

# Safety and Resilience Committee 10 August 2023

Meeting will be held in the Council Chamber at Level 2, Philip Laing House  
144 Rattray Street, Dunedin  
[ORC Official YouTube Livestream](#)



## Members:

Cr Gary Kelliher (Co-Chair)	Cr Tim Mepham
Cr Alan Somerville (Co-Chair)	Cr Andrew Noone
Cr Alexa Forbes	Cr Gretchen Robertson
Cr Michael Laws	Cr Bryan Scott
Cr Kevin Malcolm	Cr Elliot Weir
Cr Lloyd McCall	Cr Kate Wilson

Senior Officer: Richard Saunders Chief Executive

Meeting Support: Kylie Darragh, Governance Support Officer

10 August 2023 01:00 PM

Agenda Topic	Page
1. WELCOME	
2. APOLOGIES	
No apologies were submitted prior to publication of the agenda.	
3. PUBLIC FORUM	
Requests to speak should be made to the Governance Support team on 0800 474 082 or to <a href="mailto:governance@orc.govt.nz">governance@orc.govt.nz</a> at least 24 hours prior to the meeting, however, this requirement may be waived by the Chairperson at the time of the meeting. No requests to speak were made prior to publication of the agenda.	
4. CONFIRMATION OF AGENDA	
Note: Any additions must be approved by resolution with an explanation as to why they cannot be delayed until a future meeting.	
5. DECLARATION OF INTERESTS	
Members are reminded of the need to stand aside from decision-making when a conflict arises between their role as an elected representative and any private or other external interest they might have. <a href="#">Councillor interests are published on the ORC website.</a>	
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7. OPEN ACTIONS FROM RESOLUTIONS OF THE COMMITTEE	
There are no open actions currently for this meeting.	

8.	<b>MATTERS FOR CONSIDERATION</b>	7
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	The purpose of this report is to provide an update on the South Dunedin Future programme and to foreshadow the anticipated work plan through to mid-2024.	
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8.2	<b>HEAD OF LAKE WHAKATIPU NATURAL HAZARDS ADAPTATION</b>	20
	To inform the Committee of the approach and progress towards development of a natural hazards adaptation strategy for the area at the head of Lake Whakatipu.	
8.3	<b>PROGRAMME UPDATE; CLIMATE RESILIENCE, FLOOD REPAIRS AND PROJECTS</b>	48
	This paper seeks to provide an update on the progress of the Otago Regional Council Climate Resilience Programme ("shovel-ready" flood protection engineering projects), recovery from the 2020 and 2022 flood events, and the recent storm damage to ORC infrastructure at the confluence of the Pureua River and Koau branch of the Clutha River/Mata-Au.	
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8.4	<b>CDEM PARTNERSHIP REPORT 2022-2023</b>	108
	To report on ORC's delivery of its responsibilities under the Otago Civil Defence and Emergency Management Agreement, for 2022/23.	
9.	<b>CLOSURE</b>	



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## Safety and Resilience Committee MINUTES

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**Minutes of an ordinary meeting of the Safety and Resilience Committee held in the Council Chamber, Level 2 Philip Laing House, 144 Rattray Street, Dunedin on Wednesday 10 May 2023, commencing at 2:00 PM.**

**PRESENT**

Cr Gary Kelliher *(Co-Chairperson)*  
Cr Alan Somerville *(Co-Chairperson)*  
Cr Alexa Forbes  
Cr Michael Laws (online)  
Cr Kevin Malcolm  
Cr Andrew Noone  
Cr Gretchen Robertson  
Cr Bryan Scott  
Cr Kate Wilson

## 1. WELCOME

Co-Chairperson Gary Kelliher welcomed Councillors, members of the public and staff to the meeting at 2:00 pm. Staff present included Pim Borren, (interim Chief Executive), Nick Donnelly (GM Corporate Services), Anita Dawe (GM Policy and Science), Gavin Palmer (GM Operations), Richard Saunders (GM Regulatory and Communications), Amanda Vercoe (GM Governance, Culture and Customer), Liz Spector (Governance Support), Kylie Darragh (Governance Support)

## 2. APOLOGIES

**Resolution: Cr Wilson Moved, Cr Noone Seconded:**

*That the apologies for Cr McCall, Cr Mephram, Cr Weir be accepted.*

**MOTION CARRIED**

## 3. PUBLIC FORUM

Colin Scurr and Simon Parks, Lower Taieri Flood and Drainage Scheme spoke to the committee about the rate review.

John Glover, online, spoke about the report Head of Lake Whakatipu floodplain and the flooding issues at Kinloch Road.

There was an opportunity for the Councillors to ask questions.

## 4. CONFIRMATION OF AGENDA

The agenda was confirmed as presented.

## 5. DECLARATIONS OF INTERESTS

No changes to the Councillor Declarations of Interests were noted.

## 6. CONFIRMATION OF MINUTES

**Resolution: Cr Wilson Moved, Cr Somerville Seconded**

*That the minutes of the Safety and Resilience Committee meeting held on 23 February 2023 be confirmed as a true and accurate record.*

**MOTION CARRIED**

## 7. MATTERS FOR CONSIDERATION

### 7.1. Head of Lake Whakatipu floodplain and liquefaction hazard intervention assessments

Jean-Luc Payan (Manager Natural Hazards), Tim van Woerden (Natural Hazards Analyst), and Gavin Palmer (GM Operations) were present to respond to questions about the report. Mike Jacka (Sr Geotechnical Engineer at Tonkin + Taylor) and Grant Webby (Damwatch Engineering) were present to speak to their reports.

Mike Jacka presented a PowerPoint entitled Head of Lake Wakatipu Natural Hazards Adaptation which addressed engineering options for managing liquefaction. Grant Webby (Damwatch Engineering) responded to questions from Councillors about the Dart-Rees floodplain hazards report.

Dr Payan noted the reports were not intended to recommend actions to Council but to provide options for mitigation. Mr von Woerden noted engagement sessions with community have



started discussions about adaptation pathways using information provided in these two reports. He also noted staff will start putting together an intervention map or list to inform a timeframe for the immediate short-term actions.

Cr Kelliher asked whether the 2016 GeoSolve report “Flood Protection – Kinloch Road/Dart River” noted by Public Forum speaker John Glover could be noted as well. Following a discussion, it was agreed to include noting of that report.

**Resolution SRC23-103: Cr Kelliher Moved, Cr Wilson Seconded**

*That the Safety and Resilience Committee:*

- 1) **Notes** this report.
- 2) **Notes** the report by Tonkin + Taylor Ltd; Engineering approaches for managing liquefaction-related risk, dated February 2023 and the report by Damwatch Engineering Ltd; Dart-Rees floodplain adaptation – Report on 23-24 February workshop, dated November 2022.
- 3) **Notes** the findings presented in these reports.
- 4) **Endorses** the use of the information presented in these reports to inform natural hazard management and adaptation decision-making for the Dart-Rees floodplain and Glenorchy.
- 5) **Notes** the proposed scope and intent of the Head of Lake Whakatipu natural hazards work programme.
- 6) **Notes** the GeoSolve report entitled Flood Protection – Kinloch Road / Dart River dated 1 June 2016

**MOTION CARRIED**

*Cr Laws left the meeting at 3:35 pm.*

**7.2. Otago Region Natural Hazards Risk Assessment**

This report was provided to inform the Committee of the work programme to undertake a natural hazards risk assessment for the Otago region, and development of a prioritisation approach to inform ORC’s natural hazard risk management/adaptation planning and implementation. Tim van Woerden (Natural Hazards Analyst), Jean-Luc Payan (Manager Natural Hazards), Andrew Welch (Spatial Analyst) and Gavin Palmer (GM Operations) were present to respond to questions about the report.

Following questions from Councillors and a discussion of the report, it was moved:

**Resolution SRC23-104: Cr Robertson Moved, Cr Scott Seconded**

*That the Safety and Resilience Committee:*

- 1) **Notes** this report.
- 2) **Notes** the Otago Regional Council natural hazards risk assessment work programme.

**MOTION CARRIED**

*Cr Forbes left the meeting at 4:11 pm.*

*Cr Wilson left the meeting at 4:21 pm.*

**8. CLOSURE**

There was no further business, Cr Somerville said a karakia to close the meeting and Co-chair Cr Kelliher declared the meeting closed at 4:26 pm.

\_\_\_\_\_  
Chairperson

\_\_\_\_\_  
Date

DRAFT

### 8.1. South Dunedin - Programme Update

**Prepared for:** Safety and Resilience Committee  
**Report No.** HAZ2302  
**Activity:** Community: Governance & Community  
**Author:** Jonathan Rowe, South Dunedin Future Programme Manager  
**Endorsed by:** Gavin Palmer, General Manager Operations  
**Date:** 10 August 2023

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#### **PURPOSE**

- [1] The purpose of this report is to provide an update on the South Dunedin Future programme and to foreshadow the anticipated work plan through to mid-2024.

#### **EXECUTIVE SUMMARY**

- [2] This report provides an update on the South Dunedin Future programme by outlining key developments since Councils approved the programme plan in July 2022, and foreshadowing significant pieces of work coming up in the next 6-12 months.
- [3] Programme planning is now at a more advanced stage, with the programme broken down by phase, workstream, as well as key actions and decisions, with high-level scheduling across the three-year period July 2023 – June 2026. Delivery of the programme is led by a dedicated programme team based at Dunedin City Council (DCC), with continued collaboration with staff across DCC and Otago Regional Council (ORC), reflecting the multi-disciplinary nature of climate change adaptation.
- [4] These internal resources are now supplemented by an external consultant team providing a range of technical support services across the programme – including in strategy, communications, community engagement, risk assessment, and adaptation options development. Relationships are also developing with a range of partners and external stakeholders, including mana whenua, central government agencies, local government counterparts, private sector interests, and community stakeholders.
- [5] Community engagement remains a central focus of the programme, with extensive work undertaken to explain the complexities and uncertainties of climate change adaptation in South Dunedin in ways more easily understood by the general public. This is intended to help everyone better understand the key issues and engage with the discussion and decision-making, and has included reframing the programme around finding a balance between key concepts of people, water and space.
- [6] As the SDF programme accelerates, a range of outputs will be produced at regular intervals over the next three years, as partners and stakeholders are taken through the anticipated changes to the natural environment, the resulting risks and impacts on affected communities, and the options for managing impacts and adapting to change. The intention is that over the next three years this work results in a technically-sound, and community-supported set of adaptation options, which if approved by Councils, would be consolidated into a climate change adaptation strategy for South Dunedin.

- [7] It is anticipated that this adaptation strategy for South Dunedin will be completed by mid-2026. Early work has commenced in parallel to consider options for implementing that strategy, once the details are confirmed, including looking at potential land use change that might be required in South Dunedin to effectively adapt to the impacts of climate change over the coming century.

## RECOMMENDATION

*That the Strategy and Resilience Committee:*

- 1) **Notes** this update on the South Dunedin Future programme.

## BACKGROUND

- [8] The South Dunedin Future (SDF) programme is a joint initiative between the Dunedin City Council (DCC) and Otago Regional Council (ORC) to develop a climate change adaptation strategy for South Dunedin. A programme plan, which outlined the high-level approach for developing the adaptation strategy and delivering the SDF programme was approved by DCC and ORC Councils in July 2022 (refer report OPS2223, Strategy and Planning Committee, 13 July 2022). An update on the programme was provided to a joint workshop of both Councils on 6 June 2023. This report provides an update on delivery of the SDF programme, including reporting against the 'next steps' outlined in the July 2022 report, and foreshadows planned activities over the coming 6-12 months.

### **Programme Management Activities**

#### *Programme Planning*

- [9] Detailed planning has now broken the SDF programme into five phases, five workstreams, and a number of programme actions. These are summarised below and illustrated in the A3 Programme Overview (**Attachment A**).
- [10] The programme continues to follow the Dynamic Adaptive Pathways Planning (DAPP) approach, which promotes a five-phase circular process for adaptation planning and is guided by best practice advice from the Ministry for the Environment (MfE).
- [11] The SDF programme has been broken into five complementary workstreams, including:
- a. Natural hazards – Monitoring, investigating and predicting changes to the physical environment and the associated hazards for local communities.
  - b. Strategy and programme – Developing a clear strategic intent and designing programme structure, resources and work plan required for delivery.
  - c. Communications and community engagement – Developing, designing and delivering a range of communications and community engagement activities in support of other programme work streams.
  - d. Risk assessment – Undertaking a three-stage climate change and natural hazard risk assessment for South Dunedin (and some parts of wider Dunedin city)
  - e. Adaptation options – Undertaking a five-stage adaptation options development process, following the PARA (protect, accommodate, retreat, avoid) framework.
- [12] Programme staff are also actively engaging with central and local government contacts on climate change adaptation policy, planning and practice – which is developing quickly, following the Auckland Anniversary floods and Cyclone Gabrielle in the North

Island in early 2023. This includes work to develop a Climate Change Adaptation Bill as part of wider reform of the Resource Management Act 1991.

- [13] The programme has established an academic research partnership contract with the Centre for Sustainability at the University of Otago, focussing on developing research summary products in areas relevant to the programme 6-12 months prior to addressing those issues through the programme. The first summary, produced in February 2023, focussed on Community Engagement for Climate Change Adaptation. A second summary, expected in August 2023, will focus on Community Mapping for Climate Change Adaptation (e.g. mapping community views, values and connections, in addition to relevant physical features in and around South Dunedin).

#### *Programme Communications*

- [14] Work has been undertaken to distil the wide range of complex and uncertain issues characterising the SDF programme, such as environmental change, social dynamics, and economic variables, into some key concepts and principles. The primary purpose has been to support programme communications by offering simpler concepts that are more easily understood by a wider range of people.
- [15] This has included distilling the programme down to three key concepts: people, water and space. The objective of the programme is essentially to find a balance between people, water and space, making South Dunedin a safer and better place to live, work and play, while maintaining and creating more space for water – given climate change is expected to mean rising groundwater, rising sea levels, and increased frequency and severity of rainfall events.
- [16] This work is central to reframing of the issues and purpose of the SDF programme. It supports the shift away from a deficit-focused, binary approach where South Dunedin must be protected from climate change at all costs until everyone has to leave. Pivoting to an opportunity-focussed, dynamic approach where South Dunedin’s climate change-related challenges are logically assessed, quantified, and adaptation options developed that not only manage risks and make South Dunedin *safer*, but also support activities (e.g. urban regeneration) that make South Dunedin a *better* place to live.
- [17] This involved rebranding work for the SDF programme through production of a programme flyer and other marketing materials that were launched at the South Dunedin Street Festival on 1 April 2023. A copy of the Flyer is included as **Attachment B**. A programme communications and engagement strategy is under development, and further flyers are planned for 2023, covering “The Science of South Dunedin”, “What matters most in South Dunedin”, and “The Adaptation Options for South Dunedin”. These are intended to gradually introduce the community to the key issues, provide a platform for more informed discussion, and enable better quality decisions and outcomes.

#### *Partner & Stakeholder Engagement*

- [18] Partner and stakeholder engagement remains central to the SDF programme, and staff are regularly engaging with central government, local government, private sector and community stakeholders on a wide range of issues. This has included monthly meetings with the South Dunedin Community Network, a presentation to the South Dunedin

Community Hui on 8 March 2023, as well as periodic meetings with a range of other community groups and representatives across South Dunedin to keep stakeholders up to date with developments, strengthen relationships, and deepen our understanding of what matters most for the community.

- [19] Programme governance and management continues to evolve, as more partners and stakeholders are engaged, and as the programme produces greater clarity on the problems to be solved, people's interests and objectives, and options for delivery. The SDF programme continues to report regularly to a joint Steering Group comprising General Managers from DCC and ORC, and provides periodic briefing and reporting to both Councils and Council Committees. As an operations level, day-to-day activities are managed by a DCC-based team of three staff, complemented by a range of other staff across DCC and ORC. The programme team regularly works with other local government staff, and central government agency staff, on a range of issues, and in coming months it is likely that more formal working groups and collaborative programme structures will be established involving representatives from councils, central government, mana whenua, private and community sectors, and consultant teams.

### ***Programme Actions***

#### ***Engagement with Mana Whenua***

- [20] The SDF programme is operating on the basis that all our work will serve to build and enhance the mana of the DCC and ORC's Treaty partnerships with mana whenua. We expect this will be achieved through ongoing collaboration with Ōtākou Rūnaka and Kāti Huirapa Rūnaka ki Puketeraki, their consultancy arm Aukaha, and a range of local Māori organisations in Dunedin. These partnerships continue to develop. A range of operational discussions are underway with Aukaha, with an initial focus on partnership principles, incorporating mana whenua values, priorities and insights into the programme strategy, and co-development of programme workstreams.

#### ***Consolidated natural hazards information***

- [21] ORC is continuing to lead the gathering and analysis of natural hazards information. There are currently 31<sup>1</sup> permanent monitoring wells where groundwater levels are recorded.
- [22] GNS Science have been engaged by ORC to update the analysis of the groundwater levels and the understanding of groundwater processes (e.g. magnitude and spatial variability) in the area. This work will inform the risk assessment and the development of adaptation options (refer to Discussion section).
- [23] ORC, supported by NIWA, is continuing to monitor the sea level at the Green Island site. The site has been operating since 2003. Land movement on Green Island is also being monitored. This is to determine if there are changes in land elevation occurring at this site, and help in the assessment of the relative contributions of land subsidence and changes in sea level to 'relative sea level rise' at that site.

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<sup>1</sup> Permanently monitored sites as of October 2021. Five additional piezometers installed by DCC and University of Otago are also occasionally accessed for readings.

- [24] ORC has engaged NIWA to update the maps of coastal inundation from extreme sea level rise<sup>2</sup> using more accurate ground elevations. The purpose of this work is to refine the understanding and extent of the consequences of sea level rise on coastal inundation. This work will also inform the South Dunedin Future Programme, in particular the risk assessment and the development of adaptation options (refer to Discussion section).
- [25] ORC is working with the University of Otago, School of Surveying on improving the monitoring network for vertical land motion in South Dunedin. The current focus is on defining the coverage of the network and identifying adequate sites in the South Dunedin area to install the monitoring equipment. This work is to ensure that South Dunedin site specific vertical land motion data is available.
- [26] Work is underway to consolidate a wide range of natural hazard-related information relating to South Dunedin so that this can be integrated into programme workstreams. For over 10 years the ORC, supported by GNS Science, NIWA, and others, has led a programme of monitoring, investigation and prediction relating to natural hazards affecting South Dunedin.
- [27] This and other information is being consolidated into a range of SDF programme outputs, including community flyers summarising the natural hazards, website updates, and a range of technical reports as inputs into the risk assessment and adaptation options workstreams. This information is critical to understanding current natural systems, their interaction with the built environment, how these relationships might be affected by climate change, and what options there are for mitigating negative impacts.

#### *Procurement of Technical Support Services*

- [28] The SDF programme involves detailed technical work and extensive community engagement over multiple years. The SDF programme team, which includes a dedicated Programme Manager and two advisors, supported by a range of staff from across different teams in DCC and ORC, identified areas in which external technical expertise is required to complement internal capability and support delivery of programme workstreams and development of the adaptation strategy for South Dunedin. This support is required to ensure all technical work is high quality, independent, and peer reviewed, and that programme direction and decisions are extensively engaged with affected communities.
- [29] An open tender procurement process to source the technical support services required to deliver the SDF programme commenced in November 2022. This process concluded in July 2023, and resulted in DCC contracting a consultant group comprising engineering, planning and environmental services firms WSP, BECA and Tonkin & Taylor, to support delivery of the SDF programme over the next three years (2023/24 to 2025/26). The total value of this contract is \$1,931,184, which will be funded from a mix of DCC South Dunedin Future operational funding, ORC natural hazards operational funding, and central government grant funding.
- [30] The contracted services focus on four workstreams:

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<sup>2</sup> <https://niwa.co.nz/natural-hazards/our-services/extreme-coastal-flood-maps-for-aotearoa-new-zealand>

- a. Strategic Programme Advisory Support
- b. Communications and Community Engagement Support
- c. Climate Change and Natural Hazard Risk Assessment
- d. Adaptation Options Development

(a more detailed breakdown of contracted services is included in **Attachment C**)

- [31] A further contract is in development with a secondary supplier to undertake technical peer review of the risk assessment and adaptation options development workstreams.
- [32] The fifth workstream, natural hazards, was not included in this procurement process. This workstream is ORC-led and subject to a number of other contracting arrangements, for example for scientific or technical research, as inputs into the SDF programme, as opposed to professional services to deliver key workstreams of the programme.

## DISCUSSION

### *Upcoming Programme Actions*

- [33] Following onboarding of the technical support services consultant team in late July, the SDF programme is expected to accelerate, and will start producing outputs across all five workstreams from August 2023. All key programme actions are noted on the SDF Programme Summary document in **Attachment A**, but key outputs over the next six months are also noted below:

#### *Workstream: Natural Hazards*

- a. Information gathering and analysis: continued groundwater levels and sea level monitoring. Establishment of site-specific vertical land movement monitoring sites. Up-to-date analysis of the groundwater levels and refined understanding of groundwater processes in South Dunedin. Updated coastal inundation maps from extreme sea level rise.
- b. Science of South Dunedin flyer: Flyer and supporting web content explaining the science of climate change and how it will impact South Dunedin. Making this more accessible for everyday people.

#### *Workstream: Strategy & Programme*

- c. Mana whenua engagement: Engagement with Aukaha and local rūnaka to integrate views, values and insights into revised SDF programme strategy
- d. National adaptation plan: Analysis of National Adaptation Plan, which was released in August 2022 (after Council approval of the SDF programme plan) to incorporate key elements into revised SDF programme strategy
- e. Council Report - Revised SDF programme strategy: Paper to DCC and ORC Councils seeking approval of refined SDF programme strategy

#### *Workstream: Communications and Community Engagement*

- f. What matters most engagement: Utilising “people, water, space” reframing of the programme, a series of communications and engagement activities will be



undertaken to test and refine our understanding of community priorities and the objectives of the programme.

*Workstream: Risk Assessment*

- g. Initial Risk Assessment: Undertaking the first stage of a three-stage risk assessment process, which will start with a high-level climate change and natural hazard risk assessment for Dunedin city (before narrowing to focus on South Dunedin).

*Workstream: Adaptation Options*

- h. Options Review: Undertaking a desktop review of national and international adaptation literature, policy, practice, planning documents and case-studies of relevance to South Dunedin. This will include crowdsourcing of adaptation ideas from local communities.
- i. Longlist of generic adaptation options: Developing a long-list of up to 20 adaptation options spanning the spectrum of 'fight or flight', grouped into four adaptation options of protect, accommodate, retreat, and avoid.
- j. Council Report – Generic Adaptation Options: Paper to DCC and ORC Councils presenting the initial long-list of generic adaptation options and seeking approval to engage the community on the options in early 2024.

[34] As the programme advances, it is intended to settle into a cycle of (i) technical work producing a selection of adaptation options – a wide range initially; (ii) consideration and endorsement by Councils; and (iii) a period of community engagement on those options, which would inform further technical work. This process would be repeated over the course of three years, to narrow down and eventually settle a preferred set of adaptation options, which would be consolidated into the climate change adaptation strategy or South Dunedin.

*Early thinking on implementing the adaptation strategy for South Dunedin*

[35] As the technical work of the SDF programme accelerates, some early thinking has also started about how best to implement the climate change adaptation strategy for South Dunedin, which is expected to be produced by mid-2026. The contents of the adaptation strategy, including the balance of adaptation options selected and implemented across South Dunedin over time, are yet to be determined. It is important not to pre-empt or pre-judge the outcome of that process, which will be guided by detailed and independent technical work and extensive community engagement.

[36] However, it is important to begin thinking about how various adaptation options could be implemented, and to commence preparations – particularly if long lead in times are involved. To this end, initial thinking has commenced on the assumption that land use change of some form will be required in South Dunedin over the coming century to manage the impacts of climate change, be that through hard infrastructure protections like pumps, pipes and sea walls, accommodation of hazards through nature-based solutions like open water courses, parks and wetlands, or through retreating or relocating to move people and property out of harm's way.

[37] There are approximately 6,500 properties in South Dunedin, and if land use change of 1% per annum was required over a 100-year period in order to effectively manage and adapt to the impacts of climate change, that would mean a change affecting 65 properties each year, every year, for the next century. Such a rate of change is yet to be confirmed, so is indicative at this stage, though possible given anticipated changes in sea level rise, groundwater levels, and rainfall.

[38] Preliminary work is underway to explore options and models for facilitating such land use change should that prove to be required, with a view to identifying viable approaches, and getting these set up in parallel to the SDF programme – so implementation could commence immediately upon completion of the adaptation strategy for South Dunedin in 2026. Further advice will be provided to Councils in due course as this work progresses.

### **OPTIONS**

[39] This update report is for noting only, so no options are provided.

### **CONSIDERATIONS**

#### **Strategic Framework and Policy Considerations**

[40] These are described in the paper and attachments, with a subsequent report on SDF programme strategy to be provided to Council in September 2023.

#### **Financial Considerations**

[41] ORC's financial contributions to the SDF programme are provided for in the 2023/24 Annual Plan, or will be considered as part of the next Long Term Plan process.

#### **Significance and Engagement Considerations**

[42] Not relevant to the decisions being made in respect of this paper.

#### **Legislative and Risk Considerations**

[43] These are described in the paper and attachments.

#### **Climate Change Considerations**

[44] The SDF programme is making a significant contribution to climate change adaptation in Otago.

#### **Communications Considerations**

[45] These are described in the paper and attachments.

### **NEXT STEPS**

[46] These are described in the paper and attachments.

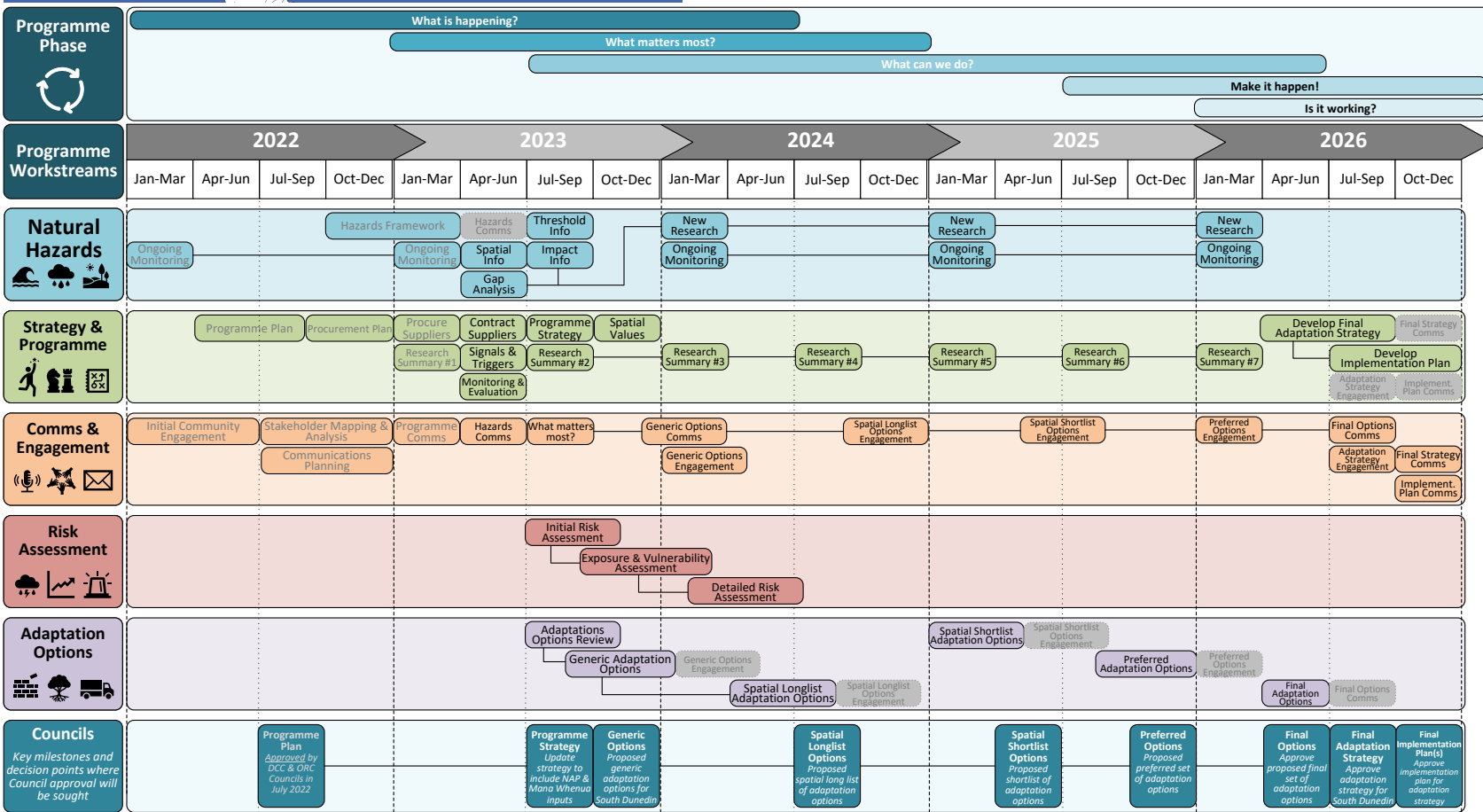
### **ATTACHMENTS**

1. SDF Programme - Summary One- Pager ( A 3) [8.1.1 - 1 page]
2. South Dunedin Future Flyer Apr-23 [8.1.2 - 3 pages]
3. SDF Technical Support Services - Contracted Services [8.1.3 - 1 page]



# South Dunedin Future Programme

- South Dunedin Future is a **joint programme** between Dunedin City Council and Otago Regional Council to find ways to respond to climate change and flooding problems in South Dunedin.
- We need to **adapt South Dunedin's infrastructure and environment** in a way that creates more room for increasing levels of rain, sea and groundwater, while protecting space for people and the things that matter.
- We are **making a plan** with the South Dunedin community, mana whenua and stakeholders to work out what's most important and to find the right balance between people, water and space.
- This will involve **lots of technical work and community engagement** over a number of years. Some key pieces of this work are mapped out below.



### Get in touch

Head to our website to learn more and subscribe for regular updates or drop us a line.

[dunedin.govt.nz/southdunedin](https://dunedin.govt.nz/southdunedin)  
[southdunedinfuture@dcc.govt.nz](mailto:southdunedinfuture@dcc.govt.nz)  
03 477 4000

# South Dunedin Future



**SOUTH  
DUNEDIN  
FUTURE**

## Let's make a plan!

**DUNEDIN** | kaunihera  
CITY COUNCIL | a-rohe o  
ōtepoti

**Otago  
Regional  
Council**

# We need to talk about water.

In South Dunedin there's water coming down from the sky, up from the ground and in from the sea, and it's ending up in places we don't want it.

We saw this with the flood in 2015, and the science tells us this kind of event will happen more often.

Climate change means there'll be more rain, bigger storms, rising seas and higher groundwater.

## We need a plan.

There's so much to love about South Dunedin – its diversity, its community and all the great things you can do here. And it's flat so everything's easy to access.

On the downside, the water coming in has nowhere to go, and South Dunedin's infrastructure struggles to cope with it.

## We need to find a balance between people, water and space.

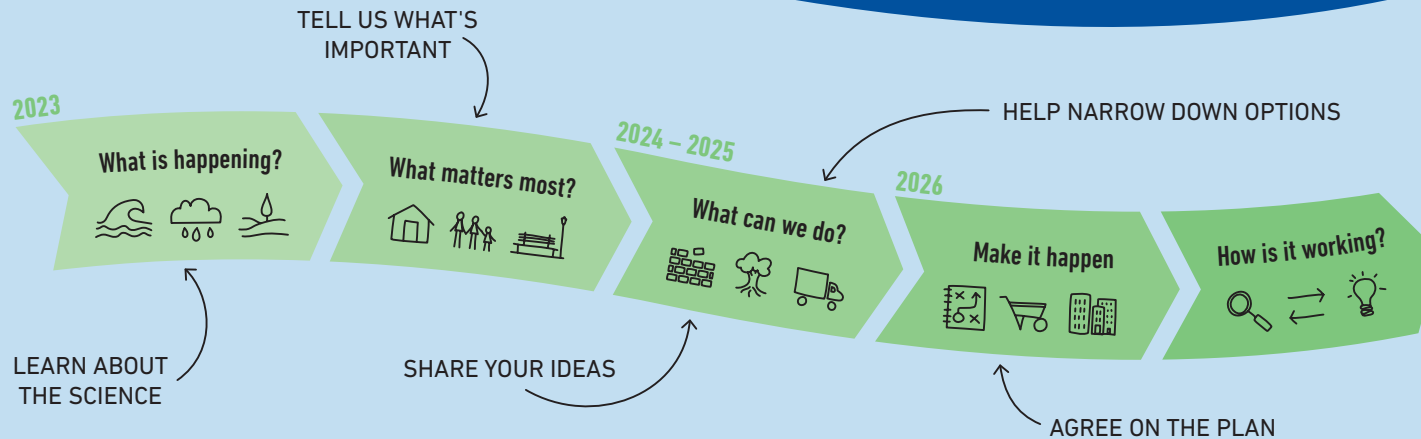
We've launched South Dunedin Future so we can figure out what to do. We need to work out how to adapt and allow for water, yet still have space for people and the things that matter.

The Dunedin City Council and Otago Regional Council are leading this programme to produce a plan for the future.

We'll hold discussions and workshops, we'll hear everyone's ideas, and we'll work out our options.

By 2026, we will have a strategy that tells us what we'll do, when we'll do it, and how.

**We've been preparing for this for a long time, but South Dunedin Future starts now.**





## **South Dunedin Future Technical Support Services - Contracted Services**

### Primary Supplier(s)

#### WS1 Strategic Programme Advisory Support

Provision of strategic and technical advice relating to programme planning, design and delivery, including coordination of suppliers, interfacing between technical disciplines, developing adaptation signals, triggers and thresholds, programme strategy, risk and issues management, benefits management, reporting, monitoring and evaluation.

#### WS2 Communications and Community Engagement Support

Provision of communications and engagement advice on wide-ranging issues of relevance to the programme, including: finalising the programme communications and engagement plan, review of science communications materials, design, delivery and analysis of engagement activities and communications products during the three stages of the risk assessment workstream and five stages of the adaptation options development workstream, and development of a final adaptation strategy document.

#### WS3 Risk Assessment

Undertaking a three-stage climate change and natural hazard risk assessment for South Dunedin, including design, delivery and reporting on findings, covering an initial high level desktop review, assessment focussing on exposure and vulnerability, and further detailed assessment on risk consequence, indirect and cascading risks. This work also includes responding to and integrating technical peer review findings.

#### WS4 Adaptation Options

Undertaking a five-stage adaptation options development process, utilising a Dynamic Adaptative Pathways Planning (DAPP) methodology and following the PARA (protect, accommodate, retreat, avoid framework), including: review of national and international adaptation options, developing generic long list of options, developing a spatial long list of options, developing a spatial shortlist of options, and developing final preferred options.

### Secondary Supplier(s)

#### Peer Review – Risk Assessment

Technical peer review of WS3 Risk Assessment work undertaken by Primary Supplier to ensure the robustness and appropriateness of the approach (such as comparing with best practice, identifying risks and opportunities, validating conclusions, challenging and stimulating discussion around alternate ideas).

#### Peer Review – Adaptation Options

Technical peer review of WS4 Adaptation Options work undertaken by Primary Supplier to ensure the robustness and appropriateness of the approach (such as comparing with best practice, identifying risks and opportunities, validating conclusions, challenging and stimulating discussion around alternate ideas).

## 8.2. Head of Lake Whakatipu Natural Hazards Adaptation

<b>Prepared for:</b>	Safety and Resilience Committee
<b>Report No.</b>	HAZ2301
<b>Activity:</b>	Governance Report Ann Conroy, Team Leader Natural Hazards Adaptation
<b>Author:</b>	Tim van Woerden, Natural Hazards Analyst Jamie MacKenzie, Natural Hazards Adaptation Specialist Jean-Luc Payan, Manager Natural Hazards
<b>Endorsed by:</b>	Gavin Palmer, General Manager Operations
<b>Date:</b>	10 August 2023

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### PURPOSE

- [1] To inform the Committee of the approach and progress towards development of a natural hazards adaptation strategy for the area at the head of Lake Whakatipu.

### EXECUTIVE SUMMARY

- [2] The Otago Regional Council (ORC) led natural hazards adaptation programme for the area at the Head of Lake Whakatipu is progressing towards delivery of a first iteration of the Adaptation Strategy document by June 2024.
- [3] ORC is using the Dynamic Adaptive Pathways Planning (DAPP) approach as a framework for development of a natural hazards adaptation strategy.<sup>1</sup> Current work under the programme is primarily focussing on the second and third Phases, “*What matters most?*” and “*What can we do about it?*” (Figure 1).
- [4] The Strategy will be delivered in the form of two complementary documents. The first is a ‘Condensed Strategy’ document, focussed on key points, with accessible language and imagery. The second is an accompanying guidance document with underlying details of the decision-making process and Action Plans.
- [5] This paper outlines key activities in this work programme to develop a natural hazards adaptation strategy, including community and partner engagement, and technical and supporting assessments.
- [6] The next stages of the DAPP cycle (from now to June 2024) have three main themes to explore with the community and partners through community engagement activities:
- Views, values and aspirations for the future
  - Adaptation pathways and desired outcomes
  - Feedback on design and implementation of first iteration of an adaptation strategy

### RECOMMENDATION

*That the Safety and Resilience Committee:*

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<sup>1</sup> van Woerden T & Payan J, 2021. *Natural Hazards Adaptation in the Head of Lake Whakatipu*. ORC Report HAZ2105, Report to 27 May 2021 meeting of the Otago Regional Council.



- 1) **Notes** this report.
- 2) **Notes** the Head of Lake Whakatipu natural hazards adaptation work programme and community engagement.

## BACKGROUND

- [7] ORC, in collaboration with project partners, is leading a programme of work to develop a natural hazard adaptation strategy for the head of Lake Whakatipu area.
- [8] The Long-Term Plan (LTP) targets for the adaptation strategy are shown in Table 1.

**Table 1: 2021-2031 Long-Term Plan (LTP) targets for the head of Lake Whakatipu natural hazards adaptation strategy**

2021/22 TARGET	2022/23 TARGET	2023/24 TARGET
<b>The Head of Lake Whakatipu natural hazards adaptation strategy progresses as per annual work plan</b>	The Head of Lake Whakatipu natural hazards adaptation strategy progresses as per annual work plan	The first Head of Lake Whakatipu natural hazards adaptation strategy completed by 30 June

- [9] The adaptation project approach and work activities previously completed are outlined in the update papers presented in May 2021,<sup>2</sup> June 2022,<sup>3</sup> and May 2023.<sup>4</sup>
- [10] In May 2023, technical reports were presented to the committee which outlined assessments of potential hazard management interventions for liquefaction and flooding hazards.
- [11] This paper provides an update focused on development of the natural hazards adaptation strategy for the head of Lake Whakatipu area, and the associated community engagement activities and social impact assessment.
- [12] Updates for other activities in this work programme since the May 2023 paper are included as Appendix 1. These include flood hazard assessment for the Buckler Burn, development of a flood forecasting model for the Glenorchy Lagoon, and commencement of a natural hazard risk assessment project.
- [13] Figure 1 shows an overview of key activities in the head of Lake Whakatipu natural hazards adaptation work programme, with the programme currently essentially focussing on the second and third Phases, “*What matters most?*” and “*What can we do about it?*” and building towards delivery of a first iteration of the strategy document by June 2024. This diagram updates the similar figure compiled for, and presented in, the previous (May 2023) committee paper.

<sup>2</sup> van Woerden T & Payan J, 2021. *Natural Hazards Adaptation in the Head of Lake Whakatipu*. ORC Report HAZ2105, Report to 27 May 2021 meeting of the Otago Regional Council.

<sup>3</sup> van Woerden T & Payan J, 2022. *Head of Lake Whakatipu flooding and liquefaction hazard investigations*. ORC Report HAZ2202, Report to 9 June 2022 meeting of the Otago Regional Council Data and Information Committee.

<sup>4</sup> van Woerden T & Payan J, 2023. *Head of Lake Whakatipu floodplain and liquefaction hazard intervention assessments*. ORC Report OPS2256, Report to the 10 May 2023 meeting of the Otago Regional Council Safety and Resilience Committee.

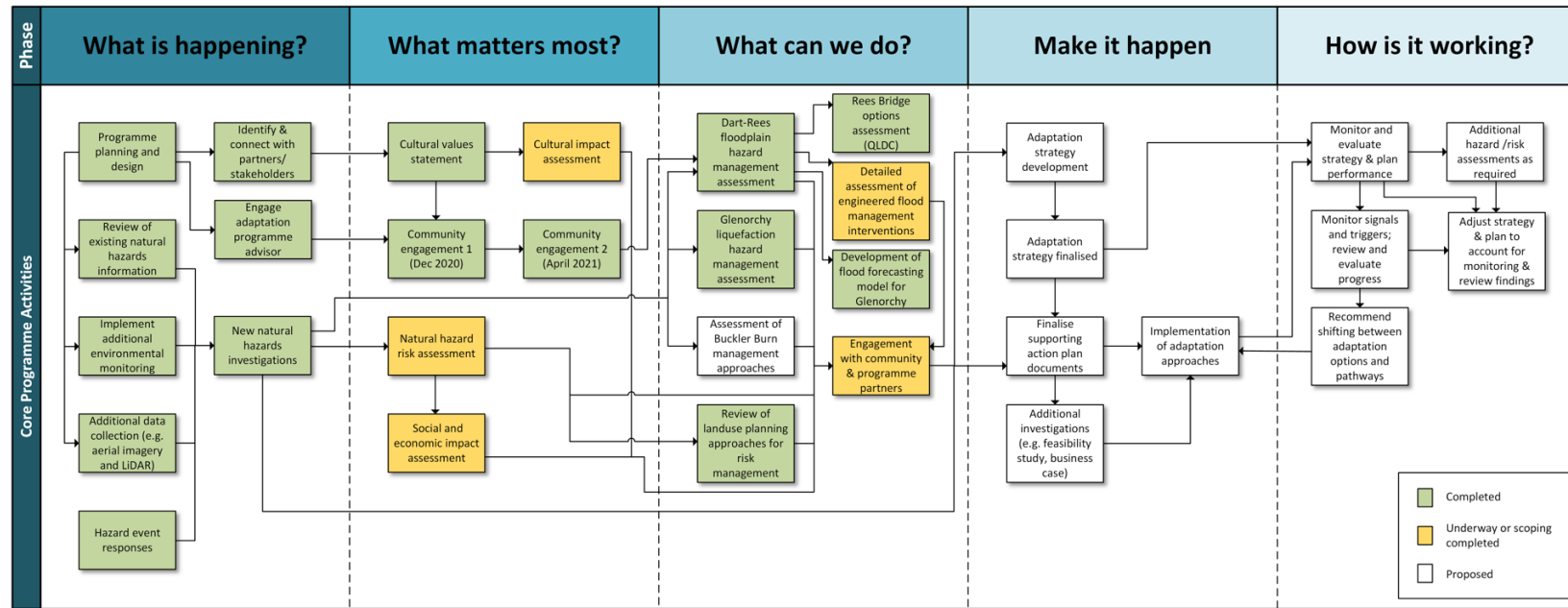


Figure 1: Head of Lake Whakatipu programme overview of key activities. This diagram updates Figure 4 from the previous (May 2023) committee paper.

**ADAPTATION STRATEGY DEVELOPMENT**

- [14] Timing for delivery of the first iteration of the Strategy is June 2024, aligning with the target specified in the 2021-31 Long-Term Plan.<sup>1</sup>
- [15] It is proposed to deliver the Strategy in the form of two complementary documents. The first is a ‘Condensed Strategy’ document, focussed on key points, with accessible language and imagery. The second is an accompanying guidance document, with underlying details of the decision-making process and Action Plans. The intent of the guidance document is to increase confidence in the strategy through transparency.
- [16] The Strategy will support the community's vision and objectives for the future by enabling flexible and adaptive decision making, and for planning under conditions of uncertainty. Figure 2 shows how physical, social, cultural and economic elements will be monitored (“signals”) and pathways or responses can be revisited when pre-defined decision points (“triggers”) occur. This is part of how the Strategy will evolve through future iterations.
- [17] The “PARA” framework (Protect/Accommodate/Retreat/Avoid)<sup>2</sup> is an accessible way to introduce the types of high-level adaptation responses available and guide discussions around responses, opportunities and constraints (Table 2). Figure 3 is a conceptual example of how PARA responses for flood hazard adaptation could fit into the pathway concept. A range of potential hazard management responses for liquefaction hazards are illustrated in Figure 4, showing their potential implementation either proactively or following a major earthquake.
- [18] The development of adaptation or hazard management approaches should be an integrated response considering the full multi-hazard risk profile, and the potential cascading hazard interactions between different hazard types.
- [19] For example, liquefaction or lateral spreading may damage flood protection structures, and may also cause widespread ground subsidence which would increase the areas exposed to flooding. Assessments of the feasibility of any new or modified flood protection structures should therefore consider both flooding and geological hazard types.

**Table 2: Types of potential adaptation responses, summarised as the ‘PARA’ framework (Protect/Accommodate/Retreat/Avoid).**

Type of response	Explanation	Examples
<b>Protect</b>	Reduce risks through ‘holding the line’ using natural buffers or hard structures.	Construction of floodbanks or erosion protection structures. Geotechnical ground improvements to reduce liquefaction or lateral spreading susceptibility.
<b>Accommodate</b>	Adjustment of existing assets to anticipate hazard risk and reduce future hazard impacts.	Retrofit building modifications to reduce potential damage such as raising floor levels above flooding

<sup>1</sup> The LTP target for the 2023/24 year is “The first Head of Lake Whakatipu natural hazards adaptation strategy completed by 30 June.”

<sup>2</sup> Peart R, Boston J, Maher S, Konlechner T, 2023. *Aotearoa New Zealand’s Climate Change Adaptation Act: Building a Durable Future. Principles and funding for managed retreat.* Environmental Defence Society Incorporated.

		level, or for seismic strengthening of existing foundations. Flood warning and Civil Defence planning. Insurance cover to mitigate financial impacts.
<b>Retreat (also known as "Relocation")</b>	Moving existing people and assets away from the hazards in a managed way over time, <sup>1</sup> or as a consequence of damage after natural hazard events.	Relocation from higher-risk areas following hazard impacts (e.g. subsequent to Cyclone Gabrielle, or the Canterbury earthquake sequence) or intolerable repeat events.
<b>Avoid</b>	Stop putting people and assets in harm's way.	Using land use planning rules to prevent further growth into areas prone to natural hazard impacts.

- [20] The first iteration of the Strategy will include preferred adaptation pathways agreed with community and partner input. Adaptation responses in the preferred pathways will be at various levels of maturity, from detailed planning (e.g. funding secured and work programme underway) through to screening level (e.g. requires further feasibility assessment and business case).
- [21] Action Plans will be included for agreed adaptation responses that are implementable within current constraints, consistent with the elements of good decision making discussed in IPCC Foundations for Decision Making (2014)<sup>2</sup>.
- [22] These supporting Action Plan documents could include; floodplain management; monitoring of the physical and social indicators; emergency preparedness; major event recovery; and strategy review.
- [23] Other responses will be in the strategy pathways at a screening level, with current constraints clearly identified. Decision points may be defined for review and further investigation. Some constraints may change in the future, for example policy reform, or opportunities following major hazard events.
- [24] Constraints to potential implementation of adaptation responses may include;
- timescale required for implementation
  - effectiveness of the response
  - level of remaining residual risk
  - consideration of possible maladaptation and lock-in
  - resourcing (e.g. public or private funding of geotechnical ground improvements)
  - community or partner capacity
  - level of current knowledge
  - legislation, governance and institutional frameworks, systems and processes

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<sup>1</sup> Retreat from risk can also be "unmanaged", i.e. an unplanned, uncoordinated ad-hoc response where individuals make their own decisions as to whether and when to move from areas of higher natural hazard risk (Peart *et al*, 2023).

<sup>2</sup> Jones RN *et al*, 2014: *Foundations for decision making*. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

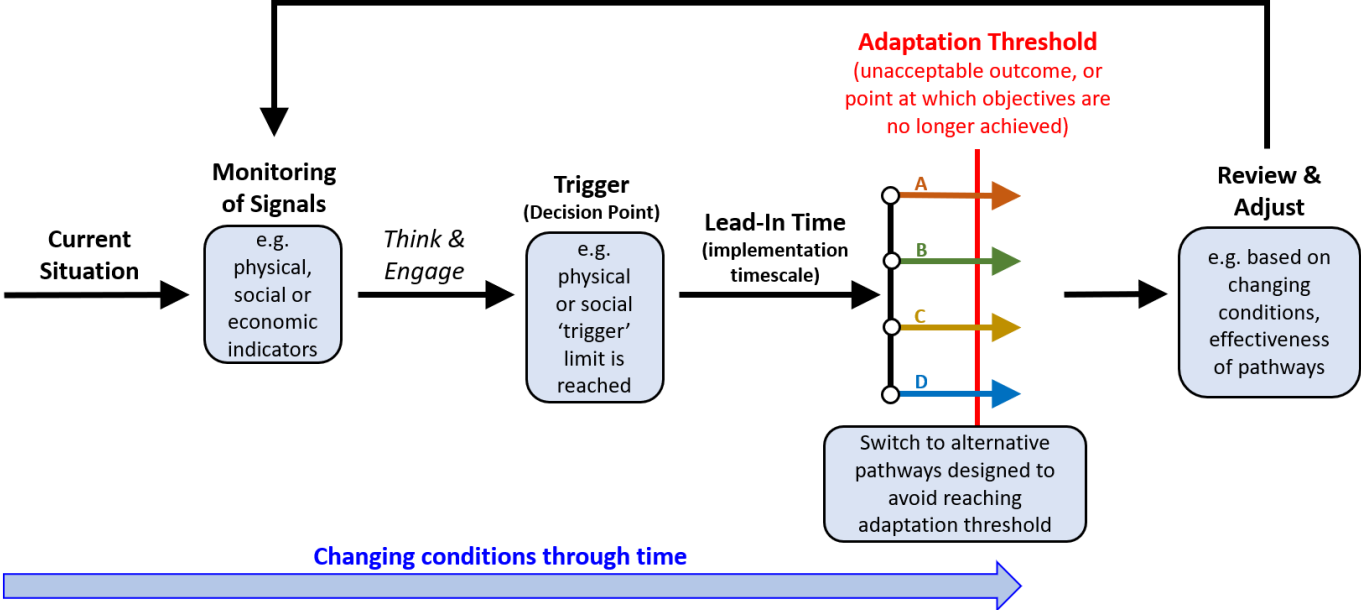


Figure 2: Conceptual outline of the adaptation pathways decision-making process.<sup>1</sup>

<sup>1</sup> Figure based on NZ adaptation guidance documents, e.g. the MfE (2017) Coastal hazards and Climate change guidance.

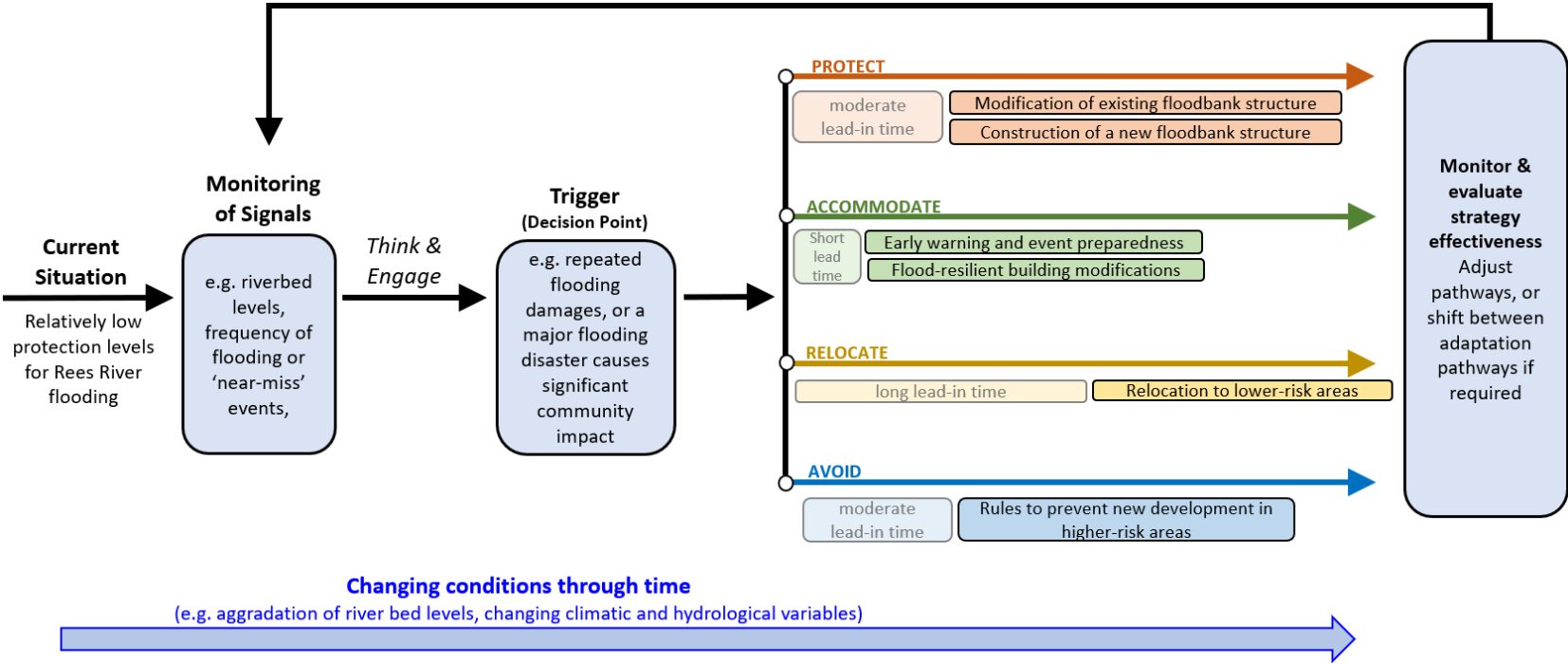


Figure 3: Example of the adaptation pathways concept showing some possible management responses for flood hazard.

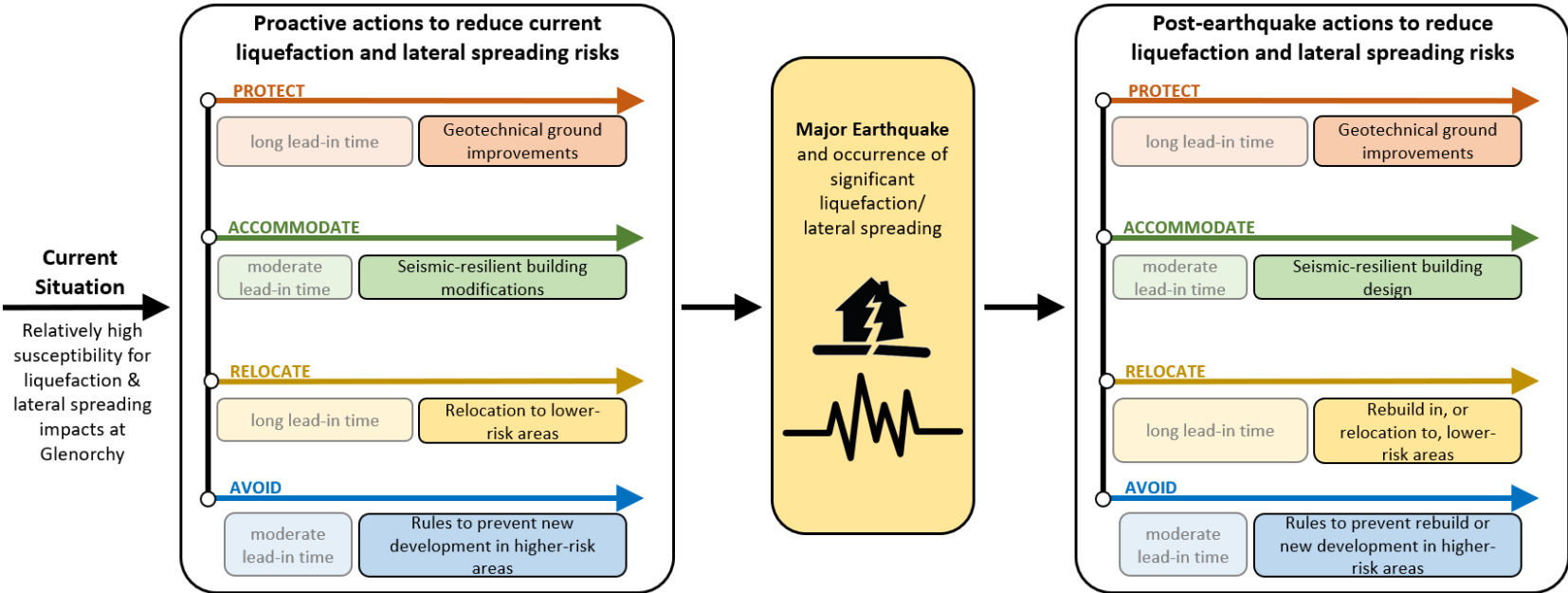


Figure 4: Example of the possible hazard management responses for liquefaction and lateral spreading hazards.

## COMMUNITY ENGAGEMENT

- [25] There is no single ‘best’ approach to engagement as every community and every context is different. The work programme is guided by best-practice principles for community engagement to natural hazards and climate change adaptation (Table 3).
- [26] NIWA<sup>10</sup> is providing ORC with expertise in implementing the adaptive pathways approach and social science aspects of the programme, including engagement. Engagement design and planning is also informed by recent Master’s research which evaluated the effectiveness of the ORC’s engagement activities as part of this programme from 2019 to mid-2022.<sup>11</sup>

**Table 3: Principles for natural hazards and climate change adaptation engagement, adapted from Barth et al (2023).<sup>12</sup>**

Principles for effective community engagement	
<b>Understand the problem and context before starting to develop solutions (place-based).</b>	Prioritise clear communication on expectations and processes (transparency and accountability)
<b>Develop council-community relationships that are grounded in trust, reciprocity and care.</b>	Value local knowledge, experiences and expertise, including Indigenous knowledge.
<b>Utilise existing networks and relationships.</b>	Recognise and seek to minimize existing injustices (inclusivity).
<b>Use a variety of engagement tools to suit different contexts, goals, groups of people and timeframes (inclusivity and accessibility).</b>	Recognise that the community can benefit from good engagement processes as well as from collaboratively designed adaptation solutions.

- [27] Adaptation guidance<sup>13</sup> emphasises that effective community engagement is essential for successful adaptation action. Engagement with Head of Lake Whakatipu communities has taken place since 2019 (Table 4). Engagement so far has had significant focus on building relationships, supporting community buy-in to the adaptation programme, gaining a shared understanding of the natural hazards and adaptation challenges ahead, and initial thoughts on values.

**Table 4: Summary of community engagement activities completed for the head of Lake Whakatipu natural hazards programme.**

Engagement Activity	Date	Purpose
<b>Presentations to Glenorchy Community Association (GCA)</b>	2019-2020	To update the GCA on ORC’s completed and planned natural hazards activities.
<b>e-newsletter</b>	Ongoing, 2020-present	To provide progress updates for the work programme and give an indication of upcoming project work.
<b>Community drop-in session</b>	December 2020	Discuss and provide information on the range of natural hazard events the community is exposed to, and how these events and landscape changes have impacted the community in the past.
<b>Public talk</b>	April 2021	Provide an expert (Prof. James Brasington, University of

<sup>10</sup> Dr Paula Blackett, an Environmental Social Scientist.

<sup>11</sup> MacKenzie, J. 2023. *Telling Stories: Community engagement in a complex and dynamic natural hazards adaptation context at the Head of Lake Whakatipu* (Thesis, Master of Arts). University of Otago. Available at: <http://hdl.handle.net/10523/15469>

<sup>12</sup> Barth J, Bond S & Stephenson J, 2023. *Community engagement for climate change adaptation*. Research Summary for the South Dunedin Future Programme. Centre for Sustainability, University of Otago. Available at: <http://hdl.handle.net/10523/15157>

<sup>13</sup> e.g. Ministry for the Environment (MfE), 2017. *Coastal Hazards and Climate Change: Guidance for Local Government*.



		Canterbury) overview of the river processes and changes of the Dart-Rees floodplain, and their implications for natural hazards.
<b>Community drop-in session</b>	April 2021	Discuss with the community the natural hazards challenges facing this area in the future, and to initiate discussions about what adaptation to those challenges could look like
<b>Online presentation</b>	June 2022	To present and update on investigation findings into liquefaction and flood hazards
<b>Community drop-in session</b>	June 2022	An in-person opportunity to discuss in more detail the investigation findings into liquefaction and flood hazards

- [28] The next stages of the DAPP cycle (from now to June 2024) have three main themes to explore with the community and partners through community engagement activities:
- Views, values and aspirations for the future
  - Adaptation pathways and desired outcomes
  - Feedback on design and implementation of first iteration of an adaptation strategy
- [29] This engagement phase offers community and partners the following opportunities to shape the strategy:
- Vision and objectives for community
  - Principles of adaptation at Head of Lake Whakatipu
  - What’s most important to address, protect, recognise, respect for Head of Lake Whakatipu’s future
  - Potential adaptation pathways
  - Signals, triggers, adaptation thresholds
  - Overall scope and content of the adaptation strategy
  - How we engage in the future
- [30] There are some aspects of the programme that are fixed:
- Timeframe for delivery of first iteration in June 2024 (specified in ORC 2021-31 Long Term Plan).
  - Use of the adaptation pathways framework (DAPP).
  - Natural hazards and climate change science – the Strategy is supported by the best available science and technical guidance.
- [31] The proposed community engagement activities through to June 2024 are outlined in Table 5. Proposed community engagement includes ongoing activities such as regular e-newsletter updates to community members (see example in Appendix 2), as well as focussed activities relating to various stages of the programme.

**Table 5: Community engagement overview**

Activities	Jul-Sep 2023	Oct-Dec 2023	Jan-Mar 2024	Apr-Jun 2024
Workshop session(s) <ul style="list-style-type: none"> <li>• Collaboratively develop adaptation strategy principles and shared strategy vision with community and partners.</li> <li>• Build community understanding of the range of potential adaptation and hazard management responses, benefits and constraints.</li> </ul>				
Series of community engagements to co-develop and identify preferred outcomes, signals and triggers, and preferred pathways to get to preferred outcomes				
Gain feedback from community members on the draft adaptation strategy.				
Present to community about the finalised adaptation strategy (1st iteration) and action plans.				
Actively use the programme webpage and e-newsletter to inform the community on programme activities and engagement outcomes.				
Ongoing activities (e.g.ArcGIS StoryMap, stall at community events) to increase understanding of programme with a wider audience and promote two-way communication and engagement about adaptation strategy and pathways.				

[32] Planning is underway for the next in-person engagement sessions in Glenorchy in late August 2023. The purpose of the sessions is to develop principles, shared vision and preferred outcomes; build community understanding of a range of potential adaptation responses; facilitate discussion about key aspects of responses; and start thinking about pathways. It is also an opportunity to give an update of the programme plan for the next 12 months.

[33] It is proposed to have multiple sessions on the day, including an evening session. The suggested workshop format is expected to include the following content:

- **Short presentation/floating materials:** Overview of programme, where we’ve been, where we’re going in next 12 months.
- **Activity about strategy:** key principles, vision and preferred outcomes for the future.
- **Discussion and activity:** possible hazard management interventions and adaptation responses (PARA framework), realities/constraints/benefits of each response, participants can then experiment with building an adaptation pathway.

[34] Engagement planning is considering other community engagement programmes across Queenstown Lakes District, or that local communities may be interested over the same time period (i.e. engagement on the proposed ORC Land and Water Regional Plan and Queenstown Lakes District Future Development Strategy/Spatial Plan 2024 Gen 2.0). This aims to avoid engagement fatigue and better support alignment across ORC community engagement programmes.

## **SOCIAL IMPACT ASSESSMENT**

- [35] A social impact assessment (SIA) is needed to better understand the impacts of natural hazards on local communities in the Head of Lake Whakatipu area. In broad terms, social impacts are any changes to the wellbeing of people and communities, planned or unplanned, that arise from human actions or natural events, including economic impacts. The SIA is a key piece of work under the DAPP process to support decision-making.
- [36] A two-phase approach to undertaking the SIA is proposed, due to dependencies with other pieces of the work programme.
- Between September to November 2023, Phase 1 will focus on understanding the social and economic baseline; and impacts of potential natural hazard scenarios on the wellbeing of people and communities. Local knowledge will be collected through the use of both desktop and first-person methods. Three natural hazards scenarios will be assessed 1) repeated impacts of frequent storm events; 2) a major earthquake; 3) a major storm scenario. All scenarios will be based on “status quo”, defined as current baseline development, and the existing mix of management actions already in place to manage natural hazard risks in the project area (such as emergency preparedness, flood warning, floodbank protection, road and river maintenance, and reactive road repair). Procurement for Phase 1 of the SIA commenced in late July.
  - Between late 2023 and early 2024 (to be confirmed), Phase 2 will focus on the impacts of preferred adaptation pathways, once these are identified and defined.
- [37] QLDC and the community, through the Glenorchy Community Association (GCA), provided feedback on the proposed SIA scope and suggestions were incorporated. Both QLDC and the GCA will be involved further in the process of the SIA assessment, for example to provide feedback on the methods and draft assessment report.
- [38] Mana whenua, represented by Aukaha and Te Ao Marama, were also invited to provide feedback on the SIA scope and be further involved in the SIA process. Aukaha have indicated that their preferred approach for assessing cultural impacts is a separate Cultural Impact Assessment, with further discussions to take place in early August.

## **DISCUSSION**

- [39] The ORC-led natural hazards adaptation programme for the area at the Head of Lake Whakatipu is progressing towards delivery of a first iteration of the Adaptation Strategy document by June 2024.
- [40] The Adaptation Strategy will include both the strategy documents, and action plans. The first iteration will include preferred pathways agreed with community and partner input. Adaptation responses in the pathways will be at various levels of maturity, from detailed planning level through to screening level only.
- [41] Some of the adaptation responses identified may be implementable within the current constraints and actionable within relatively short timeframes. For example, the flood warning and response improvements, which have already been designed and implemented (Appendix 1).

- [42] Other adaptation responses are more complex and may require significant further investigations. These may include feasibility studies, cost-benefit analysis and business case development, investigations of potential funding options, and consideration of environmental, legal, technical and planning factors. Realistic timescales for implementation of complex responses may range from 5 years to a decade (or longer).
- [43] It is expected that the management of these hazards may require use of a series of diverse responses (e.g. Table 2) implemented progressively over time. Monitoring will provide feedback on effectiveness and changing conditions, and pre-defined decision points will guide when to review and adjust the strategy (e.g. Figures 2, 3 and 4).
- [44] “Residual risk” is the risk that remains after risk treatment or management actions have been applied and is inherent in areas where people and assets are exposed to natural hazards<sup>14</sup>. It is a key concept when talking about the benefit and effectiveness of adaptation responses. Many responses are only partially effective, in that they reduce risk without eliminating it, and thus the remaining risk is “residual risk”. Community understanding and tolerance of residual risk is an important factor in decision-making.
- [45] No hazard management responses or interventions considered have yet been selected or ruled out. All of these responses are still ‘on the table’ and will be considered further in a collaborative decision-making process.
- [46] Continued collaborations and consideration of all engagement input will be essential to ongoing progress in development and implementation of an adaptation strategy.
- [47] As has been seen following the North Island flooding damages earlier this year, the occurrence of any catastrophic natural hazard events may alter the context and constraints for implementation of adaptation responses, with opportunities for new governance, funding arrangements and timescales.<sup>15</sup>
- [48] Toka Tū Ake/EQC is a stakeholder in the level of risk associated with liquefaction and lateral spreading at Glenorchy, and the steps that could be taken to manage that risk. The commission has been informed of progress with the Head of Lake Whakatipu programme and asked how it wishes to be involved in, and engaged with, the programme.

## CONSIDERATIONS

### Strategic Framework and Policy Considerations

- [49] The information presented and the adaptation approach discussed in this paper reflects Council’s Strategic Directions where our vision states: communities that are resilient in the face of natural hazards, climate change and other risks.
- [50] The proposed Otago Regional Policy Statement June 2021<sup>16</sup>, states that ORC and territorial authorities are both responsible for specifying objectives, policies and methods in regional and district plans for managing land subject to natural hazard risk. ORC specifically is responsible for “*identifying areas in the region subject to natural*

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<sup>14</sup> Ministry for the Environment (MfE), 2017. *Coastal Hazards and Climate Change: Guidance for Local Government*.

<sup>15</sup> New Zealand Government, 2023. *Cyclone Gabrielle Recovery Taskforce terms of reference*.

<sup>16</sup> Section HAZ–NH–M1

*hazards and describing their characteristics as required by Policy HAZ–NH–P1, mapping the extent of those areas in the relevant regional plan(s) and including those maps on a natural hazard register or database.”<sup>17</sup>*

#### **Financial Considerations**

- [51] The budget in the 2023/24 Annual Plan provides for the forward work programme described in this paper. The budget for the 2023/24 financial year for professional services for the Head of Lake Whakatipu natural hazards adaptation programme is \$470,000.
- [52] ORC has applied for funding from The Ministry for the Environment (MfE) funding programme, *Nature Based Solutions for Resilience Planning* towards the investigation of ‘soft engineering’ flood protection responses for Glenorchy.

#### **Significance and Engagement Considerations**

- [53] This paper does not trigger ORC’s policy on Significance and Engagement.

#### **Legislative and Risk Considerations**

- [54] The work described in this paper helps ORC fulfil its responsibilities under sections 30 and 35 of the RMA.
- [55] ORC has the functions and responsibilities of a catchment authority under the Soil Conservation and Rivers Control Act (1941). The functions of the Act include the power to execute works necessary for “*preventing or lessening any likelihood of the overflow or breaking of the banks of any watercourse*”.<sup>18</sup> The Act enables ORC to “*erect any new defence against water, or carry out any other work it thinks necessary or desirable for the purpose of controlling or preventing damage by flood waters*.”<sup>19</sup>
- [56] ORC has no obligation to carry out specific engineered mitigation works for the management of liquefaction or lateral spreading hazards. However, having initiated a process to develop long-term responses to natural hazards for the Glenorchy community, ORC must exercise reasonable care, and be cognisant of its various statutory functions and duties, in assessing whether mitigation or other measures should be undertaken.
- [57] Although ORC does not have an obligation to undertake engineered mitigation works, a number of other actions have been carried out in response to reports on liquefaction hazard and its management.<sup>20 21</sup> These actions have included;
- Making the investigation reports publicly available, and presenting mapping of liquefaction-prone land on the ORC Natural Hazards Portal.<sup>22</sup> Toka Tū Ake/EQC’s

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<sup>17</sup> ORC Natural Hazards Portal: <http://hazards.orc.govt.nz>

<sup>18</sup> SCRA 1941: Section 126, 2(c)

<sup>19</sup> SCRA 1941: Section 133, 1(c)

<sup>20</sup> Tonkin + Taylor Ltd, 2022. *Glenorchy Liquefaction Vulnerability Assessment*. Report prepared for Otago Regional Council.

<sup>21</sup> Tonkin + Taylor, 2023. *Engineering Approaches for Managing Liquefaction Related Risk*. Report prepared for Otago Regional Council.

<sup>22</sup> <http://hazards.orc.govt.nz>

recently released Natural Hazards Portal includes a link to ORC's Natural Hazards Portal.<sup>23</sup>

- Ensuring that resource consent staff are aware of the liquefaction risk so that the risk can be taken into account in the consideration of resource consent applications.
- The liquefaction hazard reports and mapping information have been provided to the Queenstown Lakes District Council (QLDC), so they can be taken into account in their assessment of building consent applications and other decisions of QLDC.

[58] Toka Tū Ake/EQC provide natural disaster insurance for residential homes and land. The Natural Hazards Insurance Act passed into law in February 2023 and will come into force on 1 July 2024, replacing the Earthquake Commission Act (1993). The EQC will be transitioning to a new name - Toka Tū Ake/Natural Hazards Commission (NHC). There is no obligation for Toka Tū Ake/EQC to carry out liquefaction mitigation work, and the new Act does not introduce any obligation on NHC to implement risk mitigation (e.g. to reduce or avoid liquefaction risk).

[59] The likely reforms of the Resource Management system<sup>24</sup> and strengthening of provisions to do with local authority leadership for climate change adaptation are noted.<sup>25</sup>

#### **Climate Change Considerations**

[60] The effects of climate change have been considered in flood hazard assessments for Dart and Rees Rivers, and Buckler Burn, and in the assessment of risks and potential hazard management responses for those hazards.

#### **Communications Considerations**

[61] ORC will continue to make all investigation findings available to the head of Lake Whakatipu community and provide regular programme updates via the e-newsletter.

[62] Community engagement planning is discussed in paragraphs 25-34.

#### **NEXT STEPS**

[63] The key next step activities for the work programme which are in progress or scheduled are identified in Figure 1.

[64] These activities will include;

- Continued planning for community engagement activities, the next of which is scheduled for late August 2023.
- Completion of social and cultural impact assessment studies, and a natural hazard risk assessment

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<sup>23</sup> [www.NaturalHazardsPortal.govt.nz](http://www.NaturalHazardsPortal.govt.nz)

<sup>24</sup> A summary of reform work programmes is outlined here: [https://www.dia.govt.nz/diawebsite.nsf/Files/Local-Government-2023/\\$file/Central-government-reforms-impacting-on-local-government-July-2023.pdf](https://www.dia.govt.nz/diawebsite.nsf/Files/Local-Government-2023/$file/Central-government-reforms-impacting-on-local-government-July-2023.pdf)

<sup>25</sup> Government is expecting to introduce a Climate Adaptation Bill into Parliament by the end of 2023.

- [65] Programme updates for ORC councillors are scheduled for November 2023, and February and June 2024. These may include workshops and/or committee papers, as appropriate.

**ATTACHMENTS**

1. Update on other activities in the adaptation programme [**8.2.1** - 6 pages]
2. Example of newsletter July 2023 update [**8.2.2** - 6 pages]

**Appendix 1: Updates on activities in the Head of Lake Whakatipu natural hazards adaptation programme.**

**1. INTRODUCTION**

The paper presented to the committee provides an update focused on development of the natural hazards adaptation strategy for the head of Lake Whakatipu area, and the associated community engagement activities and social impact assessment.

This appendix provides supporting information summarising other technical activities in this work programme completed since the May 2023 paper.

**2. ACTIONS FOLLOWING FROM FLOODPLAIN MITIGATION ASSESSMENTS**

The May 2023 Committee paper<sup>1</sup> presented a report compiled by Damwatch Engineering Ltd<sup>2</sup> which identified the potential engineering or river management approaches available for management of flooding and floodplain hazards on the Dart-Rees floodplain. The report assessed possible management interventions for areas where flooding or erosion may impact the community or infrastructure in the head of Lake Whakatipu area.

The report listed four potential immediate short-term actions<sup>3</sup> which could assist with flood hazard preparedness for Glenorchy;

- Flood warning improvements.
- Revision and communication of flood response procedures.
- Consideration of improvements to the existing stopbank (e.g. raising the crest profile, improving the structural quality and integrity).
- Investigation of vegetation planting on the left bank of the Rees River where flood breakouts into the lagoon area occur.

The report also listed a series of potential investigations and monitoring actions<sup>4</sup> which may be required for assessment of potential hazards to the Rees River bridge.

Table 1 and Sections 2.1-2.3 of this appendix describe the actions which have subsequently been undertaken to address those recommended actions for Glenorchy flood preparedness and Rees Bridge management.

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<sup>1</sup> van Woerden T & Payan J, 2023. *Head of Lake Whakatipu floodplain and liquefaction hazard intervention assessments*. ORC Report OPS2256, Report to the 10 May 2023 meeting of the Otago Regional Council Safety and Resilience Committee.

<sup>2</sup> Damwatch Engineering Ltd, 2022. *Dart-Rees floodplain adaptation – Report on 23-24 February workshop*. Report prepared for Otago Regional Council.

<sup>3</sup> Section 7.2 of the November 2022 report by Damwatch Engineering Ltd.

<sup>4</sup> Section 7.4 of the November 2022 report by Damwatch Engineering Ltd.



**Table 1: Summary status of short-term floodplain management actions recommended by the 2022 report by Damwatch Ltd.**

Action	Status
<b>Flood warning improvements, Revision and communication of flood response procedures.</b>	A flood forecasting model to forecast water levels in the Glenorchy Lagoon has been developed and is now in a testing phase. Internal flood response procedures have been updated to include model use (Section 2.1 of appendix).
<b>Consideration of improvements to the existing stopbank, Investigation of vegetation planting on the left bank of the Rees River</b>	A technical assessment has been scoped, and procurement is expected to commence in August 2023 (Section 2.2 of appendix).
<b>Assessment of potential hazards to the Rees River bridge</b>	QLDC consultants have completed a structural options assessment (Section 2.3 of appendix).

## 2.1. FLOOD WARNING AND FLOOD RESPONSE PROCEDURES

There are now >18 months of monitoring data available from the three new environmental monitoring sites established by ORC in the Rees-Glenorchy area as part of the Head of Lake Whakatipu natural hazard adaptation programme. These three new sites are;

1. Rees River flows at Invincible (site established December 2021),
2. Glenorchy Lagoon water level (site established October 2020), and
3. Lake Wakatipu level at Glenorchy marina (site established January 2021).

These new datasets provide opportunity to investigate further developments of flood forecasting systems to improve the flood warning capability for Rees River flooding events at Glenorchy township.

HydroScience consultancy<sup>5</sup> have reviewed hydrological datasets and carried out analyses required to inform development of a flood forecasting model. Hydrological analysis has investigated and established the relationships between rainfalls, Dart and Rees River flows, Lake Whakatipu levels at Glenorchy, and Glenorchy Lagoon levels. Multiple regression analysis has then informed development of a flood forecasting model which can be used to estimate water levels for Glenorchy Lagoon.

The Glenorchy flood forecasting model uses inputs of;

- Forecast or recorded rainfall totals for Paradise, Hillocks and Cascade Hut.
- Initial flows for the Rees and Dart rivers
- Initial water levels in the Glenorchy Lagoon and for Lake Whakatipu at Glenorchy.

The model is used by ORC's 24/7 flood response team to forecast possible water levels at Glenorchy Lagoon when significant rainfall totals are forecast for the Rees catchment. The model can provide up to about three days early warning (Figure 1) and estimates the final lagoon level for a rainfall event. ORC's flood response procedures have been updated to incorporate use of this new model, and Emergency Management Otago have been briefed on the model capability.

Following completion of the model in mid-May 2023, the model was tested during a series of moderate Rees catchment rainfall events in late May/early June. Based on the actual rainfall totals

<sup>5</sup> HydroScience, 2023. *Flood forecasting for Glenorchy township*. Prepared for Otago Regional Council.

recorded during these events, the modelled levels were within the  $\pm 2$  standard error range estimated. This is considered acceptable.

This is a new model and is still in a testing phase, and so requires application in a wider range of future rainfall and flood events to better evaluate model performance and accuracy. The model will then be revised once longer monitoring data series are available or following the occurrence of any very large flooding events.

The forecast results and observed water levels in the Glenorchy Lagoon are related to flood warning thresholds in ORC’s flood response procedure. The thresholds are defined in relation to the crest of the Glenorchy floodbank. Their purpose is to assist ORC and Emergency Management Otago flood response in Glenorchy.

This new forecasting model for Glenorchy Lagoon complements an existing ORC flood forecasting model which estimates high lake levels for Lake Whakatipu based on forecast or recorded rainfall totals.

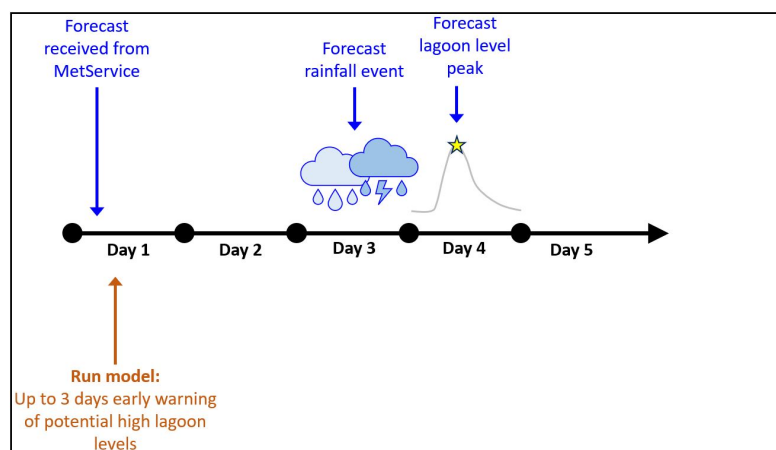


Figure 1: Sketch showing the timeline of up to three days early warning which may be provided for high levels in the Glenorchy Lagoon.

## 2.2. FLOOD PROTECTION FEASIBILITY ASSESSMENTS

A technical feasibility study to investigate potential engineered flood protection improvements for the lower Rees floodplain and Glenorchy township is currently in scoping and procurement. This study will build on the initial assessments of benefits, challenges and constraints for flood hazard management interventions outlined in the report compiled by Damwatch Engineering Ltd.

Investigations are proposed to assess and describe the conceptual designs of interventions, associated technical challenges for implementation, the identification of environmental impacts, a review of consenting requirements and indicative costings. Assessments will consider the use of both ‘hard’ engineering approaches (e.g. engineered structures such as floodbanks) and ‘soft’ engineering

solutions (e.g. vegetative buffers). The existing hydraulic model for the Dart-Rees floodplain<sup>6</sup> will be used to assess the flood hazard performance provided by the range of approaches assessed.

The investigation scope includes consideration of (at least) the following potential engineered flood management interventions for the lower Rees River floodplain and Glenorchy township;

- a. raising or modifying the existing Rees-Glenorchy floodbank structure;
- b. construction of bunding or new floodplain structures to reduce overland flood flows from the Rees River into Glenorchy Lagoon; or
- c. the use of 'soft engineering' approaches such as vegetative buffers to modify overland flood flows from the Rees River into Glenorchy Lagoon; or
- d. any combinations of these interventions a-c.

ORC has applied for funding from The Ministry for the Environment (MfE) funding programme, *Nature Based Solutions for Resilience Planning* towards the investigation of the 'soft engineering' aspects of the study.

### 2.3. REES BRIDGE ASSESSMENTS

The report compiled by Damwatch Engineering Ltd confirmed the threat of riverbed aggradation reducing waterway flood capacity at the Rees River bridge, and increased potential for scour impacts or structural damages to the structure.

Queenstown Lakes District Council (QDC) has since completed a structural options assessment<sup>7</sup> to help provide direction and guidance towards a long-term asset management strategy for the bridge structure. Assessments completed for QLDC included geomorphic and hydraulic analysis, and consideration of several potential structural investment options.

ORC collaborated with QLDC and supported the project through providing relevant ORC information and datasets. ORC and QLDC are discussing the report findings and recommendations. There are no recommendations for physical interventions in the short term, but a focus on and allocation of respective responsibilities for recommended structural and environmental monitoring and river management actions.

### 3. BUCKLER BURN FLOOD HAZARD ASSESSMENTS

Glenorchy township is developed on the alluvial fan formed by Buckler Burn and therefore may be exposed to flooding, debris-flooding or debris flow hazards from this catchment (Figure 2). A flood hazard assessment for the Buckler Burn and Glenorchy is being completed by Land River Sea Consulting Ltd (LRS). The draft assessment report has been completed and is currently being externally reviewed by Tonkin + Taylor Ltd.

The investigation is being undertaken to understand in more detail the flooding characteristics (e.g. floodwater extent, depth, velocity) and potential impacts of the flooding hazard from the Buckler Burn for the Glenorchy township.

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<sup>6</sup> Land River Sea Consulting Ltd, 2022. *Dart-Rees flood hazard modelling*. Report prepared for Otago Regional Council.

<sup>7</sup> WSP New Zealand Limited, 2023. *Rees River Bridge Options Assessment*. Report prepared for Queenstown Lakes District Council.

Modelled flooding scenarios have included combinations of large (up to 300 cumec) river flows, and the effects of alluvial fan aggradation on fan morphology. There is uncertainty in the magnitude of floodwater flows from the Buckler Burn catchment, but the modelled design flows of 250 and 300 cumec exceed previous estimates of the 1% AEP (100-year ARI) flood event.



**Figure 2:** Overview of the Buckler Burn stream and alluvial fan, with Glenorchy township located the northern side of stream's active channel. The full township area is developed on Buckler Burn alluvial fan deposits, and the higher terraces to each side of the stream are remnants of older alluvial fan-delta surfaces formed when the lake was at higher levels. Photograph dated May 2018.

#### 4. NATURAL HAZARD RISK ASSESSMENT

The natural hazard investigations completed by ORC for flooding,<sup>8</sup> liquefaction<sup>9</sup> and alluvial fan<sup>10</sup> hazards have identified that these events pose a risk to the Glenorchy or Kinloch areas, but these risks have not yet been systematically assessed through a detailed qualitative approach; or using a quantitative approach.

<sup>8</sup> Land River Sea Consulting Ltd, 2022. *Dart-Rees flood hazard modelling*. Report prepared for Otago Regional Council.

<sup>9</sup> Tonkin + Taylor Ltd, 2022. *Glenorchy Liquefaction Vulnerability Assessment*. Report prepared for Otago Regional Council.

<sup>10</sup> Land River Sea Consulting Ltd, 2023. *Buckler Burn flood hazard modelling*. Report prepared for Otago Regional Council.

The May 2023 committee paper<sup>11</sup> assessed the risks of flooding and liquefaction/lateral spreading using the approach described in the proposed Otago Regional Policy Statement 2021. This preliminary assessment evaluated the risks of flooding and liquefaction/lateral spreading as being “significant”.

According to the risk assessment guidance in the proposed Otago Regional Policy Statement (RPS), a more detailed quantitative assessment should be undertaken for any hazards which are determined as being “significant”. ORC has procured consultant expertise to undertake the natural hazard risk assessment, and this project has commenced in late July 2023.

The risk assessment findings are intended to be used for the following purposes;

1. Providing the head of Lake Whakatipu community with information on the relative levels of natural hazard risk in the township. This information has been specifically requested by the community as feedback during community engagement sessions and as feedback on behalf of the Glenorchy Community Association.
2. Provide justification for adaptation or risk management activities, including potential use of land use planning controls. This would provide a robust evidence base for any future land use decision making, such as if avoidance or relocation approaches may be appropriate for higher-risk areas.
3. To complement and provide information which will feed into other proposed studies, such as a social impact assessment, and more detailed review of engineered floodplain management interventions.
4. To provide information to inform next steps, for example, to help determine requirements and priority for any additional hazards or risk analysis necessary.

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<sup>11</sup> Paragraphs 41-44 in the 10 May 2023 committee paper, *Head of Lake Whakatipu floodplain and liquefaction hazard intervention assessments*.

Appendix 2: July 2023 newsletter for the Head of Lake Whakatipu natural hazards adaptation programme.

[View this email in your browser](#)

## HEAD OF LAKE WHAKATIPU



### COMMUNITY UPDATE 27 | JULY 2023

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Kia ora koutou,

Here is our programme update for July, with information about the Buckler Burn flood hazard assessment, our social impact assessment, and when we're next coming to Glenorchy.

We are nearing the end of the project's stage that focuses on what is happening in terms of natural hazards as we ask what matters most and what we can do about it.

We know that at times it has not been easy to understand the purpose of each assessment, or what the differences are between a hazard study and a risk study. In this edition, we try to make things a bit clearer.

And as we wrap up this part of the programme, with a lot of technical information and science, we get closer to development of adaptation options and pathways that will enable us and the community to collectively make some decisions about how to adapt to the changing landscape and natural hazards at the head of the lake.

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### Buckler Burn update

A flood hazard assessment for the Buckler Burn has been completed. It will be reviewed by an independent expert before being finalised later this month.

This study is looking at whether flooding from the Buckler Burn could affect the Glenorchy township, and what the characteristics of a flood might be, for example, the depth or velocity of flood waters.

As with all our hazard assessment reports, we will share these investigation findings on the [HOTL programme page](#) as soon as they are available and invite your feedback/comments.

Image: Buckler Burn flowing into Lake Whakatipu



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## Assessing the social impact

We have put together a scoping document for a social and economic impact assessment.

Social impacts refer to changes to the wellbeing of individuals and communities, which occur when human actions or natural events alter the way people live, work, play, and participate as members of society.

Social impacts can be negative or positive. This information will help us inform our decision making and adaptation pathways.



This scoping part is about laying out the proposed work plan so that we can get community feedback at the early stage, before the work starts. The scoping discussion document includes the following:

- Why we are proposing a two-phase social impact assessment at the Head of Lake Whakatipu.
- Baseline data collection and proposed scenarios that will be assessed in the first phase.
- Proposed methods to undertake the data collection, assessment, and how the local community could be involved in the process.
- The general objectives of the second phase, which will be scoped further once we have collaborated on the preferred pathways later this year.

We shared this scoping discussion document with the Glenorchy Community Association earlier this week to get some feedback from the community about whether we're on the right track. Once scoping is complete, there will be a request for tender advertised and an independent consultant will undertake the assessment.

Keep an eye out, as there will be other ways for community members to be involved at different steps of the social impact assessment. You can also get in touch with us at any time to ask questions or provide comments.

Image: Glenorchy boat shed





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## What is a risk assessment?

And how is it different to other technical assessments we've done at the Head of the Lake?

We have undertaken many different hazard investigations and assessments over the years, which helped us to better understand the different hazards at the Head of Lake Whakatipu, for example, our assessment of flooding of the Buckler Burn.

We have also looked at ways to adapt to or manage these various hazards. We are now at the stage where we are undertaking a risk assessment.

The risk assessment captures all these technical investigations and other data to calculate the likely consequences of potential hazard events for the community, their homes and other infrastructure.

Risk is calculated by the nature of the hazard, as well as what is exposed to the hazard (i.e. what is in harm's way), and factors that make people, communities or places more vulnerable to harm from the impacts of hazards (i.e. socio-economic status, age, ability, gender).

This is an important part of the programme, and it will help inform our adaptation and hazard management planning.

If you're unsure about how this works and why this work is a critical foundation to future decision making, please call us.

We are happy to talk to anyone who lives or has a vested interest in the area at the Head of Lake Whakatipu about what this means for them.

Image: Mt Alfred



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## Our next community engagement update

We are planning a community session in a couple of months.

This is an opportunity to further refine community values and objectives and discuss possible adaptation and hazard management options at the Head of the Lake and what it all means for you as a community.

We'd like to give an in-person update about the programme and where we are heading over the next 12 months.

We also want to check in with you, the community, about the different perspectives on the future of adaptation and natural hazard management for Glenorchy and surrounds to guide our work and the strategy.

Later in the year, we will be coming back with a shortlist of adaptation options and pathways to discuss. These will be possible pathways for the future of the Head of the Lake.

More details to come in our next newsletter!

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## As always, we value your feedback

This adaptation programme was initiated because complex, increasing natural hazards in the Head of Lake Whakatipu require a comprehensive management response that takes a long-term view and encompasses all types of natural hazards.

This is your community, and we want to work with you to develop understanding and resilience. Check [here](#) to learn more about the whole programme.

If you have questions or need information, visit our [website](#) to see the [reports](#) and get [answers](#).

You can also contact ORC Natural Hazards Manager Jean-Luc Payan on 0800 474 082 or email us for more information at [headofthelake@orc.govt.nz](mailto:headofthelake@orc.govt.nz).

This email will go to our Natural Hazards team, and we will provide responses to any emailed questions and facilitate answers from our consultants if needed.

### Head of Lake Whakatipu newsletter sign-up

If you are currently not receiving our monthly newsletters, you can [sign up here](#) and view archives of past editions.

### Contacts

If you have any questions or would like to get in touch with us, please email us at [headofthelake@orc.govt.nz](mailto:headofthelake@orc.govt.nz).



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### 8.3. Programme Update; Climate Resilience, Flood repairs and Projects

**Prepared for:** Safety and Resilience Committee  
**Report No.** OPS2324  
**Activity:** Governance Report  
Brett Paterson, Team Leader Project Delivery  
**Author:** Michelle Mifflin, Manager Engineering  
**Endorsed by:** Gavin Palmer, General Manager Operations  
**Date:** 10 August 2023

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#### PURPOSE

- [1] To provide an update on the progress of the Otago Regional Council Climate Resilience Programme (“shovel-ready” flood protection engineering projects), recovery from the 2020 and 2022 flood events, and the recent storm damage to ORC infrastructure at the confluence of the Pureua River and Koau branch of the Clutha River/Mata-Au.

#### RECOMMENDATION

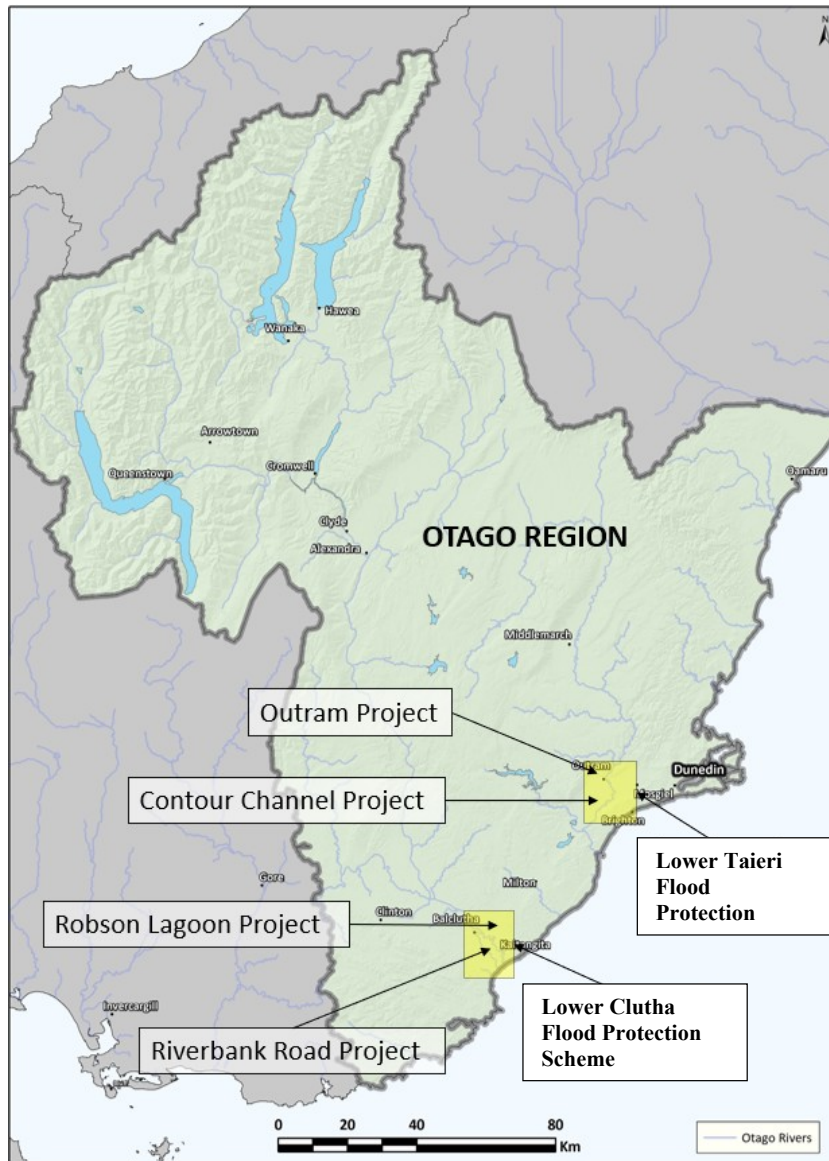
*That the Committee:*

- 1) **Receives** this report.
- 2) **Notes** the progress with ORC’s Climate Resilience Programme and recovery from the 2020 and 2022 flood events.
- 3) **Notes** the recent storm damage near the confluence of the Puerua River and Koau branch of the Clutha River/Mata-Au.

#### Otago Regional Council Climate Resilience Programme

- [2] The Climate resilience programme is made up of four flood protection related projects (“shovel-ready” projects) that received approval for Provincial Growth Fund (PGF) funding valued at \$5.44 million in 2020. Council approved funding of up to \$3.2 million towards these projects on 23 September 2020. The PGF funding was intended to create jobs and achieve climate resilience objectives. ORC’s projects are part of a package of 55 flood protection projects with a total value of \$337 million being delivered by regional councils/unitary authorities. The government is co-investing \$217 million in these projects, through the Ministry of Business, Innovation and Employment (MBIE).

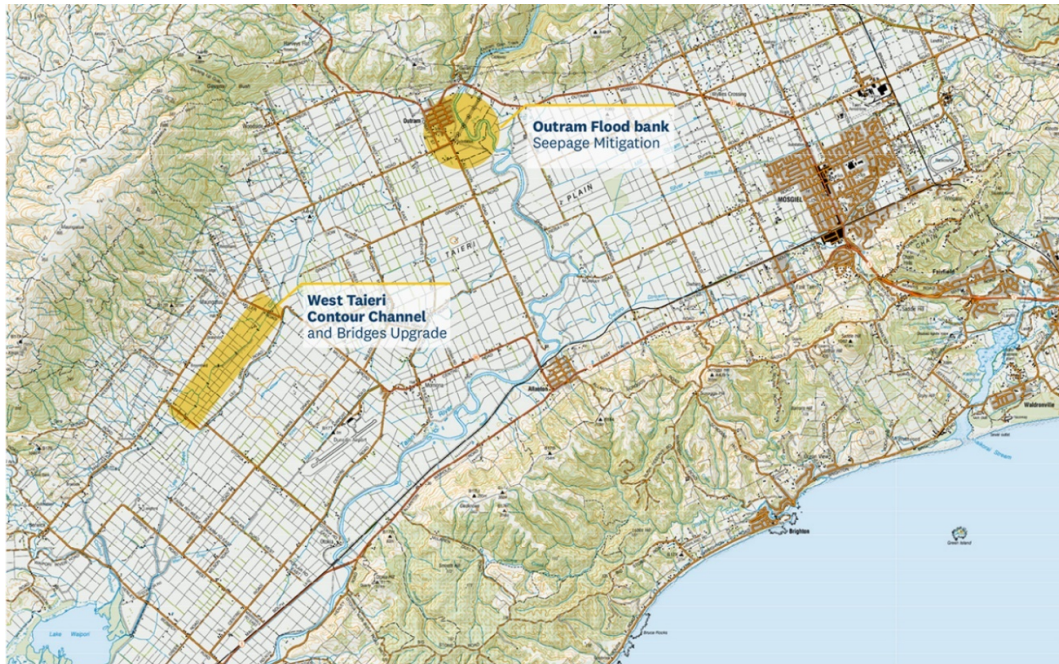
- [3] The four ORC Climate Resilience Programme projects are:
- a. West Taieri Contour Channel and Bridges Upgrade (Contour Channel project),
  - b. Upgrade and Installation of Flow Management Structures at Robson Lagoon, Lower Clutha (Robson Lagoon project),
  - c. Riverbank Road Floodbank Stabilisation, Lower Clutha (Riverbank Road project),
  - d. Outram Flood Seepage Mitigation (Outram project)<sup>1</sup>.



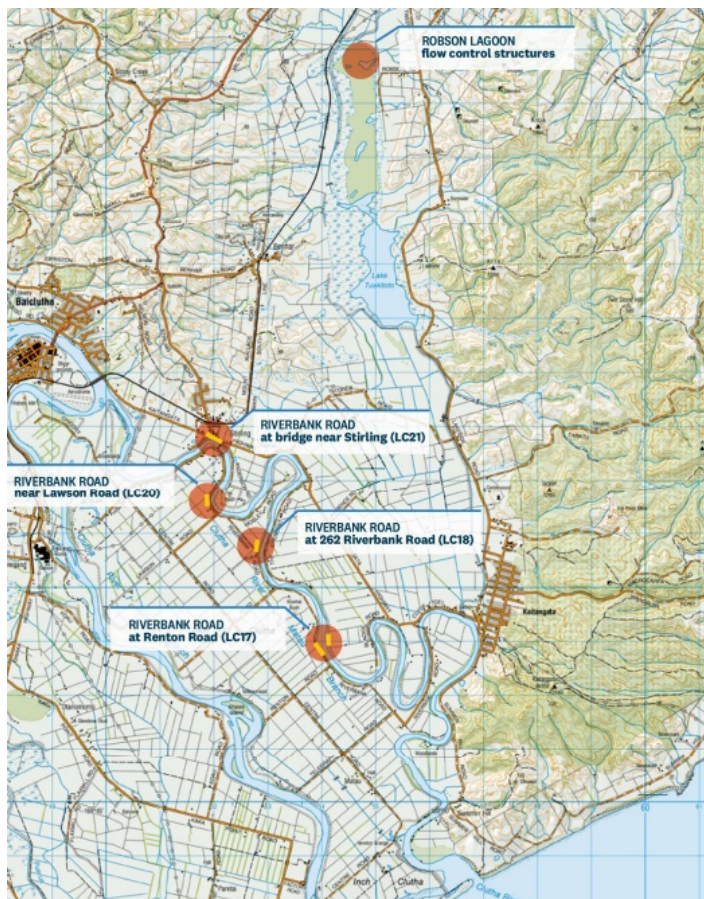
**Figure 1: Climate Resilience Programme – Project location map.**

<sup>1</sup> This project is referred to as Outram Flood Protection in the MBIE Funding Agreement.





**Figure 2: Climate Resilience Projects – Lower Taieri Flood Protection Scheme.**



**Figure 3: Climate Resilience Projects – Lower Clutha Flood Protection and Drainage Scheme.**

- [4] ORC selected these projects because, with the assistance of central government funding, they would:
- Stimulate the local economy, especially for Clutha and Dunedin Districts,
  - Create jobs in the region,
  - Benefit lifeline utility assets owned by or under the control of central government (State Highways, Dunedin International Airport),
  - Contribute to the mitigation of flood risk, sustain and improve resilience where possible to counter the effects of future climate change, and
  - Enhance water quality and ecosystem health in a regionally significant wetland (Robson Lagoon, South Otago).

### Progress Update

#### Contour Channel Project

- [5] The Contour Channel is a man-made watercourse, with the adjacent floodbank originally constructed in the early 1900s using horse and cart construction techniques. It is not considered to be constructed to an acceptable modern standard.

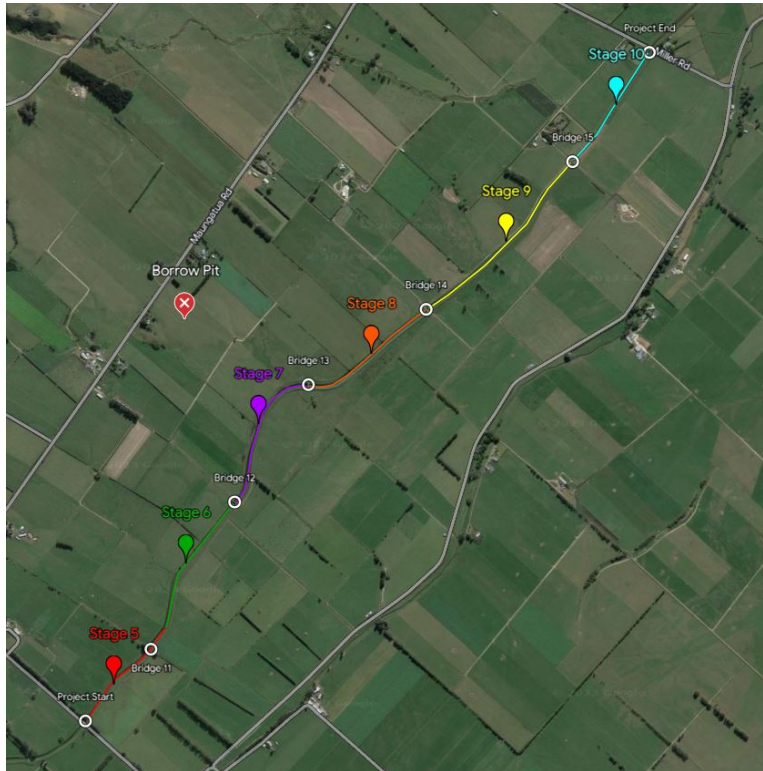


**Figure 4 and 5: Contour Channel construction early 1900's.**

- [6] The Contour Channel intercepts runoff from the various steep streams located on the Maungatua Range and conveys this runoff by gravity to the Waipori River (Figure 2). The Contour Channel floodbank has an undulating longitudinal profile, which promotes concentration of overtopping during flood events, which can expose parts of the floodbank to relatively rapid failure. Failure of the floodbank would potentially inundate an area of 7,300 hectares of high value agricultural land including Dunedin International Airport.
- [7] The project is staged, with Stages 5 – 10 of the floodbank reconstruction and replacement of Bridges 11, 12 and 14 being included in the original project scope (Figure 6). It is the continuation of a programme that ORC commenced in 2007 with Stages 1 to 4 completed by 2013.
- [8] Construction of Stages 5 and 6 started on site on 24 January 2022. The works progressed well with only minor disruption due to poor weather. The site works were completed 6 May 2022 and practical completion was issued for the contract on 2 June 2022 following receipt of the final contract deliverables and completion records.

- [9] Construction work on Stage 7 of the floodbank commenced in January 2023 and progressed well over the summer construction season with Stage 7 being fully completed, and work beginning on Stage 8. The site was disestablished for winter at the end of April 2023 with approximately 100m more floodbank constructed than was originally planned for the season. Construction is planned to recommence onsite in the spring of 2023 with the continuation of Stage 8 and Stages 9 and 10 to follow.
- [10] Construction of Bridge 11 began onsite in March 2023 and has been progressing over autumn and into winter. Bridge 11 is expected to be completed in early August 2023 (Figure 7).
- [11] The tendered prices for Stages 7 - 10 and Bridges 11, 12 and 14 of the Contour Channel indicate that there will be a higher cost to complete all the works than is allowed for within existing budget. The award of Stages 7 – 10 and Bridges 11, 12 and 14 has been staged to allow for budget constraints to be addressed.
- [12] A variation was presented to and accepted by MBIE to transfer unspent funding from the Outram project to the Contour Channel project. This variation will allow the project to progress within the available funding which means completing the full floodbank works (Stages 7 – 10) and Bridges 11 and 12.
- [13] Bridge 14 will be removed from the project scope, and it is anticipated that this bridge will be completed at a later date, following funding approval through the 2024 – 2034 Long Term Plan process. The existing bridge will remain in operation until it is replaced. The bridge does require replacement because of its structural condition, however like all bridges across the Contour Channel, Bridge 14 has had its load ratings assigned accordingly to manage safe operational use of the bridge until renewal/replaced to a modern standard.
- [14] The floodbank construction to Stage 10, and Bridges 11 and 12 are planned to be fully complete June 2025.





**Figure 6: Contour Channel Stage map.**



**Figure 7: Bridge 11 replacement underway at Contour Channel (18 July 2023).**

**Outram Project**

- [15] The floodbank at the Outram weighting blanket site experiences seepage during high river flows. Seepage may threaten the long-term integrity of the floodbank and potentially lead to piping creating a risk to West Taieri, including Dunedin International Airport. Piping is a mode of floodbank failure due to internal erosion resulting from

seepage and has been observed along the Outram floodbank during high river flows. This seepage has been reduced to acceptable factors of safety through this project by extending the floodbank toe with an earth fill weighting blanket. The weighting blanket construction comprises of approximately 9,000 cubic metres of earth fill. This reduces the seepage pressure within the floodbank and hence the likelihood of piping and catastrophic collapse. As with all floodbanks there is still a residual risk of failure.

- [16] Following completion of the required design and consenting the project construction tender was awarded October 2022 with the contractor establishing onsite in November 2022. The construction work progressed well over the 2022 / 2023 summer construction season with the major works being completed by late December 2022. The construction works are now fully completed, and completion reports have been submitted to MBIE for approval.
- [17] The Outram project has achieved practical completion and cost at completion has been forecast at \$1,270,000. The project original budget was \$2,000,000. The saving is due to the extent of construction works required being less than was originally expected following completion of the detailed design. The surplus MBIE funding has been transferred to the Contour Channel project as described above.



*Figure 8: Construction progressing at Outram site (22 November 2022).*

### **Robson Lagoon**

- [18] The regionally significant Lake Tuakitoto Wetland complex, which includes Robson Lagoon, is located in the Clutha/Mata-Au catchment, approximately 7km northeast of Balclutha, Otago. This project has upgraded flow management structures within Robson Lagoon to improve flow during flood events, whilst maintaining sustainable water levels during normal and low flow conditions. This provides a more sustainable habitat for local wildlife, such as native fish, and will protect the cultural values associated with the area.
- [19] The contractor established onsite on 10 January 2022 and commenced installation of the instream structures.
- [20] Over January and February 2022 work progressed onsite at pace with fair weather conditions providing stable water levels within the lagoon. This allowed all the instream

work to be completed within the first consented construction window well ahead of the project plan schedule.

- [21] Equipment for the automation of the control gate was sourced from overseas and was affected by COVID-related supply chain issues. The delay in this supply meant that the automation could not be installed when the control gate was installed in February 2022. The automation equipment was installed in November 2022, completing the work.
- [22] The project is now fully complete with all required reporting submitted and accepted by MBIE.
- [23] The project was completed with a final cost of \$849,397. The project cost exceeded the original MBIE project budget of \$500,000. Initial project costs were underestimated as they were based on quotes for construction received several years prior to the application being made to MBIE for “Shovel Ready” funding. There has also been a requirement for automated monitoring, necessitating a variation to the electrical costs for ongoing monitoring.
- [24] The increased cost of the Robson Lagoon Project was highlighted to MBIE in April 2022, when a variation to the programme was requested. A transfer of unspent budget was requested to be made from the Riverbank Road Project. This request was granted.
- [25] The balance of the overspend in the Robson Lagoon project, has been funded by Council funds approved and allocated to the Robson Lagoon project within the current 2021 - 2031 LTP.
- [26] A community open day was held on 19 April 2023 at Robson Lagoon (Figures 9 and 10). The purpose of the event was to celebrate the completion of the flow structure upgrade and was held in conjunction with ORC’s Environmental Implementation team, who are undertaking a hydrological assessment of the wider Tuakitoto catchment. It was an opportunity for ORC to engage with the public, with a chance to learn about the environment and history of the area, and for the public to talk and interact with ORC staff, as well as Councillors and key stakeholders including MBIE and Otago Fish and Game.



**Figure 9: (left): Opening speeches at Robson Lagoon field day and Figure 10: (right): The new control gate.**



### **Riverbank Road**

- [27] Following the February 2020 flood, repairs were required at several sites along Riverbank Road in the Lower Clutha Flood Protection and Drainage Scheme. Four sites were included as part of ORC's Climate Resilience Programme.
- [28] Damage at three of the sites was repaired using an environmentally friendly vegetative solution, while repair at the site adjacent to the Riverbank Road bridge at Stirling, required detailed investigation, design, and repair using approximately 3,500 cubic metres of rock to re-establish protection of 300m of floodbank (Figure 11).
- [29] Work at the four sites was completed at the end of December 2021. The project is now fully complete with all required reporting submitted and accepted by MBIE.
- [30] The Riverbank Road project was completed for \$950,000, compared to a budget of \$1.0 million. The underspend of \$50,000 has been transferred to the Robson Lagoon Project as described above.



*Figure 11: Riverbank Road floodbank at bridge near Stirling (LC21), before(left) and after (right) reshaping and vegetation stabilisation.*

### **Climate Resilience Programme Broader Outcomes**

- [31] The funding agreement with MBIE requires ORC to give effect to Broader Outcome considerations within the Climate resilience programme. This have been achieved by:
- Partnering with Aukaha to provide a targeted approach to engage with Māori and Pasifika to enhance employment opportunities within the Climate Resilience programme and broader ORC activities.
  - Including requirements in request for tender (RFT) documents that will actively promote contractors to engage with Māori owned business and/or employ Māori and Pasifika within their operation. These requirements have been given significant weighting within the tender evaluation which will

provide contractors who strive to achieve the required broader outcomes a tangible business advantage.

- c) Working proactively with Aukaha to enable opportunities for apprenticeships or cadetships directly with ORC or within our supplier organisations.

[32] Social procurement benefits over the four projects are summarised in Table 1. These show the person months (FTE’s) for each metric.

**Table 1. Broader Outcomes summary**

ORC Climate Resilience Programme Broader Outcomes	Project to date to 30 June 2023				
	Contour Channel	Outram	Riverbank Road	Robson Lagoon	Programme Total
Total FTE Months	73.9	24.6	25.3	25.2	149.00
NZ Residents	58.8	23.9	25.3	25.0	132.9
Non-resident	0.9	0.0	0.2	0.0	1.1
Apprentices	1.2	0.6	2.0	3.4	7.2
Previously unemployed	2.8	0.0	0.0	0.0	2.8
Local (Otago resident)	27.4	21.7	21.1	24.0	94.2
Aged 15-24	1.6	1.3	1.4	3.9	8.1
Māori	3.3	0.0	1.0	0.0	4.3
Pasifika	0.6	0.0	0.0	0.0	0.6
Women	1.8	6.9	5.5	13.7	28.0

**Financial Summary of Climate Resilience Programme**

[33] A summary of status of the ORC Climate Resilience Programme costs and funding is included in Table 2 below. The total budget as set out in the ORC/MBIE Funding Agreement is \$8.5 million.

[34] MBIE has committed 64% or \$5.44 million towards this programme and ORC is committed to providing the remainder of the funding of \$3.06 million.

[35] The breakdown by project showing expenditure to date for each project is included in Table 2. To date \$5.04 million has been spent and ORC has claimed \$2.8 million from MBIE.

**Table 2. Climate Resilience funding summary.**

<b>Climate Resilience Programme as at 30 June 2023</b>						
<b>PROJECT</b>	<b>Project Budget Million \$</b>	<b>MBIE Funding Committed** Million \$</b>	<b>ORC Funding Million \$</b>	<b>Expenditure to Date Million \$</b>	<b>MBIE Funding Received to date* Million \$</b>	<b>Est. Cost at Completion Million \$</b>
Contour Channel	5.73	3.67	2.06	2.36	0.96	5.73
Robson Lagoon	0.55	0.35	0.50	0.85	0.35	0.85***
Riverbank Road	0.95	0.61	0.34	0.93	0.61	0.95
Outram	1.27	0.81	0.46	0.89	0.88	1.27
<b>TOTAL</b>	<b>8.50</b>	<b>5.44</b>	<b>3.36</b>	<b>5.04</b>	<b>2.80</b>	<b>8.80</b>

\* This committed amount includes MBIE approved variations (which means transfer of MBIE funds between projects and removal of Bridge 14).

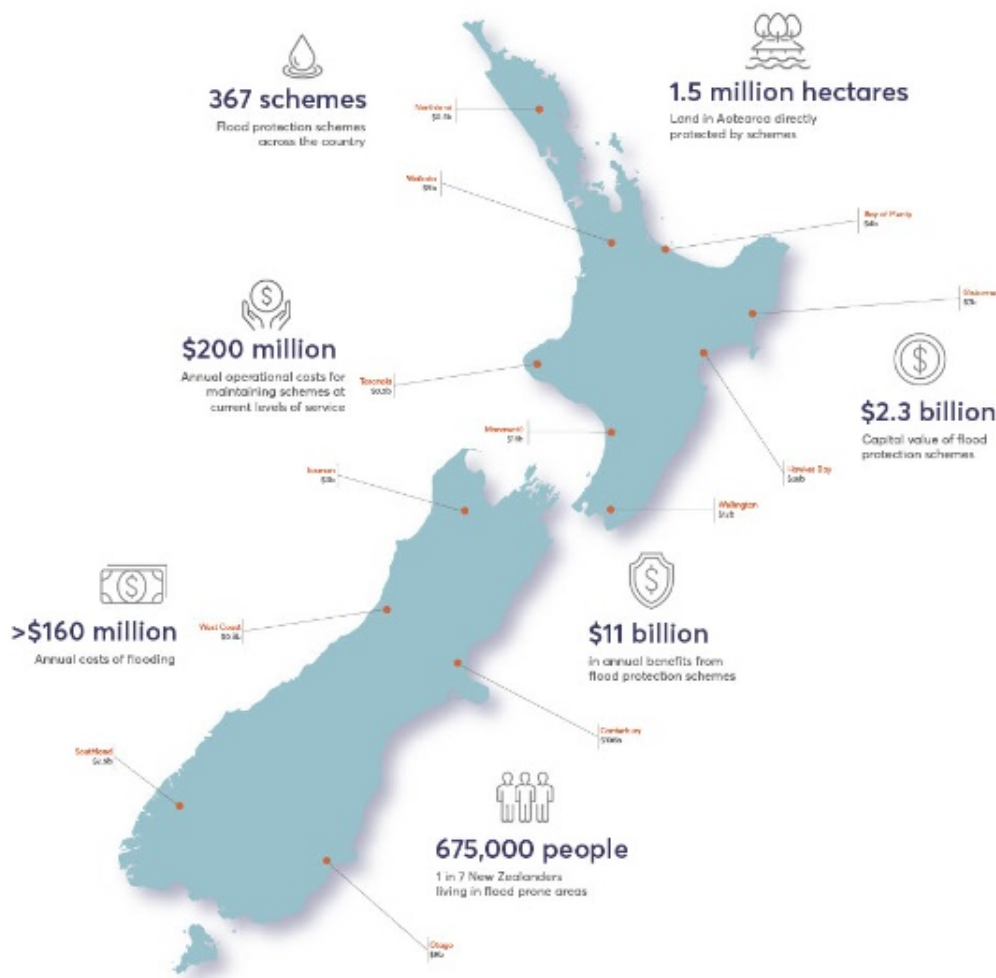
\*\* Note total funding received from MBIE is dependent on timing of claims and payments received. The next claim to MBIE is July 2023.

\*\*\* The balance of the overspend in the Robson Lagoon Project, has been funded by Council funds approved and allocated to the Robson Lagoon project within the current 2021 -2031 LTP.

#### **Future Co-Investment Opportunities**

- [36] ORC, along with other Regional Councils provided input into a co-investment case which was submitted to Government in December 2022 as a second tranche of Climate Resilience Programme projects, following the success nationally of the current 'shovel ready' (Climate Resilience) tranche of funding.
- [37] This co-investment case was an attempt to secure a permanent budget line with Government for funding towards resilience against flood risk areas.
- [38] The submission, which was led by the River Managers' Special Interest Group (River SIG) prepared a co-investment case of the 92 projects amounting to \$428m.
- [39] These projects supported the following key principles, which have followed principles from the 'shovel ready' funding;
- Being able to be completed in three years;
  - Regional co-investment funding is available;
  - Projects in communities with lower socio-economic status would be favoured for funding.
  - All projects will accelerate adaptation to climate change;
  - All projects will enable communities adjacent to the projects to receive a higher level of flood risk resilience; and
  - The projects reflect the application of Te Mana o Te Wai / environmental principles.

[40] A national overview of the flood protection schemes is represented by the below figure, which is an extract from the 'Before the deluge', proposal for co-investment in river management and flood protection document (Appendix A).



**Figure 12: Overview nationally of the flood protection schemes.**

- [41] The documents presented to Government are included in Appendices A and B.
- [42] The ORC’s co-investment list of projects included in the \$428 million are summarised in Appendix C.
- [43] The River SIG was advised 18 May 2023, through the Government’s Wellbeing Budget 2023 (Support for today, Building for tomorrow) announcement, that a second tranche of Climate Resilience funding as presented through the investment case was not successful as a budget line item.
- [44] The funding that would be provided however was to be directed to Westport (\$22.9m) and the North Island extreme weather recovery (\$100m) efforts. The latter is required to

be spent within 12 months by the respective North Island regions that have significant weather recovery programmes underway.

- [45] The regional council sector has continued to engage with Government to consider opportunities for funding towards the co-investment case that was put forward in December 2022.
- [46] ORC is keeping its co-investment project list live and updated, so that it is able to respond rapidly if an opportunity for co-investment arises. The projects that ORC have submitted reflect current and/or known areas of flood / resilience risk and are mostly supported through current 2021 – 2031 Long Term Plan. Where projects are not currently a placeholder within the current 2021 – 2031 Long Term Plan, this will be considered in the new 2024 – 2034 Long Term Plan process.

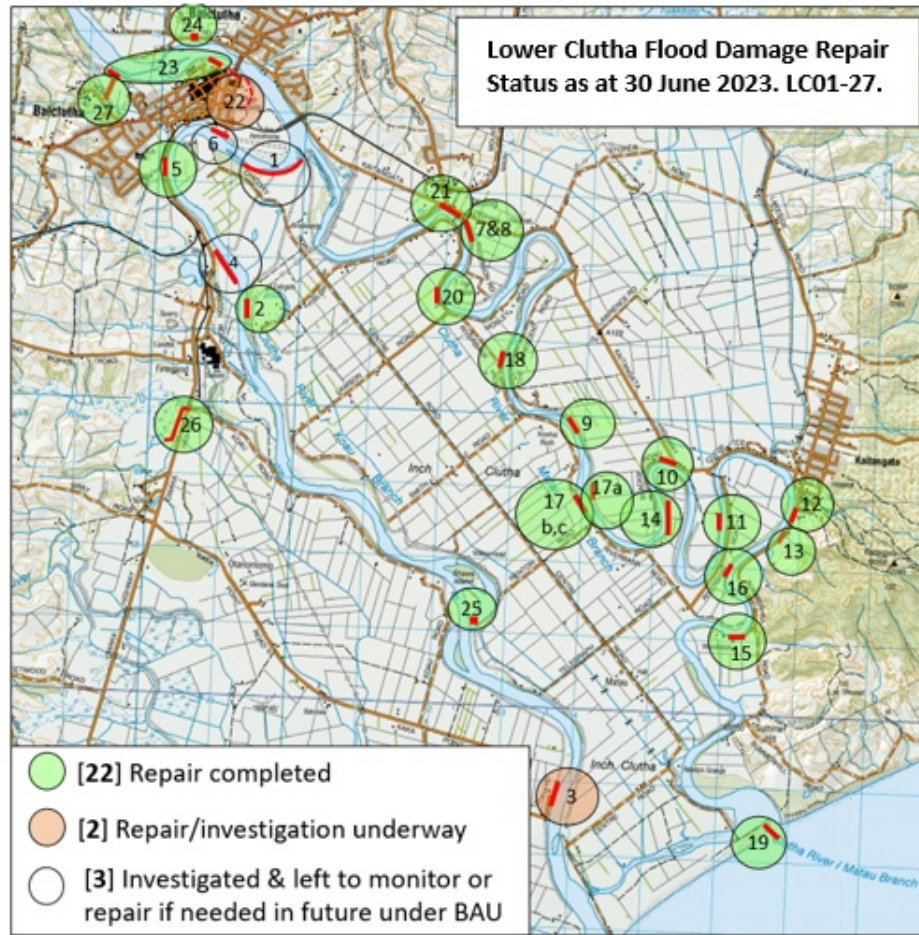
#### **Adverse Weather Event Recovery Programmes of Work**

- [47] Otago experienced two weather events in February 2020 and July/August 2022 which have had significant impact, not only financially, but also on the scheme and/or rivers environment. The two heavy rainfall events affected the Otago region and the Clutha River catchment particularly. Both events were consistent in characteristics as there was widespread rainfall that elevated river levels. Whilst each event had unique hydrology specifics, both events required response and resultant recovery with significant repairs and cost.

#### **November 2019 and February 2020 Adverse Weather Events**

- [48] Between November 2019 and February 2020 two heavy rainfall events affected the Otago region and the Clutha River catchment particularly: the November/December 2019 event had a long duration and large amounts of rain falling on the headwaters of Otago during this period; the February 2020 event was shorter, more widespread with the largest amounts of rain falling in the headwaters and in the lower parts of the Clutha River catchment. This resulted in the ninth largest flow (3,175 cubic metres per second) since 1863 and the largest flow in the last 20 years in the Clutha River at Balclutha.
- [49] Following the November 2019 and February 2020 rainfall events, staff located 35 flood damage areas (sites) across Otago. These sites were mapped, and a programme of repair and recovery was undertaken.
- [50] Of the 35 identified flood damaged sites, across Otago, 30 have now been completed, two are underway, and three have been investigated and left to monitor and repair if needed under business as usual.
- [51] The two sites that are still to be completed are the Balclutha pressure relief wells (LC22), and the Floodbank at Factory Road, Paretai (LC03).





**Figure 13: Lower Clutha – February 2020 Flood Damage. Status of repairs at 30 June 2023.**

- [52] The purpose of the Balclutha pressure relief well network is to reduce ground water pressure beneath the floodbank during elevated river levels. The network consists of 44 relief wells which are positioned on the landward side of the true right Lower Clutha Flood Protection and Drainage Scheme floodbank. The locations of them are shown in Figure 14.



**Figure 14: Relief well locations, Balclutha.**

- [53] Inspections and testing following the flood event identified three relief wells that require replacement due to internal damage and displacement of the well tubes. Each well is required to be replaced with two new wells to maintain suitable spacings between the wells.
- [54] The Balclutha relief wells are awaiting granting of the required consents for the installation of replacement wells. The well installation is expected to be completed in the summer of 2023/2024, consents permitting.
- [55] The floodbank at Factory Road, Paretai (LC03) has suffered erosion damage during the flood events. This requires reinstatement and widening of the existing floodbank and rock lining to protect the floodbank from further damage that may result in a floodbank failure at this location.
- [56] The construction works at Factory Road has been tendered and the work awarded. This is planned to commence in October 2023 in line with consent requirements.



**Figure 15: Erosion damage and slumping at Factory Road site, Paretai (March 2020).**

### **July/August 2022 Adverse Weather Events**

- [57] Between 12 July and 8 August 2022 there were four successive weather events that resulted in elevated flows in rivers across the region. The distribution of rainfall accumulations across the region varied for each event and subsequently had different impacts throughout the region, impacting areas across central, coastal, and south Otago at different times throughout.
- [58] The flood repair and recovery programme is available to the public online as an interactive map showing repair sites, their programmed completion, and their status (Figure 16). It is updated monthly as work progresses. The live repair programme can be viewed by visiting the following ORC webpage and clicking the link to the dashboard near the bottom of the page – [Flood Repair Programme | Otago Regional Council \(orc.govt.nz\)](https://orc.govt.nz). The programme remains subject to changes as the investigations and repair works are undertaken. The detailed list of sites is included in Appendix A.
- [59] The majority of the repair sites remaining consist of erosion to riverbanks, within schemes and other rivers/waterways.
- [60] Figure 16 shows the distribution of flood recovery and repair works identified across the Otago region, and the status of this work identified as at the end of June 2023. Most of this work is related to bank erosion and debris accumulation. This programme includes work across the schemes and rivers.
- [61] All the identified repair sites are vulnerable to any weather systems, until they are repaired. The priority for repairs is expediting the urgent sites to ensure risk of further damage is reduced/eliminated and to ensure appropriate measures are in place to respond in the case of a weather event.
- [62] The management of the remaining repair works is through operational monitoring of these sites including mitigation interventions (which can include erosion mitigation with rock) if a forecasted weather event is predicted to have an adverse effect on specific sites.



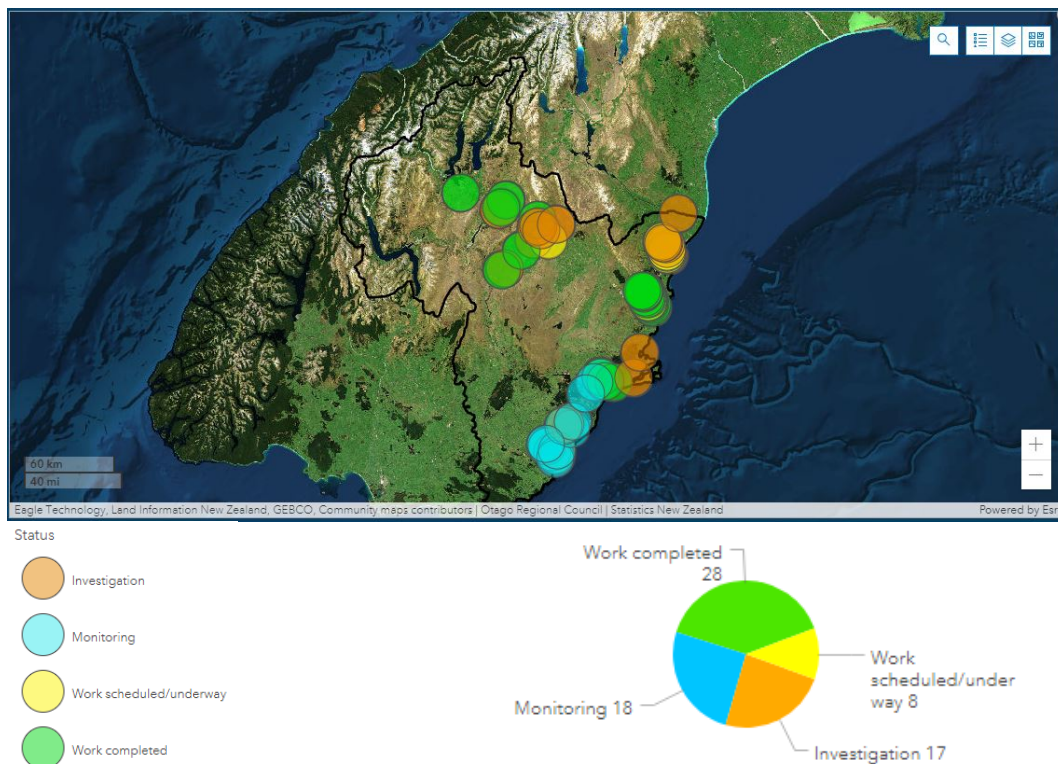


Figure 16: Flood recovery works identified during July/August 2022 flood events.

**Financial Impact of 2020/2022 Adverse Weather Events**

[63] The summary of repair expenditure required to complete repairs/remediation from both the February 2020 and July / August 2022 adverse weather events is summarised in Table 3 below, including a forecasted expenditure across current and future annual plans.

**Table 3: Summary of Costs for Recovery of ORC 2020 and 2022 Adverse Weather Events**

Weather event	Preliminary Estimates at time for repair site identification	Actual Expenditure to Date as at end of June 2023	Contributions from NEMA, MBIE or other (as at end of June 2023) <sup>Refer to Note 1</sup>	Cost to ORC (schemes and rivers reserve deficit) <sup>Refer to Note 2</sup>	Forecast Expenditure to Complete		Estimated Cost at Completion
					FY2023/2024	FY2024/2025	
February 2020 Otago region (schemes and rivers)	\$4,000,000	\$3,600,000	\$608,000	\$3,627,053	\$900,000	Nil	\$4,500,000
			\$264,947				
			\$469,053				
July / August 2022 Otago region (schemes and rivers)	\$2,128,000	\$355,309		\$1,855,309	\$1,150,000	\$350,000	\$1,855,309
<b>Totals</b>	<b>\$6,128,000</b>	<b>\$3,955,309</b>	<b>\$1,342,000</b>	<b>\$5,482,362</b>	<b>\$2,050,000</b>	<b>\$350,000</b>	<b>\$6,355,309</b>

Note 1: MBIE has contributed \$608,000 towards flood recovery for flood damage repairs on the floodbank at Riverbank Road in the Lower Clutha, approved as part of the Climate Resilience Programme.

Note 2: The National Emergency Management Agency (NEMA) contribution towards this expenditure is estimated to be \$734,000. Of this, \$264,947 has been received (Claim 1 and 2) and the remainder is yet to be claimed.

[64] The flood protection schemes and river channels damaged by weather outlined in this paper are not insured<sup>2</sup> by the ORC. The flood protection and river management schemes are structured as self-insured funding models. The schemes and river management budgets fund additional and unforeseen events, such as flooding, from reserves<sup>3</sup>.

[65] In relation to Table 3 above, Council was advised on 14 September 2022 of the preliminary estimates for damage across rivers and schemes for the July/August 2022 event. The February 2020 event preliminary estimates were provided to Council on 27 May 2020.

[66] ORC has some choices available for funding to reduce scheme reserve deficits. Funding may be available through accessing the ORC Emergency Response fund and/or borrowing against the Flood Protection and Drainage Schemes.

#### **ORC Emergency Response Fund (ERF)**

[67] The ORC Emergency Response fund<sup>4</sup> is not a funding source, however it can be accessed to provide immediate response funds for weather/flooding events. It was accessed to support repairs resulting from the February 2020 weather event. The amount that was accessed was \$0.5M.

[68] It is also noted that Council has previously approved approximately \$0.62M of repair works during the November 1999 floods, funded from this fund, primarily for river restoration works in Queenstown-Lakes and Central Otago Districts.

#### **National Emergency Management Agency (NEMA)**

[69] Government funding, available to repair essential infrastructure following emergencies, is administered through NEMA. Costs to repair essential eligible infrastructure, above a threshold are claimable at a 60% subsidy from Central Government. The threshold is 0.002% of the Rateable Value of Council infrastructure in the financial year in which the damage occurred. For ORC the threshold for damage in 2019/20 was around \$1.8M. ORC was successful in its application for subsidy as the damage expenditure exceeded the threshold for the February 2020 adverse weather event.

[70] For the July / August 2022 event, the threshold for the damage in 2021/2022 was calculated at \$2.3M. This has meant the repairs resulting from the July/August 2022 weather event would not be eligible for the subsidy from NEMA, as the expenditure to repair is likely not to exceed this threshold. The threshold calculation is shown in Table 4.

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<sup>2</sup> The ORC flood protection infrastructure insures; Pump Stations are insured, including pump station buildings, associated infrastructure and pump station foundations.

<sup>3</sup> Reserves are the surplus or deficit associated with each scheme and/or river management budget. The reserve at the end of each Financial Year will rollover into the new Financial Year and Annual Plan.

<sup>4</sup> As at 30 June 2023 the value of the fund equalled \$4.79M. Any approval to use the Emergency Response fund needs to acknowledge who should replenish it. That is, should the general ratepayer pay for this or the targeted ratepayer. The Emergency Response fund was created in 1995 primarily as a self-insurance mechanism for flood response and repairs.

**Table 4: February 2023 Claim threshold calculation**

Description	Unit	Amounts	Comments
<i>Rateable Value of Otago</i>	\$	116,963,845,570.00	<i>CV as of 25 July 2022</i>
<i>NEMA Threshold Modifier</i>	%	0.0020	<i>Stipulated by NEMA</i>
<i>Calculated NEMA Claim Threshold</i>	\$	2,339,276.91	<i>CV x 0.00002</i>

- [71] Eligible infrastructure includes all constructed assets (floodbanks, pumps, pumphouses, culverts, etc) and willows planted specifically to provide flood protection. Flood management response costs (other than ORC staff), flood recovery coordination, flood damage assessment, investigation (external to ORC staff costs), contracting and construction to repair eligible assets are considered eligible.
- [72] Non-eligible costs include river management to address aggradation and remove excess of gravel, debris removal and repair to natural riverbanks. Any improvement to the asset undertaken during the flood damage repair is considered to be a betterment, not eligible for NEMA funding.

#### **Kuriwao Fund**

- [73] Consideration to receive further funding to reduce the scheme reserve deficits by accessing the Kuriwao Fund (for the Lower Clutha Flood Protection and Drainage Scheme).
- [74] The Otago Regional Council (Kuriwao Endowment Lands) Act 1994 (“the Act”) was enacted to:
- Confirm the vesting of land in the Otago Regional Council (“Council”);
  - Redefine the purpose for which the land is held by the Council;
  - Recognise existing leases of the land;
  - Transfer the lessor’s interest in leases of the land to the Council;
  - Empower the Council to dispose of the land; and
  - Define the purposes for which any of the proceeds from the sale of the land may be used.
- [75] The Council holds income derived from leases and the proceeds from the sale of Kuriwao land, upon trust.
- [76] Council currently holds \$7.4M of Kuriwao funds.
- [77] The Lower Clutha Flood Protection and Drainage Scheme receives an annual income of \$0.25M from the Kuriwao fund. This figure has not increased since 2011. The fund is being used to part-fund ORC’s investigation of shoreline retreat and sea level rise impacts on the Clutha delta.
- [78] The Act defines the purposes for which any of the income (including the proceeds from the sale of land) may be used.
- [79] To enable the Lower Clutha Scheme to access additional resources from the Kuriwao fund requires:
- the proposed use of the income to fall within the Act’s purposes;

- b. the works must be for the benefit of the Lower Clutha District (as defined); and
- c. Council to approve the use of income.

[80] Increasing the annual Kuriwao reserve contribution to the Lower Clutha Flood Protection and Drainage Scheme would allow a smoother approach to funding.

[81] It is necessary to continue to progress the flood damage repairs, to not only determine the actual repair costs, but to repair and mitigate sites that are exposed to further damage from future events. The outcome of the NEMA funding application(s) will also determine the remaining expenditure to the respective scheme reserves. The strategy for addressing the long-term impact of the weather/flood event expenditure on the scheme reserves will need to occur through the Annual Plan or Long-Term Plan processes.

**Storm Damage to Puerua River and Koau Training Line Infrastructure**

[82] During the week of 3 July 2023 a combination of wave action/storm surge and high flows from the Puerua River catchment (south of Balclutha) caused retreat of the coastline into the Puerua Estuary creating a new coastal channel and significant damage to infrastructure (training line). This has resulted in a series of geomorphic changes which have the potential to impact on drainage from the Puerua River catchment and ORC river mouth (Koau branch of the Clutha River) infrastructure part of the Lower Clutha Flood Protection and Drainage Scheme (Figures 17 and 18).



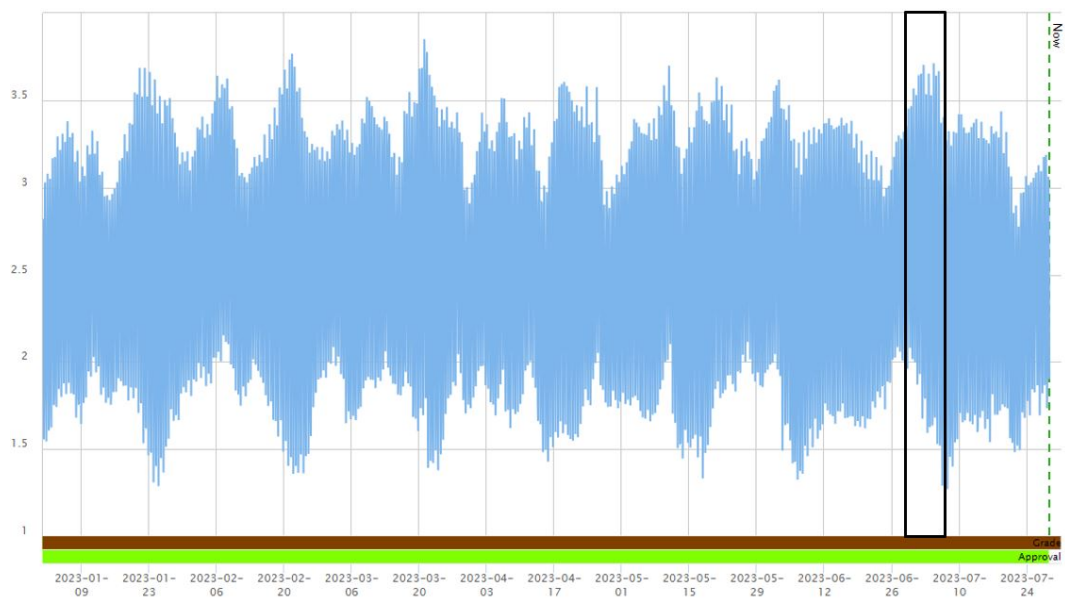
**Figure 17: Koau Training Line location, Lower Clutha delta.**





**Figure 18: River outflows and coastal overtopping at the Puerua River estuary.**

[83] Records from ORC’s Green Island Sea level recorder show the storm surge event (Figure 19). Hindcast model data<sup>5</sup> confirms conditions of large waves and high storm tides during this event. For a point located about 15 km offshore from the Clutha Delta coastline, hindcast modelling estimates there was a Significant Wave Height<sup>6</sup> of up to 4-5 metres, a maximum wave height of 8-9 metres, and a storm tide height<sup>7</sup> of up to about 1.3 metres.



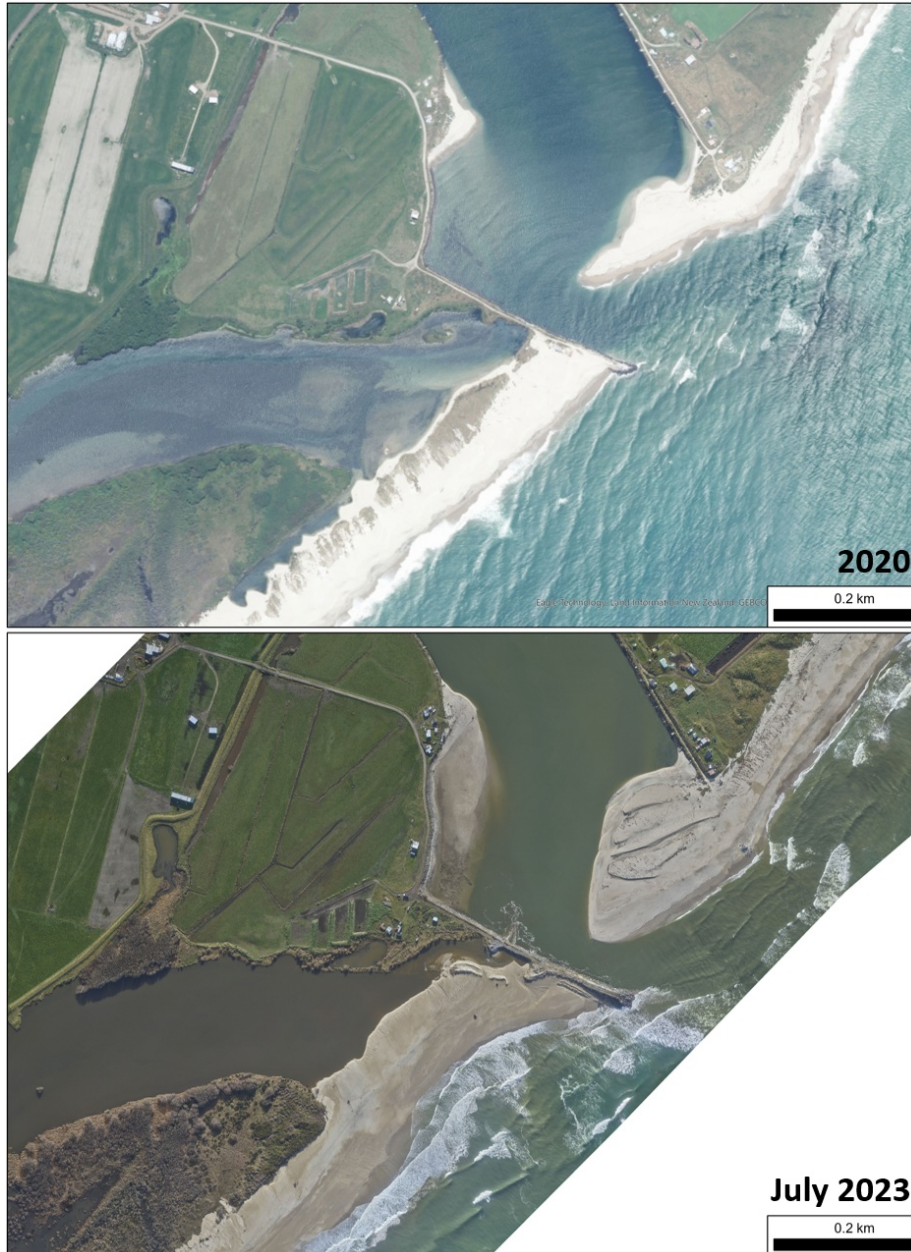
<sup>5</sup> Hindcast model data provided by MetOcean.

<sup>6</sup> The 'significant wave height' is the average height of the highest 1/3 of waves.

<sup>7</sup> The combination of tide height and barometric pressure effects.

**Figure 19: Sea level for the 2023 year to date, recorded at Green Island. The black outline highlights the period of the early-July storm surge event which caused coastal erosion in the Clutha Delta area.**

[84] These changes are summarised by the series of photographs shown in Figures 20 to 22.



**Figure 20: Aerial imagery showing the Koau Mouth and Puerua outfall area before (top) and after (lower) the recent coastal erosion events. This comparison shows the coastal erosion of shoreline immediately to the south of the Koau mouth training line structure, and a significant inland movement of the dune system into the Puerua estuary.**





**Figure 21: The coastline impact of the Puerua Estuary and Lower Clutha Flood Protection and Drainage Scheme infrastructure (5 July 2023).**



**Figure 22: The coastline impact of the Puerua Estuary and Lower Clutha Flood Protection and Drainage Scheme infrastructure (5 July 2023).**

- [85] There has been rapid erosion alongside the ORC training line structure at the Clutha River's Koau mouth, including damage to several of the outfall culverts which drain the Puerua River to the Clutha River/Mata-Au.
- [86] There has been shoreline retreat and erosion of sections of the natural dune system, including at the Koau mouth area (Figure 21).

- [87] The Puerua River has naturally formed a new outlet directly to the coast (Figures 19, 20 and 21).
- [88] The outflow capacity from the Puerua River may be reduced (damages to culvert functionality), and this may also have an impact on the capacity for land drainage from the Paretai area.
- [89] The Engineering and Natural Hazards teams are both prioritising further investigations on the risk to people, property and infrastructure.
- [90] Operational response continues to be a heightened tactical maintenance to ensure the drainage scheme functionality continues. Further investigations into flood hazard and geomorphic change will inform the short to medium term infrastructure remediation.
- [91] The current Long Term Plan contemplated work on adaptation investigations<sup>8</sup> which have been undertaken to inform operational response and future considerations on infrastructure investment.

## **CONSIDERATIONS**

### **Strategic Framework and Policy Considerations**

- [92] There are no policy considerations associated with receiving this report.

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<sup>8</sup> *Clutha Delta and Molyneux Bay Coastal Morphology and Natural Hazards*, Report HAZ2207, Report to 8 December 2021 meeting of the Data and Information Committee.

### **Financial Considerations**

[93] These are described in the report, particularly the estimated costs for both the February 2020 and July/August 2022 floods. Those costs are unbudgeted and will be incurred as deficit to the schemes and/or rivers management reserves.

### **Significance and Engagement Considerations**

[94] No considerations arising from this paper.

### **Legislative and Risk Considerations**

[95] The nature and setting of the assets that have been damaged during the flood events, particularly within the flood protection scheme, are such that they are vulnerable to future damage. This is a cost risk for ORC.

### **Climate Change Considerations**

[96] Flood recovery has focused on reinstating like-for-like damaged infrastructure. Climate change considerations, particularly in the Lower Clutha Flood Protection and Drainage Scheme are being investigated by ORC as part of a separate programme of work.

### **Communications Considerations**

[97] There are no communications considerations with receiving this report.

### **NEXT STEPS**

- [98] Continue progressing Climate Resilience projects to the completion of all projects in the programme by June 2025.
- [99] Complete the February 2020 flood recovery programme currently forecasted for June 2024.
- [100] Continue with the high priority repairs identified by the recovery programme for the July August 2022 flood event.

### **ATTACHMENTS**

1. Appendix A Flood protection co-investment supporting document 8 December 2022 [8.3.1 - 11 pages]
2. Appendix B Flood protection - investment summary [8.3.2 - 19 pages]
3. Appendix C ORC second tranche co investment projects [8.3.3 - 1 page]
4. Appendix D July - Aug 2022 Flood Recovery Works List [8.3.4 - 3 pages]

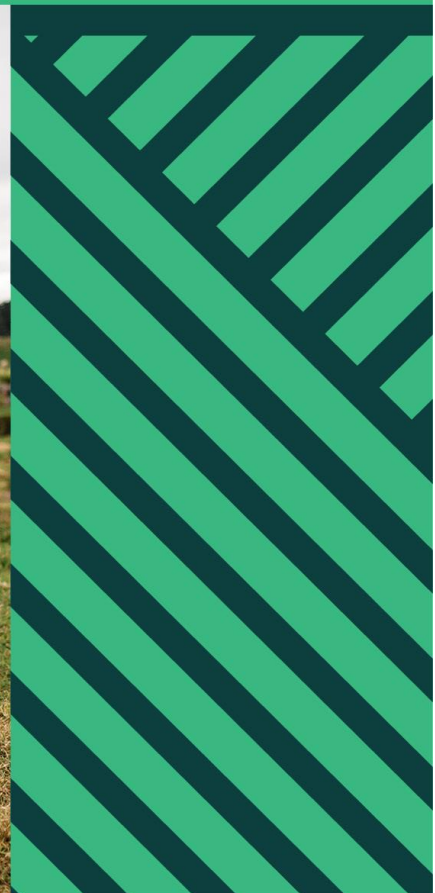


Regional and  
Unitary Councils  
Aotearoa

# Central Government Co-investment in Flood Protection Schemes

- A report to support the request for  
Budget 2023 funding to build  
community climate-change resilience  
against flood risks

DECEMBER 2022





## Summary

Floods are New Zealand's number one natural hazard. Flood risks across New Zealand are escalating, consistent with international trends. Te Uru Kahika members (regional and unitary district councils) are fully committed to meeting their flood protection responsibilities. They invest around \$200 million each year to sustain and improve related infrastructure across Aotearoa.

In a climate-changing world, that investment – together with other flood risk mitigation measures, cannot on its own provide the level of security, 'service level' and the flood risk mitigation / climate change resilience now expected of flood protection schemes. Increased co-investment, alongside a suite of broader measures, will be required to enable communities to meet this challenge.

A step change is required. Measured urgency is needed to adapt existing flood protection measures to be fit to meet present and future risk management expectations. It is clearly in the national interest that these adaptations occur.

With some minor exceptions, there is a good understanding of what interventions are now required at all locations. The relationships, capacity and capability exist, at a good and improving standard within central and regional public agencies and the private sector, to enable timely and effective execution of a national programme delivered at the regional level. Increased Government and council co-investment is required to build community resilience against flood risks.

## Our request

There is an overwhelming national interest in Government assisting to resolve Aotearoa's flood protection challenge. Te Uru Kahika request Government to partner with it on a two-step journey:

- **Step one:** Commit \$257m, via Budget 2023, alongside regional council co-investment, to the collaborative delivery of a three-year programme of 92 carefully selected flood protection projects.
- **Step two:** Commit to a long-term collaborative, multi-tool, and well-funded co-investment approach to the task of building community resilience against flood risks.

## Benefits

The benefits for Government of co-investing in the 'step one' second tranche of flood protection schemes are substantial:

- More vulnerable communities will be protected.
- The fiscal impacts of more frequent and severe floods will be mitigated.
- The return on investment is considerable (\$1 spent protecting a community avoids \$5-\$8 in clean-up costs afterwards).
- The intangible benefits – in terms of reduced health, social, cultural, and environmental impacts – are significant and can be long lasting.
- The climate is rapidly changing. The frequency and magnitude of floods is accelerating. Flood protection is the primary defense / adaptation tool for effective mitigation of the increased risks posed by climate change.
- The present high level of private flood risk insurance will be sustained. This will reduce the substantial contingent liability for the Government arising from both property and larger community recovery costs.
- There are a wide range of Government owned and nationally strategic assets such as lifeline utility networks, roads, schools, and hospitals that will be protected.
- Relevant and necessary Te Uru Kahika capacity and capability will be retained and enhanced rather than diminished.
- The effective functioning of flood-prone regional economies and communities will be sustained by providing safety, security, connectivity, and reliability.

## Current 55 Kānoa / regional council projects

We have made demonstrable progress in implementing the current 55 community resilience projects, funded as part of the Covid-19 recovery response. These projects have delivered on Government and community objectives in an efficient and cost-effective way. This confirms the capability and proven reliability of Te Uru Kahika member councils to deliver projects of this type.

We now wish to build on this previous work with a second tranche of 92 projects. For these new projects, we wish to continue to work under the governance / partnership oversight and guidance provided under the 'Resilient River Communities' banner by Kānoa. Effective relationships and competencies have been developed. These should be sustained.

## Forward programme

### FIRST STEP: CO-INVESTMENT IN 92 ADDITIONAL FLOOD PROTECTION PROJECTS

We have worked with Maven Consultants Ltd to prepare a business case to support the \$257m we have requested from Government to enable the proposed 92 new projects to be delivered more quickly than otherwise would have been the case. The total cost of these projects is \$428m.

The requested \$257m reflects a cost share arrangement close to that used in the first tranche of projects.

### SECOND STEP: LONG-TERM PROGRAMME

Our previous work suggests future flood protection needs will cost \$350m pa. Regional councils have recently increased their investment commitment from \$175m pa to \$200m pa. to help achieve this objective. The annual shortfall of \$150m was the suggested amount required as part of Government's long-term co-investment.

More collaborative work is recommended as being necessary, to refine the proposed long term Government co-investment share. This additional work would cover the:

- Preferred service level for all the 367-flood protection and river management schemes across Aotearoa. (This service level is expected to be 1:100 or better).
- Confirmed estimates of the cost required to achieve that level of service.
- Priority to be attributed to projects across Aotearoa.
- Cost share between Government and Te Uru Kahika members across different parts of Aotearoa.
- Costs saved because of flood harm / damage averted.
- Relationship between proposed flood protection investment and measures that avoid, accommodate or retreat from floods.
- Relationship between flood protection investment and environmental / Te Mana O Te Wai / give the river 'more room to move' initiatives.
- Relationship between flood protection investment and Waka Kotahi and or KiwiRail investment infrastructure improvement plans.

The end point of this second step would be the accelerated achievement of improved community resilience against flood risks. The critical ingredient to the achievement of this objective is the provision of an agreed quantum of more permanent Government budgetary assistance. This will give certainty to communities and business (including the insurance companies) about investing in the future of the regions.

### COLLABORATION TO ACHIEVE COMMUNITY RESILIENCE AGAINST CLIMATE CHANGE / FLOOD RISKS

Government consideration of policy for building community flood risk resilience is currently diffused between MfE, Treasury, NEMA, DIA and MBIE. The Insurance Council, Te Waihanga (Infrastructure Commission), the EQC (Natural Hazards Commission / Toka Tū Ake) and the Productivity Commission also have a vital interest in this subject. Central to the deliberations of all these parties are the policy and delivery interests of members of Te Uru Kahika.



A leadership platform is required to draw these parties together. The 2019 / 2020 work of the multi-party / DIA supported 'Community Resilience Steering Group' set the precedent for the desired collaborative approach. We call upon you to re-convene a similar platform to guide the proposed 'second step' work.

## Recommendations to government

1. Make provision for \$257m in Budget 2023, for co-investment in a three-year delivery programme for 92 additional flood protection projects.
2. Apply the current successful governance / partnership oversight provided under the 'Resilient River Communities' banner by Kānoa to the proposed second tranche of 92 projects.
3. Work with Te Uru Kahika to implement a longer-term programme and co-investment arrangements capable of building a comprehensive approach to enhancing the resilience of our communities against flood risks.
4. Re-constitute a collaborative platform like the previous 'Community Resilience Steering Group,' to consolidate future community flood risk resilience recommendations.

Figure one: Kaitāia – new high-flow-level spillway, constructed with assistance of Kānoa funding. Prevented flooding from a 1 in 100 year event on 18 August 2022. Previously only had a 1 in 20 to 30 year protection level.



# Back story

## Previous progress

Te Uru Kahika has been attempting to progress the case for Government co-investment in flood protection schemes since at least 2018. Our efforts have been well received, but we are yet to secure the necessary longer-term decisions, co-investment funding and partnership certainty.

The acceleration of the effects of climate-change induced high-magnitude floods mean that now is the time for action. That said, the Government's commitment of \$217M (2020) toward the cost of the 55 selected 'ready to go' flood protection projects were much welcomed by Te Uru Kahika and affected communities. That joint programme is now over half completed. The value of the investments is already demonstrably evident.

The chronology of Te Uru Kahika efforts, and others, to progress the case for Government co-investment may be summarised as follows:

- [Hiding in Plain Sight](#), Tonkin + Taylor, 2018: documented the characteristics and value of New Zealand's 367 flood protection schemes.
- [Central Government Co-investment in River Management for Flood Protection](#), Te Uru Kahika, 2020: documented the case for co-investment.
- [Investing in Natural Hazards Mitigation](#), NZIER, 2020: provided forecasts and findings about the return on investment in flood risk mitigation.
- [Covid recovery funding](#), 2021: provided for the injection of \$217M capital into essential flood protection works as part of the Covid-19 recovery 'shovel ready' programme.
- [Co-investment Supplementary Report](#), Te Uru Kahika, January 2022: provided information drawn from Blenheim, Ashburton, and Westport case studies to expand the evidence base in support of Government co-investment in flood protection.
- [Co-investment in Westport's Resilience](#), a proposal to Hon Nanaia Mahuta, prepared by West Coast Regional Council, Buller District Council and Ngāti Waewae, July 2022: established the business case to support Government co-investment in building community resilience against flooding at Westport.

## Investment logic

The logic to support Government co-investing in a second tranche of flood protection projects is strong. Our summary of this rationale is displayed in Figure three. Several elements are particularly salient:

**Our destabilised climate is causing bigger rain events**, with bigger river flows, more flooding, greater flood damage and more harm to our communities. Recent Westport, Nelson and Tairāwhiti Gisborne floods are still very clear in the minds of those carrying the on-going burden of these events. Our current flood protection infrastructure was not designed for this emergent level of flooding.

**Flood protection is the first line of defense** for our communities.

- Research undertaken by NZIER (2020) confirms the natural hazard management cost-benefit of focusing attention on flood protection structures.
- Research undertaken by Tonkin + Taylor (2018) confirms that:
  - o \$11b of annual benefits accrue because of flood protection schemes.
  - o The value of the assets and productive land protected by current schemes is increasing.
  - o A total of 1.5 million hectares of land are protected by New Zealand's 367 Schemes.
  - o In the meantime, \$160m of costs are incurred annually by those areas without adequate flood risk resilience measures.
  - o A total of 675,000 New Zealanders live in flood prone areas.
  - o National and international research shows \$5-\$8 dollars of costs are avoided for every \$1 invested in flood protection.

**We need to apply a comprehensive approach** to the task of building the resilience of our communities against flood risks.

- New instruments have been developed as part of the resource management legislative programme.
- Managed retreat will play a critical future role in community adaptation to flood risks, at some locations.
- Te Mana O Te Wai and environmental values need to be more clearly reflected in the design of future schemes. We note the 'river needs more room to move' at some locations.

All these measures will take some time to be put in place. In the meantime, the pace of increase in the frequency and magnitude of flood events is accelerating. Projects (such as the 92 listed in our proposal) with clear and enduring benefits are required now as a bridge to allow the proposed more comprehensive set of flood risk mitigation tools to be rolled out.

**There is a distinct national interest and a wide-ranging set of crown assets protected** by flood protection schemes. Case study research carried out in Ashburton, Westport, and Blenheim (Te Uru Kahika, 2022) calculate the value of these Crown assets at over \$1b at each of these locations. Admittedly, much of this value is accounted for by expensive road and rail assets, but the protection provided to schools and hospitals etc., cannot be forgotten. The Crown does not pay rates. Crown assets are therefore protected at no cost to the Crown.

**Regional and unitary district councils have proven their capacity and capability** to deliver flood protection scheme projects. With the help of Kānoa, the 55 projects funded as part of Government's Covid recovery programme are being delivered on-time and within budget expectations. It is vital that the established pipeline of engineers, contractors, council works etc., enabling this to be achieved, is sustained. Governance and reporting systems are already in place. These can be taken forward and applied to the second tranche of 92 projects.

**The insurance sector is increasing its premiums** and is threatening to withdraw services from some flood prone areas. The important 'risk transfer' role played by the insurance sector depends for its success on how well flood risk itself is managed. IAG have clearly noted (press release, 18 August 2022) they will 'remain in the game' if flood protection structures are put in place. The impacts on the economy of the withdrawal of the insurance sector would be immense. New Zealand insured flood losses in the last five years have been double those of the previous five years (pers. comm., Tim Grafton, 30 November 2022).

## Business case

A business case '*Before the Deluge: Building Flood Resilience in Aotearoa*,' has been prepared for Te Uru Kahika by Maven Consultants Ltd. This business case provides strong support for the requested \$257m Government co-investment toward the cost of a second tranche of 92 flood protection project throughout Aotearoa.

The *Before the Deluge* report records a wealth of information to establish the strategic, economic, financial and management / implementation case for this co-investment. Highlights include the information provided about the:

- Current state of flood protection in Aotearoa, the related / evolving climate-change-induced social, economic, cultural, and environmental challenges and the flood harm faced by New Zealanders.
- Implications of applying a 'deprivation' approach to determine the priority to be accorded to flood protection projects.
- Details about the 92 projects put forward by Te Uru Kahika members as part of the second tranche of projects, and the related delivery roadmap.
- Benefits achieved from the central government's co-investment of \$217m into the first tranche of 55 community resilience building projects – and what more could be achieved from a similar commitment to a second tranche of 92 projects.
- Emergent insurance sector decisions and implications for Aotearoa.
- Longer-term pathway opportunities, including how the PARA approach to building community resilience against flood risks may be applied, and the importance of a long-term Government co-investment approach, to achieve less harmed / more resilient river-side communities and land uses.

## Prioritisation

As noted previously, Te Uru Kahika is seeking a Government contribution of \$257m toward 92 projects, with a total cost of \$428m. These projects have been identified via a robust Te Uru Kahika process. Members of Te Uru Kahika are confident they can meet their share of these costs. The listed projects are 'ready to go'. Te Uru Kahika members have the capacity and capability to deliver on these additional projects. They will be completed within three years of co-investment contracts being signed.

In selecting these projects, emphasis has also been given to the need for these projects to:

- Provide protection to lower socio-economic communities.
- Accelerate the provision of an increased level of service / protection against the accentuated flooding effects of climate change.
- Reflect Te Mana O Te Wai / environmental considerations.

Our emphasis toward projects serving the interests of lower socio-economic communities reflects the policies recorded in the July 2020 Cabinet Paper. It also reflects the work commissioned by DIA who attempted to define

the number of communities throughout Aotearoa suffering 'affordability' challenges such as those being experienced in Westport.

## Cost apportionment

In the past, Government has applied a considered and sensible approach toward co-investing in flood risk mitigation:

- The 55 'Shovel Ready' flood risk mitigation projects funded in 2020 by Central Government, as part of their Covid recovery programme, received a cost share of between 64% (for comparatively wealthy regions) and 75% (for less wealthy regions).
- Prior to the early 1990s, the capital cost of the substantial river management and flood protection schemes put in place by Catchment Boards, was commonly supported at levels of up to 75% by Government.
- The Te Uru Kahika report (January 2022) called for co-investment of up to 75% toward the cost of whole of catchment climate-change-adaptation approaches and slightly lesser rates for maintenance / operational expenditure.

The Business Case, developed by Maven Consultants Ltd and put forward by Te Uru Kahika to support the request for co-investment via Budget 2023, considers a range of approaches. In essence, this is based on Government co-investment of either 60% - for most districts, or 75% - for less-well-resourced districts.

This apportionment has been calculated on the assumption that \$257m is the maximum that central government may allocate to the proposed second tranche of flood protection projects. If additional funding was available from Government, then the preference of Te Uru Kahika would be to establish a cost apportionment ratio equaling that applied to the funding provided for the previous tranche of 55 post Covid-recovery projects i.e., 64% - for wealthier districts, and 75% - rating challenged / less-wealthy districts. If this cost share apportionment was applied, then Government's co-investment share of the projects would total \$289m.

Te Uru Kahika members also note they have other projects in their infrastructure strategies that, with little additional effort, could be added to the 92 put forward in the Business Case for accelerated delivery. We suggest that every reasonable opportunity should be taken to deliver improved flood resilience, to as many locations as possible, as soon as possible.

## Westport

The question of how the co-investment request from West Coast councils will be addressed by Government is not clearly apparent to members of Te Uru Kahika.

Te Uru Kahika members remain totally supportive of the West Coast councils' request for Government co-investment of \$45m. This is viewed as being a fair cost share toward the \$56m total cost of the broad spectrum of community flood risk resilience initiatives they have identified.

Te Uru Kahika members request that Government consider Westport's case in parallel, but in addition to the request for \$257m for accelerating implementation of the proposed 92 proposed. Westport is a regretful example of a 'bottom of the cliff' response and recovery as opposed to the proposals herein. It should receive co-investment funding as a separate consideration to the request for \$257m national funding outlined in this report.

## Case studies of the benefit of co-investment

Kānoa and Te Uru Kahika have jointly prepared a 'half-time' report on the progress made, and the benefits achieved, from the 55 Covid-recovery projects that received earlier co-investment support from Government. Salient indicators of the benefits achieved from these projects so far include:

- An additional 8,642 ha of community resilience achieved against flood risks.
- 650 local jobs created.
- 835 ha of wetland created or enhanced.
- \$8.4m of Māori business contract value allocated.
- \$50m of potential flood-harm from the 1:100-year 18 August 2022 event averted in Kaitiāia.
- Flood risk resilience provided to housing, businesses, state highways and local roads, the airport, the hospital, several Marae and 10,000 ha of highly productive horticultural, viticultural, and farming land across Gisborne - as part of the Waipaoa flood control scheme upgrade.

## Conclusion

Climate change is causing more frequent and more intense floods. Increases in flood risks come with a social, economic, cultural, and environmental cost that can no longer be shouldered by members of Te Uru Kahika on their own.

The case for Government committing to a second tranche of flood protection projects, as part of Budget 2023, is clear. Measured urgency exists to improve community climate resilience to flood risks.

A longer-term collaborative approach to building community climate resilience against flood risks is also required. Te Uru Kahika members look forward to partnering with central government agencies, and others, to achieve this objective.

Figure two: Westport flooding, July 2021





Figure three: Investment logic





**Te Uru  
Kahika**

Regional and  
Unitary Councils  
Aotearoa

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Regional and  
Unitary Councils  
Aotearoa

# Before the deluge

## Building flood resilience in Aotearoa

Investment summary



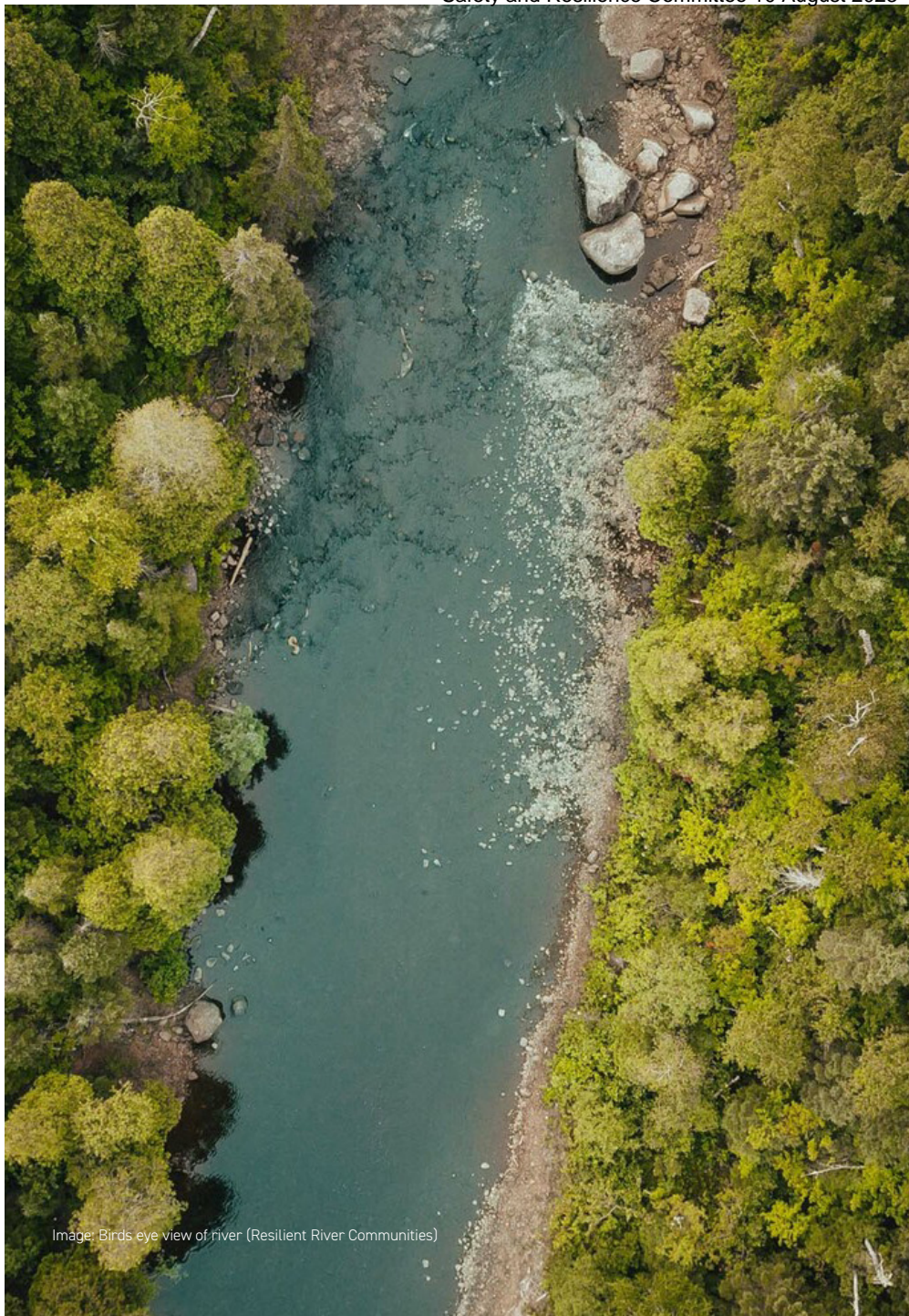


Image: Birds eye view of river (Resilient River Communities)

# Resilient River Communities

The MBIE/Kānoa/Regional and United Council 'Climate Resilience Flood Protection Programme' is developing the way forward for central government co-investment in flood resilience.

The 16 regional and unitary councils across Aotearoa are tasked with the integrated management of land, air, and water resources; supporting biodiversity and biosecurity; provision of transport services regionally; and building community resilience against climate change and natural hazards such as floods.

Collectively the regional sector's efforts are represented - through council Chief Executives - under the newly established identity Te Uru Kahika. Te Uru Kahika draws on expertise and local knowledge to promote the wellbeing of our environments and our communities.

In recent years, Te Uru Kahika has boosted its capacity to prepare for and respond to the impacts of climate change and natural hazards. The increase in flooding expected due to climate change has been a particular focus of this collective, as well as for the councils themselves.

River management and flood protection schemes, managed by the regional sector, have a critical role in mitigating against the full consequences of damaging flood events, the most frequent natural hazard experienced in New Zealand. This has been led by the River Managers' Special Interest Group (SIG), comprised of regional and unitary councils working collaboratively to increase community flood resilience.

However, climate change is expected to lead to more frequent and intense floods, and adapting to these increasing risks in the face of climate change comes with costs that can no longer be shouldered at a regional level alone.

In 2021, Resilient River Communities was launched as a joint initiative between Kānoa (the

regional Economic Development and Investment Unit), regional and unitary councils. The Kānoa Climate Resilience Flood Protection Programme initiative was aimed at developing and upgrading crucial river management and flood protection schemes via a co-investment partnership approach with central government.

Through this initiative \$312 million worth of flood resilience projects are being delivered across Aotearoa, with a \$217 million co-investment from Kānoa. In addition to the flood resilience benefits, these schemes have also enabled social procurement outcomes including the creation of jobs, new businesses, and opportunities for local communities.

Alongside this, in recent years Te Uru Kahika, through the River Managers' SIG, has led a wider programme of work establishing the need and urgency for longer-term central government co-investment in flood protection and management. This included work lead by Tonkin+Taylor in 2018 and a substantive sector report published in 2020.

Thus far, these efforts have facilitated dialogue with key Ministers and officials, including the release of a 2020 Cabinet paper which set out a proposed framework for central government to take on a more active stewardship role in improving community resilience to flood risk. However, a co-investment commitment has not been secured to date.

Given the upcoming resource management reforms, alongside the growing risk of flood risk, it is timely to revisit the matter of co-investment that will provide pathways to long-term solutions for Aotearoa.





Image: Hutt River

# At a glance

An overview of the challenge and the necessary response.



**A significant investment is required.**

Te Uru Kahika is seeking co-investment of \$257.2m from central government alongside \$171m from regional councils to accelerate delivery of 92 urgent shovel-ready projects.



**Continuation of existing Covid recovery funding allows:**

- The momentum developed over the last few years to be maintained
- More vulnerable communities to be protected
- Minimising and/or avoiding the fiscal impacts of more frequent and severe floods.



**The case for taking immediate action is irrefutable.**

Both national and international studies show the return on investment from well-designed flood protection works is considerable: \$1 spent protecting a community avoids \$5-\$8 in clean-up costs afterwards, before the intangible benefits - in health, social, cultural, and environmental impacts - are considered.

The climate is rapidly changing. The frequency and magnitude of floods is accelerating.



**There is a distinct national interest and national assets to be protected.**

Co-investment from central government acknowledges shared accountabilities.



**Regional councils have demonstrated their capacity and capability to deliver flood protection infrastructure.**

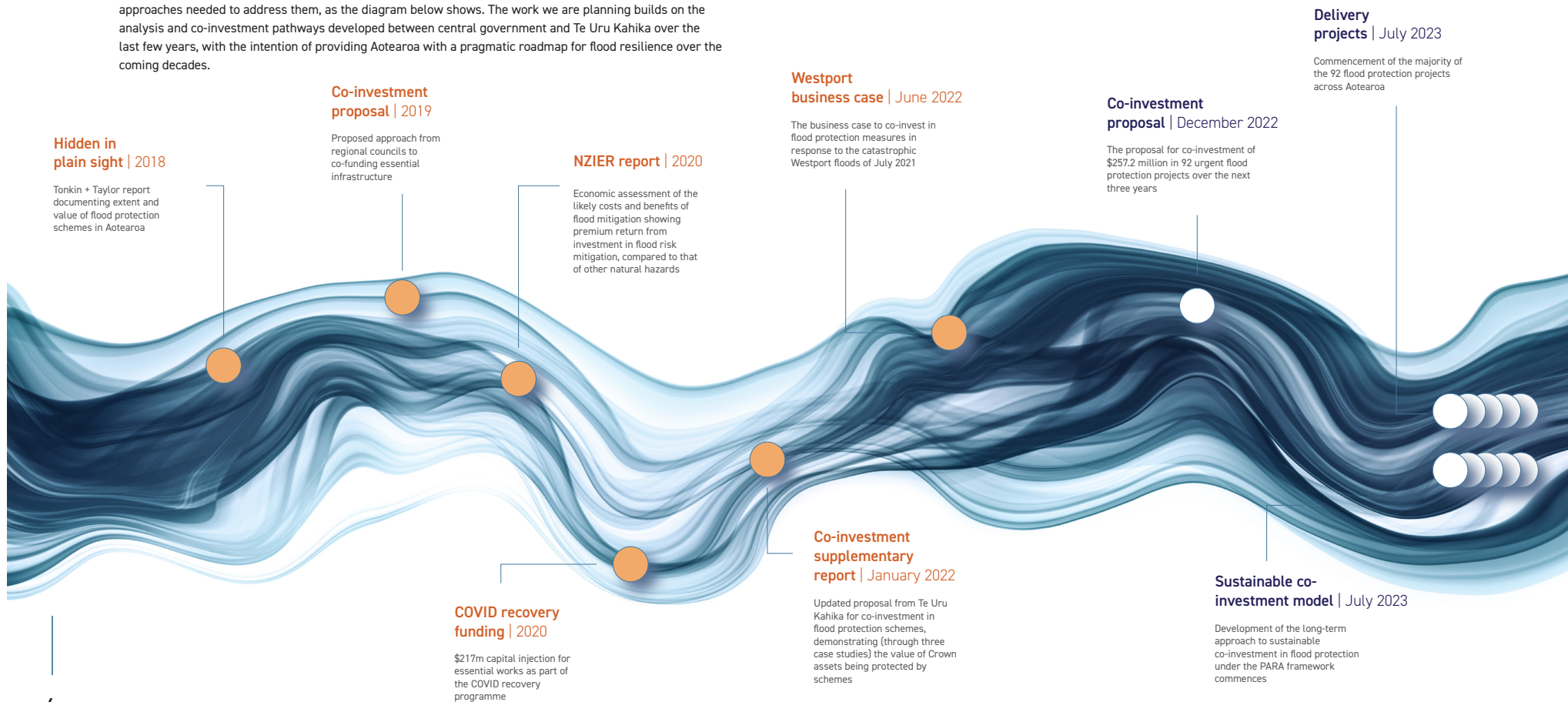
This remains the first line of defence against flood risks, and a primary means of building community resilience until other longer term measures are put into effect.



# The role of this investment case

## How this investment proposal relates to other initiatives.

Considerable work has been done over the last few years to assess and quantify the risks and investment approaches needed to address them, as the diagram below shows. The work we are planning builds on the analysis and co-investment pathways developed between central government and Te Uru Kahika over the last few years, with the intention of providing Aotearoa with a pragmatic roadmap for flood resilience over the coming decades.



# The current state of flood protection

Flood protection is crucial to the economic, social, cultural, and environmental wellbeing of Aotearoa.

Flooding is the most common natural hazard in Aotearoa, with a major flood event occurring on average every eight months. Across the country around 675,000 people – or 14 percent of the population – live in areas prone to flooding.

Floods impose an annual cost to the nation of over \$160 million in direct economic damage and clean-up costs, and a much higher toll in wider economic, social, cultural, and environmental impacts. It is also one of the most avoidable hazards and can largely be mitigated through flood protection schemes that reduce the risk of flooding.

Flood protection can be understood as a network asset that may include stopbanks, floodgates, pump stations, diversions, and river management works; all of which work together to protect areas where people live, work, and play.

There are currently 367 flood protection schemes in place, representing a combined capital value of \$2.3 billion, with \$200 million in annual operational expenses to maintain current levels of service. Together, these schemes directly protect around 1.5 million hectares of land and capital across the country, including the most highly populated regions in the country and many areas of significant cultural and social value, such as marae and urupā.

The map at right provides a snapshot of key flood-related metrics, including the estimated benefit value (in \$billions) of these schemes for each region across the country. Consequently, these tend to be areas with the highest levels of

economic activity and are therefore central to New Zealand's economy.

In this way, flood protection schemes comprise a core economic enabling infrastructure and are crucial to the economic, social, cultural, and environmental wellbeing of Aotearoa.

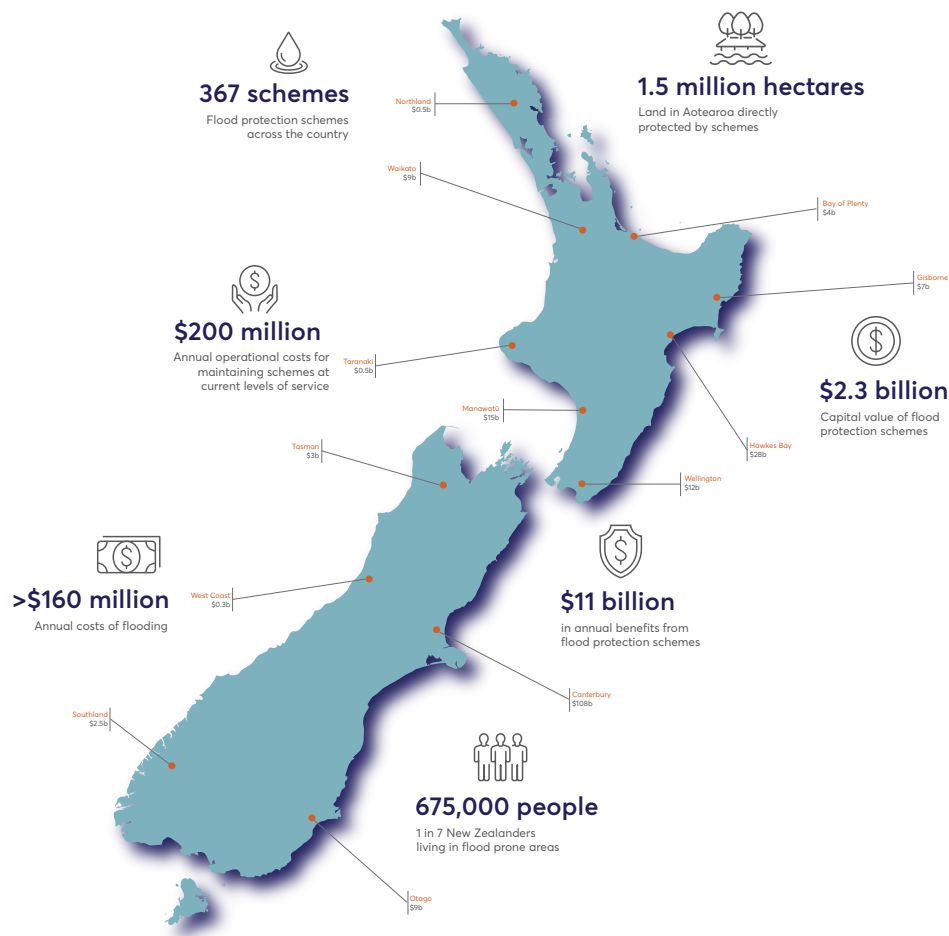
Schemes are largely funded through targeted rates and operated and managed by local and regional councils. Yet, they also provide wider benefits in protecting Crown assets on non-rateable land, and critical national infrastructure such as three waters, transport networks, and energy and telecommunication links.

Indeed, the total value of these benefits to the nation have been estimated at \$11 billion each year. This is a benefit-to-cost ratio of around 5:1.

Despite the billions of dollars in benefits, flood management and protection has been largely absent from conversations with central government over the last three decades

This current funding model is neither sustainable nor fit-for-purpose in the face of growing challenges around climate change and the ability of local ratepayers to fund the necessary level of investment.

Source: Tonkin & Taylor (2018). Hiding in plain sight: An overview of current practices, national benefits and future challenges of our flood protection, river control and land drainage schemes. Report for River Managers' SIG.





# The evolving scale of the challenge

## Climate change impacts and our current funding approach are exacerbating our risks.

Flooding poses very significant risks to lives, livelihoods, communities and the economy, as we continue to see with every major flooding event. However, there are three main indicators that the situation is about to become worse.

First and foremost, existing flood protection schemes require ongoing maintenance and repair to maintain the levels of service and/or renew the asset for upcoming decades. Many schemes need major upgrades in order to continue functioning as intended. This does not include the implementation of new schemes and initiatives to meet current and future needs.

However, flood protection schemes are primarily funded through a ratepayer base, and increasing rates to fund this necessary work is neither viable nor equitable. In the absence of any central government funding, the affordability and continuity of flood protection schemes – so crucial to protecting our nation’s assets – remains under threat.

Second, the assets protected by these schemes have steadily increased in value over time. Adjacent urban development has also intensified. This means that the damage from a major flood event will incur significant wellbeing and economic costs, which are rising over time. Traditionally some of these costs have been recouped via insurance, although pay-outs do not cover the full extent of damage nor do they reduce the future risk of flooding.

Third, and relatedly, the impacts of climate change are creating further risks to our flood resilience. Both NIWA and international evidence indicates an increased frequency and severity of extreme flood events, alongside rising sea levels which pose threats to coastal communities.

Increasing flood events lead to successive increases in insurance premiums as well as the partial or full

withdrawal of cover by insurance companies, as already seen in parts of the United States.

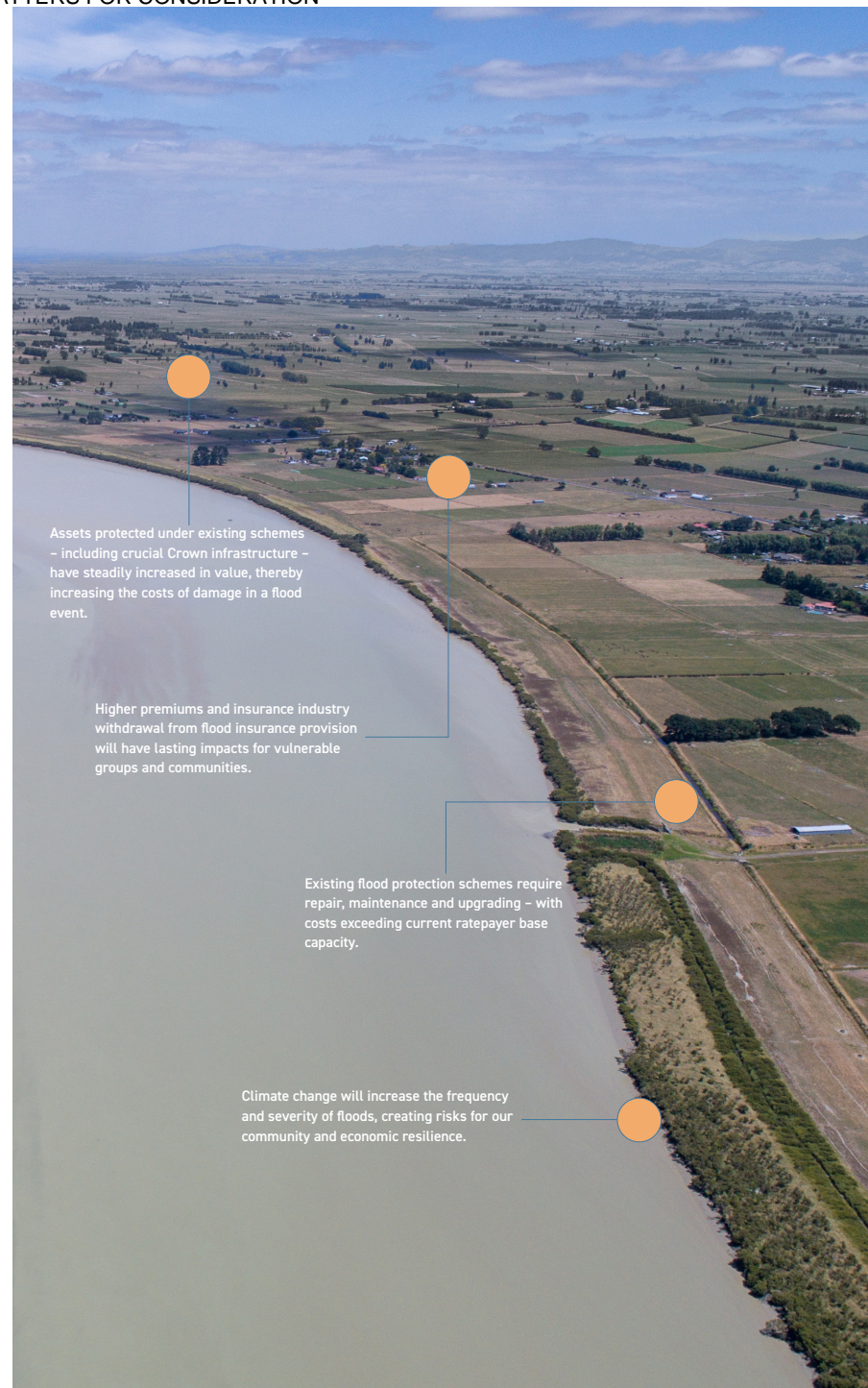
Indeed, recent research has conservatively estimated that New Zealand will see very significant insurance premium hikes within the next ten years, with more than 10,000 houses across Wellington, Auckland, Christchurch, and Dunedin experiencing full insurance withdrawal by 2050. While the Insurance Council of New Zealand has previously signalled their own commitment toward maintaining insurance support for high risk communities, this is contingent on broader national-level commitments toward flood risk mitigation.

Higher insurance premiums and retreat will create lasting impacts for vulnerable communities who will be unable to rebuild nor have the means to relocate after a flood. This is just one way climate change will disproportionately be felt those most vulnerable in society, with enduring impacts on intergenerational wellbeing.

Flooding also represents a significant liability for the government through disaster response and funding via agencies such as NEMA. The projected costs of climate change on storms and flood liability alone is conservatively estimated to increase Crown liability to between \$231 and \$261 million per year by 2050.

Together, these lines of evidence suggest materially increased risks to Aotearoa’s wellbeing and economy in coming years. Mitigating these foreseeable risks through central government co-investment will serve as the nation’s first line of defence against climate change-induced flooding, with benefits for every New Zealander.

Sources: NZIER (2020). *Investment in natural hazards mitigation: Forecasts and findings about mitigation investment*. Report to DIA; Storey, B., Owen, S., Noy, I. & Zammit, C. (2020). *Insurance Retreat: Sea level rise and the withdrawal of residential insurance in Aotearoa New Zealand*. Report for the Deep South National Science Challenge, December 2020.





# Impact on communities: The case of Westport

## There are significant and long-term impacts on our communities and economies from flooding events.

Flooding creates detrimental economic, social, cultural, and environmental impacts for communities, as illustrated by the recent Westport floods.

### Floods create significant financial costs in damage, recovery and response, and wider economic damage

The July 2021 floods alone saw more than 2,000 people evacuated from over 826 properties. Nearly a quarter of the town's housing stock was damaged or deemed unsafe for occupation, representing around \$88 million in insurance claims settled to date.

Unfortunately, while the town was still recovering, in February 2022 another major flood led to further evacuations, damage to homes and infrastructure, access to the town being cut off, and a State of Local Emergency being declared.

Initial damage assessments carried out in late February estimated between \$21.5 and \$43 million in damages from the two flooding events. This includes costs in damage to crucial infrastructure such as roading and water supply, removal of domestic waste, and damage to at least 70 farms district wide.

More than a year on from the July floods, less than one fifth of homes have been fully repaired and the costs of recovery have been estimated at nearly \$100 million. Unfortunately, these damage and recovery costs will fall to the community in a region with high levels of socioeconomic deprivation.

Beyond the immediate costs incurred from flood damage, there is also the sizeable cost associated with Government responses to flooding events, such as deploying the New Zealand Defence Force, emergency services, and other relief agencies. While these have not been quantified for the Westport case, data from 1976 to 2004 indicates government expenditure on civil defence responses for floods alone averaged about \$15 million per year.

There are also broader economic costs associated with social and business disruption, such as accommodating displaced residents, losses in income and production from businesses being unable to operate, disruption to schooling, and damage to natural and cultural heritage. Ultimately these costs are subsequently borne by the entire nation through higher insurance premiums as well as tax increases to fund repairs and future flood response.

### Floods also create significant social and environmental impacts on wellbeing

The impacts of flooding on families and communities can extend well beyond the 'recovery and rebuild' stage. Aside from potential injuries and loss of life, there is also the enduring psychological and emotional toll on affected communities.

A recent news article following Westport residents a year on from the July floods shows just how much of a daily stressor it can be, and how long it can take for a community to recover from a major flood event. Long term, these can affect people's tolerance of flood risk and their willingness to live in certain areas.

Flooding and other natural disasters can also exacerbate inequities, especially when there is a reliance on insurance-based transfer of risk, as is the case in New Zealand. This is because low-income and disadvantaged households disproportionately live in low-cost housing/rentals less resilient to floods and in high-risk areas, and may be unable to afford appropriate levels of insurance.

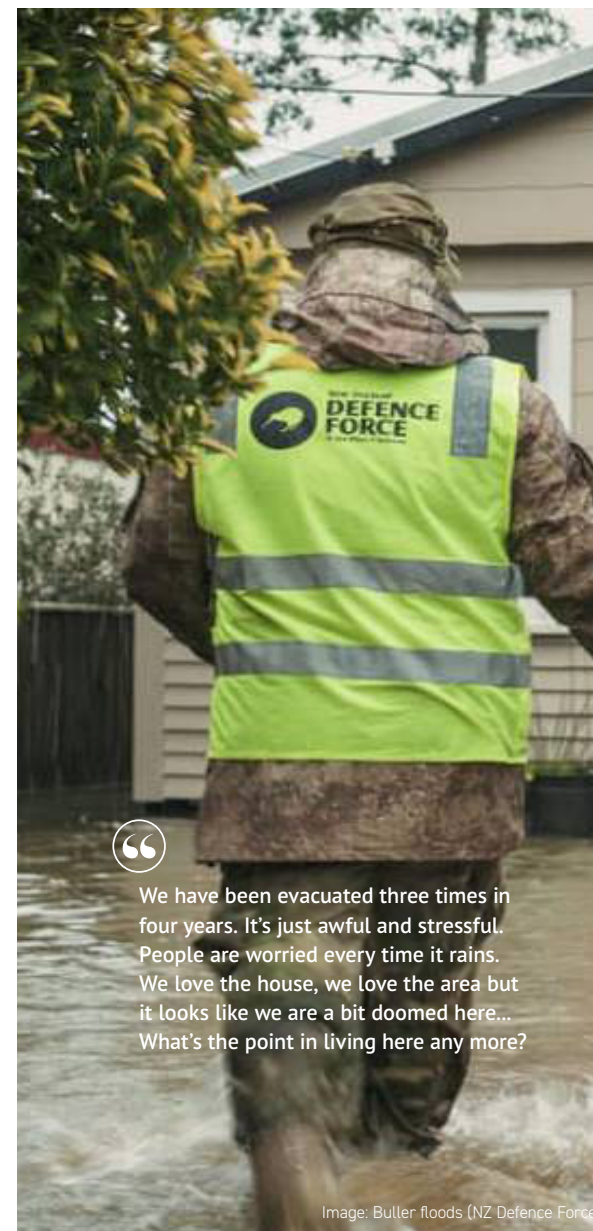
Thus, many of these families are unable to rebuild post-disaster and struggle to recover. They may also lack the means and support networks to relocate, resulting in higher debt or even homelessness. The compounding effect of these challenges creates a poverty trap with lasting intergenerational impacts.

Such impacts may be further amplified for vulnerable groups in Aotearoa – including Māori, recent migrants and ethnic minorities, the elderly, and people with disabilities. A recent DIA report identifies at least 75 communities across Aotearoa with high levels of socioeconomic vulnerability and exposure to risk of flood, with 44 of these being particularly 'vulnerable' in terms of not having flood protection infrastructure nor financial capacity to fund flood responses.

Finally, there are also environmental impacts of flooding. For example, as a result of the July 2021 floods in Westport more than 2,100 tonnes of flood-affected building and domestic waste was sent to landfills. This creates a further unquantified financial and environmental cost.

In this way, the economic, environmental, social, and intergenerational wellbeing impacts of flooding are felt long after the floods recede. More often than not, these impacts of climate change-induced weather events are disproportionately borne by low-income and vulnerable groups. Importantly, it is not just these natural disasters, but also how governments mitigate and respond to them, that contributes to growing inequality.

Sources: Stuff.co.nz. (15 July 2022). *More than 400 homes still not repaired one year on from Westport floods*. Retrieved from <https://www.stuff.co.nz/the-press/news/west-coast/300636197/more-than-400-homes-still-not-repaired-one-year-on-from-westport-floods>; DIA. (2020). *Vulnerable communities exposed to flood hazard* report.



We have been evacuated three times in four years. It's just awful and stressful. People are worried every time it rains. We love the house, we love the area but it looks like we are a bit doomed here... What's the point in living here any more?

Image: Buller floods (NZ Defence Force)

# There are strategic risks in our current approach

The business as usual approach to flood protection is creating significant strategic risk for the Crown.

Climate change will increase our flood risk of flood events, and if left unmitigated this will lead to partial or full insurance retreat.

## Climate change increases flood risk and insurance retreat

Climate change has been identified as a threat to the re/insurance industry as early as 1979. The issue impacts insurance markets in two ways.

First, extreme weather events are increasing our underlying flood risk meaning insurance companies are also increasingly taking on a greater risk, along with potentially bigger financial losses. This requires a greater reliance on reinsurance to remain solvent.

Second, it means that flooding is no longer an unforeseeable or chance event, but is becoming an increasing reality for many regions. Indeed, the Insurance Council of New Zealand (ICNZ) notes that certain impacts of climate change such as sea level rise are neither unforeseen nor insurable.

As a result, insurers are more attuned to climate change in their actuarial analysis and pricing. Using sophisticated catastrophe and disaster modelling tools, insurers are now shifting toward risk-based pricing where individual flood risk ratings determine premiums.

In some cases, the level of flood risk may be too high or unprofitable for re/insurers to underwrite, making insurance unaffordable and/or restricted in certain regions (partial retreat) or creating 'no go' zones where insurance companies fully retreat from providing coverage.

Previous evidence suggests partial insurance retreat occurs when flood probabilities exceed the 2% Annual Exceedance Probability (AEP) threshold, and full retreat by 5%. In fact, we are already seeing insurance retreat play out in flood-prone areas such as Florida and Louisiana, in the United States.

## The state of play in Aotearoa

According to a 2018 Lloyd's of London report, New Zealand is the second riskiest country, after Bangladesh, in terms of expected losses from natural disasters (as a proportion of GDP). We also have one of the highest levels of insurance penetration in the world - between 96 to 98% of homes being insured - with flood risk cross-subsidised over a wide base.

However, in late 2021 Tower Insurance shifted toward an individual risk based system for flood protection with approximately 10% of its customer base seeing an increase in premiums. Based on early indications we can expect the local insurance market to follow suit, especially since most insurance companies in Aotearoa are internationally based.

Other companies such as IAG have also signalled the impending impact of climate change on risk, while calling for urgent collaborative flood risk prevention and reduction.

These changes are likely to have implications for insurance availability and affordability, and central government is already considering options for home flood insurance as outlined in the National Adaptation Plan.

The ICNZ has also set out its views on the need for an urgent, proactive, and coordinated approach to flood risk mitigation and adaptation in Aotearoa. They have emphasised that the time for acting is now, while insurance is still largely accessible across the country, rather than relying on affordability issues as the trigger for action.

More recently IAG has echoed these sentiments and put forward a three-step plan for flood risk reduction, including:

- (1) improved mapping of flood prone locations;
- (2) implementing national policy to stop development in flood prone locations; and
- (3) developing a business case for a national programme of investment in flood protection based on priority locations identified in step 1.

Thus, there is growing impetus from the insurance industry for more proactive risk reduction and adaptation in the lead up to its eventual shift toward risk-based pricing, alongside consistent signalling that the industry is committed to being part of the solution.

Sources: Bajrektarevic, A., & Baumer, C. (2012). *Climate change and reinsurance: The human security issue*. Economics, Management & Financial Markets, 7(4), 42-86; Surminski, S. (2017). *Fit for the future? The reform of flood insurance in Ireland: resolving the data controversy and supporting climate change adaptation*. Policy paper, The Grantham Research Institute on Climate Change and the Environment; Storey, B., Owen, S., Noy, I. & Zammit, C. (2020). *Insurance Retreat: Sea level rise and the withdrawal of residential insurance in Aotearoa New Zealand*. Report for the Deep South National Science Challenge, December 2020; Lloyd's of London. (2018). *A world at risk: Closing the insurance gap*; Ministry for the Environment. 2022. *Aotearoa New Zealand's first national adaptation plan*. Wellington.; ICNZ. (2022). *ICNZ submission on the draft National Adaptation Plan including managed retreat*. Retrieved [www.icnz.org.nz](http://www.icnz.org.nz).

# Our co-investment approach

Significant national interest in flood protection requires ongoing co-investment.

**Our co-investment proposal will enable essential infrastructure work to progress in some of our most vulnerable communities.**

In 2021, Kānoa invested \$217 million into 55 flood protection projects across Aotearoa as part of the government's COVID-19 recovery programme. This investment represents the most significant contribution from central government in over 30 years and has fast-tracked projects to improve long-term community flood resilience.

Regional councils prioritised 'shovel ready' projects that would accelerate existing or planned programmes of work for flood risk management. Kānoa and central government priorities for these projects were around climate resilience, with social procurement as an implementation requirement.

This programme was considered the first step in an establishing an effective ongoing co-investment partnership for flood resilience between central and local government.

The progress to date evidences councils' capability and track record of delivery on projects funded through central government contributions. These projects have also delivered social, economic, cultural, and environmental benefits.

The sector's delivery and execution of these 55 essential flood protection projects provides an important foundation for co-investment and developing genuine partnership with central government in improving community flood

resilience and wellbeing outcomes.

Within this context, our request for co-investment of \$257.2 million over three years represents the continuation of essential infrastructure work, allowing some of our most vulnerable communities to progress shovel-ready flood protection projects.

Central government has and continues to demonstrate a significant interest in improving our flood resilience in the face of climate change; as seen in the 2020 Cabinet Paper, the National Adaptation Plan 2022-2028, and the Resource Management Act reforms. This interest is also increasingly reflected in our communities' needs and expectations.

Sources: Cabinet paper. (2020). *Improving resilience to flood risk and supporting the COVID-19 recovery*; Ministry for the Environment. 2022. *Aotearoa New Zealand's first national adaptation plan*. Wellington; ICNZ. (2022). *ICNZ submission on the draft National Adaptation Plan including managed retreat*. Retrieved [www.icnz.org.nz](http://www.icnz.org.nz).

Two additional elements are required to ensure Aotearoa has a robust approach to flood protection that will respond effectively to the challenges of climate change. These are a sustainable co-investment model that brings together central and regional government, and a national PARA assessment model that enables informed decisions to be made about protection, mitigation and retreat on a community-by-community basis across Aotearoa.

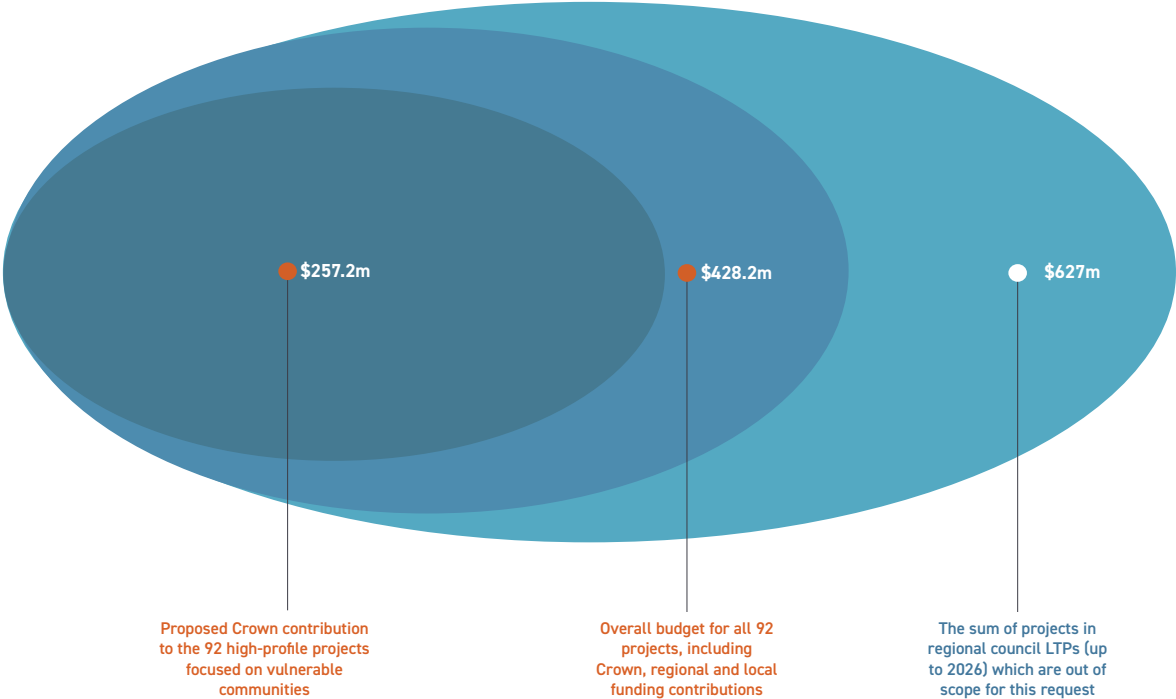


# The co-investment summary

Our suggested co-investment allocation rate is 75%/60%, based on deprivation (at the territorial authority level) and ability to fund flood protection measures from the regional ratepayer base, as detailed overleaf.

The \$428.2m of capital investment is therefore shared 60% central government and 40% regional councils. As the figure at right shows, the central government investment is \$257.2m (with regional council investment being \$171m). This is a capex investment.

The following pages provide an overview of the investment summary, proposed flood protection projects, projected cashflow, and delivery roadmap for this package of projects.



# Project investment summary

A deprivation-based approach has been used to allocate national funding, using a 75/60 model.

Following the recent steer by DIA as well as the focus on deprived communities in the 2020 Cabinet Paper, we have used deprivation as both a prioritisation tool for the most vulnerable region, as well as a suggested mechanism for apportioning cost share across projects.

The methodology is based on a region - here, we refer to the Territorial Authority (TA) level - being allocated a co-investment contribution based on ability to fund the flood protection measures from the regional ratepayer base.

Specifically, we use the 2018 Index of Multiple Deprivation (IMD) as an indicator of deprivation at the TA level. The IMD18 comprises 29 indicators grouped into seven domains of deprivation: Employment, Income, Crime, Housing, Health, Education and Access to services. Data zones (TAs) are then ranked into deprivation quintiles, as indicated by the heat map colouring in the table at right.

This table summarises the funding breakdown across projects and shows what the allocation of investment between central government and regional councils might look like with such an approach. Thus, majority of regions are allocated a co-investment contribution of 60%, with the most deprived territorial authority - Ōpōtiki District - getting a higher rate of 75%.

As indicated on the previous page, the overall central government investment is \$257.2m and the regional council investment is \$171m.

Territorial Authority (TA)	IMD (Total)	Level of assistance	Total Project Cost	Crown	Regional
Ōpōtiki District	5321	75%	\$1.84	\$1.38	\$0.46
Far North District (2)	4801	60%	\$0.91	\$0.55	\$0.36
Horowhenua District	4627	60%	\$12.70	\$7.62	\$5.08
Hauraki District (6)	4622	60%	\$16.98	\$10.19	\$6.79
Gisborne District (3)	4480	60%	\$17.60	\$10.56	\$7.04
Whanganui District	4383	60%	\$13.20	\$7.92	\$5.28
Whakatane District (2)	4322	60%	\$22.40	\$13.44	\$8.96
Waitomo District	4219	60%	\$5.00	\$3.00	\$2.00
Kaipara District (2)	3998	60%	\$17.00	\$10.20	\$6.80
Masterton District (6)	3939	60%	\$13.19	\$7.91	\$5.28
Grey District	3896	60%	\$4.00	\$2.40	\$1.60
Waikato District (6)	3725	60%	\$18.44	\$11.06	\$7.38
Thames-Coromandel District	3593	60%	\$2.80	\$1.68	\$1.12
Hastings District (2)	3535	60%	\$34.00	\$20.40	\$13.60
Palmerston North City (2)	3519	60%	\$6.50	\$3.90	\$2.60
Invercargill City	3395	60%	\$11.00	\$6.60	\$4.40
Napier City	3390	60%	\$2.00	\$1.20	\$0.80
Taupo District	3248	60%	\$3.40	\$2.04	\$1.36
Upper Hutt City (3)	3200	60%	\$19.66	\$11.80	\$7.86
Kapiti Coast District	3095	60%	\$14.70	\$8.82	\$5.88
Gore District	3044	60%	\$18.00	\$10.80	\$7.20
Westland District (3)	3032	60%	\$19.00	\$11.40	\$7.60
Western Bay of Plenty	2933	60%	\$13.00	\$7.80	\$5.20
Nelson City (6)	2911	60%	\$27.00	\$16.20	\$10.80
Christchurch City	2831	60%	\$1.50	\$0.90	\$0.60
Clutha District (3)	2813	60%	\$6.50	\$3.90	\$2.60
Dunedin City (10)	2791	60%	\$27.80	\$16.68	\$11.12
Carterton District	2728	60%	\$2.68	\$1.61	\$1.07
Timaru District (3)	2641	60%	\$7.50	\$4.50	\$3.00
South Wairarapa District (5)	2565	60%	\$12.60	\$7.56	\$5.04
Tasman District (2)	2517	60%	\$11.40	\$6.84	\$4.56
Marlborough District (4)	2449	60%	\$13.80	\$8.28	\$5.52
Ashburton District	2314	60%	\$20.00	\$12.00	\$8.00
Waimakariri District (2)	2204	60%	\$6.50	\$3.90	\$2.60
Southland District (4)	1879	60%	\$2.10	\$1.26	\$0.84
Central Otago District	1217	60%	\$1.50	\$0.90	\$0.60
<b>Total investment</b>			<b>\$428.20</b>	<b>\$257.20</b>	<b>\$171.00</b>

Source: *Index of Multiple Deprivation*. Retrieved <https://imdmapp.auckland.ac.nz/>



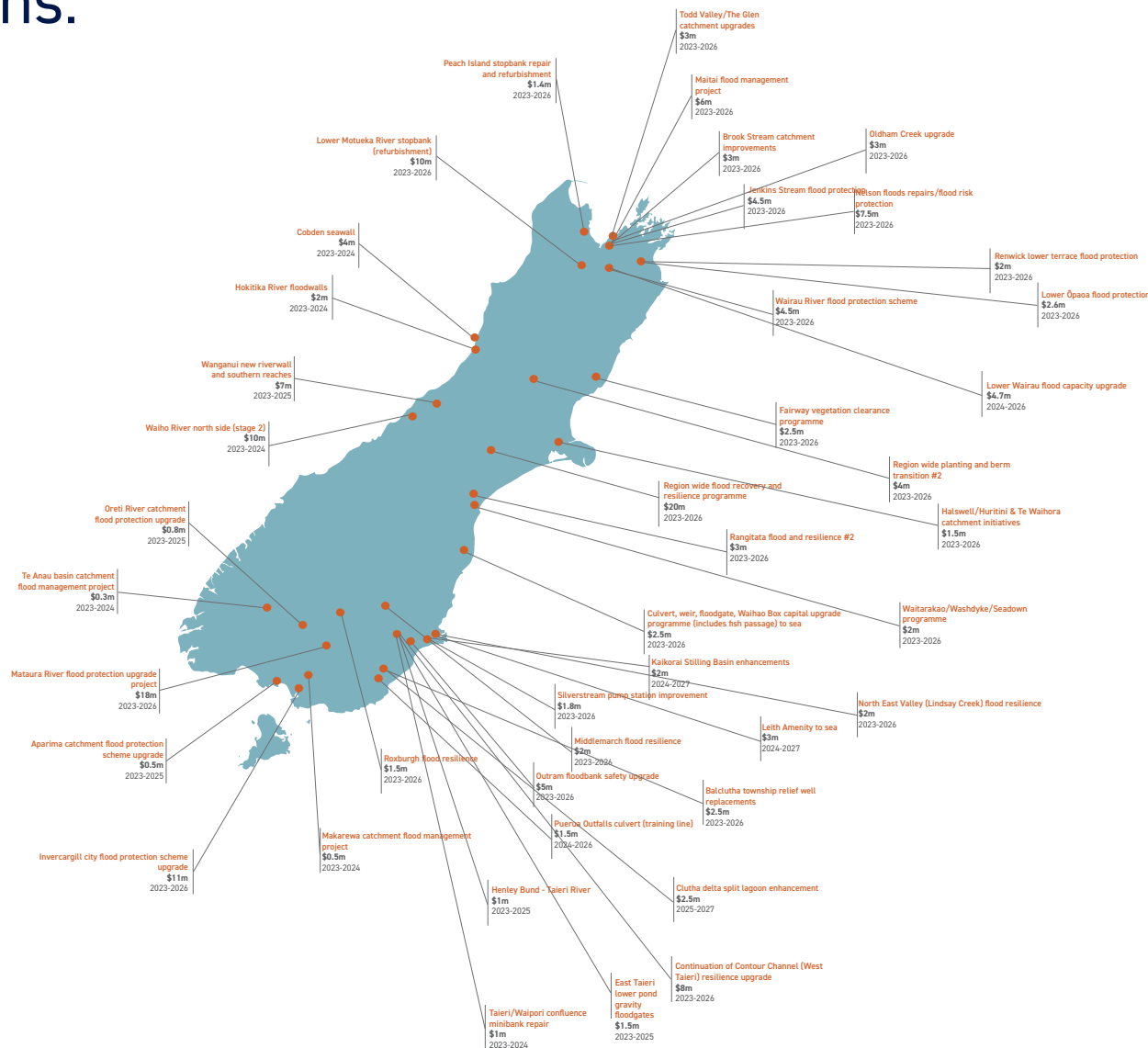
# Project locations: South Island

## Profile

Total number of projects = **43**  
Total investment = **\$177.6m**

## Territorial authority by deprivation quintile

Grey District	3896
Invercargill City	3395
Gore District	3044
Westland District	3032
Nelson City	2911
Christchurch City	2831
Clutha District	2813
Dunedin City	2791
Timaru District	2641
Tasman District	2517
Marlborough District	2449
Ashburton District	2314
Waimakariri District	2204
Southland District	1879
Central Otago District	1217

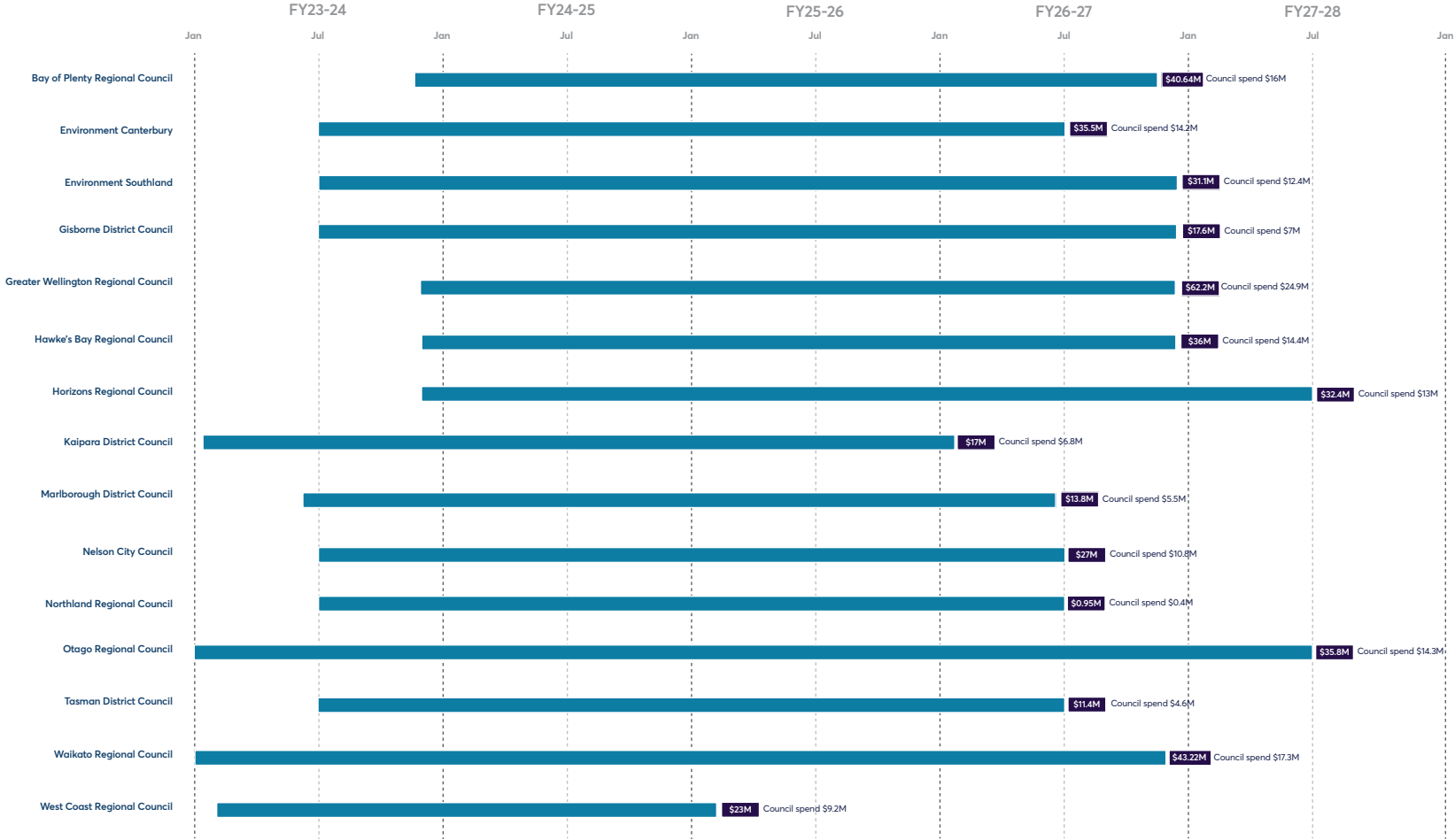


FOR CONSIDERATION > V1.0 > 7 DECEMBER 2022



# The delivery roadmap

Consolidated overview of Regional Council spend



FOR CONSIDERATION > V1.0 > 7 DECEMBER 2022

# The options for longer term intervention

There are a range of options for central government intervention varying in terms of costs and risk profiles.

Investing in flood resilience through PARA represents the least risky and most cost-effective and equitable option forward.

The figure at right illustrates the range of central government intervention options in flood risk. These options range from preventative spending through to dealing with the consequences post-flooding.

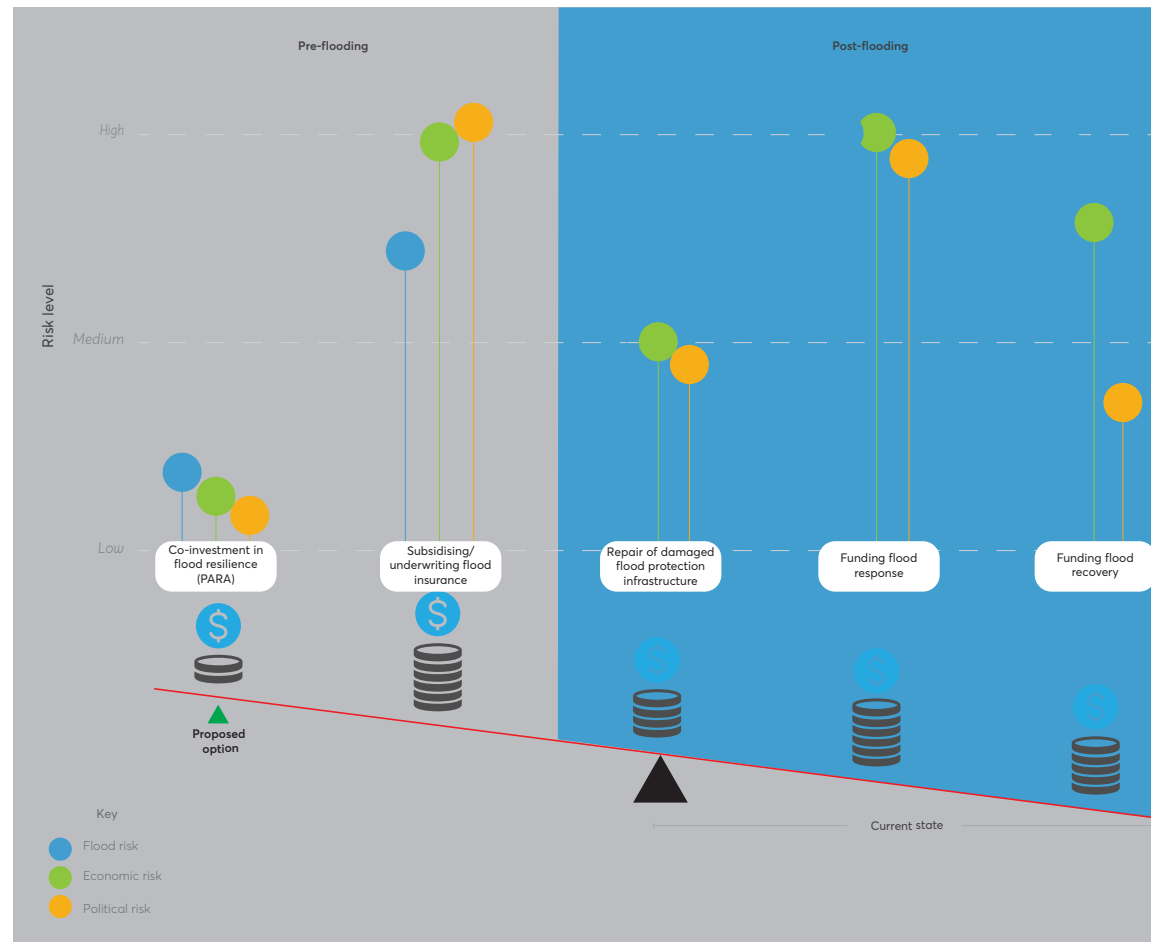
The risk profile for each option is depicted. This includes:

- Economic risks such as increased Crown liability or debt as well as increased future spending due to climate change impacts,
- Political risks such as incentivising risk-taking, creating unrealistic or impractical public expectations for intervention, and erosion of public trust and confidence, and
- The likelihood of spending reducing future flood risk.

The relative financial costs of each option is also indicated.

In weighing both risks and costs, it becomes evident that co-investment in flood resilience through the PARA framework is the most cost-effective option.

It is also the pathway that most equitably allows for sharing the costs of climate change across government, industry, and the public. This is our proposed option.



# Developing a sustainable flood management co-investment model

Agreeing a new national approach will need input from national and regional government, as well as the perspectives of the insurance industry.

Getting beyond the current project-based approach requires the development of a sustainable model for co-investment. This model will require a range of inputs, as the diagram at right notes:

- The planned changes to the legislative and regulatory frameworks in a range of areas – from climate change to local government – will need to be taken into account as both enabling and constraining factors
- In particular, there is a need for legislation to consider flood protection projects within the context of climate change adaptation as a matter of national interest
- Existing legislation will likewise form part of the foundation for how and why governance, implementation and funding is apportioned between different agencies and tiers of government
- The perspectives of the community, iwi and the business sector need to be taken into account.

There are a number of matters that need to be addressed as part of the work, notably:

- The governance, authority and responsibility of the various entities and agencies responsible for national flood protection
- The intersection between flood protection and other PARA-related factors, such as planning controls in flood-prone areas
- The equitable share of funding between central regional and local government, and the participation of the insurance industry in helping develop solutions
- The processes and decision points used to make investment decisions about flood protection initiatives within the PARA framework.

Developing the co-investment model will require a range of agencies to be involved alongside Te Uru Kahika. The proposed work plan for how this will be achieved is shown on subsequent pages.



# Developing a sustainable flood management co-investment model

## Agreeing a new national approach will also require further work to determine an equitable long-term co-investment commitment.

Based on the current Regional Council funding in the current LTPs the total investment in the 10 year LTP horizon out to 2032 is \$3.1B. In the 3 years out to 2026 the sum outside the scope of this co-funding request is \$627m.

However, as experience across the country shows, even this level of self-funding and investment from communities is insufficient in the face of the evolving climate change challenges. A more sustainable co-investment model – reflecting a genuine partnership between central and local government – is required to address our future flood resilience needs.

Previous work by Te Uru Kahika has estimated the likely cost of this work at around \$350 million pa. Regional councils have recently committed their investment at \$200 million pa; an increase from the previous \$175 million pa. This leaves an annual shortfall of \$150 million - the suggested co-investment amount from central government long-term.

However, additional work is needed to confirm whether this amount will be sufficient. This work would clarify the:

- Preferred level of service for all 367 flood protection schemes in Aotearoa (at a level of 1:100 or better)

- Cost required to achieve expected service levels
- Prioritisation of projects across the country
- Cost share between central and regional councils, and how this is apportioned across different regions
- Intended benefits, including cost savings, from flood damage or harm averted
- How these investments relate to the different PARA measures; Te Mana o Te Wai considerations; as well as environmental and considerations
- Relationship between flood protection investment and Waka Kotahi and/or Kiwi Rail infrastructure improvement plans.

The likely investment for this work is indicated in the work plan on the next page. The primary outcome of this work will be to determine a long-term and equitable co-investment amount that can be agreed upon with central government – as a budgetary allocation for an agency such as DIA – toward improving our communities' resilience against flood risk and related climate change effects.

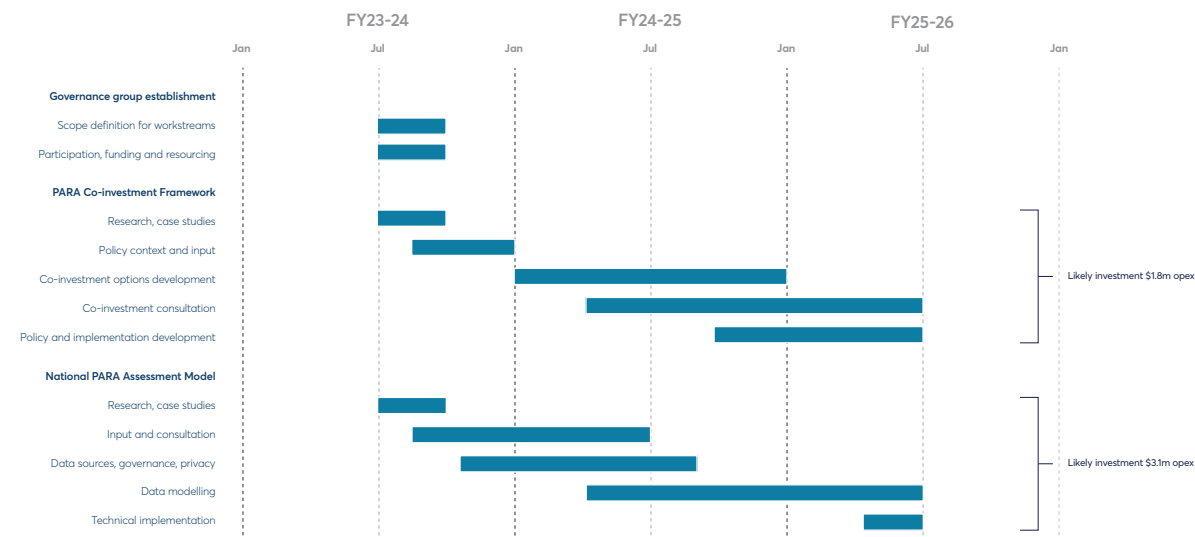


The equitable funding of essential flood protection infrastructure in a world increasingly challenged by climate change is an issue for many governments. After extensive flooding in 2007, the UK government reviewed its national strategy – and there are potential learnings for Aotearoa New Zealand in their findings and their path forwards.

# The sustainable co-investment work plan

Work on both the policy aspects and the national model can commence in FY23/24.

Developing the correct PARA policy frameworks and supporting data model will require a separate project, with an agreed governance structure, participating councils and agencies, and input from iwi, the insurance sector and other key stakeholders. Initial opex funding for this work has been included within the bid for Budget 23, and an initial high-level project plan with resourcing estimates is shown below.



## Coordinating across the sector

Given the nature and implications of flood protection, it is likely that a range of agencies will wish to contribute to the development of the sustainable co-investment approach, and may wish to either provide data to or receive information from the national PARA assessment model. In addition, a range of interested parties will also wish to participate in both the policy development and the data modelling, including iwi and the insurance industry.

And in order for the theory of PARA to be translated into effective policy, operational initiatives and on-the-ground activities, it will be necessary for the work to be anchored in the reality of what can be achieved for and with communities across Aotearoa. For this reason, it is proposed that Te Uru Kahika act as the coordinating body for the policy work and the data modelling, using a shared governance model with appropriate central government agencies.

Undertaking this work will require resourcing and funding on behalf of Te Uru Kahika and agencies. The budgets at left represent the commitments of time and resource over the next three years required to achieve the policy outcomes and data model, over and above existing baselines. In practice, it is anticipated that some existing baseline resource will also be contributed from regional councils and participating agencies.

It is proposed that these further areas of work are developed into a separate business case, under the auspices of the proposed governance entity, in order to define the scope and outcomes expected and confirm the resourcing and budget for the activity.

# Recommendations

**It is recommended that government proceed with co-investment as a matter of national interest.**

As evidenced throughout business case, considerable work has been done over the last few years to assess and quantify the risks across our current flood protection schemes, as well as the investment approaches needed to address these.

In particular, we have highlighted the inequities in the current funding approach and its inability to remain a sustainable funding model in the long-term. We have also demonstrated there is significant national interest in flood protection and resilience - in terms of its wellbeing and fiscal impacts, as well as through the protection of vital Crown assets and infrastructure.

The current proposal builds on the analysis and co-investment pathways already established between central government and Te Uru Kahika. It sets out an immediate prioritisation of flood protection works, along with a pragmatic roadmap for flood resilience over the next few decades.

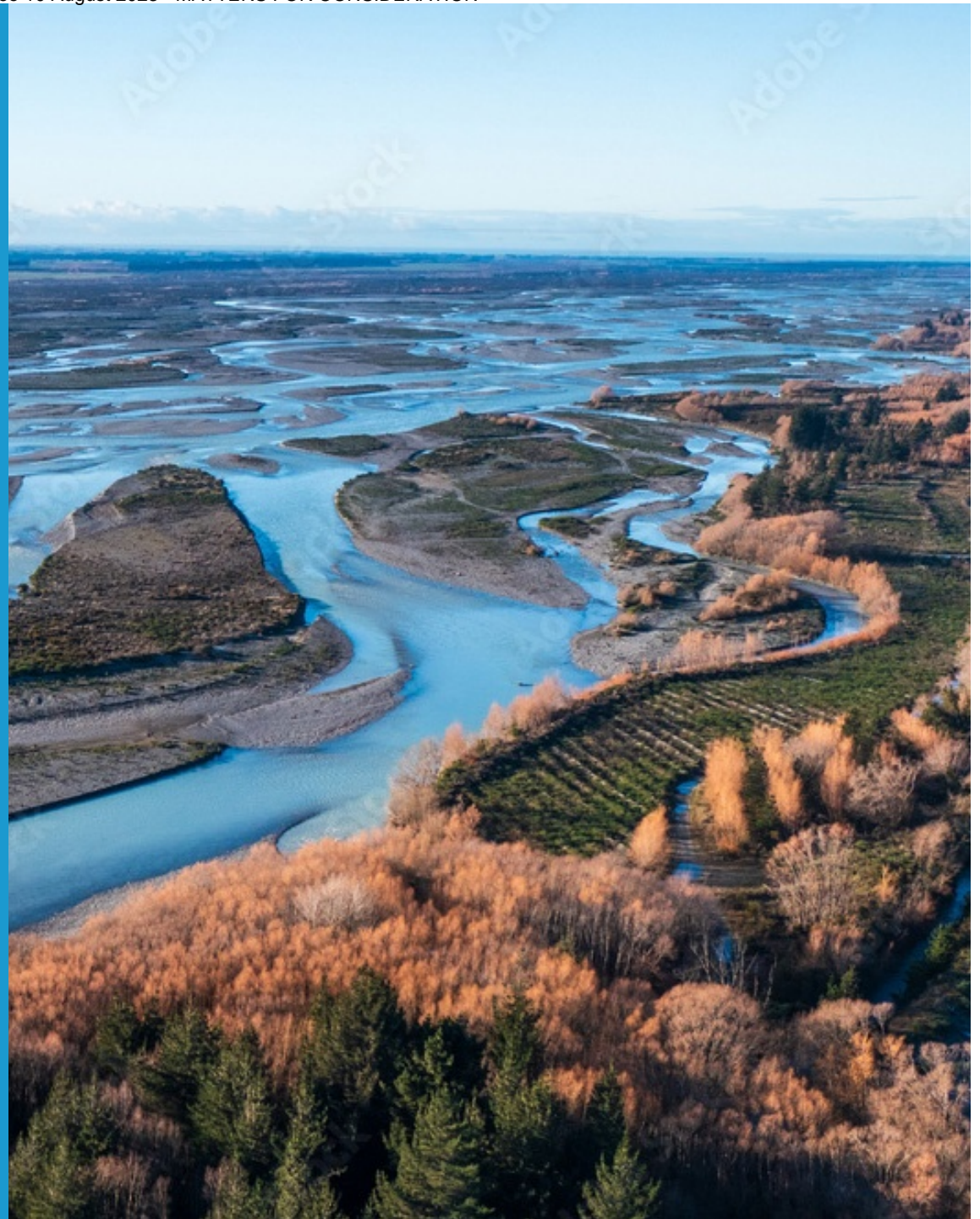
We therefore recommend that central government:

1. Approve the \$257.2 million request for co-investment in a three-year delivery programme for 92 additional flood protection projects, and
2. Sustain the existing governance arrangements (Advisory Board) under the Resilient River Communities banner for the proposed tranche of projects

The indicative co-investment rates and amount are consistent with what has been funded through the previous Kānoa Covid Recovery Programme, albeit with local government contributing at a higher rate. However, the continuation of shovel-ready funding is unsustainable for developing our flood resilience long-term.

In order to develop a comprehensive national model of flood resilience, we recommend that central government:

3. Work with Te Uru Kahika to invest in and implement a longer-term programme of work including developing a sustainable co-investment model and a national PARA (multi-tool) assessment model
4. Re-convene the Community Resilience Steering Group to provide leadership and a consolidated steer on future community flood resilience recommendations.





Safety and Resilience Committee 10 August 2023 - MATTERS FOR CONSIDERATION

Council	Project Name Scheme/	BP very rough order of cost 13- 06-23	Project Description Edit to provide short summary sentence	What does the project achieve Edit to emphasise the following: Increase in level of protection (to meet climate change, or address shortfall) Accelerate a project that otherwise be delayed due to Local Government	Proposed Start Date	Project Duration (Up to 3 years)	Total Cost \$m	Total cost already funded \$m	Total cost paid LTP \$m	Years within LTP
Otago Regional Council	Henley Bund - Taiari River	\$0.4M	Protection to the Henley township from the Taiari River.	Address deprivation, increases level of protection to meet climate changes/sea level rise and provide funding due to limited funding/affordability	Feb-23	2	1.0	0.3	0.3	1.0
Otago Regional Council	Middlemarch Flood Resilience		Flood and hazard mitigation for the Central Otago township of Middlemarch	Address deprivation, increase level of protection to meet climate change and provide funding due to no funding available	Oct-23	3	2.0	0.1	0.1	1.0
Otago Regional Council	Roxburgh Flood Resilience		Flood and debris flow mitigation for the central Otago township of Roxburgh.	Address deprivation, increase level of protection to meet climate change and provide funding due to limited funding available	Oct-23	3	1.5	0.08	0	1
Otago Regional Council	Outram Floodbank Safety Upgrade		Climate resilience works to a 6-metre-high flood bank with seepage risk which protects a township (Outram) and other infrastructure (Dunedin International Airport).	Addresses; Increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	June 2023 - Consenting/Approvals Sept 2024 Construction	3	5.0	0.8	1	1
Otago Regional Council	Baldutha Township Relief Well Replacements	\$0.5M	Following the February 2020 flood event highlighted damage to a number of the wells and it is recommended that three wells be replaced and replacement of two wells.	Address deprivation, increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	Sep-23	3	2.5	0		
Otago Regional Council	Silverstream Pump Station Condition & Environmental Improvement	\$0.5M - \$1.0M	Upgrade of the pumpstation floodbank for seepage issues and environmental improvements, this site is ranked highly in terms of ORC's	Address deprivation, increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	Sep-23	3	1.8	0.14	0	1
Otago Regional Council	North East Valley (Lindsay Creek) Flood Resilience		Development of the flood protection scheme for the Lindsay Creek to provide protection to properties.	Address deprivation, increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	Oct-23	3	2.0	0.16	0	1
Otago Regional Council	Continuation of Contour Channel (West Taiari) Resilience Upgrade	\$1.0M - \$1.5M	Renewal of the Contour Channel was originally built in the 1900s to intercept runoff from the Maungatua Range and uses gravity to drain to the Waipori	Address deprivation, increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	Design/procurement/consent March 2023 Construction Oct 2024	3	8.0	2.5	3	1
Otago Regional Council	Kaikorai Stilling Basin Resilience and Environmental Enhancements		Replacement of a stilling basin on the Kaikorai Stream that was significantly damaged in the 2017 flood.	Address deprivation, increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	2024	23/24 - Complete design and initiate	2.0	0.15	0	2
Otago Regional Council	East Taiari Lower Pond Gravity Floodgates	\$0.5M - \$1.0M	Work is required to replace the gabion headwalls, culvert and gravity gates to ensure ongoing structural integrity.	Address deprivation, increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	Oct-23	2	1.5	0		
Otago Regional Council	Clutha Delta Split Lagoon Environmental Enhancement		The installation/modification of the split lagoon culvert to improve its operational and flow control and better facilitate fish passage through	Address deprivation, increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	Jan-25	2	2.5	0.2	0	2
Otago Regional Council	Puerua Outfalls Culvert (Training Line)		Upgrade/modification to culvert system following storm damage in 2020 flood event.	Address deprivation, increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	2024	2	1.5	0.05	0	1
Otago Regional Council	Taiari/Waipori Confluence Minibank Repair		Repair of a section of minibank on the right bank of the Taiari River which was damaged in the January 2021 flood event	Address deprivation, increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	Oct-23	1	1.5	0		
Otago Regional Council	Leith Amenity to sea		Renewal of the stretch of the Leith between Forth St and the harbour to better align with the upstream improvements and surrounding area.	Address deprivation, increase level of protection to meet climate change, accelerate project that would face delay due to Regional Council constraints and provide funding due to limited funding available	2025	3	3	0.68	1	1
<b>TOTAL</b>							<b>35.8</b>	<b>5.2</b>	<b>5.03</b>	

**July / August 2022 Flood Damage**

Location	River / Scheme	SiteID	Repair Description	Priority	Status
Lower Taieri	Schedule Drain 05A	ET1	Erosion to approx 20m to the true left bank of drain 05A East Taieri Cemetery, adjacent to	Moderate	Work completed
Central Otago	Ida Burn	IDA01	Ida Burn - Channel alignment two sections at Barneys	Moderate	Work scheduled/underway
Waitaki	Kakanui	KAK01	Tree debris on Kiwirail bridge upstream of SH1. Kiwirail responsibility to remove.	N/A	Monitoring
Waitaki	Kakanui	KAK02	Mill Dam recorder site. New erosion bay on river true right upstream of previous repair.	Low	Investigation
Waitaki	Kakanui	KAK03	Erosion due to excessive gravel height on adjacent island that requires lowering through	Moderate	Monitoring
Waitaki	Kakanui	KAK04	Lowering of gravel beach on river true left to restore flood capacity and take pressure off Maheno floodbank and spillway where spillway scouring and bank failure occurred in 2014	Moderate	Work scheduled/underway
Waitaki	Kakanui	KAK05	Repairs to bank edge by pushing up gravel fan material to fill in erosion bites and minimise risk of river overflowing onto terraces.	Moderate	Work scheduled/underway
Waitaki	Kakanui	KAK06	Repairs to bank edge by pushing up gravel fan material to fill in erosion bites and minimise risk of river overflowing onto terraces.	Moderate	Work scheduled/underway
Waitaki	Kakanui	KAK07	Repairs to bank edge by pushing up gravel fan material to fill in erosion bites and minimise risk of river overflowing onto terraces.	Moderate	Work scheduled/underway
Waitaki	Kakanui	KAK08	River true right bank erosion needs bite filled.	Moderate	Investigation
Waitaki	Kakanui	KAK09	Robb Crossing gravel beach. Gravel management required. Accumulation of gravel	Moderate	Investigation
Waitaki	Kakanui	KAK10	Confluence of Kakanui and Kauru rivers. Bank blowout on true right bend has caused river to enter and old channel bed, split flows and creating an island.	Moderate	Investigation
Waitaki	Kakanui	KAK11	Johnstons bend at Frenchs Rd, erosion and gravel accumulation.	Urgent	Work scheduled/underway
Lower Clutha	Matau	LC15	Erosion to approx 85m of bank, true left bank on an outside bend,CH M47-51	Urgent	Work scheduled/underway
Lower Clutha	Matau	LC17	Erosion/dropout to approx 50m of bank, year 2020 flood recovery site LC17 b, c,	Moderate	Monitoring
Lower Clutha	Matau	LC28	scour approx 20m, true left bank, CH M11-12	Low	Monitoring
Lower Clutha	Matau	LC29	scour, true left bank CH M30	Low	Monitoring
Lower Clutha	Matau	LC30	Erosion to approx 50m of bank, true right, outside bend, CH M40-41	Low	Monitoring
Lower Clutha	Matau	LC31	Erosion to approx 25m of bank Summer Hill Road, CH M54 true left bank	Low	Monitoring

Safety and Resilience Committee 10 August 2023 - MATTERS FOR CONSIDERATION

Lower Clutha	Matau	LC32	Erosion to approx 140m of bank, CH M77-80, true left bank, outside bend, bank has slipped away due to the bank being sprayed, the riverside face of the ORC flood bank has fallen away	Urgent	Investigation
Lower Clutha	Kaitangata Creek	LC33	approx 100m true left and true right of Kai channel between between St Albans st & St	Low	Monitoring
Lower Clutha	Matau	LC34	Erosion to approx 20m of bank, true left, CH M260	Low	Monitoring
Lower Clutha	Koau	LC35	Erosion/dropot to approx 100m of bank true left, CH C150-152	Low	Monitoring
Lower Clutha	Matau	LC36	Erosion to approx 30m of bank, CH C171-172, true left just down stream from Clutha depot	Low	Monitoring
Dunedin	Leith	LL01	Erosion of river bank	Moderate	Investigation
Lower Taieri	Taieri River	LT1	Multiple sites throughout the schemes river banks and berms	Moderate	Work completed
Lower Taieri	Taieri River	LT2	Erosion to approx 80m of bank, True right upstream/at top of shoot	Low	Monitoring
Lower Taieri	Taieri River	LT3	Erosion to approx 50m of bank, true left, at the end of Lyndsay Road	Moderate	Monitoring
Lower Taieri	Lower Taieri Flood Scheme	LT4	Voids were discovered on the river side of the flood bank, Geosolve have investigated, and a repair option has been recommended	Moderate	Work completed
Lower Taieri	Taieri River	LT5	Erosion to approx 150m of bank, true right 150m downstream from SH87 bridge	Low	Monitoring
Lower Taieri	Silverstream	LT6	Along the Silverstream banks and berms	Moderate	Work completed
Lower Taieri	Lower Taieri Flood scheme Contour channel bank	LT7	Damage to true right flood bank, suspected collapsed culvert has exacerbated bank erosion causing significant damage	Moderate	Monitoring
Lower Taieri	Waipori River	LT8	Combined distance of 100m of erosion on the true right and true left banks, Waipori River	Moderate	Monitoring
Central Otago	Dunstan Creek	MAN01	Dunstan Creek at Docherty's - bank erosion	Moderate	Work completed
Central Otago	Woolshed Creek	MAN02	Woolshed Creek - bank erosion	Moderate	Investigation
Central Otago	Dunstan Creek	MAN03	Dunstan Creek - bank erosion	Moderate	Investigation
Central Otago	Manuherikia River	MAN04	Manuherikia - bank repair	Moderate	Investigation
Central Otago	Manuherikia River	MAN05	Removing debris from fairway	Moderate	Work completed
Central Otago	Manuherikia River	MAN06	Fisher Lane - bank rebuild	Moderate	Investigation
Central Otago	Manuherikia River	MAN07	Manuherikia at Vercoe's - bank rebuild and gravel realignment	Moderate	Work completed
Central Otago	Manuherikia River	MAN08	Manuherikia - Channel alignment upstream of St Bathans Rd bridge.	Moderate	Investigation
Central Otago	Hills Creek	MAN09	Hills Creek - Remove willows obstructing channel	Moderate	Investigation
Waitaki	Shag River	SHA01	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA02	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA03	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA04	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA05	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA06	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA07	Tree debris to be removed.	Urgent	Work completed

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Waitaki	Shag River	SHA08	Tree debris to be removed.	Urgent	Work scheduled/underway
Waitaki	Shag River	SHA09	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA10	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA11	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA12	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA13	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA14	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA15	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA16	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA17	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA18	Tree debris to be removed.	Urgent	Work completed
Waitaki	Shag River	SHA19	Tree debris to be removed.	Urgent	Work completed
Clutha	Tokomairiro River	T1	Erosion to approx 80m of bank, 200m downstream of Coal Gully rd bridge, true right	Moderate	Monitoring
Clutha	Tokomairiro River West Branch	T2	Erosion to approx 20m of bank, 300m upstream from SH1 bridge	Low	Investigation
Clutha	Schedule Drain SO	T3	Erosion to approx 20m of bank, true right bank, upstream from Allison Road bridge where	Low	Monitoring
Clutha	Schedule Drain S (Salmon Creek)	T4	Erosion to approx 50m of bank, true left, directly upstream of bridge on Back Road the stream passes under, Erosion. Channel need re-centering and bank batter reprofiled. Channel dries out in summer and best time to do works.	Low	Monitoring
Waitaki	Waikoura Floodway	WAI01	Cardrona River at The Larches, 2 sections of repair.	Moderate	Investigation
Wanaka	Cardrona River	WAN01	Lindis - Downstream of Ardour Rd bridge.	Moderate	Work completed
Wanaka	Lindis River	WAN02	Fallen trees	Moderate	Investigation
Central Otago	Lindis River	WAN03	Fallen trees	Urgent	Work completed
Central Otago	Lindis River	WAN04	Fallen trees	Urgent	Work completed
Clutha	Schedule Drain S (Salmon Creek)	T5	Erosion to approx 20m of bank, true right 12 Melville Avenue Milton	Low	Work Scheduled/underway

#### 8.4. CDEM Partnership Report 2022 - 2023

**Prepared for:** Safety and Resilience Committee  
**Report No.** OPS2321  
**Activity:** Governance Report  
**Author:** Gavin Palmer, General Manager Operations  
**Endorsed by:** Gavin Palmer, General Manager Operations  
**Date:** 10 August 2023

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#### PURPOSE

- [1] To report on ORC's delivery of its responsibilities under the Otago Civil Defence and Emergency Management Agreement, for 2022/23.

#### EXECUTIVE SUMMARY

- [2] ORC and the five Otago territorial authorities have responsibilities under the Civil Defence and Emergency Management Act 2002 within the Otago Civil Defence and Emergency Management Group area. Those responsibilities are delivered through Emergency Management Otago with support from each local authority, including ORC. The responsibilities of ORC and four of the five territorial authorities are recorded in the Otago Civil Defence and Emergency Management Agreement (June 2022). ORC's achievement in relation to its functions and responsibilities specified in the Agreement, for 2022/23, is summarised as follows:

47 – Achieved  
6 – Partially Achieved  
1 – Not Achieved  
5 – Not Applicable.

#### RECOMMENDATION

*That the Safety and Resilience Comm:*

- 1) **Notes this report.**

#### BACKGROUND

- [3] ORC and the five Otago territorial authorities have responsibilities under the Civil Defence and Emergency Management Act 2002 within the Otago Civil Defence and Emergency Management Group area (Figure 1). The Group area includes the whole of Waitaki District.

# Group Area Boundary



Group Boundary  
 District Boundaries

Information on this map may not be used for the purposes of any legal disputes. The user should independently verify the accuracy of any information before taking any action in reliance upon it. This map was generated for A4 printing on 27/07/2023 at the scale of 1:1,500,000.

**Figure 1 Otago CDEM Group area. Note that it includes all of Waitaki District.**

- [4] Whilst the Act prescribes governance and oversight arrangements for the Civil Defence and Emergency Management (CDEM) functions undertaken by local authorities, it is silent on the operational arrangements and how they should be structured. This gives the Groups discretion on how they choose to deliver the responsibilities and the



associated delivery structure. For the Otago CDEM Group those responsibilities are delivered through Emergency Management Otago with support from each local authority, including ORC (Figure 2). The responsibilities of ORC and four of the five territorial authorities are recorded in the Otago Civil Defence and Emergency Management Agreement (June 2022)<sup>1</sup>.

## CDEM Group Structure

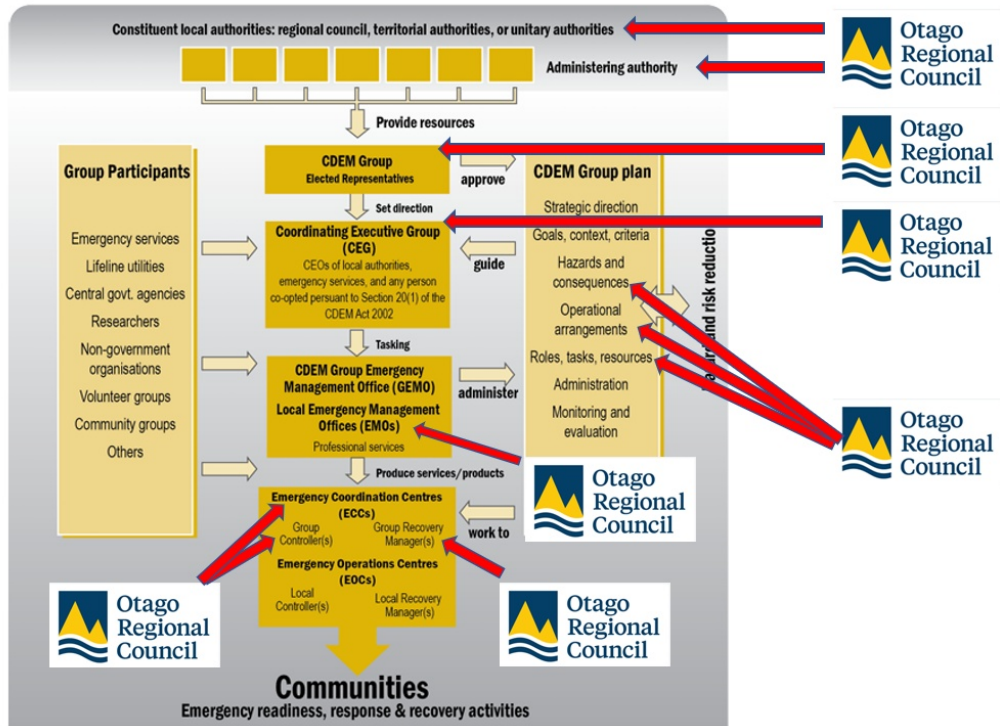


Figure 2 ORC’s participation in the Otago CDEM Group.

- [5] This report describes ORC’s achievements in relation to each of its responsibilities set out in the Agreement. It also provides detail and context for reporting against the 2022/23 Annual Plan measures and targets. Those measures and targets are presented in Figure 3, for reference.

<sup>1</sup> *Emergency Management Otago Partnership Agreement*, Report OPS2104, Report to 25 May 2022 Council.

### Level of Service Statements, Measures and Targets

The service statements (LoS), measures and targets for this activity are defined in the table(s) below.

Level of Service: Support the Otago CDEM Group in improving the resilience of Otago to civil defence emergencies.	
Performance measure	Target
Support is provided to the Otago CDEM Group as per the CDEM Act and Otago CDEM Partnership Agreement.	Fulfil all requirements as the administering authority

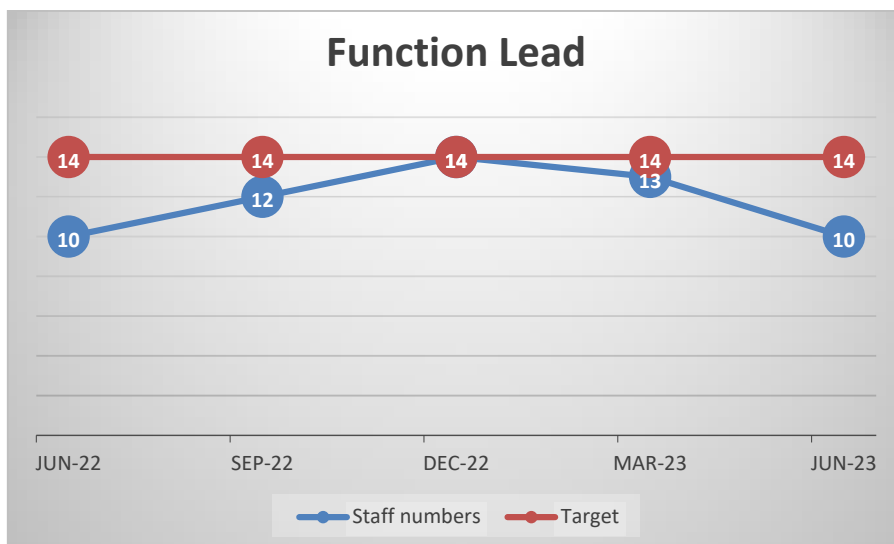
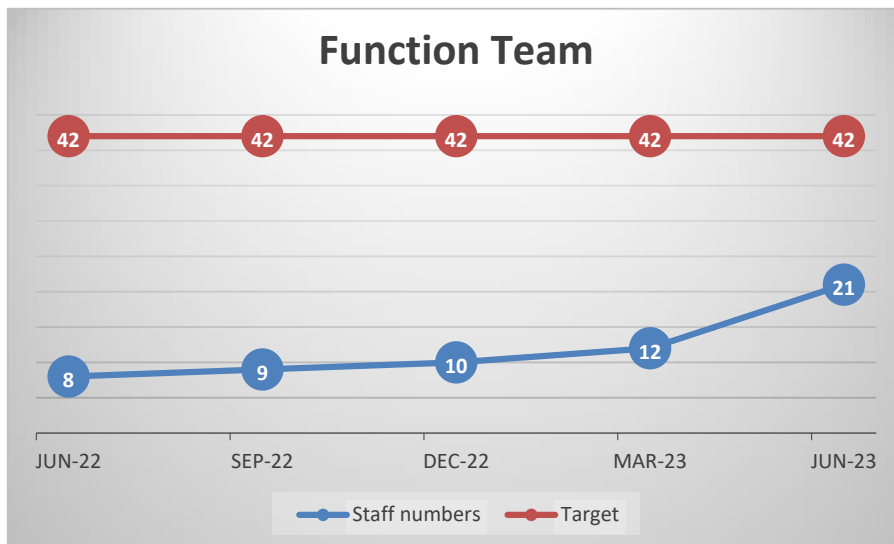
Level of Service: Provide resources to coordinate an efficient and effective region-wide response to a civil defence emergency.	
Performance measures	Targets
An adequate Emergency Coordination Centre (ECC) facility and staffing are available.	Adequate staff who are trained and available for any activation of the ECC
	An appropriate facility is available for activation at all times
Maintain response functionality to enable operational situational awareness when ECC activated.	Response solutions are checked as scheduled and any issues remedied

**Figure 3 ORC Annual Plan 2022/23 targets for civil defence and emergency management.**

### DISCUSSION

- [6] The functions and responsibilities of ORC under the Agreement are listed in Attachment 1. Achievement against each of those responsibilities for 2022/23 is noted, with commentary. This is summarised as follows:
- 47 – Achieved
  - 6 – Partially Achieved
  - 1 – Not Achieved
  - 5 – Not Applicable.
- [7] The Emergency Coordination Centre (ECC) activated over three weeks in July 2022 for a series of heavy rain events, and again in 20-21 March 2023 for a heavy rain warning. All were in monitoring mode, with some support around sharing duty flood information. There were no declarations in Otago in 2022/23.
- [8] There were two significant deployments of Emergency Management Otago staff to Auckland (6 people) with the February 2023 flooding, then the upper North Island following Cyclone Gabrielle (4 people). At the request of the National Emergency Management Agency (NEMA), the Manager Emergency Management Otago was deployed to Far North District for 10 days as Local Controller. Additionally, two staff were deployed to the West Coast to support lower Westland in August 2022 and again in May 2023.
- [9] An effective CDEM response is critically dependent on staff capability and capacity. EMO has a core complement of professionally trained staff with a wider pool of trained staff available from ORC. ECC staff capability throughout 2022/23 is shown in Figure 4 (available, trained staff) along with target levels recommended by Emergency

Management Otago and approved by the Coordinating Executive Group (CEG)<sup>2</sup>. A larger number of ORC staff are available to support ECC operations but not all are trained to the minimum standard. The Function Team staff numbers are the combined totals across all seven Coordinated Incident Management System (CIMS) functions. As a generalisation, ORC staff that are directly involved in responding to flood events (principally from the Engineering, Environmental Monitoring and Natural Hazards teams) are not part of the ECC and are not counted in Figure 4. The variation in staff numbers throughout the year reflects changes in staff availability, largely due to staff leaving ORC or changing roles within ORC.



<sup>2</sup> A Function Lead leads one of the following functions as defined in the Coordinated Incident Management System (CIMS) model: Intelligence, Logistics, Operations, Planning, Public Information Management (PIM), Safety, Welfare.

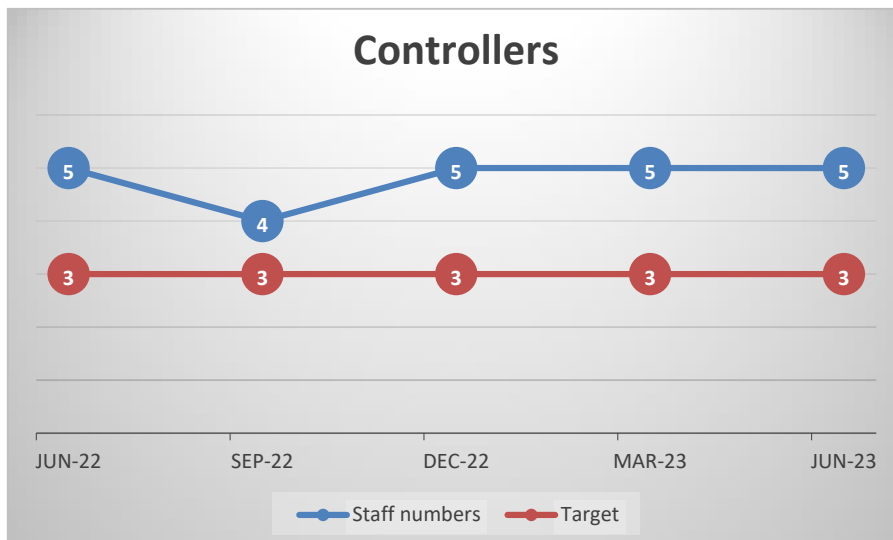


Figure 4 ECC staff capacity and capability (trained staff) during 2022/23.

- [10] Steps are being taken to attain and maintain the target levels for staff trained to (or better than) the minimum standard. These include:
- Formalisation of the process within ORC for recruiting staff for the ECC.
  - Monthly reporting of ECC staffing levels to the Executive leadership Team so that levels are actively monitored and managed.
  - Clarity around the priority staff should give to their ECC responsibilities versus their usual duties.
  - Incorporation of ECC responsibilities into Position Descriptions and performance plans, for staff that fulfil ECC roles.
  - More regular (quarterly) training opportunities for staff that fulfil Function and Function Lead roles, to provide flexibility.
  - Clarity around the budgeting for staff training and exercises.

## CONSIDERATIONS

### Strategic Framework and Policy Considerations

- [11] The partnership is aligned with Council's Strategic Directions where the vision states: *communities that are resilient in the face of natural hazards, climate change and other risks.*

### Financial Considerations

- [12] Financial reporting is part of the Annual Report for 2022/23, and quarterly reporting throughout the year.

### Significance and Engagement Considerations

- [13] Not relevant.

### Legislative and Risk Considerations

- [14] There is no legislative requirement for ORC and the rest of the Otago CDEM Group to have a written agreement however an agreement is good practice and reduces risk for all parties by ensuring respective responsibilities are clear.

### Climate Change Considerations

- [15] Robust and effective CDEM arrangements assist ORC in delivering its climate change adaptation programme of work.

**Communications Considerations**

- [16] Not relevant.

**NEXT STEPS**



- [17] To take the steps outlined in paragraph 10 to increase ECC staffing capacity and capability.
- [18] To provide an update to the Safety and Resilience Committee in February 2024 on progress with achievement of the Partnership Agreement responsibilities, for the first six months of the 2023/24 year.

**ATTACHMENTS**

1. Otago Civil Defence Emergency Management Agreement 2022 table [8.4.1 - 11 pages]

**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**




-  Achieved
-  Partially Achieved
-  Not Achieved
-  Not Applicable

Function	ORC Responsibility	Achievement 2022/23	Explanation
<p><b>Business Continuity Management</b> Disruptions are an expected part of business, so it's important to be prepared for when they occur. Disruptions can be internal events that impact on organisation alone (e.g: IT system failure), or external events that could impact across several organisations and locations (e.g., earthquake).</p>	<p>Undertake business continuity planning for Otago Regional Council to be capable of delivering essential services and a functioning Group Emergency Coordination Centre (GECC) during a crisis/ emergency event and through the recovery.</p>		<p>Arrangements for the ORC flood team to operate remotely were established and tested during the 2020 pandemic lockdown. ORC does not have a Business Continuity Plan.</p>
<p><b>Capability Development, Training and Exercises</b> Training and exercising progressively enhances individuals, local authorities and the Otago CDEM Group's capability to prepare for and manage emergencies and resources, using lessons learnt. The CDEM Group and each member of the Group are to take all steps necessary on an ongoing basis to maintain and provide, or to arrange the provision of, or to otherwise make available suitably trained and</p>	<p>Agree sufficient access to all ORC staff identified in CDEM roles with supervisors to ensure they're available for, attend and complete all competencies associated with training and exercises in accordance with the agreed training schedule.</p>		<p>The target number of staff for Function Leads and Function Teams have not been available. More regular exercises (quarterly) and improved processes for recruitment will assist.</p>














**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**








Function	ORC Responsibility	Achievement 2022/23	Explanation
competent personnel, including volunteers, and an appropriate organisational structure for those personnel, for effective civil defence emergency management.			
<b>Community Resilience and Partnership</b> Community resilience in the Civil Defence and Emergency Management context, can best be described as the community's ability to cope with, bounce back and learn from adversity encountered during and after disasters. There are activities to support in building community resilience. These activities are community engagement, community planning, public education, monitoring and evaluation to measure community resilience. The integration and inclusion of iwi in community resilience activities cements the Otago CDEM principles of Māori partnership.	Support Emergency Management Otago (EMO) and local level Community Resilience activities by commitment of staff resources and technical information to assist in local Community Resilience activities (hazard specific) as required.		
	Ensure whole-of-council approach to Regional Council Community Resilience activities.		
<b>Equipment</b> Includes all equipment to support readiness, response and recovery activities.	Fit out and provide associated Information Technology (IT) equipment and infrastructure for EMO staff and GECC facilities (and alternate sites).		

**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**








Function	ORC Responsibility	Achievement 2022/23	Explanation
	Implement minimum equipment standards required for GECC in line with CDEM Group policy.		
	Own equipment and associated infrastructure, to cover costs to maintain it to an operational standard and to manage and conduct maintenance programme.		
	Provide EMO with furniture and equipment for staff located at Otago Regional Council offices.		
	Undertake fleet management of all Emergency Management Otago vehicles.		
	Procure any priority equipment required by the activated GECC to ensure effective operational capability of the GECC.		No priority equipment was required.
<b>Facilities</b> Includes any facility to support readiness, response and recovery activities.	Provide and maintain GECC facilities (and alternate facilities) for operational response.		The Philip Laing House Council Chamber has been tested as an alternative ECC during an exercise and shown to have limited functionality.
	Provide EMO with fit for purpose office space.		
	Support the activation of the GECC facility if required for response if requested by the Group Controller.		
<b>Financial Management</b> The CDEM Group is to ensure allocation of financial budget to	Provide financial management and accounting services for CDEM Group budget.		



**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**







Function	ORC Responsibility	Achievement 2022/23	Explanation
ensure effective delivery of the of CDEM services as outlined in the Group Plan.	Manage, administer and submit reporting to the CDEM Group of Regional Council budgets for regional CDEM delivery.		
	Provide staff time and travel and accommodation costs associated with attendance at training and exercises.		
<b>Governance and Management</b>	<b>Joint Committee</b>		
	Active participation through appointed designates.		
	As Administrating Authority provide governance and secretarial support to the Joint Committee.		
	Provide reports and recommendations on Regional Council matters to the Joint Committee.		No reports on Regional Council matters have been required to be reported to the Joint Committee.
	Provide reports, decisions and recommendations back to Regional Council on CDEM Group matters		
	<b>Coordinating Executive Group (CEG)</b>		
	Active participation through appointed designates and provide support as agreed to lead delivery of the regional CDEM work programme.		
	Develop and implement specific Regional Council Annual Plan		

**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**







Function	ORC Responsibility	Achievement 2022/23	Explanation
	tasking in a Regional Council CDEM work programme with alignment to CDEM Group Annual Plan.		
	<b>CEG Operations Sub-committee</b>		
	Active participation through appointed designates and support the CEG Sub-committees.		
	Ensure the alignment of CDEM Group Annual Plan and Regional CDEM work programmes.		
<b>Hazard and Risk Management</b> In relation to relevant hazards and risks: identify, assess, and manage those hazards and risks; consult and communicate about risks; identify and implement cost-effective risk reduction. Identification of the hazards and risks in a Group area that may result in an emergency that requires national-level support and co-ordination.	Lead identification of hazards (as required) in accordance with the hazard scape outlined in the CDEM Group Plan at the regional level.		
	Own and manage the hazards (as required) and risk within the appropriate area of responsibility as mandated through the Regional Policy Statement in alignment with the hazardscape detailed in the Otago CDEM Group Plan.		
	Fund and manage hazard investigation within the appropriate area of responsibility as mandated through the Regional Policy Statement in alignment with the hazardscape detailed in the Otago CDEM Group Plan		
	Support effective planning for response through collaboration on hazard risk management for hazards		



**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**








Function	ORC Responsibility	Achievement 2022/23	Explanation
	with cross regional and national impacts.		
<b>Lifeline Utilities</b> Lifeline's failures can disrupt and endanger the wellbeing of local and regional communities. Effective relationships, priority of response protocols and lead agency role definition can reduce the risk such failures may pose. Lifeline utility means an entity named or described in the CDEM Act 2002 in Part A of Schedule 1, or that carries on a business described in the CDEM Act, Part B of Schedule 1.	Lead hazard risk assessment and planning for hazard risk reduction and response activities on key Regional Council services and infrastructure.		
	Support lifelines projects and activities.		No support was requested as the lifelines project utilised existing information. The ORC Natural Hazards retains the capability and capacity to assist as required.
<b>Planning</b> Fundamental to any successful undertaking is attention to planning and preparation. Whilst we pay attention to the plans that are produced, the process of planning is important to ensure that the plans developed meet the needs of the people affected.  CDEM Groups and agencies are expected to routinely incorporate CDEM arrangements into their business planning and risk management processes, and to regularly monitor and report on	<b>Otago CDEM Group Plan</b>		
	Support, the development, implementation, maintenance, monitoring and evaluation of the Otago CDEM Group Plan.		
	Ensure alignment between the Otago CDEM Group Plan and Regional Council Long Term Plans.		
	<b>Pre-event response action planning</b>		
	Support development, implementation, maintenance of CDEM response planning for Regional Council.		
	<b>Standard Operating Procedures</b>		
	Support the development, implementation, maintenance of		

**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**







Function	ORC Responsibility	Achievement 2022/23	Explanation
their progress as appropriate. This is an important role to play in making progress towards the vision of a 'Resilient New Zealand'.	CDEM Standard Operating Procedures as required		
	<b>Recovery planning</b>		
	Support the development, implementation, maintenance of Regional Council Recovery Plan for key council infrastructure and assets.		There is no Regional Council Recovery Plan. Event-specific recovery plans have been prepared for damage to flood protection infrastructure and assets as required.
	<b>Financial planning</b>		
	Support the development, implementation, maintenance of CDEM Group policy on the management of response and management of response and recovery claims.		
<b>Public Information Management</b> Public information management (PIM) enables people affected by an emergency to understand what is happening and take the appropriate actions to protect themselves. This is achieved by making sure that timely, accurate, and clear information is shared with the public in an emergency. Strategic communications is a core component of Public Information Management activities.	<b>Public Information Management staff</b>		
	Alternate Group Public Information Managers provided by Regional Council.		
	Provide staff to support a 24/7 duty Group PIM function.		
	Provide communications/ media staff to receive training and support the Group and local PIM functions, including strategic communications		
	<b>Public Information Management planning</b>		
	Support all CDEM Communications and Social Media activities at the Group and local level as required.		



**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**







Function	ORC Responsibility	Achievement 2022/23	Explanation	
	Support consistent CDEM messaging across all Regional Council social media platforms and websites.			
	Provide communications/ media staff to support the Group and Local PIM function during response and recovery if required.			
<b>Reporting, Monitoring and Evaluation</b> All members of the CDEM Group must provide reports that may be required by the Group. Monitoring and evaluation provide a method for learning from experience, analysing capability, planning and allocating resources, and demonstrating results as part of accountability to stakeholders.	<b>Reporting</b> Ensure Elected Officials and Leadership Team are informed of Joint Committee and CEG resolutions, directions and decisions.		Information is made available via ORC's website and, as required, through Chairperson's reports to Council.	
	Provide reporting to Joint Committee, CEG and CEG Sub-Committee on specific Regional Council Annual Plan tasks related to CDEM.			
	<b>Monitoring and Evaluation</b> Support, contribute and implement a lessons learned/ knowledge management process for CDEM Group.			
	Support Monitoring and Evaluation process for CDEM Group.			
	<b>Staff</b> All staff with CDEM responsibilities including CDEM career staff, CDEM appointed staff, Regional Council and Territorial Authority staff	<b>CEG Operations Sub-committee</b> Appoint a Senior Manager as CDEM designate to represent Regional Council.		
		<b>CDEM career staff</b>		

**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**

Function	ORC Responsibility	Achievement 2022/23	Explanation
<p>fulfilling CIMS functions as part of an Emergency Coordination Centre (ECC) or Emergency Operations Centre (EOC) and any CDEM volunteers providing support to any CDEM function.</p> <p>The CDEM Group and each member of the Group are to take all steps necessary on an ongoing basis to maintain and provide, or to arrange the provision of, or to otherwise make available suitably trained and competent personnel, including volunteers; and an appropriate organisational structure for those personnel, for effective civil defence emergency management.</p>	<p>The Otago Regional Council is the employer of CDEM career staff (EMO) to deliver CDEM outlined in the CDEM Group Plan and this Agreement.</p>		
	<p><b>24/7 Duty staff</b></p>		
	<p>Provide staff to support a 24/7 duty Group Controller capability.</p>		
	<p><b>Staff for CIMS functions</b></p>		
	<p>Group Emergency Coordination Centre Incident Management Team and alternates provided by Regional Council.</p>		
	<p>Provide staff to Coordinated Incident Management System (CIMS) functions within the GECC.</p>		Staff are provided to these functions but target levels have not been met for Function Leads and Function Teams.
	<p>Consult with EMO on appointments of staff to Coordinated Incident Management System (CIMS) functions for the GECC.</p>		
	<p>Ensure all CDEM GECC staff have respective CDEM role included in Job Description, KPI in annual performance plan, required training and exercising in annual professional development plan and be allocated the time for active participation.</p>		Not all ORC staff have their CDEM ECC roles included in Job Descriptions and performance plans.
<p><b>Activation in response/ recovery</b></p>			



**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**

Function	ORC Responsibility	Achievement 2022/23	Explanation
	Ensure availability and prioritisation of staff to conduct GECC operations and deliver 24/7 response.		
	Support the provision and deployments of surge regional council CDEM staffing to support Group and Local level response and recovery within the Otago or across New Zealand.		No deployment of ORC staff (in addition to EMO staff) was required.
<b>Warning Systems</b> When there is an imminent threat to life, health or property from hazard events the issue of official warnings is the responsibility of CDEM agencies.	Ensure an effective flood event monitoring and information system.		
	Promote the flood warning system to partners, emergency services and communities.		
	Support the dissemination of warnings from the CDEM Group to communities.		
<b>Welfare Management</b> Management of welfare across all welfare services and clusters: Registration, Needs Assessment, Inquiry, care and protection services for children and young people, Psychosocial support, Household goods and services, Shelter and accommodation, Financial Assistance and Animal welfare.  The objective of the welfare services function is to carry out activities across the 4Rs to provide for the	Support Group (GECC) and local (EOC) welfare activities in response.		No support was required during Group or local responses.

**Attachment 1 - Otago Civil Defence and Emergency Management Agreement June 2022**

Function	ORC Responsibility	Achievement 2022/23	Explanation
needs of people affected by an emergency and to minimise the consequences of the emergency for individuals, families and whanau, and communities.			

