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Modeling of the Effects of the Modified Marina Configuration on Waves in Victoria International Marina

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Previously ASL had conducted high resolution numerical wave modeling studies of the effects of the Victoria International Marina, and in particular it's wave attenuator system, on the natural wave environment in the vicinity of the marina in Victoria Harbour¹. Since the time of this study, the size and configuration of the Victoria International Marina has changed through a reduction in its areal extent on the north-western side of the marina.

As requested by Community Marine Concepts, ASL has redone the wave model run for the large wave/wind conditions with 25 knots SW wind (Case 4) to preliminarily examine the effect of the new wave attenuator design (Figure 1) on waves in Victoria International Marina (VIM). It should be noted that the 25 knot wind case are at or beyond the limit of wind conditions for recreational paddling in the outer part of Victoria Harbour and that float plane operations will likely be restricted or cancelled under these strong winds.

The model results are shown in Figure 2 and Table 1, where Figure 2 shows the model results of significant wave vectors and contours of significant wave height (Hs) differences with versus without attenuator, and Table 1 shows sites 1 – 7 significant wave height results over all directions and the partial Hs values for the primary and secondary peaks in the directional wave spectra (corresponding primarily to the reflected energy off the shoreline and Marina for before and after development).

Table 1: Summary of the significant wave height results over all directions and the partial Hs values for the primary and secondary peaks in the directional wave spectra (corresponding primarily to the reflected energy off the shoreline and Marina for before and after development).

| Site | Full direction (0 – 360 deg) | | Primary (incoming waves) Peak | | | | | | Secondary (Reflected Waves) Peak | | | | | |
|------|------------------------------|------------------------|-------------------------------|--------------------------|--------|-----------------------|--------------------------|--------|----------------------------------|--------------------------|--------|-----------------------|--------------------------|--------|
| | Hs (m) without attenuator | Hs (m) with attenuator | Without attenuator | | | With attenuator | | | Without attenuator | | | With attenuator | | |
| | | | Direction range (deg) | Peak Direction (towards) | Hs (m) | Direction range (deg) | Peak Direction (towards) | Hs (m) | Direction range (deg) | Peak Direction (towards) | Hs (m) | Direction range (deg) | Peak Direction (towards) | Hs (m) |
| 1 | 0.38 | 0.38 | 310 - 170 | NE | 0.38 | 350 - 210 | NE | 0.38 | 170 - 310 | W | 0.04 | 210 - 350 | NW | 0.04 |
| 2 | 0.33 | 0.38 | 270 - 130 | ENE | 0.31 | 270 - 130 | ENE | 0.30 | 130 - 270 | SW | 0.12 | 130 - 270 | S | 0.23 |
| 3 | 0.29 | 0.29 | 270 - 130 | ENE | 0.26 | 250 - 110 | ENE | 0.25 | 130 - 270 | S | 0.12 | 110 - 250 | SE | 0.15 |
| 4 | 0.28 | 0.27 | 280 - 140 | ENE | 0.25 | 270 - 130 | ENE | 0.25 | 140 - 280 | S | 0.11 | 130 - 270 | SSE | 0.09 |
| 5 | 0.25 | 0.24 | 280 - 140 | E | 0.24 | 270 - 130 | E | 0.23 | 140 - 280 | S | 0.08 | 130 - 270 | SSE | 0.07 |
| 6 | 0.31 | 0.34 | 290 - 150 | ENE | 0.28 | 270 - 130 | ENE | 0.27 | 150 - 290 | SW | 0.12 | 130 - 270 | S | 0.21 |
| 7 | 0.35 | 0.35 | 290 - 150 | ENE | 0.34 | 290 - 150 | ENE | 0.35 | 150 - 290 | SW | 0.09 | 150 - 290 | SW | 0.08 |

¹ ASL Environmental Sciences Inc. Preliminary Report: Modeling Effects of the Wave Attenuator for the Victoria International Marina (Response to Triton Consultants Ltd. Report). Report Prepared for Community Concepts, August 10, 2009.