Southampton 4 element model

# Cases and interventions

Case 1– sea level rise of 2mm/year (base case)

Case 2 – sea level rise with a nodal cycle of amplitude 0.15m

Case 3 – as Case 1, with the historic interventions included (but no maintenance dredging)

Case 4 – as Case 3,with a capital dredge of 7.2 Mm3 in 2020 (split 4 and 3.2 Mm3 between outer and inner channel, respectively).

Case 5 – as Case 4, with reclamation of the inner flats removing 20 Ha with a volume of 0.5 Mm3.

The variation of moving, fixed and equilibrium volumes of all elements combined in response to sea level rise and the nodal tidal cycle is as follows:

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The impact of the 3 interventions considered is shown for moving and fixed volumes below and the changes between 2000 and 2050 are summarised in Table 1. These results include sea level rise of 2mm/year but exclude any maintenance dredging

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Table – Summary of changes between 2000 and 2050 for the various cases studied (excl. maintenance volumes)

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| Case | Moving surface volume  (water volume change) | Fixed surface volume  (morphological change) |
| 1 – sea level rise of 2mm/year | 1.00E+05 | -4.60E+07 |
| 2 – As 1, with ntc of 0.15m | -2.29E+06 | -5.43E+06 |
| 3 – historic changes + slr | -8.10E+05 | -3.79E+06 |
| 4 – As 3, with dredge in 2000\* | 9.29E+06 | 6.30E+06 |
| 5 – As 4, with reclamation in 2020\* | 8.69E+06 | 5.82E+06 |

(\*) estimated change includes the perturbation due to the dredge in 2000.

# Interventions including maintenance dredging

The Inner Channel is subject to regular maintenance dredging in and around the docks. If this is included every year at a rate of 280,000 m3/year, the overall response and impact of subsequent interventions are significantly modified. The impact of the 3 interventions considered is shown for moving and fixed volumes below and the changes between 2000 and 2050 are summarised in Table 2. Again these results include a sea level rise of 2mm/year and include the influence of maintenance dreding.

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Table – Summary of changes between 2000 and 2050 for the various cases studied (incl. maintenance volumes)

|  |  |  |
| --- | --- | --- |
| Case | Moving surface volume  (water volume change) | Fixed surface volume  (morphological change) |
| 1 – sea level rise of 2mm/year | 1.00E+05 | -4.60E+07 |
| 2 – As 1, with ntc of 0.15m | -2.29E+06 | -5.43E+06 |
| 3 – historic changes + slr | 1.03E+07 | 7.57E+06 |
| 4 – As 3, with dredge in 2000\* | 2.14E+07 | 1.84E+07 |
| 5 – As 4, with reclamation in 2020\* | 2.08E+07 | 1.79E+07 |

(\*) estimated change includes the perturbation due to the dredge in 2000.