Progress Report

Reducing flood risk in a changing climate:

A flood risk reduction strategy for Anzac Parade

Progress Report

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Contents

1. Introduction

This report will showcase the progress made in from May 2020 to October 2020. It will outline the geographical boundaries of the project and the design and implementation of an initial communications strategy. It will also describe the ethical implications of this project as well as the mitigation measures being taken. And finally, the initial results of the pilot study will be outlined with some reflections on how these inform the issue of resilience-building options, the governance aspect of this project, public engagement, and the next steps to be taken.

2. Definition of the area of the project (MAP)

Anzac Parade is a part of what is known as Whanganui East, and boundaries had to be established to limit the geographical scope of the project. The area was delimitated to ensure that all the Anzac Parade residents who are located within the parameters of the 200-year flood line were included. This includes residents who live on perpendicular roads connected to Anzac Parade but not directly on Anzac Parade, and still exposed to the modelled 200-year flood level (e.g.: Boydfield Street, Duncan Street, etc.). As Figure 1 indicates, Te Mawae Street bounds the area to the north, and Mount View Road bounds the area to the south. To the east, the boundary will be the 200-year flood line, and to the west, the river itself. These boundaries resulted in the inclusion of a total of 174 properties.

Figure 1. Horizons Regional Council designed map of the designated area for the Anzac Parade Resilience Building Strategy project.

3. Communication strategy

Before initiating direct communication and interviews with residents a joint communication strategy was designed by Massey University and Horizons Regional Council. The communications strategy is a coordinated approach to:

1. Create awareness amongst residents that the project is underway,
2. introduce the consultants and the objectives of the project, and
3. explain that the project is focused on identifying and assessing a series of possible resilience building options, ranging from protection to accommodation and managed retreat.

As Figure 2 shows, initial communications included: Firstly, Horizons Regional Council drafted and published a press release which was printed on the Whanganui Chronicle on the 20th of August. The press release was drafted by Horizons staff with input from Massey University staff, Horizons councillors, and the endorsement of Whanganui District Council (WDC) and Ngā Tāngata Tiaki o Whanganui (NTT). Once the press release was published, a letter was drafted by Horizons staff informing residents from the designated area of the project and that Massey University staff would be contacting them. At this stage, a second letter has been drafted by Massey University staff to

engage with residents, but it will not be sent out until the project receives full ethics approval by the Massey University Human Ethics Committee (MUHEC), which currently has a provisional approval.

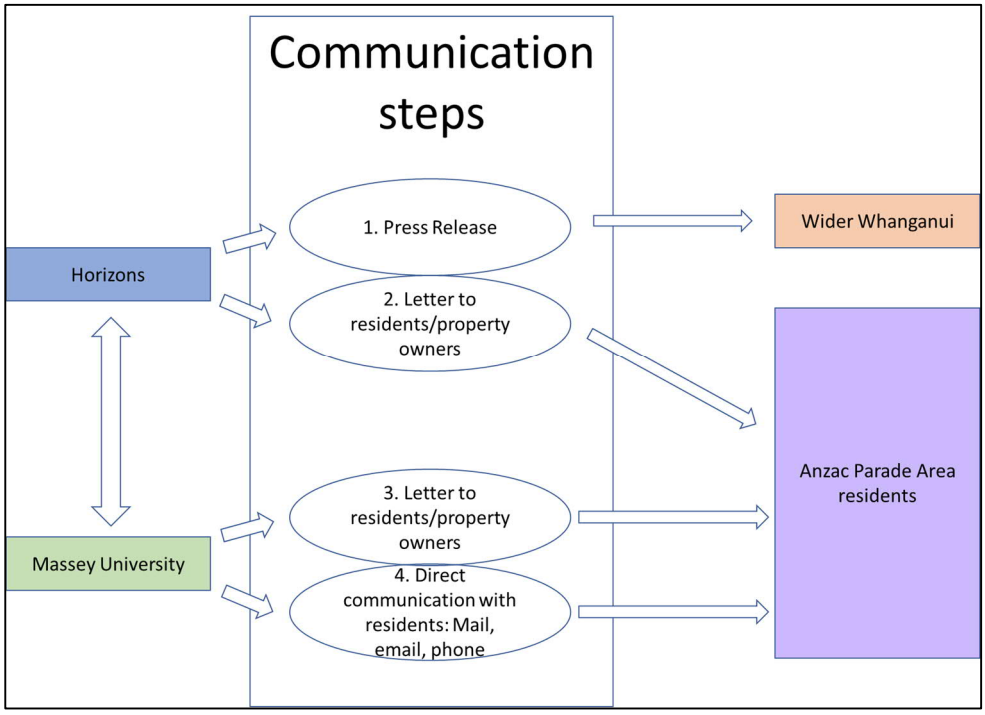

Figure 2. Initial communication strategy framework.

4. Pilot study

A total of nine pilot interviews were conducted with residents, CDEM staff, Red Cross staff, local council staff, as well as councillors from both local and regional levels. The purpose of this pilot study was twofold: firstly, to assess the risks of causing emotional distress to residents through the interview process and identify strategies to mitigate these risks. Secondly, to test an interviewing instrument and rationale (interview questions). Both objectives were achieved, and the results are outlined below.

4.1. Ethics

The peer-review process was discussed and analysed by the project team in the light of the *Massey Code of Ethical Conduct for Research, Teaching and Evaluations involving Human Participants*. Ethical considerations were also discussed with the Chair of the Southern B Human Ethics Committee (Dr Gerald Harrison). Ethical issues were also discussed with selected local community leaders and local specialists relevant to the project. The initial phase of the project (pilot study) was consented as 'low risk' (see related application No. 4000022739).

One key ethical element for consideration was the involvement of tāngata whenua and mana whenua as foundational partners for the project. To honour the principles of te Tiriti O Waitangi / The Treaty

of Waitangi (including participation, partnership, and protection), guidance was sought from Te Rūnanga o Tūpoho. After discussing the envisaged approach with Te Rūnanga o Tūpoho, they endorsed the project and advised that partnering at the Iwi level was preferable. Furthermore, additional advice and guidance will be provided on how to conduct this project in a way that honours and respects Te Awa Tupua. Consultations with NTT will also be pursued through Te Rūnanga o Tūpoho.

Another important ethical consideration to consider was that the interviews could expose some residents, especially those who were flooded in 2015, to emotional distress. After consulting local community leaders and local specialists (local CDEM and Red Cross staff) multiple strategies were considered: conduct interviews with/in the presence of a support person chosen by the interviewee (another family member, friend, neighbour, etc.); provide contact information for health and mental health support services in case participants require assistance after the conversations; and, finally, have local emergency phone numbers at hand at all times (e.g. Crisis Assessment and Treatment Team) in case further assistance is needed during the interview. Following the Massey Ethical Code, and the Privacy Act 1993, confidentiality will be assured to the extent allowed by the law, and information sheets and consent forms will always be provided to participants to review and sign before conducting interviews. The project will distribute the burden of participation as fairly as possible.

4.2. Pilot study results

Findings from the pilot study provided valuable insights about the flood experience from key informants with different cultural and organisational backgrounds. The pilot study revealed some initial key considerations for the design and implementation of the resilience-building strategy. The following sections will introduce and discuss each of these.

4.2.1. Key considerations

A synthesis of key considerations was identified in this initial stage of the project is presented in Table 1, and

Table *2*. A detail of each of these considerations will be elaborated in the next sections.

Table 1. Synthesis of key considerations for designing and implementing a resilience-building strategy for Anzac Parade.

Key consideration	Description
a. Te Awa Tupua Framework	Need to align the Anzac Parade resilience strategy with Te Awa Tupua multi-levelled (social, economic, natural, cultural, spiritual, etc.) framework.
b. Importance of Highway 4	Highway 4 is considered to be of vital importance for Whanganui because it provides access to the township. Leaving it unprotected could exacerbate the risk of being isolated during and after an extreme flood event.
c. Social vulnerability	Social vulnerability in Anzac Parade could hinder residents capacity to access resources to flood-proof the housing stock due to affordability and tenancy issues.
d. High resident turnover	The number of residents who moved to the area after the 2015 floods have no experience in floods and have a low perception of flood risk. In addition, the high frequency with which residents change over the years due to flood migration could also be hindering the sense of community and collective action.
e. Residents distrust towards public organisations	Some residents show distrust towards public organisations due to post 2015 floods unfulfilled promises, and sense of inaction about increasing flood-protection in the area.
f. Different technical information circulating	Horizons and WDC forecasting models are producing different outcomes due to apparent different data inputs. These differences lead to ambiguity in decision making and can hinder the legitimacy of decisions to not raise stopbanks in the area and Matarawa diversion scheme.
g. Open dialogue between Horizons and WDC to identify pragmatic resilience building options for Anzac Parade	A relationship of open dialogue between Horizons and WDC was identified and it offers a valuable opportunity to align interests, roles, and responsibilities about the emerging resilience-building strategy. It can also be harnessed to address the technical and bureaucratic differences between both councils.

Table 2. Synthesis of key considerations for designing and implementing a resilience-building strategy for Anzac Parade (cont.)

Key consideration	Description
h. Liquefaction risk in Anzac Parade for raising houses	There are moderate earthquake and liquefaction risks in Anzac Parade area. This could pose a technical and costly barrier for raising houses.
i. Difference between broader Whanganui residents, and Anzac residents over financial responsibility for flood-protection measures in the area	A tension between broader Whanganui residents and Anzac Parade residents over the distribution of the costs of flood-protection measures in the area. This could be a barrier that reduces the amount of viable resilience-building options due to affordability.
j. Kowhai park	Kowhai Park was identified as a unique value of Whanganui and it offers an opportunity because it could be expanded or restored to maximise its natural buffer capacities whilst also improving the public amenities of the area.
k. Flood-proofing	Individual flood-proofing was identified to be used by a resident in the area, and potentially, by others as well. This offers an opportunity because it shows that these types of resilience-building options are acceptable to some residents, thus offering a low-cost option to increase flood resilience in the area.
l. Early warning systems, readiness programs and CDEM engagement in the area	Existing local CDEM actions in the area such as early warning systems, readiness programs, and community engagement offer an opportunity because these activities are contributing to community development in the area and fostering community leadership for resilience building. Further supporting these activities and acknowledging them in the strategy is important to enhance the readiness aspects of resilience-building in the area.
m. Climate emergency declaration and climate change strategy	The Whanganui climate emergency declaration and climate change strategy offer an opportunity because these policy documents indicate that the council and the general public are relatively aware of climate change and its consequences for low-lying areas. Furthermore, these documents institutionalise the acceptance of climate change as a risk factor to be addressed in other local planning instruments.

a. Te Awa Tupua Framework

The first scoping report produced for this project also identified the Te Awa Tupua Framework as of vital importance for the process of formulating a resilience-building strategy for Anzac Parade (Garcia & Glavovic, 2020). This framework manifested as law in the Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 acknowledges the Whanganui River catchment as an indivisible physical and metaphysical living whole, an ancestor. Furthermore, as described in the Whanganui River Report

(1999) developed by the Waitangi tribunal the river '*(…) in Māori terms, the river was a single and indivisible entity, a resource comprised of water, banks, and bed (…) the river is called a tupuna awa, or a river that either is an ancestor itself or derives from ancestral title*' (p. xiv). Other research into the topic if the Whanganui River conducted by Rudge (1993) can be used to expand this way of defining the river:

> '*The river is a unifying symbol for members of the largest political grouping; the iwi. It is currently regarded as the soul of the tribe, and the waters of the Whanganui are perceived as its blood or life force. Because the waters of the awa flow past hapū who live on its banks, it is said that the awa retains the tribal culture of the iwi*' (p. 51).

In other words, the introduction of this framework into western law is only a recent event, whilst this indigenous and complex way of understanding, feeling, and relating to the river is ancestral to the Whanganui iwi (Waitangi Tribunal, 1999), yet very present, as the words of Turama Hawira (one of two elected Te Pou Tupua) show:

> '*Every time you go on the river, each trip is unique. It's like you are walking into the eternal present, the space of the eternal present. What do I mean by that? It's a place that is timeless, and you can commune with your tupono of yesterday as if they were still there. And it has all that ambience around it. You are never alone on the river, it has its own resonance, its own song. The river sings, every ripple has a different tune, when you are on it, and you are flowing with it, you just become one with the river really*' (Ngā Tāngata Tiaki o Whanganui, 2020, mins 00.27-01.21).

Through the provisions of the Te Awa Tupua (Whanganui River Claims Settlement) Act 2017, Te Awa Tupua is endowed with legal personhood and the human voice for this physical and metaphysical entity is represented by a single role held by two people (Te Pou Tupua). These two people are appointed in agreement between Whanganui Iwi and the Crown. In addition, The Te Awa Tupua Act 2017 also establishes NTT in replacement of Te Atihaunui a Pāpārangi as the new mandated iwi organisation that collectively represents the different Whanganui iwi (e.g.: Hinengākau, Tama Upoko, Tupoho, Uenuku, and Tamahaki). All the iwi and hapū of the Whanganui River *'have an inalienable connection with, and responsability to, Te Awa Tupua and its health and well-being*' (Te Awa Tupua Act 2017, Section 13.b). As such, consulting with the relevant iwi, and through the appropriate channels to explore how they would like to partner with this project is essential to ensure that this process unfolds in a way that honours the partnership principle expressed in the Tiriti o Waitangi (The Treaty of Waitangi).

The importance of engaging with iwi and te awa tupua was also noted in the Horizons Catchment Operations Committee meeting of the 9th of September 2020. During this meeting, Prof. Bruce Glavovic and I presented the project and some of the initial results described in this report to the Catchment Operations Committee. Some councillors present in the meeting highlighted the importance and need to ensure that the necessary consultations with iwi took place. In addition, as described in section 4.1 of this report, upon ethical review of this project the Massey University Human Ethics Committee also raised the issue of not only engaging with the relevant iwi, but also with the River itself as a partner and not a stakeholder. Furthermore, the ethics committee provisionally approved the project subject to showing proof of engagement and consent of the relevant iwi and the river which was obtained in September 2020.

Following these suggestions, a hui was arranged through Horizons Regional Council with Te Rūnanga o Tūpoho's Kaiwhakahaere Uncle John Maihi, and three of his advisors; Mariana Waitai, Jill Sheehy, and Beryl Miller. The hui took place on the 16th of September of 2020, and in the meeting, the attendees for Upoko expressed their views on different elements related to the project such as ensuring that koha is provided for participants during public consultation phase; the environmental impacts of the resilience-building options considered; and the political complexities underpinning current inter-iwi relations. But perhaps more importantly, they also expressed their interest in this particular project as it relates directly to Te Awa Tupua and it's well-being. They also expressed that they would take our korero back to the iwi to collectively discuss and agree on how they would like to be a part of this process, as well as aid in facilitating contacts with the wider iwi represented through NTT, and the awa itself.

It is important to understand this project as a humble contribution to contribute to the translation of this ancestral framing of Te Awa Tupua into practice by creating spaces for meaningful dialogue and collaboration between western and indigenous worldviews. In doing so, this project could set an important and valuable precedent in terms of equitable engagement with tāngata whenua for flood-related resilience-building efforts that are undertaken in rivers of special significance for Māori. Furthermore, this would open significant opportunities for future flood resilience-building processes in other flood exposed locations in the wider Manawatu/Whanganui region. And finally, inclusively

conducting this project would put all parties involved at the technical and political forefront of bicultural flood-related resilience-building efforts in New Zealand and the world.

In summary, the Te Awa Tupua framework offers an important opportunity because…

- it highlights the importance of considering the broader implications of the project for the awa and its people.
- it acknowledges the ancestral responsibility of the whanganui iwi to the awa, and thus, to decide if and how they want to partner in this project.
- it can set a positive precedent for future regional, national, and international flood resilience building processes in rivers of special significance to indigenous peoples.

b. Importance of Highway 1

Highway 4 was identified by two participants to be of key importance for Whanganui, and thus, specific options should be considered in the strategy to make it more resilient. A regional councillor's narrative can be interpreted to indicate that this highway is vital because it provides access in and out of Whanganui East and the broader Whanganui:

> *'Another element I haven't touched on yet is the road, as a State Highway. And whether or not that stays there. Like, if we went for something quite radical, would the road stay there as well? I mean, we'd always need some sort of access point, and obviously the bridge, Dublin Street Bridge is sort of a key access point into Whanganui East'* (Regional Councillor).

Furthermore, as reflected in the narrative of a WDC staff member involved in the 2015 flood response, the vital importance of highway 4 was highlighted during the 2015 floods when the highway was blocked at several points due to flood intrusion, silt, and landslides. NZTA contractors who were meant to help clear the road were not able to access Whanganui due to highway 4 being closed. This forced WDC staff to take over the response efforts to clear the sections of highway 4 within the city of Whanganui:

> '*It's a major route, we need to be able to get in and out of here. Like I say, we were cut off for over two days, that's a hell of a thing to be cut off. You couldn't even get to the airport. We couldn't get out in any direction, and nobody could get in from any direction, it's a hell of a thing (…) And, also, bear in mind that these poor buggers here (Anzac Parade), they couldn't go that way to Palmerston North because the Highway was closed, they couldn't come down here because the State Highway was deep in silt, they couldn't do anything (…) SH4 was supposed to be done (cleared) by NZTA contractors who are Higgins, but Higgins couldn't get*

here, they managed to get a couple of local teams but all they did was open a little track on the middle of the Highway which means we couldn't get people to their houses or out. So, through the emergency powers, I basically took possession of this section of the Highway, and I told Higgins to go further up and clear the Highway up there, and I brought my contractors who were Downers and together with my staff we cleared it (SH4). I cleared it up, I should have said that in that time frame, we basically cleaned and pushed everything into Kowhai Park. We couldn't truck it out because NZTA had loaders down here clearing all the slips which were all over the road, huge and into the river. So, we couldn't truck it out, so we pushed it into Kowhai Park and then we went and cleaned up Kowhai Park because it was only silt' (WDC staff member).

Because of its vital importance, it can be interpreted from this WDC's staff narrative that the focus on Anzac Parade residents is too narrow and that the importance of highway 4 for all of Whanganui's residents should not be underestimated:

'*people have focused on what about those poor buggers that have got silt in their houses? I really do sympathise with them, but the most vital thing for us (WDC engineering staff) is to keep State Highway 4 open. We can't, for example, walk away from that area and leave SH4 unprotected, it's a State Highway for Christ's sake (…) State Highway 4 is vital for Whanganui, so it's not just about what we do with these thirty houses*' (WDC staff member).

In summary, Highway 4…

- is one of only two access roads to and from Whanganui.
- if blocked, help can't get into Whanganui and people can't get out.
- if left unprotected, it's more likely to be blocked.
- it is important to consider options to keep Highway 4 safe or divert it to increase resilience.

c. Social vulnerability

As part of the first scoping report produced for this project, the Whanganui East area had been categorised to be within the moderate to high categories of social and economic deprivation scale in New Zealand. This means that most of the people who live in the area might tend to have lower salaries, lower levels of formal education, and less access to stable (tenancy) and healthy (warm and dry) housing (Garcia & Glavovic, 2020). These trends can pose an affordability barrier for residents to access flood-proofing and protection measures for nuisance flooding. Interview material confirmed

this information. A local resident, describes some of the residents as homeowners of elderly age and dependant on pensions who might not be able to afford property-specific resilience-building actions. Other residents were described as younger but live there because houses were more affordable than anywhere else in Whanganui (after 2015 floods).

> '*There's a lot of elderly people who have lived here for forty or fifty years, there were a number of first homeowners that this was all they could afford to get (…) most of them (are vulnerable), from the people that I have spoken to down here they are mostly retired, probably only on a limited income, I mean, I am only surmising here, but given the look of them and how they look after their property I formed an opinion and they seem to be getting by on their pension or on their benefit, they don't seem to be wealthy people (…) whether she (elderly resident) even has a couple of hundred dollars to do that (flood-proof her house) I don't know. I am lucky that I can afford to do that*' (Local resident).

Two councillors, one of whom conducted an informal survey of the area in 2017, all found that many people who reside in the area are lower-income tenants who are not able to afford to rent anywhere else in Whanganui. These people are described as '*vulnerable*' because they are not able to have a say about the fate of the property they live in.

> '*So, a number of the properties were tenanted, and those people had very little say in what was going to happen. So, some of them had the ability to ensure the contents of their property, but a lot of them were vulnerable, quite vulnerable people. There were a few that owned the property, quite happy with the risk, and took it on. But there were a number of them who were there because it was somewhere where they could rent a house because the rental price was a bit lower, and I am guessing that a lot of those people would not have insurance*' (Regional Councillor B).

And finally, these narratives also indicate that affordability of the area can be preferred and prioritised over the risk of living in a flood-prone area. One of the councillor's interview talk illustrates this in the following way:

> '*I've met some people who are strangers to me who have said 'we just want to 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. We can't afford other places, we don't want to leave, and yes there are floods, but we are prepared for them and it's a risk we are prepared to live with'. I had a friend who was a tenant and because she didn't own the property she felt a lot more vulnerable and disrupted, and couldn't move back in, so, her life was a lot more upturned*' (Regional Councillor B).

In summary, social vulnerability could pose a barrier because it…

- is characterised by lack of access to resources (political, built, economic, social, cultural, etc.).
- is associated with specific sectors of this area: elderly on a pension, low-income property owners, low income tenants.
- can underpin some of the resident's accessibility to economic and built resources.

However, social vulnerability…

- can be addressed by considering affordability of resilience-building options. E.g.: Low-cost options, financing, and/or grants.
- of tenants can also be addressed by integrating special provisions for this group in the strategy.

d. High resident turnover

Another three key elements that some participants referred to during the conversations were the high resident turnover, the lack of experience in floods, and the low sense of community. These three themes have been grouped because they are very closely related.

Interpretation of a councillor's interview talk suggests that many of the tenants in Anzac Parade came to this area after the 2015 events. This is because many of the houses which were flooded were sold for a low price, bought, refurbished, and tenanted for a low price.

> '*A lot of them (tenants in Anzac Parade area) came after. And, the reason I say that is that the people who owned the houses took the insurance money, sold out to investors, investors did them up, and put tenants in them (…) because the people who have come in afterwards might have a different view to someone who was actually there in 2015 and scared the life out of them and they are still there because they can't afford to move or whatever it is (…)*' (Regional Councillor A).

This same interview talk suggests that many of the newcomers lack the experience of the flood and thus might underestimate the risk and be more comfortable with it than those who lived through the extreme event: '*the people who came in afterwards might have a different view to someone who was actually there in 2015*'.

In addition, interpretation of the narrative of a local CDEM staff member who has been working in the area since 2014 also reiterates the low perception of flood risk in newcomers. But also, that this is not the first time that a shift of population occurred after a flood. This participant describes the selling and buying of houses at a low price post-flooding as following a cyclical pattern.

> '*In 2016 we were aware of people moving into the area that didn't consider it to be that much of a bigger risk (…) the general attitude with people is like with earthquakes unless they are directly affected it fades with time. And I look back historically and some of the people I've talked to after this event (2015) bought their houses after the previous floods (1990) (…) At that stage no they were not aware of this, most people when they buy houses they are not hazard aware and they buy it because it was low cash and the location is across from a park, close to town, walking distance and nice houses that have been recently redecorated. And you see it, and it happens historically, it's almost like a business cycle' (CDEM Staff).*

The high transience of the population hinders the ability for the residents to accumulate experience with the floods and retain that experiential knowledge within the group because people tend to sell their properties and leave. In addition, interpretation of a resident's narrative, who did not experience the 2015 floods first-hand, seems to indicate that this location does not have a strong sense of community:

> '*Not particularly (have a sense of community), I mean, people are pretty friendly and all that. The lady over here, who used to be over there, had a house party once. These guys over here had a house party once, which was just us, three, or four, or five, but I don't feel a community spirit as such, no more than being part of the rest of Whanganui*' (Resident).

In short, the high level of resident turnover in the Anzac Parade area hinders the possibility of accumulating experiential knowledge of the floods and the social ties that living in the same area can produce and hightens the underestimation of actual flood risk. As a result of this dynamic characteristic of the population, loss of experiential knowledge, and social ties, the sense of community is also hindered.

In summary, variations in appreciation of flood risk in Anzac Parade are important because they…

- might be hindered by loss of social ties due to migrations after flood events (high turnover).
- might be hindered by loss of experiential knowledge of the floods and heightened by the influx of people without experience of the floods.

e. Residents distrust towards public organisations

In addition to the previous points, distrust towards public organisations also were mentioned by some participants. A Red Cross volunteer involved with a door-knocking survey to diagnose flood preparedness provided this explanation:

> '*I know that there were a few people that had been promised some sort of barriers for their property that had never shown up, and sandbags that had never shown up (…) I'm not sure (by whom), but they said that they were still waiting for sandbags and barriers that had never arrived whether that is Council, CDEM, or Horizons I am unsure (…) I think I got the impression that they had been promised a few things that never actually eventuated or happened, things like resources that they could have. And I know there was one lady who was still quite upset about the lack of communication through-out the whole event, and the lack of updates. And then there was a few people who had been asked to evacuate because there's actually some of the houses are on quite a high rise, so you have the flats and then it goes up quite steeply. So, a lot of those people (on the rise) were being told that they needed to evacuate but they felt they shouldn't because they were up on a hill and they were fine and could get out through their back yard and they were getting trouble for not evacuating as well*' (Red Cross volunteer).

The Red Cross volunteer's interview talk reflects that there are residents who might still be upset in the Anzac Parade Area ('*there was one lady who was still quite upset'*). Furthermore, this interview talk also links the '*upset*' to unfulfilled promises from some public organisation ('*I got the impression that they had been promised a few things that never actually eventuated*'). 'Upset', was also tied to '*lack of communication*' from public organisations during the event and recovery period, as well as the perception of being evacuated without good reason ('*they needed to evacuate but they felt they shouldn't*'). The interview talk of a resident of the Anzac Parade area also confirms the presence of feelings of anger towards Horizons in particular:

> '*(…) this (conversation) just reminded me of how pissed of I am and have been with Horizons, I mean, I've written articles saying that I think horizons is a total waste of time and why are we paying for this (rates for flood-protection)! (…) I think they (Horizons) have made their decision (to not raise stopbanks) in the Council, I think it was the wrong decision*' (Anzac Parade resident).

This resident's interview talk can be interpreted to signal a strong sense of anger and distrust towards Horizons ('*how pissed I am and have been with Horizons*'). The anger also appears to be directly linked to a sense of doubt in respect to the act of paying rates to Horizons for flood-

protection which this resident feels he is not getting ('*why are we paying for this*', '*I think it was the wrong decision*'). However, independently of the driver of the distrust, this residents narrative seems to confirm that some residents might still distrust other (or the same) public organisation mainly due to unfulfilled promises, lack of communication, and frustration with emergency response, recovery, and reduction decision making.

These elements highlight the need to devote extra effort in this project to open clear, consistent, and accessible lines of communication with residents to both provide information about the status of the project, but also, to ensure we can receive feedback during the process. Finally, expectations of the potential outcomes of the project will also need to be carefully managed to avoid creating false expectations in residents that further increase the sense of unfulfilled promises.

In summary, the distrust towards public organisations is an important consideration because it…

- is driven by previous unfulfilled promises, lack of communication, and frustration with disaster management decision making.
- can be increased if communications and expectations are not managed appropriately.

However…

- distrust towards public organisations could be reverted if communications and expectations are managed appropriately.

f. Different technical information circulating

In addition to the previous considerations, a WDC staff member indicated that there are differences between climate change-related statistical and forecasting models used between Horizons Regional Council and WDC. These differences are described in the following interview talk:

> '*We (WDC Engineering staff) put together a report for Horizons and the Councillors and everybody. And, we put the Matarawa diversion as number one importance. The overland flow pass modelling in 2015, 16, 17 and early part of 18 we went and took a verification and validation process, we have monitoring for every rain event with sensors and transducers in all the points that we verified and validated. We then went on and said what if they basically improve the Matarawa diversion? And the difference is huge (…) Horizons manages the scheme called Matarawa diversion, but they haven't maximised it. Horizons in the rural area*

have a series of attenuation dams, and then they have the Matarawa diversion, but Matarawa diversion, if they open it, only diverts 60%, they claim 70%, but it's more like 60% of the water. We are saying they should basically change it to 100%, it's Horizons job, but they don't want to do that (…) But to increase the flow, I believe they will have to go through some capital costs, but there is also a process of consultation, they have to consult with the community, and with the Iwi, and they seem very reluctant to do that (…) The other thing is that our Councillors are very frustrated with Horizons that they haven't done anything on the Matarawa diversion, they (Horizons) haven't basically updated their river modelling which we need to basically finalise and finetune all our modelling which we do for every catchment of the area. Until we get the river levels from Horizons and their river modelling we can't finalise our modelling (…) And by the way, these models take about two weeks to run one iteration, they are huge, I spent seven figures on these because I have done them for everywhere. We believe that it's essential to maximise the Matarawa diversion, we believe that pending on the information that Horizons gives us that stopbanks will have to be raised slightly, big deal, peanuts really, so if they can keep the river out, we can reduce the influx that comes from the Matarawa Stream because it'll be diverted, and we then only have to deal with stormwater, and we can basically deal with a one in two hundred year event quite nicely. But if the river is excessive for many hours we would probably be prepared to put in a couple of pumps in Kowhai park and actually pump it over the stopbanks (…)' (WDC Staff).

This WDC staff's narrative can be interpreted to highlight some key differences between the data managed by WDC and Horizons Regional Council. Mainly, associated with Horizon's climate change-related flood projections ('*they haven't basically updated their river modelling*'), as well as statistical projection models for the Matarawa flood-diversion scheme ('*they haven't done anything on the Matarawa diversion*'). This participant's talk also shows that WDC's data has been updated, verified, and validated ('*in 2015, 16, 17 and early part of 18 we went and took a verification and validation process*'). Interpretation of these participants talk can indicate that how this participant presents the data that is shaping decisions associated with the Matarawa diversion scheme and stopbanks seems to privilege WDC's technical perspective due to the consistent updates, verifications, and validations. In addition, another source of legitimacy for his data appears to come from the amount of time and money invested in these: '*these models take about two weeks to run one iteration, they are huge, I spent seven figures on these*'. In contrast, the data that underpins Horizons disaster management decisions is strongly questioned by describing it as lacking the necessary updates, verifications, and validations.

The main problem that arises from this distinction between data sets is that each one leads to different actions. Horizons data indicates that Matarawa scheme does not need to be maximised because it would not have a significant effect (Stowell, 2020), and that stopbanks should not be raised (Horizons, 2018). Whilst WDC's data indicates that maximising the Matarawa diversion scheme would indeed create a significant positive difference ('*We then went on and said what if they basically improve the Matarawa diversion? And the difference is huge'*). And, in addition, WDC's staff view from the data they have indicates that stopbanks should also be raised ('*we believe that pending on the information that Horizons gives us that stopbanks will have to be raised slightly*'). These differences are significant and could hinder the decision-making process that led to the decision to develop this project.

Furthermore, as mentioned before, the existing feelings of anger in some residents shown in the previous section are also associated with decisions made by Horizons not to provide more flood-protection in the form of raised and/or improved stopbanks. This interview talk of an Anzac Parade resident further illustrates his perspectives on this matter and as well as the issue of technical legitimacy:

> '(we need) *More flood-protection, higher and better stopbanks. The argument that XXXX gave me, and I read the report, their report about engineering, is that the stopbanks around here are prone to piping (…) piping is when the pressure from one side forces the water through little channels, might be microscopic channels and the water pops up on the other side. My argument to him is that I think you'll pretty much find that in most areas, he says not. But I think they have made their decision in the Council, I think it was the wrong decision, and now they are trying to justify it*' (Anzac Parade resident).

Similarly to the argument made by the WDC staff member, this resident questions the legitimacy of the technical report that lead Horizons to decide not to raise the stopbanks given the soil's proneness to 'piping' ('*I think they have made their decision in the Council, I think it was the wrong decision, and now they are trying to justify it*'). Although this particular participant does not have

In summary, different technical information represents a key consideration to be addressed because it…

- it is based on different data sets.
- it leads to different decisions.
- it creates ambiguity in the decision-making process.

However…

- technical differences can be resolved through dialogue and agreement on how to technically reduce the ambiguity between models.

a strong engineering background to support his questioning of the report, his opinion, tied to the WDC staff's technical perspective could undermine Horizon's technical basis to support the decision not to raise the stopbanks.

g. Open dialogue between Horizons and WDC to identify pragmatic resilience building options for Anzac Parade.

Another key considertion to progress the Anzac Parade resilience strategy is associated with what was noted by a regional councillor as an open dialogue between Horizons and WDC to assess pragmatic resilience-building options for Anzac Parade:

> '(…) *there is one highly influential person who still thinks that we still haven't done enough in Horizons in terms of exhausting options (…) But I think that there are no hardcore champions (for any specific resilience-building option) in the district council, so I think that they probably agreeable to something pragmatic (…) They have some really good people in there. And, I think they are still not fully trusting, I think there is still something between us, although the relationships are getting better, they (relationships) have certainly been worst in the past*' (Horizons Regional Council B).

The narrative presented above shows that this participant perceives some underlying tensions at a political level between these two local Government bodies ('*there is still something between us*'). Furthermore, this tension is strongly associated with issues of trust between both councils ('*I think they are still not fully trusting (of Horizons)*'). However, the general feel for this relationship is positive ('*they have some really good people in there*', '*the relationships are getting better*'). This participant also indicated that despite there being some highly influential people who still believe that Horizons hasn't exhausted all options to decide whether or not stopbanks should be raised, WDC is open to resilience building options as long as these options are pragmatic.

Given the complementary responsibilities that both Councils have in the area, it is essential to reach alignment between Horizons Regional Council and WDC to identify viable resilience building options and distribute responsibilities for implementation. This open dialogue and improving political relation between both councils is a significant opportunity to foster spaces of dialogue that facilitate the alignment of interests and responsibilities that emerge from the different resilience building options for Anzac Parade. Furthermore, this improving political relation between Horizons and WDC could be harnessed to address the technical differences that seem to characterise the current bureaucratic relationship and technical differences between both councils (see Section 4.2.1.f).

In summary, open dialogue between Horizons and WDC offers a valuable opportunity because…

- it enables dialogue to align interests, roles, and responsibilities in reference to the emerging resilience building strategy.

h. Liquefaction risk in Anzac Parade for raising houses

An additional key consideration identified in this initial round of interviews is associated with liquefaction risk. The interview talk of a CDEM staff member illustrates this point:

> '*The issue with raising houses is that most of that area there is liquefaction prone, it is wet clay, if you are going to pour down, you are going a long way down. Our earthquake risk has just come out and it's not huge, but we still shake like a pudding, so, if you are going to raise stuff up, all you are doing is turning one type of risk into something else*' (CDEM staff).

This participant's talk indicates that although the earthquake risk in the area is relatively low, the land is liquefaction prone. This can be corroborated by reviewing the CDEM Group Plan 2016-2021 which reads as follows:

> '*The Region encompasses some of the most seismically active parts of New Zealand. Small earthquakes have occurred regularly throughout c.150 years of recorded history and several moderate events remind us that the threat is a real one*' (CDEM, 2016).

Coupled with the moderate earthquake risk, specific data from WDC also shows that the Anzac Parade area is exposed to moderate risk of liquefaction (Figure 3).

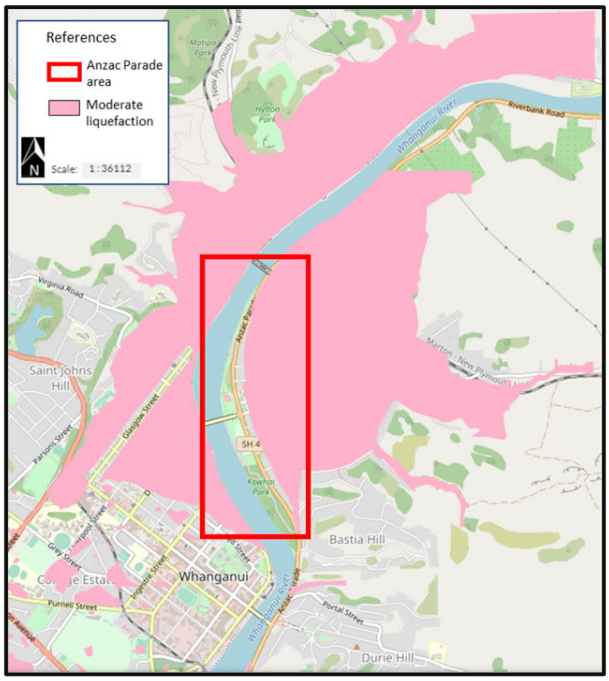

Figure 3. Liquefaction risk in Whanganui as indicated by WDC (Image extracted from: https://data.whanganui.govt.nz/maps/new?layer=geonode:moderateliquefaction).

The coupled moderate risk of earthquake and liquefaction-prone characteristic of the soil in Anzac Parade could pose an obstacle to raising houses as an option to reduce flood risk. This is because the costs of stilt improvement in liquefaction prone land could be challenging and costly due to how deep the stilts might need to be buried until they reach the solid ground ('*most of that area there is liquefaction prone (…) if you are going to pour down, you are going a long way down*').

In summary, liquefaction risk could pose a barrier because…

- it characterises most of Anzac Parade.
- when coupled with the moderate earthquake risk can also produce structural damage to the housing stock built on stilts.
- stilt improvements could be costly and challenging in this land.

However…

- geotechnical reports could clarify the liquefaction risk on an individual property level and provide indications to guide stilt improvement technicalities and costs.

i. Difference between broader Whanganui residents, and Anzac residents over financial responsibility for flood-protection measures in the area

A local resident of Anzac Parade noted that there might be challenges to secure funding through ratepayers to raise or improve stopbanks in the Kowhai Park area:

> '*I would suggest that they (broader Whanganui) probably wouldn't (approve of investing on higher stopbanks (…) but I think that unless you leave here and understand the situation, I don't think it's any of their business to comment on this (…) It's very easy for them to say 'how stupid of you to live there, you get what you deserve', and we have a right to live here. People who built all these homes were given a permit to build, wrongly (given permits) in my opinion, but they are here now*' (Anzac Parade resident).

This resident's perspective also highlights an inherent tension existing between the broader Whanganui and the residents exposed to high levels of flood risk in Anzac Parade. This tension is directly associated with the distribution of financial responsibility of flood-protection measures for Anzac Parade across Whanganui residents. It is this participant's perception that the broader Whanganui residents would not be willing to bear the costs of improving the existing flood-protection (stopbanks).

In addition, this participant's talk also highlights that the tension between residents who are directly affected by the flood risk and residents who are not is underpinned by an irrational choice to live in a high-risk place ('how stupid of you to live there'). Furthermore, this resident also refers to '*a right to live here (Anzac Parade)*'. This right can be interpreted to be associated with building consents issued in the past to allow those properties to be built despite it being a highly hazardous area ('*homes were given a permit to build, wrongly in my opinion*'). This reference can also be interpreted as a way of deflecting responsibility for the current financial costs of the flood-protection measures towards those organisations that originally, and '*wrongly*', provided the building consents to develop houses in a flood-prone area.

In any case, this trend of the low willingness of the broader Whanganui residents to bear the costs of improved flood-protection for this area was also noted by a Horizons councillor:

> '*(…) when we went to the community (wider Whanganui) three odd years ago and asked the question of raising the stopbanks and whether they were prepared to help with the funding it was a very definite no, a very definite no*' (Regional Councilllor A).

The 2017 community engagement process mentioned by this participant consisted of the following:

'*(…) public meetings and a Horizons presence at the River Traders Market, promoted through both local newspapers and radio advertisements. Capturing the views of residents consisted of one-on-one conversations, encouraging email feedback and the use of a simple token voting system (for or against more flood-protection)*' (Horizons Regional Council, 2017, p. 2).

The report for the community engagement process also confirms the trend noted both by participants in the following way:

'*It is difficult, however, to conclude that any widespread support exists within the community, other than among those directly affected, for higher Kowhai Park stopbanks. The existing funding model relies heavily on the wider urban area shouldering the bulk of the cost; it is difficult to see how flood-protection standards could be increased within the existing funding framework. To do so would seemingly require those receiving the direct benefit to pay a higher proportion of the cost, a challenging proposition given the demographics of that part of the Whanganui community. That leaves Council in something of a quandary, with a significant number of houses exposed to a relatively substantial flood risk but with little ability/appetite to pay more for an increased standard of flood-protection, aside from the substantial technical (and by implication cost) challenges that raising stopbanks through Kowhai Park would pose*' (p. 1).

This extract from Horizons community engagement report (2017) synthesises the tension between Horizons, the broader Whanganui residents, and the Anzac Parade residents where: i) the broader Whanganui residents are not willing to pay for the flood-protection costs of this specific flood-prone section of the river, ii) the local residents of Anzac Parade might not be able to afford to bear the costs of the flood-protection measures on their own. However, as challenging as this situation is, it only highlights the importance of assessing other options to increase resilience in the area without relying so much on area-wide flood-protection measures, as well as consider the affordability of these.

In summary, the tension between the broader Whanganui and the local Anzac Parade residents over financial responsibility of flood-protection measures could pose a barrier because…

- broader Whanganui residents do not seem open to bearing the majority of the costs of flood-protection measures for this area.
- local Anzac Parade area residents do not appear to be willing or able to afford the costs of major flood-protection improvement works.

However…

- exploring other more viable options to reduce flood-risk might offer innovative avenues to increase resilience in the area.

j. Kowhai Park

Kowhai Park is a distinct feature of the Anzac Parade area and its relation to the Anzac Parade Resilience Building strategy was noted by one of the pilot study participants in the following way:

> '*I feel like it (space resulting from a possible managed retreat strategy) has to be more than just rubble and silt from the last flood, we need to replace it with something beautiful, a place that you like to take your dog to, to grow community food, you like to have your kids playing, a new, or extended Kowhai park. Whatever it is that also is flood resilient, because it will also have water across it, but you can make public facilities a lot more resilient than you can make houses* (…)' (Regional Councillor).

Two elements can be highlighted in this narrative. Firstly, the need to include Kowhai Park as part of the resilience-building strategy. The use of public and green facilities as buffer zones that draw on the protective and absorptive capacity of natural elements is well noted in recent policy and scholarly literature (e.g.: Matos Silva & Costa, 2016; Watson et al, 2020; van Wesenbeeck et al., 2017; WWF, 2017), and is also noted by this participant: '*it (Kowhai Park) will also have water across it, but you can make public facilities a lot more resilient than you can make houses*'. And secondly, the issue of planning how to effectively integrate into the existing landscape any spaces that might become available if some properties were to be sold through a voluntary managed retreat program. This participant explains that her wish is to see any new emerging spaces linked somehow to the existing Kowhai Park ('*a new, or extended Kowhai Park*'). The Regional Councillor goes on to describe a vision of what this '*new, or extended*' Kowhai Park would look like:

> '*you know, when I thought before, what is the future of a future Kowhai Park? I always think of the King's Park (Perth, Australia). It's not designed for flooding because they don't have flooding there, but it's elevated and you can just imagine water flowing through it in a different way*' (Regional Councillor).

This way of describing this participant's vision for Kowhai Park is important because although it is tied to a very specific and visual example ('*King's Park*'), it also ties both the current use of Kowhai Park and its potential future expansion with its natural capacity to act as a nature-based buffer zone ('*imagine water flowing through it in a different way*'). In addition, this same participant also highlighted Kowhai Park's significance for the wider Whanganui township:

> '*In terms of Kowhai Park's history as a real attraction for people passing through Whanganui, I want to keep that flavor. I want people who pass through Whanganui to stop, so I don't want an outcome of this process to have people don't stop, I don't want them to bypass*

Whanganui. I think that people stopping in Whanganui and experiencing a beautiful part of Whanganui is something positive for us' (Regional Councillor).

This participant indicates that the importance of Kowhai Park is also tied to its potential to attract people who pass through Whanganui and stop to experience '*a beautiful part of Whanganui*'. Interpretation of these words can also indicate that having people stop in Whanganui instead of transiting through highway 3 and 4, could also mean capturing economic resources in the form of tourist spending, thus becoming '*something positive for us*'. However, not everyone shares these perspectives. A resident of Anzac Parade referred to this issue:

'*(…) and she said she wouldn't want to be remembered as the Councilor who got rid of half the trees in Kowhai Park. And, that was her sole reason for not being supportive of increasing the flood-protection here (stopbanks), which I thought was pretty stupid because these are people's lives here, and people's lives are more important than a few bloody trees*' (Anzac Parade resident).

This resident's narrative shows an opposed position where the importance of some characteristic elements of Kowhai Park ('*trees*') are relativised about human life ('*people's lives are more important than a few bloody trees*'). The reason why this relativisation occurs is that one of the arguments proposed by Horizons (2017) to not raise the stopbanks was that the foundation improvement works needed to raise the stopbanks would have significant impacts on a large number of trees within the park's boundaries:

'*A review of existing geotechnical data suggests that a higher stopbank would create a range of challenges mainly relating to foundation strength (ability of the ground to support the weight of a larger stopbank) and piping risk (…) Adequately mitigating that risk would require intensive (and expensive) foundation improvement work, potentially adding 40-50% to the $6M - $7M estimated construction cost. An increased stopbank footprint alone would require a large number (in excess of 100) of trees within the park to be removed; measures to adequately address the likelihood of a piping failure (a high bar in an urban environment) are likely to significantly add to the impact on Kowhai Park. That is, the impact on the park would be substantial*' (Horizons, 2017, p. 3).

So, although the potential for Kowhai Park to be improved and restored to maximise its natural buffer capacity while maintaining its value as a public recreation amenity is very attractive, not everybody in the community might agree. Because of its significance to the wider Whanganui people, the role of Kowhai Park as part of the resilience-building portfolio of options needs to be further assessed and consulted. Key stakeholders such as local and regional councils, residents, and iwi, should all have meaningful opportunities to express their visions for the place, and collectively decide on what the best options for Kowhai Park would be concerning the emerging strategy.

In summary, Kowhai Park offers an opportunity because…

- it could be expanded or restored to maximise its natural buffer capacities.
- it could offer an opportunity to restore/improve public amenities in the area.

However…

- identifying the different stakeholder views (residents, businesses, NGO's, district council, regional council, and iwi) on what the future of Kowhai Park might look like will be essential to determine viable futures.

k. Flood-proofing

Further strategic opportunities were found in terms of flood-proofing individual properties as a possible option to foster resilience to nuisance flooding in the area. A resident form Anzac Parade, described the actions he has taken so far with his property:

> '*My place here, I have spent five thousand dollars water-proofing it. That block wall you see right there, totally illegal, I didn't get permission to do it, but I went ahead and did it, and it's gone three blocks higher than what it was before. The flood was about here and my new wall was about there (indicating lines in the wall), but when the next flood comes in this high (indicating a line above the wall), well… I haven't tested it yet because we haven't had a flood, so I don't know if my flood-proofing is going to hold, fingers crossed it will (…) I've got plywood that goes across there, plywood that goes across the front door, and plywood across the garage, the rest of it is all sealed off, underneath the house it's all sealed off (…) a local carpenter, a local builder guy that I know (helped me do this), he sourced the stuff that you put underneath all the gaps, and it expands and it goes hard and you paint it. I've got all the sheets and timber to go across the window, and it's not to stop water coming in the window but to stop the windows from breaking (…) 98% per cent (confident on the flood-protection measures of the property), I don't know I might have missed a gap or two, I don't know if the*

sealing I put there will work, with the pressure of the water it might pop-out, I don't know, but at least I've tried and I feel pretty confident that what I've done will work, but I don't actually know that' (Anzac Parade resident).

The first thing that stands out from this participants narrative is the willingness to invest in flood-proofing for individual properties ('*I have spent five thousand dollars water-proofing it (house)*'). The floodproofing measures include brick/block protection walls, plywood protection for openings, water-proof sealants for gaps, and timber to protect the glass windows. This text shows that some people might be willing to invest in flood-proofing at an individual property level, or even improve the measures they might currently have as part of a short term and low-cost option to increase resilience in the area. However, there are challenges associated with this.

The first challenge that emerges is the legality of the flood-proofing measures. An Anzac Parade resident indicated that some of the actions taken to protect his house might not be legal from a consenting perspective. Secondly, although the participant acknowledged the uncertainty of how well the protection measures would work ('*I don't know*'), the narrative also shows overconfidence on the effectiveness of these protection measures ('*98% (confidence), I feel pretty confident that what I've done will work*'). And thirdly, although the use of local builders with local knowledge could prove beneficial for effective protective measures ('*a local builder*'), it is also uncertain how much technical knowledge they might have in terms of the effectiveness of the methods utilised. This could exacerbate the feeling of confidence in methods that perhaps are not entirely reliable. And finally, a fourth challenge emerged for the implementation of individual property flood-protection measures; affordability.

'*Look at my neighbour next door, she could do hers for less than a thousand dollars (…) she's on piles, and has a concrete plate all around it, all she has to do is block up the air holes and block off the two doorings which is quite simple. I have suggested it to her, but her attitude being that she is an elderly lady that has been there for over forty years I think, whether she even has a couple of hundred dollars to do that I don't know. I am lucky that I can afford to do that*' (Anzac Parade resident).

The issues of social vulnerability and accessibility to resources noted in the initial report (Garcia & Glavovic, 2020), and noted again in section 4.2.1.b of this report could limit people's access to flood-proofing measures. This participant suggests that a few simple actions could help a neighbour improve the properties water-proofing capacity ('*she could do hers for less than a thousand dollars (…) which is quite simple*'). However, this participant also questions her access, as '*an elderly lady*', to the

necessary economic means to put these protective measures in place is questioned ('*whether she even has a couple of hundred dollars to do that I don't know*').

The set of challenges described above could be overcome to harness the latent opportunity to implement individual protective measures on the short-term. For example, the challenges of the compliance and technical know-how could both be addressed by providing property protection advice through Horizons Regional Council, WDC, or in a coordinated fashion. Technical advice could be provided to assess the effectiveness of different protection options for individual properties, but also, advice on how to either secure council consent or apply for a consent waiver if this was possible. The issue of affordability could be addressed by either providing flood-proofing grants or low-interest (or cero interests) loans to residents through Horizons Regional Council.

In summary, individual flood-proofing offers an opportunity because…

- it is already being implemented by some residents.
- it offers a low-cost option to increase flood resilience in the area.
- it could be implemented in the short-term.

However…

- to be successful, the implementation of individual property flood-proofing actions should consider the technical, bureaucratic, and financial challenges that doing so might represent to some residents.

I. Early warning systems, readiness programs and CDEM engagement in the area

Additional opportunities for a resilience-building strategy emerged from the narrative of a CDEM staff member. This participant described the numerous readiness and response actions being taken in Anzac Parade, and the wider Whanganui area:

> '*(CDEM engages with Anzac Parade residents) a few times a year actually, for example, in 2017 I made the call early to get declaration to evacuate people and the way I shaped it was that even if the flood doesn't happen, this is good practice for people to practice their own emergency evacuation (…) One of the biggest complainants from 2015, a person who hadn't been there, which is quite a common thing for people that complain, which is that they weren't there for the event, but whose mother lives in ground zero of the area, next to the Matarawa Stream. We engaged with him, educated him, and actually brought him as one of the volunteer managers with some basic level training and he helped coordinate his*

neighbours in the area for the evacuation (…) We've got very well developed plans for the area and we practice those in Anzac Parade with door-knocking after hours with the volunteer groups that we use (…) we are walking billboards, so we are often down there with our vehicles and do drive-by (…) Short-term measures for us is all about warning, it's about giving people time. Since 2015 I've put a fire/weather system station, funded by rural fire of all things, and middle reaches which covers the gap that we had in 2015 and that shows the rainfall levels there, and that allows us to do some rough calculations of what the hazards are and what the actually is (…) our own processes when it comes to communicating risk to people, communicating stuff like 'we need to move now' in the early course. And facilitating what I call 'idiot-proof' guide to evacuation, effectively within fifteen minutes we can take someone off the street and they have the information to safely and quickly go through the door-knocking process' (CDEM Staff).

CDEM's practice evacuations, volunteer managers, early warning systems, and engagement with the community are all important opportunities to harness as part of the resilience-building strategy for Anzac Parade. These are all actions that are already taking place, that do not require additional funding, and thus, should be continued, if not strengthened (by facilitating the search of additional funding) to ensure that appropriate community-based readiness and response practices are in place. Furthermore, in doing so, awareness of the flood-risk could be increased across those residents who currently might underestimate it (see section 4.2.1.d).

In summary, local CDEM actions in the area offer an opportunity because…

- they are raising flood-risk and climate change awareness in residents through frequent community engagement.
- they facilitate community-based responses through volunteering programs.
- they are thus contributing to community development in the area and fostering community leadership for resilience building.

m. Climate emergency declaration and climate change strategy

Finally, a Whanganui councillor from WDC noted that climate change is a relatively well-accepted fact and that there currently is a climate emergency declaration in place in Whanganui, and a climate change strategy being developed. He described this in the following terms:

'*It is only mildly contentious now (…) We (WDC) still have a couple of councillors who would say that they are not convinced that there is any climate change, but even if there is we*

shouldn't need to worry very much because nothing is going to happen to us. And the other view, of course, is that whatever we do from a mitigation point of view won't affect the world (…) But overall, it (climate change) is very accepted that the issue is there, that it is affecting and will affect people in low lying areas, and from that point of the declaration we were able to get a climate change strategy underway at Council which is being written and will be consulted on at around Christmas time' (WDC Councillor).

This participants words indicate that the issue of climate change is accepted to different degrees across the WDC. Four positions are described. The first description shows that some councillors are perceived as climate change deniers ('*they are not convinced that there is any climate change*'). The second description indicates that the participant understands some councillors as accepting of the fact that climate change is occurring but feel that the consequences are far removed from the local reality ('*nothing is going to happen to us*'). The third depiction provided by this participant illustrates that to his perspective, some councillors accept climate change as a fact, but do not think that much can be done to mitigate its impacts ('*whatever we do from a mitigation point of view won't affect the world*'). And finally, the fourth position towards climate change within the council seems to fully accept the reality of climate change and its consequences ('*is very accepted that the issue is there, that it is affecting and will affect people in low lying areas*'). This last group is described as the prevalent group ('*But overall, it is very accepted*'). However, this currently dominating position of climate change acceptance wasn't always present in the council, and it was only recently that such a change occurred:

'*It took me two cracks, six months apart to get it (declaration of climate emergency) through Council. The opposition to it was quite vociferous to being with and they managed to gather enough troops to cut it off before it even got to Council. But, I think it was this February that I went into a proposal to declare a climate emergency believing that I might get four votes out of thirteen on the day, and we ended up with a nine to three vote in favour of it (…) in the meantime, and at the time it didn't seem that important, but the students had built the strike for climate march, and even Whanganui during the school day, some schools wouldn't let the children go. We had probably three hundred to three hundred and fifty school youths outside Council building who couldn't be ignored saying 'this is our future'. There were a few articles in the news media pushing it. And I think that generally there is an awareness that this is an issue that is growing and people are slowly starting to accept something that they never would have wanted to*' (WDC Councillor).

The participant's words are very important here because it shows that the issue of climate change and its acceptance within the political spheres of the WDC appears to be driven externally, by public

protests and the media. These words indicate that initially, the climate emergency declaration was not easy to pass, requiring two attempts to get it approved ('*It took me two cracks*'), and opposition was '*quite vociferous*'. The participant also describes how in between attempts to pass the climate emergency declaration student protests became quite strong, and the way media was portraying these protests added political pressure to pass the declaration ('*we had probably three hundred to three hundred and fifty school youths outside Council building*', '*there were a few articles in the news media pushing it*'). This meant that the public demand '*couldn't be ignored*'. Furthermore, the participant continues to add that acceptance of climate change continues to grow in the Whanganui general public. This general acceptance of climate change is an opportunity for the resilience-building strategy for Anzac Parade because it provides a rough idea that the underlying acceptance of climate change, one of the key drivers of flood risk in the area, is already present within the Council's political structure, as well as the general public. In addition, due to the existing pressure to act on the issue of climate change, a climate change strategy is already being designed by the Council. However, the resulting strategy might be too general to and overarching to include specifics such as localised issues of flood-risk:

> '*It (the strategy) hasn't been very specific, and I don't think it will (include climate-risk), it'll be an overarching document that will inform many of our other strategies such as our housing strategy, the point of the climate strategy as far as I am aware of is to improve awareness of the issue and to inform any other operative strategy such as the infrastructure strategy as well, but it'll be very aspirational rather than actually directive. Certainly afterwards there will be an action plan that falls out of it and will be a little bit more specific (…) I would expect that (climate-risk) will be there (Climate Change Strategy) those parameters have already highlighted other levels of risk that we face and we might face in the future, because it can change, and the hard data, the evidence that is coming through on climate change is enough to inform the strategy and what directions it should take, what areas we should focus on. But (I don't think we'll get into) getting down to 'we need to do X here because it rains more'* (WDC Councillor).

Despite its specificity, this participant reports that the climate change strategy might include issues of climate-risk. The acknowledgement of climate-risk provides a valuable opportunity to align the Anzac Parade Resilience Strategy as an actionable strategy that is guided by the wider Whanganui climate change strategy and grounded in the lived reality of Whanganui residents.

In summary, climate emergency declaration and climate change strategy offer an opportunity because…

- it broadly shows the council's and the general public's awareness of climate change and its consequences for low-lying areas.
- it institutionalises the acceptance of climate change as a risk factor to be addressed in other local planning instruments.

However…

- it will be important to inform and align the Anzac Parade Resilience Strategy with the Whanganui Climate Change Strategy.

5. Literature review of resilience-building options

The initial results of the pilot study have already identified possible options and avenues to increase resilience in Anzac Parade. Some of these options are currently being developed by individual residents in the form of flood-proofing properties with sealant, plywood, and block walls. Others call for a reconsideration of the need for improved stopbanks and the maximisation of existing diversion schemes or using the natural environment and green spaces as recreational buffer zones.

To progress the exploration of options, a literature review was conducted to construct a repository of resilience-building options. The results of the literature review are synthesised in Table 3. However, it is important to state that the intention of the table is only to illustrate the wide array of options recorded in current literature, and not to establish a definite and final list of implementable options for the area. Many of the options presented in Table 3 might not be relevant to the case of Anzac Parade. However, there is value in presenting the table as a starting point and as a repository from which some ideas, options may be drawn from for assessment of social, political, environmental, and economic viability.

Table 3. Initial and unfinalised repository of resilience-building options obtained from the literature.

Type of measure	Scale	Specific measures	Sources
Structural	Area-wide	Damns / Dykes / Walls / Retention basins / Flow retardation basins / Debris control structures / Impounding dams / Stopbanks / River management schemes / Drainage for surficial water	Attems et al., 2019; Beddoes & Booth, 2011; Davar et al., 2001; Duží et al., 2015; Federal Emergency Management Agency, 2009; Federal Emergency Management Agency, 2000; Kahn & Ahmad, 2017; López-Marrero & Tschakert, 2011; Matos Silva & Costa, 2016; Maqsood et al., 2015; Marfai et al., 2015; Rogers et al., 2020; World Health Organisation, 2002.
	Property specific	Earth bund walls (stopbanks) / Property boundary walls and fences / Raise house - Extend walls of the house upward and raise lowest floor / Raise house - Converting the existing lower area of the house to non-habitable space and build a new second story for living space / Raise house - Lift entire house, with floor slab attached, and build a new foundation to elevate the house / Storm porch to external doorway / Cementitious renders / Bituminous coatings / Brick veneer / Water resistant walls, floors, and insulation / Mastic sealants / Airbrick heights / Automatic airbricks / External doors (door guards) / Sealing building openings / Elevated light shafts / Overhead sewers / Automatic activating external door guards / Anti-backflow / Flood skirts / Flood alarms / Tanking (waterproof membranes in walls and floors) / Pump and sump system / Internal doors (materials and easily detachable for safekeeping) / Skirting boards / Resilient kitchen design (raised) / Replacement bath / Raising service meters above flood level / Raising boilers above flood level / Raised electrics / Flood bags for dry storage / Toilet bung / Drainage for surficial water / Design and shape of building / Floating/Amphibious buildings / Tubes (air and water filled) / Filled containers (permeable and impermeable) / Building additional floors and moving livable area to second level	
Non-structural	Area-wide	Early warning systems / Land-use planning / Governance: Fostering and enabling transboundary cooperation to manage flood risk across political boundaries / Emergency, contingency, and recovery planning (evacuation routes, procedures, drills, disaster relief, return to property plans, etc.) / Communal work (sense of community) / Social learning processes and mobilising local knowledge / Effective links between community members and public officials related to flood management and emergency management (social capital) / Public education and awareness of risk and possible resilience-building actions	
	Property specific	Formal (private or public) and informal (family) loans / Moving household equipment to higher places / Content insurance Property insurance / Household preparedness and evacuation plans / Savings	
Ecosystem-based	Area-wide	Urban greenery (green walls) / Urban furniture (inverted umbrellas/Art Installations) / Rooftop detention (green roofs/blue roofs) / Reservoirs (artificial detention basins/water plazas/underground reservoirs/cisterns) / Bioretention (wet bioretention basins/dry bioretention basins/bioswales/bio-retention planters/rain gardens) / Permeable paving (open cell pavers/interlocking pavers/porous paving) / Infiltration techniques (infiltration trenches) / Stream recovery (stream rehabilitation/stream restoration/daylight streams) / Open drainage systems (street channels/extended channels/enlarged channels/check dams) / Floating structures (floating pathways/floating platforms/floating islands) / Wetproof (submergible parks/submergible pathways) / Raised structures (cantilevered pathways/elevated promenades) / Coastal defenses (multifunctional defenses/breakwaters/embarkments) / Floodwalls (sculptured walls/glass walls) / Barriers (demountable barriers) / Levees (gentle slope levees) / Forest repopulation on river basin / Increase water absorption capacity of the soil Limit soil sealing in urban development	
	Property specific	Landscape design / Introduction of native species with high water absorption capacity / Increase water absorption capacity of the soil / Limit soil sealing in properties	

6. Governance

The results of the pilot study also provided key insights for the completion of objective 3 of the project. Objective 3 of this project refers to two governance bodies that would be established through this project: An Anzac Parade Community Forum (including residents and tāngata whenua), and a Technical Advisory Group. Both bodies were proposed with different aims. The Anzac Parade Community Forum would be established to involve key stakeholders in the development of the strategy as well as to enhance local ownership and responsibility for the resulting strategy. The Technical Advisory Group would be formed with experts from key Government agencies, tāngata whenua and researchers, to complement the current understanding of flood risk, identify options and associated implications including understanding social vulnerability elements that contribute to flood risk. The results of this pilot study inform these objectives in the following way.

Firstly, the insights gained about social dynamics in the area such as a low sense of community due to flood-migration dynamics (see section 4.2.1.d) highlight the need to review whether a community forum is feasible or desirable in this context. Without the community base to collectively agree on communal representation, the community forum might simply become an illegitimate sounding board only for the most vociferous residents instead of the overall group, or potentially multiple existing groups. In other words, if there is no pre-existing and clear sense of community, it will be hard for the group to make legitimate collective decisions about the representation. That is, who represents the group in a community forum. Forcing the discussion of representation in a group with a low sense of community can create conflicts between residents and ultimately undermine intentions to build a resilient community. Further consultation with residents is needed to be able to make an informed decision on whether a community forum is feasible or even desirable.

And secondly, the technical differences found between Horizons Regional Council and WDC (see section 4.2.1.f) highlight the importance of establishing a space for technical differences to be resolved if they persist. Having a technical advisory board for stakeholders to discuss and resolve differences about the way flood risk and vulnerability are understood is key to ensure that the knowledge base that is informing decision making is both scientifically legitimate and collectively agreed upon. However, there is still no clarity on the issue of membership, or in other words, who should be included in such body beyond some key organisations. Interview material shows that participants consider local and regional council's as well as the central Government and the local Iwi as important political and technical organisations to be involved. Other scientific organisations such as NIWA were mentioned as a strong source of legitimacy for scientific climate data and models making this a potentially important organisation to include as part of the technical advisory group.

In short, there are important questions to be made about the feasibility and desirability of establishing a community forum in the current social context of the Anzac Parade area, further consultations will help determine whether such a forum should be established. However, the technical advisory group seems to be much more feasible and possibly desirable although determining membership is still unclear beyond some key organisations such as Horizons Regional Council, Whanganui District Council, central Government, Iwi, and NIWA.

7. Public engagement

This project relies heavily on public engagement in the form of one-on-one in-depth interviews to gather meaningful information from residents about preferred resilience-building options, and the criteria that shape these preferences. This information is vital to be able to assess the social acceptability and accessibility to the different options considered. Initially, this public engagement element of the project was planned to take place during the second semester of 2020. However, a series of compounding situations have resulted in the delay of the public engagement phase until early 2021: COVID-19, delays in Massey University ethics application processing, and political/technical complexities.

The first situation that emerged was the COVID-19 quarantine and subsequent surge in cases which resulted in level 2 restrictions applied across the country from the 11th of August to the 21st of September. This slightly limited the potential for face-to-face contact with residents in the Anzac Parade area.

Secondly, delays in the processing of the ethics application by the Massey University Human Ethics Committee. The application was submitted in early August but was not reviewed until the 10th of September. Furthermore, the comments required to receive full approval were sent by the MUHEC on the 19th of October. Only after this date can the comments be officially addressed and sent back to the MUHEC for final approval. This can also take at least a couple of weeks, and public engagement phase cannot start until after the full approval has been issued by MUHEC.

And thirdly, and perhaps more importantly, public engagement stage should take place only after all the relevant public organisations have shown strong signs of technical and political endorsement to the projects process. Without this endorsement, the options and criteria identified in consultation with the residents might fall short of support from local authorities rendering the project and its outcomes unimplementable. Given that public comments were made in the press by Whanganui District Council public officials requesting to be further involved in the project (Stowell, 2020), a decision was made to focus the efforts of the remaining months of the year to progress engagement and endorsement of the relevant public and iwi authorities before moving on to public engagement

phase. This will ensure that there is consistent support across the different tiers of local and tribal authorities with key cultural, political, and financial responsibilities to enhance the chances of implementation of the strategy.

8. Summary of next steps

Given the new information elicited through the pilot study the following plan of action is proposed for the coming months (until December 2020).

i) Reconsider formation of a community forum (informed by further consultation to take place early in 2021).
ii) Continue to progress work aligning stakeholders interests and roles for the project with a focus on Iwi, Hapū, Horizons Regional Council, and Whanganui Regional Council.
iii) Continue to progress work concerning considerations of partnership with the awa.
iv) Engage with central government representative (possibly Department of Internal Affairs, or Department of Prime Minister and Cabinet) to explore their potential role in supporting the implementation of a resilience-building strategy for Anzac Parade.
v) Engage and consult with Insurance sector (through the Insurance Council of New Zealand) to explore insurance sector position in regard to either supporting or anticipating changes in the way insurance providers assess the risk and issue policies in places such as Anzac Parade.
vi) Progress desktop analysis of property information provided by The Property Group.
vii) Address comments from Massey Human Ethics Committee and secure full approval of the ethics application.
viii) Prepare public engagement stage to take place in early 2021.

9. Final remarks

This report has outlined the progress made from May to mid-September. Some of the key elements presented here include the delimitation of the geographical boundaries of what constitutes the floodable Anzac Parade area, as well as the design and implementation of the initial communication strategy.

The initial results of the pilot study informed the full Massey University Human Ethics Committee application which provisionally approved the application until the comments provided by the committee are addressed in written form and returned to the Chair of the committee for final approval. The results of the pilot study also provided the necessary information to begin identifying key considerations (e.g.: different technical information circulating, the importance of highway 4, the anger of residents towards Horizons, etc.) for the successful implementation of a resilient-building

strategy for Anzac Parade. Both the initial interviews and literature review also allowed to identify a pool of initial options (e.g.: structural, non-structural, ecosystem-based). Lastly, the viability and desirability of establishing two bodies of governance (community forum, technical advisory group) were informed by the results of the pilot study. Given the social context of Anzac Parade, the community forum might not be feasible, nor desirable. Further public consultations to take place in the near will clarify and inform this decision. The technical advisory board was found to be feasible and perhaps desirable, although there is a compelling need to advance work on the issue of membership of this group (who should be a part of it, and how).

Finally, public engagement phase has been delayed until early 2021 due to the compounding situation of COVID-19 related restrictions, delays in MUHEC reviewing process, and technical and political complexities underpinning local authority endorsement of the project.

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