Harrow Flood Investigation Amendment C38wwim Mapping Report

June 2025

Author of report

Glenelg Hopkins Catchment Management Authority

How to reference this report

Harrow Flood Investigation Amendment C38wwim Mapping Report (Glenelg Hopkins Catchment Management Authority, 2025).

Overview

This report will provide an explanation of the flood mapping used for the Harrow C38wwim Amendment.

Name of original flood study

Harrow Flood Investigation (Water Technology Pty Ltd, June 2017)

Does the draft amendment mapping reflect 'best available data'?

The Glenelg Hopkins Catchment Management Authority considers that the amendment mapping represents the best available data complying with the Victorian Planning Provisions Clause 13.01-1S.

Does the draft amendment mapping factor in climate change?

The Harrow Flood Investigation included modelling of 10 per cent, 20 per cent and 30 per cent increased rainfall intensity to the 1 per cent Annual Exceedance Probability hydrology, but only the 10 per cent increased rainfall intensity in the hydraulic model which produces the flood mapping. The flood investigation also modelled the 0.5 per cent and 0.2 per cent Annual Exceedance Probability scenarios. Climate change guidance for flood estimation has been updated since the completion of the Harrow Flood Investigation, with the release of Version 4.2 of Australian Rainfall and Runoff providing best practice guidance for flood estimation. The WMA Climate Change Calculator tool in line with the Australian Rainfall and Runoff, Version 4.2, was used to determine which modelled event was likely to best represent a climate change adjusted future 1 per cent Annual Exceedance Probability event, which determined to be the 0.5 per cent Annual Exceedance Probability event. The draft amendment mapping uses the 0.5 per cent Annual Exceedance Probability event as the best representation of a climate change adjusted 1 per cent Annual Exceedance Probability event.

Does the Catchment Management Authority or council have local policy on which emission scenario and time horizon to use?

Glenelg Hopkins Catchment Management Authority takes a conservative approach for flood risk management for planning purposes through adopting the Shared Socioeconomic Pathway 5-8.5 to a planning horizon of 2100. The planning horizon of 2100 complies with Coastal inundation and erosion strategies of the Victorian Planning Provisions Clause 13.01-2S, and as Glenelg Hopkins Catchment Management Authority is a coastal Catchment Management Authority the 2100 planning horizon has been adopted throughout the catchment for riverine and coastal flooding. The Shared Socioeconomic Pathway 5-8.5 is used to ensure that planning decisions are made to protect the community under a wide range of possible climate change outcomes and their impacts on flood risk. Adoption of the Shared Socioeconomic Pathway 5-8.5 provides for responsible flood risk management and planning outcomes that are sustainable to the 2100 planning horizon.

Explain the methodology used to update an original flood study to factor in climate change?

The draft amendment mapping has been prepared by the Glenelg Hopkins Catchment Management Authority, 2025. For flood investigations and intelligence prepared prior to the Australian Rainfall and Runoff Version 4.2 update, Glenelg Hopkins Catchment Management Authority utilises the WMA Climate Change Calculator tool to determine a projected 1 per cent Annual Exceedance Probability event for 2100. It should be noted that a limitation of the WMA Climate Change Calculator tool is that it provides an estimated 1 per cent Annual Exceedance Probability event for 2090 as its maximum planning horizon, however Glenelg Hopkins Catchment Management Authority considers this a suitable proxy time horizon in the absence of flood information for 2100.

The draft amendment mapping factors in climate change using the following required inputs into the WMA Climate Change Calculator tool:

- Snap approach*
- Initial Loss (mm) - 35
- Continuing Loss (mm/hr) - 5
- Critical Duration (hr) - 30
- Urbanisation (%) – 0
- Guideline – ARR V4.2 IFD and loss adjustment
- 1 per cent Annual Exceedance Probability
- Time Horizon – 2090
- Emission scenario- Shared Socioeconomic Pathways 5-8.5

*Note that the snap approach includes the catchment upstream of Rocklands Reservoir and may overestimate the projected increases in flood magnitude.

The WMA Climate Change Calculator tool projects that a future 1 per cent Annual Exceedance Probability flood event under the Shared Socioeconomic Pathway 5-8.5 for the year 2090 is equivalent to a 1 in 139.3 Annual Exceedance Probability historical event for Harrow. In Annual Exceedance Probability per centages this is between a 1 and 0.5 per cent event. Glenelg Hopkins Catchment Management Authority compared the flood extents for the climate change modelling of the 1 per cent Annual Exceedance Probability with an increase in rainfall intensity of 10 per cent, and the 0.5 per cent Annual Exceedance Probability event and found that the 0.5 per cent Annual Exceedance Probability event was the smaller of the two. As the 0.5 per cent Annual Exceedance Probability event is the next largest event exceeding the 1 per cent Annual Exceedance Probability event it has been chosen to represent a suitable climate change scenario for the purpose of this amendment.

Has the draft amendment mapping undergone any other spatial changes from the raw flood modelling data found in the original study?

The raw Harrow flood modelling has been processed to produce the draft amendment mapping. A high hazard flood extent was extracted using the following criteria from the 0.5 per cent Annual Exceedance Probability mapping produced by the Harrow Flood Investigation (Water Technology Pty Ltd, 2017) as the projected 1 per cent Annual Exceedance Probability by 2090:

- Depth equal to or greater than 0.5 metres and,
- Velocity equal to or greater than 2 metres per second and,
- Depth x Velocity product equal to or greater than 0.4 metres squared per second.

Both the 0.5 per cent Annual Exceedance Probability flood extent and the high hazard flood extent were smoothed through an automated GIS process and areas known as flood islands, which are areas fully surrounded by floodwaters, were filled in through an automated GIS process.

Within the Township Zone, the overlay applied was dependent on the level of flood hazard:

- The Floodway Overlay was applied within the high hazard flood extent
- The Land Subject to Inundation Overlay was applied to the remainder of the floodplain outside of the high hazard flood extent.

Outside of the Township Zone the Floodway Overlay was applied to the entire 0.5 per cent Annual Exceedance Probability flood extent. The decision to apply the Floodway Overlay outside of the Township Zone was based on a desktop assessment undertaken between Glenelg Hopkins Catchment Management Authority and West Wimmera Shire where it was noted that all properties within the 0.5 per cent Annual Exceedance Probability flood extent, with the exception of a single property, were either entirely within the high hazard flood extent or had

sufficient land available that any future development could be located entirely outside of the 0.5 per cent Annual Exceedance Probability flood extent. The single property identified in the Farming Zone that did not meet this criteria had the overlays applied as per the Township Zone criteria above to not preclude development potential.

Minor adjustments to the mapping have been made to remove overlays from property boundaries where the area impacted is less than 30 metres squared. See Image 1 for an example of manual adjustments.

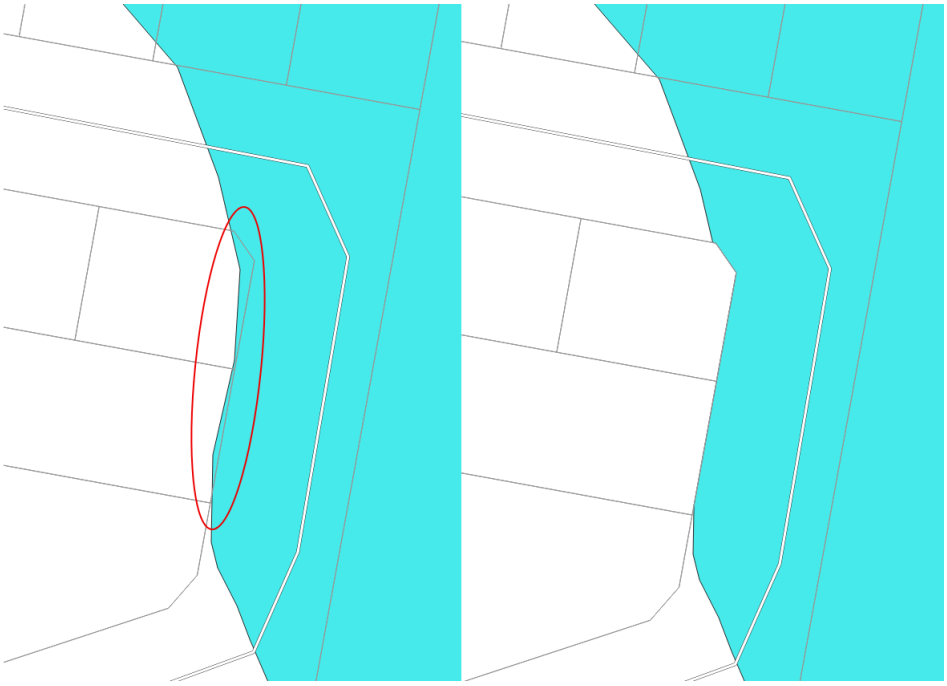

Figure 1 – Left: Properties impacted by amendment mapping based on flood mapping. Right: After manual adjustments have been applied to flood mapping.

Conclusion

The draft amendment mapping represents the best available flood information for a future 1 per cent Annual Exceedance Probability by 2090 under the Shared Socioeconomic Pathway 5-8.5 using outputs from the Harrow Flood Investigation (Water Technology Pty Ltd, 2017)