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MEMORANDUM

TO: SUE ROB, NELSON CITY COUNCIL

FROM: JIM DAHM, ECO NOMOS LTD

SUBJECT: PEER REVIEW – TONKIN AND TAYLOR COASTAL INUNDATION MAPPING

DATE: 18 NOVEMBER 2020

As requested, I provide a review of the coastal inundation mapping and accompanying report (T+T, 2020a) produced by Tonkin and Taylor Ltd for Nelson City Council for the upcoming community consultation

Each map shows the areas that may be flooded from the sea by two separate scenarios:

- A high spring tide, with MHWS6 being adopted for the mapping – the spring high tide level that is exceeded by only 6% of all tides
- Elevated sea levels associated with a rare and severe coastal storm, with the 1%AEP extreme sea level adopted for the mapping. The 1%AEP event is the storm-elevated sea level with a 1% probability of being equalled or exceeded in any given year. It is sometimes also referred to as a "100-year return period event"; meaning that such an extreme sea level has an average recurrence interval of 100 years, when averaged over very long periods (many centuries).

The various maps show the flooding associated with these two separate events for a range of sea levels, including:

- Present day sea level
- 0.5m sea level rise
- 1.0m sea level rise
- 1.5m sea level rise

- 2m sea level rise

The MHWS-6 elevation used in the mapping is based on analyses of the Nelson tide gauge records by NIWA. The 1%AEP extreme sea level mapped is the static extreme sea level (i.e. excludes wave runup) and is based on the recent coastal inundation assessment by Tonkin and Taylor (T+T, 2020b), which has been reviewed separately (Eco Nomos, 2020). In my opinion, these values are the best present estimates and appropriate for use. However, as discussed in the earlier review, the 1%AEP extreme sea level may be revised once we receive further information from the community.

Future sea level rise is a matter of considerable uncertainty and therefore existing central government guidelines (MfE, 2017) provide a range of different sea level rise scenarios. When adjusted to the 2008-2017 mean sea level (MSL) baseline for Nelson region, these various scenarios suggest potential sea level rise of 0.53-1.45m over the next 100 years (see Table 3.5 in T+T, 2020b), with sea level continuing to rise beyond that period. The 2m sea level rise scenario is therefore likely to occur beyond the next 100 years based on best present information. Nonetheless, it is a useful scenario to also include as it shows potential longer tem change. Accordingly, the 0.5-1.5m sea level rise scenarios mapped are those most relevant to the next 100 years, while the 2m scenario provides a useful indication of potential longer term change.

The mapping has adopted a bathtub approach with land areas below the flood elevations mapped as potentially affected, differentiating between those areas which are connected or not connected to the coast via overland flowpaths. As T+T (2020b) outline, the areas not connected by overland flow paths might still be flooded via the stormwater pipe network and/or by raised ground water levels. The maps are subject to the limitations of the bathtub approach (outlined by T+T, 2020b) and the accuracy of the available topographic data.

Overall, while information received during the public consultation phase may well lead to further refinement, it is my opinion that the maps are based on the best information presently available and are suitable for the public consultation.