

# Land Development Report

 Cove Road & Mangawhai Heads Road, Mangawhai  
The Rise Private Plan Change – PPC83

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**Prepared For:**

The Rise Limited  
21 Garbolino Road  
RD 5  
Wellsford 0975  
New Zealand

**CHESTER**

Revision History

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Action	Name	Signed	Date
Prepared by	W. Gooder Civil Engineer		
Reviewed by	S. Rankin Director BE (Env) CPEng (NZ & Fiji) CMEngNZ IntPE(NZ) MFIE(Fiji)		26 January 2024

Distribution

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The Rise Limited		Client



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- Kiapara District Council – Mangawhai Community Wastewater Scheme, Council Briefing – September 2023



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## 1. Introduction

Chester Consultants Ltd (Chester) has been engaged by The Rise Limited to provide a Land Development Report with respect to the proposed Private Plan Change (PPC83) for the rural area to the east of Cove Road, Mangawhai and to the north of Mangawhai Heads Road (West), Mangawhai, referred to herein as 'the PPC'.

This report is produced to inform the PPC. This report was produced after submissions were made in relation to the PPC. Our report is to replace an earlier report found in Appendix 3 of the PPC submission; identified as Land Development Report by JAZ Civil Ltd. for The Rise Ltd, dated 20/06/2023, revised 7 November 2022.

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

This report is based on development data provided by third party contributors to the private plan change application as well as data obtained from the KDC and Northland Regional Council (NRC) maps current to the site at the time of this document's production. All vertical levels stated in this report are in New Zealand Vertical Datum 2016 (NZVD2016) unless stated otherwise. Should alterations be made which impact upon the development, not otherwise authorised by this report, then the design / comments / recommendations contained within this report may no longer be valid.

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



## 2. Site Description

The PPC Area is comprised of multiple lots and is approximately 56.9ha in size. Refer to Appendix 1 of the *Assessment of Effects and Section 32 Evaluation Report*, produced by Barker & Associates Limited for a list of the legal descriptions, title references and property address of each parcel that making up the PPC Area.

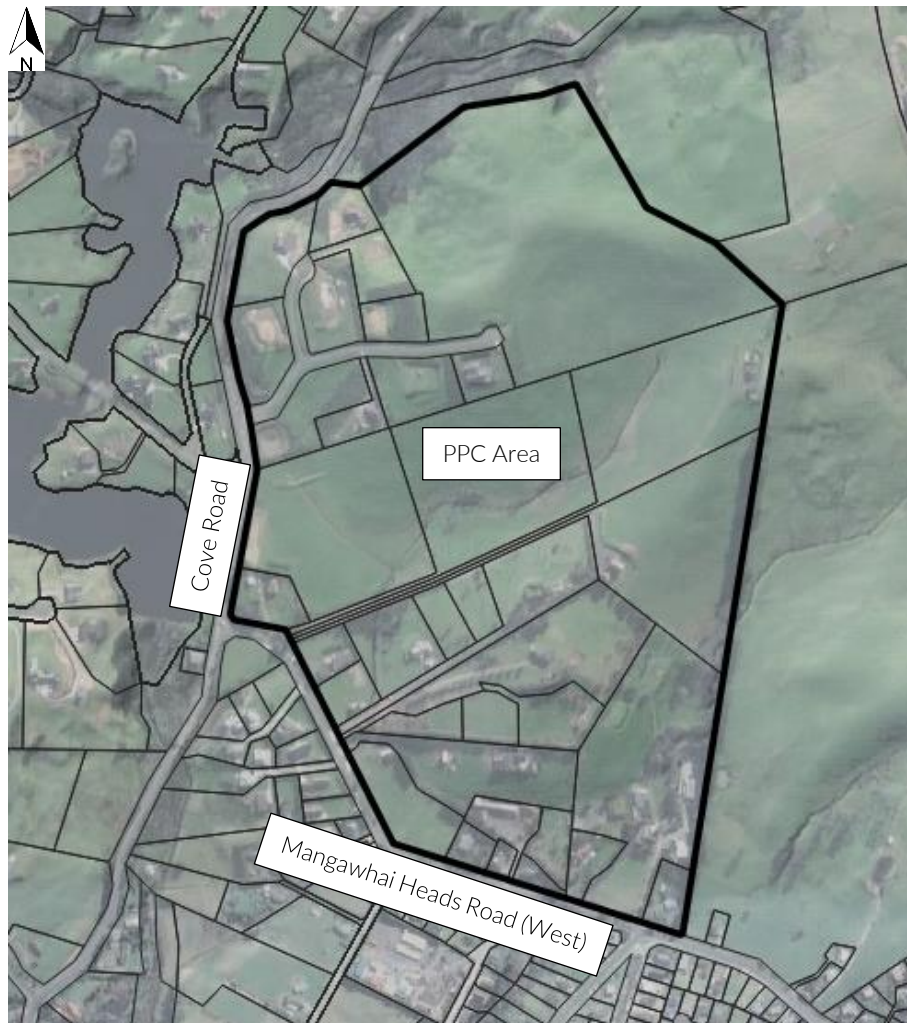


Figure 2-1: Private Plan Change Area.

## 3. Purpose

The purpose of this report is to inform the civil engineering matters for consideration as part of the PPC. This report is intended to support the proposed Private Plan Change by reporting on the following:

- Natural Hazards (Flooding)
- Earthworks
- Erosion & Sediment Control
- 3 – Waters
  - Water Supply
  - Stormwater
  - Wastewater



The report will:

- Identify what infrastructure is necessary to allow development in line with the proposed zoning.
- Confirm if existing infrastructure has sufficient capacity, and if not, identify potential options to provide it.
- Identify [if any] the Kaipara District Council's commitments to bulk infrastructure upgrades (wastewater treatment) and convey how they relate to the PPC.
- Outline the requirements for a stormwater management plan for the site that can be implemented under the proposed provisions in line with the national freshwater policy, National Policy Statement for Freshwater Management 2020 (NPS-FM).
- Demonstrate that there are viable engineering solutions to support the application for the PPC.

It is not the intention of this report to propose final engineering solutions, rather to outline the solutions that are available to enable the PPC. The final engineering solutions will be detailed as future consents in line with the resultant zoning provisions.

## 4. Natural Hazards

This section of the report will comment on Natural Hazards, specifically Flood Risk. Comments in the section of the report will draw upon the findings of the Flood Risk Assessment prepared by Chester and provided separately.

### 4.1 Flood Risk

Chester has completed a detailed flood assessment, the conclusion of the that assessment is provided below; for further details refer to the full assessment.

*"The PPC area contributes to flooding both in areas within the PPC Area and outside the PPC Area. The majority of the land within the PPC Area flows to the south with the other parts of the PPC Area flowing to the west and to the north.*

*From the flood models, most of the flooding affects the existing development located on the low-lying land of the PPC Area and where the residential properties are located near the existing twin 1.2m diameter culverts that run under Mangawhai Heads Road (West).*

*Flooding within the PPC Area in the low-lying land is caused by floodwaters spilling over the channel banks. In the residential properties to the south of the existing twin 1.2m diameter culverts under Mangawhai Heads Road (West), flooding is caused by flood waters overtopping the road and running into their properties from the road frontage or from floodwaters spilling the channel banks.*

*Upgrading the existing twin 1.2m culverts is not estimated to improve the flooding hazard in this area due to the combination of being located in low-lying land that is affected by tidal levels, low culvert slopes due to low-lying ground terrain on either side, incoming flowrates exceeding modelled culvert capacity.*

*Under the Proposed Scenario the flood extents and depth does increase but in our opinion is does not create an additional hazard eg. the areas effected are currently estimated to be already affected albeit to a lesser extent. If these effects are considered to be more than minor stormwater mitigation of the flood flows would be recommended to pre-development levels."*

In addition to the conclusion from the Flood Risk Assessment report it is our opinion that the flooding related to the PPC is not of a scale or magnitude that it would preclude the development of the PPC area inline with the zoning proposed.



## 5. Earthworks, Erosion & Sediment Control

This section of the report will comment on earthworks, erosion and sediment control within the PPC area and provide a general comment on the Geotechnical Report provided by others.

### 5.1 Earthworks

Earthworks activities will be required to transform the existing rural topography to form ground profiles suitable for residential development and subdivision. Earthwork operations to build internal roads, control stormwater and install in ground services will be required at subdivision stage with the potential for building platform works at either the subdivisional stage or at the time of the dwelling being constructed.

#### 5.1.1. Earthworks Effects

Any effects within the PPC area, through a planning lens, is limited to the difference between the provisions of Rules 12.10.1a and 13.10.1a of the current KDC district plan. From an engineering perspective the existing rural zoning is more permissive so the up zoning of the area would result in the Council having a more central role to manage the potential effects of earthworks operations as the trigger for needing a land use consent is reduced.

Therefore, it is our opinion that the potential effects arising from the earthworks are reduced. However, for future development applications, to enable the residential development, there will be a requirement for an Excavation and Fill Management Plan as part of any resource consent application.

### 5.2 Geotechnical

The Geotechnical Statement by Wiley Geotechnical Limited (WGL) is found in Appendix 5 of the Barker and Associates Report. This is a short statement, with caveats, suggesting that the site is suitable for residential development.

The statement does say that one of the main considerations with increased residential density across the proposed plan change area would be the increased stormwater run-off from future impervious areas and potential flood risk. This flood risk has been assessed by Chester in the associated Flood Risk Assessment.

The statement also says; *“We understand that wastewater disposal for increased residential density would be provided by connecting into the EcoCare Council wastewater network.”* This statement is not correct, the PPC could connect to the existing wastewater network and treatment plant; alternatively, a communal or private wastewater system could be proposed at resource consent stage in accordance with the operative planning provisions.

### 5.3 Erosion & Sediment Control

From an engineering perspective the means to manage the effects of any land disturbing activity relates to the applicability and the effectiveness of the erosion and sediment control practices to be implemented.

The PPC area does not have any features or constraints that would prevent or limit the use of effective erosion and sediment control.

Erosion and sediment control would be implemented in areas being modified as a standard requirement to mitigate the effect of the earthworks on the surrounding environment. Any sediment control devices would be constructed in general accordance with the applicable engineering standard and may include, but not be limited to the following:

- Stabilised construction entranceways
- Silt fences / Super silt fences
- Clean water diversion bunds
- Decanting earth bunds / Sediment retention ponds
- Flocculation
- Progressive site stabilisation through mulching, topsoiling or granular hardfill etc





### 5.3.1. Performance Standards

The Engineering standards refer to the “*Auckland Regional Councils Technical Publication 90 (TP90)*” for Erosion, Sediment and Dust Control for guidance. TP90 has been updated and replaced by the document; “*Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region*”, known as GD05. As a result, GD05 is the document that would be referred to for guidance on what the relevant performance standards are, and the best practical means of achieving them. GD05 is widely used in the Northland Region and is explicitly referenced in the Proposed Regional Plan for Northland (Appeals Version – March 2022) as being required for any earthwork activity.

We anticipate that this plan change area would apply the GD05 document, current at the time, as the required standard at the time of development.



## 6. Water Supply

This section of the report will comment on the water supply and firefighting water supplies strategy for the PPC area.

### 6.1 Existing Water Supply

Mangawhai is not currently serviced with a comprehensive public reticulated water network, a limited water supply network does exist which is fed from a bore near the end of Fagan Place and pumped to a reservoir near Greenview Drive. The groundwater undergoes simple chlorination by the addition of chlorine tablets prior to reticulation to a limited number of customers. Figure 6.1 below illustrates the existing general arrangement.

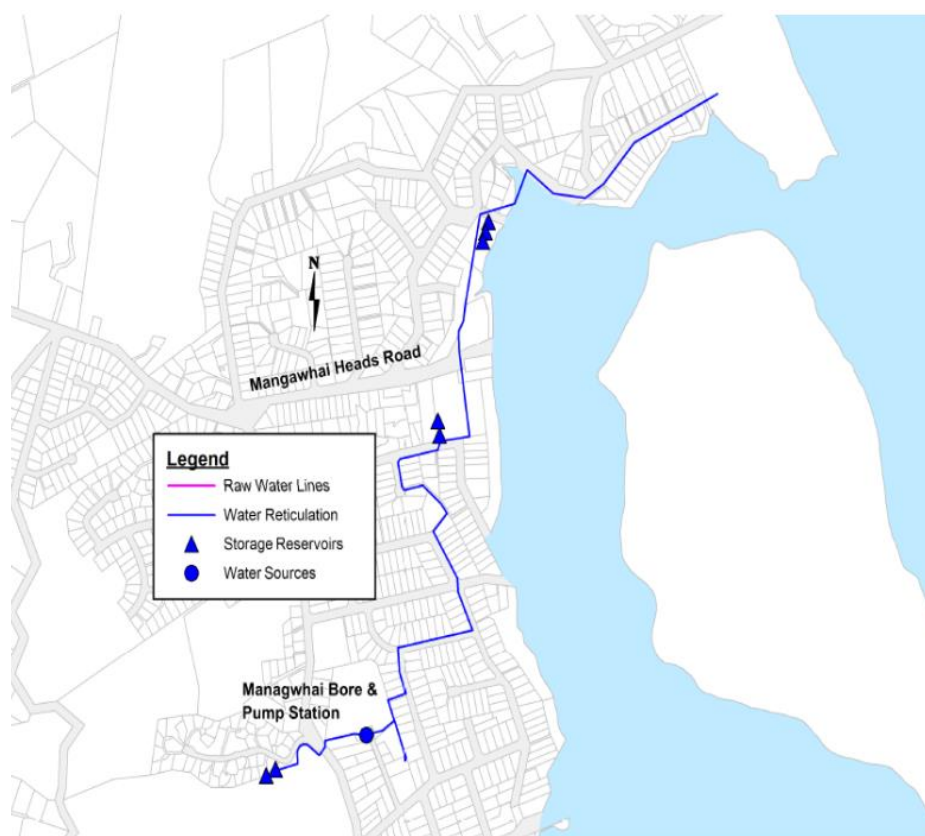


Figure 6-1: Existing Water Supply reticulation (KDC Asset Management Plan 2015)

In general, the majority of Mangawhai's residents water supply is from water tanks being fed from roof runoff, with firefighting water supplies being legislated in addition to the potable supply for general use since Plan Change 4 took effect on 18 December 2018. Plan Change 4 requires 10,000L of dedicated water be provided per house for firefighting water supplies unless agreed otherwise with Fire & Emergency New Zealand (FENZ). Further information on Plan Change 4 is available on the KDC website; with the link below providing overview.

<https://www.kaipara.govt.nz/services/district-plans/plan-changes/plan-change-4-fire/plan-change-4-fire-fighting-faqs>



## 6.2 Proposed Water Supply

The intended water supply strategy for the PPC area is to comply with the existing provisions and the generally adopted approach in Mangawhai; however, we have looked to provide more clarity and strengthen the minimum water supply volumes and fixtures required to help define what an adequate water supply is.

Currently the KDC district plan references the New Zealand Building Code with respect to onsite water supply; specifically, Clause G12. The Functional requirement of a water supply system is defined by G12.2 which states, “Buildings provided with water outlets, sanitary fixtures, or sanitary appliances must have safe and adequate water supplies.”

The key word in this requirement in the context of a plan change is adequate; the associated Acceptable Solutions and Verification Methods for Clause G12 does not provide a definition of “adequate”. Previously we have sought clarification from the Ministry of Business, Innovation and Employment (MBIE) and we were advised that the Territorial Authority / Consenting Authority defines what is considered to be adequate in that region.

The plan change process allows the opportunity for adequate to be defined as well as require more sustainable technologies when it comes to water supply.

We are aware of the limitations of the local water supply system; specifically:

- Reliance on rainwater tanks feed from roof runoff,
- Limited local bore water supplies to top up wants,
- Need to import water from outside the community.

The Cove Road North Precinct provisions seek to define what an adequate supply is by specifying minimum tank sizes and also require the use of water saving fixtures and fittings to use the captured water in the most efficient manner possible.

Additionally, the provisions do not preclude the implementation of a reticulated water supply network being used to service the development, however it is not anticipated as part of this plan change as the introduction of a wider reticulated water network would be a substantial capital works project for the entire area not limited to the PPC area; as such we expect that any water reticulation scheme would be led by the Council or a water authority.

### 6.2.1. Full Potable On-Site Supply

On-site potable water supply tanks are proposed to be implemented which would be filled by rainwater harvesting from the roof and supplemented by tanker truck as/if required on a house-by-house basis. The effectiveness of this approach is influenced by many factors including, water demand, catchment/roof area, rainfall, and storage volume. Table 6-1 below has been taken from the ARC Countryside Living Toolbox and is what we recommend as minimum rainwater tank volumes to provide adequate supply for residential dwellings.

Table 6-1: Recommended Tank Volumes for On-site Residential Supply.

Roof Catchment (m <sup>2</sup> )	Bedrooms				
	1	2	3	4	5
100	20 m <sup>3</sup>	50 m <sup>3</sup>			
120	15 m <sup>3</sup>	35 m <sup>3</sup>			
140	10 m <sup>3</sup>	30 m <sup>3</sup>	75 m <sup>3</sup>		
160		20 m <sup>3</sup>	60 m <sup>3</sup>		
180			50 m <sup>3</sup>	75 m <sup>3</sup>	
200			45 m <sup>3</sup>	65 m <sup>3</sup>	
220			35 m <sup>3</sup>	55 m <sup>3</sup>	90 m <sup>3</sup>
240			30 m <sup>3</sup>	50 m <sup>3</sup>	80 m <sup>3</sup>
260			30 m <sup>3</sup>	45 m <sup>3</sup>	70 m <sup>3</sup>
280				40 m <sup>3</sup>	65 m <sup>3</sup>
300				35 m <sup>3</sup>	60 m <sup>3</sup>

As shown above a typical 600m<sup>2</sup> site with a 180m<sup>2</sup> roof area and nominal 3-bedroom house would require 50m<sup>3</sup> of on-site storage. This could be provided by two 25m<sup>3</sup> above ground tanks which would typically take up 20m<sup>2</sup> of a sites area which can be accommodated within the 600m<sup>2</sup> lot.



The table provides a link between the size of the roof and the number of people in the household by way of bedroom numbers; this approach is consistent with onsite wastewater disposal design where design flows need to be estimated from the house population which is derived from the number of bedrooms.

### 6.2.2. Water Reduction

Coupled with the requirement for the minimum water tank size is the requirement for households to use water saving devices and fixtures in accordance with AS/NZS 6400/2016 otherwise known as WELS. A minimum WELS rating of 3 is required.

### 6.2.3. Fire Fighting Water Supply

In the absence of a reticulated water supply network firefighting water supplies will be provided in accordance with Plan Change 4. This requires a minimum dedicated firefighting water supply of 10,000L per household or an alternative approved supply in accordance with Plan Change 4.



## 7. Stormwater

This section of the report will comment on the stormwater management for the PPC area. It addresses both stormwater quality and quantity. Comments in the section of the report will draw upon the findings of the Stormwater Management Plan prepared by Chester and provided separately.

### 7.1 Adoption of Chapter 13 Stormwater Rules

With respect to stormwater, the potential effect the development could have on the receiving environment is limited to the differences between the existing Chapter 12 provisions in the district plan and the proposed Chapter 13, Cove Road North Precinct provisions for stormwater and how they control development. Table 7-1 identifies the most relevant rules.

Table 7-1: Relevant District Plan Rules to Stormwater

Chapter 12 – Rural – Existing Condition	Chapter 13 – Residential – Proposed Condition
12.10.8 Permeable Surfaces	13.10.12 Permeable Surfaces - Modified
12.15.5 Stormwater Disposal	13.14.5 Stormwater Disposal – Modified

### 7.2 Permeable Surfaces

When comparing the rules, a notable difference is that in the rural zone a 10% impermeable coverage within any one hectare of a site is considered a permitted activity when the Harbour Overlay is considered. Whereas in the proposed residential Cove Road North Precinct zone this is increased to 60% impermeable of the net site area. The Kaipara District Plan rule 13.10.12 – Permeable Surfaces permits impermeable coverage less 40% (less than 35% being building coverage).

The change in zoning does give rise to additional potential stormwater effects. In our opinion the management of those effects are suitably addressed within the proposed provisions of the Cove Road North Precinct; specifically, any development must comply with the proposed rules relating to stormwater. Because the proposed provisions impose what we consider to be best practice stormwater management for all impermeable areas, irrespective of permitted impermeable allowances, the effects of development with respect to stormwater will be managed.

The purpose of the permeable surfaces rules in this context is to guide catchment planning and ensure that future land uses stay within the limits allowed for. An example of this is: where a subdivision proposes a catchment stormwater device to protect the receiving environment, that device would be designed to allow for the permitted impermeable allowance of its catchment. The rule ensures that future Lot owners in that subdivision don't increase their impermeable coverage over what has been allowed for.

Given the above, it is our opinion that applying the proposed Chapter 13 Cove Road North Precinct rules to the PPC Area will be sufficient to mitigate the potential effects on the receiving environment from residential development given the constraints specified.

### 7.3 Current Best Practice Stormwater Management

It is acknowledged that Chapter 13 of the current district plan has been in effect within other residential areas of the Kaipara District and it has not always resulted in quality stormwater outcomes which could be considered in line with current best practise. This is because what is considered best practice stormwater management which now includes water sensitive design (WSD) has advanced beyond the current published engineering standards.

To have current best practice stormwater management outcomes in the PPC Area, specific stormwater management provisions are proposed for the Cove Road North Precinct to advance the stormwater approach.

We have developed these provisions by first developing a Stormwater Management Plan (SMP) for the PPC area, then drafting conditions that impose the provisions of that SMP. The SMP considers a number of documents including the Regional Plan for Northland meaning the provisions are responding to the current National, Regional and District stormwater considerations.

The recommendations from the SMP are summarised below, for full details please review the separate SMP prepared by Chester.



#### 6.2.4. Stormwater Quality

- Treatment of the Water Quality Volume (WQV) or Water Quality Flow (WQF) from all private driveways and public roads via a water quality device for the relevant contaminants.
- WQF to use the 10mm/hr rainfall intensity and WQV to use the 1/3 of the 2 Year ARI 24-hour rainfall depth with climate change as substitution for the percentile rainfall event in Auckland Council's GD01.
- Inert building materials are to be utilised (e.g. inert roof material) to prevent leaching/runoff of contaminants.

#### 6.2.5. Stormwater Quantity

##### 6.2.5.1. Stormwater Retention

- Re-use / rainwater harvesting is required for all residential properties via rainwater tanks.
- Stormwater retention of the first 5mm of rainfall runoff from all impermeable surfaces is to be provided with the retention volume either to be re-used or infiltrated within a 72-hour period.
- If it has been determined that there is not enough water demand or soakage available to provide retention via re-use or infiltration over a 72-hour period, then retention is to be substituted with detention with the volume to be discharged over a 24-hour period.

##### 6.2.5.2. Stormwater Detention

- Stormwater detention for the difference between runoff volumes between the pre- and post-development scenario for the 1/3 of the 2 Year ARI 24-hour rainfall depth with climate change to be provided minus any retention volume provided for all impermeable surfaces with the discharge to be over a 24-hour period.
- Stormwater attenuation for the 5%, 10% and 1% AEP 24-hour rainfall events between the pre and post-development scenario.
- Pre-development scenario to be considered as 100% grass cover.

#### 6.2.6. Stormwater Discharge

Utilise soakage systems wherever possible as a primary means of stormwater disposal even if the full design soakage is not achievable.



## 8. Wastewater

This section of the report will comment on the wastewater management for the PPC area.

### 8.1 Existing Wastewater Network

Mangawhai has an existing reticulated wastewater network made up of approximately 68.3km of pipeline (including rising mains and gravity lines) and twelve wastewater pumpstations (WWPS). The reticulated network conveys wastewater to the Mangawhai Community Wastewater Treatment Plant (CWWTP). The treated wastewater is pumped to Brown Road irrigation farm for disposal to land. Figure 8-1 below illustrates the general arrangement of wastewater reticulation.

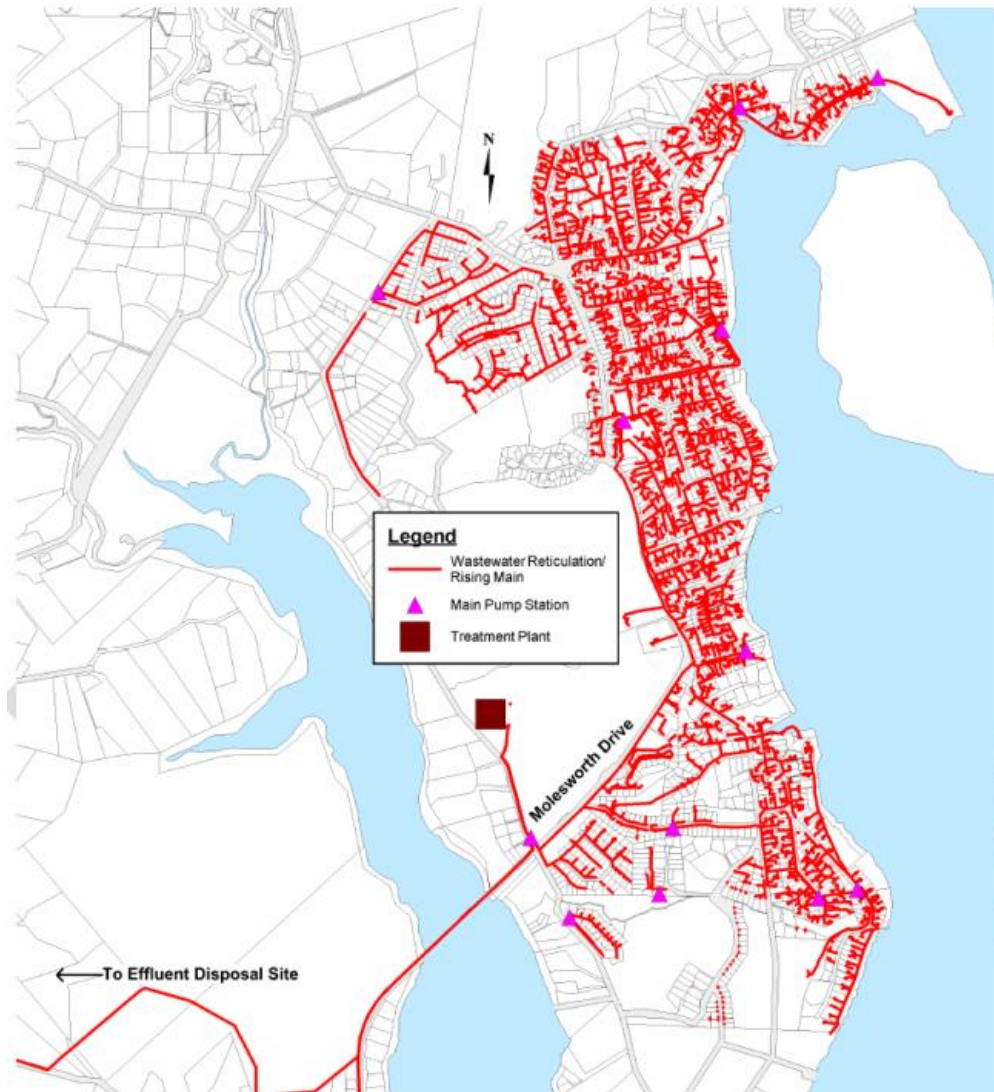


Figure 8-1: Existing wastewater network (KDC Asset Management Plan 2015)



## 8.2 Existing Network Conditions

From our investigations we have assessed Mangawhai's current wastewater treatment capacity and how it relates to the proposed plan change area.

### 8.2.1. Wastewater Treatment Plant

The treatment plant utilises a CASS system with two CASS tanks followed by pressure filtration and disinfection. Sludge is dewatered via belt press and disposed of to a landfill. The treated wastewater is pumped to an irrigation farm on Browns Road, 12km from the plant where the water is stored in a buffer dam and irrigated to a portion of the farmland. Figure 8-2 below is an aerial of the CWWTP.



Figure 8-2: Mangawhai CWWTP layout (KDC Maps accessed 19/12/2023)

We understand the following with respect to the WWTP:

- Based on Mangawhai Community WW system Master Plan Strategy Report by WSP, the CWWTP has a capacity limit inflow peak flow rate of 70 L/s, Brown Road farm disposal field (65.5ha) in operation and Consented Discharge Rate of 5000m<sup>3</sup>/ha/yr irrigation.
- The WWTP was recently upgraded with a balance tank that increased the peak flow capacity to 100 L/s with a new inlet screen, flow control system and provide 900m<sup>3</sup> of storage.
- The WWTP is on a parcel of land 32ha in area which is largely un-utilized by the WWTP. Consequently, we presume that area availability would not be a constraint for potential future expansion of the WWTP.

In 2023 further works have been commissioned by the Council with Beca Hunter H2O provided two new documents associated with the CWWTP, specifically "Mangawhai CWWTP Options Report Peer Review" and the "Mangawhai WWTP Optimisation Summary Report"; both of these reports are available here:

<https://www.kaipara.govt.nz/services/water-services/wastewater/mangawhai-wastewater>

The Beca Hunter H2O reports review and build upon the reports previously prepared by WSP, the main points from the review of these two documents were the following:

- The existing plant is estimated to be at capacity in Summer 2024; this brings the timeline forward from the WSP Report which estimated between 2025 – 2028,
- The report recommends a different upgrade from the WSP Report, with an expansion of the CASS process rather than the transition to MBR,





- The recommended upgraded is estimated to be \$11M less by 2026. The WSP documented costed the MBR system at \$34.5M in 2026 vs the CASS estimate of \$23.5M in 2026.

Two presentations have been provided in 2023 to the elected members around the Mangawhai Community Wastewater Scheme, the first in April 2023 and the most recent in September 2023. The September 2023 contained the staged costed upgrade options with a timeline for delivery and the associated uplift in capacity. Figure 8-3 has been extracted from the September 2023 document.

## Plant Capacity & Growth

• Total plant design capacity - No of connections	= 3,000
• No of connections at 2023	= 2,764
• <b>Implement stage 1 inDENSE (2023/24) new plant capacity - No of connections</b>	<b>=3,550</b>
• Implement stage 1 indene (2023/24) additional connections	=786
• <b>Implement stage 2 CASS, inDENSE &amp; UF (2025/26) new plant capacity - No of connections (growth out to 2047)</b>	<b>= 5,470</b>

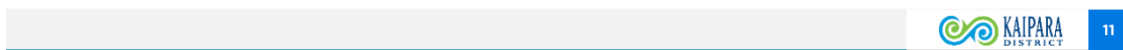


Figure 8-3: Extract from Mangawhai Community Wastewater Scheme – Council Briefing – September 2023

Figure 8-3 indicates that the current number of connections is 2764 (assumed to be current at September 2023) which results in an available capacity of 236 connections. This reserve capacity has been indicated to be taken up by Summer 2024. The proposed staged upgrades (Stage 1 and Stage 2) increase the capacity to provide ongoing capacity beyond the 3000 total connections with 786 connections available after Stage 1 (2023/24) to 3550 connections and a further total capacity of 5470 connections available after Stage 2 (2025/26).

The presentation requested a decision to be taken by the elected members to approve the design and implementation of Stage 1 works and the design of Stage 2 and Stage 3. The Council approved Stage 1 and 2 works as proposed. The minutes of the council meeting are here with the specific decision in Section 5.2:

<https://pub-kaipara.escribemeetings.com/Meeting.aspx?Id=4204d597-fedf-4e81-87cb-4493a3993c71&Agenda=Agenda&lang=English>

For completeness we have attached document Council Briefing document in the Appendix.

### 8.2.2. Existing Network Constraints

In our opinion the existing WWTP has capacity, and it can be upgraded as necessary to facilitate growth as outlined above. The upgrading of a WWTP is typically a capital works project so the administration of these upgrades would typically be managed by the Council. The wastewater distribution network being either gravity pipelines, pump stations and associated rising mains would have detailed capacity assessment completed as part of the resource consent stage and where capacity is insufficient the development would either need to wait for the Council to undertake any planned works to provide capacity or the development could undertake the works necessary to enable the necessary capacity either at their cost or via a Development Agreement.

### 8.2.3. Kaipara Infrastructure Strategy

We note that in revision 6 of the Draft Kaipara Infrastructure Strategy published February 2021 there is a Major Capital Expenditure allowance of \$37M for Wastewater Growth in Mangawhai which confirms the commitment of capital expenditure to increase the capacity of the existing wastewater network and disposal system.



Major Capital Expenditure								
Description	2021/26	2026/31	2031/36	2036/41	2041/46	2046/51	Key Driver	Uninflated Cost (\$m)
Te Kōpuru Wastewater treatment upgrade							LOS+Growth	0.35
Dargaville wastewater treatment plant upgrade							Growth	2
Dargaville wastewater growth							Growth	12.75
Dargaville wastewater renewals							LOS	2.7
Maungatūroto renewals							LOS	2.84
Maungatūroto Growth projects							Growth	1.94
Mangawhai upgrade existing reticulation and disposal options							Growth	15.5
Mangawhai Capacity upgrades to 5,000 connections							Growth	20.3
Mangawhai wastewater small extensions right of ways							Growth	1.2
Kaiwaka wastewater growth							Growth	3
Kaiwaka wastewater renewals							LOS	1.32

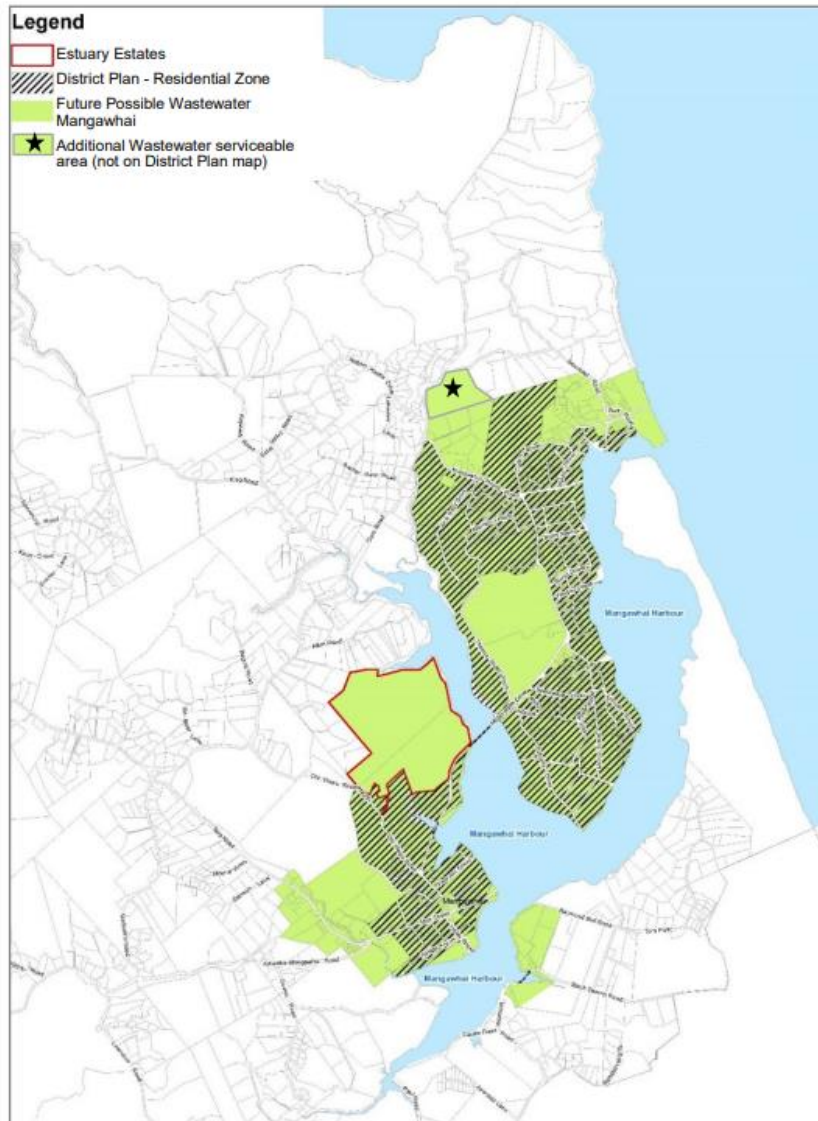
Figure 8-4: Significant Wastewater Capital Projects 2021-2051 (extracted from Table 16 Kaipara Infrastructure Strategy, Rev 6)

### 8.3 Wastewater Demand

The PPC seeks to zone an area with a density that is aligned with the current residential zone specifically 600m<sup>2</sup>. It is important to note that the 600m<sup>2</sup> alignment with the existing residential zone is a change from the PPC as lodged; the initial application featured an increased density of 400m<sup>2</sup>.

It is critical that the PPC area is contained within the area of benefit for the Mangawhai Community Wastewater Scheme. With the PPC being within the area of benefit and with a density in line with the current residential zoning provisions it means the wastewater resulting from future development would be anticipated by the reporting completed for Council on the WWTP and the network. Figure 8-5, on the following page, illustrates the current and future area of benefit, the PPC area is “starred” in the legend and noted as “Additional Wastewater serviceable area (not in District Plan map)”. The figure is extracted from the Kaipara District Council Spatial Plan and the same figure was used in the Mangawhai Community Wastewater Scheme - Master Plan Strategy, prepared by WSP, dated 21 January 2022.





**ABOVE FIG. 3-3-1: The current Residential Zone and area possibly serviced by the wastewater network in the near future**

Figure 8-5: Potential Mangawhai Wastewater Service Area (extract from Page 20, Mangawhai Spatial Plan)

## 8.4 Wastewater Servicing

The wastewater servicing for the PPC area is anticipated to be via a connection to the Mangawhai Community Wastewater Scheme with any associated network upgrades identified and addressed through the resource consent process. The area is anticipated to connect at the density proposed by the Council documents.

No specific precinct provisions are anticipated as being necessary, the existing provisions are considered to be adequate for connection to the Council system as well as the ability to utilise a private or communal system at the time of resource consent.



## 9. Summary

In Section 3 of the report outlined it will:

1. Identify what infrastructure is necessary to allow development in line with the proposed zoning.
2. Confirm if existing infrastructure has sufficient capacity, and if not, identify potential options to provide it.
3. Identify [if any] the Kaipara District Council's commitments to bulk infrastructure upgrades (wastewater treatment) and convey how they relate to the PPC.
4. Outline the requirements for a stormwater management plan for the site that can be implemented under the proposed provisions in line with the national freshwater policy, National Policy Statement for Freshwater Management 2020 (NPS-FM).
5. Demonstrate that there are viable engineering solutions to support the application for the PPC.

In this section we provide commentary back to this purpose.

1. Wastewater treatment is the key infrastructure element required to enable development.
2. The existing Mangawhai CWWTP has capacity which is being aligned to the rate of development and the PPC area is considered to be within the area of benefit where growth is anticipated.
3. The Council has committed funding for the wastewater upgrades in Mangawhai to support growth as shown in Figure 8-4 and detailed in the presentations to the elected members of the Council.
4. A draft SMP has been prepared and is provided separately which aligns to the various standards.
5. Sections 4 to 8 in the report outline how the PPC area can be serviced and developed.

## 10. Conclusions

We do not believe there is any engineering limitation discussed within the scope of this report that would prevent the future development of the area in accordance with the proposed zoning and the associated provisions.



## 11. Limitations

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

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

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



## 12. Appendix







Kaipara te Oranganui

**KAIPARA  
DISTRICT**

Two Oceans Two Harbours

# Mangawhai Community Wastewater Scheme

Council Briefing – September 2023



# Previous Updates

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- December 2022 – Overview, options, cost, and programme
- April 2023 – Update options, solutions, cost, and programme

# Purpose

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To update Elected Members on the progress of the optimisation of the Mangawhai Wastewater Treatment Plant and the plans to accommodate growth.

# Context

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- Update on Brown Road Farm wastewater irrigation
- Overview of the Mangawhai wastewater upgrade solutions
- Growth projections
- Staged upgrades
- Upgrade solution
- Technical solutions
- Golf Course subsurface irrigation
- Upgrade programme
- Network upgrades
- Next steps

# Eel Management - Brown Road Farm Pond



# Technical Team

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Optimisation and upgrades planning has been conducted by leading experts in wastewater treatment and effluent reuse from Australia and New Zealand:

- Clint Cantrell (SCO Consulting)
- Craig White (Beca HunterH2O)
- Liam Tamplan (Beca HunterH2O)
- Garrett Hall (Beca)
- Peter Gearing (Effluent irrigation specialist)

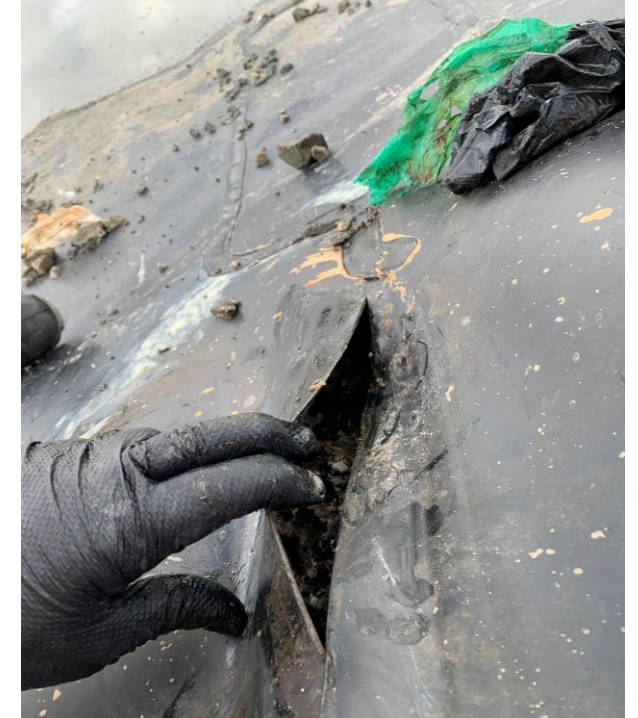
# Brown Road Farm Issues / Actions



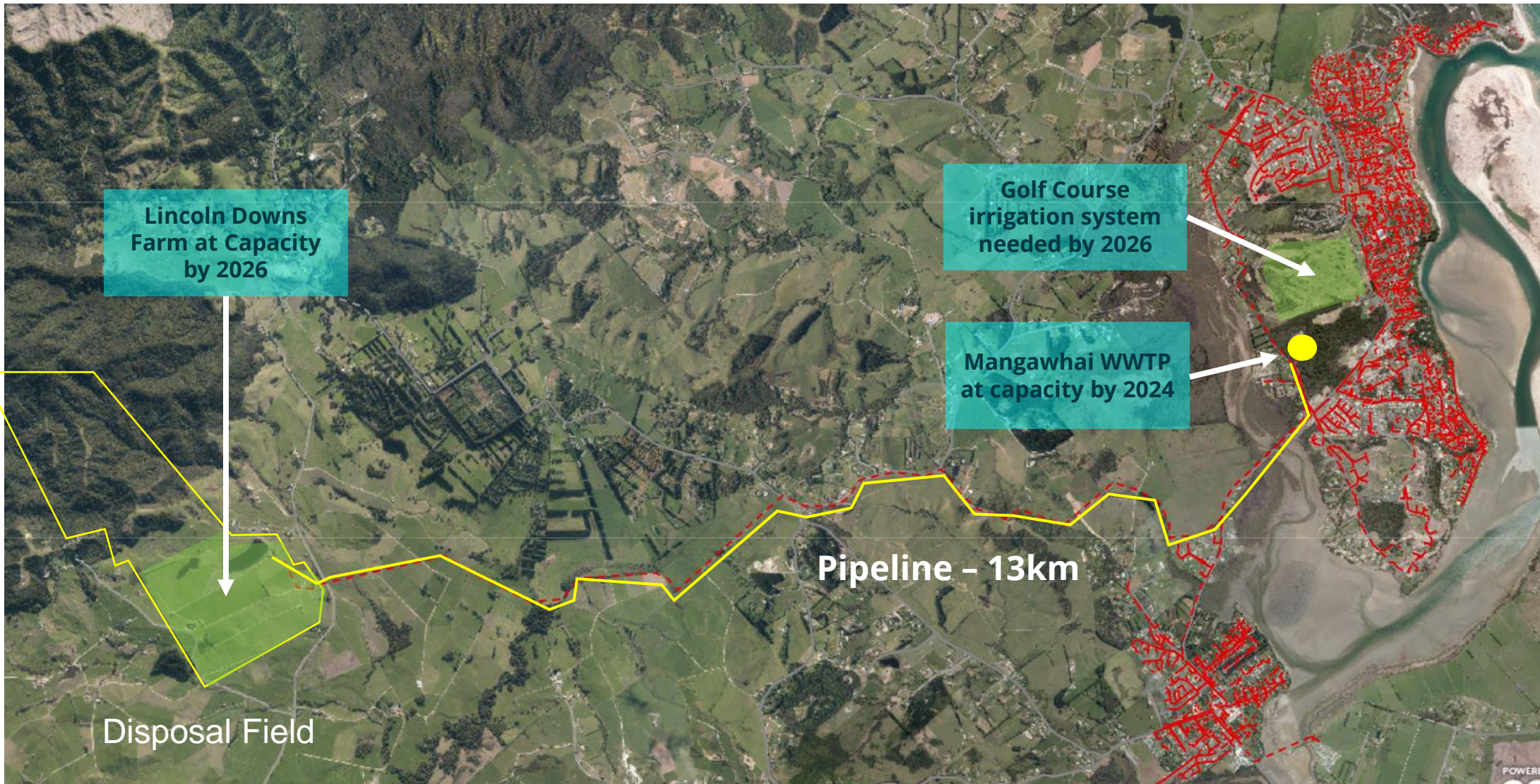
Issues	Actions
Bacteria levels (E.coli)	Sources confirmed as avian
Algae/cyanobacteria	Reduce phosphorus from WWTP
Odours	Effluent pipe moved, sludge being removed
Liner leakage	Dam almost drained, defects found, repairs in progress

# Brown Road Farm Wastewater Irrigation Update

- The pond is currently being drained under emergency works and will be fully drained by the end of September.
- Residents have been complaining of excessive levels of hydrogen sulphide odour and alleged health problems due to the presence of the odour. Given the issues related to the residents health, we involved the Medical Officer of Health from Ngā Tai Ora - Public Health Northland.
- Pond liner has been leaking and affecting the structural integrity of the pond. Repairs will commence in September 2023.

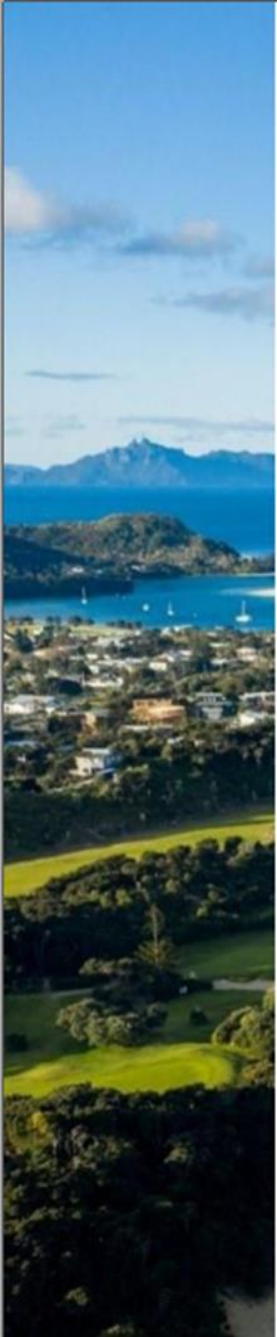


# Mangawhai Wastewater Upgrade Solutions Overview





# Growth Forecast



WWTP at capacity →

Lincoln Down at capacity →

Year	Connections	Total Population Equivalent		
		EP		
		Resident	Summer	Peak
<b>2023 (TODAY)</b>	2,764	3,700	5,400	13,500
<b>2024</b>	2,900	3,900	5,650	14,150
<b>2026</b>	3,200	4,300	6,250	15,650
<b>2028</b>	3,500	4,700	6,800	17,100
<b>2047</b>	5,470	7,300	10,650	26,700
<b>Ultimate 2051</b>	5,800	7,750	11,300	28,350

# Plant Capacity & Growth

- Total plant design capacity - No of connections = 3,000
- No of connections at 2023 = 2,764
- **Implement stage 1 inDENSE (2023/24) new plant capacity - No of connections =3,550**
- Implement stage 1 indene (2023/24) additional connections =786
- **Implement stage 2 CASS, inDENSE & UF (2025/26) new plant capacity - No of connections = 5,470**  
**(growth out to 2047)**

# Project Estimate & Implementation

The table below sets the estimated cost for the Mangawhai Wastewater Scheme.

Stage 1 - Mangawhai WWTP near term capacity upgrades		
Element	Description	Estimated Cost (P95)
inDENSE design & implementation	Construction and commissioning of the inDENSE system	\$735,000
<b>Sub Total</b>		<b>\$735,000</b>
Stage 2 - Mangawhai WWTP Long-term capacity upgrades plus Class A enhancement		
Element	Description	Estimated Cost (P95)
Design & implementation of Stage 2 upgrades	Design of balance tank conversion to 3rd CASS unit with inDENSE, and Class A system	\$21,725,000
<b>Sub Total</b>		<b>\$21,725,000</b>
Stage 3 - Browns Farm and Golf Course effluent irrigation systems		
Element	Description	Estimated Cost (P95)
Concept design and consent plan development	Concept design of golf course and Browns Farm (enhancement) irrigation systems	
Consent application and consultation	Consultation and consenting for golf course and enhanced Browns Farm systems	
Detailed design	Detailed design of golf course and Browns Farm systems	
Implementation	Construction and commissioning of golf course and Browns Farm systems	
Design & implementation of Stage 3 upgrades		\$24,450,000
<b>Sub Total</b>		<b>\$24,450,000</b>
Network Upgrades		
Network Upgrades		Estimated Cost (P95)
<b>Sub Total</b>		<b>\$25,000,000</b>
<b>Total</b>		<b>\$71,910,000</b>

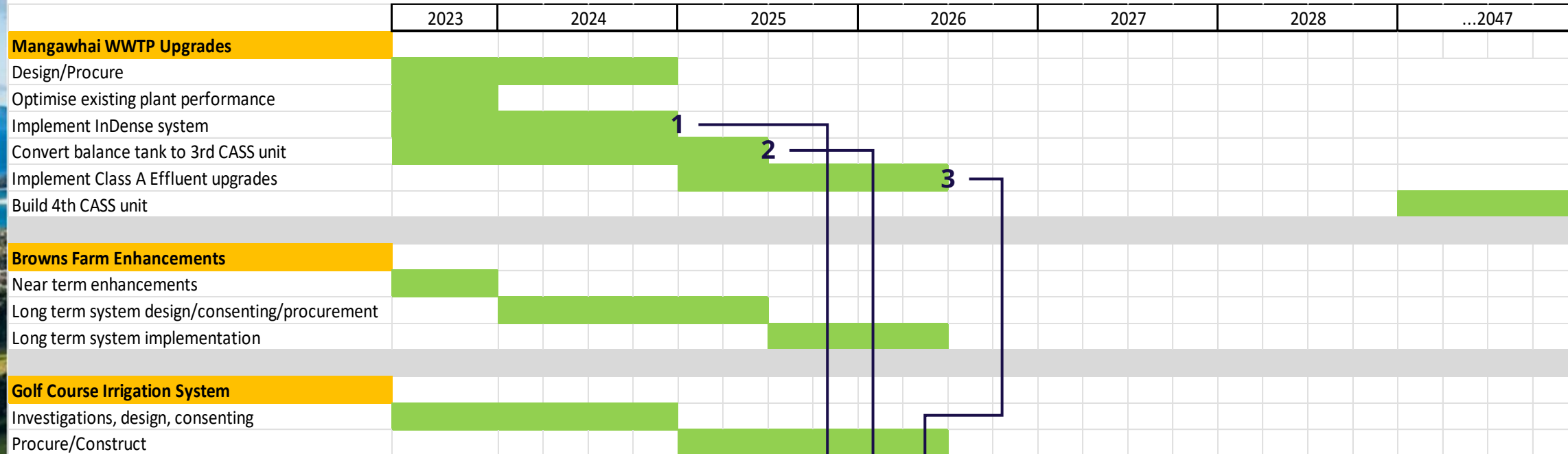
It is proposed that the stage 1 implementation works is to be delivered by June 2024. The remaining stages 2 and 3 will be transferred to Wai Tāmaki ki Te Hiku (Entity A) to deliver.

# Staged Upgrades

The Mangawhai wastewater upgrade solutions were presented at the Council briefing on 5 April 2023. The solutions are:

- Stage 1:
  - Optimise the treatment plant
  - Design inDENSE system
  - Implement the inDENSE system
- Stage 2:
  - Design upgrades of the inlet screen, convert the balance tank to a third cyclic activated sludge system (CASS) biological reactor unit and the second inDENSE system
  - Design the ultra-filtration system with UV disinfection system
  - Resource Consent application for the subsurface irrigation
  - Resource Consent application for Brown Road Farm
- Stage 3:
  - Golf Course subsurface irrigation
  - Brown Road Farm irrigation optimisation

# Strategy Programme



- 1 ✓ Capacity boosted to 2028
- 2 ✓ Capacity boosted to 2047
- 3 ✓ Class A effluent quality achieved

# WWTP Upgrades – next 3 to 4 years

## Phase 1 - 2024



- ✓ **Optimise existing systems for peak flows**
- ✓ Implement indene system to boost capacity
- ✓ Capacity to 2027/28

## Phase 2 - by 2026



- ✓ Convert balance tank to 3<sup>rd</sup> CASS reactor
- ✓ Implement Class A system
- ✓ Install new recycled water supply system
- ✓ Other miscellaneous upgrades
- ✓ Class A effluent for recycling use
- ✓ Capacity to 2047

# Optimisation of Mangawhai WWTP Progress Update

- ✓ Detailed performance sampling
- ✓ Experts on-site operating with KDC
- ✓ Addressed air flow systems
- ✓ Addressed reactor settling issues
- ✓ Reduced nitrate and phosphorus
- ✓ Stopped solids loss from reactors
- ✓ Much clearer effluent
- ✓ Stress taken off final effluent filters
- ✓ Near term benefits for Lincoln Down
- ✓ Reduced power usage



Effluent to  
Lincoln Down

# Planning for Mangawhai WWTP Stage 1 Upgrade Progress Update



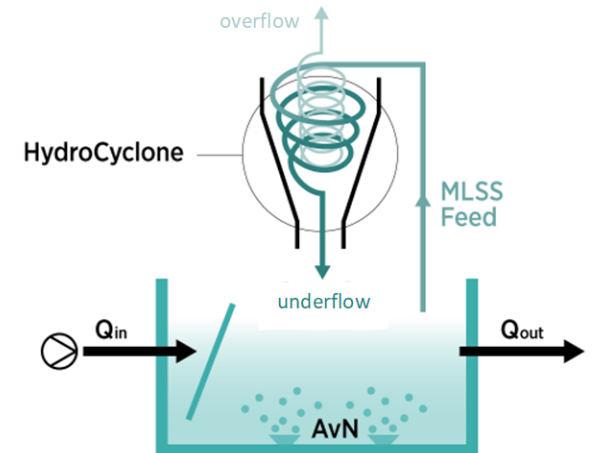
Aeration/Treatment mode



Settling/Decant mode\*  
\* Critical to retain the solids when decanting...



inDENSE system at Watercare Mangere WWTP





# Golf Course Irrigation System Progress

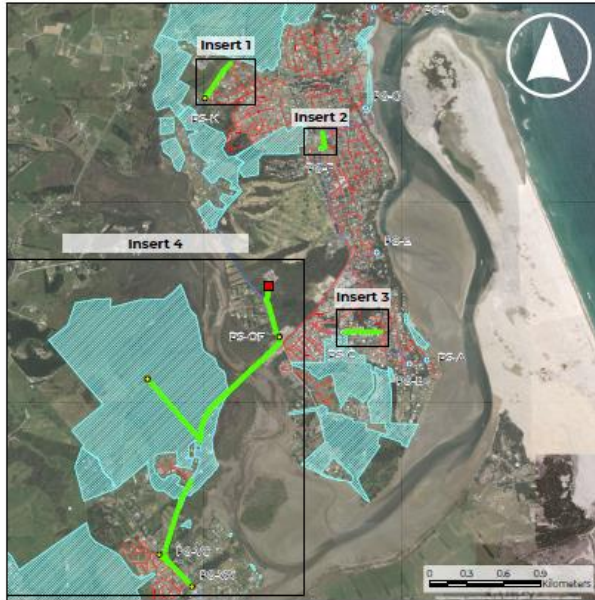


- 7 groundwater monitoring wells installed (need minimum of 1 year of data)
- Subsurface drip irrigation system and wetlands for polishing
- Capacity more than sufficient for peak summer conditions
- Still requires Brown Road Farm

# Reticulated Network Programme



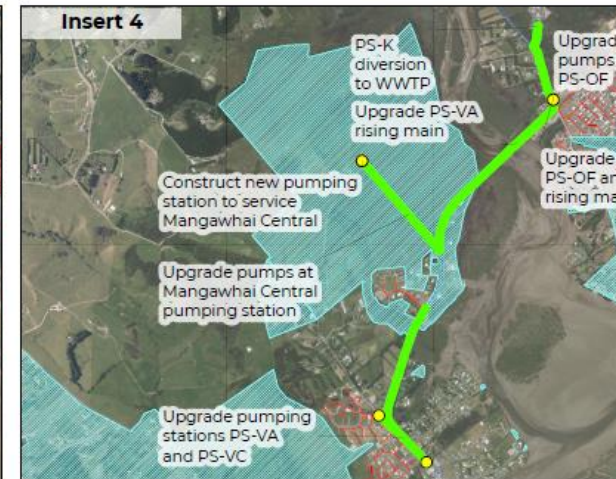
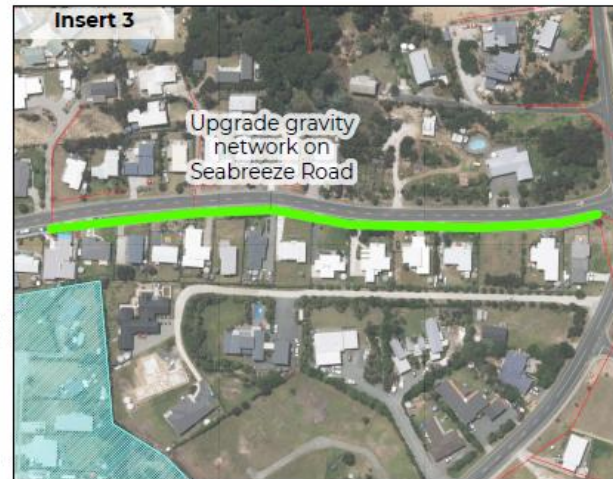
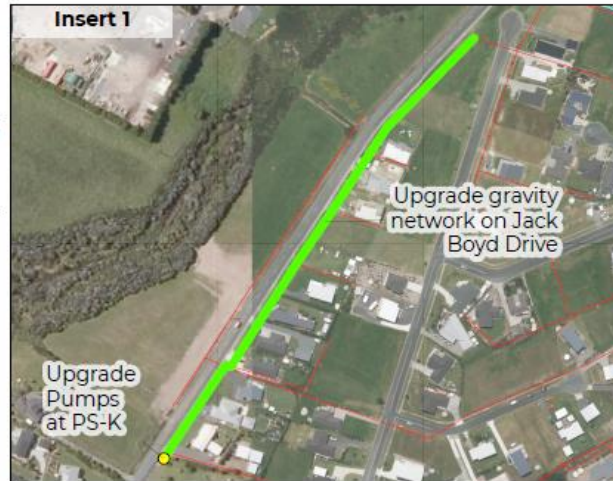
## Mangawhai Community Wastewater Network Upgrades



**Existing Network**  
 - Gravity Sewer  
 --- Rising Main

### Legend

- Pumping Stations
- Mangawhai Community Wastewater Treatment Plant
- New Development Areas



# Next Steps



1. Seek Council approval at the September 2023 meeting for the technical team to design and implement the stage 1 works and design of stages 2 & 3
2. Complete ongoing optimisation of the Mangawhai Wastewater Treatment Plant by the end of September 2023
3. Complete the repairs of the Brown Road Farm's effluent irrigation dam



# Thank You

Anin Nama



0212817527



[anama@kaipara.govt.nz](mailto:anama@kaipara.govt.nz)



Kaipara District Council

