

**MINUTES** of a meeting of the Raglan Community Board held in the Supper Room, Town Hall, Bow Street, Raglan on **WEDNESDAY 23 JUNE 2021** commencing at **1.35pm**.

**Present:**

Mrs G Parson (Chairperson)  
Mr S Bains [*from 1:38pm until 3:25pm*]  
Mr D Amore  
Mr T Oosten [*from 1:38pm*]  
Mr C Rayner  
Cr LR Thomson

**Attending:**

Cr A Bech *via audio visual platform*  
Cr C Eyre

Mr S Howard (Watercare)  
Mr R Pullar (Watercare)

Ms A Diaz (Chief Financial Officer)  
Mr I Cathcart (Special Infrastructure Projects Manager) *via audio visual platform*  
Ms C Nutt (Water Contract Relationship Manager)  
Ms G Kanawa (Democracy Team Leader)  
Ms C Beavis (Senior Communications Advisor)  
Mr M Horsfield (Democracy Advisor)

5 Members of the public in attendance

**APOLOGIES AND LEAVE OF ABSENCE**

**Resolved: (Mrs Parson/Cr Thomson)**

**THAT** an apology be received from **Mr MacLeod**;

**AND THAT** an apology for lateness be received from **Mr Bains** and **Mr Oosten**;

**AND FURTHER THAT** an apology for early departure be received from **Mr Bains**

**CARRIED**

**RCB2106/01**

## **CONFIRMATION OF STATUS OF AGENDA ITEMS**

**Resolved: (Mrs Parson/Cr Thomson)**

**THAT** the agenda for a meeting of the Raglan Community Board held on Tuesday, 23 June 2021 be confirmed and all items therein be considered in open meeting;

**AND THAT** all reports be received.

**CARRIED**

**RCB2106/02**

## **DISCLOSURES OF INTEREST**

There were no disclosures of interest.

## **CONFIRMATION OF MINUTES**

**Resolved: (Mrs Parson/Mr Amoores)**

**THAT** the minutes for a meeting of the Raglan Community Board held on Wednesday, 12 May 2021 be confirmed as a true and correct record of that meeting subject to the following alterations:

- Item 6:6, Sound Splash Report

**ACTION:** That Council provides a report relating to emergency service (Westpac Rescue, Police) activities during Sound Splash.

**CARRIED**

**RCB2106/03**

Mr Oosten and Mr Bains arrived at the meeting at 1:38pm during the above item.

## **PUBLIC FORUM**

The following matters were discussed

- Manu Bay Boat Ramp – It was noted that the report from the project manager should be received from all stakeholders. The public was unhappy with the levels of transparency. The report should be included in the agenda for public viewing.
- Path through football fields – Concern regarding the lack of consultation with the soccer club regarding the path along Marine Parade and its intrusion into the pitches and was unhappy with the final direction of the path. Aeration work was conducted too

late, and has affected the quality of the pitch. New gateway for vehicles may move the path more into the fields.

- Buses – Question raised whether the revised Bus Services project was delayed.
- Papahua cycleway has a lot of kinks in it and there was concern regarding motorbikes using the cycleway.
- Papahua footpath – Questions raised as to why the footpath goes behind the toilet block and that it should continue straight along the front of the block. Could be explained due to proximity to campervan disposal block.

**ACTION:** Staff to engage with the Board regarding the Papahua Walkway with an explanation as to why the Papahua Shared Path goes behind the toilet block and not straight in front of them.

## **REPORTS**

### Raglan Wastewater Treatment Plant Discharge Consent Application Update and Proposed Community Communications.

Agenda Item 6.1

Tabled Item: Raglan Wastewater Treatment Plant Discharge Consent Application Presentation

The report was received [RCB2106/02 refers] and discussion was held.

- Presentation was a pre-cursor to the public meeting being held on Tuesday 29 June 2021. Main purpose of the public meeting was to try and find a solution that aligns with what the Raglan community wants. The meeting offers a chance for the public to contribute to the project.
- The current wastewater treatment plant was constructed in the 1970s. Consents had been previously opposed by Tainui O Tainui. Discharge to land consent was not advanced. A 15 year consent was granted in 2005 which included the removal of a pond as it was located on a significant site to Tainui O Tainui.
- Seven (7) options had been identified to move forward which included Marine, Freshwater and Land discharges.
  - Marine Discharge
    - Currently the status quo. Investigations had been made including a dye test. Outlet would need to be cemented into deep bedrock. Key considerations include a new outfall with diffuser. This would require significant investment.
  - Freshwater Discharge
    - Would include one of the highest levels of treatment Membrane Bioreactor (MBR), which is a biological process.

- A key consideration was that advanced treatment was balanced against residence time of the plume within the harbour.
- Plume modelling was undertaken of the lower and upper harbour. Concern was noted that discharges would not fully be taken out with the tide, especially in the upper harbour.
- Ecology surveys have been conducted on the affects on fish and spawning.
- Land Discharge
  - Four different options
    - 100% private land discharge and storage.
    - Combined public land discharge and alternative discharge for winter flow.
    - Combined private land discharge and alternative discharge for winter flow.
    - Combined public land discharge and alternative discharge for winter flow with a membrane bioreactor.
  - Key consideration was affordability and realistic acquisition (private land) versus effective re-use and achievable discharge (public land).
  - Possible land clusters for discharge were identified. Noted that the area would need to be large.
  - Public land discharge could include the Golf Course and Wainui Reserve.
- The likely direction would need to consider future growth of Raglan.
- WDC Funding Decisions
  - Key considerations were targeted and general rates.
  - \$28 million budgeted in the Draft LTP 2021-2031 for the Raglan Wastewater Treatment Plant Upgrade.
  - Proposed 17% increase of the wastewater targeted rate. The community would need to be mindful of this.
- Communications
  - There had been public huis held on zoom.
  - A public meeting would be held on Tuesday 29<sup>th</sup> June 2021. Drop in sessions will be held in July at the Raglan Library.



- There would be a dedicated webpage on Council's website for the project.
- Project team would continue to work with Hapu, stakeholders and the community.
- Noted that it was important to understand the breakdown of the MBR process separate to stream discharge, and what material would be removed compared to the current process.
- Questions raised regarding what Council was doing to engage with Central Government on three waters funding.
- Important to highlight the role of Waikato Regional Council in the project.
- Questions raised of who the stakeholder groups were and what was the nature of the collaboration.
- Investigations should be undertaken to understand the individual cost to ratepayers per project option.
- Questions raised regarding who the decisions makers were. The community should be informed and consulted on the decision making process.

#### Representation Review Presentation

##### Agenda Item 6.2

The report was received [RCB2106/02 refers] and discussion was held.

##### Tabled Item: Representation Review Presentation

- A Representation Review was needed to be conducted every six (6) years.
- The legislative change and the adoption by Waikato District Council of Maaori Wards delayed the process of representation review.
- Still changes to be made to the proposals of possible wards. This will affect the Raglan ward boundaries.
- Briefing has been provided to Community Board and Committee Chairs regarding the of the proposed status and changes to community boards and committees.
- The Council will adopt the initial proposal during an extraordinary meeting on Wednesday 7<sup>th</sup> July 2021.
- Public consultation will go for six (6) weeks throughout July-August 2021.

- The following was being considering for the representation review;
  - Are Councillors elected by ward or district wide?
  - Total number of Councillors
  - Number, name and boundary of wards.
  - Number of members per ward (plus or minus 10% rule applies)
- Boundaries of Community Boards. Need to take into account whether to limit the boundary to urban areas or extending it out into rural areas. However, this may mean that extending the boundaries would include more people in the catchment for the targeted rate. There could be a possible challenge to this from the community if proper consultation was not conducted.
- Community Board members can stand for the board but only moved and seconded by individuals who live in the Board catchment.
- Raglan ward boundaries would grow due to the introduction of Maaori wards.
- Communities of Interest – Important to get feedback to shape the ward correctly.
- Important not to make any assumptions, and important to get the feedback from communities outside of the current boundaries.
- Public consultation process yet to be developed.
- Total number of Councillors predicted to be 11 general councillors and 2 Maaori councillors. Additionally, likely to be 7 wards.
- Three tiers of Community Board/Committees.
  1. Community Boards. They have formally elected members with appointed Councillor/s. They are provided with two Council staff. Boards funded by targeted rates with access to discretionary funding. Supported with minutes and agendas.
  2. Community Committees, Volunteers. Partially supported by Council with Senior Leadership Team member attending. They are being asked if they wish to have a targeted rate for a discretionary fund. All meetings are advertised via Council and some committees received assistance with agenda and minutes. Two currently have discretionary funds as they were previously Community Boards.
  3. Community Committees. Not supported by Council, typically in very small communities. With growth, they may wish to become a larger formal Committee. Agenda and minutes are not located on the Council website.
- Community Boards may wish to merge and have subdivisions as an option to link communities of interest.

- Possibility of either the Board or Council to undertake public consultation sessions in the rural areas outside Raglan on whether they should be included in the Community Board boundaries.

**ACTION:** Raglan Community Board will connect with rural communities and put forward the Board recommendation to Waikato District Council by 30<sup>th</sup> June 2021.

Mr Bains left the during the above item at 3:25pm.

Discretionary Fund Report to 9 June 2021  
Agenda Item 6.3

The report was received [RCB2106/02 refers] and no discussion was held.

**Resolved: (Mrs Parson/Cr Thomson)**

**THAT the Raglan Community Board approves payment to Margaret Boggiss from their Discretionary Fund in the amount of \$50 for a Wreath for ANZAC Day 2021.**

**CARRIED**

**RCB2106/05**

Raglan Works, Actions & Issues Report: Status of Items June 2021  
Agenda Item 6.4

The report was received [RCB2106/02 refers] and discussion was held.

Tabled Item: Manu Bay Breakwater Report

- Manu Bay Breakwater
  - The Project Manager discussed the tabled report relating to the Breakwater. More investigations and surveys were needed to be undertaken by the survey team. Further rock removal was needed in front of the breakwater itself. Looking to move forward with collaborating with the Raglan Sports Fishing Club and capping the breakwater. An independent engineer was on board, who can directly inform on what the changes and impact are of the works. The report circulated confirms the performance of the breakwater.
  - The delay in the availability of the report had been due to its review and edits being undertaken to clarify wording and information.
  - Questions raised regarding when the next meetings would occur. Important to have discussions with the Community Projects Manager along with stakeholders. Council had engaged with a surveyor to work on the current settlement and would move forward with the next stage of consultation.

**ACTION:** Mr Amoore, Cr Thomson and Mrs Parson would meet with the Community Projects Manager to discuss further consultation.

- Inter-Raglan Bus Service
  - Mrs Parson would follow up with the Senior Transportation Engineer to get Mr Rayner and Mr Bains involved in the working group.
- Civil Defence
  - Information from the Community Response Planning workshop undertaken in 2020 can be included in the Community Resilience Plan.
- Aerodrome Safety Improvement
  - Mrs Parson had been in contact with the General Manager Service Delivery and the Open Spaces Team Leader who had engaged with a consultant regarding the safety improvements. The final brief would be available on the website.
  - A proposal would be received from the consultant in response to the brief from Waikato District Council. A report from consultant is due by the end of July 2021.
  - The red lines on the Aerodrome would be repainted.
  - The proposed fencing was on hold until the independent review was completed, this will inform any further discussions/decisions moving forward.
  - Parking on the airfield – Camp staff had noted the limited parking due to overflow from the Camping Ground.
- Raglan Chronicle and Hikotron items can be removed from the report.
- Papahua Walkway
  - Discussion held regarding the alignment of Stage 2 Papahua walkway and providing feedback to staff from previous discussion during the Public Forum.

**Resolved: (Mrs Parson/Mr Rayner)**

**THAT the Raglan Community Board requests that work does not start on the Papahua Walkway Stage 2 until a site visit had been undertaken by board members to finalise the position of the path.**

**CARRIED**

**RCB2106/06**

Proposed Road Name List for Rangitahi Limited Stage 2 Precinct D Subdivision at Raglan  
Agenda Item 6.5

The report was received [RCB2106/02 refers] and discussion was held.

- Noted that the Maaori street names should have more of a connection to the Community.

**Resolved (Mrs Parson/Cr Thomson)**

**THAT the Raglan Community Board supports, and recommends, to the Infrastructure Committee for approval, the following eight proposed road names supplied by Rangitahi Limited for Rangitahi Peninsula Stage 2 Precinct D at Raglan in accordance with the Road Naming Policy:**

- **Arapatiki Street (Road 7)**
- **Tunarua Street (Road 8)**
- **Ruruhi Street (Road 9)**
- **Pae Kotare Street (Road 10)**
- **Kapokapowai Street (Road 11)**
- **Kawakawa Street (Road 12)**
- **Koromiko Lane (Joal Lots 713, 274-278)**
- **Rerekahu Lane (Joal Lots 719, 208-215)**

**CARRIED**

**RCB2106/07**

Raglan Community Board LTP 2021-2031 Submission  
Agenda Item 6.6

The report was received [RCB2106/02 refers] and discussion was held.

- The Board noted their thanks to the Chair for presenting to the LTP hearings.

### Chairperson's Report

#### Agenda Item 6.7

The report was received [RCB2106/02 refers] and discussion was held.

- Harbour board leases
  - A discussion was held regarding a request to receive an annual report regarding the harbour board leases.

**ACTION:** Board would like an annual report regarding the harbour board leases including financial information.

- An upgrade to the harbour beacons was required, and the height of the beacon would need to be raised as complaints had been received.
- Verandah Lighting
  - There was currently no Council policy on verandah lighting. Cr Thomson raised the topic with the Chamber of Commerce for lighting improvements. Concern that it was a safety issue. Council should have a bylaw position on Verandah lighting.
- Representation Review
  - Board members would share an email that would be drafted by Mrs Parson to test the waters and explain how the public could be involved in the proposed representation review during the public consultation period.
- Trial Community Board Evening Meeting
  - Possibly have an evening meeting at 5pm on Wednesday, 27 October 2021.

### Raglan Naturally Report

#### Agenda Item 6.8

The report was received [RCB2106/02 refers] and no discussion was held.

Councillor's Report  
Agenda Item 6.9

The report was received [RCB2106/02 refers] and discussion was held.

- Good strategy planning underway at the Raglan Camp Ground with regards to erosion and climate change.
- Unsealed Roading network public meeting – Concern regarding the condition of the roads. Good turn out for the meeting and would meet again in six (6) weeks.
- Raglan Area School – Road Safety. Had met with the PTA. There was a need to get more people involved in road safety strategic planning.

Board Members Report  
Agenda Item 6.10

The report was received [RCB2106/02 refers] and discussion was held.

- Opening of the CBD parklets will now be held on Friday, 25 June 2021.

There being no further business the meeting was declared closed at 4:29pm.

Minutes approved and confirmed this                      day of                      2021.

G Parson  
**CHAIRPERSON**

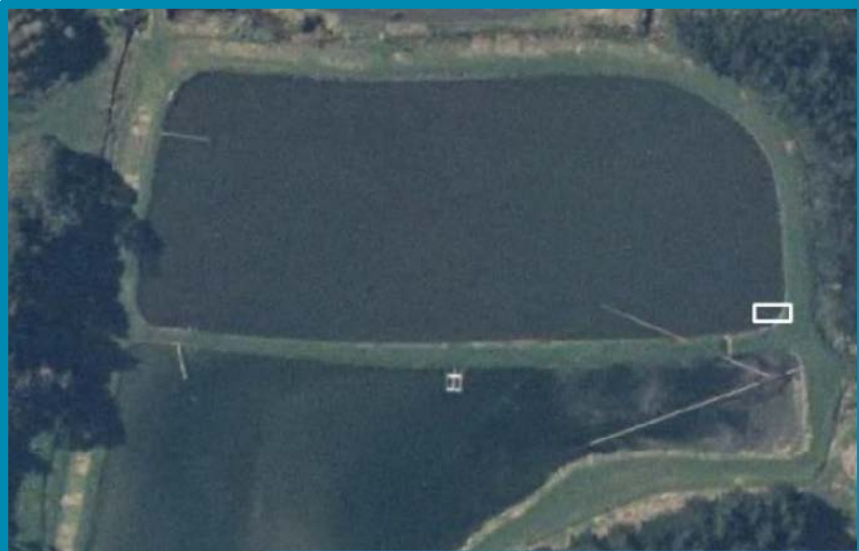
# Raglan Wastewater Treatment Plant Discharge Consent Application

- **Background and Investigations**
- **Community communications**
- **Feedback**

23/06/2021 Presented by the Consenting Project Team (WDC and Watercare)



# BACKGROUND



2002



Upgrade post consent (2004 –directed by Environment Court)

## THE RAGLAN CHRONICLE

EST. 1903

Ngā Ripo o Whāingaroa

ISSUE #731

### THE RAGLAN CHRONICLE

Whāingaroa news for you weekly  
107 June 2021 • Issue #731



Taniwha reclaims his lair at Raglan sewage ponds

Published on July 18, 2019

Download the latest issue

*Te Atai o Rongo is represented as a taniwha at the top of the pou. His son Kaihu is below. He is facing the river, his accessway to and from the sea.*

*The stainless steel design represents the ripples that follow te Atai o Rongo when he travels.*

*It is also in the shape of an arero (tongue) to issue the challenge to council and the community to remove wastewater from the moana.*

# BACKGROUND

*Key Stakeholders Group  
Monthly Updates (2020-2021)*

**2020 Project Objectives**      keep community healthy; environmental protection;  
support kaitiaki; protect visitor experience;  
partnership; sustainability; affordability



	Option	Treatment	Discharge
<b>Marine Discharge</b>	Option M1	Existing treatment process + tertiary membrane	New harbour outfall
	Option M2	Membrane Bioreactor (MBR) and UV disinfection	New harbour outfall
<b>Fresh Water Discharge</b>	Option F1	MBR and UV disinfection	Freshwater diffuse discharge
	Option L2	Existing treatment process + tertiary membrane	Private land discharge and storage
<b>Land Discharge</b>	Option L1	Existing treatment process + tertiary membrane	Combined public land discharge (irrigation) and alternative discharge for winter flow
	Option L3	Existing treatment process + tertiary membrane	Combined private land discharge and alternative discharge for winter flow
	Option L4	MBR and UV disinfection	Combined public land discharge and alternative discharge for winter flow

**✗ Deep Bore Injection**

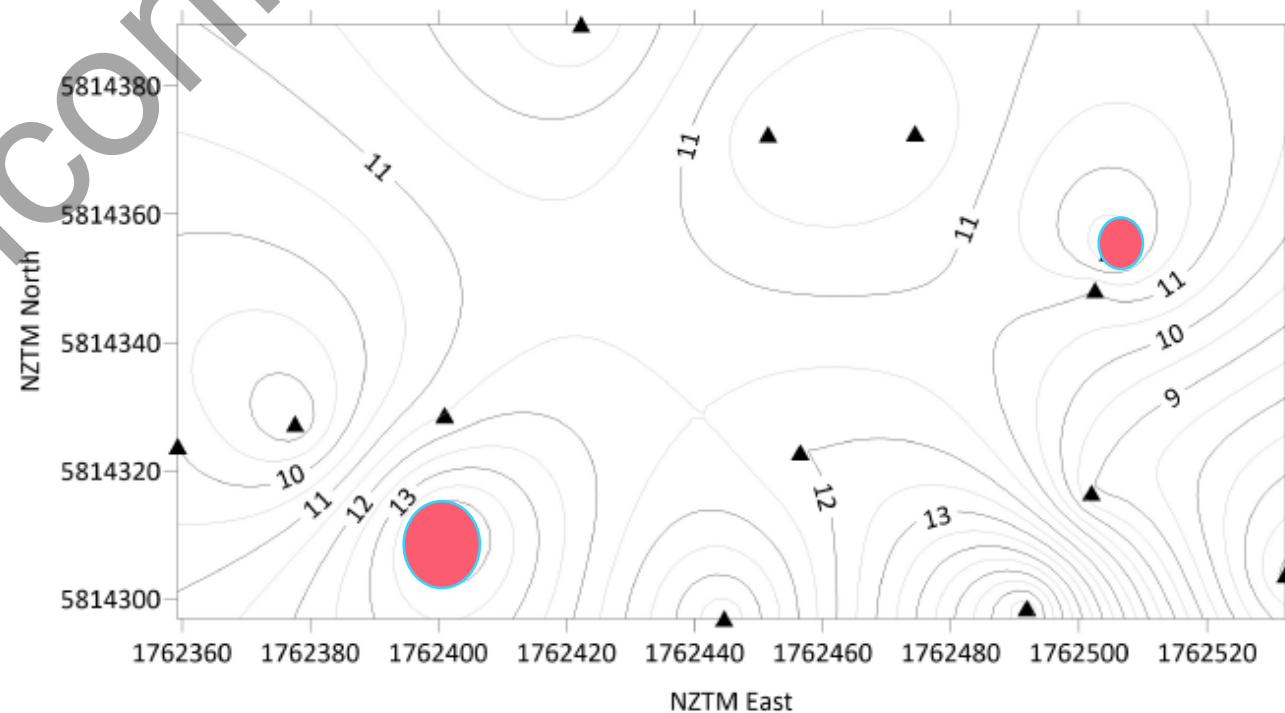
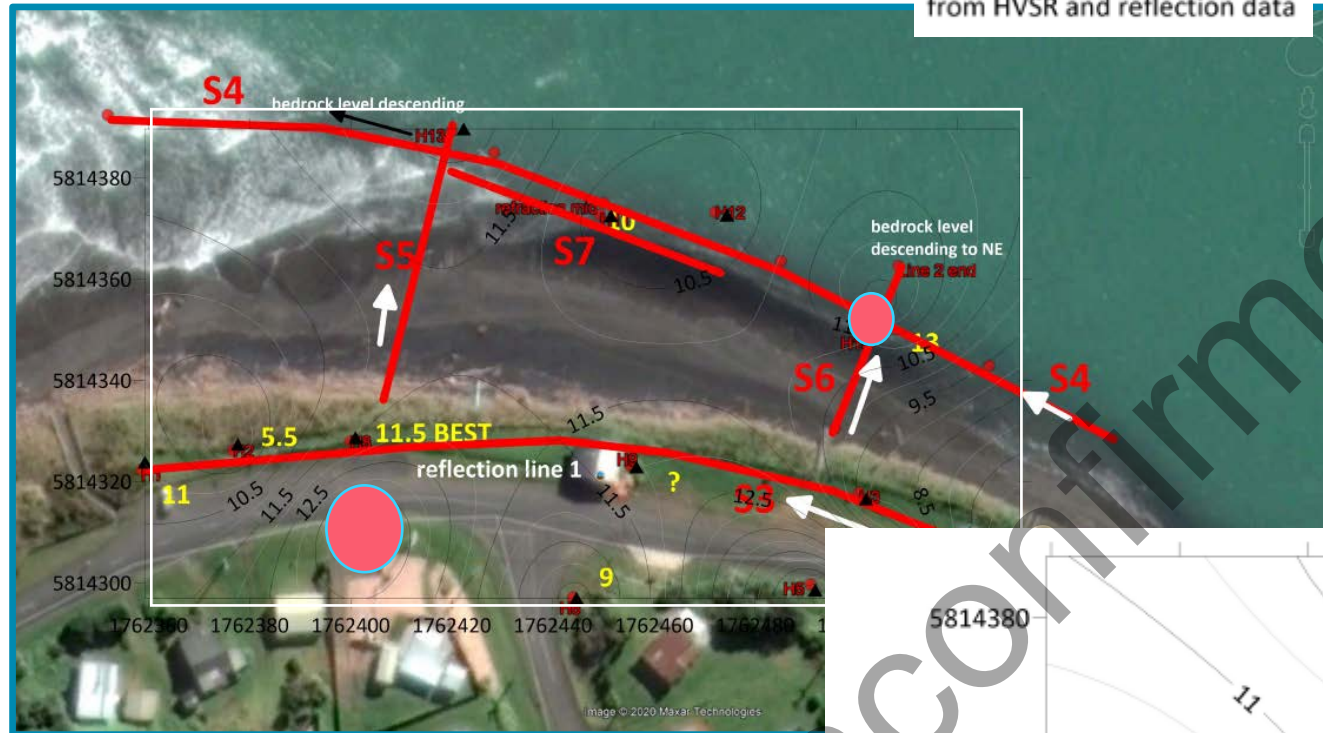
# INVESTIGATIONS **MARINE DISCHARGE**



2020 Dye Test



# INVESTIGATIONS MARINE DISCHARGE

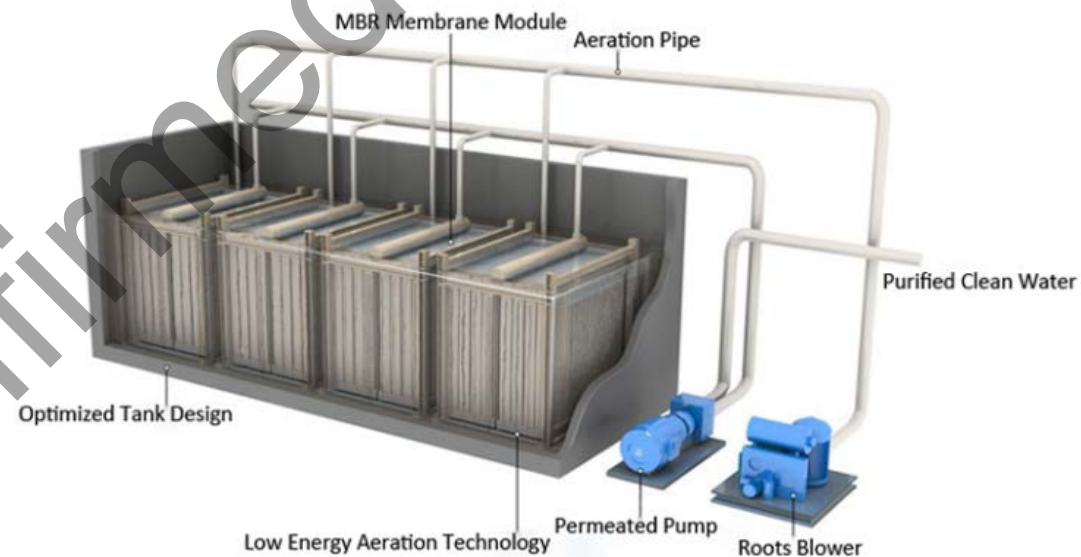


**Key Consideration:**  
***New Outfall with diffuser***

# INVESTIGATIONS FRESH WATER DISCHARGE



## Membrane Bioreactor (MBR)



**Key Consideration: Advanced treatment balanced against residence time of plume within the harbour**



# INVESTIGATIONS FRESH WATER DISCHARGE



2020 Stream Health Survey



2020 Fish & Spawning Survey





# INVESTIGATIONS LAND DISCHARGE

Option	Treatment	Discharge
Option L2	Existing treatment process (UV) + tertiary membrane	<b>100% Private land</b> discharge and storage ( <b>dam</b> )
Option L1	Existing treatment process (UV)+ tertiary membrane	Combined <b>public land</b> discharge (irrigation) and alternative discharge for winter flow ( <i>point source/high rate to sand</i> )
Option L3	Existing treatment process (UV) + tertiary membrane	Combined <b>private land</b> discharge and alternative discharge for winter flow ( <i>point source/high rate to sand</i> )
Option L4	<b>Membrane Bioreactor</b> and UV disinfection	Combined <b>public land</b> discharge and alternative discharge for winter flow ( <i>point source/high rate to sand</i> )





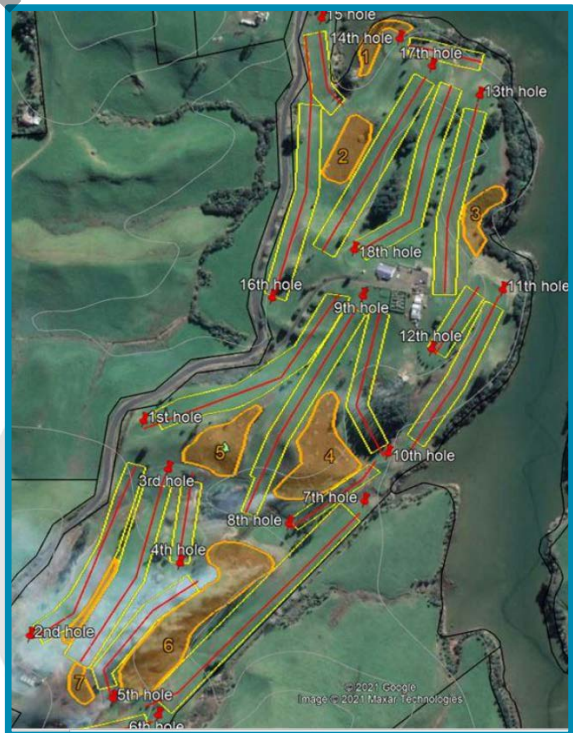
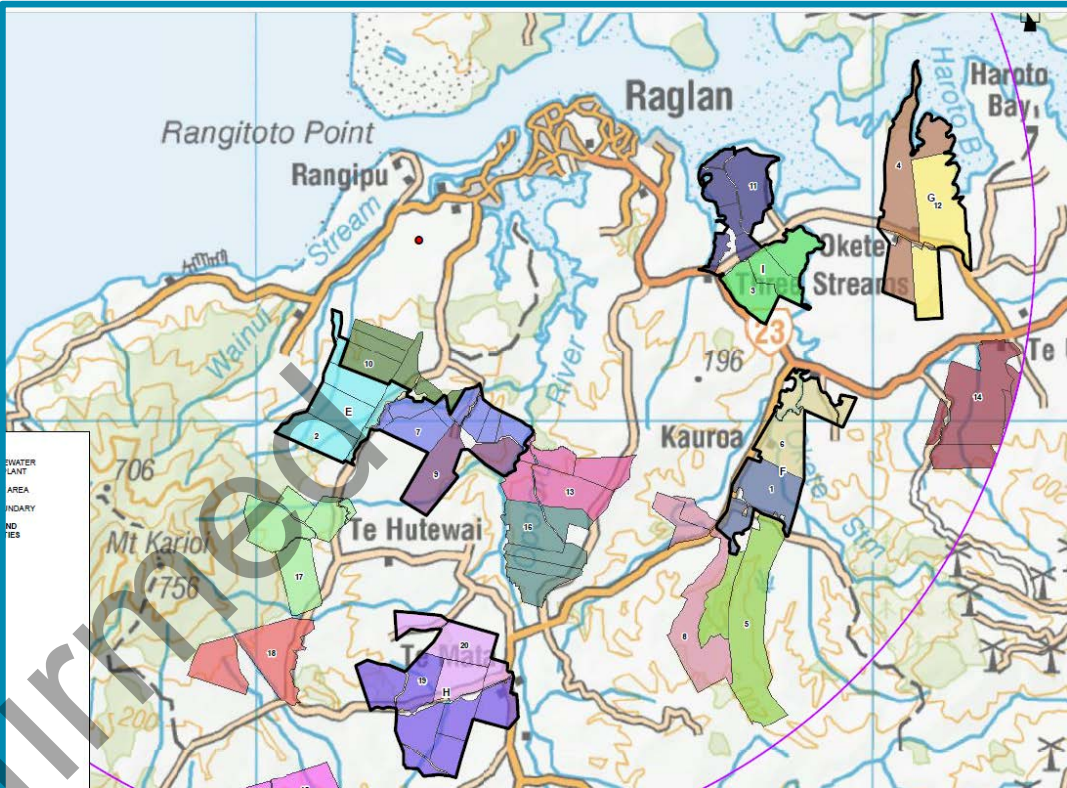
# INVESTIGATIONS LAND DISCHARGE

*(Conceptual Only)*

*L2: 100% to land with Winter Storage (dams)*

*L1: Public land with Alternative Discharge (sandy soils)*

**Investigating Hydraulic Characteristics for Winter flow**



**Key Consideration:**  
***Affordability and realistic acquisition (private land)***  
***vs***  
***Effective re-use and achievable change (public land)***



# Likely Direction (Technical Team Recommendation)

Option	Option Appropriateness (Technical Team scoring)	Hapū (feedback)	Community Board Feedback (some KSH)	Financial (LTP \$M)
MARINE1	55			17
MARINE2	50			30
FRESHWATER 1	30			30
100% TO LAND (L2)	72	<p>Business case needed by hapū prior to position-forming.</p> <p><b><i>What is an achievable not-point source option (i.e. allowing customary kaimoana collection that has been prohibited for decades?)</i></b></p> <p>Existing outlet could be o.k for an interim time with effective conditions working toward alternative discharge for winter flow (i.e. high rate discharge to sands)</p>	<p>Community Board have highlighted that positioning will be in-step with hapū</p>	58
<u>PUBLIC LAND (L1)</u>	61			25
<u>PRIVATE LAND (L3)</u>	65			43
MBR & PUBLIC (L4)	58			42

Existing Flow



Future Flow



**Key Consideration/Status:**

***Challenges with Public Land***

***(ability for co-use/public reception of discharge method)***

## WDC Funding decisions

### Raglan wastewater treatment plant upgrades

Draft LTP 2021-31 Budget

2021/22	2022/23	2023/24	2024/25	2025/26	Total (inflated)
510,000	4,935,000	6,873,048	7,196,081	8,781,618	\$ 28,295,747



#### Key Consideration:

- Targeted Rates
- General Rates

## Communications for the project

- *Ongoing public hui by zoom*
- *Upcoming public meetings and drop-in sessions*
- *Media and social media*
- *Dedicated web page*
- *Working together with hapū, stakeholders and community*

Unconfirmed



# Community Board/Project Team Discussion

## Discussion Starters

- Critique of presentation content for the wider community meeting;
- What are best methods for future meaningful community engagement and information distribution



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### Updated Timeline (contd)

- 15 June to 29 June – Presentation on decisions to date on initial proposal
- 28 June – Briefing presenting draft initial proposal to Councillors
- 21 June to 30 June – Staff finalise changes to initial proposal
- 7 July – Council adopts Initial Proposal
- 9 July to 20 August – Consultation period
- 9 September – Rep Review Hearings

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### Decisions required for initial Proposal

1. Councillors elected District Wide or by Wards
2. Total number of Councillors
3. Number, name and boundaries of Wards
4. Number of members per Ward
5. Number, name and boundaries of Community Boards
6. Number of members per Community Board
7. Draft Initial Proposal adopted, including changes and reasons for those changes

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### Councillors & Wards

- Maaori representation to be elected District Wide
- Balance of Councillors to be elected by Wards
- Total number of Councillors:
  - 11 (General) by Ward
  - 2 (Maaori) District Wide
- 7 Wards – boundaries and names yet to be finalised (changes recognise feedback on communities of interest)

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## Community Boards vs Committees

- Three tiers of support:
  - Community Boards:
    - funded by targeted rates with access to discretionary funding
    - formally elected representatives including appointed Cr(s)
    - fully supported by Council 2 x staff resources per board
  - Community Committees (urban/lifestyle areas):
    - partial funding provided through general rates for administration/printing/discretionary funding
    - community volunteers
    - partially supported by Council 1 staff per committee and 1 Cr appointed (non voting member)
  - Community Committees (rural areas):
    - completely voluntary with no council resource

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## Smaller Community Committees – Tier 3

- No Council resources provided
- Committee members voluntary
- Agendas/minutes not on Council website
- Many of these smaller committees reflect the size of the community and some originally started as Hall/Reserve Committees
- With growth some of them may wish to move towards Tier 2 but this does have funding implications

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## Community Committees – Tier 2

- Partially supported by Council – all meetings advertised as part of Council monthly advert.
- Some agendas put together by Democracy Team and loaded to Council website.
- Minutes provided by Community Committee Secretary for loading to Council website.
- 1 senior staff member at meeting.
- Based on urban limits and local Councillor appointed as non voting member
- Currently 4 – Meremere, Pokeno, Tamahere and Te Kauwhata.
- Would your community support a targeted rate, and if so at what level \$20, \$20-40, \$40+

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### Community Boards – Tier 1

- Meetings fully supported by 2 x Council staff – targeted rate collected
- Number and name of Community Boards (currently 5 - Huntly, Ngaruawahia, Onewhero-Tuakau, Raglan and Taupiri)
- Will boundaries be contained to urban areas or extend to rural areas of the ward
- Any boundary changes need to factor in – impact to residents not currently paying targeted rate and communities of interest from those outside urban areas
- Will the Community Boards have subdivisions linking communities of interest (note +/-10 rule)
- Number of elected members on each board
- Number of appointed members, ie Councillor(s)

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That's all – any questions or comments?



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	Community Board (for a larger community)	Community Committee (for a larger community)	Other Community Committees and Representative bodies (incl. Residents & Rate Payers Associations, and smaller community groups)
	Tier 1	Tier 2	Tier 3
<b>Legal status</b>	Unincorporated body (separate from Council and not a committee) s51 LGA 2002	Unincorporated body – established by, and for, a specific community. It is not a Council committee.  Option to become incorporated	Unincorporated body – established by, and for, a specific community. It is not a Council committee.  Option to become incorporated
<b>Governing legislation</b>	Governed by same legislation as the Council (as far as applicable to a community board). In particular: <ul style="list-style-type: none"> <li>• LGA 2002 (meeting process, decision-making etc)<sup>1</sup></li> <li>• LGOIMA (Council information, meeting process)</li> <li>• LEA (elections)</li> <li>• LAMIA (members' interests)</li> </ul>	Not expressly governed by local government legislation, though any decisions made under delegation from Council need to comply with relevant legislation.  Best practice/guidance is that it mirrors Community Board compliance with legislation.  LGOIMA applies to any official information held by the community committee.	Not expressly governed by local government legislation.  LGOIMA applies to any official information held by the community committee.
<b>Governing documentation</b>	Community Board Charter (with Council) – terms of reference and delegations  Follows Standing Orders  Code of Conduct (optional to adopt)	Community Committee Charter- terms of reference and delegations  Follows Standing Orders and Council Code of Conduct (not formally adopted).	Each committee responsible for its own governing documentation on how it will operate.

<sup>1</sup> LGA (Local Government Act); LGOIMA (Local Government Official Information and Meetings Act); LEA (Local Electoral Act); LAMIA (Local Authorities (Members' Interests) Act)

	Community Board (for a larger community)	Community Committee (for a larger community)	Other Community Committees and Representative bodies (incl. Residents & Rate Payers Associations, and smaller community groups)
	Tier 1	Tier 2	Tier 3
Representative function	Represents a community within a defined geographic area, determined as part of Council's representation review.	Represents a community without a defined area; informal understanding of the community's parameters.	Represents a community without a defined area; informal understanding of the community's parameters.
Role and responsibilities <sup>2</sup>	<p>As set down in the LGA<sup>3</sup> and as delegated by Council (refer to Board Charter). These include:</p> <ul style="list-style-type: none"> <li>• Represent and advocate for community;</li> <li>• Engage and consult with its community;</li> <li>• Maintain an overview of Council services in the community;</li> <li>• Submissions to Council;</li> <li>• Oversee and support community projects;</li> <li>• Can establish subcommittee(s);</li> <li>• Develop and implement community plan/placemaking activities;</li> <li>• Approve discretionary funding activities (see below);</li> <li>• Connect with hall committees in board's area;</li> <li>• Appointments on non-Council bodies within board's area.</li> </ul>	<p>Set out in the Committee's charter (incl. any delegations from Council). These include:</p> <ul style="list-style-type: none"> <li>• Represent and advocate for community;</li> <li>• Engage and consult with its community;</li> <li>• Maintain an overview of Council services in the community;</li> <li>• Submissions to Council;</li> <li>• Oversee and support community projects;</li> <li>• Can establish subcommittee(s);</li> <li>• Develop and implement community plan/placemaking activities;</li> <li>• Approve discretionary funding activities (see below).</li> <li>• Connect with hall committees in board's area;</li> </ul>	<p>Set out in the committee's governing documentation. No delegations from Council.</p>

<sup>2</sup> What is delegated to a Community Board (or Committee) is outside the scope of the representation review, though can be reviewed/considered at the same time if desired.

<sup>3</sup> Refer s52 LGA – set out in Appendix 1.

	Community Board (for a larger community)	Community Committee (for a larger community)	Other Community Committees and Representative bodies (incl. Residents & Rate Payers Associations, and smaller community groups)
	Tier 1	Tier 2	Tier 3
<b>Appointment of members</b>	<p>Determined under the LEA – elected members appointed via local authority elections; appointed members resolved by Council (in accordance with representation review).</p> <p>Currently each has 6 elected members and either 1 or 2 appointed members.</p>	<p>Determined in accordance with Committee Charter, acting as community volunteers.</p> <p>Council senior staff facilitate an informal elections process for members.</p> <p>Local councillor(s) to attend as non-voting member.</p> <p>Currently able to have between 3 and 14 elected members.</p>	<p>Determined by committee's governing documents, acting as community volunteers.</p> <p>Council does not facilitate and is not usually involved in process.</p> <p>Local councillor(s) may attend as non-voting member.</p> <p>Able to determine number of elected members.</p>
<b>Funding</b>	<p>LGA requires Council to provide “the necessary administrative and other facilities for that community board” and cover the board's expenses in fulfilling its roles and responsibilities (subject to any limit set by the Council): thus administration funded via general rates</p>	<p>Administration funded via general rates (staff time and budget for admin support between \$500 and \$4000 depending on size of population)</p> <p>No legislative obligation for Council to fund/support.</p>	<p>No Council funding other than and budget for admin support between \$500 and \$1000 depending on size of population).</p> <p>No legislative obligation for Council to fund/support.</p>
<b>Discretionary funding (for community)</b>	<p>Own discretionary fund in LTP/AP from Targeted Rate*- WDC staff process valid, approved expenditure on behalf of the committee and prepare reconciled statement of fund for each Board meeting.</p> <p>It is anticipated that discretionary funding expenditure is in line with Local Area Blueprint and other community aspirations.</p> <p><i>*Targeted Rate covers discretionary funding and member remuneration</i></p>	<p>Own discretionary fund in LTP/AP <u>IF</u> Targeted Rate in place– WDC staff process valid, approved expenditure on behalf of the committee and prepare reconciled statement of fund for each committee meeting.</p> <p>Can currently apply for funding via Rural Ward Discretionary Fund (funds under ‘sinking lid’) but in future funding applications need to align with Local Area Blueprint and/or be included on WDC's Unfunded Projects List</p>	<p>Can currently apply for funding via Rural Ward Discretionary Fund (funds under ‘sinking lid’) but in future funding applications need to align with community aspirations and/or be included on WDC's Unfunded Projects List</p>

	Community Board (for a larger community)	Community Committee (for a larger community)	Other Community Committees and Representative bodies (incl. Residents & Rate Payers Associations, and smaller community groups)
	Tier 1	Tier 2	Tier 3
<b>Remuneration of members</b>	Elected members may receive remuneration as determined by the Remuneration Authority, fully funded from Targeted Rate by rate payers within the boundaries of the Board.	No remuneration for elected members (if a Targeted Rate is in place this will be for discretionary funding only). In effect, members are unpaid volunteers.	Likely no remuneration for elected members; remuneration, if any, as determined by committee's governing documents (i.e. must be self-funded)
<b>Governance support</b>	<p>Democracy team oversee all meeting and governance requirements (including agendas, minutes, circulation of actions from meetings and LGA/LGOIMA meetings compliance).</p> <p>Chairperson training provided as part of induction.</p> <p>Co-ordinate regular catch-ups between Chair, Democracy Team rep and Management rep.</p> <p>Assistance and advice provided for chair reports.</p> <p>Facilitate and part-fund attendance of representatives to biennial Community Board conference.</p>	<p>Committee has its own secretary, elected from amongst its members.</p> <p>Democracy team collates and distributes agendas and posts online, prepares draft minutes for committee secretary, circulates actions to WDC staff, publishes agendas and minutes online.</p> <p>Ad-hoc governance support provided as and when required (e.g. membership queries, conflict of interest issues etc).</p>	No governance support from Council
<b>WDC staff support</b>	Senior staff member supports Board, attending each meeting as representative for Council management.	Senior staff member supports Committee, attending each meeting as representative for Council management.	No direct, ongoing support provided by WDC staff though may appear from time to time on particular issues of local concern or general matters of interest.
<b>Other Council operational support</b>	<p>Prepare and update formal Works and Issues report each meeting.</p> <p>Engage/consult with Board on community and district-wide issues.</p>	<p>Prepare and update formal Works and Issues report each meeting.</p> <p>Engage/consult with committee on community and district-wide issues.</p>	<p>No additional operational support provided.</p> <p>May engage/consult with committee on community and district-wide issues.</p>

## Appendix 1 – Role of Community Board (section 52, LGA)

The role of the community board is to:

- (a) represent, and act as an advocate for, the interests of its community; and
- (b) consider and report on all matters referred to it by the Council, or any matter of interest or concern to the community board; and
- (c) maintain an overview of services provided by the Council within the community; and
- (d) prepare an annual submission to the Council for expenditure within the community; and
- (e) communicate with community organisations and special interest groups within the community; and
- (f) undertake any other responsibilities that are delegated to it by the Council.

## Appendix 2 – Questions Community Boards and Committees

As part of the Reshape Waikato project (representation review) we would like your feedback on:

1. What is your community of interest? Considering this, where should your boundaries be, i.e. limited to urban areas, extend across the ward or several wards (noting that wards are likely to have different boundaries now, so it is unlikely that matching ward boundaries will be workable).
2. If you are a board/committee within a large ward do you think it would be better to have one board/committee, with or without subdivisions (noting that the +/-10% ratio applies as in the case with wards) or multiple board/committees?
3. What do you think the appropriate number of elected members should be for your community?
4. How many Councillors do you think should be appointed to or attend your Community Board/Committee?
5. Given these boundaries and number of members, will your community be best represented by a community board or community committee arrangement? Note differences from table above AND 6. below if changing from a committee to board is your recommendation.
6. Will your community support a **targeted rate of \$20, \$20-40 or \$40+** for:
  - a. Remuneration of members
  - b. Discretionary funding for local projects
  - c. Cost recovery for supporting a community board **DECIDE Q1-6 BY 30 JUNE FOR CONSULTATION WITH WIDER REP. REVIEW**
7. Should each community board/committee consult with its community on its own targeted rate (reflecting local affordability, size and amount of community aspirational projects, desired speed of project implementation and so on) or have a standard rate where each committee then decides the split between administration costs and discretionary funding only? **DECIDE Q7 BY YR END FOR SEPARATE FUNDING CONSULTATION**

# **Reshape Waikato survey and focus group data analysis**

Elected Members Workshop - February 2021



1. Introduction
2. Summary of the key findings
3. Survey analysis
4. Stakeholders focus groups analysis
5. Community focus groups analysis
6. Map boundaries
7. Conclusion and recommendations

## I Introduction

Council is required by the Local Electoral Act 2001 (LEA) to undertake a review of its representation arrangements at least once every six years. The goal of this representation review process is to ensure that local authorities provide fair and effective representation for people and communities in their authority areas. As part of this process, Council needs to make important decisions regarding the number of wards and community boards within the District as well as the location of their geographical boundaries. The number of Councillors and elected community board members are also up for review. Research of community representation preferences and community engagement are key in guiding this process to achieve better outcomes for the communities that live in the District.

Reshape Waikato is the name given to the 2020/2021 representation review process at the Waikato District Council. This report summarises the findings of three engagement strategies that were carried out by the Reshape Waikato project team between 18 August 2020 and 26 November 2020. The three strategies were as follows:

1. Community Survey
2. Stakeholder Focus Groups
3. Community Focus Groups

The Reshape Waikato project team initially identified an intrinsic tension between broad but shallow public engagement (general consultation or engagement) and narrow but in-depth public engagement (targeted consultation or engagement). The team opted for covering both ends of the spectrum with an additional focus on the narrow, in-depth, dimension of consultation. The team developed three different approaches to public engagement.

The first engagement strategy was a community survey. The goal of the survey was to get a first, broad, understanding of our communities' views. This represented the broad, but shallow, end of the public engagement spectrum. Information was provided through Council's online consultation site "Shape Waikato", and hardcopy material was distributed to all Council offices and libraries. Participation in the survey was based on self-selection and no interaction with the contributors occurred.

The second and third engagement strategies involved focus group sessions. The goal of the focus group sessions was to gain numerically narrower, but much more reasoned, input from the public. Focus group sessions were divided into two streams.

- The first stream was the "stakeholders focus groups". In these focus groups, categories of stakeholders were identified: community boards/committees members, businesses (small and big), community organisations and service providers (schools, health care, etc.). When multiple stakeholders belonged to a same category and no relevant criteria existed, random selection was used to select participants. This was mainly the case with small businesses and schools because while there were not many community organisations and big businesses in some areas, there were usually many schools and small businesses. A more detailed explanation of the selection process can be found in the relevant sections of each engagement strategies in this report.
- The second stream of focus group sessions involved a mix of randomly selected members of the public who were contacted using the electoral roll data and members of the public who participated in the survey.

In both type of sessions, balanced educational material on the representation arrangements that had been reviewed by the Mayor and Councillors Bech and Sedgwick was presented to the participants. Participants engaged in comprehensive and small group discussions before engaging in a number of

activities and answering a set of questions. There were seven sessions and each session lasted about two hours.

This report offers a description and analysis of the information collected through these three engagement strategies before offering some discussions and indicative conclusions that should guide the development of an initial proposal by the Council.

## **2 Summary of the key findings**

Based on the project team's pre-engagement strategy, the following views and preferences have been identified:

- There is a need for amending current representation arrangements (which is in line with the Local Government Commission recommendations from the Council's previous representation review).
- The preferred number of councillors was between 14 and 16.
- The preferred number of wards was between 6 and 8 (with a possible option of having some councillors elected at large).
- Community Boards are popular forms of local representation and the area they cover could be increased.
- Some consideration should be given to the establishment of rural community boards.

## **3 Survey analysis**

- Introduction

The survey was the first step in the Reshape Waikato project team's early engagement strategy. The rationale behind the survey was to retrieve a numerically high and quantifiable set of data. This approach allowed us to reach a broad set of residents but the trade-offs of this approach were a) self-selection biases and b) a potential lack of in-depth, well-reasoned, answers and data.

- Methodology and number of respondents

An online survey was posted on Shape Waikato on 18 August 2020 and closed on 1 October 2020. The survey was open to anyone to respond to and we received 394 contributions (378 contributors). There were seventeen multiple choice questions, with, when relevant, space for comments and/or extra explanation to capture the thoughts of the responder. The survey was advertised through social media, and through Council's website. Hardcopies were made available at libraries and Council offices.

There was no mechanism in place to control the contributors' identity and it is, therefore, possible that a small number of responses came from a) the same people who may have done the survey twice and/or b) people who do not live/own property in the District. There was some evidence from the responses of a couple of cases of both a) and b).

- Demographic information about the respondents (questions 1; 15-17)



The majority (38.32%) of contributions came from people living in a locality that was not listed in the survey (the key localities were identified and included but it was preferable not to list all localities in the District to avoid a fragmentation of the data). About a quarter of the contributions came from localities in the Northern part of the District: Tuakau (13.45%), Pokeno (6.09%), Port Waikato (4.57%), and Mercer (1.27%).

Other significant response rates included Ngaruawahia (6.85%) and Tamahere (6.85%), Raglan (5.84%), and Huntly (5.33%).

37.31% of contributors were in the 45-60 age group, 29.70% in the 30-45 age group, and 20.05% in the 60-75 age group. 65.48% identified as New Zealand Europeans, 26.14% identified as Maaori, and the remainder of the contributors were part of other ethnic groups.

Finally, 64.21% of the contributors were female, 32.49% were male, and 3.30% preferred not to disclose that information.

- Respondents' travel patterns (questions 2-4)

Most respondents (27.66%) work at a place that was not listed in the survey. Hamilton (18.02%) and Auckland (17.51%) are the main places where the contributors work and 11.17% responded "within 5km of where you live".

Again, most contributors (31.22%) go grocery shopping to a place that was not listed in the survey. The rest of the people tend to go to Hamilton (28.43%), Auckland (14.97%), Huntly (6.35%), and Ngaruawahia (4.57%).

When it comes to socialising, contributors mainly socialise in Hamilton (27.16%), 17.77% socialise in Auckland, and 15.99% in a place that was not listed in the survey. Tuakau (6.85%) and Raglan (6.35%) also appeared to be popular places for socialising.

- Communities of interests and sense of belonging (5-6)

The following factors were the five most important in relation to the contributors' sense of belonging (contributors could select up to five): use of land (72.08%), activities and shared community services ((56.85%) in particular sports/recreational and community facilities (more than half the contributors mentioned these two), geography/landscape (53.30%), business and retail services (44.42%), and social connection with immediate neighbours (41.12%).

- Respondents' sentiment about the current representation arrangements (7-9)

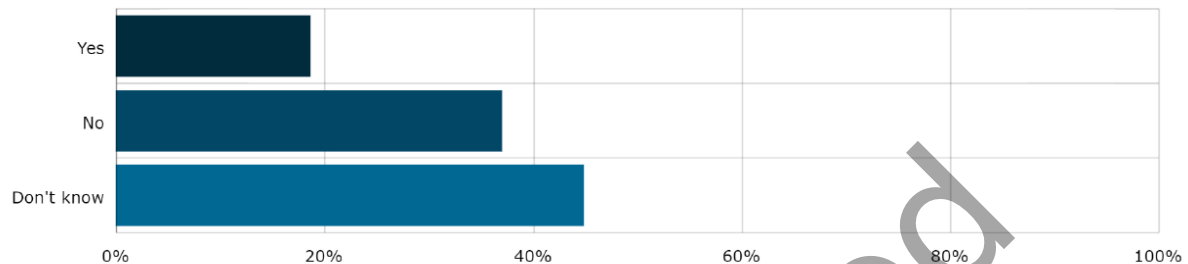
When asked if they felt that the current representation arrangements were fair and effective, 44.67% of the respondents replied that they did not know. 36.80% answered "no" and 18.53% answered "yes". It is unclear from the information provided in the responses whether or not the role of Maangai Maaori at Council is well understood.

The reasons given for being dissatisfied with the current arrangements mainly related to the lack of diversity of the current elected representatives. Comments about Maaori and rural underrepresentation on Council were specifically referred to.

The Northern area of the District also appeared to express more discontent about their representation. Again, from the information provided in the responses it is unclear whether or not the respondents had a clear idea of the role of Maangai Maaori at Council, or how the ward systems are in part dictated by population densities causing rural communities and urban communities to be grouped together.

#### 7. Do you feel the current representation arrangements are fair and effective? Required

Multiple Choice | Skipped: 0 | Answered: 394 (100%)

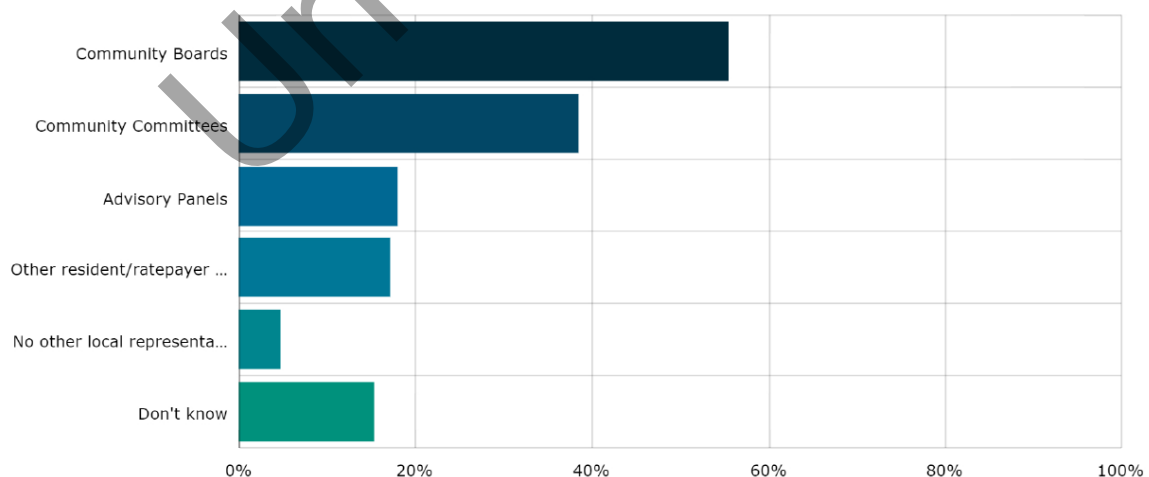


#### • Respondents' sentiment about alternative forms of local representation (10-14)

The contributors' preferred form of local representation were community boards (55.33%) and 71.83% said that council should continue to have community boards. 19.54% of contributors did not know if the Waikato District should keep community boards and 8.63% believe that the District should not have community boards. Those who didn't support community boards queried their (cost) effectiveness.

#### 10. Other than the elected Council, what is your preferred option(s) for representation on local issues (i.e. issues in the District)? Select one or more of the following options: Required

Multiple Choice | Skipped: 0 | Answered: 394 (100%)



Furthermore, 42.25% said that community boards should cover a smaller area (be more focused) than they currently do and 20.07% said they should cover a larger area.

Besides community boards, 38.32% of contributors preferred community committees (38.32%) and the rest favoured other types of local informal representation such as advisory panels (17.77%) and/or resident/ratepayer organisations (17.01%).<sup>1</sup>

- Discussion and conclusion

A certain sentiment of dissatisfaction with the current arrangements emerged from the survey. Lack of representativeness and inefficiency were common themes raised by the contributors. Two important things should, however, be noted:

- a) The lack of representativeness could have been accentuated by the demographic characteristics of the contributors (e.g high participation from Maaori and women). Some contributors, for example, were dissatisfied with the lack of Maaori representation and made the case for the establishment of Maaori wards.
- b) The sentiment of dissatisfaction expressed was not always related to representation arrangements that are the subject of the initial proposal (e.g. decisions regarding the electoral system and Maaori wards have already been made by Council).

Nothing unexpected arose from the survey regarding communities of interests and travel patterns. The focus group sessions offer a more valuable insight into travel patterns.

#### **4 Stakeholders focus groups analysis**

- Introduction

The stakeholders focus group sessions were the second step in the Reshape Waikato project team's early engagement strategy. The rationale behind these sessions was to engage with a smaller sample of the District's population but engage in more in-depth conversations and activities to collect well-informed, more qualitative, data. This approach allowed us to ensure that participants made considered contributions but the trade-off of this approach was the lower number of people participating (compared to an online survey). This represented the numerically narrow, but in-depth, end of the public engagement spectrum.

- Methodology and number of respondents

The first stream of focus group sessions was the "stakeholders focus groups". In these focus groups, relevant categories of stakeholders were identified: community boards and community committee members, businesses (small and big), community organisations, and service providers (schools, health care, etc.). The stakeholders were identified by using Council's internal contact databases and internet searches.

When multiple stakeholders belonged to a same category and no relevant criteria existed for selection, random selection was used to choose the participants. This was the case with small businesses and schools only.

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<sup>1</sup> Respondents could choose more than one option.

A shortlist of contacts was established and three areas (North (From the northern border to Mercer); Centre (from Meremere to Taupiri); South (everything south of Taupiri)) were created for logistical purpose. There were between 49 and 54 potential participants in each area. Businesses represented approximately 40% of the initial list.

Participants were contacted by members of the project team (mostly by phone) and four stakeholder focus group sessions were held in the District with interested stakeholders between 21 October 2020 and 29 October 2020. There were 36 participants and the dates and locations were as follow:

- Wednesday 21 October in Huntly
- Thursday 22 October in Te Kowhai
- Wednesday 28 October in Huntly
- Thursday 29 October in Pokeno

- Communities of interest and sense of belonging

Most of the responses to the question regarding communities of interests led to expected answers: dependence on shared facilities and shared social/recreational spaces were the main factors leading to a sense of belonging. Shared transport/commuting patterns also played an important role in defining communities of interests as well as the feeling of living in a rural/residential/lifestyle area.

A couple of other interesting factors were also highlighted:

- Problems or obstacles that are shared by a community (such as crime or unemployment) can lead to a feeling of belonging to a shared community.
- Shared dependence on water resources can also be a factor in communities of interest.

- Number of councillors

The average preferred number of councillors was 14 councillors. The minimum was 8 and the maximum was 22 councillors. The most common was 10 councillors. It should be noted that a few participants explained that the number of councillors is directly related to the number (and delegations) of community boards. More community boards with more delegations would require less councillors. This approach seemed to be preferred by some participants during the discussions.

- Ward structures and boundaries

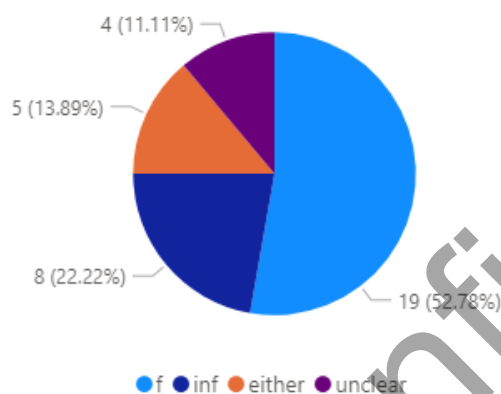
The average number of wards was 6.44 when people were asked to draw boundaries between the wards. The minimum was 4 and the maximum was 12 wards. The most common was 6 wards.

- Community boards and alternative local representation arrangements

Feedback indicated that community boards are popular representation arrangements. It should be noted, however, that this could be due to the selection process and demographics of these stakeholder's sessions as many community board members came to the sessions.

There was a slight preference among participants for formal local representation arrangements such as community boards instead of informal arrangements such as community committees (52.78%). There was no clear direction as to whether community boards should cover larger, smaller, or the same areas as they currently do, or should have more or less elected community members although it was suggested that having uneven number of Board members would be preferred to avoid 'even votes'.

Formal - Q4



## 5 Community focus groups analysis

- Introduction

The community focus group sessions were the third step in the Reshape Waikato project team's early engagement strategy. The rationale behind these sessions was to engage with a smaller sample of the District's population but engage in more in-depth conversations and activities to collect well-informed, more qualitative, data. This approach allowed us to ensure that participants made considered contributions but the trade-off of this approach was the lower number of people participating. This represented the numerically narrow, but in-depth, end of the public engagement spectrum. As explained in the next section, the difference between this third strategy and the second one, relates to the selection method for the participants.

- Methodology and number of respondents

The second stream of focus group sessions was the “community focus groups”. In these focus groups, 393 invitation letters were sent to semi-randomly selected members from the public (the only criteria applied to the selection process was to ensure a balance between rural and urban and Maaori representation). People who completed to community survey were also invited by email. 19 participants attended which represent a response rate of 4.83%.

- Thursday 12 of November in Ngaruawahia
- Thursday 19 of November in Pokeno Thursday 26 of November in Huntly

- Communities of interest and sense of belonging

Most of the responses to the question regarding communities of interests led to expected answers and were similar to the stakeholders focus groups: dependence on shared facilities and shared social/recreational spaces were the main factors leading to a sense of belonging. Shared transport/commuting patterns also played an important role in defining communities of interests as well as the feeling of living in a rural/residential/lifestyle area.

- Number of councillors

The average preferred number of councillors was 16.22 councillors. The minimum was 12 and the maximum was 24. The most common was 16. It should be noted that in these groups as well, some participants explained that the number of councillors is directly related to the number of community boards ie: if there are community boards offering an additional layer of representation to communities, more councillors may not be necessary. If there are fewer community boards or they cover a smaller area, more councillors is preferred to offer more representation.

- Ward structures and boundaries

The average preferred number of wards was 7 when people were asked to draw boundaries between the wards. The minimum was 1 (at large) and the maximum 15. The mode was 6.

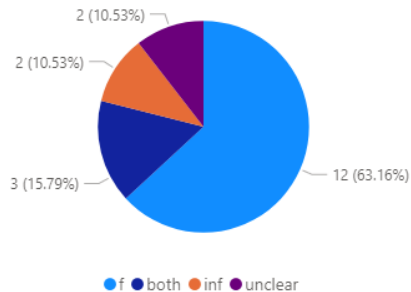
- Community boards and alternative local representation arrangements

Community boards remained popular representation arrangements in the community focus group sessions despite the absence of community board members.

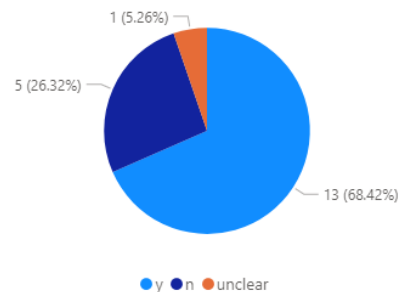
Participants preferred formal local representation arrangements such as community boards instead of informal arrangements such as community committees (63.16%). 68.42% of

participants also believed that community boards should cover the entire district and 52.94% believed that rural and urban areas should have different community boards.

Formal - Q4



Whole Dist - Q5

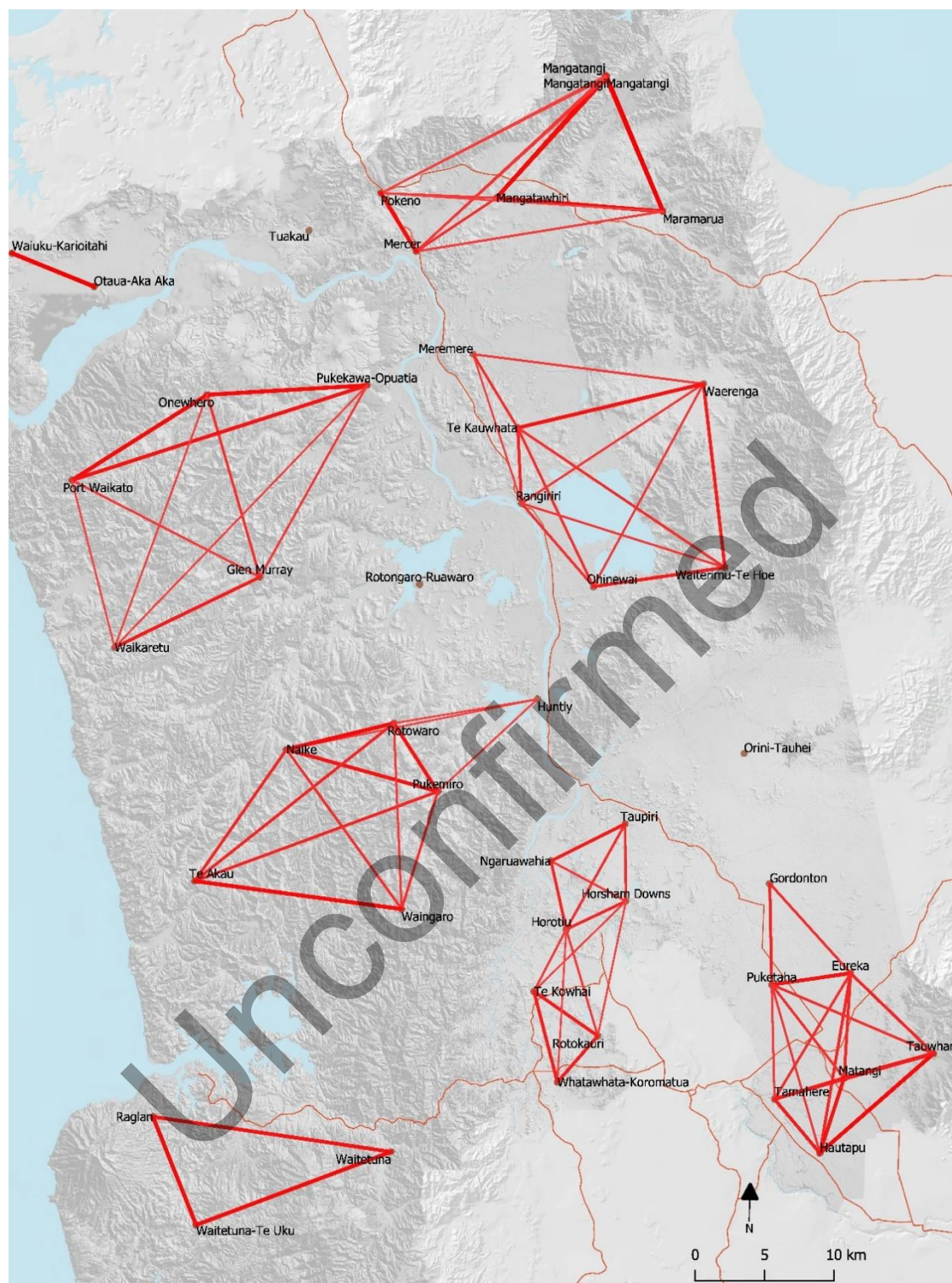


- Further thoughts and observations
  - 1) When comparing the two different types of focus groups, no strong differences on the questions related to the number of wards, communities of interests, and local representation can be noticed. Noticeable differences on the question related to councillors, however, can be noticed with a tendency for community groups to desire more councillors (average 16.22; most common 16) than the stakeholders groups (average 14.06; most common 10).
  - 2) While the findings related to communities of interests did not produce any unexpected results, it should be noted that it was requested for the mapping activity to keep the notion of communities of interest in mind. The map analysis in the next section, therefore, offers further data on communities of interests.
  - 3) The selection method of participants ensured that representation was given to all areas of the district, providing an opportunity for balanced feedback.

## 6 Map boundaries

Focus group participants were asked to group localities together to form wards and had to keep the notion of community of interest in mind while doing so. The map below shows the stronger connections established by participants between localities (which was achieved through a software which counted how many times each localities were grouped together). The thickness of the line indicates the strength of the connection. Other maps illustrating weaker connections are available as attachments to this report.





As we can see, eight wards are formed by using these connections. The localities that are not linked to any wards are fluid and could be moved to any contiguous ward. The strength and weaknesses of connections should be used to move localities between wards (the weaker the connection, the more they can be moved legitimately) when trying to respect the  $\pm 10\%$  demographic rule.



## **7 Conclusion and recommendations**

Important that the public feedback is considered as part of the Council's deliberations on an initial proposal. The Project Team's early engagement strategy successfully retrieved data from a broad set of residents regarding their views and preferences on the district's representation arrangements.

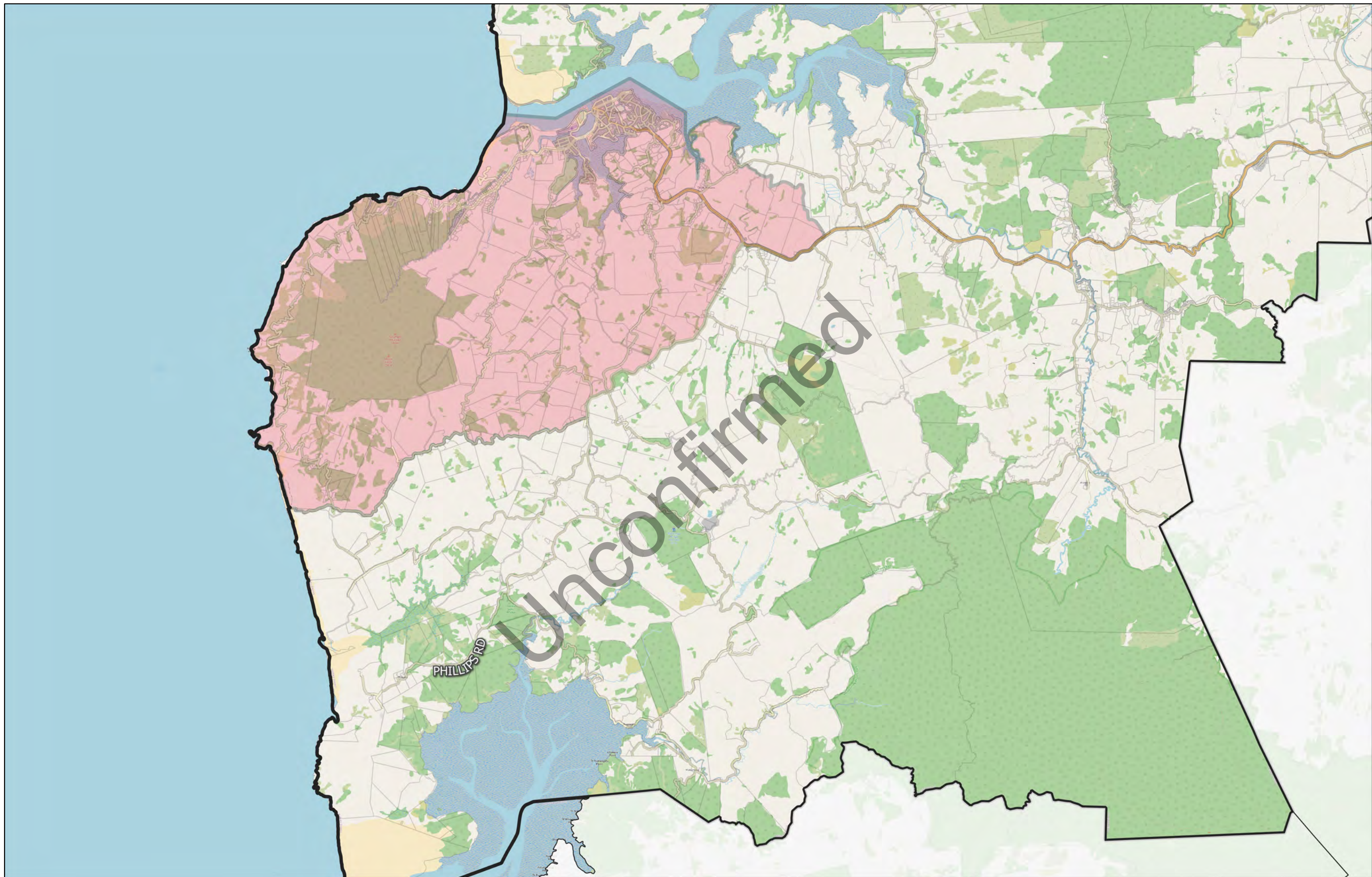
The process gave us the chance to meet many residents, provide objective information to them on representation review, and listen to, and capture, their thoughts and feedback. Overall, the approach to early engagement was effective and welcomed by participants. The Council can now take the information provided by the community during engagement and use it to inform their deliberations and eventually their initial proposal.

Through our early engagement strategy, we found out that there is a need for change and that the current representation arrangements need some amendments. Options include increasing the number of elected members and decreasing the number of wards.

Feedback supported community boards being the main form of local-level representation and the area they cover could be increased while some consideration could be given to the establishment of rural community boards.

The full data sets collected through the project team's early engagement strategy are available on request.







## Memorandum

**To:** Trevor Ranga, Project Manager, Waikato District Council  
**From:** Sam Morgan, Principal Coastal Consultant  
**Date:** 15 June 2021  
**Subject:** Manu Bay Breakwater Review - Initial Findings

## INTRODUCTION

4Sight Consulting Ltd. (4Sight) were recently engaged by Waikato District Council (WDC) to undertake an independent review of the performance of the breakwater at the Manu Bay boat ramp, Raglan. We understand that the works to repair/replace the breakwater protecting the Manu Bay boat ramp were undertaken in 2015. These works involved constructing a new breakwater on approximately the same alignment as the previously failed structure but did change in material type and form detail. These changes have led to concern within the community that there is an increased level of overtopping and surge of the breakwater which has decreased the usability of the boat ramp. WDC has been involved in discussion with various stakeholders associated with the boat ramp and wider Manu Bay surrounds. It is understood a request has been made that the monitoring and review of the breakwater performance be undertaken by a party that is independent from the original repair works.

The intent of this memorandum is to provide a summary of the initial review of the breakwater design and monitoring of the structure's performance. Please note further work is required around the local coastal processes operating in the area in order to better understand the dynamics of the breakwaters performance and management issues. Further, as there is insufficient data around the performance of the previous breakwater a detailed comparison between the two is not possible.

## BACKGROUND AND DESIGN DESCRIPTION

The breakwater is located immediately northward of the Manu Bay boat ramp and is intended to shelter the ramp from open ocean swells to provide safe launching of watercraft and ocean access. The former breakwater was an ad-hoc structure made of a concrete-capped boulder and gabion basket filled mound. It was replaced in 2015 following the failure of the end section in late 2014. The new breakwater is located on approximately the same alignment as the previous structure and is of a similar scale and shape to the one it replaced. The design comprises a grouted boulder structure which has been built over the remains of the old breakwater. Inspection of the construction drawings show a decreasing crest elevation from southwest to northeast along the structure. The rock protrusions above the concrete surface appear to be greater on the northern side of the breakwater and less so on the surface and southern side. This is due to the placement of larger rock on the prevailing batter to deal with the direct impact of waves.

A comparison of the construction drawings for the original structure with those of the replacement breakwater has identified the following key differences:

- A change in material type with the new structure being built of large boulders with concrete grout.
- The breakwater planform has been straightened out to make it linear rather than bending to the north as the original structure did. This means that the outer end of the replacement breakwater is more parallel to the boat ramp alignment.
- The new structure appears to have maintained a similar length to that of the former structure, although a more uniform width for the majority of the structure of around 9m means it occupies a marginally increased footprint area within the CMA when compared to the existing.

- Based upon survey data of the structure in October 2019 the crest of the structure does appear to be between 300-700mm lower across the mid to outer parts of the breakwater. Although this does vary along the structure.
- There is some inconsistency between the As-built information and the October 2019 survey. This may indicate some subsidence and/or settling of the breakwater.
- The replacement breakwater has a more gently sloping profile on the seaward (northern) facing side compared to the pre-existing structure. It has been interpreted from the construction drawings that the original breakwater had a steeper slope of around 1H:1.5V on the seaward side. This compares to the current structure which has a flatter gradient of 2H:1V on the seaward side.

## BREAKWATER DESIGN REVIEW

Predictions of wave overtopping of the breakwater under various combinations of tide and swell conditions were obtained using the Overtopping Neural Network<sup>1</sup>. The Neural Network is a conceptual design tool that can be used for several types of coastal structures to estimate the mean overtopping discharge per meter of coastline. It is traditionally used to enable estimates of damage to buildings and seawalls resulting from wave overtopping. In this circumstance we have applied the model to establish theoretical estimates of the levels of overtopping with respect to the existing crest height of the breakwater under different water level and wave conditions, which have subsequently been ground-truthed by visual observations. Further sensitivity testing has also been undertaken to identify the crest height required to achieve acceptable levels of overtopping under the same input conditions.

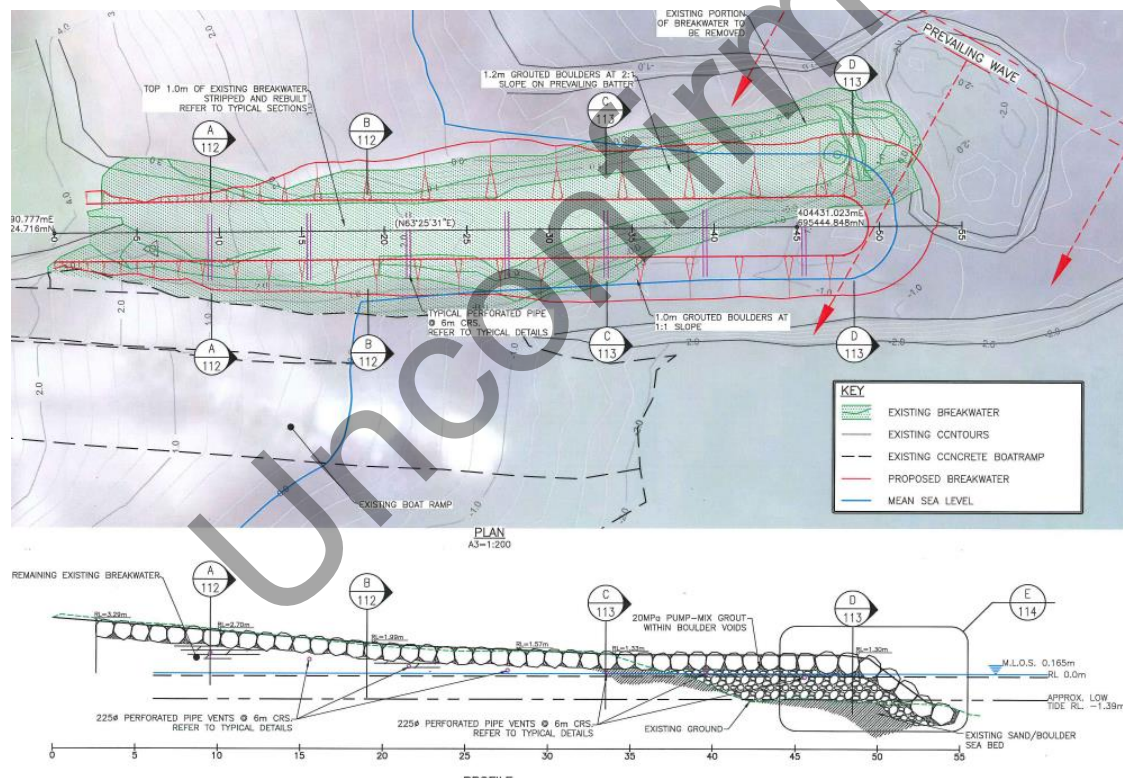


Figure 1: Manu Bay breakwater plan and profile showing locations of cross sections A-D. Supplied by WDC.

For the analysis we utilised four representative cross-sections of the structure as interpreted from the construction drawings supplied by WDC (Figure 1). Tidal data for the site has been inferred from the Ragan tide gauge (sourced from LINZ) and this is summarised in Table 1 below. A comparison of the high tide levels with the construction drawings reveals that the crest heights at the lower end of the structure are below the level of MHWS, meaning the structure is prone to overtopping during high

<sup>1</sup> Van Gent, M.R.A., Van Den Boogaard, H.F.P., Pozueta, B. and Medina, J.R. (2007). Neural network modelling of wave overtopping at coastal structures. Coastal Engineering, Vol.54, pp. 586-593.

background water levels without taking into account any additional wave activity on top of that. Therefore the focus of the overtopping analysis has been on neap tidal conditions. The water level and wave combinations applied were those presented in **Table 2**, which correlates to MHWN with limited wave action through to a moderate to large swell. Further detail including all of the model inputs, outputs, and any assumptions made are presented in **Appendix A**.

Table 1: Tidal variables at the subject site. Source: LINZ.

Tidal Variable	Chart Datum (CD)	Moturiki Vertical Datum 1953 (MVD-53)
MHWS	3.3	1.67
MHWN	2.6	0.97
MSL	1.8	0.17
MLWN	0.9	-0.74
MLWS	0.1	-1.54

The results of the overtopping analysis show that based on the design crest heights the breakwater is overtopped on neap tides with a low to moderate swell. This has been confirmed by observations made via the Manu Bay surf camera (see following section). We interpret these results to mean that breaking wave heights in the order of 1m and above will likely result in a dangerous degree of overtopping of the structure in its current form.

Table 2: Predicted overtopping discharges for representative cross sections of the existing breakwater.

Cross Section	Crest Height (mRL)	Scenario 1: MHWN + Low Swell			Scenario 2: MHWN + Low to Moderate Swell			Scenario 3: MHWN + Moderate to Large Swell		
		SWL (mRL)	H <sub>mo</sub> (m)	Q (l/m/s)	SWL (mRL)	H <sub>mo</sub> (m)	Q (l/m/s)	SWL (mRL)	H <sub>mo</sub> (m)	Q (l/m/s)
A	2.70	0.97	0.5	0.1	0.97	1	0.4	0.97	1.6	8
B	1.99			0.5			3			32
C	1.57			13			32			124
D	1.33			13			38			140

Notes:

1. Refer to Figure 1 for locations of cross sections A-D
2. All levels relative to Moturiki Vertical Datum 1953 (MVD-53)
3. SWL = Static Water Level
4. H<sub>mo</sub> = Significant wave height at structure toe
5. Q = Mean overtopping discharge (anything greater than 10-20l/m/s considered significant).

Tables 3.1 and 3.3 of the Overtopping Manual<sup>2</sup> (refer to **Appendix A**) provides overall guidance on the tolerable overtopping discharges for structural design of breakwaters as well as the limits to ensure the safety of people at/near the structures. It has been interpreted from these tables that an acceptable overtopping discharge for the Manu Bay breakwater would be in the order of 10-20l/m/s.

The results of the sensitivity testing are presented in **Table 3** below which shows the predicted overtopping for various static water level and wave height combinations based on the existing breakwater crest (at the lowest point), alongside the predictions for a raised crest moving up in 200mm increments. The intent of this is to provide an indication of the reduction in wave overtopping that could be expected should the crest be raised at the tail end. This analysis demonstrates that raising the crest by 400-600mm will result in a substantive reduction in overtopping volumes. However, this

<sup>2</sup> EurOtop. (2016). Manual on wave overtopping of sea defences and related structures: An overtopping manual largely based on European research, but for worldwide application. Second Edition.

analysis would need to be refined by more detailed investigations into fluctuations of water levels at the site. This analysis would provide increased confidence in the reduction of overtopping potential and volumes of discharge over the structure. It is noted below that these types of investigations would be problematic in themselves.

Table 3: Results of the sensitivity analysis for various breakwater crest heights tested.

Crest Level		RL1.3m*	RL1.5m	RL1.7m	RL1.9m
Static water level (m MVD-53)	Input conditions $H_{mo}$ (m)	Mean overtopping discharge (l/m/s)			
0.97	0.5	13	4	1	0.5
	1	38	19	9	4
	1.6	140	95	63	42
*Existing crest height at the tail end of the structure (i.e. 'cross section D').					

## BREAKWATER PERFORMANCE MONITORING

Monitoring of the breakwater performance was undertaken over the month of April utilising the Manu Bay surf camera from the [Surf2surf.com](https://www.surf2surf.com) website. It is recognised that the camera is not focused on the breakwater itself and the images recorded at intermittent intervals leading to the possibility of missing overtopping events. However, the images are considered sufficient to observe general overtopping events of the structure.

It is understood that there has been some prior monitoring footage captured as part of the surfbreak research program. However, this data was understood to still be in a raw format and time intensive processing would be required to extract the information required. Further, by initiating a fresh set of monitoring data we were able to establish an observed baseline for overtopping rather than being reliant upon cross referencing against modelled predictions of overtopping and hindcast weather data. Overall the monitoring approach undertaken was considered to be more cost effective and time efficient method than analyzing the previously monitored data.

Monitoring was focused around the high tide period as this was considered the most likely time for overtopping to occur. In order to support these observations, tide and swell predictions for Raglan were also recorded to match the corresponding day.

Observations from the surf camera were supplemented by on-site observations of conditions and the structure itself on April 1, 23 and 24, 2021. These provided on the ground observations of wave overtopping events and general guidance around the condition of the structure. Particular focus was given to potential settlement of the breakwater that may lead to increased overtopping vulnerability. It is noted that these were informal observations and would be best confirmed by survey of the structure and focused observation of overtopping events.

Observations over the monitoring period revealed the susceptibility of the breakwater to overtopping due to high static water levels. **Figure 2** below captured on the 31<sup>st</sup> of March 2021 shows overtopping of the structure during spring tide conditions (CD 3.21m/1.58m MVD-53) and minimal swell conditions. These observations demonstrate the susceptibility of the structure to the background water levels comprising of tide, storm surge, wave setup or a combination of these factors. The additional factors (being wave setup and storm surge) increase the background 'static' water level conditions which allow for an increased frequency and period of time that the structure is overtopped. This was observed in **Figure 3** below taken on the 9<sup>th</sup> of April 2021 which shows the structure being overtopped. Predicted tidal conditions on this day were in the neap range (CD 2.7m/1.07m MVD-53) with a predicted breaking wave height in the order of 1.1-1.7m, which is considered to be relatively moderate for the site.





*Figure 2: Overtopping of the breakwater observed on 31/03/21 during minor swell and spring tide conditions.*



*Figure 3: Overtopping of the breakwater structure 1hr before a neap high tide during moderate swell conditions observed on 9/04/21.*

Camera observations have been compared against the Waikato Regional Council (WRC) tide gauge data for Manu Bay over the monitoring period. **Figure 4** below shows the water level fluctuations over the monitoring period relative to MVD-53. It is noted that the tide gauge records water levels at the site which include other variables such as storm surge, wave set up and wind set up on top of the background tidal fluctuations. Focus on the comparison has been given to the period of overtopping around the 31<sup>st</sup> of March (**Figure 5**) and during the period of lower water levels around the 20<sup>th</sup> of April (**Figure 6**). Tide gauge data from the 31<sup>st</sup> of March revealed water levels approximately 400mm above the predicted tide levels suggesting some degree of influence from other meteorological influences. Tide gauge data collected around the 19<sup>th</sup> and 20<sup>th</sup> of April was reflective of the predicted tidal levels. As can be seen in **Figure 7** below overtopping of the structure was still apparent during these lower water level periods and moderate swell conditions.

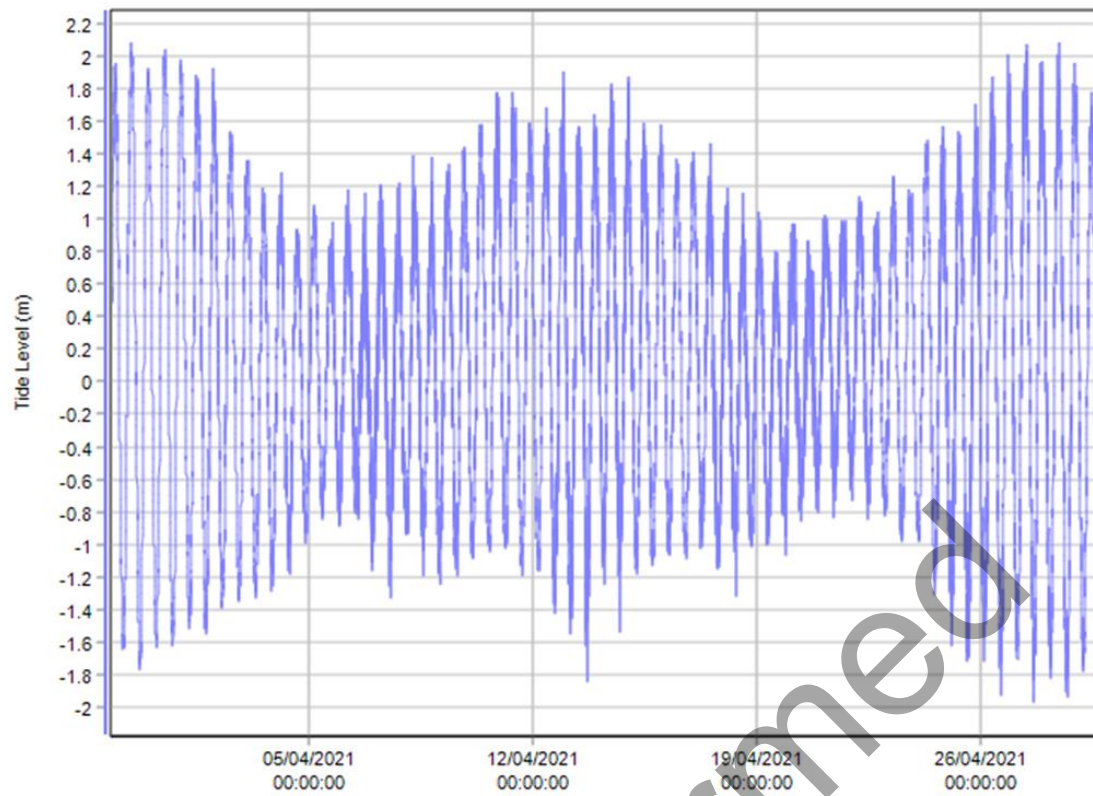


Figure 4: Manu Bay tide gauge data over the monitoring period (MVD-53). (Source: WRC).

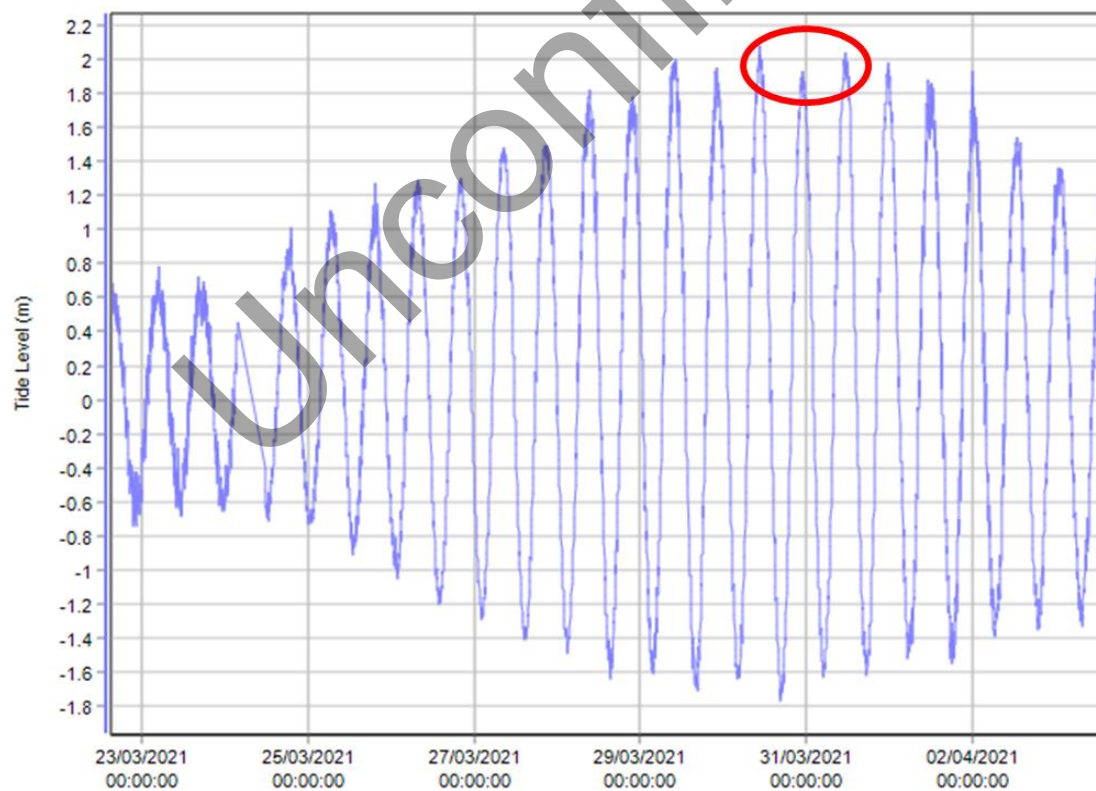


Figure 5: Tide gauge data over the initial monitoring period showing water levels above the predicted tides.



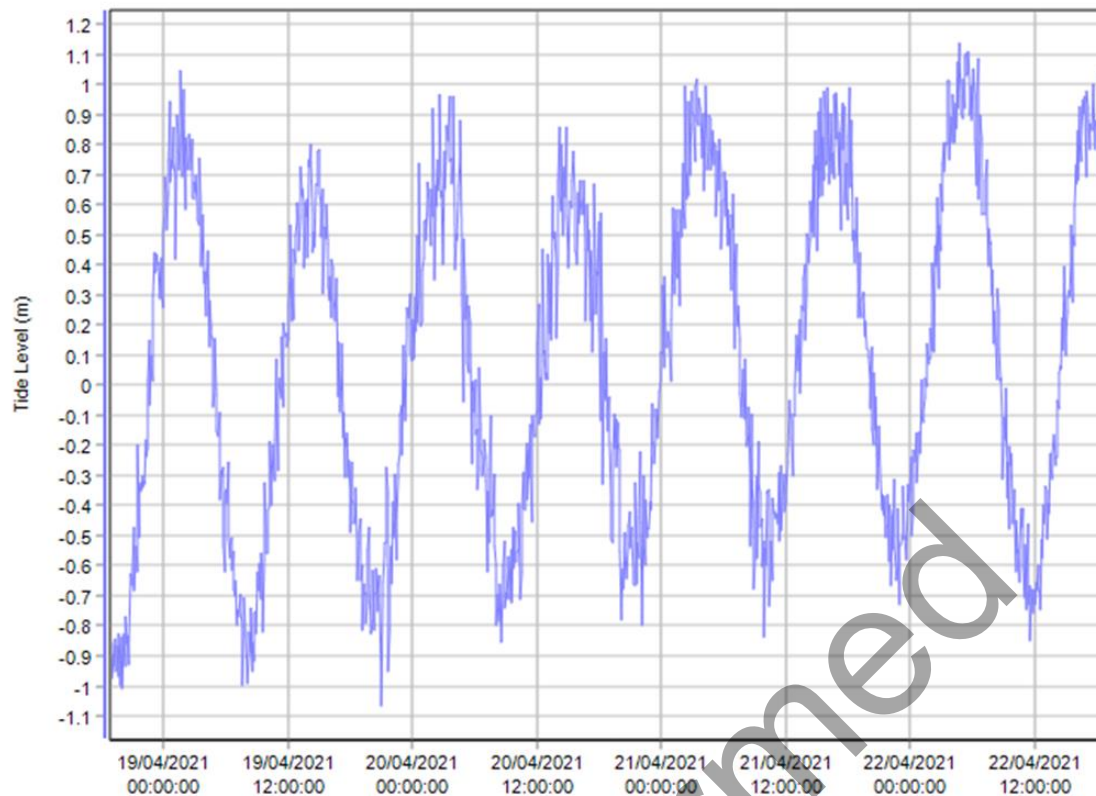


Figure 6: Tide gauge data from the middle of the monitoring period showing water levels at approximately the predicted tide level.



Figure 7: Surf camera observations from 21/04/2021 during a neap high tide and moderate swell conditions.

Observations from the site (including video footage) undertaken on 1<sup>st</sup> April 2021 show that the breakwater, whilst being overtopped, it does break up the approaching wave energy. Once the approaching wave has broken over the structure the wave energy further dissipates as it moves into deeper water (**Figure 8**). The dissipation of this energy is apparently translated in to localised changes in the currents and surges around the boat ramp.



*Figure 8: Wave overtopping event at the Manu Bay breakwater. Note the extent the white water line on the inside of the ramp indicating the dissipation of broken wave energy as the wave moves over the breakwater and into deeper water. The extent of wave penetration past the breakwater will be highly dependent upon swell conditions at the time.*

## ROCK TRANSPORTATION

It is understood that the deposition of rock material on the ramp has becoming an increasingly problematic issue for ramp users. Further, removal of the rock from the ramp has become challenging for WDC due to the frequency of deposition and logistics of undertaking the works over low tide periods to allow access. The frequency of rock deposition on the ramp has anecdotally increased since the recent removal of rock (approximately 78m<sup>3</sup>) to deepen the water in front of the breakwater with the aim of reducing the wave energy acting upon the structure. Although this may be related to seasonal fluctuations in wave climate, and it would assist in analysis of the issue if records of rock removal were kept for later comparison.

**Figure 9** below shows the migration of small rock across the crest of the upper portion of the breakwater. **Figure 10** shows the smaller rock material exposed following the removal of the larger rock and with the smaller size of the underlying material it is susceptible to transportation over the breakwater given the relatively high energy environment. This is considered to be a probable source for at least some of the rock deposits on the ramp. This will likely continue until the smaller rock source is exhausted and the system adjusts to the removal of the larger rock and changes presented by the new breakwater design. It is unclear how long this behaviour may continue given the potential for rock to be transported to the area from the Manu Bay rock fan and predominate SW swell refracting into the bay. Further, the breakwater is considered to act as a groyne and trap for any material being transported. This behaviour has been supported by prior investigations into coastal processes at the site (undertaken by eCoast) and photos (e.g. **Figure 11**) of the site prior to the reconstruction of the breakwater.





Figure 9: Photo showing the migration of rock material over the upper portion of the breakwater.



Figure 10: Exposed smaller rock from below the area of excavated larger rock. Note the protection structure constructed from the excavated rock along the upper the bank in the centre top portion of the image.





Figure 11: Photo showing accumulated rock material at the western base of the breakwater prior to reconstruction. (Source: WDC).

Another potential source or rock deposits on the boat ramp is the rock mound located offshore from the tip of the breakwater as can be seen in **Figure 12** below. The origin and nature of this feature has not been investigated but the feature was present in some form prior to the reconstruction of the breakwater. Given its position within the tidal prism it is almost constantly being acted upon by wave energy (outside periods of spring low tides) leaving material from within the mound susceptible to transportation as wave energy (either as waves, infragravity waves, surges or currents) refracts around the tip of the breakwater and toward the boat ramp.



Figure 12: Rock mound beyond the tip of the breakwater highlighted by the red circle. (Source: WDC).

## BREAKWATER PERFORMANCE

The design crest height of a breakwater will be reflective of the requirements for protection at the subject site. Typically, conventional breakwater designs would be set to avoid overtopping during extreme static water levels and moderate swell conditions. It is understood in this instance that design was restrained to the existing footprint so to avoid additional resource consenting costs and delays, with some degree of uncertainty around the potential outcome if a more substantial structure was pursued. It is clear from monitoring observations that the breakwater at Manu Bay is overtopped frequently and even during spring tide conditions with little to no swell. The structure does appear to provide some protection to the boat ramp over mid to low tide periods.

Surge at the ramp is understood to be a problem for users launching and retrieving boats. The frequency and degree of surge is difficult to ascertain from the monitoring undertaken. Given the high energy environment, frequency of significant swell events and complex interactions between these and the breakwater, modelling to obtain a detailed understanding of the surge operating at the ramp would be problematic. Surge at the ramp is most likely to be a result from diffracted waves approaching the ramp as they move around the tip of the breakwater, as well as other factors such as infragravity waves. However, regular overtopping over the structure is likely to create more surge and turbulence at the ramp as the wave energy moves across the ramp.

## CONCLUSIONS

Direct comparison between the current and previous structure are problematic due to the lack of data previously. Analysis and observation of the breakwater's performance does indicate that overtopping of the structure does occur on a relatively frequent basis from periods of mid tide onwards.

There appears to be some confusion around the crest height of the structure given discrepancy between the as-builts, design heights and recent survey data. This may in part be related to potential settlement of the structure following construction. It is recommended that an updated survey and condition assessment of the structure be undertaken to confirm the situation.

An initial sensitivity analysis on different crest heights has indicated that by raising the crest by 400mm from the design levels would result in a reduction in overtopping frequency and discharge volumes. However, the exact degree of this reduction would need to be supplemented by further investigations of water levels and swell conditions at the site. Given the high energy and complex nature of the system there is always likely to be a degree of uncertainty around this type of analysis. It is also noted that intuitively as predicted future sea-level rise is experienced the breakwater can be expected to be over topped more frequently and for longer periods. The potential impact of this work on the surfbreak would need to be considered during the design to avoid, remedy or mitigate any adverse effects.

Investigations into the cause, magnitude and frequency of surge at the ramp is also problematic, but surge at the ramp is likely to be affected by overtopping of the ramp. Extending the breakwater length may alleviate some of the surge acting on the ramp, but given the high energy environment surge at the ramp is to be expected. As an analogy, other ramps on high energy coasts, such as Gisborne and Port Taranaki, experience significant surge despite being set deep within controlled harbour settings.

Transportation of rock material appears to be related (at least in part) to the exposure of smaller rock after the excavation of larger rock in front of the breakwater. Raising the crest of the breakwater at its base will help to alleviate this source of rock. However, there is still the possibility of material being deposited on the ramp from the round mound out from the tip of the breakwater. Programming a maintenance regime with spring low tide periods may assist WDC in managing this issue.

Further removal of rock in front of the breakwater is not considered to be an appropriate management response for issues at the ramp. This may lead to increased exposure of smaller rock which would then become available for transportation over the breakwater. It may be more appropriate to place larger rock in front of the breakwater to help dissipate the wave energy acting upon the breakwater and trap

small rock being transported across the structure. This would need to be investigated further and the potential impact on the surfbreak taken into account.

Observation of the overtopping action of the breakwater shows that the broken wave energy dissipates in the deeper water over the ramp as the wave moves shoreward. This action results in less turbulence and wave energy as you move further way from the breakwater. This presents an opportunity for safer boat launching on the inner portions of the ramp, as the relatively calmer water allows to manoeuvre the boat in a way to better absorb the energy. Reorientation of the inner portion of the ramp may help to maximise this opportunity.

Any protection being afforded to the ramp must be considered in the context of general boating conditions on the West Coast and the frequency of what could be considered safe boating weather. Consideration should be given to providing ramp users guidance around use of the ramp and potential hazards at the site and on the West Coast generally. This could be in the form of clear signage at the ramp.

Unconfirmed

## APPENDIX A

Unconfirmed

## Calculations of Wave Overtopping using the Overtopping Neural Network (Van Gent et al., 2007) Existing Breakwater

Tide data for Raglan (source: LINZ)

	CD	MVD-53
MHWS	3.3	1.67
MHWN	2.6	0.97
MSL	1.8	0.17
MLWN	0.9	-0.74
MLWS	0.1	-1.54

Site:	Manu Bay Breakwater	Designed:	Alison Clarke
Client:	Waikato District Council	Reviewed:	Sam Morgan
Project No:	9092	Date:	1/05/2021

Model Input Parameters																					Output
Cross Section	RL at toe (m)	Crest height (m)	Static Water level (mRL)	h (m)	H <sub>m0</sub> (m)	T <sub>m-1.0</sub> (s)	β (deg)	ht (m)	Bt (m)	hb (m)	B (m)	cot α <sub>d</sub> ^*	cot α <sub>u</sub> ^*	γ <sub>f,d</sub> ^*	γ <sub>f,u</sub> ^*	D <sub>d</sub> (m)	D <sub>u</sub> (m)	Ac (m)	Rc (m)	Gc (m)	q l/m/sec
D	-2	1.30	0.97	3.30	0.50	13	0	3.30	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.33	0.33	3.6	12.7
C	-1.2	1.33	0.97	2.53	0.50	13	0	2.53	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.36	0.36	3.6	12.7
B	-0.118	1.57	0.97	1.69	0.50	13	0	1.69	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.60	0.60	3.6	0.52
A	0.964	1.99	0.97	1.03	0.50	13	0	1.03	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	1.02	1.02	3.6	0.13
D	-2	1.30	0.97	3.30	1.00	7	0	3.30	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.33	0.33	3.6	38.2
C	-1.2	1.33	0.97	2.53	1.00	7	0	2.53	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.36	0.36	3.6	32.6
B	-0.118	1.57	0.97	1.69	1.00	7	0	1.69	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.60	0.60	3.6	3.03
A	0.964	1.99	0.97	1.03	1.00	7	0	1.03	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	1.02	1.02	3.6	0.351
D	-2	1.30	0.97	3.30	1.60	8	0	3.30	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.33	0.33	3.6	140
C	-1.2	1.33	0.97	2.53	1.60	8	0	2.53	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.36	0.36	3.6	124
B	-0.118	1.57	0.97	1.69	1.60	8	0	1.69	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.60	0.60	3.6	32.4
A	0.964	1.99	0.97	1.03	1.60	8	0	1.03	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	1.02	1.02	3.6	7.94

### Notes:

All levels relative to Moturiki Vertical Datum (MVD-53)

Existing crest and toe levels interpreted from construction drawings and cross sections provided by WDC.

\*Revetment slope is 1V:2H on the seaward side

^Grouted concrete structure allows for smoother impermeable surface, although large boulders protruding above the general concrete surface (0.6m diameter) introduce an element of roughness, hence roughness factor set to 0.9

Spectral wave period at the structure toe derived from joint probability (wave height/peak period) hindcast data. Source: <https://app.meteoceanview.com/hindcast/sites/nz/-37.8/174.8#>

For definitions of the parameters input for the running of the NN tool refer to [http://overtopping.ing.unibo.it/overtopping/neuronet/net\\_solve/](http://overtopping.ing.unibo.it/overtopping/neuronet/net_solve/)

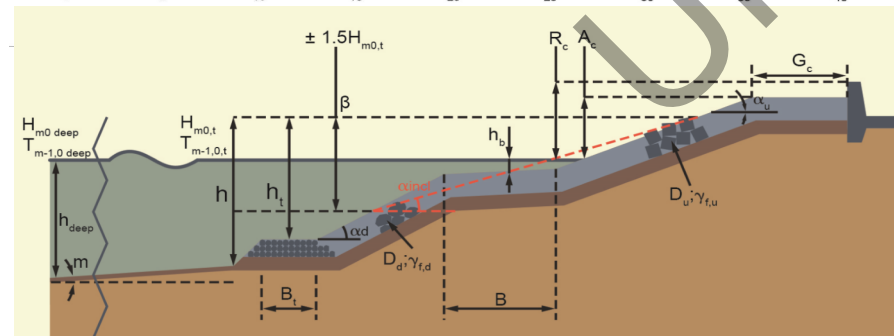
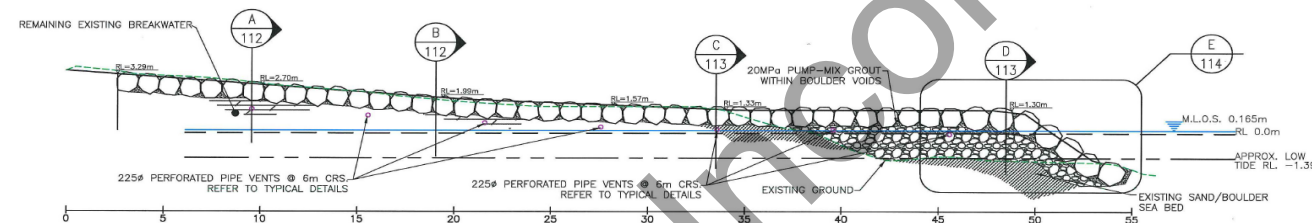


Table 3.1 Limits for wave overtopping for structural design of breakwaters, seawalls, dikes and dams

Hazard type and reason	Mean discharge q (l/s per m)	Max volume V <sub>max</sub> (l per m)
Rubble mound breakwaters; H <sub>m0</sub> > 5 m; no damage	1	2,000-3,000
Rubble mound breakwaters; H <sub>m0</sub> > 5 m; rear side designed for wave overtopping	5-10	10,000-20,000
Grass covered crest and landward slope; maintained and closed grass cover; H <sub>m0</sub> = 1 – 3 m	5	2,000-3,000
Grass covered crest and landward slope; not maintained grass cover, open spots, moss, bare patches; H <sub>m0</sub> = 0.5 – 3 m	0.1	500
Grass covered crest and landward slope; H <sub>m0</sub> < 1 m	5-10	500
Grass covered crest and landward slope; H <sub>m0</sub> < 0.3 m	No limit	No limit

Table 3.3 Limits for overtopping for people and vehicles

Hazard type and reason	Mean discharge q (l/s per m)	Max volume V <sub>max</sub> (l per m)
People at structures with possible violent overtopping, mostly vertical structures	No access for any predicted overtopping	No access for any predicted overtopping
People at seawall / dike crest. Clear view of the sea.	H <sub>m0</sub> = 3 m H <sub>m0</sub> = 2 m H <sub>m0</sub> = 1 m H <sub>m0</sub> < 0.5 m	600 600 600 No limit
Cars on seawall / dike crest, or railway close behind crest	H <sub>m0</sub> = 3 m H <sub>m0</sub> = 2 m H <sub>m0</sub> = 1 m	<5 10-20 75
Highways and roads, fast traffic	Close before debris in spray becomes dangerous	Close before debris in spray becomes dangerous



## Calculations of Wave Overtopping using the Overtopping Neural Network (Van Gent et al., 2007) Sensitivity Analysis

Tide data for Raglan (source: LINZ)

	CD	MVD-53
MHWS	3.3	1.67
MHWN	2.6	0.97
MSL	1.8	0.17
MLWN	0.9	-0.74
MLWS	0.1	-1.54

<b>Site:</b>	Manu Bay Breakwater	<b>Designed:</b>	Alison Clarke
<b>Client:</b>	Waikato District Council	<b>Reviewed:</b>	Sam Morgan
<b>Project No:</b>	9092	<b>Date:</b>	1/05/2021

Model Input Parameters																				Output	
Scenario	RL at toe (m)	Crest height (mRL)	Static Water level (mRL)	h (m)	H <sub>mo</sub> (m)	T <sub>m-1,0</sub> (s)	β (deg)	ht (m)	Bt (m)	hb (m)	B (m)	cot α <sub>d</sub> *	cot α <sub>u</sub> *	y <sub>f,d</sub> <sup>^</sup>	y <sub>f,u</sub> <sup>^</sup>	D <sub>d</sub> (m)	D <sub>u</sub> (m)	Ac (m)	Rc (m)	Gc (m)	q l/m/sec
Existing Crest	-2	1.3	0.97	3.30	0.50	13	0	3.30	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.34	0.34	3.1	12.7
plus 200mm	-2	1.5	0.97	3.50	0.50	13	0	3.50	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.54	0.54	3.1	3.77
plus 400mm	-2	1.7	0.97	3.70	0.50	13	0	3.70	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.74	0.74	3.1	1.25
plus 600mm	-2	1.9	0.97	3.90	0.50	13	0	3.90	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.94	0.94	3.1	0.48
Existing Crest	-2	1.3	0.97	3.30	1.00	7	0	3.30	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.34	0.34	3.1	38.2
plus 200mm	-2	1.5	0.97	3.50	1.00	7	0	3.50	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.54	0.54	3.1	18.5
plus 400mm	-2	1.7	0.97	3.70	1.00	7	0	3.70	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.74	0.74	3.1	8.86
plus 600mm	-2	1.9	0.97	3.90	1.00	7	0	3.90	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.94	0.94	3.1	4.26
Existing Crest	-2	1.3	0.97	3.30	1.60	8	0	3.30	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.34	0.34	3.1	140
plus 200mm	-2	1.5	0.97	3.50	1.60	8	0	3.50	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.54	0.54	3.1	94.7
plus 400mm	-2	1.7	0.97	3.70	1.60	8	0	3.70	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.74	0.74	3.1	63.1
plus 600mm	-2	1.9	0.97	3.90	1.60	8	0	3.90	0	0	0	2.0	2.0	0.9	0.9	0.60	0.60	0.94	0.94	3.1	41.6

### Notes:

All levels relative to Moturiki Vertical Datum (MVD-53)

Existing crest and toe levels interpreted from construction drawings and cross sections provided by WDC.

\*Revetment slope is 1V:2H on the seaward side

^Grouted concrete structure allows for smoother impermeable surface, although large boulders protruding above the general concrete surface (0.6m diameter) introduce an element of roughness, hence roughness factor set to 0.1

Spectral wave period at the structure toe derived from joint probability (wave height/peak period) hindcast data. Source: <https://app.metoceanview.com/hindcast/sites/nz/-37.8/174.8#>

For definitions of the parameters input for the running of the NN tool refer to [http://overtopping.ing.unibo.it/overtopping/neuronet/net\\_solve/](http://overtopping.ing.unibo.it/overtopping/neuronet/net_solve/)