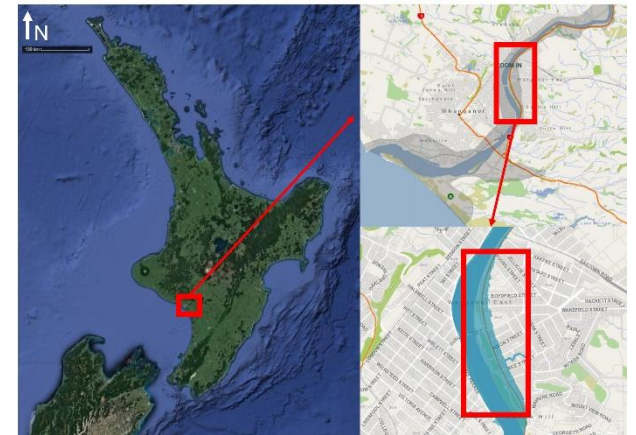


ANZAC PARADE FLOOD RESILIENCE STRATEGY 2022-2122



25 May 2022



Preface

To be completed for final Strategy

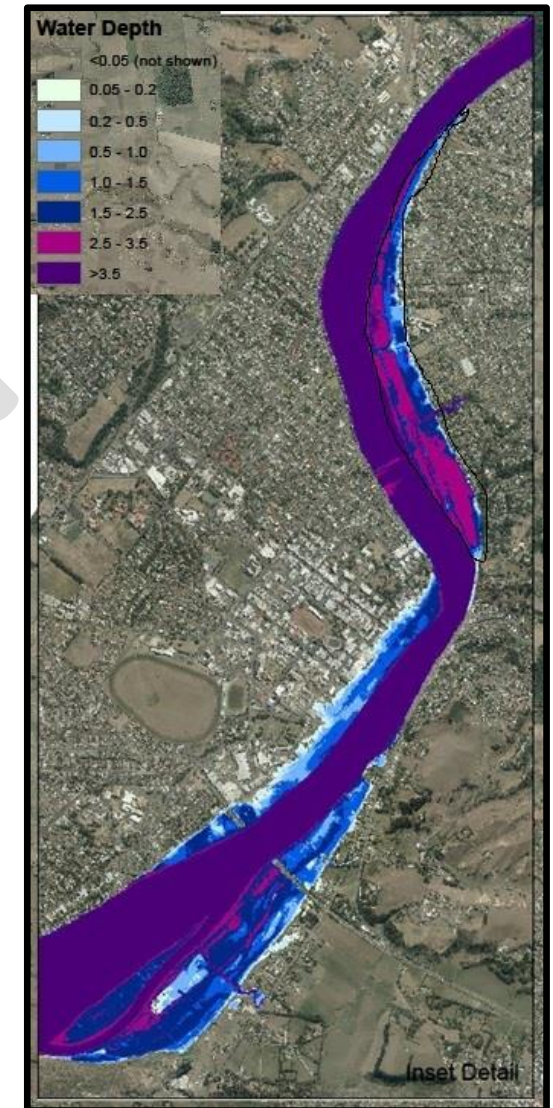
DRAFT



Properties along Anzac Parade in close proximity to the Whanganui River

Table of Contents

Introduction	1
Flood risk in the Manawatū-Whanganui region	2
Co-designing the flood resilience strategy for Anzac Parade	3
Flood risk along Anzac Parade	4
Options to reduce flood risk and build resilience	5
Pros and cons of medium- to long-term interventions	7
Building enduring flood resilience: Anzac Parade in a national and regional context	11
Recommendations	13
Acknowledgements	17



2015 flood water depth

Introduction

This draft Strategy summarises information to make strategic choices about managing flood risk and building resilience along Anzac Parade. A portfolio of more detailed background information will be available on release of the final Strategy.

The Strategy was commissioned by Horizons Regional Council.

The draft Strategy is available on Horizons' website at www.horizons.govt.nz/anzac-parade and feedback can be submitted at the bottom of this webpage. This webpage includes more background information about the Anzac Parade resilience strategy and its formulation.

Reference here is made to 1:50, 1:100 and 1:200 year floods. A 1:100 year flood does NOT mean that such a flood will happen only once every 100 years. It is a statistical measure indicating the likelihood that this flood level will be reached once in 100 years. It is a 1% chance of this flood level being reached in any given year. A 1:50 year flood has a 2% chance of this flood level being reached in any given year. A 1:200 year flood has a 0.5% chance of this flood level being reached in any given year. Climate change increases the likelihood of more extreme flood events. In some places, floods that had a 0.5% chance of occurring in the past may have a 2% chance of occurring by 2100.

Ko au te Awa, ko te Awa ko au

I am the River and the River is me

...I moved here and then when I started working, my work mates ...figured out where I lived and they was like they were 'oh my gosh you know when (the) 2015 floods happened your house was like nearly fully submerged.' I was like, 'WOW I didn't know that.'
– Tenant since 2015

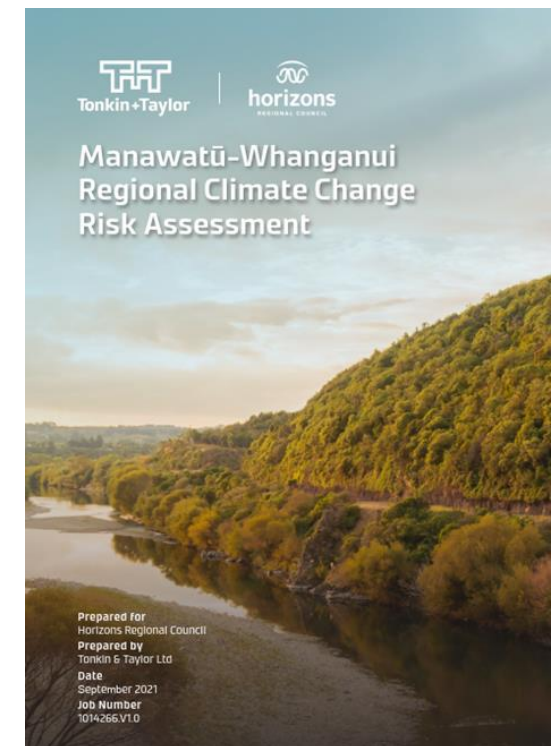
Flood risk in the Manawatū-Whanganui region

The region has been subject to many extreme flood events over time. The February 2004 and June 2015 floods breached stopbanks, caused widespread infrastructure and environmental damage, flooded homes, displaced residents, disrupted farming, and caused psycho-social harm. Fortunately, there was no loss of life. However, there were some 'narrow escapes'.

Many communities in the region are already exposed and vulnerable to flood risk, e.g., Putiki, Scott's Ferry, Tangimoana, Whangaehu village, Foxton Beach and many others.

Climate change is projected to increase the intensity of rainfall events in the west of the region, with higher rainfall in winter causing an increase in sediment loads and more frequent large extreme events. The magnitude of more frequent flood events (e.g., 1:10, 1:20, 1:30 year floods) is expected to increase.

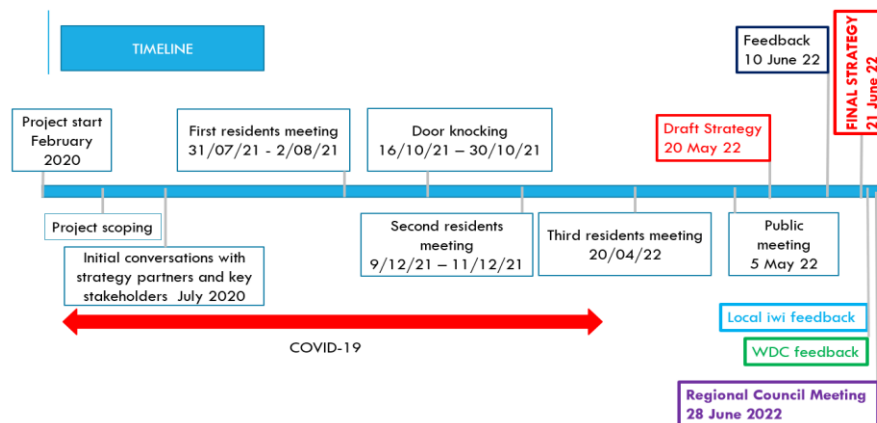
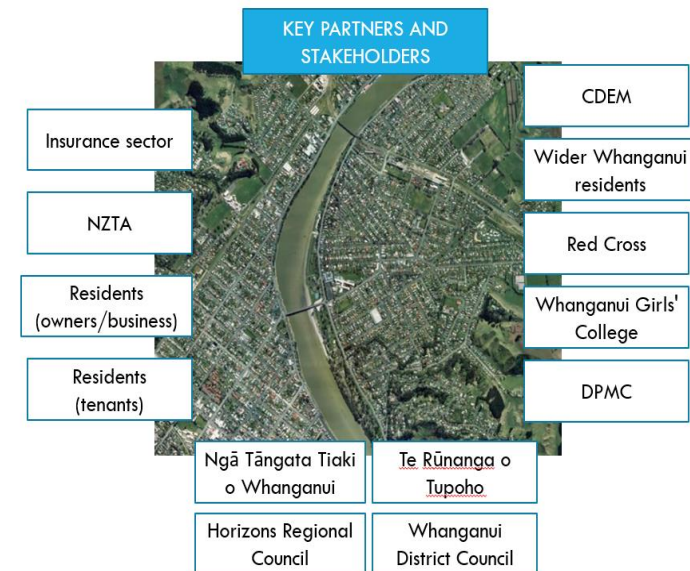
A Regional Climate Change Risk Assessment has been carried out. A Climate Action Joint Committee (CAJC) has been set up with representation by leaders of each local authority and iwi in the region. The purpose of the CAJC is to inform strategic leadership about how to reduce greenhouse gas emissions and prepare for climate change impacts.



Co-designing the flood resilience strategy for Anzac Parade

Horizons Regional Council commissioned Massey University to facilitate the drafting of the Strategy. Described as 'co-design', this process was founded on a partnership between Ngā Tāngata Tiaki o Whanganui, Te Rūnanga o Tupoho, Whanganui District Council and Horizons Regional Council - the founding partners with long-term custodianship of the strategy.

Massey University specialists in natural hazards planning and community resilience, Professor Bruce Glavovic and Martín García Cartagena, with the assistance of Kathryn McDowell, were the independent facilitators of this co-design process. They aimed to create meaningful opportunities for all parties to share their concerns in an open and transparent manner. They acted as a bridge to bring different parties together to formulate a community-based strategy that is co-owned by the strategy partners, Anzac Parade residents, wider Whanganui public and other key interested and affected parties.



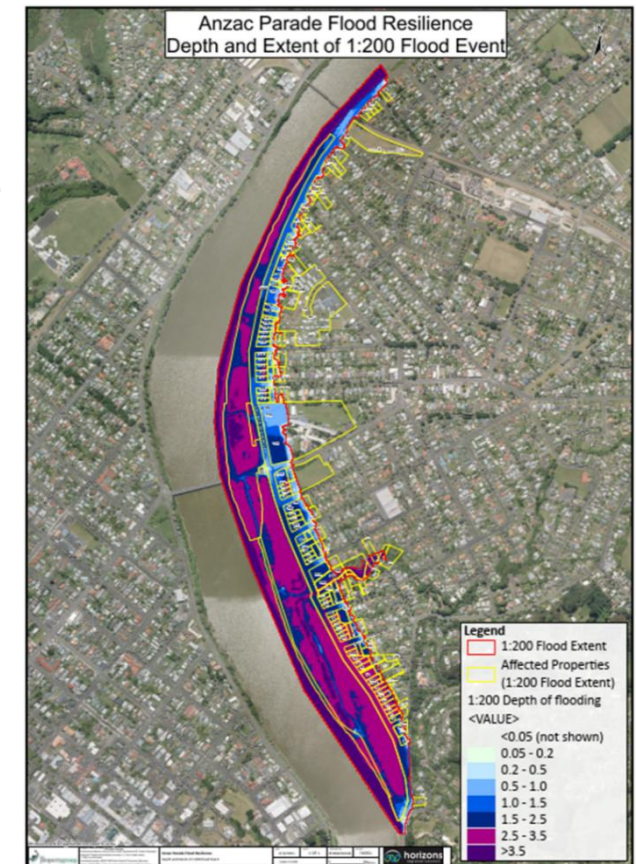
Flood risk along Anzac Parade

Residents along Anzac Parade currently have 1:30 year stopbank protection. The June 2015 flood was a 1:130 – 1:150 year event. People were evacuated at short notice. About 100 homes were impacted. Some homes were very badly damaged. Insurance helped people repair flood-damaged homes.

After the 2015 flood, Horizons Regional Council assessed the existing protection along Anzac Parade and consulted residents and the Whanganui public about options for upgrading the stopbanks. Given the high costs, and the cost-apportionment scheme, an effective upgrade was considered unaffordable.

In a 1:50 year event, about 34 homes will be under >1m of water, with 108 homes affected. About 40 homes will be under >1m of water in a 1:100 year event, with 122 homes affected. About 50 homes will be under >1m in a 1:200 year event with 155 homes affected.

There is no one solution available to eliminate flood risk. A combination of short- and medium- to long-term options will need to be implemented over time.



Options to reduce flood risk and build resilience

Many possible interventions to reduce flood risk have been identified. They have different strengths and weaknesses. Not all suggestions are effective or feasible.

In the short-term (1-10 years), flood resilience depends on further improvements to:

- Early warning systems
- Evacuation procedures
- Managing nuisance flooding¹, including Matarawa Stream diversion and maintenance
- Household flood-proofing (e.g., flood barriers to divert floodwaters away from houses; fit non-return valves on drains and pipes; raise household appliances)
- Institutional arrangements and practices to reduce flood risk and build resilience (e.g., share flood risk information and coordinate functions carried out within and between different organisations in local government, local hapū and iwi, critical infrastructure providers and the community).

¹ Nuisance flooding refers to low levels of inundation that do not pose significant threats to public safety or cause major property damage. It can disrupt routine day-to-day activities, put additional strain on infrastructure systems, such as roads and sewers, and cause minor property damage.



In the medium- (10-50 years) to long-term (50-100+ years) flood resilience could be improved by:

- Carrying out works in the Whanganui River (e.g., dredging; damming; widening river mouth)
- Catchment management measures to reduce flood risk (e.g., planting; erosion control)
- Stopbank improvements
- Raising houses
- A 'buy-out' and relocation programme

So are you aware of Horizons' early warning system? Um yes but I couldn't manage to figure out how to log myself – Homeowner

YOUR REGION. YOUR PAPER

FLOOD-PRONE HOMES

What's the answer?

Experts called in to offer options for reducing the effect of flooding on Anzac Pde

Laurel Stowell

Three leading options for the protection of flood-prone Anzac Pde properties have emerged — but each comes with the question of who will pay.

The solutions have been floated by Massey University researchers Professor Bruce Glavovic and Dr Martin Garcia Cartagena and include strengthening existing stopbanks, raising houses above flood level or buying out property owners.

Garcia Cartagena outlined seven options during public meetings this month but only the three mentioned were feasible and would make a difference.

The first was raising and strengthening stopbanks, which are currently built for a one-in-50-year flood.

Getting them to a one-in-50-year standard would cost an estimated \$6 to \$7 million.

But there would still be the potential for water to creep underground behind them, as it did in 2013, and a Horizons survey found Whanganui residents didn't want to pay for the work.

With climate change, a one-in-50-year flood level may not be enough, the researchers said.

The 2013 flood was estimated as a one-in-150-year or a one-in-150-year flood.

Raising the stopbank would also reduce the amenity value of Kōwhiri Park.

Buying out property owners was definitely feasible — but it depended on "political will", the researchers said.

Buying out the owners of the 33 properties that would flood by more than a metre in a one-in-50-year flood could cost \$9.5 million, at the properties' "reasonable value".

For the 10 properties flooded in a one-in-200-year event, it would cost \$15.6 million.

There were 36 houses in Anzac Pde that flooded to more than one metre in June 2013.

PHOTO: JAMES CONLEY

Researcher Kath McDowell interviewed 67 Anzac Pde residents.

PHOTO: REYNA CONLEY

Wayne Spencer is Horizons Regional Council's northern area engineer.

PHOTO: REYNA CONLEY

Continued p3

9 4185 9400 1024

... we were told to get out, like at 10 o'clock at night. ... Like I was making my sons album for his 21st birthday, his baby photos and things through school, I had it all here and I lost the whole lot – Homeowner

Pros and cons of medium- to long-term interventions

Do nothing

- The choice to do nothing presents governing authorities and Strategy partners with an ethical dilemma: choosing inaction knowing that a major flood is inevitable, lives may be lost and livelihoods will be disrupted. Doing nothing involves major costs. The average insurance pay-out per home after the 2015 flood was ~\$50,000 per home (likely ~\$70,000-75,000 per home in 2022). Major costs will be incurred to repair critical infrastructure. Residents will suffer harm. The costs will be ongoing.

Carry out works in the Whanganui River

- Many interventions in the awa were suggested. A post-2015 flood assessment showed that the capacity of the main channel then was greater than in 1995. Interventions like dredging the river channel are neither effective nor financially feasible in the medium- to long-term. Moreover, given the legal personhood of the river and its cultural significance to tangata whenua, such interventions would cause unacceptable negative cultural and ecological impacts. Interventions in the body of the river are therefore **not** a solution for reducing flood risk along Anzac Parade.

Catchment management measures to reduce flood risk

- Sustainable land-use practices upriver can help contain erosion, improve water quality and enhance the overall condition of the awa. But these measures will not prevent major floods in future.

Dredge the river

Sort **erosion**
upstream/Paraparas/
bad land/forestry
management

Widen river mouth

Deeper catchment higher up river

Dam the river higher up

**Higher stop
banks /at same
level all along**

**Flood gates/barrier
at Park/Boat ramp entrances**

Sheet pile in stop banks

Stopbank improvements

- Stopbanks protect people and property from flooding up to the specified design standard.
- Residual risk² remains even if a high level of protection is in place.
- Significant geo-technical challenges, due to unstable and porous soil, significantly increase the costs.
- The legal personhood of the awa presents serious regulatory challenges for this option.
- Major impacts on cultural values of the awa and aesthetic and amenity values of Kowhai Park.
- Estimated costs (2022): ~\$6-7mill (1:50 year); >\$10mill (1:100 year); \$27-33mill (1:200 year).
- Major cost and affordability issues, especially given current cost-apportionment scheme and escalating climate-compounded risk.

Raising houses

- It is possible to raise houses, at a cost. Would need to comply with: floor level allows free-board above 1:200 flood level; safe access / egress (escape); withstand 1:200 year flood; and avoid significant diversion of flood waters impacting adjacent properties.
- Cost to raise typical <100m² house by 1m is \$300,000-540,000 per house, excluding geotechnical survey, outbuildings, asbestos removal, building consents, accessible ramps, etc. Liquefaction makes this option very challenging and costly. May be feasible for some homeowners. But this is **not** a feasible solution for Anzac Parade as a whole – on financial grounds alone. It is not clear whether Government would or should share some of the costs of this option.

² Residual risk is risk remaining after an intervention, e.g., if a flood is greater than the design standard or if there is stopbank failure. With climate change, flood risk is likely to escalate over time and additional improvements may be required to maintain a specified level of protection and associated residual risk into the future.

... the issue of raising houses is, most of that area is liquefaction prone. It is wet clay prone to seeping. If you're gonna bore down, um you're going a long way down
– Official



- It is not an effective solution from planning and community perspectives because it is not feasible for all homes and would result in major practical, equity and aesthetic impacts.

A 'buy-out' programme with / without relocation

- Buy-out with or without relocation moves people and property out of harm's way, eliminating flood risk. Such properties could be used for public purposes, e.g., local park.
- There is no government intention to start a compulsory buy-out programme.
- Two approaches could be used. A Covenant in favour of Horizons Regional Council would enable homeowners to voluntarily provide Horizons Regional Council with a 'first right of refusal' on sale of the property. Or the Public Works Act could be used to enable buy-out of properties.
- Proactively implementing a buy-out programme for even the most at-risk homes in a 1:200 year event (i.e., 50 homes >1m water) would cost ~\$15.6mill at Rateable Value and ~\$28.1mill at current Market Value (2022). This estimate excludes costs of demolition and / or removal of houses, critical infrastructure and re-purposing of the land. Many questions remain unanswered about the buy-out option in Aotearoa. There is no clear and consistent practice and no clarity about how costs would be shared; and what if anything central Government would contribute. It is unclear whether or not private insurance could be used to enable relocation after a flood event but at present there are no enabling mechanisms in place to facilitate this. Should government-backed buy-out be limited to primary residences and / or structured on the basis of 'ability to pay / contribute'?
- Participants in a buy-out programme could relocate to a place of their choosing. Or provision could be made for people to move to a designated new development location. However, new 'greenfield

I think in the next 50-100 years the retreat option is appropriate, but I don't want...my property to lose value.

– Homeowner

Houses are an emotional connection and also, as New Zealanders, our number one financial investment. So it is not that straight forward

– Official

development' is usually facilitated by private property developers. A new government initiative would likely need to be established to enable an 'affordable' community-wide relocation programme. Many questions need to be addressed to start such a programme, including who makes up 'the community' and how does a relocation programme secure community identity, livelihoods and resilience; how is relocation funded and facilitated; where would participants relocate to; what options would be available to those renting; how would equitable and just outcomes be ensured; and how can the long-term societal costs of climate-compounded hazard events be contained?

***I've met some people who ...
said: We want to just live with
the risk. We don't want to shift.
We like where we are and
getting a place that we can
afford with a view and being this
close. We can't afford other
places, we don't wanna leave.
– Official***

INDICATIVE COSTS TO REDUCE RISK IN MEDIUM- TO LONG-TERM

Flood risk	Do nothing	<u>Stopbank</u>	Raise houses	Buy-out
1:50 year	\$7.7mill	\$6-7mill	-	RV\$9.5mill; MV\$17.7mill
1:100 year	\$8.6mill	>\$10mill	\$12mill	RV\$10.8mill; MV\$21mill
1:200 year	\$11mill	\$27-33mill	>	RV\$15.6mill; MV\$28.1mill

Building enduring flood resilience: Anzac Parade in a national and regional context

A long-term strategy for flood resilience along Anzac Parade needs to be situated in the local, regional and national context. Parts of Whanganui, and areas along the awa, including Putiki and some of the industrial zone near the river mouth, are prone to climate change-compounded flooding. Other towns and settlements in the region are exposed and vulnerable to flood risk.

Nationally, NIWA research published in 2019 showed that 700,000 people and 411,516 buildings worth \$135 billion were then exposed to river flooding in extreme weather events, ignoring escalating risk due to climate change. 72,000 people and 50,000 buildings worth \$12.5 billion were then exposed to extreme coastal flooding. Another 116,000 people were projected to be at risk by 2100 due to climate change impacts, including sea-level rise (ignoring recent estimates of land subsidence). Aotearoa New Zealand faces immense climate change-compounded flood risk – especially where riverine and coastal flooding coincide, in places like Whanganui. Coastal flood risk is growing and will continue to increase for coming decades, centuries and millennia because sea-level rise is essentially unstoppable.

There are no simple solutions. Reducing flood risk and building resilience will require unprecedented political will, major investment and concerted effort by government, tangata whenua, civil society and

People have to remember that 200 years ago the whole of the catchment was in forest. And then Europeans came along and cleared the land and put in grass, in areas probably too steep to do so. I don't believe that the river dynamics and the land dynamics have stabilised since then. It's still changing. – Official

the private sector, including the insurance and banking sectors. New climate change adaptation legislation is being prepared but is not likely to be promulgated before the end of 2023.

Critical questions unanswerable at present:

- Who is most exposed and vulnerable to riverine and coastal flood risk in this region?
- How should interventions to reduce flood risk and build resilience be prioritised in this region?
- What contribution will Government make to such interventions, and what contribution should be made by local government and homeowners, critical infrastructure providers, insurers, etc.?
- What remedies can be put in place for those who rent properties and / or cannot afford to pay for resilience-building and possibly life-saving interventions?
- What will happen if insurance coverage becomes unaffordable or is withdrawn?
- What legal liability will Councils assume for decisions they have made or make in future that expose people and assets to well-understood climate change-compounded impacts like sea-level rise?
- Whilst there is robust understanding about climate change-compounded flood risks for Aotearoa, the region and Whanganui in coming decades, how rapid and extreme will flood impacts become by 2100 and beyond – within the lifespan of many public decisions now being made?

My answer is a broader one rather than the specific steps we could make: I'd look at the broader stuff and wonder about, you know, how much the farming and the use of the land further up the river affects erosion and the fall of the water into the river?
– Homeowner

Recommendations

Strategic short-term (1-10 years) actions for the region

1. **Identify communities, businesses, taonga and assets exposed and vulnerable to riverine and coastal hazards**
2. **Prioritise most at-risk communities** – especially where proactive buy-out / managed retreat is compelling – but use robust criteria and a legitimate process that is widely supported
3. **Improve and maintain up-to-date flood risk modelling (riverine and coastal) in a changing climate in a manner that aligns with information systems in the region's Territorial Authorities**
4. **Strengthen flood risk and resilience governance in the face of climate change**
 - a. Strengthen capabilities of the Climate Action Joint Committee to enable and deliver regional climate action.
 - b. Strengthen Te Tiriti o Waitangi-led regional risk and resilience governance capabilities, including learning from and raising awareness about the transformative potential of te ao Māori and Mātauranga Māori in addressing natural hazard risk; including the cultural significance and legal personhood of the Whanganui awa, other rivers, the coast and whenua.
 - c. Initiate strategic dialogue with key actors in insurance, banking and critical infrastructure to address open questions about flood risk reduction and resilience building in a changing climate.
 - d. Clarify legal liability facing local government in a changing climate, especially with respect to past and forthcoming decisions about development in flood-prone localities.

*E rere kau mai te Awa nui mai i
te Kāhui Maunga ki Tangaroa
The great River flows from the
mountains to the sea*

- e. Identify and close regulatory loopholes that enable new development in locations exposed to climate-compounded flood risk and extreme events.
- f. Critically assess the most effective and equitable ways to institutionalise cost-sharing of interventions to manage extreme flood risk across region.
- g. Engage in strategic discussions with key Government role-players and bodies like LGNZ about regional lessons learned on institutionalising flood resilience and open questions to be addressed in drafting Climate Adaptation legislation given the unfolding RMA law reform process.
- h. Investigate options for establishing a fund for a regional buy-out programme of priority at-risk houses and communities *pre-flood*.
- i. Investigate options for institutionalising proactive mechanisms to buy-out priority flood damaged properties *post-flood*.

***...Whanganui District Council
gave permits for all of these
properties, I think wrongly they
should never have been allowed
to build here in the first place...
But we are here and I believe
Horizons Regional Council have
a responsibility to do more
flood protection because what
we have got here is one in 30
year flood protection which is
almost non existent
– Homeowner***

Strategic short-term (1-10 years) actions to build flood resilience along Anzac Parade

Many strategically important questions that are foundational to developing a robust medium- to long-term flood resilience strategy along Anzac Parade are currently unanswerable. Such questions are being raised and taken into account in the drafting of Climate Adaptation legislation. It is expected that this legislation will be promulgated by the end of 2023. This will complete the RMA law reform process and will provide a national framework for managing riverine and coastal flood risk in a changing climate.

Given that vital national direction on matters central to flood resilience in the region and along Anzac Parade is currently under development, it is not appropriate to recommend medium- to long-term interventions at this point in time. Once this legislation is promulgated, longer-term strategic interventions can be determined with more clarity on implementation roles and responsibilities.

It is appropriate to focus on short-term actions (1-10 years):

1. Given the significant negative impacts and financial infeasibility of the stopbank improvement option in the face of escalating climate compounded flood risk; the move away from reliance on protection in the face of such risk; and the cost and affordability concerns of this option relative to a buy-out programme, **it is RECOMMENDED that Horizons Regional Council does not proceed with stopbank improvements that would materially reduce flood risk** (e.g., 1:100 or 1:200 year protection). Rather, **it is RECOMMENDED that attention should be focused on ways to enable a buy-out**

Yeah well, 10 o'clock at night with a police officer, and a few other people, telling us to get out – we didn't have time to take anything. Where in, in the city they were told at 12 o'clock in the afternoon. I'm still quite annoyed about it really – Homeowner

programme with / without community-based relocation. However, the detail of such a programme can realistically only be progressed once the Climate Adaptation legislation has been promulgated.

2. Once there is more clarity on the direction of the proposed Climate Adaptation legislation, and managed retreat provisions, it is **RECOMMENDED** that a co-designed medium- (10-50y) to long-term (50-100y) flood resilience strategy be prepared for Anzac Parade, with a focus on institutionalisation of a buy-out programme with / without community-based relocation.
3. **RECOMMEND improvements to the early warning system:** To enable easy access for diverse residents, including different age, ethnic, linguistic, etc. groups with variable internet and telephonic access in urban, town and rural settings; corroborate accuracy and timeliness of warnings given different storm trajectories and weather conditions; and explore innovative ways to keep residents up to date given the high turn-over of people along Anzac Parade.
4. **RECOMMEND improvements to the evacuation system:** Distil and apply lessons learned from recent evacuation orders and processes along Anzac Parade and the wider region.
5. **RECOMMEND improved controls on nuisance flooding,** including ongoing work on Matarawa Stream diversion and maintenance practices; and infrastructure upgrade programme.
6. **RECOMMEND preparation of flood proofing guidance and investigate public-private partnership options for implementing household flood proofing.**
7. **RECOMMEND critical analysis of and practical steps to strengthen the alignment of Horizons Regional Council and Whanganui District Council regulatory provisions and operational procedures and practices that have a bearing on flood risk reduction and resilience building in a changing**

... they built the houses in the '50s – the town planners built them and never looked, and my issue is nobody ever looks past three years because everybody is in for three years, so they are not going to do anything – although I hate to think if any of them had got in for five years (laughs). But you know what I mean – nobody looks to the future. Now this is the first time they are talking about you know 1 year, 10 years 100 year (floods) – Homeowner

climate, e.g., District Plan rules to build flood resilience along Anzac Parade; policy and plan provisions that need to be reconsidered in the light of potential future managed retreat / relocation of at-risk communities.

8. **RECOMMEND** initiation of a comparative analysis of existing legal mechanisms, governance arrangements and funding options for *pre-flood* and *post-flood* purchase of the most at-risk homes along Anzac Parade to inform the medium- to long-term strategy co-design process.

Acknowledgements

To be completed in Final Strategy

I think we've got to retreat. I mean it's really politically unpopular but there needs to be a managed retreat. And that's – and it won't be managed if people are forced into bankruptcy based on when their insurance companies pull the plug and you just, you just go, um into default.
– Homeowner

Ko te Awa te mātāpuna o te ora
The river is the source of spiritual and physical sustenance