

**IN THE MATTER** of the Resource Management Act 1991

**AND**

a submission by the Hawke's Bay  
Regional Council ('**Regional Council**')

**AND**

Central Hawke's Bay District Council  
proposed District Plan.

## **STATEMENT OF EVIDENCE OF CRAIG GOODIER**

### **Introduction**

1. My name is Craig Goodier. I am a Principal Engineer in the Asset Management Group of the Hawke's Bay Regional Council.
2. I obtained a Master of Engineering from Central Queensland University, Australia, in 1997, and a Bachelor of Engineering from Lakehead University, Canada in 1993.
3. I am a Chartered Professional Engineer, a Chartered Member of Engineering New Zealand, and have 26 years' experience practising as a Registered/Chartered Engineer.
4. Engineering New Zealand has assessed my practice area as: *Management, investigations and hydrologic and hydrodynamic analysis of rivers and drainage systems for civil infrastructure and flood hazard.*
5. I have been employed by the Regional Council since 1996. In my current role I am part of a team of engineers responsible for the engineering aspects of the Council business including a wide range of engineering related projects, flood risk assessment, flood and river control schemes, drainage schemes, flood forecasting, coastal processes and hazards, and engineering investigations. A specific part of the analysis work I complete at the Regional Council involves producing flood hazard maps for the Hawke's Bay region.

6. I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and agree to be bound by it notwithstanding that this hearing is not an Environment Court hearing. In particular, I confirm that the evidence I am giving is within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

### **Background and role at this hearing**

7. I appear for the Regional Council which made a submission (S11) on the proposed Central Hawke's Bay District Plan to provide evidence on the results, method and limitations of the flood hazard maps derived for the Central Hawke's Bay district.
8. I performed this work as part of the Regional Council's statutory roles and responsibilities, including:
  - a. those roles and responsibilities as described in Chapter 8.4.4 of the Hawke's Bay Regional Resource Management Plan (outlined in further detail in the evidence of Mr Ide for the Regional Council) and
  - b. obligations under Section 35 of the Resource Management Act 1991 (RMA) which states:

*“(1) Every local authority shall gather such information, and undertake or commission such research, as is necessary to carry out effectively its functions under this Act or regulations under this Act.*

*(5) The information to be kept by a local authority under subsection (3) shall include—*

*j) records of natural hazards to the extent that the local authority considers appropriate for the effective discharge of its functions.”*

### **Reason for submission**

9. The existing flood hazard maps in the operative district plan were created in the early 1990s using very limited contour information, and thus have limited accuracy. Their purpose was limited to showing some areas of overland flow where the residual risk of flooding from a stopbank failure exists. These maps did not serve the purpose of assisting the district council in executing their planning or building control functions.
10. Ground level information with increased accuracy and resolution was collected by Aerial LiDAR (Light Detection and Ranging) survey in 2006. This updated dataset enabled an

update to the previous flood hazard maps and was able to be used to produce more modern flood hazard maps that surpassed the previous maps in accuracy and applicability.

11. The flood hazard maps have been published on the Hawke's Bay Emergency Management Hazard Portal as part of the Regional Council's responsibilities. In this context, the Regional Council is the administrating authority of the Civil Defence Emergency Management Group, acting under the Civil Defence Emergency Management Act 2002 (CDEMA). More specifically Section 17(1) states the function of the Civil Defence Emergency Management Group as including:

*“(a) in relation to relevant hazards and risks,—*

*(i) identify, assess, and manage those hazards and risks*

*(ii) consult and communicate about risks.”*

12. The flood hazard maps were submitted to the CHBDC proposed district plan such that the maps could be included in the district plan and be used by the district council in fulfilling its functions in planning and controlling building activity in potentially hazardous zones.

#### **Method used to determine flood hazard mapping for CHB**

13. The full description of the method used to determine the flood hazard maps for CHB was included as attachment A in the Regional Council's original submission (S11), and also as Appendix D of s42a hearing report. The method report is titled *20210806-Flood-Hazard-Mapping-for-Central-Hawkes-Bay.pdf*.
14. In summary, the method uses ground elevation contours collected from the 2006 regional LiDAR Survey and aerial photos to delineate water courses and their approximate outward boundaries, assuming relatively intense rainfall and flood conditions.
15. The current flood hazard maps show areas at risk from flooding which includes water flowing in rivers, streams, drains, overland flow paths, ponded water, as well as possible areas which may be subject to erosion and avulsion due to meandering river channels.
16. In some locations, computer models were used to derive flood extents and overland flow paths.

#### **Justification for use of method**

17. The level of detail involved in flood hazard management, which includes the planning aspects of flood hazard mapping, follows a continuum, whereby at one end of the scale, basic, low accuracy hazard maps can be produced using ground level contours with a large interval and

low accuracy, and the other end of the scale high accuracy hazard maps produced using computer models generated from high accuracy ground level data combined with sufficient recorded historic hydrometric data used to calibrate the models.

18. The variation in deciding the correct level of detail for developing any flood hazard map is generally limited in scope by resources and available data.
19. Many flood hazard maps generated from New Zealand councils have been created as basic maps, and over time have been upgraded as resources and data became available.
20. One of the principal guides to effective natural hazard management is taken from the Quality Planning website (the website is backed by Ministry for the Environment, New Zealand Planning Institute, Resource Management Law Association, New Zealand Institute of Surveyors, Local Government New Zealand and New Zealand Institute of Architects). The risk-based approach to planning for hazards has four principles – the first of which relates to hazard information:

*“1. **Gathering accurate natural hazard information:** Identifying and accurately locating hazards on planning maps is essential for communicating and mitigating hazard risk. Collecting information often requires specialised technical knowledge and surveys. Maps showing the location of hazards in the vicinity of a property must be developed at an appropriate scale. As the existence of a particular hazard may have a major effect on a decision to purchase or build on a property, all information on hazards should be as accurate as technology and resources permit.”*

21. The key point is one that ‘... hazards should be as accurate as technology and resources permit.’, i.e. concerning the present case of the CHB flood hazard maps, in my opinion, the method used was commensurate with the available data and resources.
22. It should be noted that newer region-wide ground elevation data has been collected and is likely to become available the latter part of 2022. The resources allocated to the interim flood hazard maps recognised this, as it was prudent to delay producing more accurate maps using computer modelling techniques until the new ground level data was made available.

### **Limitations**

23. There are limitations to the accuracy of any flood hazard mapping due to the method used. These limitations are stated in the description of the method and are repeated here for clarity.
24. The specific line drawn to delineate the zones should be assumed to have a buffer ranging from approximately 5 m in steep areas, up to approximately 50 m in flat areas. There may be exceptions to this estimate.

25. Not all floodable areas have been mapped. There may be overland flow paths that are not able to be delineated due to limited resolution of the base contours (250 mm intervals), and there may be areas at risk from flooding that have not been examined due to lack of contour information.
26. The scale to use the mapping should be limited to approximately 1:20,000. There are instances where using the data at a smaller scale is possible, however, caution should be used in the interpretation of the specific location of the flood zone edge.

### **Summary**

27. Flood hazard mapping for CHB was completed by using a sound method commensurate with available data and resources of delineating likely flood extents using ground level contours and aerial photos.
28. The method is intended to be an interim solution to provide an update from previous mapping, which had limited accuracy and was no longer providing acceptable level of functionality for planning or building control purposes.

**Craig Goodier**

**Dated 23<sup>rd</sup> August 2022**