

# Taming the tides: green-growth across the Thames Estuary

Mark Willingale shows how a policy of managed retreat may be replaced by an integrated Metrotidal Urban Orbital that protects existing assets, reduces the flood defence line and provides green growth

For the economic benefits of the Thames Estuary growth corridor to be realised, it is widely recognised that the conurbations of North Kent and South Essex need to be connected. At the same time, climate change and rising sea levels are threatening to divide them, with over 110sq.km of the lower estuary exposed to flood risk. If considered as separate infrastructure projects, improving connectivity and reducing flood risk are very costly. A single system of integrated infrastructure would save substantial costs, reduce the risks and increase the economic benefits.

London is fortunate in that the tidal range at Tower Pier is over 7m, so London is 3.5m above mean sea level, higher than Shanghai and much of New York, and not immediately at risk but only if the tides can be tamed. The Thames Estuary acts as a funnel, causing the tides to increase upstream. From Southend Pier to Tower Pier they double in height. A barrier upstream across the tideway would be shorter but requires sea walls downstream the estuary that need to be longer and higher. A barrier at Long Reach, just upstream from the Dartford Crossing, would need a 106km flood defence system. In contrast a barrier between Southend and Allhallows across the Lower Thames Estuary would be just 8km long and faces lower tides. Should sea levels rise faster than currently projected the problem would be solved by raising 8km rather than 106km of flood datum, from a lower level.

The Metrotidal Thames Orbital integrates the

next generation of London's flood defences with a rail orbital, floating solar array, data storage and distribution to provide a robust TE2200 system with substantial green-growth across the Lower Thames Estuary for a lower cost and environmental impact than the current TE2100 proposals for managed retreat. The green growth is achieved through the generation of renewable energy for the 100,000 new homes already planned around the estuary, along with improved transport connectivity and efficient data storage and distribution.

The integrated infrastructure consists of an open-throttle, formed by extending sea walls across Sea Reach, which reduces the tidal range upstream in the event of a storm surge, thereby providing all areas upstream to London with flood defences through the 21st century, while leaving the tideway open for navigation to all existing wharves and docks. The system can then become a full barrier, when required in the 22nd century, with the 8km flood datum raised as necessary to meet rising sea levels.

A tunnel formed within the sea walls links existing rail lines and cycleways to complete a twin-track rail and micro-mobility orbital of the Lower Thames Estuary. The estuary orbital with a 4sq.km floating solar array, cycle superhighway, data storage and distribution, provides sustainable connectivity for over a million households, generating green-growth across the Lower Thames Estuary into Essex and Kent. Just 12km of new rail-



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way line creates a 132km orbital of the Thames Estuary from Central London.

Construction undertaken in the tideway makes use of a rail head from concrete casting facilities at an aggregates wharf nearby on the Isle of Grain. Spoil from the tunnel excavations is reused locally for embankments and flood bunds, to minimise the embodied energy and environmental impacts of construction. The sea walls protect the estuary from tidal squeeze, preventing the loss of over 800 hectares of saltmarsh and intertidal habitat.

In summary, a policy of managed retreat that sacrifices land to the sea and increases the flood defence line is replaced by an integrated Metrotidal Urban Orbital that protects existing assets and habitats, reduces the flood defence line and provides green growth. The orbital flood defence system developed for the Thames is applicable to urban estuaries around the UK including Tyneside, Teesside, Humberside, Haven Ports, Medway, Southampton, Bristol, Belfast and Glasgow. Further details of the Metrotidal Thames Orbital and other urban orbitals will be provided for the next issue of *Planning in London*. ■

## Managed Retreat

- Loss of land
- Loss of existing habitats
- Higher flood defences
- Longer flood defence line
- Isolation of coastal and riparian settlements

## Metrotidal Urban Orbital

- Protects landward areas
- Protects existing habitats
- Lower flood defences
- Shorter flood defence line
- Creates a single estuary economy
- Provides green-growth

