PUBLIC MEETING:
ANZAC PARADE FLOOD RESILIENCE STRATEGY

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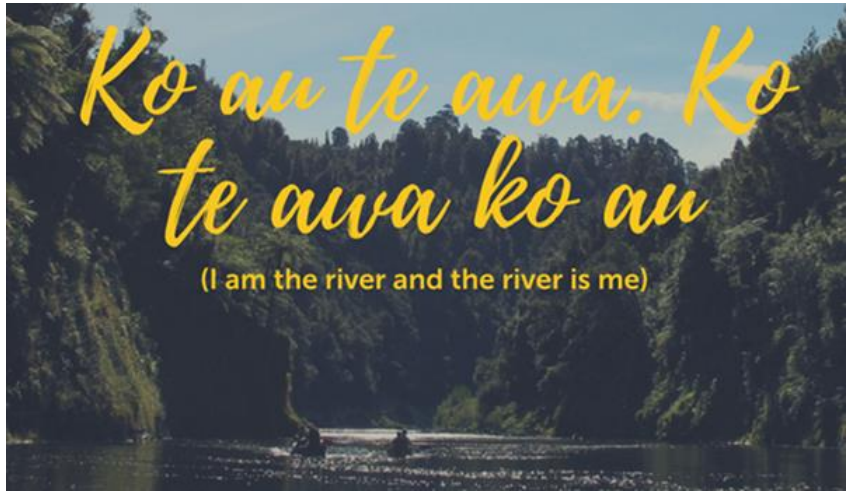
5th May, 2022

horizons regional council

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

TE KAUNIHERA A ROHE O WHANGANUI
WHANGANUI DISTRICT COUNCIL

KARAKIA



Tuia, tuia, tuia	*Stitching together*
Tuia te Rangi e tū iho nei	*Stitching together the celestial energies*
Tuia te Papa e takato ake nei	*Stitching together the terrestrial energies*
Tui te muka tangata	*Stitching together humanity*
Ka rongo te pō ka rongo te ao	*Resounding in the night, resounding in the day*
Tihei mauri ora	*Behold the breath of life*

INTRODUCTIONS

AGENDA

1. Aim of this public meeting
2. Work underway to reduce flood risk
3. What is the Anzac Parade Flood Resilience Strategy?
4. What are the options to reduce flood risk & build resilience?
5. Next steps, your contribution & closure

https://www.horizons.govt.nz/anzac-parade
FAQs, Fact Sheets

AIM OF THIS PUBLIC MEETING: ANZAC PARADE

- Share information about the strategy & how it is being developed
- Explain how you can contribute to the strategy

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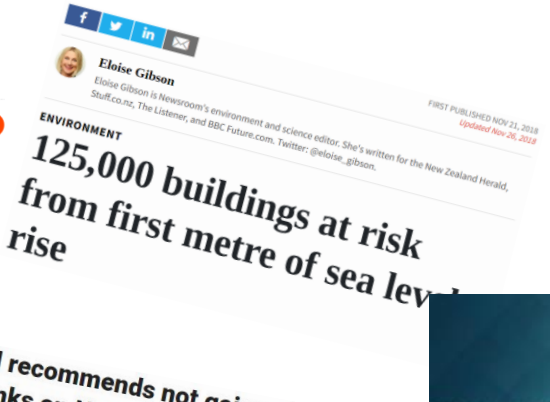
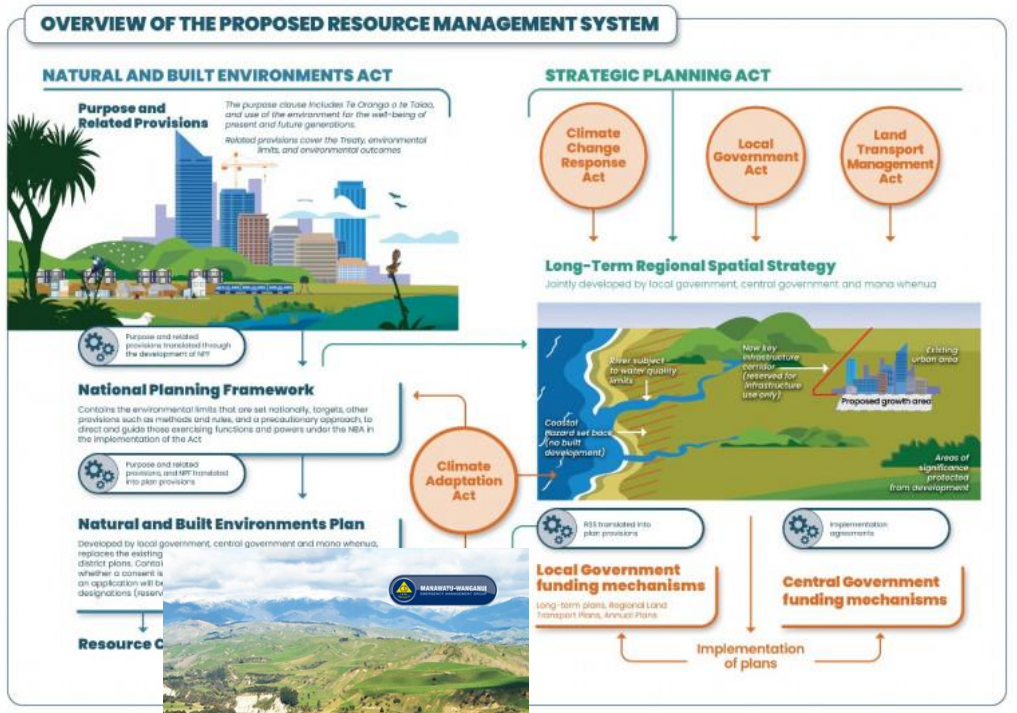
NATIONAL SCIENCE CHALLENGE: DEEP SOUTH

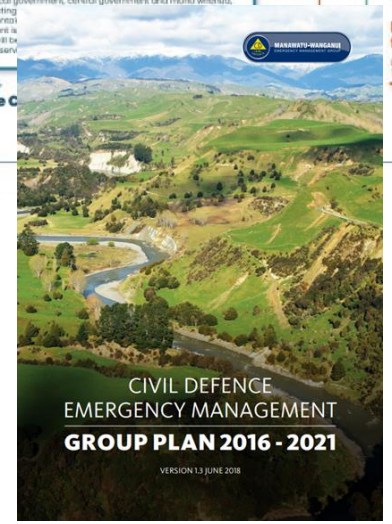
HTTPS://DEEPSOUTHCHALLENGE.CO.NZ/RESEARCH-PROJECT/NATIONAL-FLOOD-RISKS-CLIMATE-CHANGE/

- 700,000 people & 411,516 worth $135 billion presently (2019) exposed to river flooding under extreme weather events, ignoring escalating risk due to climate change. Also exposed >19,000km of roads, 1,574km of railways, 20 airports.
- 72,000 people & 50,000 buildings worth $12.5 billion presently exposed to extreme coastal flooding. Increases markedly with SLR.
- By 2100, an additional 116,000 people exposed to coastal storm flooding.

WORK UNDERWAY TO REDUCE FLOOD RISK





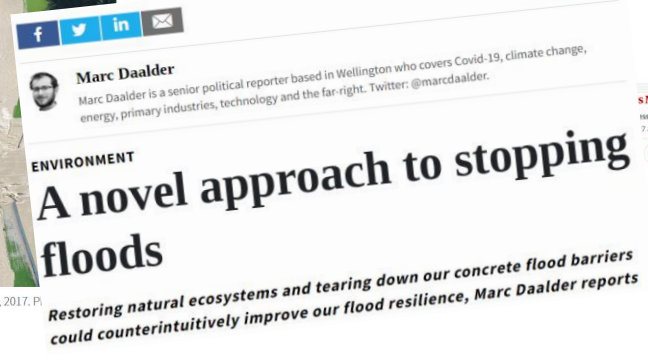


Engagement on draft national adaptation plan and managed retreat

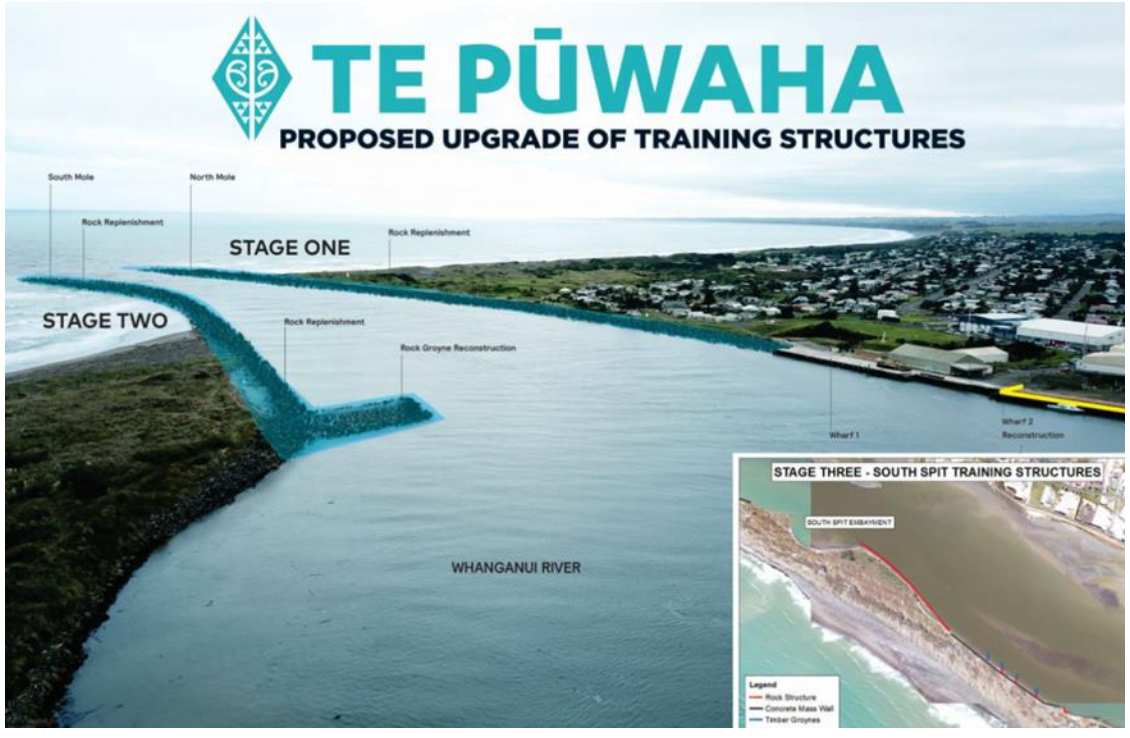
$160m a year: Sweeping new assessment of NZ's big flood threat

28 Sep, 2020 05:34 PM · 7 minutes to read

Water flows into Edgecumbe through a breach in the Rangitaiki River stopbank on April 6, 2017. P...



WORK UNDERWAY TO REDUCE FLOOD RISK



Te Pūwaha refers to the gateway, or river mouth. It is also the name of the Whanganui port revitalisation project. Te Pūwaha is a partnership involving Whanganui Iwi and five other groups invested in the project: **Whanganui District Council (WDC)**, **Horizons Regional Council (Horizons)**, Q-West Boat Builders, Whanganui District Employment Training Trust and central government. The total investment in Te Pūwaha is over $50M, with infrastructure works carried out in several sub projects. This Council item focuses on the component of the project to strengthen and upgrade old river training structures in the lower reach of the Whanganui River. More information on Te Pūwaha and the other components of work is available on Horizons and WDC websites.

Table 2: Comparison of the original and proposed revised budget for Stage 1 & 2 of the project.

Stages 1 & 2	Estimated cost - original budget ($)	Estimated revised cost March 2022($)	Difference ($)	Difference (%)
Project planning and support				
Consents	130,000	229,915	99,915	77%
Investigation/designs	160,000	313,995	153,995	96%
Comms + project management	833,334	2,130,970	1,297,636	156%
Sub total	**1,123,334**	**2,674,880**	**1,551,546**	**138%**
Construction				
Stage 1 North mole	6,490,000	7,286,638	796,638	12%
Stage 2 A Tanae Groyne	800,000	1,000,000	200,000	25%
Stage 2 B South Mole	5,000,000	5,200,000	200,000	4%
Sub total	**12,290,000**	**13,486,638**	**1,196,638**	**10%**
Total Stages 1 & 2	**13,413,334**	**16,161,518**	**2,748,184**	**20%**

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YOUR REGION. YOUR PAPER

FLOOD-PRONE HOMES

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-30-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 2015, 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 2015 flood was estimated as a one-in-130-year or a one-in-150-year flood.

Raising the stopbank would also reduce the amenity value of Kowhai 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' rateable value.

For the 50 properties flooded in a one-in-200-year event, it would cost $15.6 million.

There were 16 houses in Anzac Pde that flooded to more than one metre in June 2015. PHOTO / GLEN CONLEY

Researcher Kath McDowell interviewed 87 Anzac Pde residents. PHOTO / BEVAN CONLEY

Wayne Spencer is Horizons Regional Council's northern area engineer. PHOTO / BEVAN CONLEY

It's not certain that government would pay for this, and insurance probably wouldn't either, Garcia Cartagena said.

Owners in other areas of New Zealand are in the same situation, and getting government to pay could rely on major damage and a legal fight.

Raising houses above flood level was possible for some, the researchers said.

The cost of this was being calculated and would be available next year.

It depended on the individual house construction, and the raised houses could obstruct neighbours' views.

Also, the soil in Anzac Pde is prone to liquefaction and deeper piles would be needed.

Anzac Pde resident Des Thiele and his wife bought their house 10 years ago and were flooded in 2015.

"Nothing has happened since, and nothing is being offered as a solution," he told the *Chronicle*.

"The only real thing is an early warning notification.

"Last time we had half an hour's notice. If we had known at lunchtime it would have been better," he said.

David Cotton, chairman of Horizons' catchment operations committee and a councillor didn't want to voice an opinion about the flood resilience options until he has heard from all the stakeholders.

"I want it to come to me with fresh eyes," he said.

He was delighted with the information Massey has gathered in its $130,000 contract. One thing that stood out was how few Anzac Pde residents knew about his council's early warning system.

Another was how relaxed residents who hadn't been through a flood felt about their prospects, compared to those who had been

Continued p3

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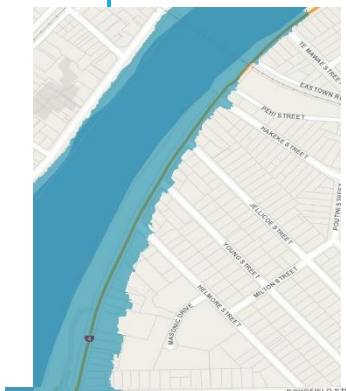
WHAT FLOOD RISK DO ANZAC PARADE RESIDENTS FACE?

- 1:50 year flood (>1m) = 34 homes
- 1:100 year flood (>1m) = 40 homes
- 1:200 year flood (>1m) = 50 homes

Residents rely on …

warnings & evacuation + insurance

WHAT IS THE STRATEGY?



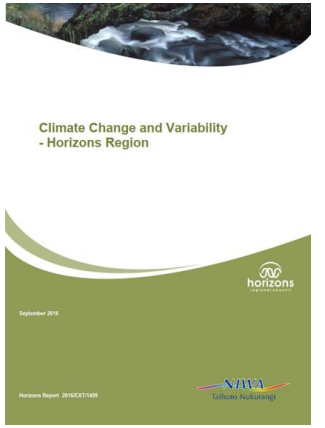
Role of Massey researchers:

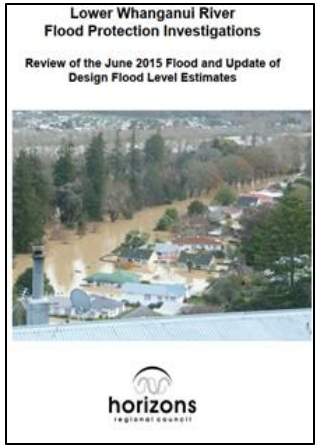
- **Bridge** to link AP residents, home-owners, hapū, iwi, awa, WDC, Horizons, stakeholders & public
- **Facilitate community-based strategy**

- **Co-designed strategy** to reduce flood risk & increase community resilience along Anzac Parade (~100 years).
- **Assess feasibility** of range of community-wide and property-specific interventions.
- Make **recommendations** based on implications of alternative interventions for flood risk reduction, resilience building, & resident & community well-being.
- **Horizons Regional Council will decide** on way forward.

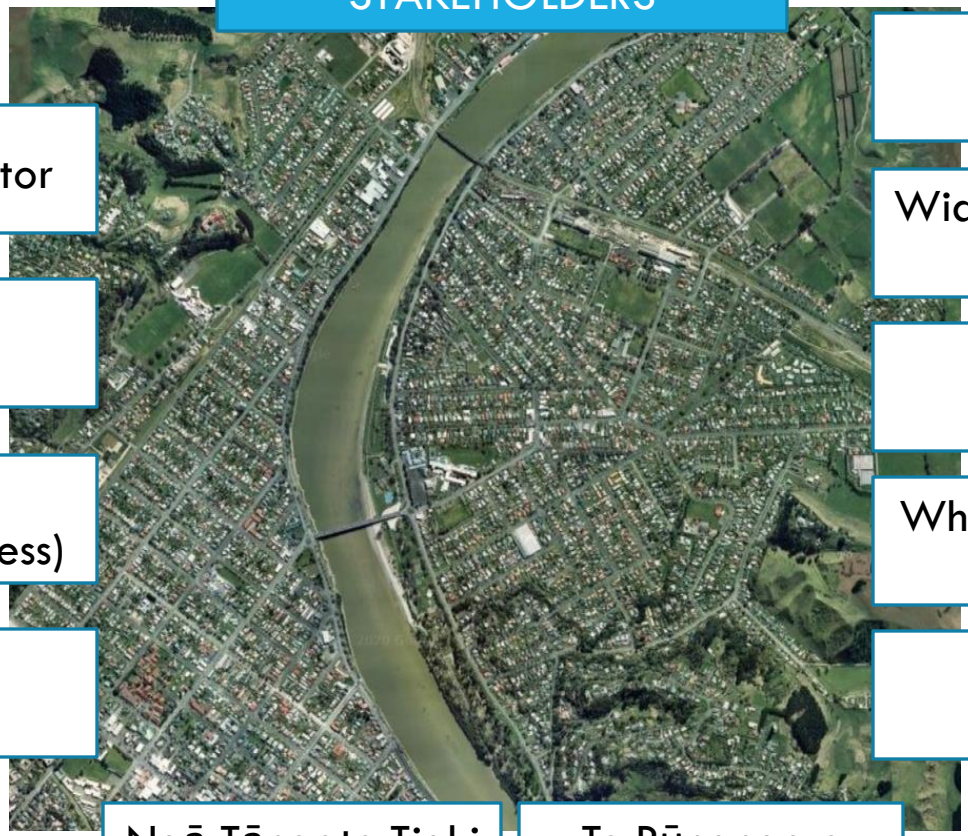
WHAT IS A FLOOD RESILIENCE STRATEGY?

- **Agreed way to reduce flood risk & build resilience (1-100y)**
- **Based on:**
  - Assessment of **risk** – given local concerns & climate change
  - Evaluate **pros & cons of different options** to reduce flood risk
  - What are **best combinations** of options to implement over time?
  - **Roles & responsibilities** for implementing strategy
  - Agreed process to **monitor, review & revise** strategy over time





Collaboration, consultation & the co-design process

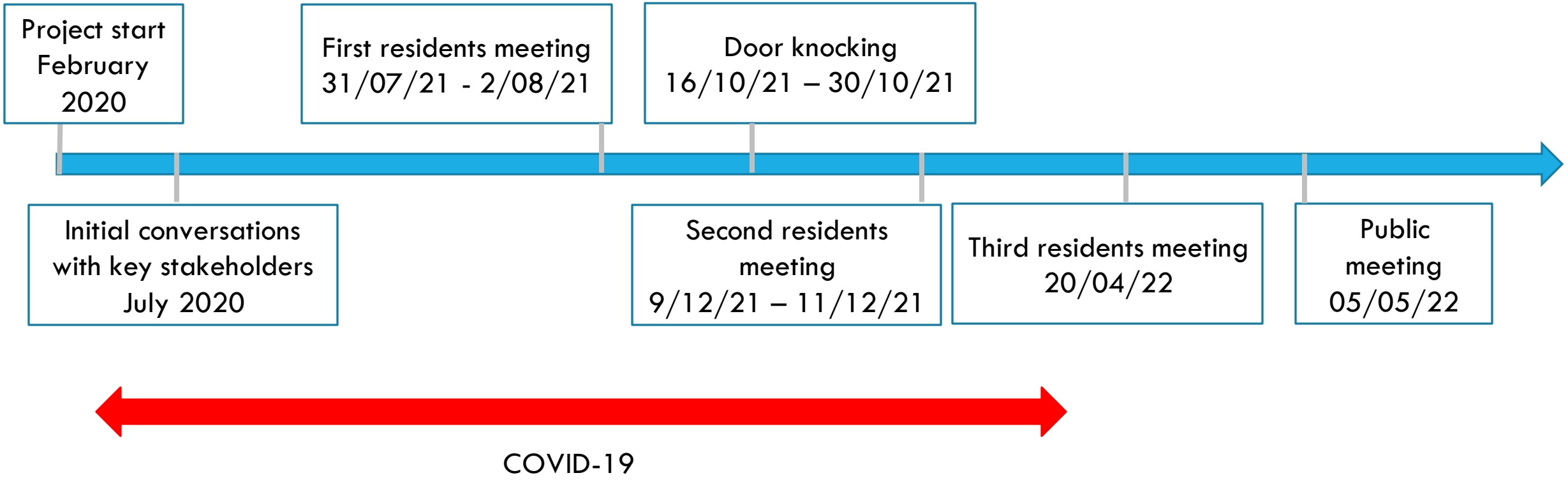


KEY PARTNERS AND STAKEHOLDERS

- Insurance sector
- NZTA
- Residents (owners/business)
- Residents (tenants)
- CDEM
- Wider Whanganui residents
- Red Cross
- Whanganui Girls' College
- DPMC
- Ngā Tāngata Tiaki o Whanganui
- Te Rūnanga o Tupoho
- Horizons Regional Council
- Whanganui District Council

Collaboration, consultation & the co-design process

ENGAGEMENT TIMELINE



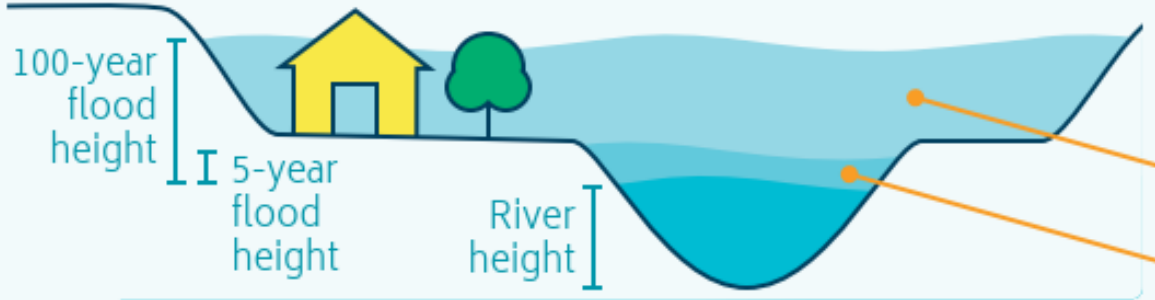
WHY A FLOOD RESILIENCE STRATEGY?

Whanganui flood, 2015

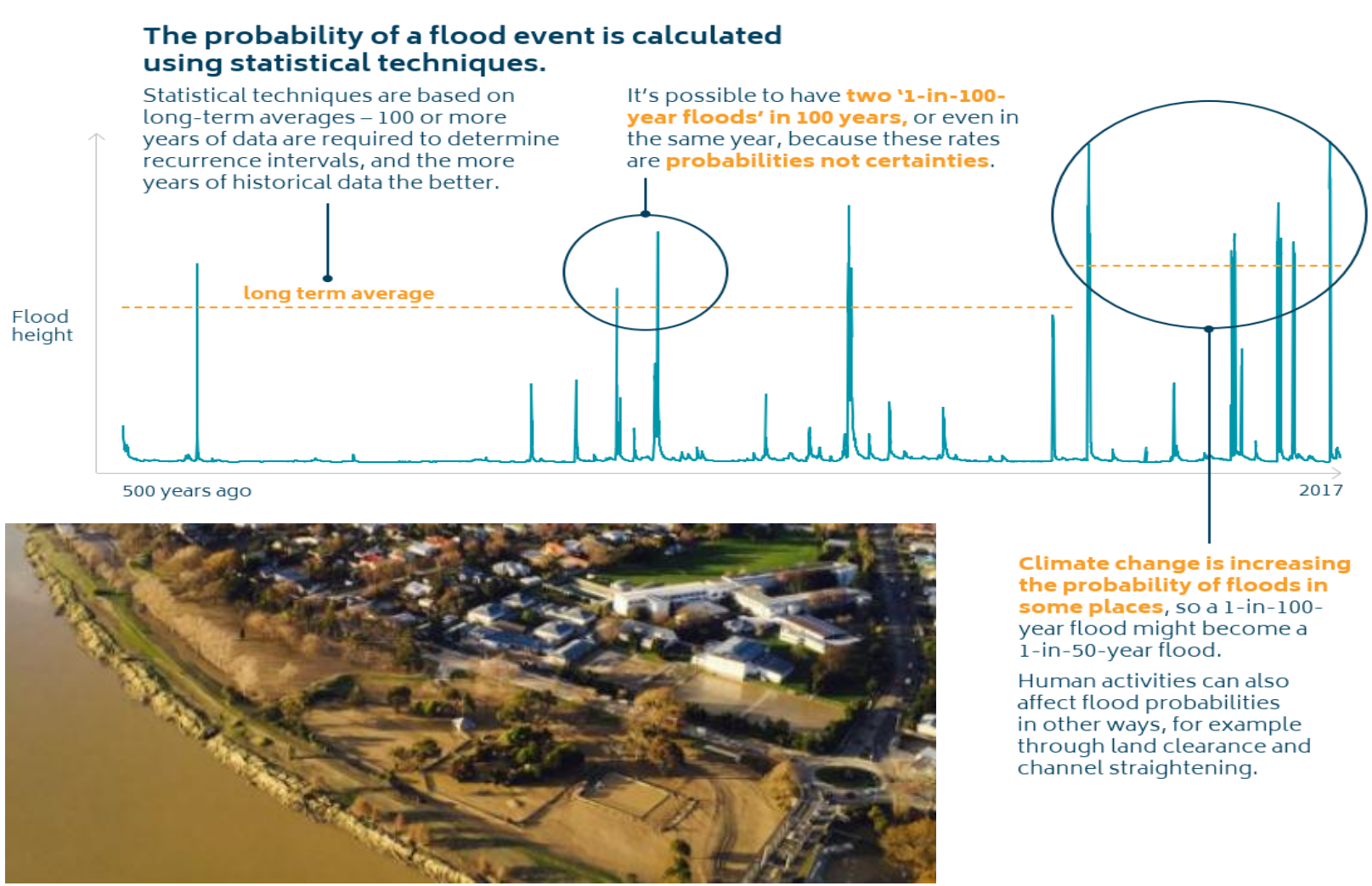
- Increasing flood risk is reality around world
- Climate change makes flooding worse
  - NIWA (2016): West of region +10-20% > winter rainfall (2040-90); sea-level rise
- Whanganui awa floods
  - June 2015 flood = 4775-5150 cubic metres per second; 1:130-150 yr
  - Floods >4000 cumecs: Mar 1990, Feb 1940, Aug 1939, May 1904, Feb 1891, Sep 1858, 1864 & 1875
  - Not a sedimentation problem – 2015 capacity of channel > 1995 (Horizons, 2016)
- Need to address flood risk & build community resilience
  - Taken seriously – Strategy formulation supported by Horizons, WDC, mana whenua, awa
  - Your views about way forward matter & will inform the strategy
  - Horizons Regional Council commissioned Massey researchers to facilitate strategy
  - Horizons Regional Council will consider recommendations & decide on way forward
  - Realistic expectations – Complex issue with many different parties involved in implementation

WHAT DOES 1 IN 100 YEAR FLOOD MEAN?

- 1:100 year flood ≠ flood only happens every 100 years
- It is statistical measure
- 1:100 year flood = likelihood flood level reached once in 100 years
- Or 1% chance of flood level being reach in any given year



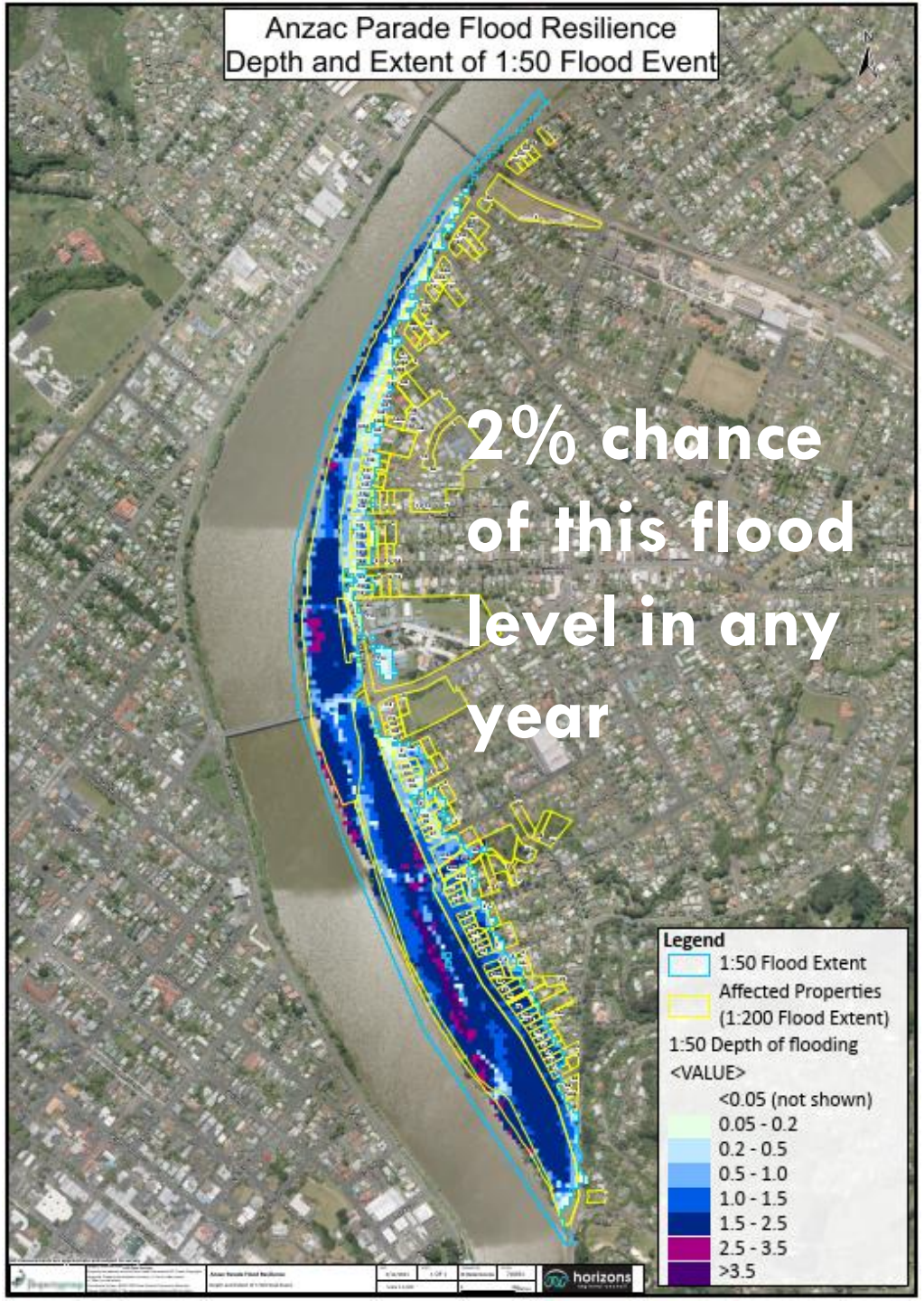
Recurrence interval	Probability of occurence per year	% chance in any year	Annual exceedance probability (AEP)
100 years	1 in 100	1%	0.01
5 years	1 in 5	20%	0.20

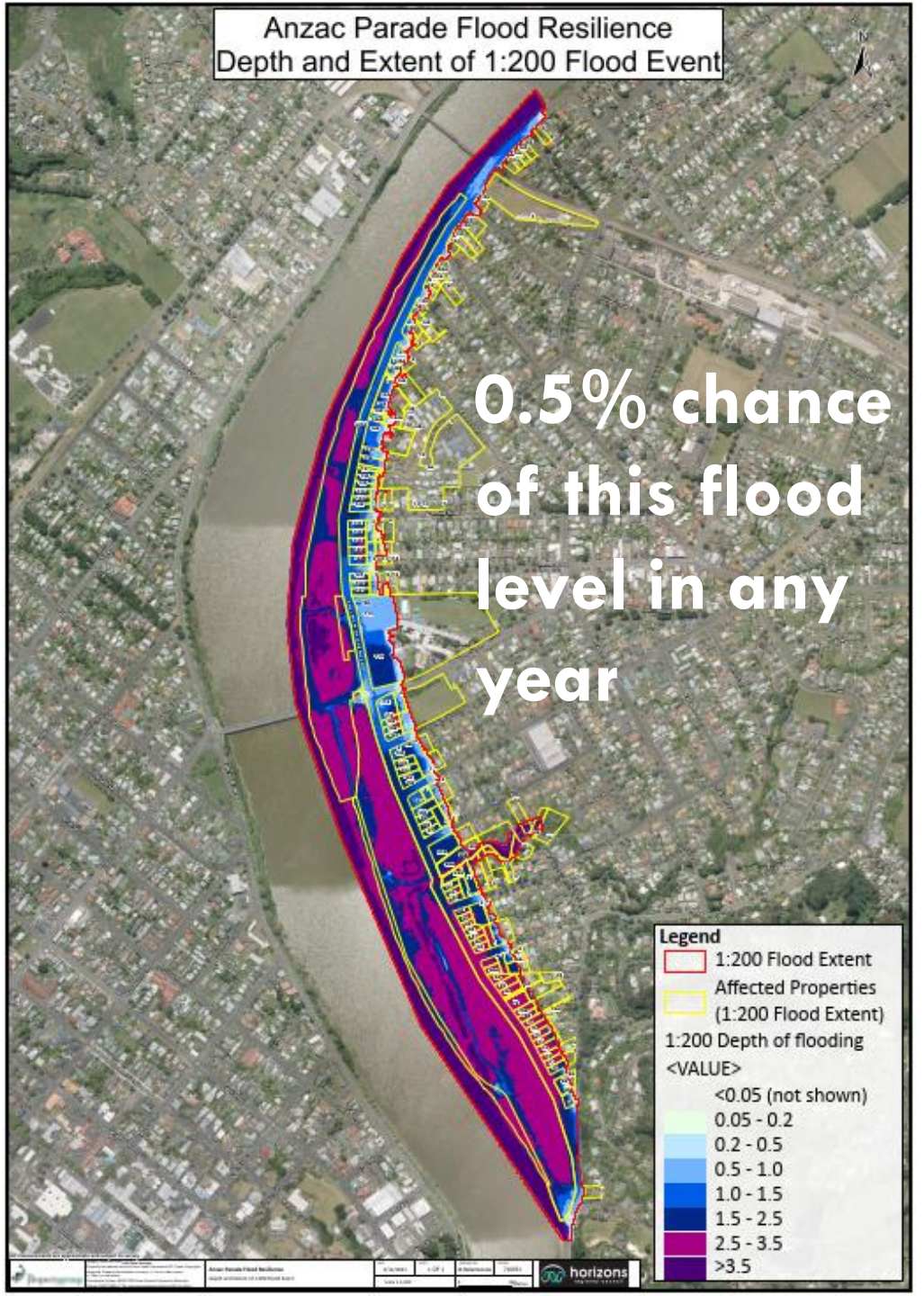


1:100 YEAR FLOOD WITH CLIMATE CHANGE

Coastal climate change infographic series
www.coastadapt.com.au
Australian Government
Department of the Environment and Energy
CoastAdapt
NCCARF
National Climate Change Adaptation Research Facility

MAPPING FLOOD RISK



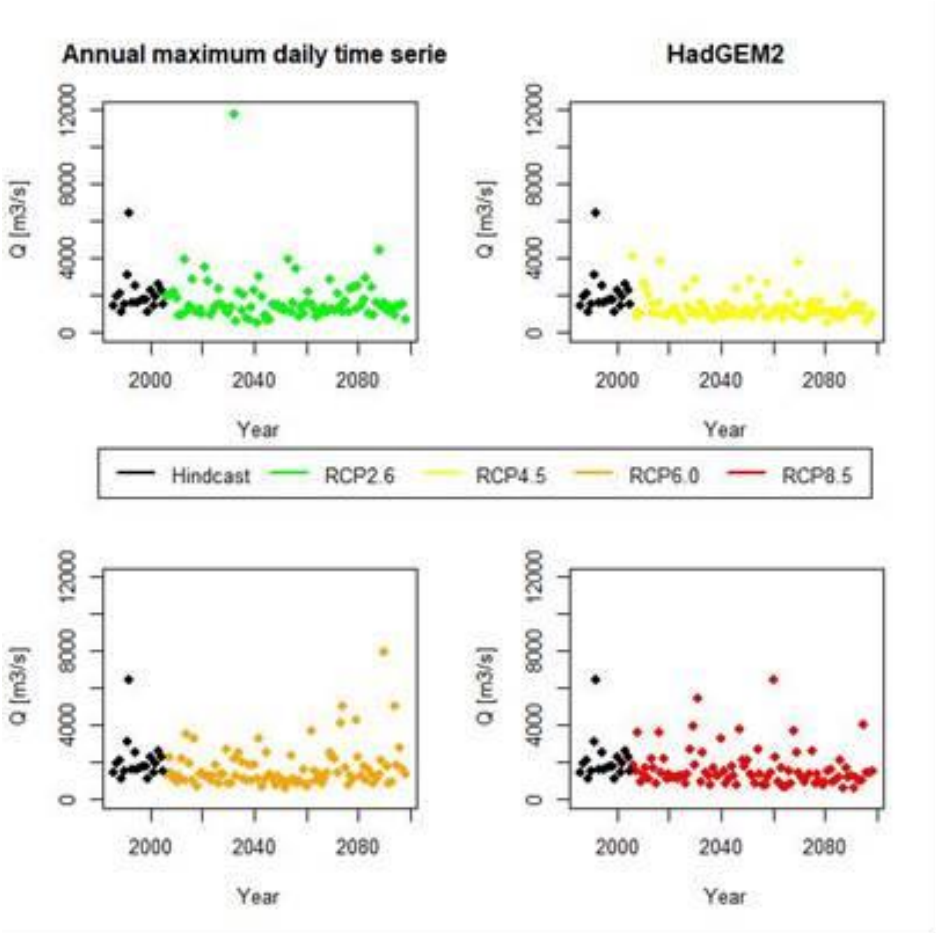


MAPPING FLOOD RISK

Climate change projections developed by NIWA indicate that:

- Existing flood frequency statistics for large events are based on a long gauging record & consider historic peaks. At present this provides us with a robust basis to quantify the impacts of a large event in the Anzac Parade area.
- There is inherent uncertainty in estimating the impacts of climate change in distant future.
- There may be little change in the less frequent events (50,100, 200yr events).
- There may be an increase in the magnitude of more frequent events (i.e., 10, 20, 30 yr events).

Annual maximum daily average flow time series over the period 1986-2098 for the HAdGEM2 GCM for 4 RCP scenarios



NIWA
Taihoro Nukurangi

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Sandbags and black polythene
Clear logs
Keep the Matarawa Stream clear/clean
Matarawa Stream floodgate
Lift houses
Take out the Matarawa Stream dogleg
The Dam higher up river is a problem
Widen the Matarawa Stream near the bottom
Relocate houses
Dredge the river silt
Dredge the port/ straighten/ widen river mouth
Sort erosion upstream/Paraparas/ bad land/forestry management
Indian floodgates
Stormwater soakpits - waterlogging ground
Inflatable banks
Higher stop banks /at same level all along
Raise land
Non-return valve on stormwater system
Sheet pile in stop banks
Keep culverts and mouth of stream clear
Pumps
Flood gates/barrier at Park/Boat ramp entrances
Plant natives
Don't know/cannot stop river
Monkey cheek method in Thailand
Deeper catchment higher up river
mother nature
Dam the river higher up
Clean drains

Options: Whanganui awa

Dredge the river

Sort erosion upstream/Paraparas/ bad land/forestry management

Widen river mouth

Deeper catchment higher up river

Dam the river higher up

- Sustainable land-use practices upriver could help & has precedent e.g., SLUI
- Public perception that deepening & widening awa could reduce flood risk
- Horizons assessment indicates minimal impact on flood levels; 2015 capacity channel > 1995
- Major interventions would have significant negative cultural & ecological impacts (river degradation, riparian & coastal habitat loss, noise pollution, increase in suspended sediment concentration, etc.) that outweigh minimal gain in flood risk reduction; regulatory challenge (awa)
- **Major works not effective; cause major impacts & long-term maintenance costs**

Options: Stopbanks

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

Flood gates/barrier at Park/Boat ramp entrances

Sheet pile in stop banks

- Horizons plus Tonkin & Taylor assessment indicates:
  - Serious technical challenges (e.g., seepage)
  - High costs (e.g., ~$6-7 mill for 1:50 year protection; >$10 mill for 1:100 year protection) & affordability; **$27-33 mill for 1:200 year protection**)
  - Regulatory challenge given awa legal status
- 2017 consultation by Horizons: Whanganui ratepayers reluctant to pay cost of increased protection at Anzac Parade
- Protection through targeted rates but no agreement by Anzac Parade residents
- **Stopbank upgrades not feasible because of technical & regulatory challenges & affordability**

Options: Raising houses

Lift houses

Kaiapoi, Waimakariri, Canterbury

Floating houses … cost … float away?

Planning implications:

Alterations to buildings are possible but must comply with:

- Suitable finished floor or ground level after allowing for freeboard above the 1:200 year flood level
- Safe access/egress (escape)
- Resilient building methods that provide resilience for up to a 1:200 year flood event
- Avoidance of significant diversion of flood flows as a result of the development

Options:
Raising houses

Lift houses

Indication of scope to raise houses

1:100yr (<1m): 40 H; $12Mill

Many additional costs & regulatory challenges

Cost implications:

Buildings in most-at-risk areas can be raised to 1m, but costs NZD300,000 – NZD534,000 per house.

- **Variables affecting cost estimate:** <100m2, heavy roof, brick veneer, chimney, 2 storeys.
- **Base cost includes:** Disconnection, jacking and chocking, demolition of existing substructure, new foundations, disposal of demolition materials, lowering and reconnection to new foundations, extending services (power, gas, water, drainage, data), and access steps/landing.
- **Excludes:** Outbuilding works, groundworks, Geotech surveys (if required), asbestos removal, accessible ramps, building consents, inflation, replacement of heavy roofs and/or chimneys.

Options: Buy-out &/or relocate houses

Don't live on a floodplain

Relocate houses

Indication of scope of buy-out

1:50yr (>1m): 34 H; RV $9.5mill
1:100yr (>1m): 40 H; RV $10.8mill
1:200yr (>1m): 50 H; RV $15.6mill

Many additional costs & regulatory challenges

There are planning tools to enable a buy-out &/or relocation program.

- WDC is currently looking into a few potential Council owned sites for future development.
- In the future, a plan change may be required to enable convert vacated lots into open space.
- However, greenfield development is almost entirely in the hands of private sector.
- Social and cultural concerns.
- None of these issues will be solved in the short term.

Options: Buy-out &/or relocate houses

Don't live on a floodplain

Relocate houses

Indication of scope of buy-out

1:50yr (>1m): 34 H; MV $17.7mill
1:100yr (>1m): 40 H; MV $21mill
1:200yr (>1m): 50 H; MV $28.1mill

Many additional costs & regulatory challenges

There are two legal mechanisms to enable a buy-out &/or relocation program.

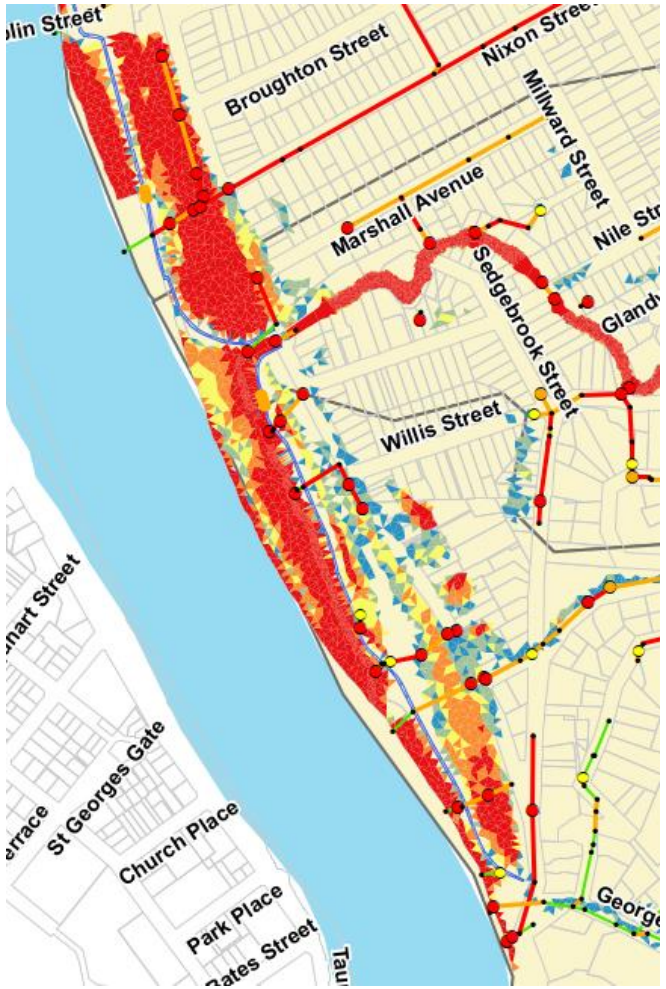
- Covenant in gross in favor of Horizons (voluntary).
- Public works Act 1981 (compulsory).
- If rented properties were bought, the buyer (Horizons) would have to see tenancy agreements through.
- The question of who pays, and whether central government would contribute is not resolved.

Additional tasks: Matarawa Stream

Matarawa Stream does not contribute significantly to major Whanganui awa flood events, but CC might change this.

However: Regular maintenance & clearing of Matarawa Stream (Gerse St. culvert) could help reduce nuisance flooding and Horizons is looking at maximising diversion scheme.

Status quo, no CC, 0.5 AEP (1:200yr)



Status quo, RCP 8.5, 0.5 AEP (1:200yr)

Additional tasks: Reduce nuisance flooding

Sandbags

Planting

Inflatable banks

Clear logs

Keep drains clear

Monkey cheek method in Thailand

Pumps

Stormwater soakpits – waterlogging ground

- Whanganui District Council has a Stormwater upgrade program in place.
- Whanganui East is one of the priority areas for system improvements to reduce nuisance flooding.
- However, this is a long term plan (30 Year Infrastructure Strategy), and will not reduce major flood risk, only nuisance flooding.
- Are some measures home-owners can take.

Additional tasks: Early warnings & evacuation

https://envirodata.horizons.govt.nz/

- Horizons and Whanganui District Council have taken note of difficulties experienced in registering and interpreting the early warning system.
- Ways to improve these processes are being investigated.

ONE

Register on Horizons Flood Alert page at www.horizons.govt.nz/river-alert-system

TWO

Have a 'go bag' ready with essential medication, masks, special dietary items, copies of important documentation, animal food etc. Visit Civil Defence website www.civildefence.govt.nz

THREE

Practise with your pets so they are comfortable getting in & out of carry cage if you need to move them in a hurry.

KEY FINDINGS

Questions or concerns?

Very limited options to reduce flood risk in short- to medium-term.

- Improve **early warning system and evacuation procedures.**
- **Keep Matarawa Stream clear.**
- **Stopbank upgrade infeasible** due to technical, regulatory, financial, cultural and CC reasons.

Long-term options are raise houses &/or buy-out/relocation program, but CC uncertainty.

- **Raising houses is feasable but costly and not cost-effective,** especially in context of climate change, and is incomplete solution.
- **Buyout/relocation program more cost-effective, but highly uncertain** given lack of guidance from central government re cost-sharing contribution.

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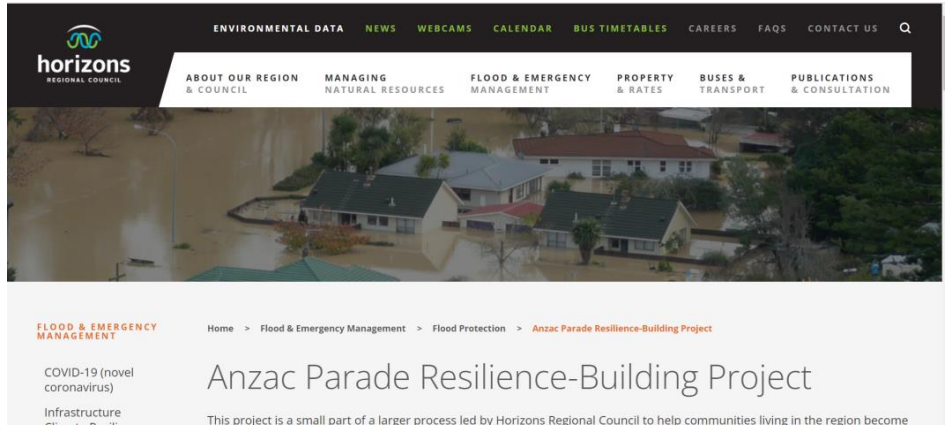
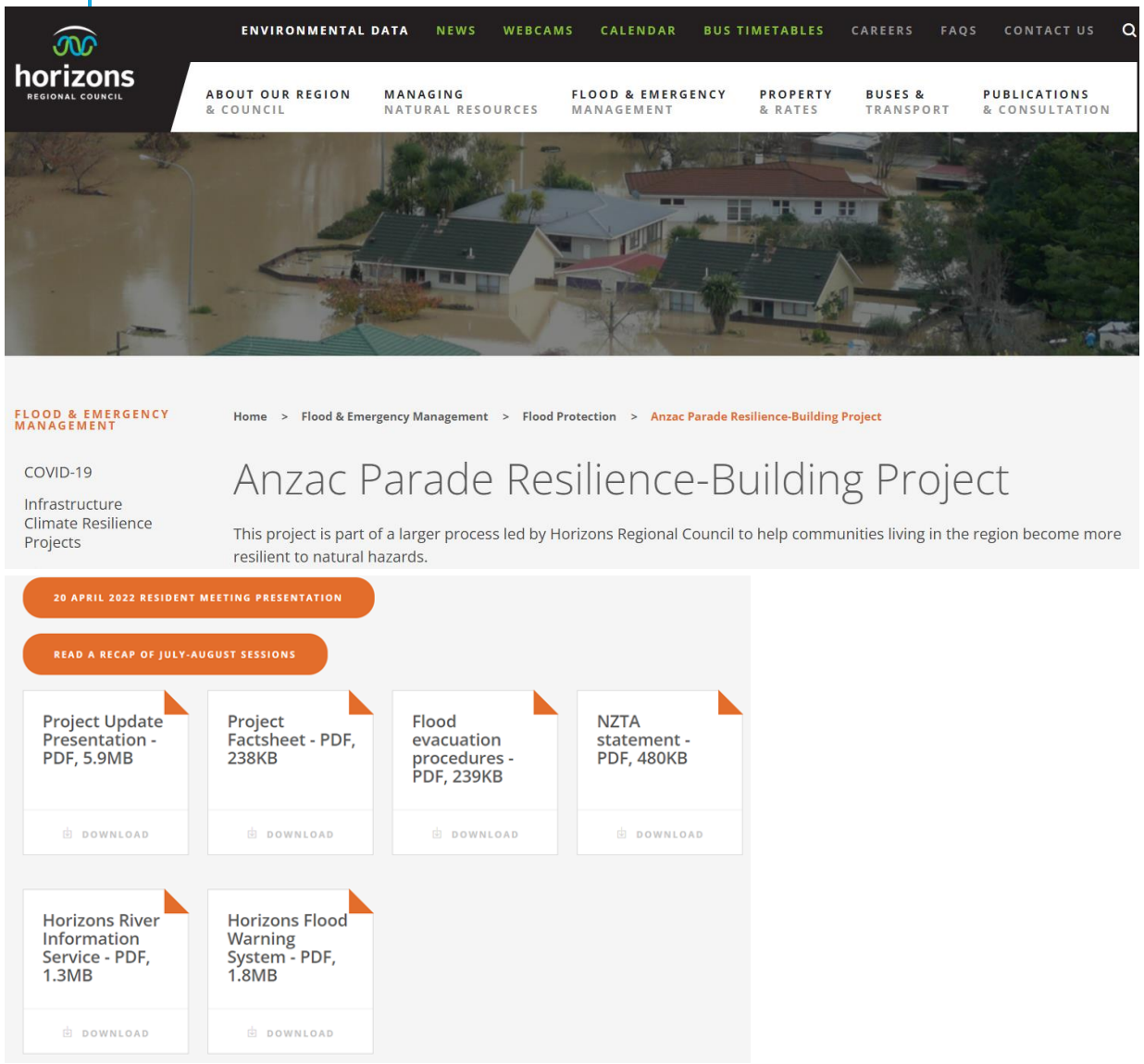


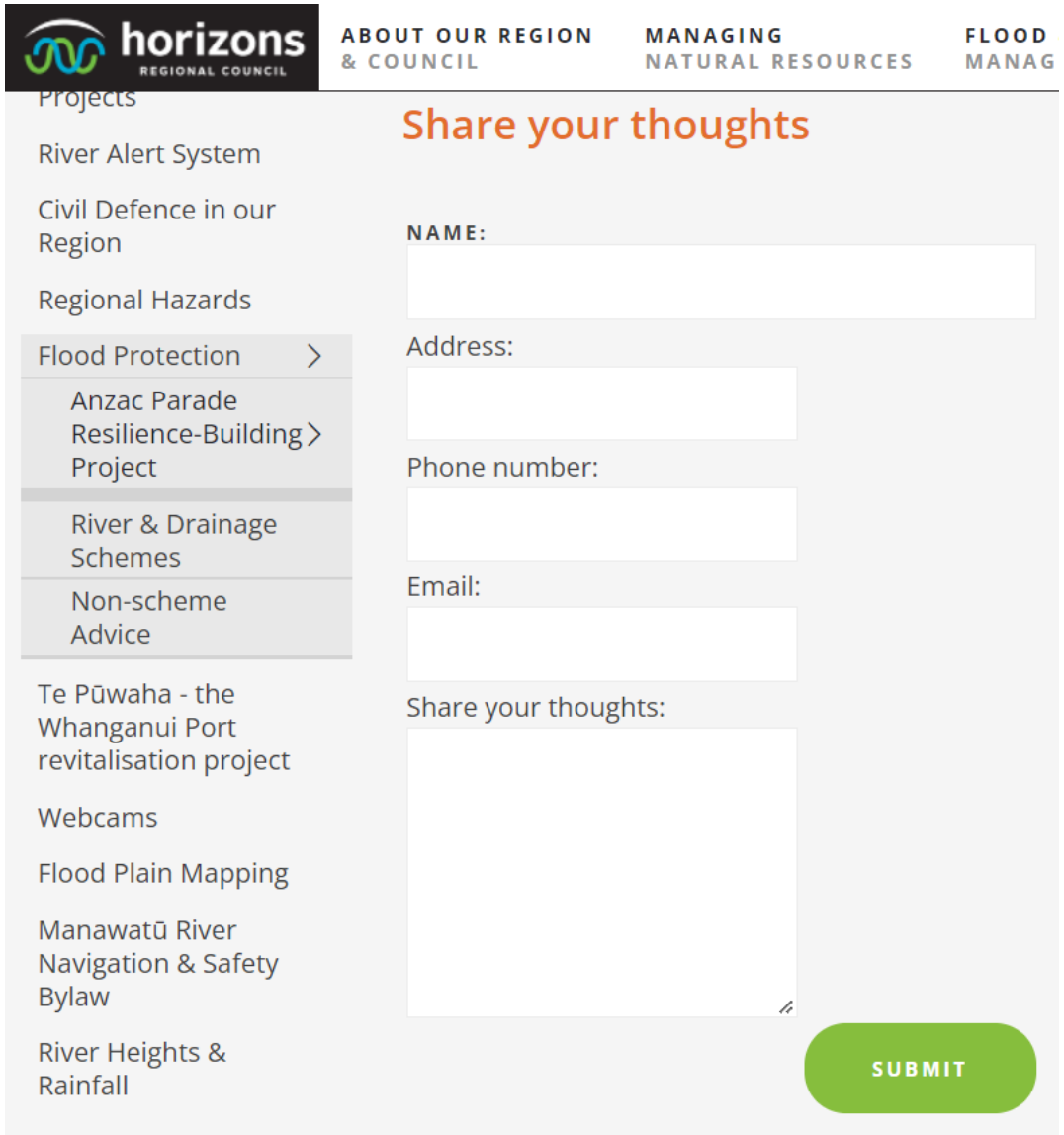
NEXT STEPS, YOUR CONTRIBUTION & CLOSURE

- **What will be in the strategy?**
  - Strategy (~20 pages of plain language key findings & recommendations)
    - Overview of strategy formulation process
    - Overview of flood risk along Anzac Parade
    - Pros & cons of options for reducing risk & building resilience
    - Recommendations
  - Supporting portfolio of documents:
    - Incl. feedback from residents, interviews, etc.; overview of decision-making context; analysis of options; guidance suggestions
- **Next steps:**
  - Draft Anzac Parade Resilience Strategy for resident, mana whenua, awa, stakeholder & public review & feedback (end May - early June'22)
  - Final Anzac Parade Resilience Strategy submitted for Horizons decision (end June'22)
- **How can you contribute to the strategy?**
  - Feedback / follow up from this meeting – *see webpage*
  - Comments on Draft AP Resilience Strategy – *see webpage*

QUESTIONS

HTTPS://WWW.HORIZONS.GOVT.NZ/ANZAC-PARADE





CLOSING KARAKIA

Kia tau ngā manaakitanga a te mea ngaro
ki runga ki tēnā, ki tēnā o tātou
Kia mahea te hua mākihikihi
kia toi te kupu, toi te mana, toi te aroha, toi te Reo Māori
kia tūturu, ka whakamaua kia tīna! Tīna!
Hui e, Tāiki e!

Let the strength and life force of our ancestors
Be with each and every one of us
Freeing our path from obstruction
So that our words, spiritual power, love, and language are upheld;
Permanently fixed, established and understood!
Forward together!