

4 September 2025  
Job No: 1017353.2402

Hawkes Bay Regional Council  
Private Bag 6006  
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Attention: Dugan Weitz

Dear Dugan

## **Ohiti Road (Omahu) Flood Protection Stopbank Works**

### **Supplementary Assessment of Upstream Flood Effects for Omāhu Stopbanks**

#### **1 Introduction**

Tonkin & Taylor Ltd (T+T) is currently supporting Hawke’s Bay Regional Council (HBRC) with the design of two new stopbanks at Omāhu, Hawkes Bay. In July 2025, T+T completed an assessment of consequential flood effects to support a resource application for the proposed stopbanks at Omāhu<sup>1</sup>. The assessment primarily looked at the flooding effects in the 100-year ARI or Cyclone Gabrielle estimated events.

This letter assesses the effects the proposed stopbanks have on flood depth and duration on the land upstream of their location, considering a 5-year ARI and 20-year ARI flood event. These more frequent events have been assessed as they have the potential to have an impact on land users upstream of the stopbanks. This letter is supplementary and should be read in conjunction with the Consequential Flood Effects Assessment.

#### **2 Flood scenario overview**

Two scenarios were modelled, including:

- 1 “Base model” schematisation.
- 2 “Proposed stopbank” – Includes the base model and the proposed stopbank preliminary design developed to accommodate the 100-year ARI RCP8.5 2050 climate event water level plus 700 mm freeboard from the Okawa model, and 100-year ARI water level plus 700 mm freeboard from the Ngaruroro River model.

These scenarios were modelled for the 5-year ARI and 20-year ARI events with present day climate.

It should be noted that in both events, there are no inflows to the model from the Ngaruroro River.

#### **3 Effects on flood extent**

Figure 3.1 shows the estimated maximum flood depths in the 5-year ARI event in the base scenario and with the proposed stopbanks. Figure 3.2 shows the difference in flood depth between the two scenarios. The figures indicate that the proposed stopbanks do not cause a significant increase in

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<sup>1</sup> Tonkin + Taylor (22 July 2025). *Consequential Flood Effects of the Omāhu Stopbanks*. Job No. 1017353.2402.

maximum flood depths upstream of the stopbanks. Taihape Road acts as a barrier to flow, preventing overland flooding from reaching the stopbanks in both the base and proposed stopbanks scenario. The stopbanks only have an effect on flooding south of Taihape Road.

Figure 3.2 shows an increase in flooding on 18 Ohiti Road. However, the model does not account for localised drainage improvements that will be constructed with the stopbank which will mitigate this increase in flooding.



Figure 3.1: Estimated flood depth during the 5-year ARI event. Depths less than 50 mm not shown.

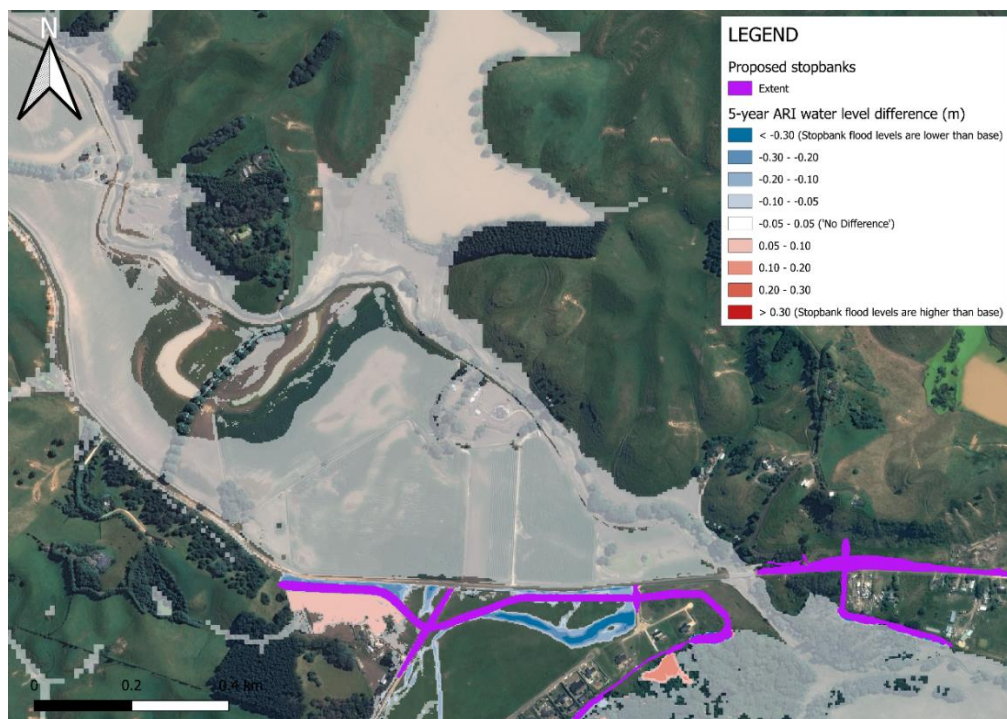


Figure 3.2: Difference in flood depth with the proposed stopbanks in the 5-year ARI event.

Figure 3.3 shows the estimated maximum flood depths in the 20-year ARI event in the base scenario and with the proposed stopbanks. Figure 3.4 shows the difference in flood depth between the two scenarios. These figures indicate that the stopbanks cause an increase in flood depths on land north of Taihape Road and near the bridge. The water depth increases by approximately 200 mm north of

Taihape Road. Figure 3.3 shows that most of this area is flooded to depths greater than 0.5 m in the base scenario during the event.

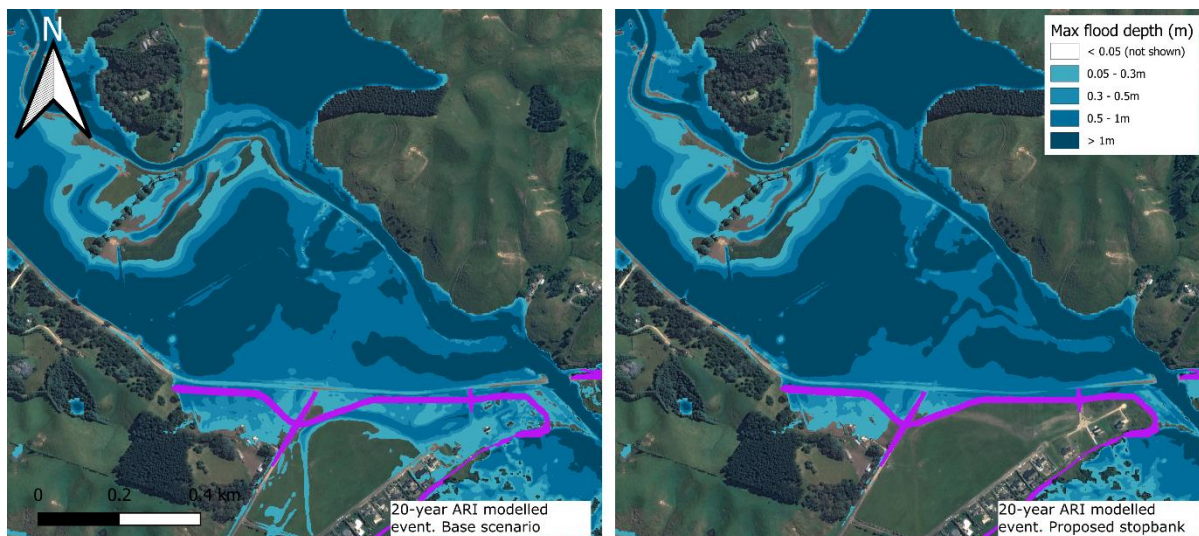


Figure 3.3: Estimated flood depth during the 20-year ARI event. Depths less than 50 mm not shown.

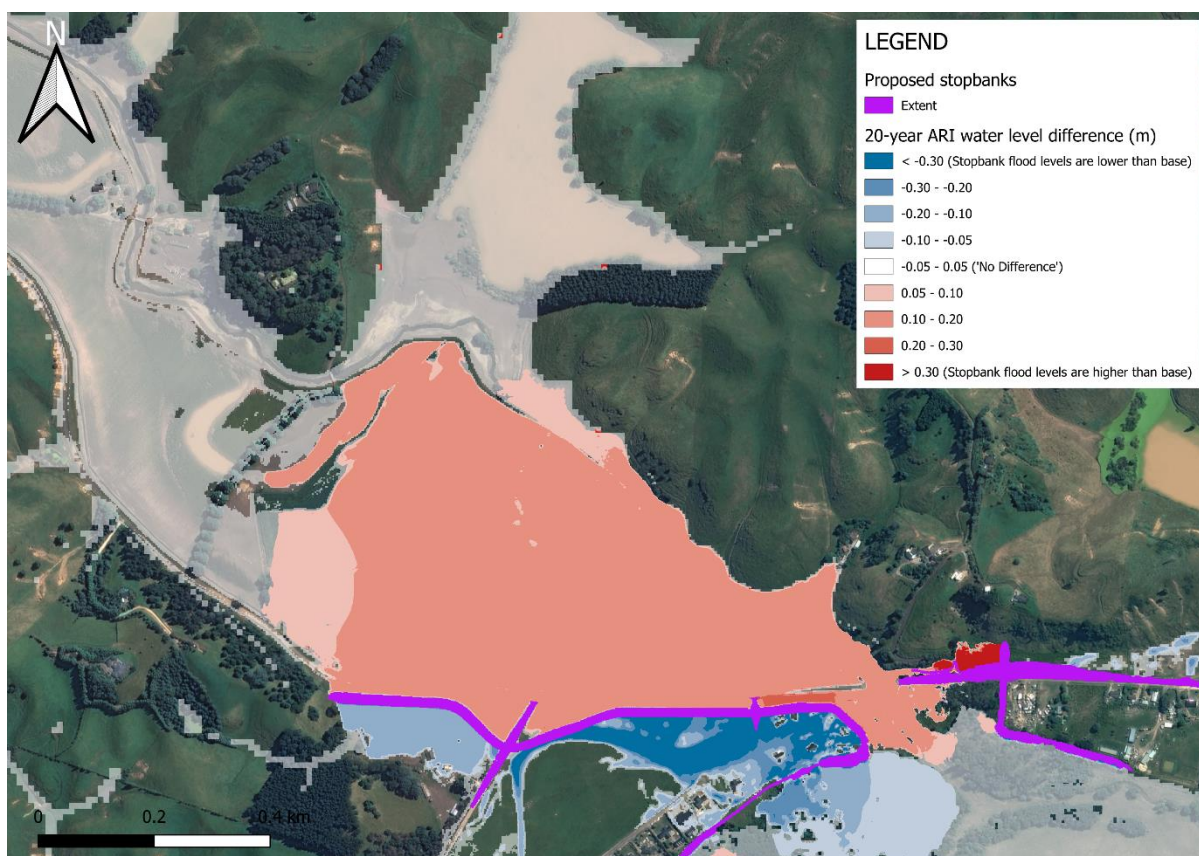


Figure 3.4: Difference in flood depth with the proposed stopbanks in the 20-year ARI event.

#### 4 Effects on duration of flooding

Figure 4.2, Figure 4.3 and Figure 4.4 shows the water level over time at the three points shown on Figure 4.1. This is only shown for the 20-year ARI event, as the stopbank did not impact the water levels in the 5-year ARI event.

The plots show that the overall duration of flooding remains similar in the estimated 20-year ARI event. The peak level changes at all three points, and the timing of the peak is slightly later.

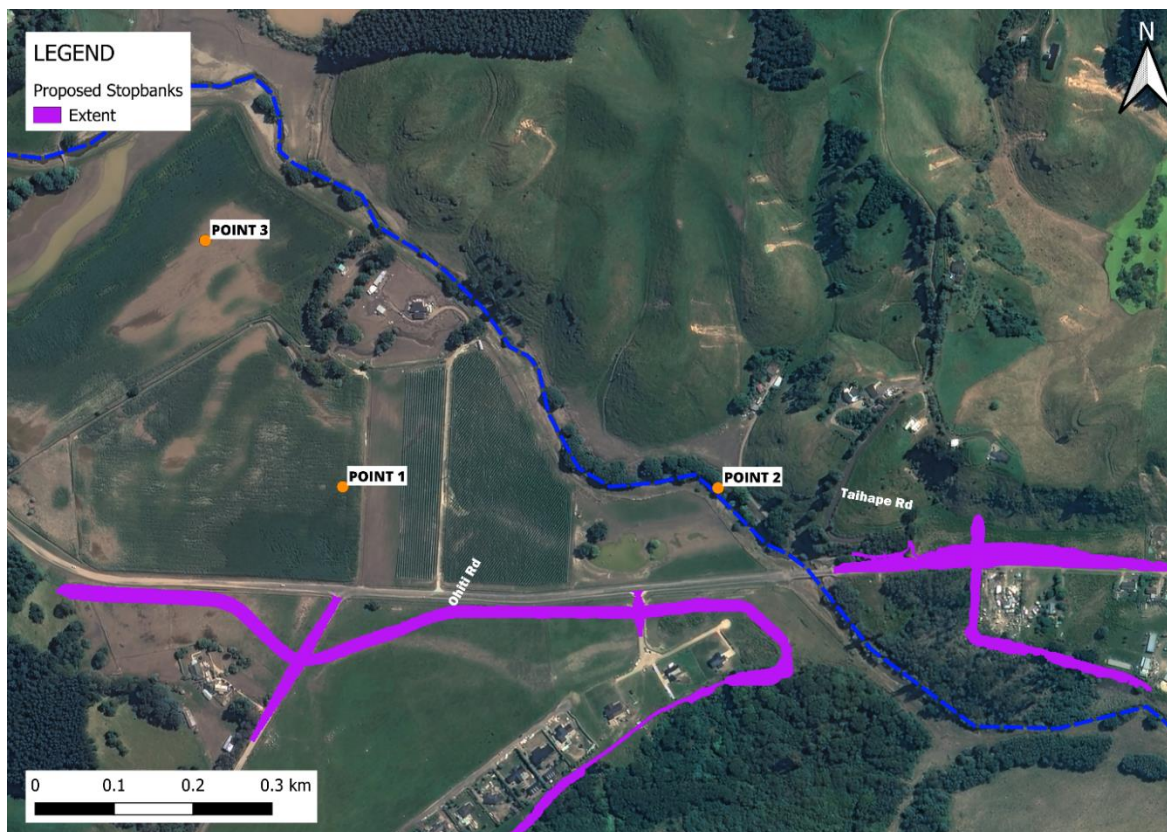


Figure 4.1: Locations of points that water level was extracted from.

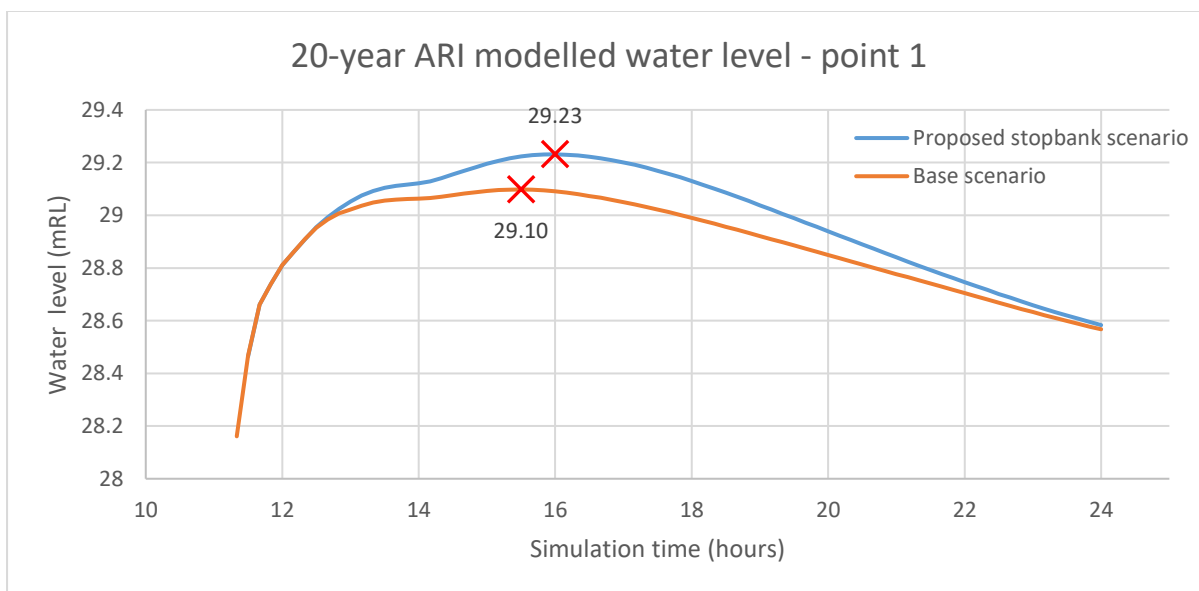


Figure 4.2: Modelled 20-year ARI water level at point 1

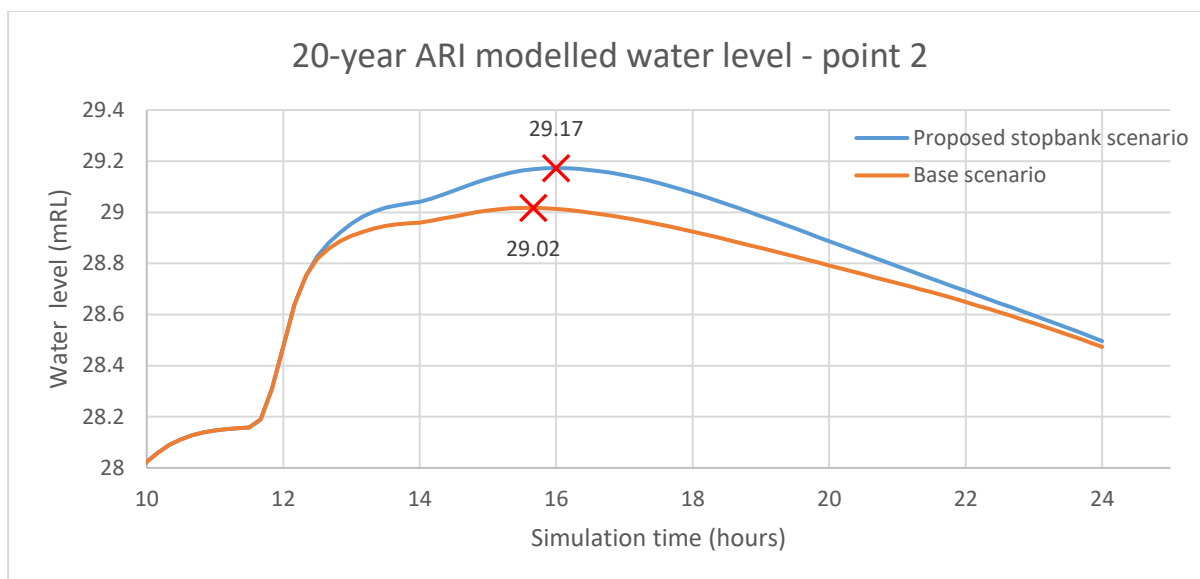


Figure 4.3: Modelled 20-year ARI water level at point 2

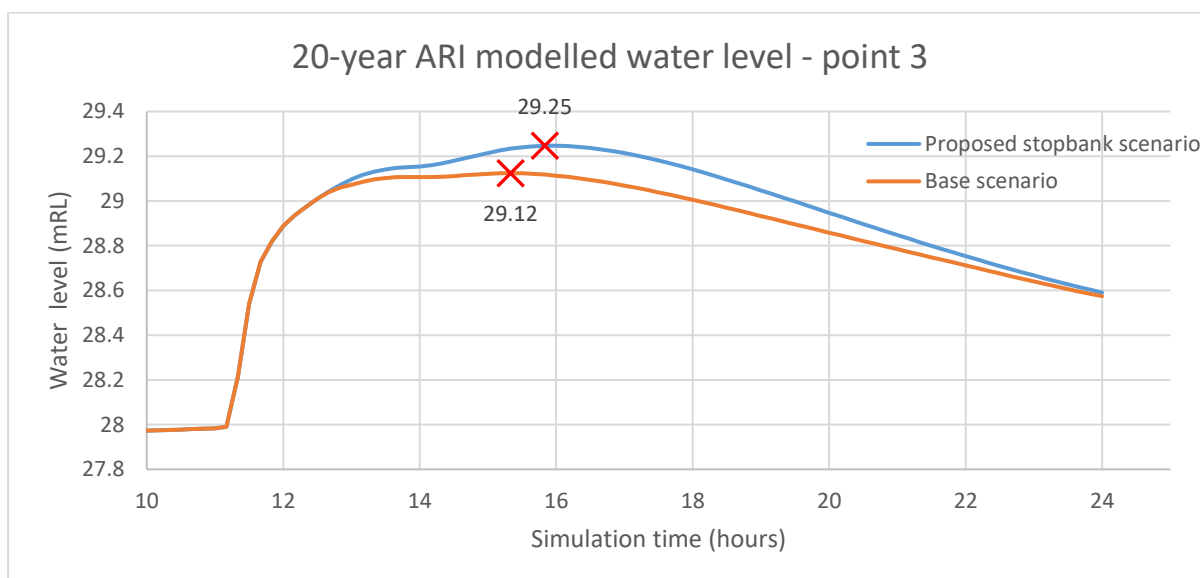


Figure 4.4: Modelled 20-year ARI water level at point 3

## 5 Summary

The model indicates that in the estimated 5-year ARI event, the proposed stopbanks do not cause a significant increase in water levels on land upstream of the stopbanks. At an event between the estimated 5-year ARI and 20-year ARI events, the water level increases to overtop Taihape Road. In the estimated 20-year ARI event, the water level increases by up to approximately 150 mm. The overall duration of flooding remains similar on this area with the proposed stopbanks.

It is difficult to discretise and quantify the effect of each separate stopbank on the water level. The modelling suggests that the combined effect of constricting the flow from all the proposed stopbanks causes the increase in water levels upstream.

## 7 Applicability

This report has been prepared for the exclusive use of our client HAWKES BAY REGIONAL COUNCIL, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Hawkes Bay Regional Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd

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4-Sep-25

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