

**BEFORE HEARINGS PANEL
AT HUTT CITY COUNCIL**

UNDER THE

Resource Management Act 1991

IN THE MATTER OF

The Proposed Lower Hutt District Plan

BETWEEN

CHRIS MOORE

Submitter

AND

THE HEARINGS PANEL

A Panel with delegated authority to hear submissions

STATEMENT OF EVIDENCE OF LOUIS FREELAND

INTRODUCTION

1. My full name is Louis Arthur Thornton Freeland.
2. I have prepared this evidence on behalf of my client, Chris Moore, who has submitted on the Proposed Lower Hutt District Plan (the PDP) relating to flood hazard at 3A Nikau Grove, Lower Hutt ("the site").
3. I am authorised to provide this evidence on behalf of my client, Chris Moore.

QUALIFICATIONS AND EXPERIENCE

4. I hold a Bachelor of Engineering with First Class Honours from Canterbury University.
5. I am a Chartered Member of Engineering New Zealand and a Chartered Professional Engineer.
6. I am the Wellington Civil Manager at Envelope Engineering Limited (Envelope), an engineering consultancy practice.
7. In my role, I manage the hydraulic modelling team and oversee the preparation of flood modelling and reports. This experience includes numerous large land development projects in the Wellington Region (and around New Zealand) including flood modelling to support resource consents. These projects involve the use and assessment of existing Tiaki Wai (previously Wellington Water) flood models as well as the creation of new models where required.
8. My involvement with this project has been assessing flood risk at the site. I have been directly involved with Envelope's specialist hydraulic modellers in the preparation of a Flood Risk Assessment Report (**Attachment 1**).

PURPOSE AND SCOPE OF EVIDENCE

9. The property at 3A Nikau Grove (the site) has been mapped as being subject to low, medium and high flood model hazards.
10. Our client has submitted on the PDP. The submission as it relates to this evidence seeks to reduce climate change allowances and questions the representativeness of the flood model compared to local topography.

EXPERT WITNESS CODE OF CONDUCT

11. I have been provided with a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's 2023 Practice Note. While this is not an Environment Court hearing, I have read and agree to comply with that Code. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

SUMMARY OF EVIDENCE

12. My evidence provides the results of a specific Flood Risk Assessment report and associated flood modelling prepared to support this evidence.
13. My evidence and the site-specific flood modelling undertaken confirms that flood risk at the site is low and the flood hazard (as defined by the PDP) is *Low Hazard*.
14. Based on the modelling undertaken, the Tiaki Wai (TW) flood modelling should be undertaken using more recent 2025 LiDAR surveys as well as incorporating site-specific topographical survey to ensure that it is representative of the catchment area and uses up to date information.
15. Using a climate change scenario of 35% increase in rainfall depth is not in accordance with TW's approach for other hydraulic models in the Wellington Region and a 20% increase would be consistent with these as well as aligning with recent scientific research which has categorised the climate change scenario behind the 35% increase as unlikely. This would also align with the recommendations of Hutt City Council in the Section 42A Report.
16. Flood depth and extent for sensitivity testing scenarios should be excluded from flooding maps to align with industry standards. This will ensure consistency in presentation of flood hazard data across the region.

RESULTS OF FLOOD MODELLING

17. Envelope has prepared a Flood Risk Assessment (Appended) which includes the creation of an updated flood model based on a flood model received from TW.
18. Adjustments were made to the model to reflect site specific topography, localised updates based on recent LiDAR surveys and changes to the modelled pipe network to reflect data captured during site investigations. These changes are described within the report.

19. The Flood Risk Assessment (FRA) assessed flooding under the 100-year event inclusive of climate change allowances. The modelling in this report has considered two climate change scenarios – 20% and 35%. The 20% scenario is what TW uses for other hydraulic models in the Wellington Region and the 35% scenario is what has been used to inform the PDP modelling.
20. No areas of the site are classified as *High Hazard* (as defined by the PDP) as the velocity or depth criteria (>0.5 m depth or >2 m/s velocity) are not exceeded anywhere within the site and there is no stream or river corridor as this is culverted through the site.
21. This agrees with the on-site assessment by Alistair Osbourne (Tiaki Wai Principal Stormwater Modeller) and in his evidence on submissions and further submissions to the PDP.
22. There are small and isolated pockets of *Medium Hazard* (as defined by the PDP) in the east of the site in both the 20% and 35% climate change scenarios. However, Small and non-contiguous areas of flooding effects are often excluded from results to filter out model noise. This aligns with the approach that we understand TW has taken based on discussions with Mr. Osbourne.
23. The areas of *Medium Hazard* are small and not connected to other areas of *Medium Hazard*. Based on this, the flood hazard at the site is considered to be *Low Hazard* across the entirety of the site in either climate change scenario.
24. The balance of flooded area on the site would be mapped as *Low Hazard* (as defined by the PDP), where modelled flood depths are greater than 50 mm.

MODEL TOPOGRAPHY

25. The TW models are built using a range of different Digital Elevation Models based on LiDAR surveys conducted in 2013 or 2016 depending on the specific model.
26. LiDAR has been recently flown in 2025 for the Hutt Valley.
27. While it is not possible or practical to keep a model completely up to date, the modelling undertaken (appended) shows that the more recent 2025 LiDAR results in tangible differences in flooding extent and depths for the assessed site and surrounding areas. It is expected that similar changes will occur for the wider area.

28. The PDP will result in restrictive rules for flood prone areas, and it is important that flood modelling used to inform the PDP is based on up to date information including the latest LiDAR survey.

MODELLED CLIMATE CHANGE

29. The modelling in this report has considered two climate change scenarios – 20% and 35% increases on current predicted rainfall depths.
30. The 20% increase scenario is what Tiaki Wai uses for other hydraulic models in the Wellington Region.
31. The 35% increase scenario aligns with a climate change scenario which recent scientific research has considered unlikely.
32. Although the climate change scenarios (20% or 35%) do not affect our conclusions for this specific site, I note that “unlikely” scenarios are typically used for testing the sensitivity of a model and setting freeboard levels rather than for setting base flood risk.
33. Using the 20% scenario would align with the flood modelling approach taken by TW in other areas of Wellington, and the recommendations of Hutt City Council in the Section 42A report (paragraphs 843 – 849).

FLOOD DEPTH MAPPING

34. Flood extents from sensitivity testing are currently included within mapped flood depth areas. These do not represent a specific, modelled event and are indicative of a range of events and scenarios.
35. It is standard practice (e.g. GWRC Flood Hazard Modelling Standard) to include these as “flood sensitive” areas or similar and not include them in depth or extent maps.
36. These areas should be removed from flood maps or otherwise relabelled as flood sensitive areas (or similar terminology). This will ensure consistency in presentation of flood hazard data across the region.

CONCLUSION

37. My evidence provides the results of a specific Flood Risk Assessment report and associated flood modelling prepared to support this evidence.

38. My evidence and the site-specific flood modelling undertaken confirms that flood risk at the site is low and the flood hazard (as defined by the PDP) is *Low Hazard*.
39. Based on the modelling undertaken, the TW flood modelling should be undertaken using more recent 2025 LiDAR surveys as well as incorporating site-specific topographical survey to ensure that it is representative of the catchment area and uses up to date information.
40. Using a climate change scenario of 35% increase in rainfall depth is not in accordance with TW's approach for other hydraulic models in the Wellington Region and a 20% increase would be consistent as well as aligning with recent scientific research which has categorised the climate change scenario behind the 35% increase as unlikely.
41. Flood depth and extent for sensitivity testing scenarios should be excluded from flooding maps to align with industry standards. This will ensure consistency in presentation of flood hazard data across the region.

5 August 2026

Louis Freeland