

TE2100 action plan: **action zone 7** – lower Estuary, urban/industrial and marshland

Action plan for zone 7 – table A.7.

12 actions identified

Description of the policy units

- Canvey Island
- Bowers Marshes
- Shell Haven & Fobbing Marshes
- Isle of Grain

Table A.7. describes the 12 actions for zone 7 – lower Estuary (urban/ industrial) which have been identified through the TE2100 Plan. The actions are described under the following headings:

- TE2100 recommended actions (and whether or not costs for this have been included in the TE2100 Plan)
- Implementation partners
- How this will be achieved
- How your response can help us finalise the TE2100 Plan



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?

Bowers
Marshes

Shell Haven
& Fobbing
Marshes

Isle of Grain

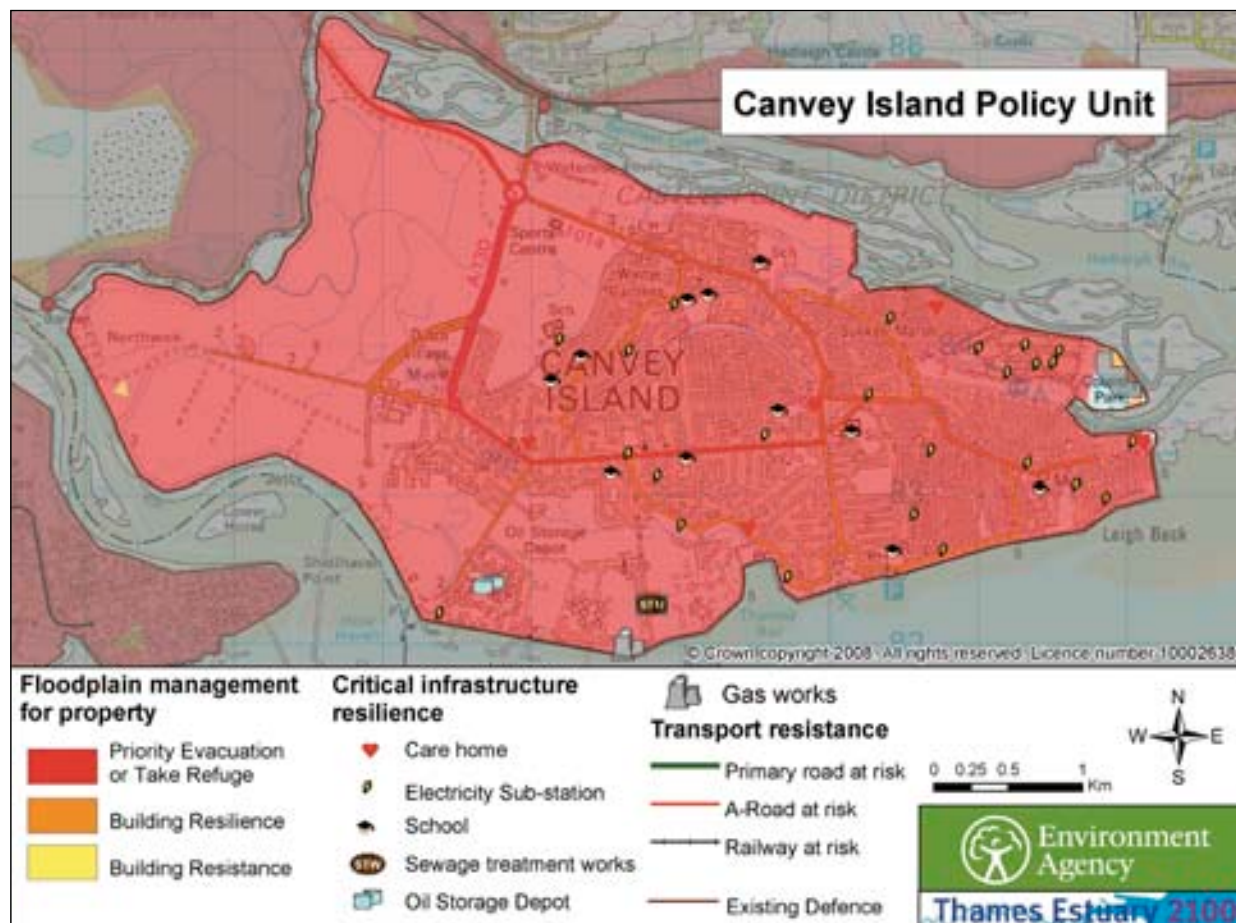
Policy unit – Canvey Island

Policy: Our recommended flood risk management policy for Canvey Island policy unit is policy **P4** to take further action to sustain the current level of flood risk into the future (responding to the potential increases in risk from urban development, land use change and climate change).

Description

Canvey Island consists of low-lying former marshland (generally <1 m AOD) surrounded by high defences. The ground level is thus about 2 m below high water on spring tides. About 60% of the island is developed, with a large residential area, caravan parks and an oil-related industrial area. The north western part of the island is undeveloped and consists of coastal grazing marsh.

The island is protected by a major system of defences that are of the order of 6 m in height. It currently has two road access points, and evacuation during a flood event would be very problematic. There is public access to all the defences around the island, and these form an important amenity facility.



At risk in Canvey Island policy unit

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Sources of flood risk

- Tidal from the Thames including Benfleet Creek and Holehaven Creek (probability 0.1% per annum or greater), flood depths up to 4 m.



Flood defences at Canvey Island

- Tidal from East Haven Creek (South bank) (probability 0.1% per annum). East Haven and Benfleet Barrier-controlled.
- Fluvial from local watercourses including the drainage systems for the developed area of Canvey Island and the West Canvey Marshes.

The existing flood risk management system

- Main tidal flood defences on the Thames including Holehaven and Benfleet Creeks.
- East Haven and Benfleet Barriers, which control tidal water levels on East Haven Creek.
- Secondary tidal flood defences on East Haven Creek.

- An extensive drainage system for the developed area with open channels and pumped and gravity outfalls.
- Drainage outfalls for the marsh drainage system.

Policy context

There is a thriving community in Canvey Island. There are 11 schools, four care homes, 21 electricity sub stations and community facilities for the resident population of 40,000, and further development is planned. Maintenance and improvement of the system of large defences is well justified.

The western part of the island is freshwater marsh. This area provides an open rural landscape which contrasts sharply with the developed eastern part of the island. The marshes form part of the proposed South Essex community parklands in the Thames Gateway Parklands vision.

There are opportunities identified through the Thames Gateway Parklands vision and implementation of the TE2100 plan to create an important area both for public amenity and habitat creation in this area although there is a debate to be had as to whether this should be freshwater habitat or tidal habitat. The Thames Gateway

Parklands vision also includes a pier for passenger ferries, improved public access to the estuary and better public access around the area (including a new footpath/cycleway crossing at the western end of East Haven Creek).

Vision

This policy unit contains a large population and would be very vulnerable to flooding in the event of failure or overtopping of the defences. Our vision for the policy unit is to make Canvey Island a safer place. The defence system will be maintained and improved but in parallel with this we recommend the introduction of community strategies for safe havens, appropriate development and other floodplain management measures as recommended in Government's guidance PPS25¹⁰. Vulnerable development such as single storey buildings, mobile home parks and camp sites should have escape or community refuge plans. If this is not possible, they should be replaced by other uses or buildings which have living accommodation above flood level. The chances of the defences failing or being overtopped are very small, but the consequence of such a failure is very high.

¹⁰ Planning Policy Statement No 25 Development and Flood Risk Management CLG 2006

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PC Roberts – Canvey Island 1953

Remembering 1953

Canvey Island is defended to a much higher standard than it was in 1953 and our Plan recommends that the defences are further improved to keep pace with climate change. But the consequences of flooding have increased more than ten-fold on Canvey since 1953, so we recommend that reliable flood plans are put in place. The plans may never be put into action, but if there is a serious breach or overtopping of the defences, the plans will save lives.

Our TE2100 Plan includes a programme of defence improvements and it is recommended that whenever defence improvements are carried out, opportunities should be maximised to improve landscape and local recreational facilities such as paths.

Local issues and choices

The weakest links in any flood defence system are the moveable gates. There are three large barriers which provide protection to the west and north of the island, and a number of smaller gates. Replacement of Benfleet, East Haven and Fobbing Horse barriers by fixed defences is a possibility although it would be a costly option, as a new fixed defence would be required to take their place.


Combining this with a habitat creation scheme is a possibility as the habitat scheme would bring an additional element of funding to the project. In the right location a new defence could also form a new road providing much needed access/egress to and from Canvey Island. Our action plan (table A.7.) recommends that these elements are investigated as part of the detailed planning for TE2100 implementation.


The drainage systems on Canvey Island will require upgrading as the sea level rises and rainfall increases. This will consist of improvements to channels and outfalls as the need arises together with a programme of upgrading of the outfalls, most of which are pumped.

This has not been covered in detail by the TE2100 project, but we recommend further investigation and this is included in our action plan (table A.7.).

As noted above, in view of the potential difficulty of evacuating the island, measures should include safe havens, high level access and shelters. This will provide the opportunity for people to move to safe areas above flood level in the unlikely but serious eventuality of tidal flooding.

Choices for managing local flood risk have not been designed or assessed in detail, and will be the subject of further investigation, consultation and subsequent appraisal as recommended in our action plan.

 Do you understand our assessment for the Canvey Island policy unit?

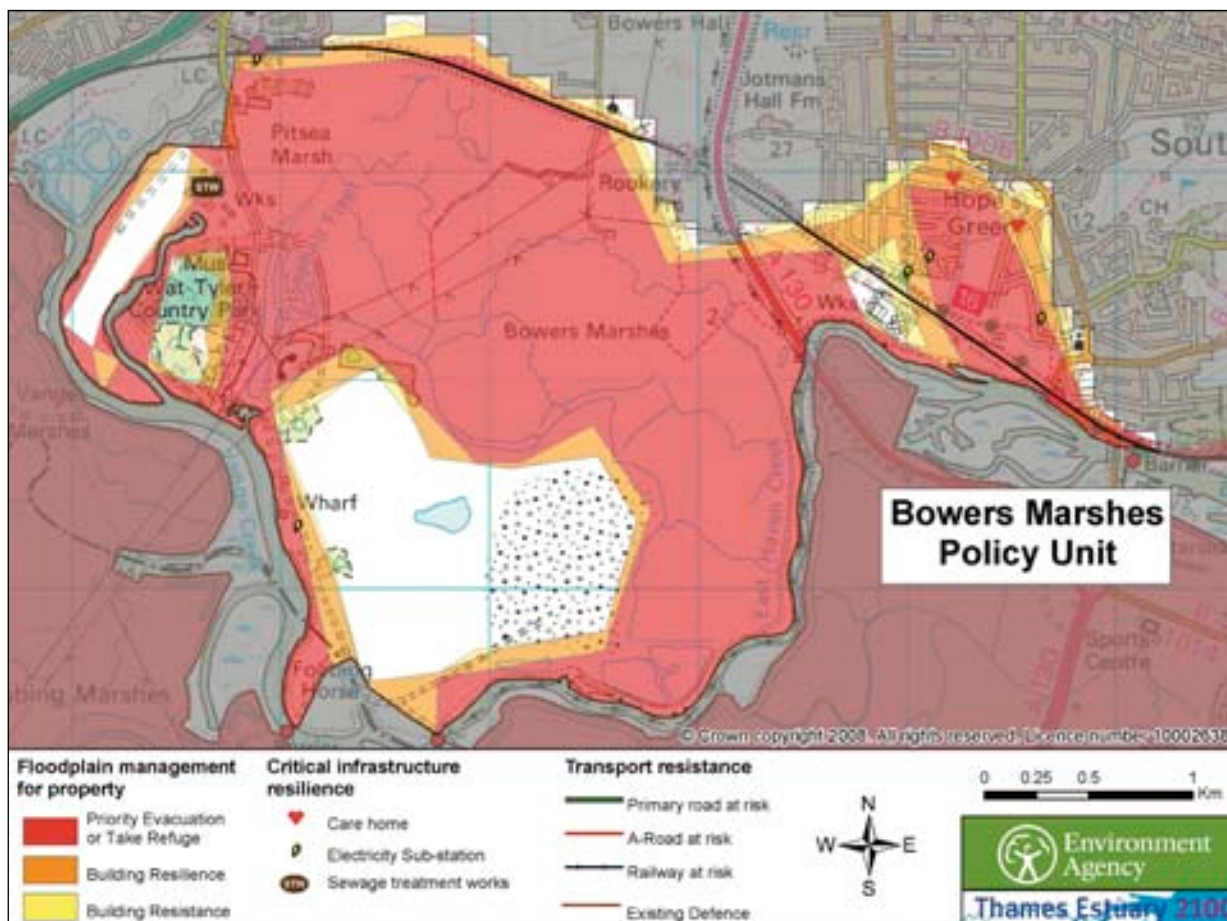
 Do you agree with it?

Policy unit – Bowers Marshes

Policy: We recommend a policy **P4** for this policy unit – to take further action to sustain the current level of flood risk into the future (responding to the potential increases in risk from urban development, land use change and climate change). The reason this policy unit justifies such a high standard although it is largely unpopulated is because of infrastructure (rail, road, sewage treatment works and electricity generation plant) and the risks of contamination from the landfill which covers a large part of the Bowers Marshes policy unit. These areas at risk are not concentrated in one location so localised secondary defences are not considered a feasible option.

Description

Bowers Marshes policy unit is an open area of freshwater grazing marshes. It has a major landfill site to the west, and some areas of historic landfill within the marsh areas. The flood risk area includes the City to Sea railway line, the main A130 road, properties in South Benfleet, the Wat Tyler Country Park, an electricity generation plant and a sewage works. Primary tidal defence is provided by three barriers and a short length of primary defence. In addition, there are secondary tidal defences along East Haven and Vange Creeks.



At risk in Bowers Marshes policy unit

Sources of flooding

- Tidal from Vange Creek (East bank) (probability 0.1% per annum, Fobbing Horse barrier-controlled).
- Tidal from East Haven Creek (North bank) (probability 0.1% per annum, East Haven and Benfleet barrier-controlled).
- Fluvial from local watercourses including the Pitseahall Fleet, Benfleet Hall Sewer and the marsh drainage system on Bowers Marshes.

The existing flood risk management system

- Fobbing Horse Barrier, which controls tidal water levels on Vange Creek.
- East Haven and Benfleet Barriers, which control tidal water levels on East Haven Creek.
- Secondary tidal flood defences on Vange Creek.
- Secondary tidal flood defences on East Haven Creek.
- Drainage system outfalls including Benfleet Hall Sewer and Bowers Marshes.

Policy context

The marshes are designated as part of the proposed South Essex community parklands in the Thames Gateway Parklands vision (including the landfill site). This includes restoration of the marshes. Therefore, new development should be limited in the marsh areas in order to maintain this

important rural landscape in an otherwise heavily developed area.



Low tide in the Canvey creeks

There is already public access to much of the area, and the Thames Gateway Parklands vision envisages improved access and connections with local communities.

Vision

Our vision for this the Bowers Marshes policy unit is to provide a level of flood risk management compatible with creating an important green space in an area of intense development including Southend-on-Sea, Basildon, east Canvey, Coryton and the London Gateway port area. The marshes form part of the proposed South Essex community

parklands in the Thames Gateway Parklands vision which includes the landfill site and restoration of the marshes.

Flood risk management can contribute to enhancing this vision by providing good public access along the tidal creeks, creating a mosaic of tidal, brackish and freshwater habitats, and contributing to this important rural landscape whilst providing appropriate tidal flood management to assets at risk.

Local issues and choices

The choice between retaining and removing Benfleet, East Haven and Fobbing Horse Barriers is covered in table A.7. together with associated changes to the defences on Vange and East Haven Creeks.

These choices affect the way flood risk management will be provided for the main assets at risk in this policy unit (including the railway, parts of South Benfleet, Wat Tyler Country Park and the sewage works). The drainage systems on the marshes will require upgrading as the sea level rises and rainfall increases, although this has not been investigated in detail in this Plan. This mainly consists of improvements to channels and outfalls as the need arises.

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Mixed land uses in Bowers Marshes

The need for floodplain management will be limited because the policy unit is largely undeveloped. However flood warning will be needed for the railway line (which continues through Hadleigh Marshes policy unit to the east) and the flood risk area in South Benfleet. In addition, potential flood impacts on new development should be reduced by flood resilient development and building designs and careful application of planning guidelines.



East Haven tidal control barrier

Choices for managing local flood risk have not been designed or assessed in detail, and will be the subject of further investigation, consultation and subsequent appraisal as recommended in our action plan (table A.7).



Do you understand our assessment for the Bowers Marshes policy unit?



Do you agree with it?

Policy unit – Shell Haven & Fobbing Marshes

Policy: Our recommended flood risk management policy for this policy unit is policy **P3**, to continue with existing or alternative actions to manage flood risk at the current level (accepting that flood risk will increase over time from this baseline), but to supplement this with local secondary defences to protect key sites such as Coryton.

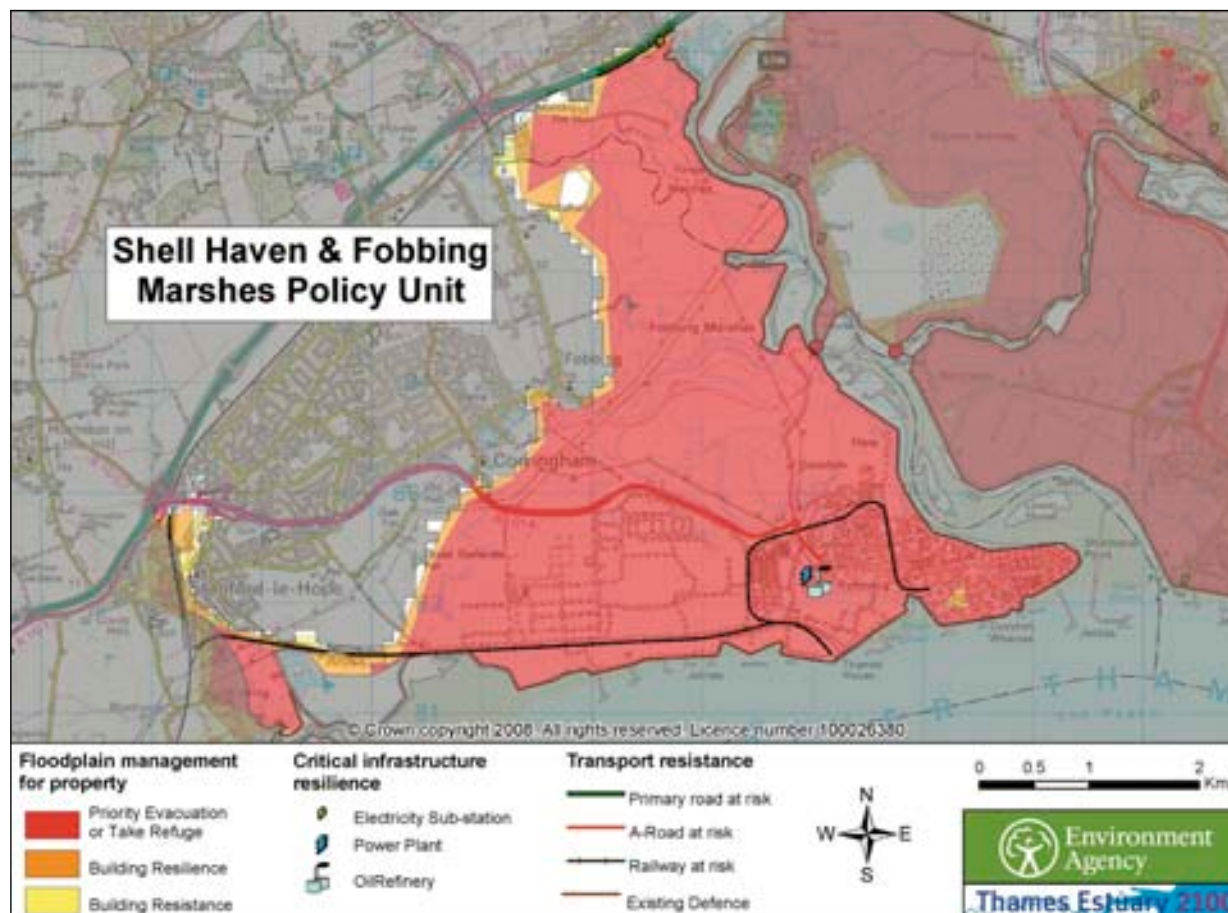
Description

Shell Haven & Fobbing Marshes policy unit is divided into two distinct areas either side of the A1014 access route to the Coryton refinery. To the north are the freshwater marshes and to the south is the industrial area along the Thames frontage.

The industrial area includes Coryton oil refinery – a key strategic site, and Shell Haven, which is the site of the new London Gateway container port.

The marshes include some SSSIs (Site of Special Scientific Interest). Much of the defence system for the marshes consists of embankments on Vange Creek upriver of Fobbing Horse Barrier.

The remaining defences on the river Thames and Holehaven Creek are primary full height defences.



At risk in Shell Haven & Fobbing Marshes policy unit

Sources of flooding

- Tidal from the Thames and Holehaven Creek (probability 0.1% per annum or greater), potential flood depths of up to 4 m.
- Tidal from Vange Creek (West bank) (probability 0.1% per annum, controlled by the Fobbing Horse Barrier).
- Fluvial from local watercourses including the marsh drainage systems on Fobbing and Vange Marshes.

The existing flood risk management system

- Tidal flood defences on the Thames and Holehaven Creek.
- Fobbing Horse Barrier and defences on Vange Creek, as these prevent tidal flooding from the north.
- Secondary tidal flood defences on Vange Creek.
- Drainage system outfalls including Mucking Creek, Shell Haven and Coryton, Fobbing Marshes and Vange Marshes.

Policy context

The freshwater marshes are designated as part of the proposed South Essex community parklands in the Thames Gateway Parklands vision, including restoration of Fobbing Marshes. They also provide areas where freshwater habitat could be created to compensate for losses elsewhere in the estuary.



Fobbing Horse tidal barrier

No new development should therefore be permitted in the marsh areas in order to maintain this important rural landscape in an otherwise high industrialised area. Whilst public access to the marshes is possible, it is generally poor and the marshes are therefore remote. The Thames Gateway Parklands vision envisages improved access as part of the proposed Parklands Vision.

Vision

The southern part of this policy unit is likely to remain commercial and industrial for the

foreseeable future. Whilst it may be possible to achieve some environmental enhancements as new works are carried out, our Plan proposed to support these industrial activities by recommending secondary defences to provide localised protection against rising sea levels to these key industrial and commercial sites.

There is an opportunity to create an important green area on the marshes, which are part of the proposed South Essex community parklands in the Thames Gateway Parklands vision. This should

include improved public access and amenity as well as habitat creation.

Local issues and choices

The choice between retaining and removing Benfleet, East Haven and Fobbing Horse Barriers is covered in our action plan (table A.7.) together with associated changes to the defences on Vange Creek.

Removing the barriers would result in gradual overtopping of the existing tidal defences into the marsh land, allowing the marshes at Fobbing and Vange to become more brackish, hence supporting natural change. If this approach is adopted, new defence arrangements would have to be put in place to protect the densely populated part of Canvey Island. This could form the basis of a much more reliable defence system for Canvey Island as discussed in the policy unit 7.1 description above.

It is anticipated that the London Gateway port at Shell Haven will include improved flood defences, possibly by raising the new quay level above flood defence level.

Managed realignment is planned at Mucking in association with the proposed new London Gateway port to provide replacement intertidal area and saltmarsh.

The drainage systems on Fobbing and Vange Marshes will require upgrading as the sea level rises and rainfall increases, although this has not been investigated in detail in our Plan. This mainly consists of improvements to channels and outfalls as the need arises.

Particular issues will include potential saline intrusion and siltation on outfalls. There is heavy siltation in Vange and Holehaven Creeks, and outfalls have been abandoned in the past and reconstructed elsewhere.



Vange Creek from Wat Tyler country park

Choices for local flood risk management have not been designed or assessed in detail, and are included in our action plan for further investigation, consultation and subsequent appraisal.



Do you understand our assessment for the Shell Haven & Fobbing Marshes policy unit?



Do you agree with it?

Policy unit – Isle of Grain

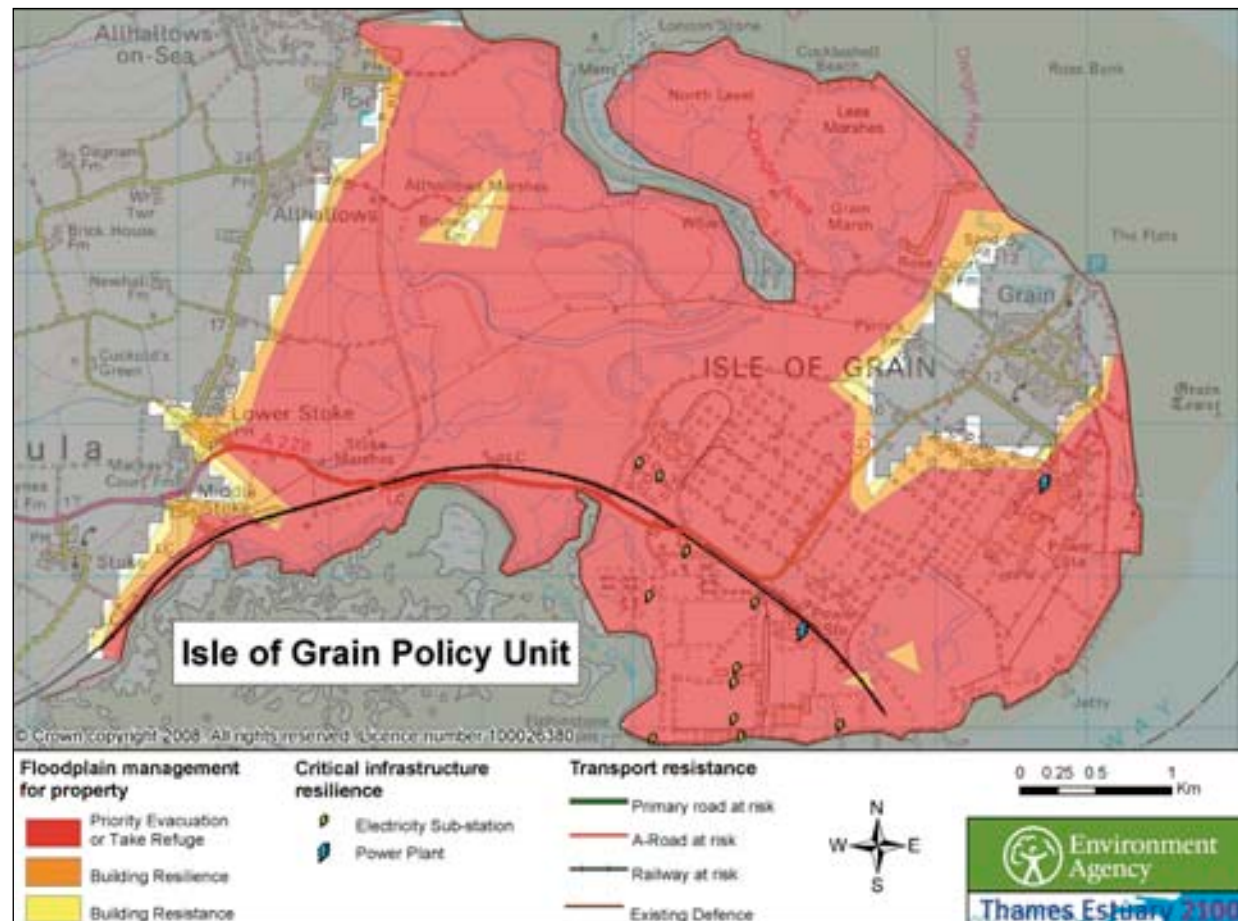
Policy: We recommend flood risk management policy **P4** to take further action to sustain the current level of flood risk into the future (responding to the potential increases in risk from urban development, land use change and climate change).

Description

The Isle of Grain policy unit has two distinct parts: an area of freshwater marshes to the west (Allhallows and Grain Marshes) and an industrial area to the south and east. The village of Grain lies on higher ground at the north-eastern extremity of the policy unit. Much of the freshwater grazing marsh in the western part of this policy unit is a designated SPA (Special Protection Area). The adjacent intertidal areas are also designated as an SPA. The main road and rail access routes to the eastern half of the policy unit cross the southern part of the freshwater grazing marsh. There are relic military defences from World War II.

Sources of flooding

- Tidal from the Thames and Medway including Yantlet Creek (probability 0.5% per annum), flood depths up to 4 m but variable.



At risk in Isle of Grain policy unit

- Fluvial from local watercourses including the drainage systems on the Allhallows and Grain Marshes.

The existing flood risk management system

- Tidal flood defences on the Thames and Medway including Yantlet Creek.
- Drainage system outfalls. The main outfalls for Allhallows and Grain Marshes are heavily silted.

Policy context

Large parts of the freshwater marshes are designated, and the area also provides an open rural landscape. The adjacent intertidal areas to the north and south west of this policy unit are also designated. The marshes are designated as community parklands in the Thames Gateway Parklands vision. No new development should therefore be permitted in these areas. However, the marshes themselves do not justify the current level of tidal flood protection along the Thames and Yantlet Creek and this must be examined as part of the implementation of the TE2100 Plan – possibly as part of the TE2100 habitat creation strategy.

The industrial area contains some very large facilities including Grain Power Station, the port of Thamesport and a new gas plant. It is therefore of

considerable strategic and economic importance. Access is via a road and railway that cross the marshes. It is understood that these are to be upgraded. Further development is expected in the already industrial eastern part of the Isle of Grain policy unit. It will therefore be necessary to continue to provide flood protection for this area together with protection of the transport links.

Vision

The western and northern part of the policy unit would be suitable for the creation of replacement intertidal habitat. This would require compensation of the designated freshwater and grazing marsh habitat that would be lost. The vision for this area is therefore a combination of intertidal habitat with surrounding community parklands areas including public access and facilities. This area will also provide safe transport links to the eastern part of the policy unit.

The eastern part of the policy unit will continue to be developed for industry and commerce in the foreseeable future. This is an important industrial and port area with large installations, and flood risk management must continue to be provided, keeping pace with climate change.

Local issues and choices

The impacts of local sources of flooding are small. The drainage systems in the eastern half of the Isle of Grain will require upgrading as the sea level rises and rainfall increases. The systems in the western half of the Isle of Grain will not be required if the defences are realigned as part of a habitat creation scheme. They are seriously affected by siltation of the outfalls.

Choices for local flood risk management have not been designed or assessed in detail and are included in our action plan for further investigation, consultation and subsequent appraisal.



Do you understand our assessment for the Isle of Grain policy unit?



Do you agree with it?

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Table A.7. – Policy units

■ Canvey Island ■ Bowers Marshes ■ Shell Haven & Fobbing Marshes ■ Isle of Grain

P4 P4 P3 P4

[Note that all dates are based on government’s current guidance on climate change – the TE2100 Plan will be reviewed and updated if these predictions change]


	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
	<p>A.7.1. TE2100 Plan informs the development and revision of local authority strategic flood risk assessments (SFRAs) and flood plans.</p> <p><i>(Cost of implementing this action not included in TE2100 Plan, but TE2100 data and information will be available to assist)</i></p>	<p>Environment Agency</p> <p>Local authorities</p> <ul style="list-style-type: none"> • Thurrock Unitary Authority • Basildon District Council • Castle Point District Council • Medway Unitary Authority <p>Local Resilience Fora</p> <ul style="list-style-type: none"> • Kent Resilience Forum, Essex Resilience Forum 	<p>TE2100 information is provided to local authorities preparing flood plans and capability testing.</p> <p>Local authority flood plans are developed with an understanding of TE2100 recommendations and data.</p> <p>Local Resilience Fora take ownership of the flood plans and all responders have confidence in them.</p> <p>A community engagement programme to ensure the public, businesses and other groups understand, are involved in and supportive of the flood plans.</p>	<p>Implementation partners: Do your flood plans include the findings and recommendations from TE2100? Do you have enough information from us to develop your flood plans so that they can be informed by TE2100? Your response will guide the development of our implementation “blueprint” during 2009 and improve arrangements for partnership working.</p> <p>Landowners, the public, business and other interested groups: The Thames tidal defences provide highly reliable protection to this lower estuary zone against surge tides. But should there be a failure of a defence or an extreme event which overtops the defences, low-lying areas of this zone would be at risk as shown on the policy unit At Risk maps. The Flood Plans will set out arrangements for managing this sort of emergency. If you have views on this, please let us know and we will share your views with those responsible for preparing the flood plans.</p>

Bowers Marshes

Shell Haven & Fobbing Marshes

Isle of Grain

TE2100 action plan: **action zone 7** – lower Estuary, urban/industrial and marshland



	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
	<p>A.7.2.</p> <p>To agree a programme to provide local flood protection, resilience and emergency plans for vulnerable key sites in action zone 7.</p> <p>Our At Risk maps for lower estuary zone 7 show that particular sites and key infrastructure which would be particularly vulnerable in the event of a failure or overtopping of the defences. Areas with a large residential population such as Canvey Island, and key industrial sites such as Coryton refinery and the Medway ports will require evacuation and flood management plans.</p> <p>Mobile homes on the Isle of Grain are vulnerable to flood risk. Moreover, Grain could be isolated in the event of tidal flooding. Flooding would disrupt port activities and freight transport by road and rail. Local residents may also be cut off for the duration of flooding.</p> <p>Canvey Island benefits from amongst the strongest flood defences on the Estuary. But no flood defence is infallible. The population on Canvey would be vulnerable to flooding. Mobile homes here are particularly vulnerable, as are single story properties in low lying areas.</p>	<p>Environment Agency</p> <p>Local authorities</p> <ul style="list-style-type: none"> • Thurrock Unitary Authority • Basildon District Council • Castle Point District Council • Medway Unitary Authority <p>Local Resilience Fora</p> <p>Kent Resilience Forum, Essex Resilience Forum</p> <p>Developers and vulnerable site owners/managers including:</p> <p>Medway Ports, Coryton Oil Refinery, Dubai Ports (London Gateway)</p>	<p>We will discuss with implementation partners to agree strategic scope of measures required, informed by information from TE2100 (see at risk maps).</p> <p>Agreement between implementation partners on the strategic approach, and roles and responsibilities for achieving it.</p> <p>All site owners must be supportive of approach and confidence of public and users maintained. Local floodplain management measures in place or planned within 25 years.</p>	<p>Implementation partners:</p> <p>Are you aware of the risks and particular vulnerability of key sites in this action zone? Do you have arrangements in place for initiating the discussion concerning scope of works required for the properties/ areas in which you have an interest? Can the Environment Agency assist with this through implementation of action A.7.2?</p> <p>Landowners, the public, business and other interested groups:</p> <p>We would be interested to hear your views to assist us in planning the implementation of this action A.7.2. particularly if you live, work or have interests in this area.</p> <p style="text-align: right;">(continued)</p>

Bowers Marshes

Shell Haven & Fobbing Marshes



Isle of Grain

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	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
	<p>A.7.2. (continued)</p> <p>We recommend a policy of substituting vulnerable housing with resilient replacements with a second story for refuge.</p> <p>Dubai Ports to have due regard for TE2100 findings when planning London Gateway port at Shell Haven. The port and associated assets should be resilient or otherwise protected to manage local tidal flood risk. Keeping pace with climate change.</p> <p><i>(Cost of implementing this action not included in TE2100 Plan, but TE2100 data and information will be available to support the action)</i></p>			
	<p>A.7.3.</p> <p>To agree partnership arrangements and principles to ensure that new development in lower estuary zone 7 is safe, and that where possible the application of PPS25 reduces the consequence flood risk – particularly in the areas where there is aggregation of flood risk for people or industry. We, along with local authority staff, are providing advice to Developers and responding to difficult Planning applications.</p>	<p>Environment Agency</p> <p>Essex CC, Kent CC, Regional authorities</p> <p>Local authority spatial and emergency planners:</p> <ul style="list-style-type: none"> Thurrock Unitary Authority 	<p>TE2100 Plan and associated information informs RSS and Local Development Frameworks (LDF) and future revisions.</p> <p>Local authority and Environment Agency Planning staff require guidance for applying the principles of PPS25¹¹ to the complexities of lower estuary defended tidal floodplain.</p>	<p>Implementation partners:</p> <p>Are your RSS and LDFs supported by sustainability appraisals that include local tidal flood risk and the implications of climate change? If not, does the TE2100 Plan provide you with the information you need to do this? If we draft guidance on the interpretation of PPS25 in a defended area, what sort of information would be most helpful to you? Would you be able to assist the Environment Agency in preparing this guidance – and would it be useful to you?</p> <p style="text-align: right;">(continued)</p>

¹¹ Planning Policy Statement No 25 “Development and Flood Risk Management” CLG 2006

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	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
 First 25 years	<p>A.7.3. (continued)</p> <p>For flood risk management to be factored into the planning process at all levels for the first 25 years from 2010 to 2034, there is need for greater clarity over methods and procedures for safety in new development behind defences.</p> <p><i>(Cost of implementing this action not included in TE2100 Plan, but TE2100 data and information will be available to support the action)</i></p>	<ul style="list-style-type: none"> • Basildon D.C. • Castle Point D.C. • Medway Unitary Authority <p>Thames Gateway Kent & Essex Partnerships</p> <p>Developers and site owners including:</p> <p>Medway Ports, Coryton Oil Refinery, Dubai Ports (London Gateway)</p>	<p>We along with implementation partners and CLG will develop guidance for development in lower estuary defended tidal floodplain.</p>	<p>Landowners, the public, business and other interested groups:</p> <p>We would be interested to hear your views to assist us in planning the implementation of this action A.7.3. particularly if you have had experience (good or bad) of dealing with us and other authorities over planning and building by the river and in the lower estuary defended tidal floodplain.</p>
 Middle 35 years	<p>A.7.4.</p> <p>To review and maintain from 2035 to 2069, the partnership arrangements and principles for development and flood risk management established in the first 25 years of our Plan.</p>	<p>As above</p>	<p>Guidance is updated to reflect changing needs. The TE2100 10-yearly update to include review of action A.7.3. and recommend any changes or developments.</p>	<p>We cannot know what institutional arrangements will be in place during this period or what pressures there will be on the environment. We do know that for the lower estuary zone to continue to thrive and for regeneration to be a success, flood risk management must continue to be integrated into the spatial planning process. If you would like to help shape the development of these arrangements during the middle years (2035 to 2069) of our Plan, then please let us have your views.</p>

TE2100 action plan: **action zone 7** – lower Estuary, urban/industrial and marshland


	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
	<p>A.7.5. To review and maintain from 2070 and into the 22nd century, the partnership arrangements and principles for development and flood risk management established in the middle years of the Plan.</p>	As above	TE2100 10-yearly update to include review of action A.7.4. and recommend further action. Guidance is updated to reflect changing needs.	Flood risk management continues to be integrated into the spatial planning process into the 22nd century. If you have views on how the relationship between spatial planning and flood risk management should be developing in the lower estuary zone as we prepare for the 22nd century, then please respond to this action A.7.5.
	<p>A.7.6. To maintain, enhance, improve or replace, the river defence walls and active structures – including the Canvey Island Barriers through lower estuary zone 7 over the first 25 years of the Plan from 2010 to 2034.</p> <p>This is a continuation of our current activities to ensure that confidence in the Thames tidal flood risk management system is maintained and that opportunities for environmental enhancements and partnership through planning are actively sought and carried out.</p> <p><i>(Cost of implementing this action is included in TE2100 Plan)</i></p>	<p>Environment Agency</p> <p>Local authorities in action zone 7:</p> <ul style="list-style-type: none"> • Thurrock Unitary Authority • Basildon District Council. • Castle Point District Council • Medway Unitary Authority <p>Land Owners</p> <p>Developers</p>	<p>Our Planning Liaison and Development Control staff will promote these works as part of ongoing development applications.</p> <p>Our Asset System Management teams will promote these schemes. However, the method of improving the defences is different from the present day approach. It involves greater maintenance and repair work in addition to replacement. Promotion of schemes through the capital programme may not be appropriate for maintenance and repair, and a different way of working may be required.</p>	<p>This is the work which we do now in the Environment Agency. We will continue with our programme of operations, maintenance and replacement but we are looking for ways of working better and more effectively.</p> <p>We are also seeking opportunities for environmental and recreational enhancements which will create a better place through our lower estuary zone, and for partnerships which will help us achieve this.</p> <p>We would welcome any comments that you or your organisation can provide which assist us in these aims.</p> <p>Our TE2100 Technical Report and local choice documents for the policy provide our assessment of the choices which are available in the lower estuary zone 7 in the short term. If you would like to comment on these in more detail, please contact the project team.</p>

Bowers Marshes



Shell Haven & Fobbing Marshes

Isle of Grain

TE2100 action plan: **action zone 7** – lower Estuary, urban/industrial and marshland

	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
	<p>A.7.7.</p> <p>To maintain, enhance and improve or replace the defence walls and active structures through lower estuary zone 7 during the 30 year period of the Plan from 2035 to 2069 with a first defence raising in 2040.</p> <p>The defences will require raising during this period of our Plan. This will require a decision to be made about the future of the existing barriers on the creeks around Canvey Island. It is likely that the Benfleet Barrier will require replacement with another structure or with alternative measures as it has very little scope for being raised. The East Haven and Fobbing Horse barriers may not be appropriate structures for future flood risk management. If these barriers are removed, this will alter management arrangements for the secondary defences on East Haven and Vange Creeks.</p> <p>Secondary defences will be required to protect the industrial areas at Coryton and Medway ports and the transport links to and from these key sites. In particular, protection will be needed for the road and rail access to the eastern part of the Isle of Grain.</p>	<p>Environment Agency</p> <p>Local authorities in action zone 7:</p> <ul style="list-style-type: none"> • Thurrock Unitary Authority • Basildon District Council. • Castle Point District Council • Medway Unitary Authority <p>Land owners and site operators including:</p> <p>Medway Ports, Coryton Oil Refinery, Dubai Ports (London Gateway)</p>	<p>Our Planning Liaison and Development Control staff will promote these works as part of ongoing development applications.</p> <p>Our Asset Systems Management teams will promote schemes through capital programme and they will form part of strategic and investment plans subject to replacement/repair working arrangements as A.7.6. above.</p> <p>There are major opportunities for reshaping the local landscape as part of these works.</p> <p>Where there are a number of local choices which can be made to fulfil the strategic brief, a local delivery feasibility study is needed for each policy unit.</p>	<p>Our aims remain as A.7.6. above, but during this period, there will be a major programme of rebuilding and refurbishment of the river walls and defences through the lower estuary zone 7. This provides many opportunities for creating a better place and to plan for a better riverside environment.</p> <p>We will be considering whether the three barriers around Canvey Island should be retained and refurbished, or replaced with a new defence between east and west Canvey. We will also be considering whether the eastern part of the Isle of Grain policy unit should become a tidal habitat creation scheme, with a new defence to the south of the policy unit. Local secondary defences to Coryton and Medway ports must also be planned.</p> <p>If you would like to help shape the future environment in these areas, then please let us have your views on action A.7.7. and also the actions relating to habitat creation A.7.8., A.7.9. and A.7.10. see below.</p> <p>Our TE2100 Technical Report and local choice documents for the policy provide our assessment of the choices which are available in the lower estuary zone in the medium term (2035 to 2069). If you would like to comment on these in more detail, please contact the project team.</p> <p style="text-align: right;">(continued)</p>

TE2100 action plan: **action zone 7** – lower Estuary, urban/industrial and marshland


	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
	<p>A.7.7. (continued)</p> <p>This will either require high defences on both sides, or raising of the road and railway to form a causeway. A similar arrangement may be required for Coryton oil refinery access routes.</p> <p><i>(Cost of implementing this action is included in TE2100 Plan)</i></p>	<p>Site developers</p> <p>Essex County Council</p> <p>Kent County Council, SEEDA, SEERA, EEDA, EERA</p>		
	<p>A.7.8.</p> <p>Habitat Creation site 1 of 4</p> <p>In 2020 the first of four intertidal habitat creation sites will be implemented. Valuable habitat is being lost because our defences are preventing it from migrating landwards as sea level rises and over the 100 year life of our Plan, 1200 hectares of new habitat will be needed. We have identified seven sites which have the right characteristics for habitat creation. The location of the sites are shown on the estuary-wide option maps. The potential sites in the lower estuary action zone are:</p> <ul style="list-style-type: none"> • Grain Marshes • Allhallows Marshes • St Mary's Marsh • West Canvey Marshes • Vange Marsh • Bowers Marsh • Fobbing Marshes. 	<p>Environment Agency</p> <p>Natural England</p> <p>Land owners</p> <p>Local authorities</p> <ul style="list-style-type: none"> • Thurrock Unitary Authority • Basildon District Council <p>Public and local interest groups</p> <p>RSPB</p> <p>Wildlife Trusts</p>	<p>Planning and groundworks will commence 10 years before implementation of the managed realignment. This preliminary work includes construction of a new line of defence to protect people and properties from the risk of flooding from the new intertidal zone. It also includes – in some cases, recharging the land levels so that the correct habitat develops. It may take up to 10 years after the realignment is implemented before the habitat is fully established at the site.</p>	<p>We would like to hear your views on our 2020 habitat creation proposal.</p> <p>It is important that we use this consultation to have a proper and effective airing of information and views regarding any land use change. In the Environment Agency, we see habitat creation as a positive step toward the goal of sustainability and supporting the habitats and species that make the Thames Estuary internationally important. As managers of flood defences we also have an obligation to maintain the ecological integrity of internationally designated habitats where it is determined our defences are having a detrimental effect. This habitat must be replaced.</p> <p>There will be no increased tidal flood risk to the public as a result of the intertidal habitat creation schemes as they will always include a new defence construction on the landward side of the new habitat to protect people and property. This provides major opportunities for improving the reliability of the defence system. It also provides opportunities for enhancements for recreation, key infrastructure, visitors' centres and other facilities.</p> <p style="text-align: right;">(continued)</p>

Bowers Marshes

Shell Haven & Fobbing Marshes

Isle of Grain

TE2100 action plan: **action zone 7** – lower Estuary, urban/industrial and marshland



	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
	<p>A.7.8. (continued)</p> <p>By 2020 new freshwater habitat will be needed to compensate for the loss of designated freshwater and grazing marsh interest features as a result of potential loss as a result of intertidal habitat creation.</p> <p>The following sites in lower estuary zone 7 have been identified as having the potential to support the interest features that could be lost, either through enhancement of existing features or creation of new habitat. The availability of these sites will depend on whether they have been required for intertidal compensation:</p> <ul style="list-style-type: none"> • Vange and North Fobbing Marshes • South Fobbing Marshes • Pitsea Marshes. <p><i>(Cost included in TE2100 Plan)</i></p>		<p>We will be looking for partnership arrangements to manage these sites and get the best for the natural environment, for the local population and for visitors.</p>	<p>In order to finalise our plans, we need to hear what you think – in general terms, or at a local level.</p> <p>We are consulting on 2 types of habitat creation:</p> <ul style="list-style-type: none"> (i) Inter-tidal habitat (ii) Freshwater and grazing marsh habitat <p>and we would like to hear your views on both.</p>

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	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
	<p>A.7.9. To maintain, operate, modify and improve the Canvey Island Barriers during the 35 year period of the Plan from 2035 to 2069</p> <p>in this policy unit includes:</p> <ul style="list-style-type: none"> • Fobbing Horse Barrier • East Haven Barrier • Benfleet Barrier. <p><i>(Cost included in TE2100 Plan)</i></p>	<p>Environment Agency</p> <p>Riparian owners with responsibility for their defences</p> <p>Land owners adjacent to the defences</p>	<p>Removal of the some of the existing active defences in the Estuary could restore parts of the floodplain to a more natural system. Passive defences could be implemented to provide an appropriate level of risk management to property at risk.</p> <p>We will promote schemes through capital programme and they will form part of strategic and investment plans.</p>	<p>Restoring natural function to the floodplain by removing structures supports the provision of an appropriate and sustainable flood risk management system and aligns with the Government's making space for water strategy. Even if you and/or your organisation are not planning this far ahead, your views and any additional information you can provide will be of interest to us for future planning.</p>
	<p>A.7.10. Habitat Creation – site 2, 3, and 4.</p> <p>In this period the remaining habitat creation sites will be implemented in 2040, 2050 and 2065. Further sites will be realigned to make up the necessary 1200 hectares of intertidal habitat creation required this century. As in action A.7.8, the potential sites in this policy unit are:</p> <ul style="list-style-type: none"> • Grain Marshes • Allhallows Marshes • St Mary's Marsh • West Canvey Marshes 	<p>Environment Agency</p> <p>Natural England</p> <p>Local authorities</p> <p>Land owners</p> <p>Public and local interest groups</p> <p>RSPB</p> <p>Wildlife Trusts</p>	<p>Monitoring and review will be required to confirm actual loss of intertidal habitat compared to that which was projected. Adjustment may need to be made to planned replacement activities.</p> <p>See A.7.8. for additional considerations.</p>	<p>We would like to hear your views on our 2040, 2050 and 2065 habitat creation proposals. If you views cover all the sites, or are generally about habitat creation, then please respond to our zone 0 estuary-wide action (A.0.6.). If you have views about specific sites in the lower estuary zone 7, please respond to this Action A.7.10.</p> <p>See A.7.8. and A.7.9. for additional considerations.</p> <p style="text-align: right;">(continued)</p>

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	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
	<p>A.7.10. (continued)</p> <ul style="list-style-type: none"> • Vange Marsh • Bowers Marsh • Fobbing Marshes. <p>Further freshwater habitat compensation may be required. The same sites described in A.7.8. are proposed as options that could support the nature conservation features that may be lost.</p> <p><i>(Cost included in TE2100 Plan)</i></p>			
	<p>A.7.11.</p> <p>To maintain, improve, enhance or replace the river defence walls and active structures through lower estuary zone 7 post 2070 and into the 22nd century.</p> <p>These are the TE2100 “End of the Century” raising of defence levels to provide continuing tidal flood risk management to the lower estuary zone 7. The defence raising will be the same in this zone, whatever “end of the century” option is selected.</p>	<p>Environment Agency</p> <p>Local authorities in action zone 7:</p> <ul style="list-style-type: none"> • Thurrock Unitary Authority • Basildon District Council • Castle Point District Council • Medway Unitary Authority 	<p>Our Planning Liaison and Development Control staff will promote these works as part of ongoing development applications.</p> <p>Our Asset Systems Management teams will promote schemes through capital programme and they will form part of strategic and investment plans subject to replacement/repair working arrangements as A.7.6. above.</p>	<p>We cannot now what institutional arrangements there will be as we approach the 22nd century, but our TE2100 vision imagines an environment where the lower estuary riverside has thriving regeneration areas and a stable, flourishing natural environment which is increasingly enjoyed and respected by the people who live, work and visit. This means that the actions established in A.7.6. and A.7.7. will be continued by whoever is looking after our environment at that time. If you have views about the long-term future management of the lower estuary zone 7 riverside, we would like to hear them. This consultation provides an opportunity for you to have these views recorded and presented as part of an ongoing vision statement to those who follow us 60 to 100 years from now.</p> <p style="text-align: right;">(continued)</p>

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	TE2100 recommended actions	Implementation partners	How this will be achieved	How your response can help us finalise the TE2100 Plan
	<p>A.7.11. (continued)</p> <p>Whether or not defences are raised, all defences will still require ongoing maintenance, repair and replacement (and hence engineering works) and this has been allowed for in our Plan investment profile.</p> <p><i>(Cost of implementing this action is included in TE2100 Plan)</i></p>	<p>Landowners</p> <p>Developers</p> <p>Thames Strategy East</p>	<p>There are major opportunities for reshaping the local landscape as part of these works.</p>	
	<p>A.7.12.</p> <p>To agree a programme of managing flooding from other sources in the defended tidal floodplain.</p> <p>Large areas of lower estuary zone 7 are low-lying, and there is a great reliance on drainage networks to deal with pluvial and fluvial flooding, particularly in areas where the urban drainage system has relatively low capacity or is prone to tide locking.</p> <p>The marsh and urban pumped drainage systems will require upgrading as the sea level rises and rainfall increases. Other issues include potential saline intrusion and siltation of outfalls.</p>	<p>Environment Agency</p> <p>Local authorities in action zone 7:</p> <ul style="list-style-type: none"> • Thurrock Unitary Authority • Basildon District Council • Castle Point District Council • Medway Unitary Authority <p>Internal Drainage Boards</p>	<p>We will discuss with our implementation partners to agree strategic scope of measures required.</p> <p>Agreement between implementation partners on the development and implementation of a surface water management plan.</p> <p>All site owners must be supportive of approach and confidence of public and users maintained. Local measures for management of flooding from other sources to be in place or planned within 25 years.</p>	<p>Implementation partners:</p> <p>Are you aware of the risks and particular vulnerability of people and property to flooding from sources other than tidal? Flooding from other sources is far more likely than tidal flooding. Do you have arrangements in place for the scope of works required for the properties/areas in which you have an interest? Can the Environment Agency assist with this through implementation of Action A.7.12?</p> <p>Landowners, the public, business and other interested groups:</p> <p>We would be interested to hear your views to assist us in planning the implementation of this action A.7.12. particularly if you live, work or have interests in this area and are concerned about flooding from sources other than tidal.</p> <p style="text-align: right;">(continued)</p>

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	<p>A.7.12. (continued) Areas which will require attention include:</p> <ul style="list-style-type: none"> • The marsh and urban drainage on the eastern half of the Isle of Grain • Fobbing and Vange Marshes drainage systems • Benfleet Hall Sewer and Bowers Marshes • The extensive drainage system in Canvey Island with open channels and pumped and gravity outfalls. • Drainage outfalls for the Canvey west marsh drainage system. • Heavy siltation in Vange and Holehaven Creeks, and outfalls have been abandoned in the past and reconstructed elsewhere. <p><i>(Cost of implementing this action is not included in our TE2100 Plan, but TE2100 data, information and recommendations are available to support the implementation of this action)</i></p>	<p>Sewage and water undertakers</p> <p>Land owners</p> <p>Developers & architects</p>		<p>Choices for local flood risk management have not been designed or addressed in detail in TE2100 but a number of areas have been identified as requiring further study at local level:</p> <p>Our TE2100 Technical Report and local choice documents for the policy provide further information on these matters and the choices which are available to assist with problems. If you would like to comment on these in more detail, please contact the project team.</p>