

#### ANZAC PARADE: FLOOD RESILIENCE STRATEGY UPDATE BRUCE GLAVOVIC, MARTIN GARCIA CARTAGENA, KATHRYN MCDOWELL

#### December, 2021





### **MEETING PURPOSE & AGENDA**

- Explain Project: Anzac Parade Flood Resilience Strategy
- Feedback from AP residents & property owners on flood risk
- Map extent & depth of possible future flood events
- Discuss possible interventions

Next steps

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





e > Flood & Emergency Management > Flood Protection > Anzac Parade Resilience-Building Project

COVID-19 (novel
coronavirus)
Infrastructure

Anzac Parade Resilience-Building Project

This proiect is a small part of a larger process led by Horizons Regional Council to help communities living in the region becom

#### PROJECT AIMS



#### **Role of Massey researchers:**

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

- Create a **co-designed strategy** to reduce flood risk & increase community resilience along Anzac Parade.
- Assess feasibility of range of community-wide and propertyspecific 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.

# WHY A FLOOD RESILIENCE STRATEGY?



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
- U 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  $\neq$  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



#### The probability of a flood event is calculated using statistical techniques.





Climate change is increasing the probability of floods in some places, so a 1-in-100year flood might become a 1-in-50-year flood.

Human activities can also affect flood probabilities in other ways, for example through land clearance and channel straightening.

#### 1:100 YEAR FLOOD WITH CLIMATE CHANGE

Coastal climate change infographic series www.coastadapt.com.au

Australian Government Department of the Environment and Energy



# WHAT IS A FLOOD RESILIENCE STRATEGY?

Agreed way to reduce flood risk & build resilience (1-100y)

#### Based on:

- Assessment of risk now & future given community concerns & climate change
- Evaluation of pros & cons of different options to reduce flood risk
- Plan with best combinations of options to implement over time
- Roles & responsibilities for implementing plan
- Agreed process to monitor, review & revise strategy in future





#### MASSEY CONVERSATIONS WITH RESIDENTS OCTOBER 2021



#### **RELATIONSHIP TO PROPERTY**



87 Households interviewed

## LENGTH OF OWNERSHIP/RESIDENCE





#### REACH OF 2015 FLOOD WATERS

#### From 68 to 165 Anzac Parade (total households interviewed)



Residents of 87 households in this area interviewed. 68 in Anzac Parade and 19 in lower lying properties on side streets.

## REACH OF 2015 FLOOD WATERS

Jublin St Bridg

From 68 Anzac Parade to Dublin Street Bridge (50 households affected)



Residents of 50 households in this area interviewed including 15 properties in lower lying houses on side streets —one in Ikitara Road, two in Willis Street, four in Nile Street, two in Marshall Avenue, four in Nixon Street and two in Sedgebrook Street close to the Matarawa Stream.



on Boydfield Street and Whanganui Girls' College on Jones Street.

#### HORIZONS EARLY WARNING SYSTEM AWARENESS





# MAPPING FLOOD RISK



Anzac Parade Flood Resilience Depth and Extent of 1:200 Flood Event 0.5% chance of this flood level in any **/ear** Legend 1:200 Flood Extent Affected Properties (1:200 Flood Extent) 1:200 Depth of flooding <VALUE> <0.05 (not shown) 0.05 - 0.2 0.2 - 0.5 0.5 - 1.0 1.0 - 1.5 1.5 - 2.5 2.5 - 3.5 >3.5

#### SOME CONCERNS / WORRIES — ABOUT 35 AP RESIDENTS (JUNE 2021)

- Worry about flooding esp. by those here in 2015 flood
- Need to manage nuisance flooding
- Need timely warning to evacuate
- Worry about security of properties if evacuated
- Worry about insurance premium increase & / or uninsurability
- Need help cleaning up after floods
- Flood made worse by SH4 and associated works?

#### SOME SUGGESTIONS — ABOUT 35 AP RESIDENTS (JUNE 2021)

Prepare & implement the strategy

Set up CDEM-community 'committee' to keep residents up to speed on risk reduction measures, etc.

Make 2015 flood level visible – e.g., under bridge & elsewhere?

Improve flood warnings & enable timely evacuation

Provide guidance on 'home preparations' to reduce nuisance flooding

Need solution to release water trapped after flood

Sandbags and	Clear logs	Keep the <b>Matarawa Stream</b> clear/clean				
black polythene	1 : 6		Matarawa Stream floodgate			
	LITT h	ouses	Take out the Matarawa Stream dogleg			
The Dam higher up river is a problem		Relocate houses Widen the Matarawa Stream near the bottom				
	Droc			il+	Dredge	the port/ straighten/
Sort erosion	DICU		e river <b>J</b>		widen	river mouth
upstream/Paraparas/ Indian floodgates			Stormwa - waterlo	Stormwater soakpits - waterlogging ground		Inflatable banks
bad land/forestry r	nanagemei	nt				
Rai Non-return valve on stormwater system	ise land	sher Sto Sheet pil	<b>op bar</b> e in stop banks	<b>1KS</b> Kee	<b>/at sar</b> p culverts an	me level all along ad mouth of stream clear
<b>Plant</b> natives	Pumps Flood gates/barrier at Park/Boat ramp entrances					
	Don't know/ca	annot stop rive	r	Μ	onkey cheek	method in Thailand
Deeper catchment higher up river	mothe	r natu	<b>re</b> Dar	m the riv	er higher up	Clean drains

#### **Options: Matarawa Stream**

#### Keep Matarawa

- Stream clear/clean
- Matarawa Stream floodgate
- Take out Matarawa Stream dogleg
- Widen Matarawa Stream near bottom

Keep culverts and mouth of stream clear

- Perception that Matarawa Stream contributed significantly to 2015 flooding
- Horizons Regional Council indicates that flow from Matarawa Stream not significant compared to flood waters from Whanganui awa
- Changes to diversion & management scheme impose significant social and ecological impacts/costs upstream > benefits from reduced flood risk to Anzac Parade
- Regular maintenance & clearing of Matarawa
   Stream could help reduce nuisance flooding to nearby properties & improve water flow

#### Options: Whanganui awa

- 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

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

## **Options: Stopbanks**

- Many residents recommend improving stopbanks
- Horizons 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; 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**



- No locally produced study of this option
- Building experts point out costly structural challenges for many houses (given cladding, roofing, foundations, etc.) & geotechnical problems (liquefaction risk = deep piles)
- Also planning & practical challenges (e.g., services; evacuation; aesthetics)
- But some houses in flood-prone areas could be raised at potentially reasonable cost
- We are getting specialist advice on technical & cost implications for typical houses in AP

Kaiapoi, Waimakariri, Canterbury

Lift houses





Floating houses ... cost ... float away?

#### Options: Buy-out &/or relocate houses

#### Don't live on a floodplain Relocate houses

Indication of scope of buy-out

1:50yr (>1m): 33 H; RV \$9.5mill 1:100yr (>1m): 37 H; RV \$10.8mill 1:200yr (>1m): 50 H; RV \$15.6mill

Many additional costs & regulatory challenges

- Buy-out / relocate houses suggested by some
  - Could be effective to reduce flood risk, but major constraints e.g., social, cultural, financial & political (e.g., who pays; what is role of central government; could affected homeowners be relocated; cost of 'clean up'; greenfield development?). Difficult in short-term.
- Buy-out / relocation of most at-risk houses may be effective in medium- to long-term, but need:
  - ) Enabling legal framework
  - ii) Fair compensation
  - iii) Address needs of renters

We are investigating practicalities; some questions may not be answered

#### **Options: Reduce nuisance flooding**



- Some suggested measures to reduce nuisance flooding e.g., sandbagging, planting wetland natives, inflatable banks, etc.
- Such measures may help in short-term, but do not reduce major flood risk that is increasing with climate change.
- Guidance for residents may be helpful.
- Maintain Matarawa stream & infrastructure.
- We will outline guidance in draft Strategy

#### Options: Early warnings & evacuation



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

- Get in touch with your local CDEM office to find out more about evacuation procedures
- Enrol in the early warning system
- Be ready!

#### ONE

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

#### 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.

#### Flood risk reduction suggestions



#### Questions or concerns?

#### In summary:

- Interventions in Matarawa Stream & awa not enough to reduce flood risk.
- Stopbank upgrade is challenging: technically, regulatory & affordability.
- Raising some houses may be feasible, but more information needed on geotechnical, planning, structural & financial implications.
- Buy-out &/or relocating some houses may be possible, but need more detailed assessment about who would pay for buy-out / relocation; unlikely in short term.
- Nuisance flooding measures may be effective for small-scale events but not major floods; guidance may help.
- Have evacuation plan, enrol in early warning system, be ready!

## NEXT STEPS

- Pros & cons of options assessed & explained to residents (Feb-Mar'22)
- Pathways to risk reduction & resilience agreed different sets of options implemented over time (workshops in Mar-Apr'22)
- Draft AP Resilience Strategy available for resident, mana whenua, awa, stakeholder & public review & feedback (May-June'22)
- Final AP Resilience Strategy publicly reviewed then submitted to authorities for decision (Jul-Aug'22)