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Date:	29 March 2017	Contact name:	Arjen Overduin
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Classification:	Open		

Dear Mr. Horton,

RE: WAVE OVERTOPPING ASSESSMENT REVIEW AT WAMBERAL

Royal HaskoningDHV (RHDHV) has peer reviewed the wave overtopping calculations in Horton Coastal Engineering (2017). The following two components have been assessed:

- input; and
- calculation method.

Input

The input component is twofold:

- structural schematisation, and;
- hydrodynamic input.

Structural

In schematising the proposed structure, it is important that model geometry and physical properties approach real life as well as possible. This was mainly ensured by incorporating the toe structure (vertical wall and capping beam) as a 'berm' and by applying the correct roughness factor of the revetment itself (multiple rock armour layers with a permeable core and a slope of 1:1.5) based on the EurOtop manual. These factors are paramount in estimating how far a wave runs up a structure (and hence how much overtopping occurs).

Hydrodynamic

On the hydrodynamic side, the governing parameters are the assumed water depth (design water level and scour level) and consequently attainable wave height and associated wave period. As waves will be (water) depth-limited, water depth is a critical parameter as this will inform wave height (and hence wave overtopping). The water levels and scour levels (and hence water depths) adopted in Horton Coastal Engineering (2017) are considered to be reasonable.

Wave heights at the proposed structure have been estimated utilising Goda (2010), whose research and methods are highly regarded in the coastal engineering field. Associated wave periods (the higher the period, the longer the wave and the more energy it has, leading to greater wave run-up and larger overtopping volumes) are also considered reasonable.

Calculation method

The wave overtopping calculations have been performed utilising the Neural Network for Wave Overtopping Predictions recommended in EurOtop. EurOtop is a well-known, world-wide accepted method for assessing wave overtopping of sea defences. RHDHV therefore considers it to be a suitable method for this exercise. Resulting overtopping volumes and their comparison to threshold values have been verified and deemed reasonable. In Horton Coastal Engineering (2017), the adopted overtopping rates were the more conservative corrected values to account for model effects, scale effects and wind effects in prototype situations (H_{m0} > 0.5 m), for rough-sloping structures (roughness < 0.9 and inverse slope > 1), rather than the direct Neural Network outputs.

In reviewing the simulations undertaken as reported in Horton Coastal Engineering (2017), it was evident that additional extensive testing simulations of the various input parameters were undertaken in order to assess the sensitivity and ensure the reliability of the wave overtopping calculation results.

Conclusion

In summary, RHDHV considers that the wave overtopping calculations undertaken by Horton Coastal Engineering (2017) were reasonable. RHDHV would not expect the works themselves to be significantly damaged by wave overtopping for the design storm over the design life, nor any of the dwellings at the subject properties.

References

Goda, Yoshimi (2010), “Reanalysis of Regular and Random Breaking Wave Statistics”, Coastal Engineering Journal, Vol. 52, No. 1, pp. 71–106

Horton Coastal Engineering (2017), “Horton Coastal Engineering Pty Ltd ats NSW Coastal Panel (Land and Environment Court No. 324345 of 2016), Response to List of Information Required for Section 34 Conciliation Conference”, 8 March

I trust the above is satisfactory. Please do not hesitate to contact Greg Britton or myself should you require any clarification or additional information.

Yours faithfully,

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