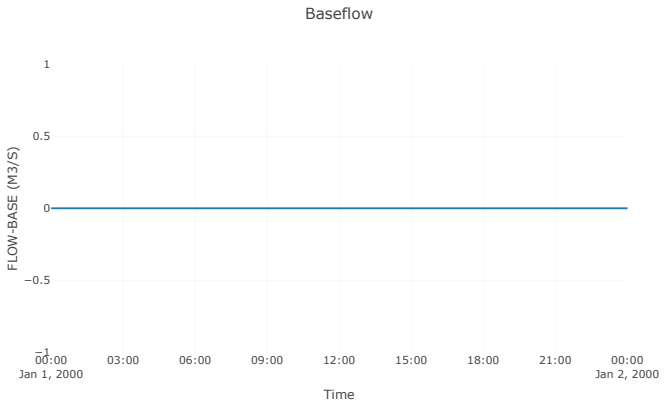
Cumulative Outflow



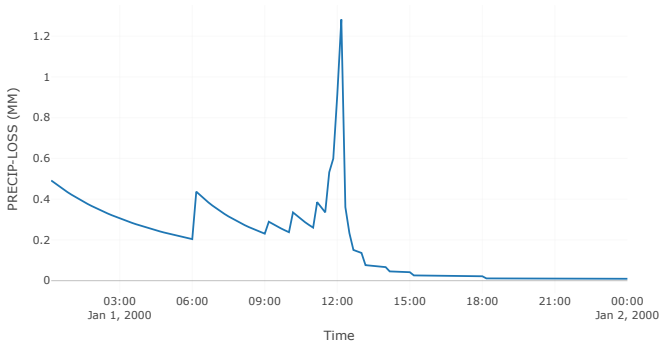
Cumulative Precipitation



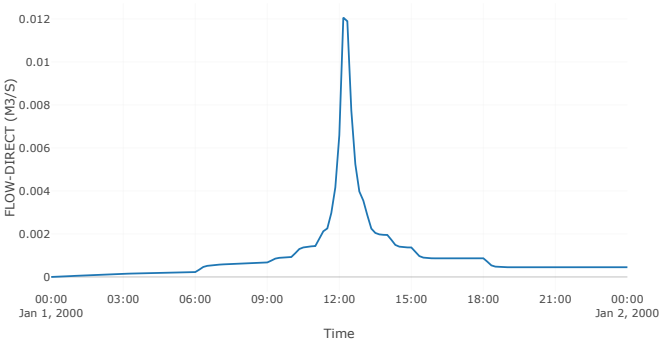

Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
25
20
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

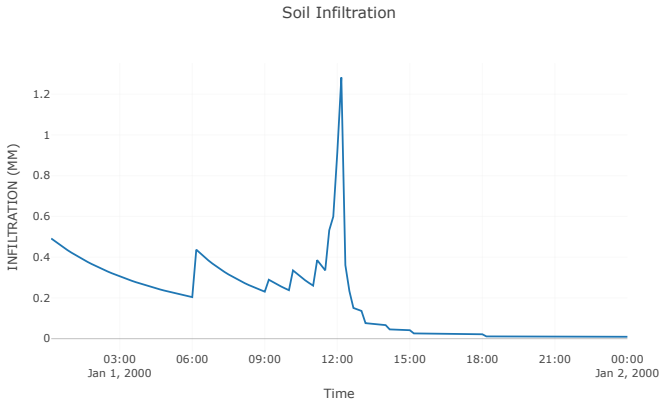

Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Precipitation Loss



Direct Runoff

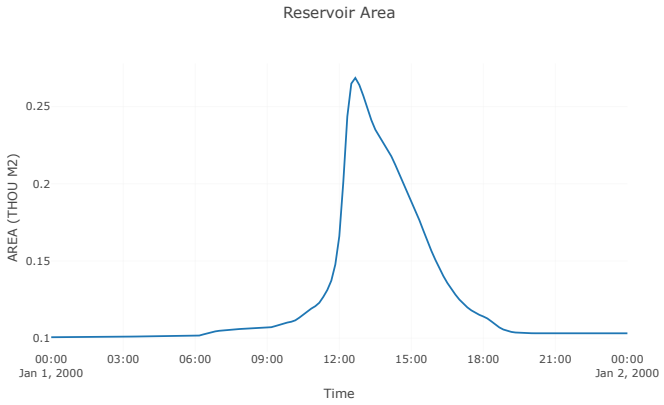


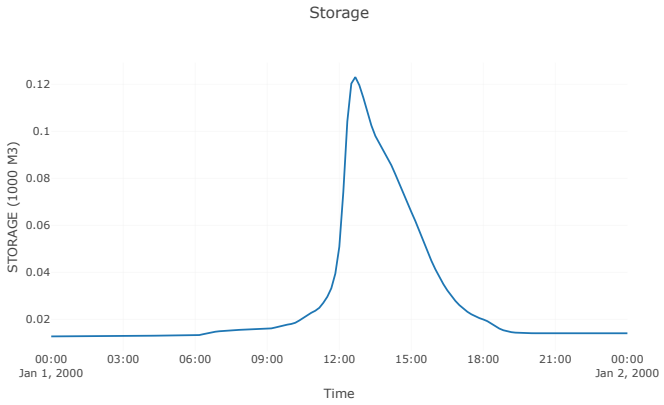

Soil Infiltration
INFILTRATION (MM)
1.2
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

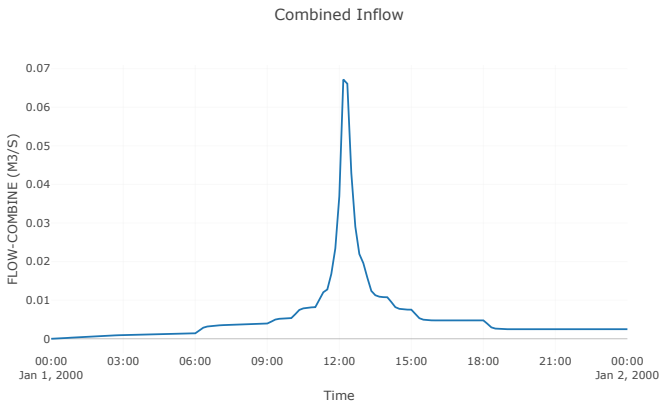
Reservoir: Pond 1

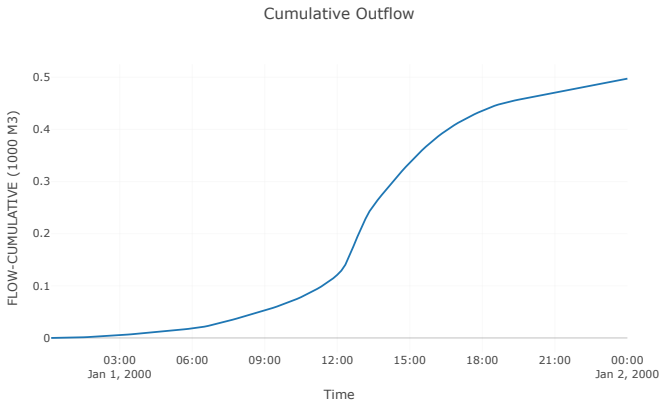
Downstream : Site Discharge

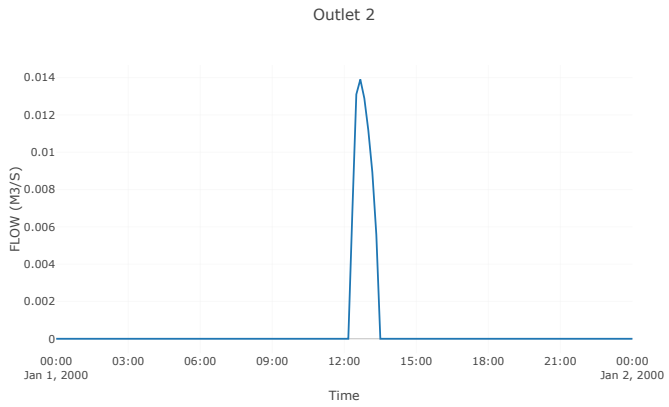
Results: Pond 1	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:40
Volume (MM)	195.26
Peak Inflow (M3/S)	0.07
Time of Peak Inflow	01Jan2000, 12:10
Inflow Volume (M3)	497.59
Maximum Storage (M3)	123.1
Peak Elevation (M)	0.89
Discharge Volume (M3)	497.33

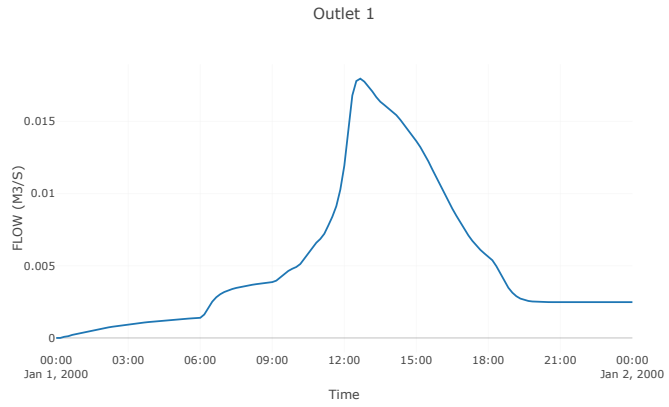


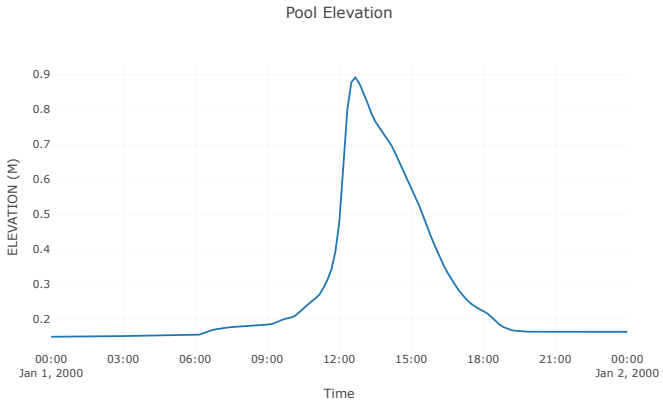


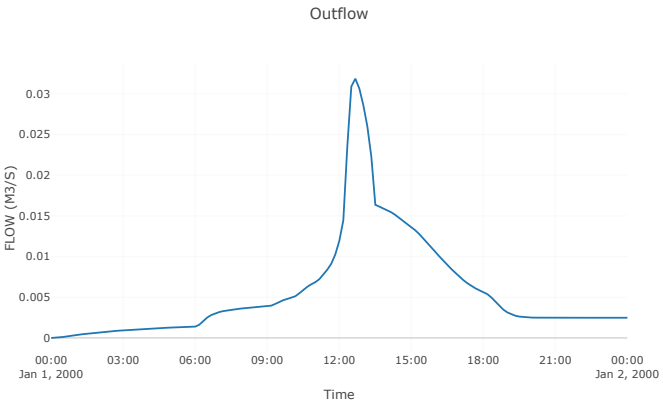

Combined Inflow
FLOW-COMBINE (M3/S)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.5
0.4
0.3
0.2
0.1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Outlet 2
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
FLOW (M3/S)
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

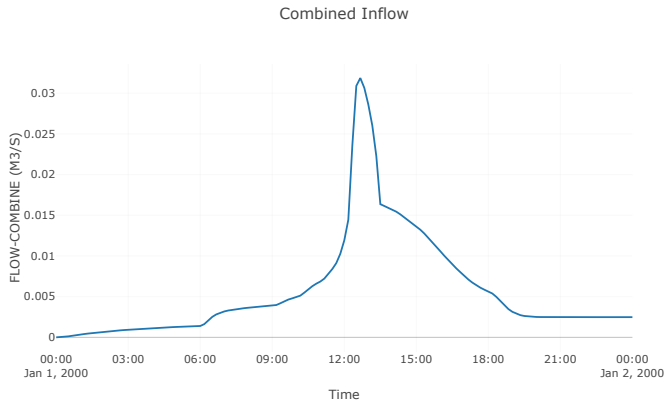

Outlet 1
0.015
0.01
0.005
0
FLOW (M3/S)
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

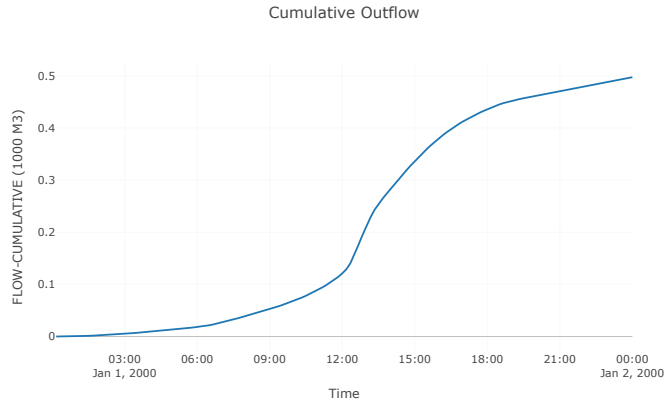

Pool Elevation
ELEVATION (M)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

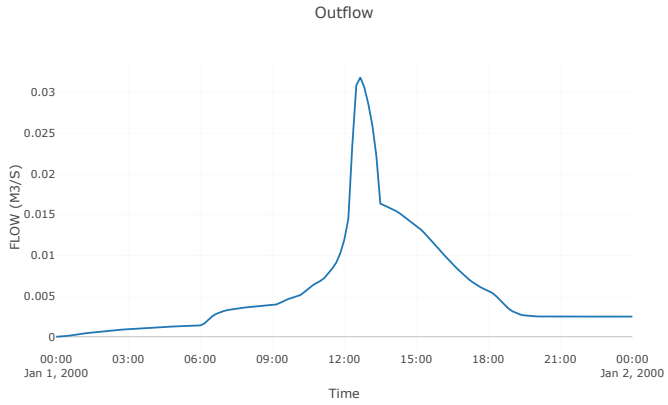

Outflow
FLOW (M3/S)
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:40
Volume (MM)	195.26






Outflow
FLOW (M3/S)
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Project: Project_1
Simulation Run: Pre Dev, 1 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 18 February 2025, 10:20

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW E, F, G CH155 - 343	0
RoW E, F, G CH77 - 155	0

Downstream

Element Name	Downstream
RoW E, F, G CH155 - 343	Site Discharge
RoW E, F, G CH77 - 155	Site Discharge

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW E, F, G CH155 - 343	0	74	5
RoW E, F, G CH77 - 155	0	74	5

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW E, F, G CH155 - 343	10	Standard
RoW E, F, G CH77 - 155	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW E, F, G CH155 - 343	0	0.03	01Jan2000, 12:20	174.84
RoW E, F, G CH77 - 155	0	0.01	01Jan2000, 12:20	174.84
Site Discharge	0	0.04	01Jan2000, 12:20	174.84

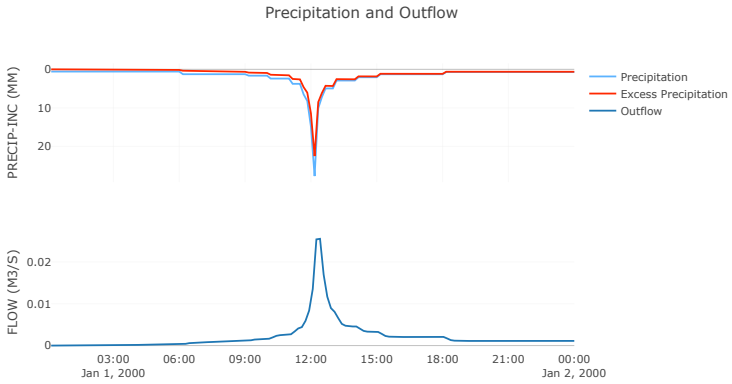
Subbasin: RoW E, F, G CH155-343

Area (KM2) : 0
Downstream : Site Discharge

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW E, F, G CH155-343	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	174.84
Precipitation Volume (M3)	260.61
Loss Volume (M3)	74.32
Excess Volume (M3)	186.29
Direct Runoff Volume (M3)	185.33
Baseflow Volume (M3)	0



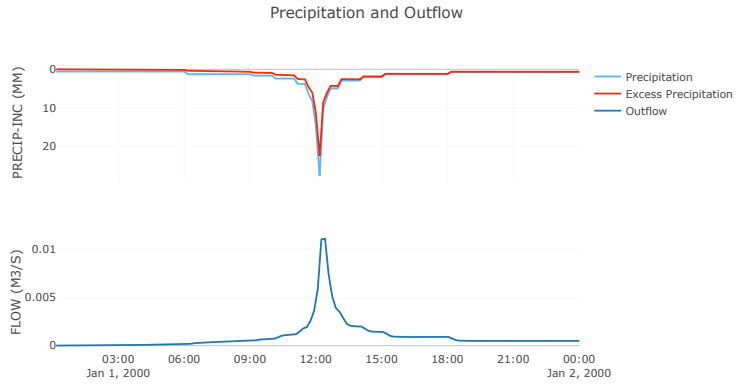
Subbasin: RoW E, F, G CH77-155

Area (KM2) : 0
Downstream : Site Discharge

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

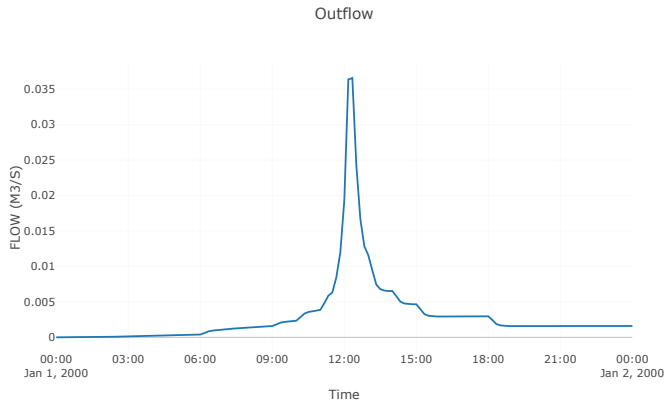
Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW E, F, G CH77-155	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	174.84
Precipitation Volume (M3)	113.1
Loss Volume (M3)	32.25
Excess Volume (M3)	80.84
Direct Runoff Volume (M3)	80.43
Baseflow Volume (M3)	0



Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.04
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	174.84



Project: Project_1
Simulation Run: Post Dev Att 1 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 18 February 2025, 11:05

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW E, F, G CH155 - 343	0
RoW E, F, G CH77 - 155	0

Downstream

Element Name	Downstream
RoW E, F, G CH155 - 343	Pond 1
RoW E, F, G CH77 - 155	Site Discharge

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW E, F, G CH155 - 343	0	89	0
RoW E, F, G CH77 - 155	0	92	0

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW E, F, G CH155 - 343	10	Standard
RoW E, F, G CH77 - 155	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW E, F, G CH155 - 343	0	0.04	01Jan2000, 12:10	260.04
RoW E, F, G CH77 - 155	0	0.16	01Jan2000, 12:10	267.84
Pond 1	0	0.03	01Jan2000, 12:30	260.07
Site Discharge	0.01	0.19	01Jan2000, 12:20	266.38

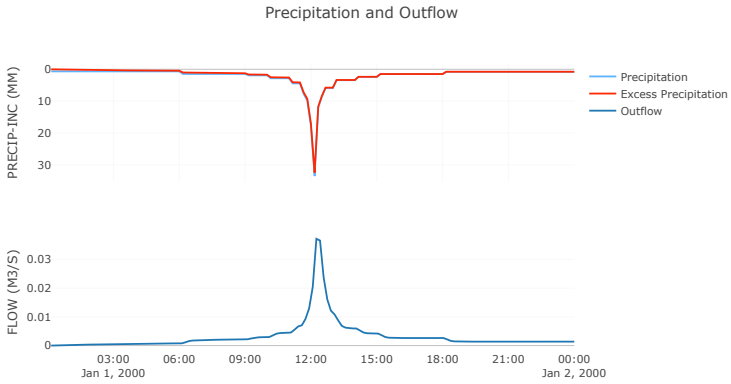
Subbasin: RoW E, F, G CH155-343

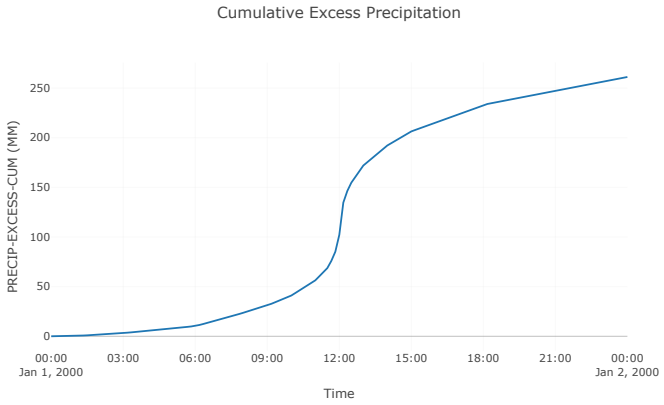
Area (KM2) : 0
Downstream : Pond 1

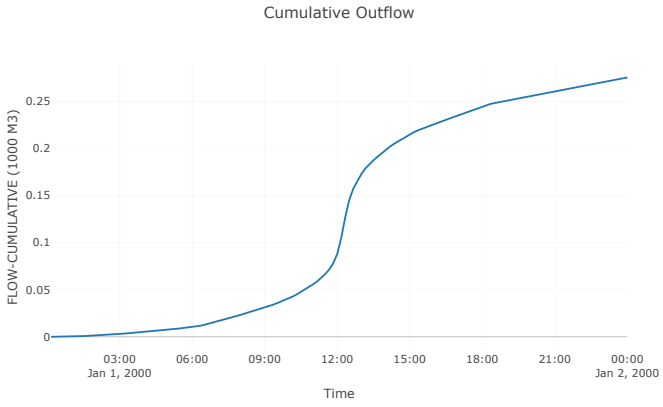
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	89
Initial Abstraction	0

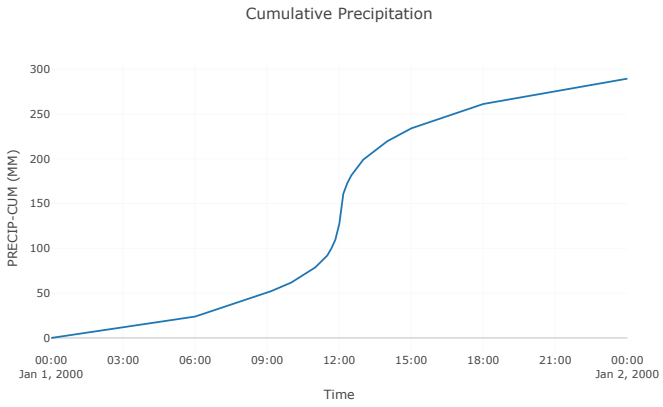
Transform: Scs	
Lag	10
Unitgraph Type	Standard

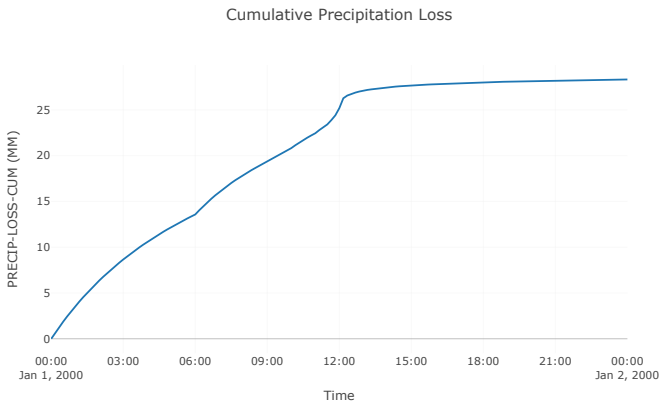
Results: RoW E, F, G CH155-343	
Peak Discharge (M3/S)	0.04
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	260.04
Precipitation Volume (M3)	306.84
Loss Volume (M3)	30.02
Excess Volume (M3)	276.82
Direct Runoff Volume (M3)	275.64
Baseflow Volume (M3)	0

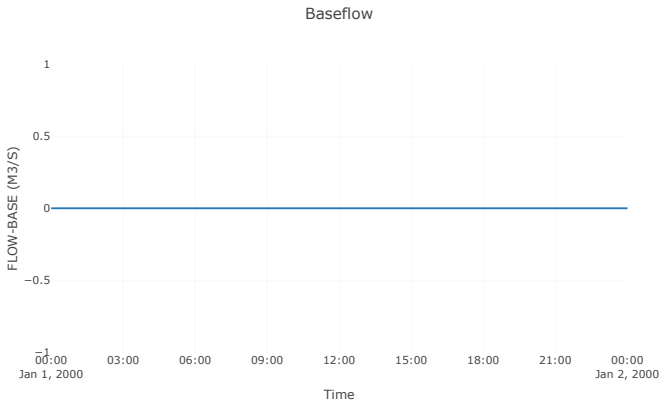


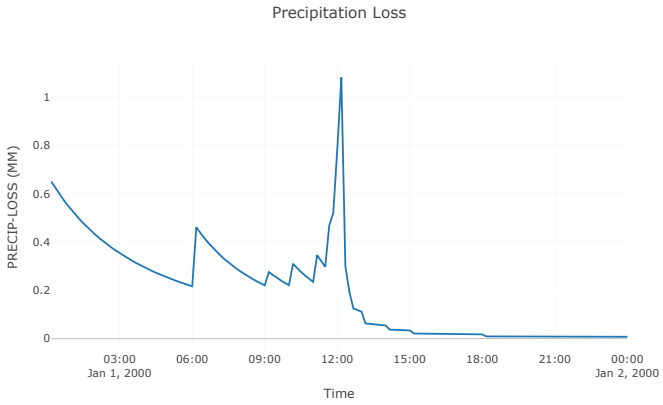


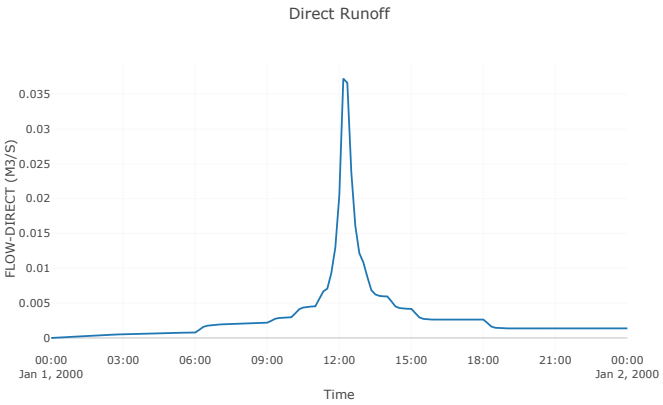

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.25
0.2
0.15
0.1
0.05
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

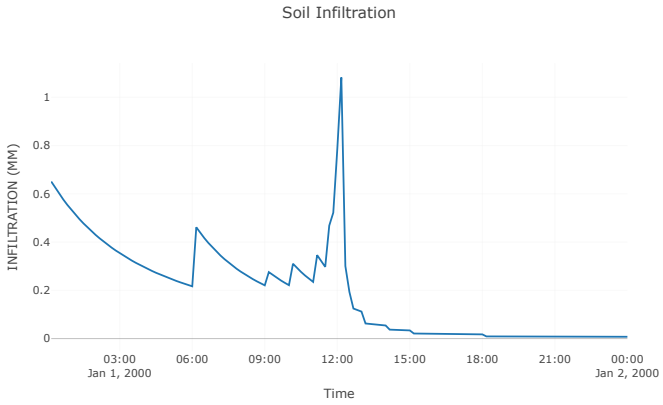

Cumulative Precipitation
PRECIP-CUM (MM)
300
250
200
150
100
50
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
25
20
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Direct Runoff
FLOW-DIRECT (M3/S)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Soil Infiltration
INFILTRATION (MM)
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

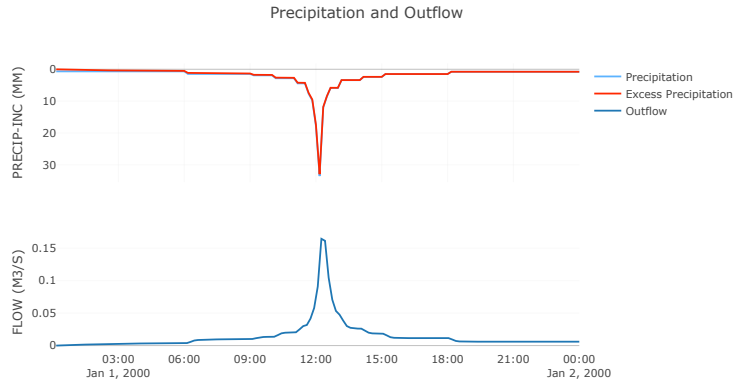
Subbasin: RoW E, F, G CH77-155

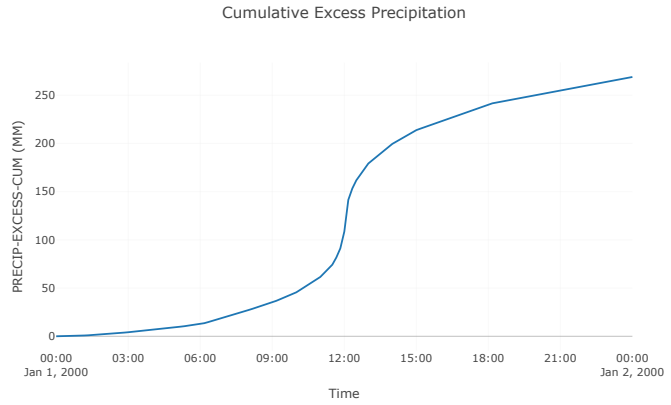
Area (KM2) : 0
Downstream : Site Discharge

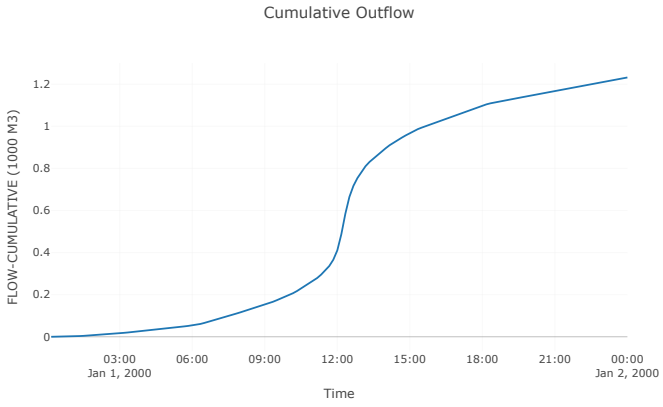
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	92
Initial Abstraction	0

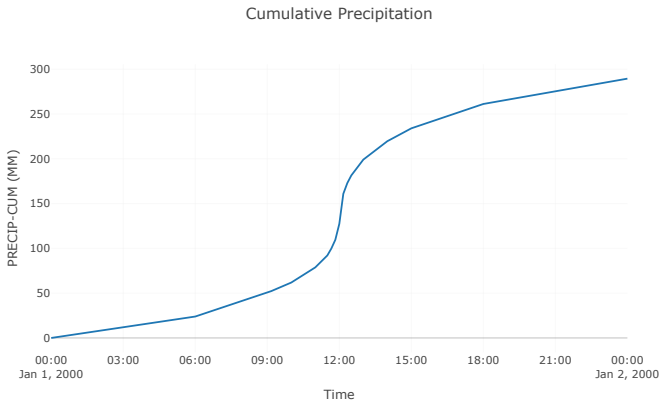
Transform: Scs	
Lag	10
Unitgraph Type	Standard

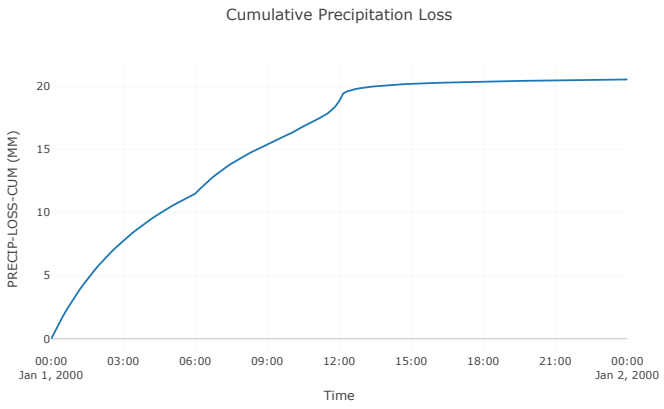
Results: RoW E, F, G CH77-155	
Peak Discharge (M3/S)	0.16
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	267.84
Precipitation Volume (M3)	1331.59
Loss Volume (M3)	94.4
Excess Volume (M3)	1237.19
Direct Runoff Volume (M3)	1232.05
Baseflow Volume (M3)	0

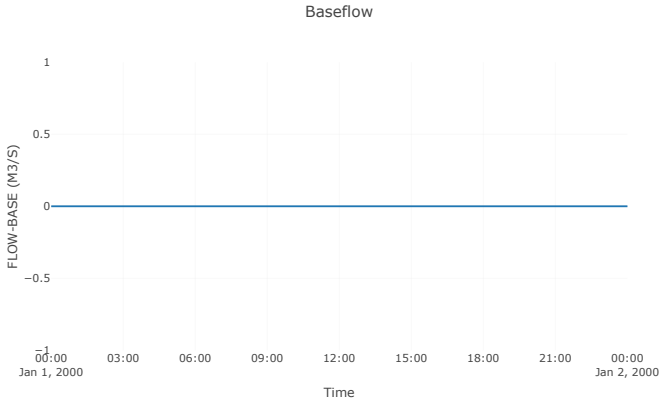


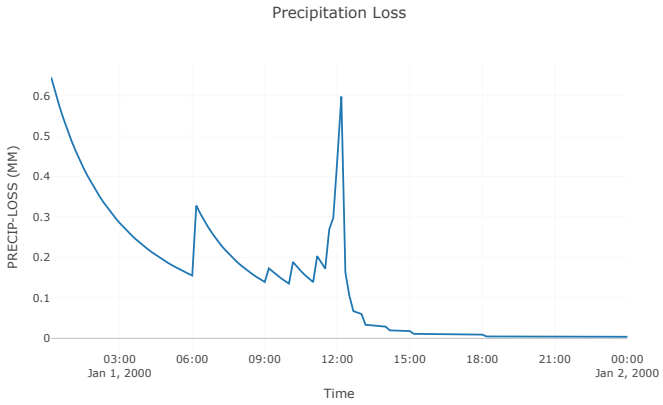


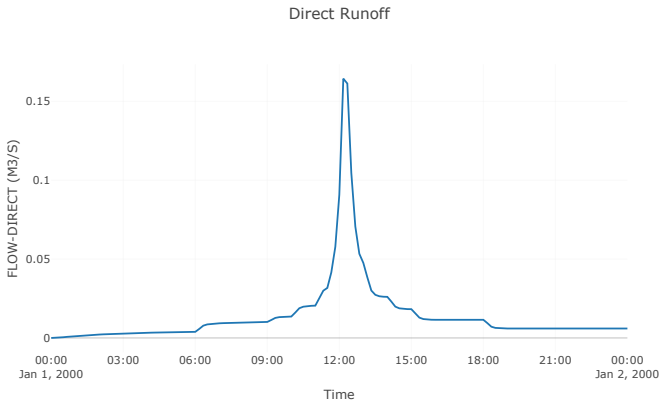

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
1.2
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

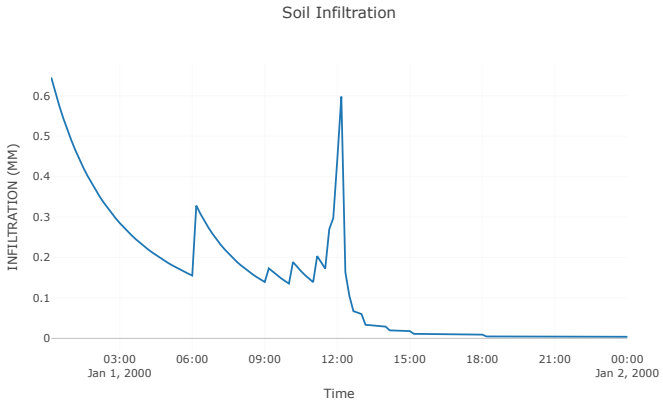

Cumulative Precipitation
PRECIP-CUM (MM)
300
250
200
150
100
50
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
20
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
0.6
0.5
0.4
0.3
0.2
0.1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

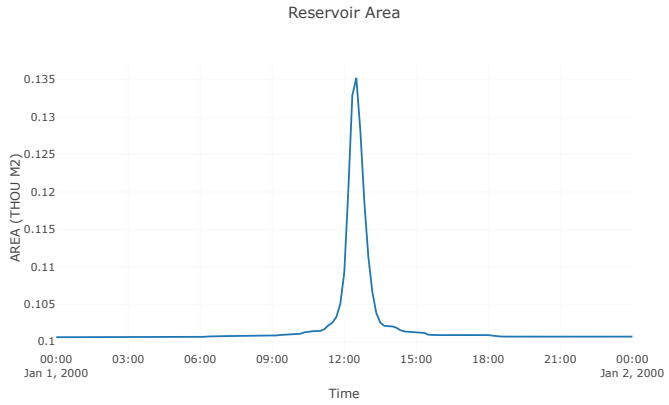

Direct Runoff
FLOW-DIRECT (M3/S)
0.15
0.1
0.05
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

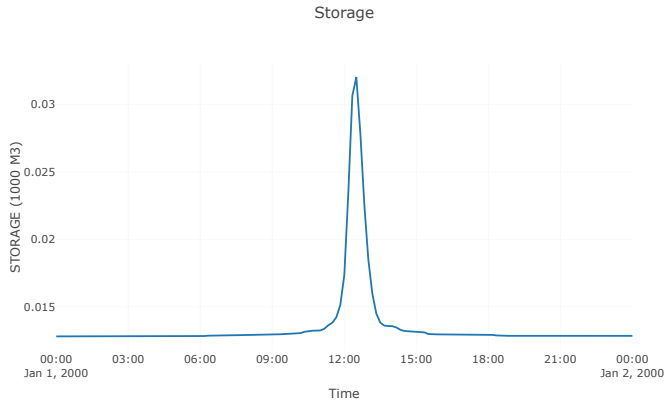

Soil Infiltration
INFILTRATION (MM)
0.6
0.5
0.4
0.3
0.2
0.1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

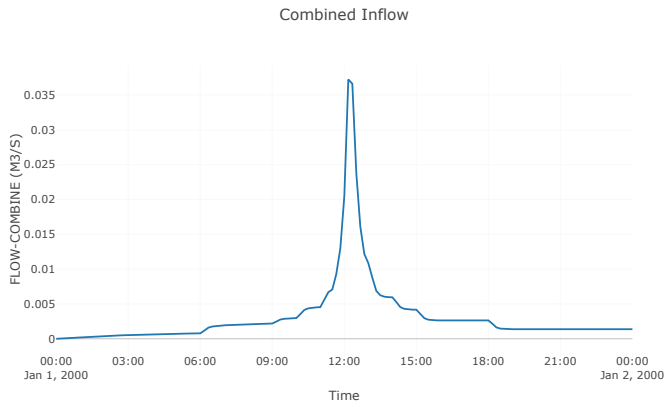
Reservoir: Pond 1

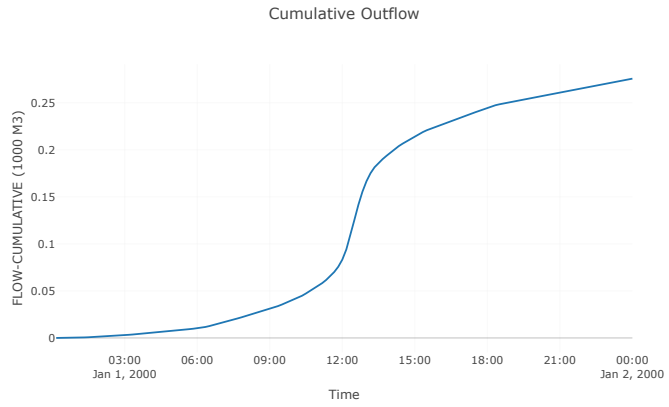
Downstream : Site Discharge

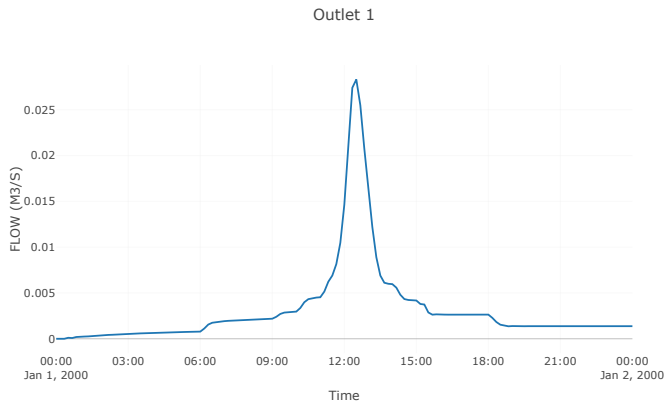
Results: Pond 1	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:30
Volume (MM)	260.07
Peak Inflow (M3/S)	0.04
Time of Peak Inflow	01Jan2000, 12:10
Inflow Volume (M3)	275.64
Maximum Storage (M3)	32.04
Peak Elevation (M)	0.33
Discharge Volume (M3)	275.67

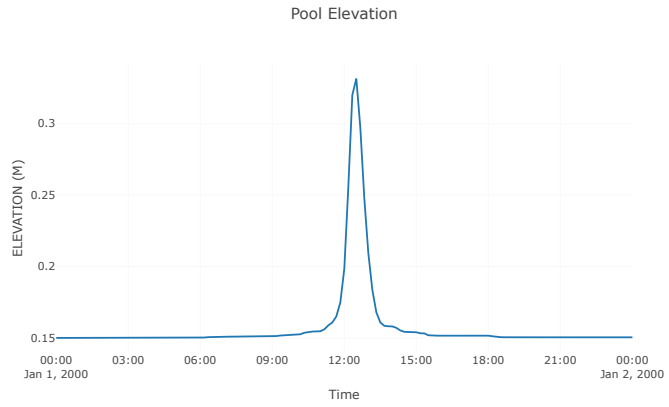


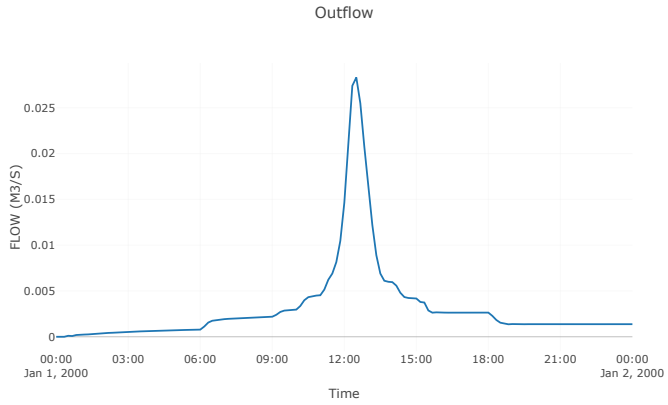



Combined Inflow
FLOW-COMBINE (M3/S)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.25
0.2
0.15
0.1
0.05
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

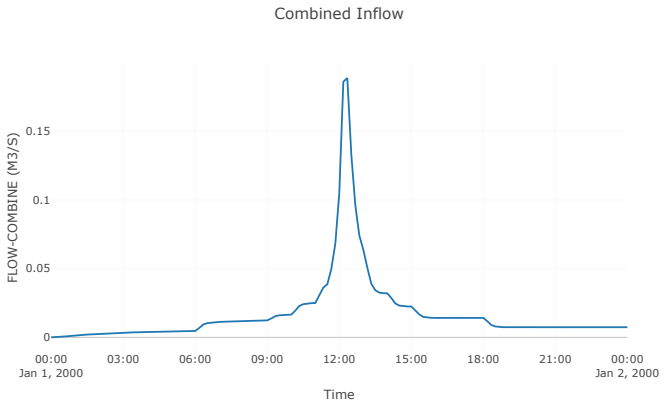

Outlet 1
FLOW (M3/S)
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

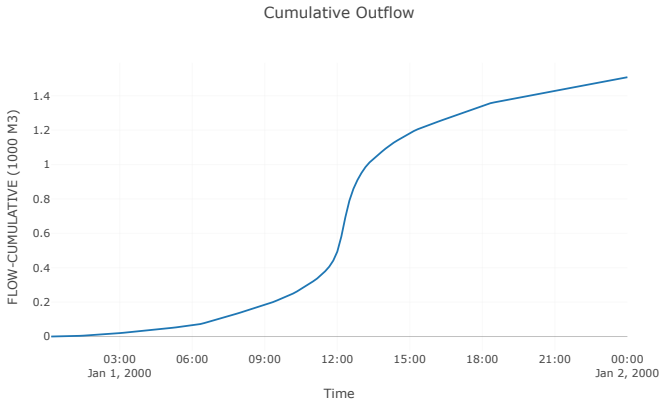

Pool Elevation
ELEVATION (M)
0.3
0.25
0.2
0.15
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

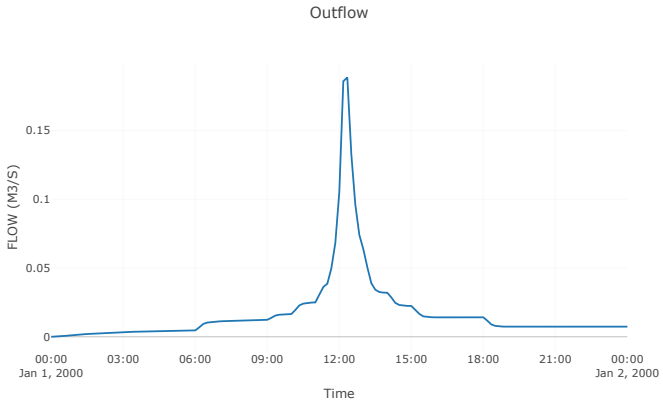

Outflow
FLOW (M3/S)
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.19
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	266.38






Outflow
FLOW (M3/S)
0.15
0.1
0.05
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Alex Billot

From: Te Hono Support <tehonosupport@fndc.govt.nz>
Sent: Tuesday, 1 April 2025 2:13 pm
To: Alex Billot
Subject: RE: Proposed subdivisions - Kaikohe

Kia Ora Alex.

The contact iwi would be Ngapuhi, communications@ngapuhi.org tel 094015530, hapu to consider will be Te Uri O Hua- Floyd Wihongi floydwihongi@outlook.com, Woody Wihongi woodywihongi@hotmail.com

Appreciate getting in contact.

From: Alex Billot <Alex@northplanner.co.nz>
Sent: Tuesday, April 1, 2025 1:26 PM
To: Te Hono Support <tehonosupport@fndc.govt.nz>
Subject: RE: Proposed subdivisions - Kaikohe

Kia ora,

Just following up on my below email, if you could please provide the Iwi contacts for the Kaikohe area (Station Road/Thorpe Road area), that would be much appreciated.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

From: Alex Billot
Sent: Friday, 14 March 2025 10:56 am
To: Te Hono Support <tehonosupport@fndc.govt.nz>
Subject: Proposed subdivisions - Kaikohe

Kia ora,

We are in the process of preparing subdivision applications for some properties in Kaikohe (Station Road/Thorpe Road).
Can you please assist with advising who the Iwi contacts are for this rohe so we can consult with them prior to lodgement of the applications?

Thanks in advance.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

Alex Billot

From: Alex Billot
Sent: Thursday, 19 June 2025 10:10 am
To: 'Bill Edwards'
Subject: RE: Proposed subdivision - Station Road/Thorpe Road, Kaikohe

Morena Bill,

Just following up on the below request for the proposed subdivisions in Kaikohe.
We are finalising our report ready for lodgement to Council and are hoping to lodge the applications in the next week.

If you require any further information, please do not hesitate to get in touch.

Thanks.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

From: Alex Billot
Sent: Friday, 2 May 2025 9:26 am
To: Bill Edwards <BEdwards@heritage.org.nz>
Subject: RE: Proposed subdivision - Station Road/Thorpe Road, Kaikohe

Morena Bill,

Just following up on the below request for the proposed subdivisions in Kaikohe.
We are just waiting on some minor changes to the engineering report so are hoping to lodge the applications in the next week or two.

Thanks.

Kind regards,

Alex Billot

NORTHLAND
PLANNING & DEVELOPMENT

Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

From: Bill Edwards <BEdwards@heritage.org.nz>
Sent: Tuesday, 1 April 2025 1:44 pm
To: Alex Billot <Alex@northplanner.co.nz>
Subject: RE: Proposed subdivision - Station Road/Thorpe Road, Kaikohe

Kia ora Alex,

Thank you we have a planning meeting on a Tuesday so we will provide comments after that.

Nga mihi

Bill

From: Alex Billot <Alex@northplanner.co.nz>
Sent: Tuesday, 1 April 2025 1:24 pm
To: Bill Edwards <BEdwards@heritage.org.nz>; James Robinson <jrobinson@heritage.org.nz>
Subject: RE: Proposed subdivision - Station Road/Thorpe Road, Kaikohe

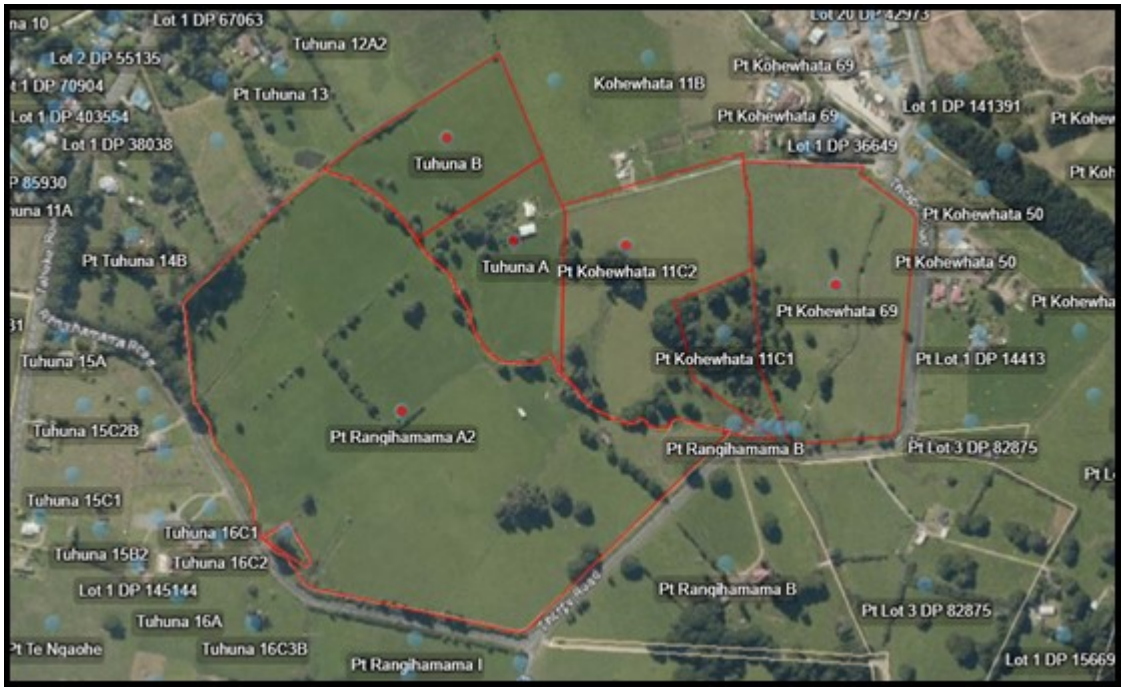
Kia ora Bill & James,

In addition to my below email, we are completing two additional staged subdivisions on adjoining lots of Pt Kohewhata 69 Block, which was described in my below email.

The second subdivision will involve a two staged subdivision. The first stage will be the subdivision of Pt Rangihamama A2 Block, where four additional two hectare lots will be created. Stage 2 will involve a boundary adjustment between Lot 5 of Stage 1 and Tuhuna A & B. The two scheme plans are attached to this email referenced Title 2 – Stage 1 & 2.

The third subdivision will also be a two staged subdivision. The first stage will involve the subdivision of Pt Kohewhata 11C2 block, where one additional allotment will be created. The second stage will involve a boundary adjustment between Lot 8 of Title 2 Stage 2 and Lots 1 & 2 of Title 3 Stage 1. The scheme plans have been attached to this email referenced Title 3 – Stages 1 & 2.

The below image shows the location of all lots involved over all subdivisions.



If you could please provide comments on behalf of Heritage Pouhere Taonga NZ to include with our application, that would be greatly appreciated.
We have also contacted Te Hono Support for Iwi contacts in the area but are yet to receive a response.

Thanks in advance.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

From: Alex Billot
Sent: Friday, 14 March 2025 11:01 am
To: Bill Edwards <BEdwards@heritage.org.nz>; James Robinson <jrobinson@heritage.org.nz>
Subject: Proposed subdivision - Station Road/Thorpe Road, Kaikohe

Kia ora Bill & James,

We are in the process of preparing a subdivision application at Pt Kohewhata 69 Block (address is 93 Station Road, Kaikohe). The proposal includes subdividing the site to create one additional allotment as can be seen in the attached scheme plan.

Can you please provide comments on behalf of Heritage NZ Pouhere Taonga to include with our application?

Thanks in advance.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

Alex Billot

From: Alex Billot
Sent: Tuesday, 1 April 2025 2:22 pm
To: communications@ngapuhi.org; floydwihongi@outlook.com; woodywihongi@hotmail.com
Cc: Rochelle
Subject: Proposed subdivisions - Kaikohe (Thorpe Road/Station Road)
Attachments: Appendix 3 - Title 1 - Scheme Plan.pdf; Title 2 - Stage 1.pdf; Title 2 - Stage 2.pdf; Title 3 -Stage 1.pdf; Title 3 - Stage 2.pdf

Tēnā koutou,

We are in the process of preparing three separate subdivision applications across adjoining allotments along Thorpe Road, Kaikohe.
Below is an image showing the allotments involved with the three subdivisions.

The first subdivision involves the subdivision of Pt Kohewhata 69 to create one additional allotment. The scheme plan is attached to this email and referenced Title 1 – Scheme Plan.

The second subdivision will involve a two staged subdivision. The first stage will be the subdivision of Pt Rangihamama A2 Block, where four additional two hectare lots will be created. Stage 2 will involve a boundary adjustment between Lot 5 of Stage 1 and Tuhuna A & B (no additional titles will be created as part of Stage 2). The two scheme plans are attached to this email referenced Title 2 – Stage 1 & 2.

The third subdivision will also be a two staged subdivision. The first stage will involve the subdivision of Pt Kohewhata 11C2 block, where one additional allotment will be created. The second stage will involve a boundary adjustment between Lot 8 of Title 2 Stage 2 and Lots 1 & 2 of Title 3 Stage 1 (no additional titles will be created as part of Stage 2). The scheme plans have been attached to this email referenced Title 3 – Stages 1 & 2.

We would appreciate if you could review the proposed subdivisions and advise if there are any comments you would like to make prior to lodgement of the applications to Far North District Council.

If you require any further information, please do not hesitate to contact our office.

Thank you for your time and consideration.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.