

## **THE H R WALLINGFORD HYDROGRAPHIC ANALYSIS OF THE METROTIDAL OPEN-THROTTLE TE2200 FLOOD DEFENCE SYSTEM**

HR Wallingford, leading experts on the hydrodynamic and environmental assessment of the Thames tideway, hold a 2D flow model for the entire Thames Estuary to its outer limits. The model was set up by HR Wallingford under a joint venture between the Environment Agency and the Port of London Authority and has been developed since 2001 to assess the effects of new infrastructure on the estuary's tidal currents and water levels. The model was used to develop the current Thames Estuary 2100 (TE2100) flood defence proposals for managing the extreme water levels of a surge tide. The TE2100 Plan is an interactive approach whereby the increase in flood risk is monitored and managed by a suite of interventions, generally of increasingly large scale and cost as sea levels rise through the century. H R Wallingford were commissioned by Metrotidal Limited to undertake modelling and analysis to demonstrate the comparable feasibility and effectiveness of their flood defence proposals and to undertake a broad environmental review to identify the main issues that would need to be addressed as the scheme progresses.

Modelling of the Metrotidal open-throttle flood defence system across Sea Reach consisting of a 300m main channel flanked by two 60m side channels has shown it to be potentially advantageous for flood management: -

- the passive system without gates can reduce landward extreme water levels in the range of 0.7 – 1.0m
- subject to which trajectory of the UKCP18 predictions the sea levels rise, the reduction in landward water levels can hold current maxima through to 2070 and on the lower rates of rise through to the end of the century, which puts the requirement for the fitting of gates to the throttle broadly in line with the TE2100 options towards the end of the century
- the fitting of gates to the Metrotidal system requires much less engineering at much lower cost than the construction of a Long Reach Barrier and associated raising of sea walls downstream
- the Metrotidal system protects an additional 88.8sq.km of the Thames from tidal squeeze so that the TE2100 remediation to provide 876ha of new intertidal area is not required
- the relatively short 8km length of the Metrotidal flood defence system between the high ground at Southend in Essex and Allhallows in Kent compared with the 106km length of flood defences required each side of the Thames for the TE2100 programme means that the Metrotidal system also provides the most viable long-term flood risk reduction through the 22<sup>nd</sup> century.