



Memorandum

To	Wairoa Flood Protection Stakeholder Group
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From	Andrew Sowersby - WSP
Office	Napier
Date	20 February 2024
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Subject	Option 1C Floodway - Draft Results

At the Wairoa flood protection stakeholder meeting on the 9th February 2024, WSP was asked to do the following before the next stakeholder meeting:

- Test whether there was a floodway option that would work hydraulically that avoids Takitimu and Tawhiti a Maru marae and the urupa;
- Provide a map showing the location of Māori land in North Clyde;
- Provide a comparative map of the peak flood extent of the Cyclone Gabrielle compared to the design flood event (100 year ARI, excluding climate change).

This memorandum presents the above requested information.

It is important to note that all options modelled to date are high-level conceptual options identified on the basis that they might be the best alignment for hydrology (to reduce flooding). The exception is with Option 1B, where we were asked to look at an option to avoid the Takitimu Marae. A preferred option will need to be developed and refined to meet the additional desired design objectives, such as minimising building loss, impacts on cultural values; reducing volumes of cut, an acceptable bund height, minimising erosion effects etc. This will involve alignment adjustments; testing various depths; bund heights; and side slopes etc.

1 Floodway Option 1C

Included below are the high-level modelling results for the floodway option called Option 1C. This floodway option is 170m wide and appears to provide similar protection benefits as Floodway Options 1A and 1B. It does however require bunds/stopbanks on its sides to keep the water in the floodway.

The stopbanks will range in height from approximately 1m to 2m including 0.5m of freeboard. The land required for the stopbank is additional to the land occupied by the floodway on the results maps below and will be approximately 12m on either side of the floodway. The volume of cut earth required is predicted to be slightly more than the Option 1B Floodway.

We will also model a 200m wide option to try and reduce bund heights. The draft results of which may be ready to be presented at the stakeholder group meeting on the 22nd February.

1.1 Modelling Disclaimer

These results shown below are high-level only, and due to the short turnaround time before the next stakeholder meeting, these results should be considered preliminary only. We have not analysed the results in detail and no peer review has yet taken place.

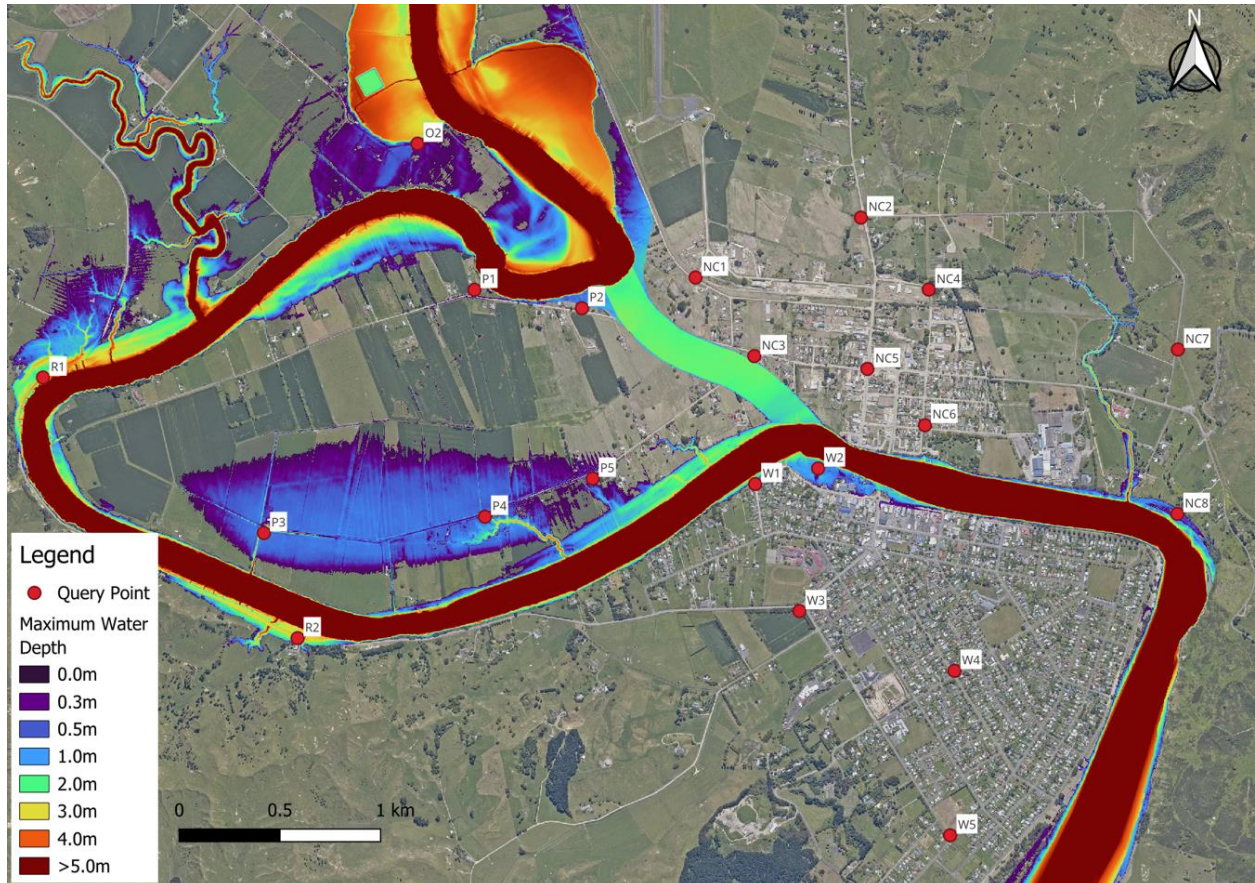


Figure 1 - Draft/Preliminary Flood Modelling for Option 1C for the predicted 1% AEP (current climate)

Option	Approx. Number of dwellings that no longer flood with the option in place ¹	Approx. Number of dwellings with a decrease of freeboard as consequence of option	Approx. Number of dwellings that did not flood before that will now experience flooding as a consequence of option implementation, plus number of dwellings demolished to construct option ²
Option 1A (Floodway)	163	0	8
Option 1B (Flood way)	163	0	15
Option 1C (Flood way)	163	0	14

Table 1 – Houses protected from flooding comparison

¹ No longer flood for the predicted 1 in 100 year ARI based on flood modelling

² No longer flood for the predicted 1 in 100 year ARI based on flood modelling

2 Māori Land Locations Wairoa

Figure 2 below shows the location of Māori land near Wairoa township. There is a large cluster of Maori land in North Clyde compared to elsewhere in Wairoa.

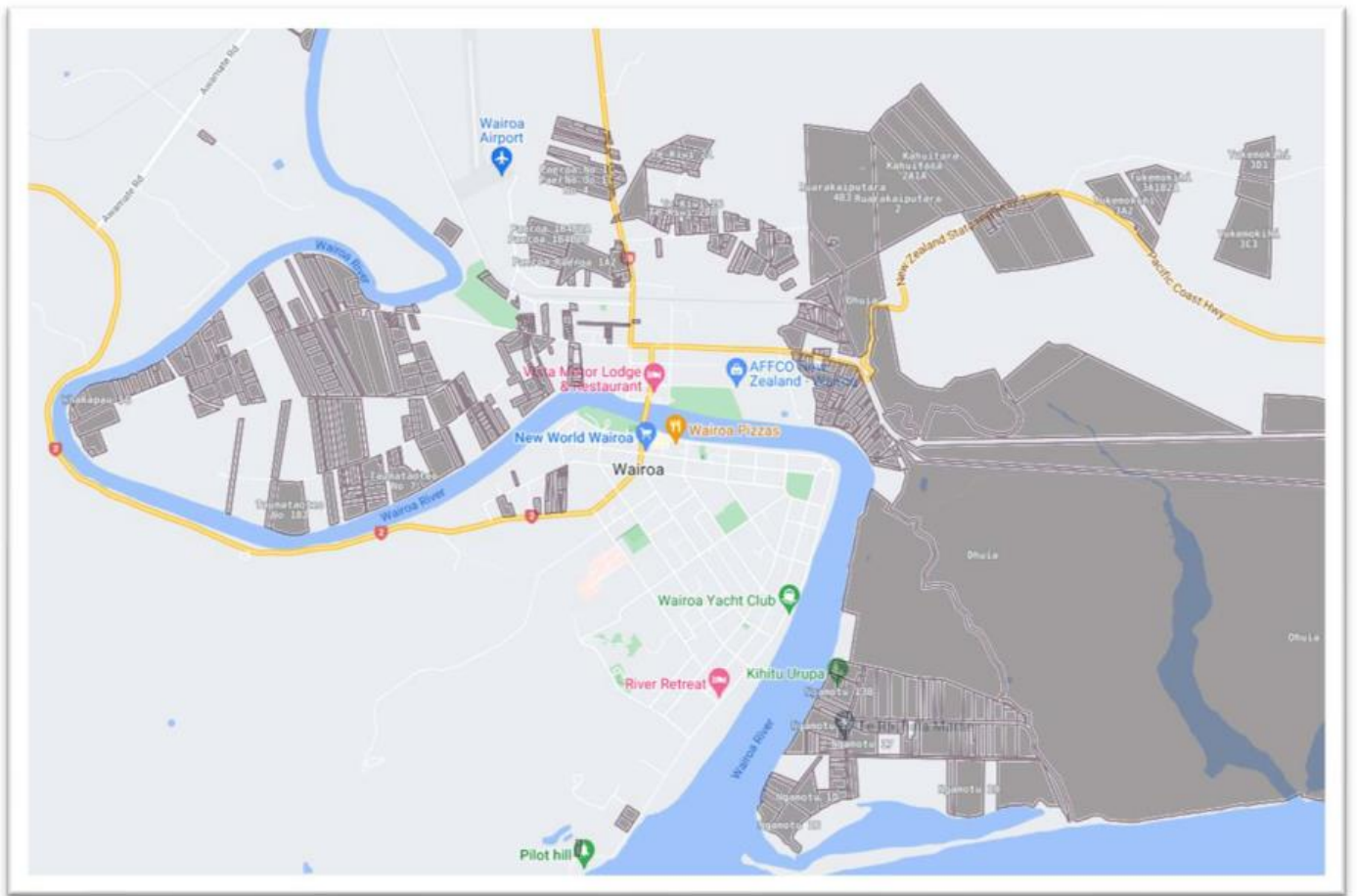


Figure 2 - Map of Maori land in Wairoa (source Pātaka Whenua, Māori Land Court online)

3 Flood Extents Comparison

Figure 3 below shows the peak flood extent estimated for Cyclone Gabrielle compared to the design flood event predicted (1% AEP, excluding climate change). The figure shows that the 1% AEP is predicted to be slightly larger than the estimated flood extents for Cyclone Gabrielle.

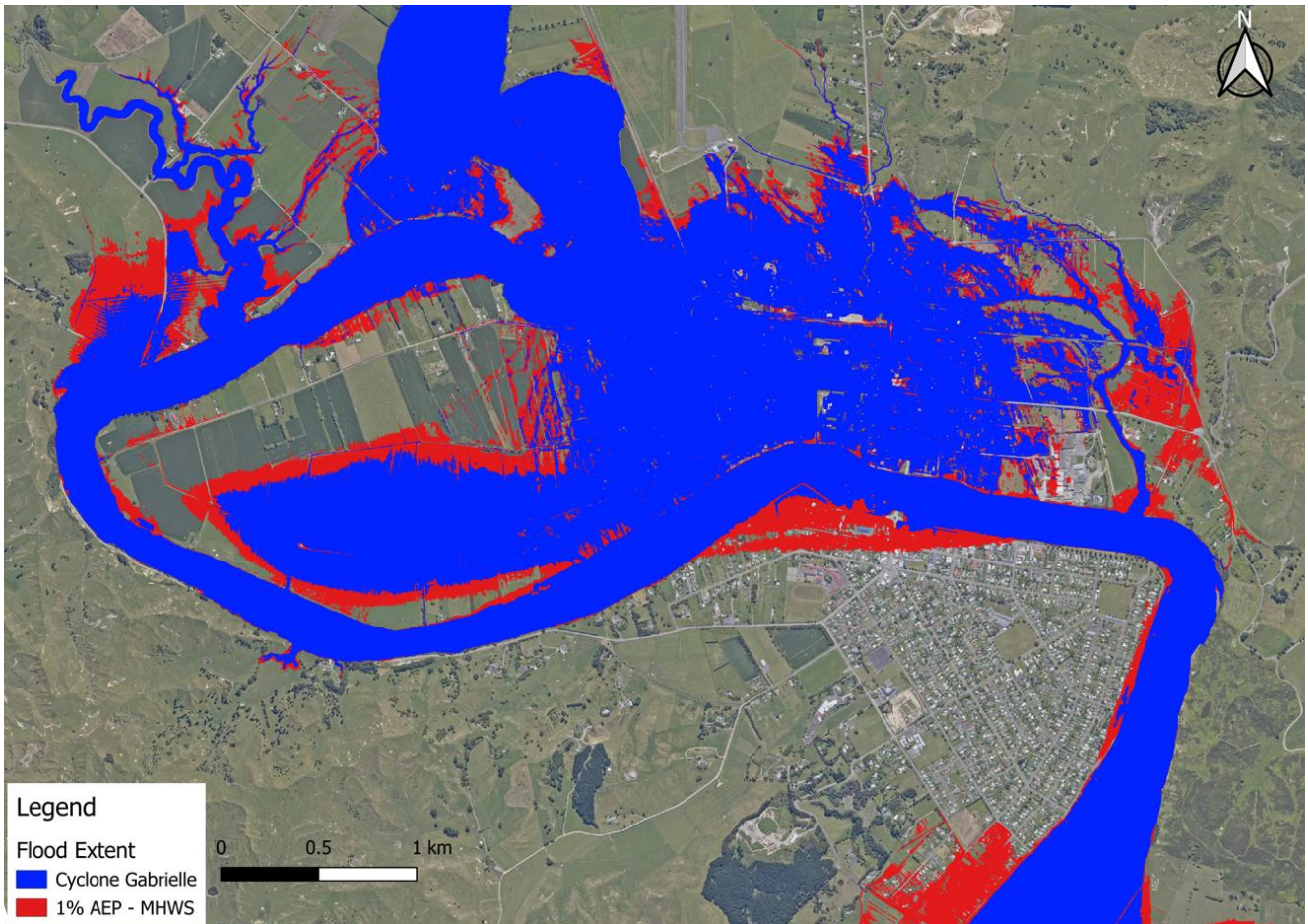


Figure 3 - Comparing the predicted peak flood extents