

**Before the Hearings Panel
At Porirua City Council**

Under Schedule 1 of the Resource Management Act 1991

In the matter of the Proposed Porirua District Plan

Between **Various**

Submitters

And **Porirua City Council**

Respondent

**Statement of evidence of Bronwen Beth Gibberd on behalf of Porirua City
Council (Coastal Hazards)**

Date: 03/11/2021

INTRODUCTION:

- 1 My full name is Bronwen Beth Gibberd. I am a Coastal Scientist and Director of 4D Environmental Ltd, a member of the Focus Resource Management Group.
- 2 I have prepared this statement of evidence on behalf of the Porirua City Council (**Council**) in respect of technical related matters arising from the submissions and further submissions on the Proposed Porirua District Plan (**PDP**).
- 3 Specifically, this statement of evidence relates to the matters in Hazards and Risks: NH – Natural Hazards and District Wide Matters: CE – Coastal Environment.
- 4 I am authorised to provide this evidence on behalf of the Council.

QUALIFICATIONS AND EXPERIENCE

- 5 I hold the qualifications of BSc and MSc (Hons) Marine Sciences from the University of Waikato (2000).
- 6 I have worked as i) Coastal Earth Scientist for the Waikato Regional Council (previously Environment Waikato), ii) Coastal Geomorphologist for Royal Haskoning (U.K) and iii) Owner and director of my own coastal science and management consultancy – 4D Environmental Ltd since 2007.
- 7 I have 20 years' involvement in applied coastal processes, focussed particularly on the assessment and management of coastal hazards, and coastal monitoring.
- 8 I have completed numerous coastal hazard assessments and provided coastal management advice at numerous sites in New Zealand and in the

United Kingdom, including coastal hazard assessments for District Plan reviews in several Districts in the Waikato and Wellington Regions.

- 9 I am a member of the New Zealand Coastal Society (technical subgroup of IPENZ).

Code of conduct

- 10 I have read the Code of Conduct for Expert Witnesses set out in the Environment Court's Practice Note 2014. I have complied with the Code of Conduct in preparing my evidence and will continue to comply with it while giving evidence. My qualifications as an expert are set out above. Except where I state I rely on the evidence of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from my expressed opinions.

SUMMARY

- 11 My name is Bronwen Gibberd.
- 12 I have been asked by the Council to provide evidence in relation to submissions on the Natural Hazards and Coastal Environment Chapters.
- 13 My statement of evidence addresses the concerns of submitters in relation to the identified coastal hazard areas, specifically the Coastal Hazard - Current Inundation, Coastal Hazard – Current Erosion, Coastal Hazard – Future Inundation and Coastal Hazard – Future Erosion overlays. I have addressed the basis of the hazard overlays and considered whether the submissions provide additional coastal processes information to indicate that an adjustment to (or removal of) the overlay may be appropriate at the relevant locations. I have not addressed the aspects of the submissions that relate solely to planning provisions.

INVOLVEMENT WITH THE PROPOSED PLAN

- 14 I have been involved in the PDP since 2018. I am co-author of the coastal hazard report *Porirua City Coastal Hazard Assessment, Focus Resource Management Group, April 2020* (“Focus, 2020”), and associated coastal hazard overlays.

SCOPE OF EVIDENCE

- 15 My statement of evidence specifically addresses the following submissions:

15.1 Submission 29.4: Future coastal inundation overlay at 20 Beach Road, Plimmerton.

15.2 Submission 210.3 & 211.4: Coastal inundation overlays at Grays Road, Pauatahanui Inlet

15.3 Submission 247.19: Coastal hazard overlays at Seaview Road, Paremata

- 16 These submissions all relate at least in part to the Coastal Hazard - Current Inundation and Coastal Hazard – Future Inundation overlays. The coastal inundation hazard areas rely heavily on a study by NIWA (Lane et al., 2013), which provides storm tide estimates for the Wellington coast (see Section 3.3 of Focus, 2020). This report provided the best available data to assess potential coastal storm inundation for Porirua City.

- 17 The coastal inundation overlays identify areas of land below a vertical elevation that represents the predicted 1% AEP storm tide. This level varies at different locations and include factors for wave effects depending on the relative exposure of the area. There is no added “freeboard” within these levels, or explicit allowance for potential errors in the elevation model used to map the spatial extent of these overlays.

- 18 As noted in our coastal hazard assessment report, there is always uncertainty and therefore must be a level of conservatism in coastal inundation estimates. Notwithstanding this, we know that over time, ongoing sea level rise will increase the severity and spatial extent of storm inundation. We therefore have high confidence that these areas will be vulnerable to coastal inundation in the future, and the uncertainty relates more to the timeframe than the hazard itself.
- 19 While land within the Coastal Hazard – Current Inundation overlay is susceptible to coastal inundation during rare and severe storm tide events, even a small amount of future sea level rise will not just increase the depth, but greatly increase the frequency of flooding. As noted in Lane (2013), sea level rise of just 0.2-0.3 m would increase the recurrence of a 1:100-year event to an event that could occur on average once a year. This highlights the importance of identifying a carefully managing these areas.
- 20 The purpose of the Coastal Hazard – Future Inundation overlays should be clearly expressed within the District Plan and in any other setting where they are used (e.g. LIM reports). It is important to understand that these do not represent an existing hazard, but a long-term future hazard.
- 21 The Coastal Hazard – Current Erosion overlay identifies the area at risk from coastal erosion with current sea level and existing coastal processes. The assessment is based heavily on direct field observations and historic records of past shoreline change, supported by a conceptual understanding of the local geomorphology and processes. The maximum width of the Coastal Hazard – Current Erosion overlays is 25 m, and in most locations the overlay is only 10-15 m wide. This area has been defined with much greater certainty than the future hazard overlays.
- 22 As there is no allowance for long term trends or sea level rise effects, we can be relatively confident that development within the Coastal Hazard – Current Erosion overlay is potentially vulnerable to coastal erosion; if not now, in coming decades. This overlay therefore identifies the width

of coastal margin where it would generally be imprudent to locate (or intensify) development in the absence of a long-term coastal hazard mitigation strategy that has been developed in collaboration with Council and community.

23 Response to submission 29.4: Mike Evans, 20 Beach Road, Plimmerton

23.1 Mr Evans has requested that the coastal hazard mapping be amended in the vicinity of 20 Beach Road. The property is located on the peninsula at the northern end of Plimmerton beach, landward of Sunset Road. Mr Evan's concern is that the prevailing wind and storm surge is from the north/north-east (from which the property is sheltered), and there is no history of inundation at the property.

23.2 The Future Coastal Inundation Area is defined at this location as coastal areas with a land elevation of 3.25 m (WVD) or below. This provides for a 1% AEP storm tide and 1.0 m of sea level rise. There is only a very small allowance for water level fluctuations, which reflects the relatively sheltered location of the property, as noted by the submitter. A larger allowance for wave effects has been applied to the coastal margin within 30 m of the beach, but this does not impact on the flooding inundation overlay at 20 Beach Road.

23.3 The seaward portion of the property at 20 Beach Road has an elevation of approximately 3.0 m (WVD) and is affected by the Coastal Hazard - Future Inundation overlay. The area may therefore be vulnerable to minor (shallow) coastal inundation with a 1:100-year storm tide, after 1.0 m of sea level rise. There is therefore no current coastal inundation hazard at the property and there is unlikely to be for many decades. This is consistent with Mr Evans' observation that the property has not been inundated in the past.

23.4 The Coastal Hazard – Future Inundation overlay highlights the potential for hazard vulnerability in the long term with projected sea level rise of 1.0 m, to guide management practices and avoid increasing long term risk. It does not represent a current hazard.

23.5 I recommend that the Coastal Hazard – Future Inundation overlay remain as notified. While the current risk is low the future inundation area provides essential information about the potential long-term risk.

24 Response to submission by Trustees of the Blue Cottage Trust, and Ken Gray No. 1 Family Trust and Ken Gray No. 2 Family Trust (Pauatahanui).

24.1 The trustees have requested that the “Coastal Hazard – Current Inundation” and “Coastal Hazard – Future Inundation” overlays be removed from 243 and 271 Grays Road, on the northern shore of the Pauatahanui Inlet. The concern is that these overlays will have an unreasonably severe impact on sustainable management and use of the properties and are not the result of adequate analysis and evaluation under S32 and s32AA of the Resource Management Act.

24.2 243 Grays Road (Lot 6 DP 28478) has an area of 6 ha. Approximately 1 ha of the property is affected by the coastal inundation hazard overlays. The remainder of the property is elevated and the existing dwelling on the property is outside the overlay.

24.3 271 Grays Road is directly adjacent to 243 Grays Road and has an area of approximately 486 ha and is held in 3 titles (Lot 1-2 DP 1408, Lot 1 DP 89872, Lot 3 DP 332721 and Lot 2 DP 408158). Approximately 3.5 ha of land adjacent to Grays Road is within the Coastal Hazard – Current Inundation overlay, and

a further 3-4 ha of land is within the Coastal Hazard – Future Inundation overlay. The remainder of the property is elevated and not affected by any hazard overlays.

24.4 The Coastal Hazard – Current Inundation overlay is defined in the Pauatahanui area as coastal areas with a land elevation of 1.95 m (WVD) or below. This provides for a 1% AEP storm tide and a small allowance for water level fluctuations.

24.5 The affected areas of both properties are adjacent to the Kakaho Stream and is part of a low-lying river valley with ground elevation of 1.5-2.0 m (WVD). The area has a direct hydraulic connection to the coast via the Kakaho Stream and across the low-lying road. The area is therefore potentially vulnerable to coastal inundation during a 1:100-year storm tide with current sea level. An additional “strip” of land will be susceptible to coastal inundation during extreme events following up to 1.0 m of sea level rise (Coastal Hazard – Future Inundation).

24.6 There is no evidence presented in the submission to suggest that the data on which the inundation area is based is incorrect. I therefore recommend that the Coastal Hazard – Current Inundation and Coastal Hazard – Future Inundation areas be retained as notified. While the Coastal Hazard – Current Inundation overlay on these properties reflects relatively shallow and occasional inundation with current sea level, the frequency and severity of inundation will increase with even minor sea level rise. The Coastal Hazard – Future Inundation overlay provides essential information about the potential long-term risk to future development.

- 25.1 The submitter has highlighted the nuances and caveats acknowledged in the Focus (2020) report and raised concern that the coastal hazard overlays do not accurately depict the risk at the properties. The submission has requested the hazard overlays be amended.
- 25.2 The properties at 51 and 57-59 Seaview Road are located on the northern shore of the Golden Gate Peninsula. The existing dwelling at 51 Seaview Road is very close to the coast and partially within the Coastal Hazard – Current Erosion and Coastal Hazard – Current Inundation overlays. The low-lying seaward portion of 57 Seaview Road is also affected by the coastal erosion and coastal inundation overlays. 59 Seaview Road is in an elevated position well landward of the hazard overlays.
- 25.3 The Coastal Hazard – Current Inundation overlay is defined in the Golden Gate area as coastal land with an elevation of 2.20 m (WVD) or below. This provides for a 1% AEP storm tide and an allowance for wind generated waves within the Harbour during extreme events. Further detail is given in Section 11.2 of Focus (2020).
- 25.4 Coastal inundation hazard is limited to the seaward portion of the properties. The most seaward areas of 52 and 57 Seaview Road are very low lying and Lidar data indicates these areas are potentially vulnerable to coastal inundation during an extreme storm surge event without wave effects.
- 25.5 The Coastal Hazard – Current Inundation area overlay indicates the area potentially vulnerable to coastal flooding during an extreme (1% AEP) storm event, so it is not unreasonable that the mapped overlay exceeds flooding observed by residents in the past.

- 25.6 The Coastal Hazard – Future Inundation overlay indicates potential inundation following 1.0 m of sea level rise and highlights areas of land where development may be at risk in the long term. This overlay will not, therefore correlate with past observations of flood events.
- 25.7 The coastal plain in this area is extensively developed, with some beachfront properties very close to the shore. Many areas have seawalls which hold the shoreline seaward of the natural position. The area seaward of 51 Seaview Road is less modified.
- 25.8 In its natural state, the shoreline position would change as chenier ridges migrate landward from the adjacent harbour. There would also be longshore gains and losses associated with wave generated longshore drift. The Coastal Hazard – Current Erosion overlay provides for these natural shoreline movements. This is covered in more detail in Section 11.1.2. of Focus (2020).
- 25.9 The shoreline fronting 51 and 57 Seaview Road is currently in an accreted state, and coastal erosion hazard is low in the short-term. Over longer timeframes, chenier features such as the one seaward of these properties migrate alongshore, resulting in erosion in some areas and accretion in others. For example, aerial photographs taken in the 1940s and 1960s show the shoreline at 57 Seaview Road approximately 10 m landward of its current position.
- 25.10 I recommend that the coastal hazard overlays remain as notified. However, it is important to recognise that these overlays will not provide a stand-alone “solution” to coastal hazard management where there is already extensive development within the coastal margin that is naturally susceptible to coastal processes and dynamics. As noted by

the submitter, the Focus (2020) report highlights the need for site specific strategies at some locations, including the beaches of the Golden Gate Peninsula. These plans are separate to the District Plan process and would include extensive stakeholder consultation and participation to address the issues.

- 25.11 The submission suggests that the Council add policy that “seeks to remove any council liability relating to new activities within the coastal hazard zones”. The proposed policy would transfer responsibility for hazard risk to the owner. While this is a planning decision, I would like to highlight here that hazard mitigation measures undertaken by private property owners can have significant effects on coastal processes, which in turn impact adversely on public amenity and recreational values of the beach. Therefore, while such an approach aims to allow for personal responsibility for mitigating hazard risk, there is potential for serious adverse impacts on public values from this. This is discussed in some detail in our report (Focus, 2020 – Section 4.3.6.)

26 Response to submissions J. Norton (148.1), D. Dale (195.1, 195.2), L. Dale (247.18) relating to the definition and labelling of coastal hazard overlays.

- 26.1 The above submissions have expressed concern that the definitions of the Coastal Hazard – Current Erosion and Coastal Hazard – Current Inundation overlays are not clear or understandable. In particular, the submissions seek clarity regarding the influence of current seawall structures on coastal hazard overlays at Plimmerton Beach.
- 26.2 The submitters have requested clearer definitions be provided within the Plan, to better guide users of the Plan

and those reading the maps to understand the meaning of the coastal hazard overlays. I agree that it would be useful to have a brief communication of the purpose of each of the hazard overlays in the Plan to aid the user to interpret the maps.

- 26.3 The Coastal Hazard – Current Inundation and Coastal Hazard – Current Erosion relate to the worst likely erosion or inundation with current sea level. Both overlays relate to current coastal processes and do not include any provision for sea level rise. These overlays are based heavily on existing observations and measurements.
- 26.4 The Coastal Hazard – Future Inundation and Coastal Hazard – Future Erosion define the additional area that is potentially at risk due to inundation and erosion associated with 1.0 m of sea level rise to 2120. As these overlays rely on projections of sea level rise, and estimates of the response of natural systems, so have less certainty than the current hazard overlays.
- 26.5 At the time of preparing this evidence my understanding is that the planner’s report includes recommended definitions to be added to the Introduction of the Plan Chapter to address these concerns. I am satisfied that the proposed definitions (below) are a fair description of the intent of the hazard overlays.
- 26.6 The proposed definitions for the Current Erosion and Current Inundation overlays are as follows: *Current coastal erosion hazard - areas potentially vulnerable to coastal erosion with existing sea level and coastal processes. Current coastal flood hazard - areas potentially vulnerable to coastal flooding with existing sea level and coastal processes in a 1:100 yr storm surge event.*

- 26.7 The proposed definitions for the Future Erosion and Future Inundation overlays are as follows: *Future coastal erosion hazard - areas potentially vulnerable to coastal erosion over the period to 2120, assuming sea level rise of 1.0 m. Future coastal flood hazard - areas potentially vulnerable to coastal flooding in a 1:100yr storm surge event over the period to 2120, assuming sea level rise of 1.0 m.*
- 26.8 The submitters have also suggested a change in the label for the Coastal Hazard – Current Inundation and Coastal Hazard – Current Erosion overlays. One concern is that the term “current” implies an immediate or short-term risk, while the intent of the overlays is to identify those areas vulnerable to inundation during extreme conditions. The terminology “current” was chosen to reflect current sea level rather than the immediacy of risk, but I can understand the potential for confusion. I have discussed potential changes with Mr McDonnell and support the revised labels proposed in his report.
- 26.9 As outlined in our report (Focus, 2020 – e.g. pg. ii and Section 3.2.1.), the identified coastal hazard areas generally do not account for the effect of existing seawalls, but instead identify areas that would be vulnerable to coastal erosion and/or inundation if the seawalls did not exist. This is a transparent approach that does not assume that the existing structures are part of the long-term coastal hazard management plan. The coastal hazard overlay also in indication of the area of land that is dependent on the structures, which is important information to guide future management.
- 26.10 The Coastal Hazard – Current Erosion overlay at Plimmerton Beach is an exception to the above. As outlined in Section 9.1 of Focus (2020), the Current Erosion overlay does not

provide define the worst likely erosion that might be expected to occur with current sea level in the absence of the seawall. The Current Erosion overlay instead reflects the likely immediate shoreline adjustment that would occur if the seawall were removed or damaged. This recognises the long history of the current seawall and the extensive beachfront development. We took this approach as we believe whatever the long-term management approach at Plimmerton Beach, there will be some form of management that limits the landward adjustment of the shoreline north of Taupo Stream.

Date: 3/11/2021

Bronwen Gibberd

4D Environmental



.....