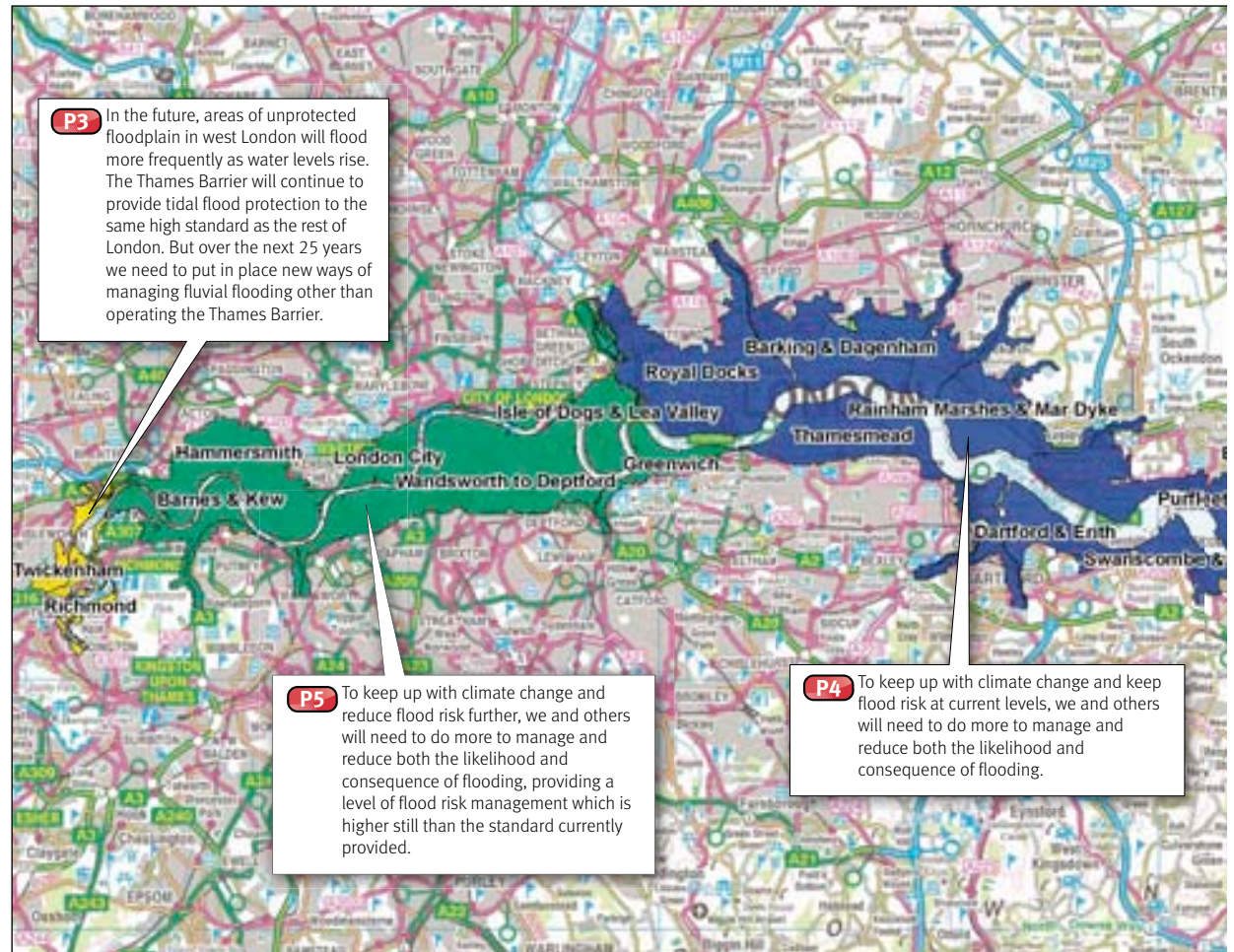


Introducing the TE2100 policies

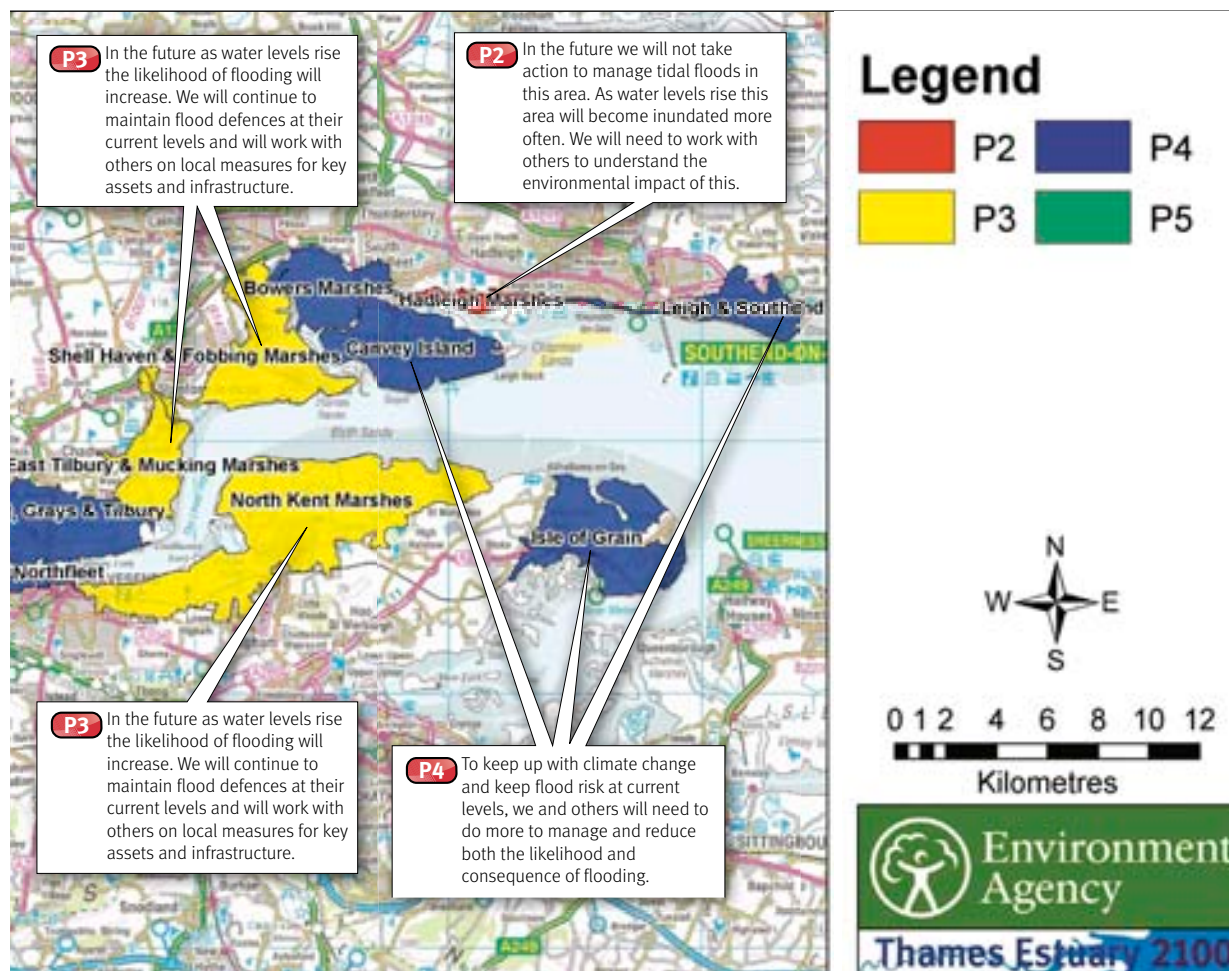
What do the policies mean?

- P1** No active intervention (including flood warning and maintenance). Continue to monitor and advise.
- P2** Reduce existing flood risk management actions (accepting that flood risk will increase over time).
- P3** Continue with existing or alternative actions to manage and **maintain** flood risk at the current level (accepting that the likelihood and/or consequences of a flood will increase over time from this baseline).
- P4** Take further action to **sustain** current scale of flood risk into the future (responding to potential increases in flood risk from urban development, land use change, and climate change).
- P5** Take further action to **reduce** the risk of flooding (now and/or in the future).

The TE2100 policies: This map shows the strategic flood risk management approach for the Thames Estuary recommended in the TE2100 Plan. We have divided the Estuary into 23 geographical areas, known as the policy units. Each policy unit has been assessed to determine the appropriate level of flood risk management.



Chapter 6: The shape of future flood risk management



Moving from vision to reality: The first stage was to assess the level of flood risk management activity we can justify in different parts of the TE2100 Plan area. This is described by the policies which are the starting point for developing the TE2100 programme of activities at estuary-wide and local scale. The policies also provide us with a single framework for considering different options and assist with prioritisation of flood risk management activities.

The policies indicate the level of flood risk management which is justified by the people, the value of property and the other assets being protected in that area. The policies set the strategic direction of flood risk management in each part of the Estuary. This is defined by one of five available policies **P1** to **P5** as shown in the table.

Policy appraisal: The social, economic and environmental value of each policy unit has been assessed through a formal process to allocate a flood risk management policy. The same process is used throughout England and Wales to ensure a nationally consistent approach to flood risk – and a level playing field when it comes to allocation of scarce resources for flood risk management. Policy **P1** was used as one of the baselines for the appraisal but has not been selected for any of the TE2100 policy units. 📍 This is explained in our TE2100 Technical Report.

Understanding impacts and making decisions

To help make decisions on which are the best flood risk management options and policies for the estuary communities and environment we have used a number of assessment and appraisal methodologies. These are designed to:


- assess what strategic flood management approach, or policy, can be justified in a local area;
- assess the impacts any individual future flood management option might have;
- appraise how potential impacts of any flood management option compares with other options.

The results of the policy assessment and appraisal can be found in chapter 6. The assessment and appraisal of flood management options used the following methods:

- **Economic appraisal** (also known as cost-benefit analysis) attempts to estimate the costs and benefits to society (the nation) of options using monetary terms;
- **Strategic Environmental Assessment (SEA)** assesses the environmental and social impacts of flood management options and how they conform to environmental legislation.

Our Plan brings the two processes together to determine the best course of action, based on current information.

Economic appraisal (cost-benefit analysis)

This is accepted best practice within flood risk management planning, and the approach is consistent with Defra’s⁶ Flood and Coastal Defence Project Appraisal Guidance series and the Policy Statement on Appraisal (July 2008) issued as a result of the Making Space for Water strategy. A key aspect of this approach is the need for greater consideration of social and environmental impacts within appraisal. TE2100 has been at the cutting edge of emerging new methods (Multi-Criteria Analysis) to factor in society and the environment in flood risk management appraisal, in addition to the traditional focus on protecting against property damage from flooding.  For more information, see the TE2100 Technical Report.

As such, although called “economic appraisal”, our approach also seeks to place value on the environmental and social impacts and benefits of our flood risk management options. It remains an economic approach however to the extent that these wider impacts are expressed in terms of

⁶ Government’s Department for Environment, Food and Rural Affairs (Defra)

Table 7.1. Impact categories assessed in the appraisal

Economic
Property
Key infrastructure
Agricultural land use
Navigation
Transport
Indirect impacts on business
Environmental
Physical habitats and biodiversity
Water quality and quantity
Natural processes
Other environmental
Landscape
Historical environment
Social
Recreation
Safety and security
Sense of community
Technical
Technical risk

money values – the “worth to society” as expressed in a monetary terms. In addition to the estimated costs of an option the types of impacts assessed as part of the economic appraisal are as follows:

- Factoring in social and environmental outcomes can change the view of which options have the biggest benefits compared to the more traditional cost-benefit analysis.
- The result of the flood risk management options economic appraisal.
- Assessing the ratio of benefits to costs for all of the options considered in this stage of the Plan lead to two “front runners” being determined:
 - ...Optimised maintenance and enhancement of the existing system with modifications made to the Thames Barrier by 2070, and further adapting the structure to become a barrier with locks or “open” barrage after 2135.
 - ...Optimised maintenance and enhancement of the existing system to 2070 and building a new barrier at Long Reach by 2070; (converting to a barrier with locks or “open” barrage after 2135).

For the period up to 2070, maintaining and enhancing the current system is strongly preferred, regardless of the “end-of century” approach

selected thereafter. Uncertainty in the assessment post-2070, and the absence of an immediate need to decide on the preferred strategy beyond that point, mean that a single preferred “end of century” option is not being promoted at this time.

Strategic environmental assessment

Strategic environmental assessment (SEA) is a systematic process of evaluating the potential consequences of a plan before it is approved, and it is legally required for TE2100. SEA involves collecting and presenting baseline information relating to the Plan; identifying alternatives to the Plan and their effects; predicting the significant environmental effects of the Plan and proposing mitigation measures for these effects; preparing an Environmental Report that documents the above information; consulting the public and authorities with environmental responsibilities; and monitoring significant environmental effects of implementing the Plan.

We have carried out the SEA at the same time as developing and drafting our TE2100 Plan. It has helped us develop and assess strategic alternatives and identify opportunities for policy amendments and environmental mitigation, while shaping our early thoughts on the content of the Plan.

We have considered the impacts of our various TE2100 Plan options. 🗨️ This is reported in the supporting SEA Environmental Report.

Impact mitigation and enhancement

We have identified in our Environmental Report several ways in which we can minimise adverse effects of the flood risk management options and enhance positive ones. Some are relevant to all of the options and some to specific options only.

Examples of these mitigation actions relevant to all options include:

- **Construction** – during the construction of any options, every effort should be made to transport construction materials by river where possible, and residents should be consulted and warned in advance of planned works.
- **Floodplain management** – we need to consider flood warning, emergency planning, spatial planning and building design, including secondary defences, as appropriate. Vulnerable populations may require extra assistance to improve the effectiveness of flood warning or emergency planning.

- **Environmental enhancement** – in terms of environmental mitigation, by managing realignment areas and enhancing existing habitat on the floodplain we can provide an important habitat for fish, birds and invertebrates. Economic benefits to the estuary could be provided from improving both recreational and commercial fisheries.

There are more details of mitigating the effects of specific options in our Environmental Report.

Habitats Regulations Assessment (Appropriate Assessment)

Under the Habitats Directive we need to make an Appropriate Assessment to determine whether the TE2100 Plan will impact upon the integrity of designated habitat sites in the Thames Estuary. Our four-stage process is outlined below:

Stage 1: Clarify whether the Plan is ‘necessary’ for the site management

The TE2100 Plan is not necessary for managing the designated sites in the Thames.

Stage 2: Assessment of likely significant effect

Sea level rise could see the loss of up to 1200 ha of designated intertidal habitat in the Thames Estuary Plan area over the next century.

This has been identified through the Greater Thames Coastal Habitat Management Plan (CHaMP). In recommending maintenance and improvement of the fixed defences, the TE2100 Plan is likely to have significant negative effect alone, and in combination, on the:

- Medway Estuary and Marshes SPA/Ramsar site
- Thames Estuary and Marshes SPA/Ramsar site
- Holehaven Creek proposed SPA
- Benfleet and Southend SPA/Ramsar site
- Foulness (Mid-Essex Coast Phase 5) SPA/Ramsar/SAC

The primary reason for this is that continuing with the current line of defences will mean that these sites are likely to suffer from coastal squeeze – where the inter-tidal habitat is squeezed out between the line of defences and rising sea levels.

Stage 3: Adverse effect assessment procedure

Discussions with Natural England on this stage are underway. Investigations to date suggest there is likely to be an adverse effect on site integrity as a result of the Plan on the:

- Medway Estuary and Marshes SPA/Ramsar site
- Benfleet and Southend SPA/Ramsar site
- Thames Estuary and Marshes SPA/Ramsar site
- Holehaven Creek proposed SPA

Stage 4: Alternatives

We have considered and consulted on a wide range of alternatives before arriving at the range of options contained in the Consultation Plan. If at this stage no alternative solutions are identified, Imperative Reasons for Overriding Public Interest (IROPI) tests will be applied and a joint case from the Environment Agency and Natural England will be submitted to the Secretary of State.

In anticipation that the Appropriate Assessment cannot conclude there will be no adverse effect, we have identified in the TE2100 Plan opportunities for 1600 ha for potential intertidal habitat creation and 1400 ha for potential freshwater habitat creation. These are identified within our action plan (Chapters 8 & 9). Following EC guidance and in agreement with Natural England, the new habitat areas are as near as possible to those adversely affected; are suitable in terms of ecological features; and should be ready in time to provide the functions they are intended to compensate for.

SEA and HRA: Conclusions

The conclusion of the SEA and HRA (Appropriate Assessment) process is that the environmentally-preferred option is to upgrade and maintain the existing system of defences (option 1.4). Barrier options are likely to infringe environmental legislation.

Bringing the economic appraisal and SEA together

In summary, the economic appraisal has identified **Improving the existing defences** (option 1.4) and a **New barrier at Long Reach** (option 3.2) as “front runners” for the period beyond 2070, with Improving the existing system (option 1.4) being preferred before then.

The SEA/HRA process has concluded that Improving the existing system – optimising repair and replacement (option 1.4) is the environmentally preferred option both pre- and post-2070.

This suggests that the overall preference would be for Improving the existing system (option 1.4), however, current information suggests that a new Barrier at Long Reach (option 3.2) might be the better economic option by a small margin post-2070.



The TE2100 action zones

Our action plan sets out our recommendations estuary-wide and in each of the TE2100 policy units. There are 23 policy units in our Plan area, so to avoid repetition we have grouped together those with similar characteristics and requiring a similar type and range of actions. There are eight of these local action zones and an estuary-wide zone:

Action zone 0 – estuary-wide

Action zone 1 – west London

Action zone 2 – central London

Action zone 3 – east London

Action zone 4 – east London downstream of Thames Barrier

Action zone 5 – middle Estuary

Action zone 6 – lower Estuary Marshes






Action zone 7 – lower Estuary, urban/industrial and marshland

Action zone 8 – Seaside/fishermen's frontage

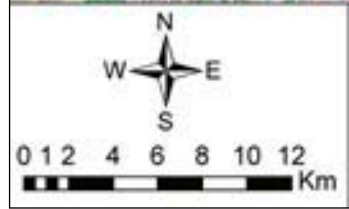
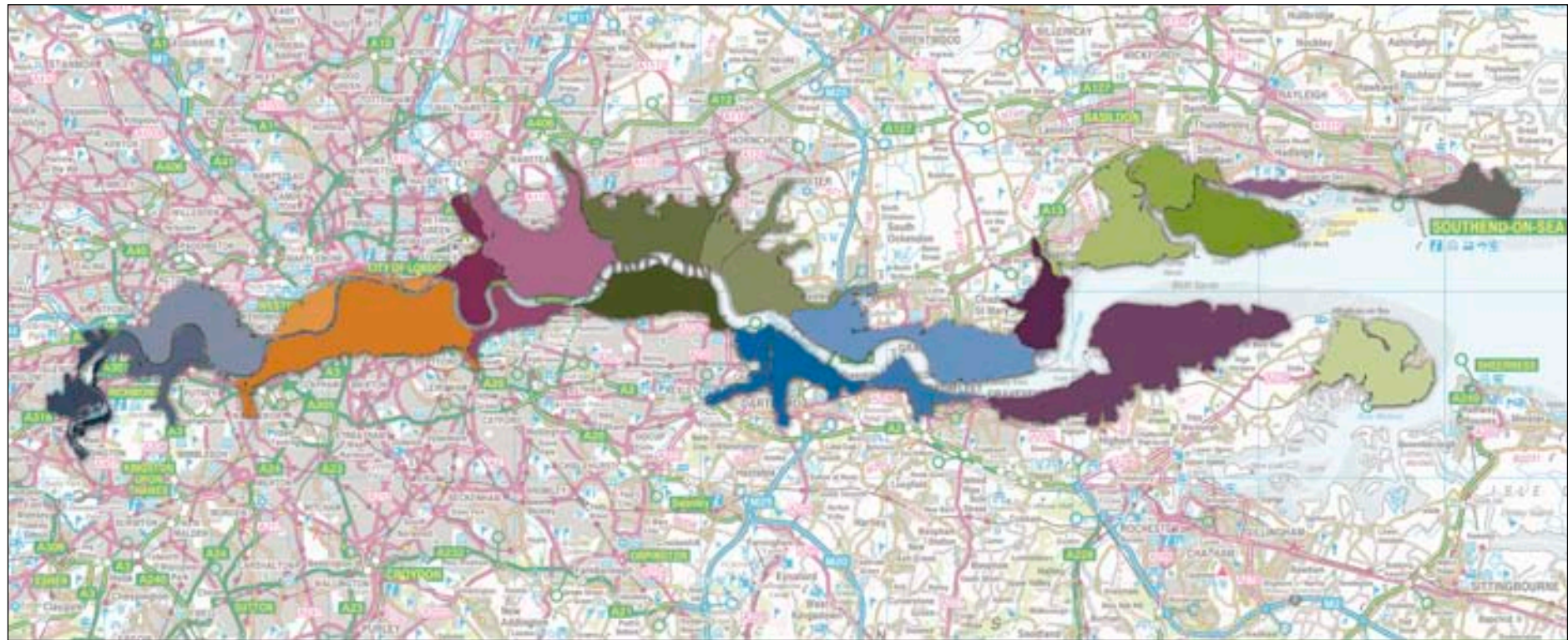
There is a description explaining the features of each policy unit and our action plan for each zone which shows:

- what actions are required;
- who will undertake these actions;
- how this will be done;
- how your response can help us finalise the TE2100 Plan.



-  Do you agree with our assessment of the policy units?
-  Do you consider that we have identified the right strategic options for managing tidal flood risk in the Thames estuary, and do you agree with the final preferred options?
-  Do you agree with the actions identified in our action plans and the timing of those actions?
-  Do you agree with the mechanisms we have set out to deliver the action plans?
-  Have we identified the right partner organisations to deliver our action plans and are you, or your organisation, able to contribute to these actions?

Chapter 8: Introducing the action plan



Thames Estuary 2100 Action Zones

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An overview of the action zones



Action zone 1



Action zone 2



Action zone 3

Action zone 0 – estuary-wide

(This action zone covers the estuary-wide options which affect to a greater or lesser degree, all 23 of the policy units)

This action zone covers the whole Estuary and our estuary-wide options are presented here for consultation. These estuary-wide options provide the strategic framework for flood risk management for the TE2100 Plan area for 100 years. Further information on what this means at local level is described in the action plan tables for zones 1 to 8.



Action zone 4

Action zone 1 – west London

(Richmond, Twickenham, Barnes & Kew and Hammersmith)

These four policy units are in West London. Whilst the area is heavily urbanised, they all have large open spaces and important recreation and amenity areas. Richmond and Twickenham both have a significant fluvial flood risk from the Thames. Richmond and Twickenham policy units have been given by TE2100 a **P3** flood risk management policy and we recommend a **P5** policy for Barnes & Kew and Hammersmith policy units. These policies are further described in the action plan and are outlined in chapter 6.

Action zone 2 – central London

(Wandsworth to Deptford and London City)

These two policy units cover the section of the Thames that passes through central London. TE2100 gives both policy units a **P5** flood risk management policy.

Action zone 3 – east London

(Greenwich, Isle of Dogs & Lea Valley and Royal Docks)

These three policy units cover much of the regeneration area in East London. Development at Canary Wharf on the Isle of Dogs continues, and there are major developments planned in the Greenwich and Royal Docks policy units. TE2100 gives Greenwich and Isle of Dogs & Lea Valley a **P5** flood risk management policy and Royal Docks a **P4**.

Action zone 4 – east London downstream of Thames Barrier

(Barking & Dagenham, Rainham Marshes & Mar Dyke and Thamesmead)

These three policy units cover the Estuary from Woolwich to Erith. Common features include new residential development, major industrial areas and open marshes. TE2100 gives all these policy units a **P4** flood risk management policy.



Action zone 5



Action zone 7



Action zone 6



Action zone 8

Action zone 5 – middle Estuary

(Dartford & Erith, Swanscombe & Northfleet and Purfleet, Grays & Tilbury)

These three policy units cover the Estuary from Erith to Gravesend. Common features include port activity, new development sites, industry and open marshes. TE2100 gives all these policy units a **P4** flood risk management policy.

Action zone 6 – lower Estuary Marshes

(East Tilbury & Mucking Marshes, North Kent Marshes and Hadleigh Marshes)

These three policy units are all in the lower Estuary. They are predominantly areas of open grazing marshes. TE2100 gives East Tilbury and North Kent Marshes a **P3** flood risk management policy and Hadleigh Marshes a **P2**. This means that flood risk is likely to increase in these policy units.

Action zone 7 – lower Estuary, urban/industrial and marshland

(Canvey Island, Bowers Marshes, Shell Haven & Fobbing Marshes and Isle of Grain)

These four policy units cover a wide range of land uses, including a major residential area (Canvey Island), major industrial areas (Shell Haven/ Coryton and Isle of Grain East), and areas of freshwater marsh. Canvey Island, Bowers Marshes and Shell Haven & Fobbing Marshes are linked together because they have a common flood risk management system. TE2100 gives Canvey Island, the Isle of Grain and Bowers Marshes a **P4** flood risk management policy and Shell Haven & Fobbing Marshes a **P3** with secondary defence arrangements at key sites.

Action zone 8 – Seaside/fishermen's frontage

(Leigh-on-Sea and Southend-on-Sea)

This single policy unit has a very different character to the rest of the Estuary and is therefore treated separately. Southend-on-Sea is a seaside resort and Leigh has a strong fishing tradition. The policy unit has a long frontage and a narrow floodplain. TE2100 gives it a **P4** flood risk management policy.

Action zones

Action zone 0 – estuary-wide

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Action zone 1 – west London

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■ Twickenham	72
■ Barnes & Kew	74
■ Hammersmith.....	76

Action zone 2 – central London

■ Wandsworth to Deptford	90
■ London City	94

Action zone 3 – east London

■ Isle of Dogs & Lea Valley.....	106
■ Greenwich.....	109
■ Royal Docks.....	112

Action zone 4 – east London downstream of Thames Barrier

■ Thamesmead	126
■ Barking & Dagenham	129
■ Rainham Marshes & Mar Dyke	132

Action zone 5 – middle Estuary

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■ Swanscombe & Northfleet	148
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Action zone 6 – lower Estuary Marshes

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Action zone 7 – lower Estuary, urban/industrial and marshland

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Action zone 8 – Seaside/fishermen’s frontage

■ Leigh-on-Sea & Southend-on-Sea	200
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