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Consultation on Defra policy statement on appraisal for flood and coastal erosion risk management

July 2008

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Executive Summary

1. This consultation sets out updated appraisal policy guidance from Defra reflecting the strategic and policy principles of the first Government response to the Making Space for Water consultation (March 2005).
2. Making Space for Water proposed that more concise appraisal policy guidance should be issued by Defra and best practice implementation guidance issued by the Environment Agency in collaboration with other operating authorities.
3. The new guidance takes account of research undertaken to support appraisal policy development and current best practice in flood and coastal erosion risk management and wider policy areas including new EU legislation such as the Water Framework Directive and the Directive for the assessment and management of flood risk.
4. In particular the new guidance:
 - Places more emphasis on achieving social and environmental outcomes of sustainable development through broader risk assessments and the use of techniques such as multi-criteria analysis and eco-systems services approaches.
 - Sets appraisal firmly within the context of a risk based approach and
 - Reinforces the context of appraisal within an holistic strategic planning framework based on whole catchments and shoreline process units.
5. Proposals for changes were presented at two stakeholder events held in summer 2007 and have helped shape the new guidance.
6. The Environment Agency is developing more detailed guidance on appraisal in collaboration with other operating authorities that will be consistent with the policies presented here later in 2008.
7. This new policy guidance from Defra and the practitioner guidance from the Environment Agency will replace the existing Flood and Coastal Defence Project Appraisal Guidance (FCDPAG) volumes 1-5.

Part 1: Consultation Overview

1.1 Background to the review of appraisal guidance

The first Government response to the Making Space for Water¹ (MSW) consultation (March 2005) set a vision for a new strategic direction for flood and coastal erosion risk management in England. This included support for the whole catchment and shoreline approach, and reflecting more of the social and environmental aspects of sustainable development.

The response specifically identified that updated appraisal guidance should be developed reflecting the strategic and policy principles of MSW. It was proposed that concise appraisal policy guidance should be issued by Defra and best practice implementation guidance issued by the Environment Agency in collaboration with other operating authorities.

The new guidance was to take account of the latest research and best practice in flood and coastal erosion risk management and wider policy areas and in particular provide revised approaches to:

- Provide better guidance on social costs and benefits so as to better identify gains and losses to individuals and different sectors and enable schemes involving multiple sources of funding including third party contributions.
- Improving the risk evidence base that drives risk management activities both in raising awareness of risk and taking more account of a wider range of risks through more consideration of social and environmental consequences as well as economic ones by using new techniques including non-market valuations and multi-criteria analysis techniques.
- Links with the Water Framework Directive.

A programme of work was established to take forward the MSW strategic direction including a project to develop new policy and practitioner guidance. This formal public consultation follows two stakeholder events in summer 2007 and provides an opportunity to shape the Policy Statement (PS) before it comes into effect.

The Environment Agency is developing more detailed guidance on appraisal in collaboration with other operating authorities consistent with the policies presented here. This guidance is due to be available by the end of 2008. Together the new PS from Defra and the practitioner guidance from the Environment Agency will replace the existing Flood and Coastal Defence Project Appraisal Guidance (FCDPAG) volumes 1-5.

1.2 Development work contributing to this proposed new Policy Statement on Appraisal

¹ <http://www.defra.gov.uk/envIRON/fcd/policy/strategy.htm>

Since March 2005 Defra has undertaken a wide-ranging programme of work investigating and informing new approaches to appraisal.

- FD 2018 R&D project– The Sugden approach – testing a disaggregated approach to appraisal. (based on similar approaches in DfT NATA guidance)
- Supplementary Guidance Note on climate change allowances (date)
- FD 2013 R&D project “Evaluating a multi-criteria-analysis (MCA) methodology for application to flood management and appraisal “Nov 2004 including pilot testing of MCA is currently in progress
- FD 2015 R&D project – “Sustainable flood and coastal erosion risk management “, January 2006
- FD2019 R&D project “Developing an evidence base for improving appraisal guidance” Dec 2006. I
- Improved methods for valuing social issues including valuing the risks to people (FD2321 R&D project – Phase 2 March 2006)
- Improved methods for valuing the environment based on the Ecosystems Services approach ((Flood and coastal erosion risk management: economic valuation of environmental effects handbook. August 2007 – Environment Agency)
- Defra’s Introduction guide to valuing ecosystem services (Defra Dec. 2007)

Results of this work can be found on the Defra Flood Management R&D website².

Other projects in the MSW programme³ have also informed the appraisal review including:

- Identifying the barriers and incentives to delivering better social and environmental outcomes (MSW project SD1). This work helped identify some of the areas with existing appraisal application where greater emphasis could be placed on social and environmental outcomes and complimented work under FD2019 above.
- Adaptation - Developing a Broad Portfolio of Options to Deliver better Flood and Coastal Solutions (MSW project SD2).
- Development of Outcome Measures (MSW project SD4).
- Building stakeholder and community engagement in the development of flood risk management solutions (MSW project SD6)

² <http://www.defra.gov.uk/environ/fcd/research/default.htm>

³ <http://www.defra.gov.uk/environ/fcd/policy/strategy/projects.htm>

1.3 Consultation Events

In August and September 2007 Defra held two consultation events to engage stakeholders in the development of the new policy. At this time the results of the main research areas were becoming available and views were sought on the direction that new appraisal guidance should take. Reports on these consultation events are available on the website⁴ and have been used to inform this new policy statement.

1.4 How this Consultation relates to other current work in Flood and Coastal Erosion Risk Management

The Pitt Review

The Pitt Review⁵ of the summer flooding 2007 was published on 25th June 2008. The review does not make explicit reference to appraisal or guidance. However it does address a number of issues which are relevant to the management approaches and types of flood risk that should be considered. These include:

- The need for a long-term investment strategy to set out the investment needs for flood risk management in England within a policy framework for delivering long-term, sustainable flood risk mitigation measures. (Pitt Report June 2008 - ES.43 and Recommendation 23.)
- Funding from all sources needs to be spent effectively (ES.46)
- Support for the risk based approach accompanied by a full range assessment of costs and benefits (Sections 7.23-7.25)

The new PS is complimentary to and facilitates these issues at a strategic level. The PS encourages appraisal to be undertaken in a holistic way that considers all forms of flood risk and seeks to manage it through adopting a broad portfolio of approaches particularly paying more attention to those that adapt to future risks such as climate change and help people come to terms with living with flood risk by making their homes more resilient to its effects. Approaches to improve adaptation and resilience are under development and being consulted on concurrently and will create a wider choice of risk management options to appraise than currently available.

The Government will be producing an Action Plan in autumn 2008 in response to the Pitt review recommendations.

Managing flooding from all sources

Previous government guidance on appraisal FCDPAG was specifically aimed at appraisal for managing fluvial and coastal erosions risks. The principles in the new PS are intended to be applied equally to flood risk from any source. Similarly these principles can and should be applied to any means to managing that risk, not just building or improving conventional defences. The strategic planning framework and risk based approach promoted in the PS will facilitate an integrated approach to all forms of flooding within which appraisal

⁴ <http://www.defra.gov.uk/envIRON/fcd/policy/strategy/sd3.htm>

⁵ <http://www.cabinetoffice.gov.uk/thepittreview.aspx>

can be used to provide a means of identifying and justifying effective management responses in an open manner. Proposals and existing responsibilities of the Environment Agency for a strategic overview of all flood risk are consistent with and can be managed within the strategic planning framework. Catchment Flood Management Plans and Shoreline Management Plans will assess all types of risk at the strategic level and identify policies for risk management. These policies can be taken forward by individual operating authorities or in partnership with others and would include plans to manage surface water. More detailed arrangements and proposals for responsibility for flooding from all sources will be included in the Pitt Action Plan mentioned above.

New legislation for flooding (Floods and Water Bill)

Government is proposing to undertake a major review of legislation relating to flooding and water issues which will be instrumental in taking forward the Pitt Action Plan. This work is in the early stages and will be progressed through 2009 and 2010 and we will encourage stakeholders to engage in this process. Ministers have announced⁶ (June 2008) that the Environment Agency will be given a strategic overview role in England for managing flood risk, from whatever source, and that local authorities will take responsibility for surface water management, including Surface Water Management Plans, under the Agency's overview.

Links to Environment Agency Prioritisation proposals

In addition the Environment Agency is currently consulting on Prioritisation arrangements to work with the Defra outcome measures and targets. Prioritisation is closely linked to appraisal because it is the next stage on where projects are selected for implementation in a programme of investment. Consistent application of this appraisal policy will ensure that prioritisation is based on comparable information for the projects being considered.

1.5 How to respond and timing

The deadline for responses is **31 October 2008**. All responses should be sent via e-mail to floodappraisal@defra.gsi.gov.uk or by post to:

Alternatively, responses can be sent by post to: Flood Appraisal Consultation, Defra, Ergon House, Area 2D, Horseferry Road, London SW1P 2AL. If you have any queries, please call the Flood Resilience Consultation Co-ordinator on 020 7238 6239.

You are welcome to comment on all aspects of this consultation, but there are some specific issues on which we would particularly value your input. These are presented as questions throughout the document and are also summarised below for your convenience.

In your response please:

- Explain who you are and, where relevant, who you represent. Also include your name and address.

⁶ <http://www.defra.gov.uk/corporate/ministers/statements/hb080625.htm>

- Order your comments under the same headings as the consultation paper.

Please note that comments received might be made publicly available unless those providing comments clearly mark them “In Confidence”. All responses will be included in any statistical or other summary of the results. Please see the section on Freedom of Information in the Cabinet Office consultation guidance for more information.⁷ You should also be aware that Defra might, in some circumstances, be required to communicate information to third parties on request, in order to comply with its obligations under the Freedom of Information Act 2000 and the Environmental Information Regulations. All responses received by the deadline will be analysed and a summary placed on the Defra website.⁸

1.6 Summary of Consultation Questions

Please refer to Part 2 of this document for the Draft Policy Statement on Appraisal for Flooding and Coastal Erosion Risk Management.

Section 1: Introduction and Background

- Q1. Does the text clearly explain the context and purpose of the policy statement and if not what additional information should be provided?

Section 1.3: Sustainable Development

- Q2. Does the text provide adequate explanation of how sustainable development should be embedded in appraisal for flood and coastal erosion risk management? Are there any other aspects of sustainable development that should be included in the policy statement?
- Q3. Do you feel that the approaches we promote, a strategic and holistic approach, long term whole life design supported by a broad portfolio of structural and non structural solutions will result in more viable sustainable solutions being identified?

Section 2: Risk Based Approach

- Q4. The policy statement sets the context for managing flooding and coastal erosion within a risk based approach. This means that risks are assessed on the basis of both the probability of flooding and the scale of consequence and that areas of higher risk are therefore more likely to justify risk management actions. Does the text adequately explain how this should be taken into account in appraisal? If not do you have any suggestions for improvements?

⁷ The Better Regulation Executive works across government to reduce and remove unnecessary regulation for the public, private and voluntary sectors; <http://bre.berr.gov.uk/regulation>

⁸ Further information at <http://www.defra.gov.uk/corporate/consult/flood-protection>

Section 3: Strategic Framework

- Q5. The policy statement reflects the planning framework consisting of high level catchment flood management plans and shoreline management plans considering all types of flooding risk. More detailed plans would be developed beneath these where necessary to manage local flooding and coastal erosion. This framework has been developing over recent years although is not yet complete. Do you consider that the text provides sufficient policy guidance on the role of appraisal in this system?
- Q6. The policy statement promotes the use of appraisal principles at each stage in the framework to determine the most appropriate approach to risk management. The purpose of high level plans such as CFMPs and SMPs is to provide a strategic view of risks and management requirements across large areas over which flooding and coastal erosion processes operate. Smaller scale plans then develop proposals for managing these requirements locally. We expect appraisal at each stage to be carried out at an appropriate level of detail necessary to inform the choices to be made mindful of the need to ensure that overall the process is streamlined and not repetitive. Do you agree that that different levels of detail are necessary and that this approach is workable. If not, what would you suggest?
- Q7. The European Directive on the Assessment and Management of Flood Risk establishes a requirement for Flood Risk Management Plans to be prepared for all areas where there is significant flood risk and for all forms of flooding. These plans have to be in place from Dec 2015. Do you think that CFMPs and SMPs should be identified as plans to fulfil this requirement? Smaller scale plans for different types of flooding would be identified and prioritised as measures under these plans for further development.

Section 4: Principles for Appraisal

- Q8. Does the policy statement provide sufficient guidance for operating authorities and at the right level, to ensure that government expectations for effective and consistent appraisal will be undertaken?
- Q9. Does the policy statement provide sufficient information and explanation for stakeholders to understand what the government expectation is of operating authorities to undertake effective and consistent appraisal.?
- Q10. Are there any other good principles of appraisal that you think the policy statement should either give greater emphasis to or has not addressed?
- Q11. The use of indicative standards of protection (IS) were recommended in FCDPAG3 as an aid to authorities to help in establishing a range of

options although they did not represent any entitlement to protection or a minimum level to be achieved. The suite of outcome measures and targets now largely replace the role of IS and better reflect a risk based approach. At the consultation events in 2007 there was not a clear consensus on whether in view of the introduction of outcome measures and targets there was no longer a role for indicative standards or something similar. Do you believe that indicative standards should be retained in some form and if so what function should they have?

Section 5: Decision Making

Q 12. Do you consider that the policy statement promotes an effective approach to selecting the preferred option for risk management?

Section 6: Public Consultation, Governance and Scrutiny

Q 13. Do you consider that the approach proposed in the policy statement will facilitate public consultation and engagement?

Q 14. Do you think that the arrangements for governance and scrutiny of appraisal and decision making will be effective?

Section 7: Legislative requirements and synergy with other government policy

Q15. Does the policy statement address the main legislative areas that are relevant to appraisal or are there any other areas that you feel should be identified here?

Q16. Are there other aspects of government policy that should be highlighted as having particular relevance to Flooding and Coastal Erosion risk management?

Section 8: Additional policy on particular aspects of valuation

Q17. Are there other aspects of valuing benefits and costs where more policy guidance should be provided?

Other questions and invitation to make general comments

Q 18. In the 2005 Making Space for Water Government response it was identified that Defra and the Agency would produce summary versions that explained appraisal policy and practice in a more accessible way for stakeholders and the general public – this was in comparison to the existing guidance Flood and Coastal Defence Project Appraisal Guidance Volumes 1-5 (FCDPAG) . To what extent do you feel that the new format of the Policy Statement for Appraisal addresses this aim.

Q 19. Are there comments or suggestions you wish to make on any other aspects of the proposed Policy Statement.

1.7 Links to further information

MSW – Making Space for Water⁹ - The Cross Government strategic approach to flooding and coastal erosion management co-ordinated as a programme of work within the Department of Environment, Food and Rural Affairs (Defra)

CFMP – Catchment Flood Management Plan¹⁰ – A high level plan recommending long term and sustainable policies for flood risk management across a river catchment. The plan is based on a comprehensive understanding of flooding processes and an assessment of risk to people, property and the environment. There is a programme in place to develop CFMPs for all catchments across England and Wales and the Environment Agency are leading this work.

SMP – Shoreline Management Plan¹¹ – A high level plan recommending long term and sustainable policies for flood and coastal erosion risk management for a length of coastline. Similar in nature and purpose as CFMPs and developed by Coastal Groups.

WFD – Water Framework Directive¹² – European Legislation which fully applies to the UK since Dec 2000 and aims to achieve stringent ecological and chemical water quality standards for all bodies of water (e.g. rivers, streams, canals, lakes, estuaries and the coast)

FCDPAG – Flood and Coastal Defence Project Appraisal Guidance¹³. A series of five volumes of guidance on Appraisal for Flood and Coastal Defence in England published by MAFF (now Defra) between 1999-2001.

⁹ <http://www.defra.gov.uk/environ/fcd/policy/strategy.htm>

¹⁰ http://www.environment-agency.gov.uk/subjects/flood/1217883/1217968/907676/?lang=_e

¹¹ <http://www.defra.gov.uk/environ/fcd/guidance/smp.htm>

¹² <http://www.defra.gov.uk/environment/water/wfd/index.htm>

¹³ <http://www.defra.gov.uk/environ/fcd/pubs/pagn/default.htm>

Part 2: Draft of Defra Policy Statement

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Foreword

This Policy Statement (PS) sets out the Government's policy on Appraisal for Flood and Coastal Erosion Risk Management. It replaces policy set out in the Flood and Coastal Defence Project Appraisal Guidance (FCDPAG) Volumes 1-5 published between 1999 and 2001.

Policy Notes on Appraisal may be published to update aspects of policy and these will be found on the Defra Flood Management website.

The policies in this PS should be implemented by Operating Authorities who use appraisal to justify government investment¹⁴ in flood and coastal erosion risk management.

Practitioner Guidance for the implementation of these Appraisal policies will be provided by the Environment Agency in association with other Operating Authorities.

Format of this document

The policies within this PS are set out as headlines in sections 1 to 8 of this document. In addition a draft version of supporting and explanatory text is provided in Annex 1 to describe how Government expects these policies to be interpreted and to provide context. In a future web based version of this document the supporting text will be accessed via a link from each policy headline as "further information".

¹⁴ Currently this policy guidance only applies to funding from Defra although in the future may apply to investment from other government departments.

1 Background to appraisal

1.1 The role of appraisal in flood and coastal erosion risk management

Flooding and coastal erosion are natural processes with highly variable impacts due to the climate and geography of the country. To take account of this variability Government promotes nationally consistent approaches to the assessment and management of these risks rather than setting national standards for protection. Appraisal provides a structured approach for assessing risk and determining the most appropriate way of managing it.

This policy statement sets out the principles of appraisal for sustainable management of flooding and coastal erosion risks in England where this work will receive public funding from Defra¹⁵. The policy statement also sets out the context within which appraisal should take place. The context includes taking a risk based and catchment wide (or coastal process cell) approach to ensure that sustainable management approaches are identified and taken forward.

The Environment Agency, in collaboration with other authorities with legal powers relating to flooding and coastal erosion risk management (including Internal Drainage Boards and Local Authorities), will publish more detailed guidance on appraisal for practitioners that is consistent with the policies in this document.

1.2 Policy and legislative context

Flood and coastal erosion risk includes:

- Flooding from all sources including rivers, the sea, surface water, sewerage and groundwater including risks resulting from a combination of these.
- Coastal erosion caused by the sea but generally not other land stability issues. Where combinations of these occur, Operating Authorities must take a holistic approach to the risk and identify appropriate responsibility (with others) for managing it.

The aim of Government is to manage risk so as to reduce the threat to people and their property from flooding and coastal erosion by employing an integrated portfolio of approaches which reflect both national and local priorities whilst delivering the greatest, social, environmental and economic benefit, consistent with the Government's sustainable development principles. (Reference 2)

Government (through Defra) provides the majority of funding for risk management activities in the form of Grant in Aid administered by the

¹⁵ It is possible that this guidance will be used for appraisal funded by other government departments in the future.

Environment Agency. The Environment Agency have the main responsibility for delivering risk management as well as a supervisory role¹⁶ for all types of flooding and can allocate funding to other authorities. Appraisal provides the business case to ensure that risk management activities undertaken are justified and that alternative options for managing risk are properly considered. Defra Ministers set targets against outcome measures to provide clarity on what policies and funding for coastal erosion risk management are intended to achieve. Decisions on the best mix of activities to deliver will be left to the operating authorities who are best placed to make these judgements.

All activities must comply with relevant legislation. (See Section 7)

Appraisal should be consistent with flood and coastal erosion risk management policies and other government policies (see Section 7) including through the development of multi-objective schemes. Other policies may offer opportunities as well as constraints.

1.3 Sustainable development

Sustainable development is to be firmly rooted in all flood risk management and coastal erosion decisions and operations. Full account must be taken of the social, environmental and economic pillars of sustainable development and arrangements should be transparent enough to allow all to see that this is the case.

Sustainable Flood and Coastal erosion risk management appraisal should be based on:

- A strategic and holistic approach to identifying problems and solutions including social, economic and environmental aspects.
- Taking a long term and whole life design approach considering and adapting to the effects of climate change.
- Proper consideration of the “do nothing” or other baseline option such as no active intervention.
- Adopting a broad portfolio of structural and non structural solutions that are resilient to changing risks and where possible work with or re-establish natural processes including the use of adaptive approaches.
- Technical issues relating to ease of maintenance, sourcing of materials and complexity of design and skills and expertise available.

Health and Social Justice considerations for Sustainable Development

Social justice, inclusion and human health and wellbeing should be reflected in appraisal. The appraisal process should seek to engage stakeholders in deciding which risk management approaches are adopted. The basis on which decisions are made should demonstrate fairness and be open and transparent.

¹⁶ Announced by Ministers in June 2008.

Environmental consideration for Sustainable Development

Flood and coastal erosion risk management has a significant impact on the natural, historic and cultural environment. The Government's investment in flood and erosion risk management (through operating authorities) must contribute to meeting its environmental objectives. Appraisal should describe and value the services provided by the natural environment of all alternative options under consideration thereby providing a framework for sound decisions based on a full awareness of the impacts. Strategic environmental assessment (SEA –reference 1) and environmental impact assessment (EIA) have important roles to play in describing both the positive and negative effects of options. Multi-criteria analysis (see section 5.2) may be used to provide a structured way of comparing those impacts that cannot easily be valued in monetary terms in an integrated fashion with cost benefit analysis.

Technical soundness, skills and knowledge for sustainable development

Operating Authorities should use sound technical analysis and principles in all their work based on accepted scientific and technical understanding that exists at the time. They should build on their skills base so that they are recognised as a competent deliverer and expert in their field to have credibility with both stakeholders and the public. Understanding and knowledge should be expanded through research and development, where necessary. Suitably qualified and trained staff should undertake all work where the use of such skills is necessary.

1.4 Consideration of Climate Change

There is growing evidence that climate change is contributing to rising sea levels and will affect future patterns of rainfall and flooding -and may already be doing so. Flood and coastal erosion risk management activities are planned to operate over a long timeframe and appraisal should use the best information available to assess the effects of climate change for the whole life of a project. Adaptive approaches should always be considered. Defra will continue to work with Operating Authorities on guidance for taking account of the effects of climate change.

2 Appraisal within a risk based approach

2.1 The risk based approach

Approaches used to manage risk from flooding and coastal erosion events must take account of the characteristics of these intermittent, variable, highly uncertain and sometimes extreme natural phenomena.

A risk based approach should be taken involving the assessment and management of risk, that considers both the impacts and probability of flooding and coastal erosion.

Probability in a changing climate

At the present time the policy is to make assessments of probability from past events and project forward using best available information on climate change and related changes. Our understanding of these impacts is developing and advice may change as scenario modelling approaches become better developed and more reliable though they will raise broader policy issues.

Assessment of consequences

A full range of consequences (damages or positive impacts) must be assessed taking into account the long term social, economic, and environmental benefits and cost - See Section 4. below.

Risk as a combination of Probability and Consequence

In order to enable a consistent comparison of different combinations of impact and probability to be made between different locations a risk neutral approach should be taken. [for example: £1 of damage with a 100% probability is equivalent to £100 of damages with a 1% probability]. There may be exceptions to this principle in limited cases such as those involving very large national losses¹⁷ or to provide greater consistency between different communities.

2.2 Risk Assessment

Strategic national and regional risk assessments will provide information on levels of risk and, should provide a consistent basis for targeting more detailed assessments and investment and should be regularly reviewed. These also provide an overview and the basis for justification of national funding levels and policy reviews. Where detailed assessments are carried out there should be arrangements to feed the results back into subsequent updates of the broader risk assessment.

All types of risk (economic, social and environmental) must be assessed using good practice approaches and on a comparable basis including the impact of extremes.

2.3 Risk management

¹⁷ Exceptions will be considered in Long Term Investment Scenarios (LTIS)

The full range of risk management options and phasing of these should be considered to facilitate adaptation to future risks.

Risk management activities should only be undertaken where justified through appraisal which meets the aims and objectives of flood and coastal erosion risk management policy and satisfies legislative requirements.

2.4 Managing Residual Risks

All risk management solutions must include arrangements to deal with residual risks (for example when the design limits are exceeded).

3 A strategic framework for risk management

3.1 The strategic framework approach

The development of a comprehensive network of shoreline management plans (SMPs reference. 4) and catchment flood management plans (CFMPs, reference 3) should be the foundation of a frame work for effective and sustainable long-term risk management for all types of flooding and coastal erosion. These should set out the more detailed policy direction and planning stages necessary to achieve the required flood and coastal erosion risk management in these areas

3.2 Stages in the Strategic Framework

CFMPs and SMPs will form the large scale holistic view of risk management requirements at the catchment or coastal process scale, beneath which medium scale strategies (where necessary) and local scale risk management activities will be developed.

Appraisal should be undertaken in a proportionate way at each stage in the framework development where decisions need to be made. All potential impacts and options should be considered to a level of detail and geographic scale appropriate to the decision required.

Risk management approaches that are identified at the catchment or coastal scale as being particularly sustainable should feed down and inform more detailed plans. This will help identify viable opportunities for working with natural processes and for collaborative projects and streamline the planning process. The strategic approach should also be the basis for apportioning impacts, benefits and costs that are realised or incurred over an extended area or period of time.

3.3 Co-ordination with other planning initiatives

Shoreline Management Plans (SMPs) and Catchment Flood Management Plans (CFMPs) should make early links with other relevant plans. The findings from flood and coastal erosion plans should also be used to influence other plans in an iterative cycle.

3.4 Responsibility for undertaking planning within the strategic framework

It will be the role of the relevant operating authorities to prepare flood or coastal erosion risk management plans.

3.5 Periodic Review

All large-scale and strategic plans should be subject to periodic review. The European Directive on the Assessment and management of flood risk requires a minimum six year review cycle (for plans identified under this directive) but this may be adjusted downwards if there is a need to take account of particular external factors or the time scales of specific changes are particularly short. A plan or strategy should be extended at the time of the

review to maintain its time frame (e.g. a further 100 years from the review date for a 100-year strategy).

4 Principles for Appraisal

4.1 Requirements for the Appraisal process

Basis for Appraisal

All appraisals relating to public expenditure should be consistent with Treasury Guidance - "Green Book, Appraisal and Evaluation in Central Government" (reference 11). Where expenditure forms part of a large programme of work in a particular area such as Flood and Coastal erosion risk management it is appropriate for a Department to provide more specific guidance.

For all levels of appraisal within the strategic framework, the Green Book approach should be followed including:

Setting the Objectives (Section 4.2, 4.3, 4.4)

- Defining the problem (using risk assessment), identifying key issues and setting clear aims and objectives.

Appraising the Options (Section 4.3)

- Identifying and developing options, data gathering and analysis, consultation,
- Evaluating and comparing all the pros and cons (benefits and costs) of options and short listing viable options to develop a best value for money solution. (Section 4.4)

Developing and implementing the solution (see Section 5)

- Determining the preferred option that presents best value for money and meets the objectives and clearly presenting the rationale and decision to adopt this.

This process must use economic, social, environmental and technical considerations at each stage to build up a comprehensive appraisal that pulls together all the relevant information, leading to logical decision making and option selection. The degree of detail involved at any level must be proportionate to the complexity of the problem and the information required to reach a decision and demonstrate robustness.

Monitoring and Evaluation

The Green Book provides guidance on requirements for monitoring and evaluation which are applicable to investment in flood and coastal erosion risk management and should be referred to. (See also Section 6.2)

4.2 Understanding the problem and setting objectives

The Green Book States:

"Objectives should be stated so that it is clear what proposals are intended to achieve. Objectives may be expressed in general terms so that the range of options to meet them can be considered. The objectives of individual proposals should be consistent with statements of government policy, departmental or agency objectives, departmental Public Service Agreements (PSAs), and wider macro-economic objectives." (Section 4.2)

The Government's Making Space for Water Strategy (2005) provides the following overall aim for all flood and coastal erosion risk management:

To manage the risks from flooding and coastal erosion so as:

- To reduce the threat to people and their property

and also:

- **deliver the greatest environmental, social and economic benefits consistent with the Government's sustainable development principles**

by employing:

- **an integrated portfolio of approaches which reflect both national and local priorities."**

Location specific objectives should be established from understanding the local flood or coastal erosion risk problem and key issues, by looking for collaborative opportunities and through consultation with all stakeholders.

The role of Outcome measures and targets set by Government is explained in Section 5.3.

Statutory Requirements also act as objectives where relevant, these include:

- Health and safety requirements which might affect changes required to FM infrastructure.
- Meeting the requirements of the European Birds and Habitats Directive
- Compliance with the requirements of the Water Framework Directive. (see Section 7)

Contributing to and collaborating with other organisations objectives

Opportunities for projects that provide multiple benefits and therefore improve value for money should be sought. In collaborative projects contributions to the costs from different parties should be in proportion to their relative benefits.

Identification of problems and key issues

An holistic, proportionate and affordable approach should be taken to identifying the relevant problems and key issues.

Establishment of appropriate boundaries

All major processes, impacts and consequences of the risk management decisions need to be captured within the geographic area considered.

Establishment of an appropriate time frame

An understanding of the dominant physical processes should be the basis for determining an appropriate timeframe for risk management decisions, though a 100 year period should be the default for most major investments.

Discounting techniques as recommended in the Treasury Green Book should be used to bring all costs and benefits to a current value based on a discounted accumulation of all the benefits and costs over the whole life being considered. Proper account should be taken of any residual benefits beyond the anticipated scheme life and any sunk costs incurred before starting.

Review of current data and knowledge

All appraisals should be based on the best knowledge available.

4.3 Identifying potential solutions and Appraising the Options

Scenario for the baseline option

A baseline option should be selected to effectively test the case for new investment. A consistent baseline should be defined to provide for prioritisation between projects.

Identification of significant opportunities/constraints

Major opportunities and any real constraints should be identified at an early stage in the strategic planning framework. Innovative approaches and lateral thinking are expected to develop the full range of potential opportunities.

Identification of options

All reasonable and significant options to address the objectives should be investigated, including an appropriate range of both structural and non-structural risk management solutions, individually or in combination. This must include options identified in more strategic plans (where these apply) that offer sustainable approaches to risk management at the wider scale.

Short listing and development of viable options and screening out unviable options

The reasons for short-listing and rejection of options should be appropriately documented to ensure transparency of subsequent decision making. The short list must always include the “do minimum” option. Unviable or less sustainable options already discounted in more strategic plans should not normally be revisited although should be documented. Appraisal Summary Tables are recommended as an aid in this process.

4.4 Appraising the Options

Valuation of Costs and Benefits

Approaches set out in the Treasury Green book should be used for the valuing costs and benefits.

As a rule all benefits and losses (costs) in an appraisal should be based on current valuations regardless of when that benefit or loss occurs in the appraisal period. This principle will ensure consistency in approach between all types of benefit and loss and between different schemes and avoid speculation of future inflation rates or valuation changes. Exceptions to the

use of current valuations would be where there are known future changes in policy or developments planned. Future policy on adaptation to climate change may require further guidance to be provided in this area.

For substantial proposals, the relevant costs are likely to equate to the full economic cost of providing the associated goods and services, and for these proposals, the full economic cost should be calculated, net of any expected revenues, for each option. In order to test the economic efficiency of different options on a comparable basis, it is necessary to discount all of the costs and benefits from the time when they arise in the future, to their present value. The Treasury sets the Test Discount Rate that shall be used to appraise public sector projects.

Beneficial impacts, costs, losses and negative impacts

Valuation should include all direct and indirect beneficial impacts, costs and negative impacts required to achieve the identified objectives for all options, whether monetarised or not, clearly identifying and describing all non-monetarised impacts and whether or not they are likely to be funded from flood or coastal defence allocations.

Standard approaches should be used for assessing benefits where possible to ensure consistency within and across different appraisals such as those recommended in The Benefits of Flood and Coastal Risk Management Manual. (Reference 8)

Section 8 provides guidance on the policy of valuation of some benefits and aspects where Treasury guidance is not specific including:

- Distributional adjustments
- Taxes and Transfer Payments.
- Dis-aggregation of benefits and costs.
- Use of optimism bias.
- Capping of property damages
- Valuation of land including potential development benefits.
- Ecosystems and the services they provide.

Valuing the Environment

Environmental benefits and damages should be valued using an ecosystems services approach that values the natural environment by looking at the range of benefits it provides to people and how these might change. Where any proposals change the ecosystem services provided, these changes should be measured to provide a value of the impact, thereby providing a comprehensive assessment of the impacts of all changes due to management actions.

Environmental assessment

Flood and coastal erosion risk management plans, strategies and projects will require **either** a strategic environmental assessments (SEA) **or** environmental

impact assessment (EIA) to comply with legislation. These assessments will provide a consistent approach to describing environmental impacts and should be integrated with and used to inform the appraisal process. Section 7 describes the legal requirements for designated sites.

Risk and sensitivity analysis

Sensitivity testing should be used at all stages of planning and appraisal to inform on the relevance of issues or uncertainty of data to making decisions. Analysis of risk and sensitivity should play a significant role in option assessment.

5 Principles of decision making

(Developing and Implementing the solution)

5.1 Selecting the Preferred Option

Flood and coastal erosion risk management has to compete with other areas of public expenditure. Hence the aim of the flood and coastal erosion risk management programme is to obtain best value for money for the whole programme within the constraints inherent in best practice appraisal, government policy and overriding external factors. Selection of the preferred option must therefore be consistent with this aim.

5.2 The Decision Process

All major risks and uncertainties that could affect the final choice of option should be identified and considered.

Projects are only economically viable if the benefits provided robustly exceed the costs (i.e. the ratio of benefits to costs is greater than 1). If **all significant factors** in the project appraisal can be satisfactorily expressed in monetary terms then benefit-cost (B/C ratio) considerations are the most appropriate basis for selecting the preferred option.

The use of incremental benefit-cost ratios can be used to justify additional risk reduction measures where this is robustly greater than 1 and compares favourably with other nationally funded projects.

Where there are significant factors that cannot easily be valued in money terms, Multi-Criteria-Analysis (MCA) should be used to inform the decision making process.

The principles of BCA and MCA are the same and should be robustly applied with equivalence in:

- the quality of valuation techniques,
- avoiding double counting,
- appropriate use of discounting or its effects,
- comparison with a baseline option

Where the decision process leads to a preferred option that is not the optimum in monetarised benefit /cost terms (although the benefits should still significantly outweigh the costs) - this should be clearly indicated in the appraisal report and a rationale given. In all cases the distribution of the costs and benefits amongst different groups should be transparent and may influence the decision Process.

5.3 Other considerations in decision making

Legal obligations

In general where there are clear legal obligations the presumption should be in favour of selecting the least cost option of achieving the required outcome. Cost-effectiveness analysis is the recommended means of appraising options in these circumstances. However there is still a need to consider the wider implications of such decisions and a full assessment of all the costs and benefits of meeting the legal obligation will be required to inform the decision making process. Options that are more costly than the least cost option may be justified on the basis of incremental benefits.

Contributions to funding from third parties

Voluntary contributions of funding to projects should be encouraged and maximised to allow more risk management to be provided but this must only influence the timing of work and should not enable an otherwise uneconomic project to be taken forward.

Transparency and Accountability in Decision Making

Operating Authorities must be accountable for the decisions they make and transparent in the way they take and communicate these decisions.

Role of government outcome measures and targets.

A suite of outcome measures for flood and coastal erosion risk management has been developed and published by Defra (June 2007) to provide greater clarity over what policies and funding for flood and coastal erosion risk management are intended to achieve. Targets were set for the capital improvements (Feb 2008) and are intended to be extended to other aspects of the programme to ensure that the overall programme delivers a range of outcomes that reflect Government Priorities.

The outcome measures and targets will operate at the programme level and should primarily influence the selection and prioritisation of projects to be implemented rather than the appraisal of individual plans and projects. (see also Section 5.2).

Prioritisation

A fair and transparent system is required to determine how and where funding for flood and coastal erosion risk management activities should be allocated and prioritised in order to realise the outcomes expected by government. Defra will agree suitable arrangements for prioritisation with the Environment Agency including arrangements to encourage voluntary contributions and ensure cost efficiency.

6 Public consultation, governance and security

6.1 Public Participation and Consultation

Operating Authorities should ensure that arrangements are in place for effective public participation and consultation procedures to achieve transparency and full engagement of all interested parties.

All decision making and appraisal documents should be made available in the public domain.

6.2 Governance and Scrutiny

Operating Authorities must have in place effective and independent arrangements to assure the quality of the appraisal, approval processes and governance of decision making.

Defra will review a sample of appraisals after they have been approved at all levels in the strategic framework for the purposes of programme and policy evaluation.

Evaluation reports should be widely disseminated and published, where appropriate, to contribute to the knowledge base upon which future decisions will be taken.

7 Legislative requirements and synergy with other government policy

7.1 EU Policy and legislation

Water Framework Directive (WFD)

All flood and coastal erosion risk management activity must comply with the Directive 2000/60/EC of the European Parliament and of the Council- the Water Framework Directive that was transposed into English law in 2002 (reference 5). The Environment Agency is delegated as the competent authority to implement the requirements in England. The WFD aims to protect the ecological quality of all inland and coastal waters. Change must generally address the objective of no deterioration to water bodies, particularly that of high status and contribute to the achievement of good status. A proportionate approach should be taken to satisfying these requirements. Appropriate use should be made of alternative objectives available and the over-riding public interests of flood and coastal erosion risk management activities conditional on these being undertaken in a sustainable manner. Operating Authorities must have arrangements in place including guidance and good practice approaches to help them to comply with the requirements. Where flood and coastal erosion risk management activities have the potential to further the objectives of the Directive, this is encouraged through the operation of multi-objective partnerships and projects.

European Directive on the Assessment and Management of Flood Risks.

All flood and coastal erosion activity must comply with Directive 2007/60/EC of the European Parliament and of the Council for the Assessment and Management of Flood Risks (ref). This legislation must be adopted into English law from November 2009. The Environment Agency will implement the requirements in England¹⁸.

The legislation requires a three stage approach to managing all types of flooding. The initial stage is a simple risk assessment to determine where significant flood risks are likely and must be completed by 2010. The second stage is to map these significant flood risks by 2013 and the third stage is to prepare plans to manage the risks by 2015. There are requirements for the co-ordination with the Water Framework Directive including the incorporation and exchange of information with River Basin Management Plans and relevant interested parties. In England these requirements are largely complimentary to existing risk assessment, flood mapping and planning currently undertaken or in the process of being developed (including Catchment Flood Management Plans (CFMPs) and Shoreline Management Plans (SMPs) and others such as those for Urban Drainage plans). As far as possible England will use the existing arrangements designed to meet

¹⁸ Subject to formal legal implementation by Nov 2010.

national circumstances including CFMPs and SMPs to address the Directive's requirements.

Environmental Assessment

An **environmental impact assessment (EIA)** is legally required for any land drainage or coast protection scheme that is likely to have a significant effect on the environment.

For high level plans and strategies a **strategic environmental assessment (SEA)** should be carried out in line with the approach described by in the Directive 2001/42/EC of the European Parliament and European Council *on the assessment of the effects of certain plans and programmes on the environment* (the SEA Directive)

A competent authority must make an **appropriate assessment** of any plan or project **if** it is likely to have a significant effect on a European site (e.g. Special Protection Area, Special Area of Conservation or Ramsar site) unless it is directly connected with or necessary for the management of the site. This assessment is to ascertain whether the plan or project will adversely affect the integrity of the European site.

7.2 Other relevant legislation

Other relevant legislation includes the Habitats Directive, Planning, Health and Safety and Human Rights. This list is not exhaustive and different aspects of legislation will apply in different circumstances.

7.3 Synergy with other government policies

Appraisal for flood and coastal erosion risk management should seek to work with other government policies including through the development multi-objective schemes. Most other relevant government policy has been developed with consideration of Flood and Coastal Erosion risk management. Other policies may offer opportunities as well as constraints.

Planning policy

Links between planning policy and flood risk management have been strengthened in recent years and Planning Policy Statement 25 (PPS25) on Development and Flood Risk (2006) sets out a framework for delivering this.

There should be a two way dialogue during the development of CFMPs, SMPS, strategies and schemes and Regional Spatial Strategies, Local Development Documents and Strategic Flood Risk Assessments. Flood and coastal erosion risks should influence long term redevelopment of existing as well as new developments.

Agriculture policy and Rural Development and Forestry

Where possible, flood and coastal erosion risk management activity should support government policy on agriculture and rural development and forestry and be consistent with the targets and priorities established. During planning phases work with Government Offices, landowners and rural communities

should be undertaken to ensure any opportunities for multiple objective projects are identified. New approaches to managing risk particularly resilience measures and in some cases adaptation, are expected to be suitable for dispersed rural or coastal communities.

Soil condition and land management practice issues

Flood risk management activity should support government policy on soils protection. Soils form an important element of the natural water cycle by storing and transferring rain water before it enters drainage channels and rivers. Maintaining or restoring good soil condition and ensuring that soils are not unnaturally eroded will ensure that land management effects are not generating extra flooding problems. Soil condition effects on additional flooding are considered to be relatively small for major floods and at the catchment scale. Locally, soil effects can cause significant and more frequent flooding, soil erosion and sediment problems.

Whilst it is unlikely that flood management alone could provide sufficient justification for independent action to improve widespread poor soil conditions where they exist, there is likely to be more justification where benefits to water quality, fisheries, transport flood risk and others are considered together in a combined or multi-objective plan (see Section 4.2).

Carbon – Social Costs of Carbon

Defra provides guidance on how to value greenhouse gas emissions in government appraisal, which currently adopt the idea of the shadow price of carbon and how it can be considered to ensure that climate change impacts are taken into account.

8 Additional policy on particular aspects of valuation

Some aspects of Treasury Guidance are non specific although warrant consistent application to appraisal for flood and coastal erosion. Defra will work with operating authorities on more detailed guidance where necessary.

The following policy guidance is given on such aspects and should be applied by Operating Authorities:

- Taxes and other transfer payments should be excluded from the economic costs. The exception to this is where a proportionate approach should be made for very small (de-minima) adjustments.
- Costs and benefits should be presented separately (disaggregated) to show the different beneficiaries and financial contributors or those who lose out from a preferred option to take forward. This information should be used to identify potential contributors and indicate the fairness of decisions to different groups.
- The use of methods to avoid optimism bias should be applied consistently to all costs.
- Basis of valuations – monetary costs and benefits should have socio-economic equity and appraisal of human related intangible impacts (Distributional Adjustments) applied where this is feasible. See Defra appraisal Guidance Note July 2004 (reference 14).
- Treatment of Agricultural Land (valuation) – See Defra Appraisal Guidance note May 2008.
- Risk to People – See Defra Appraisal Guidance note May 2008.
- Treatment of climate change impacts – Defra Appraisal Guidance note Oct 2006.

Valuing losses to property including capping damages resulting from flooding or coastal erosion

At the present time and for consistency in baseline assessments, current land uses and property occupancy should normally be considered to continue for the duration of the appraisal period. Implicit in this assumption is that values applied to these should be based on current values even when these apply to activities at some point in the future. This will ensure consistency across the valuation of different aspects even though it may not reflect the values that some elements may acquire in the future.

Usually “permanent” buildings which are at risk of total loss from flooding or erosion during the appraisal period should be valued at their current market value, excluding any adjustment in value for the erosion or flooding risk. The

value of damages to property or goods from the expected cumulative effects of floods or the one off loss from erosion over the life of a scheme should not exceed (e.g. should be capped at) the current market value of a similar property not at risk. The value of a similar property should not be enhanced by particular features such as a sea view or riverside location. As a general rule the valuation techniques applied should not work contrary to objectives for long term sustainability including viable means of adapting to risks.

Valuation of Land within the Geographic area of the Appraisal

The value assigned to land not occupied by property should normally be that associated with the current use of the land and the cost of retaining it. Where land is used for Agricultural purposes the valuation should be based either on the current market value less adjustments for transfer payments or taxes if the land is being abandoned or value of the loss or increase to production where land is temporarily affected. Defra will work with Operating Authorities to provide guidance on Agricultural land valuation. Land used for recreational or environmental purposes should be valued on the basis of the damages or benefits that flooding or erosion will have on the services that these provide using the Ecosystem services approach.

Brown field sites or areas of land should not be valued on their development potential but on the basis of the damages that flooding or erosion would cause to their current use. The exception to this may be if there is full planning permission in place and it complies with PPS25 (Ref. 12) in which case the valuation would be on the basis of the proposed land use. The primary reason for this exclusion is to preclude Government funding of works which would enable land to be developed for private gain. The precautionary principle should be applied to identifying development in risk areas. Generally it is undesirable to create new risks and restrictions on the future management options of the area.

Valuing Flood Warning Benefits

The flood warning service in England is provided by the Environment Agency as part of a combined local and national service aiming to have comprehensive coverage where practicable. Costs and benefits can be difficult to disaggregate to specific locations although the following general principles should apply:

- an allowance for the benefits and costs of existing flood warning services should be included in appraisal.
- where the provision of a flood warning service is unlikely to be effective or currently feasible as in the case of rapid response catchments where less than two hours warning can be given - this may need to be taken into account in the appraisal process as an additional social issue.
- where new flood warning services form part of a risk management option the costs and any additional benefits over those of existing services should be included in the appraisal. This might occur where flood warning and resilience measures are required to act together.

Annex 1 Descriptive and Explanatory Text to support the policy statements

1.0 Background to Appraisal

Purpose of the Policy Statement

The policy statement is to inform operating authorities in England, principally the Environment Agency, Local Authorities and Internal Drainage Boards, other stakeholders and the wider public of the Government's objectives and expectations for the use of appraisal in flood and coastal erosion risk management. It promotes a sustainable approach to the management of risk from flood and coastal erosion that is consistent with Treasury guidance and takes account of other government policies on sustainable development (including climate change and adaptation), planning, social justice and environmental protection. This guidance informs Operating Authorities how they should address these requirements in a rigorous, coherent and open manner.

The appraisal process is one of the most important tools which government can use to achieve a range of its policies. There is a government expectation that public funds expended on risk management activity will be spent wisely and achieve best value. Appraisal provides a structured way of achieving this.

1.2 Policy context

The aim of policy is to assess all types of flood and coastal erosion risks and manage them in a sustainable and integrated way in order to reduce their harmful effects. The aim of policy is also to help achieve other benefits whilst undertaking risk management where this is feasible.

During 2007/08 flood and coast operating authorities in England and Wales spent approximately £500 million to manage risks along our rivers, estuaries and coastline. Over the next decade and beyond the amount of expenditure is likely to rise to address increasing acknowledgement of the risks from flooding and coastal erosion. Operating authorities are required to use the powers conferred by legislation to assess and manage the risk, more recently through the development and implementation of high level plans, strategies and schemes and maintenance regimes - together with flood warning and emergency response plans and co-operation with planning authorities. All activities should be consistent with government policy and comply with all relevant legislation. Annex 1 provides information on other government policies which have potential synergies with flood and coastal erosion risk management.

Legislative context

Under the legislation for England covering flood and coastal defence activity (see Section 7 of the headline policies for more details), there is no general requirement for operating authorities to provide protection from flooding or coastal erosion. The legislation permits such activity, (called- permissive

powers) but there are also instances where defence activity is required by law, such as along the Thames through London.

European legislation (Directive on the Assessment and Management of Flood risk, Ref. 7) was introduced in Dec 2007 requiring maps and plans to be prepared for managing areas at significant flood risk. This legislation does not extend to coastal erosion risk. However the undertaking of work to implementation of these plans will remain within the context of permissive powers.

In addition to legislation providing permissive powers to Operating Authorities to take action to manage flood and coastal erosion risk there is also a significant body of legislation that these activities must comply with including the Directive on the Assessment and Management of Floods, Water Framework Directive,(see Section 7 of the headline policies for more details) , Strategic Environmental Assessment Directive, Birds and Habitats Directive, Health and Safety , Human Rights Act.

Justification for Funding

Government provides the majority of funding for flood and coastal erosion risk management in the form of Grant in Aid administered by Defra. This funding is dependent on Operating Authorities demonstrating a robust business case for risk management activities based on the assessment of the risk and the overall costs and the benefits, taking into account health and wellbeing and social justice, economic and environmental issues as well as sustainability and technical feasibility. Appraisal is the recommended approach to developing a rigorous business case for expenditure that demonstrates:

- Identification of the most appropriate risk management solution based on a full assessment of impacts.
- Full consideration of cross government policy and sustainable development issues including climate change.
- Best use of public money.
- Transparent, balanced decision making.
- Compliance with legislative requirements.

1.3 Sustainable Flood and Coastal Erosion Risk Management.

A commonly accepted definition of 'sustainable development' is:

'Development which meets the needs of the present without compromising the ability of future generations to meet their own needs'. This was defined in the new Government UK Sustainable Development Strategy, Securing the Future, published in March 2005.

A Joint Defra/EA research project. (Reference 13) used the principles and priority areas in the 2005 strategy and sustainable development aims in MSW (2005 reference. 2) to develop a set of principles for sustainable flood and coastal erosion risk management. These provide a basis for reviewing how appraisal should be undertaken to take account of sustainable development objectives.

The following approaches are those which will have the most influence on achieving sustainable outcomes from appraisal.

- A strategic and holistic approach to problem identification and project appraisal is most likely to ensure that all relevant issues have been addressed. Taking proper account of these issues and establishing sustainability as one of the strategic aims when exploring a wide range of solutions is likely to result in the identification and development of sustainable options.
- Taking a long term and whole project-life design approach is most likely to result in options being developed which naturally meet all types of sustainability criteria including technical, environmental, social and economic including anticipated effects of climate change. Decisions based on whole life costs and benefits including phasing rather than at the short term will give a truer comparison between options and is more likely to favour sustainable options.
- Proper consideration of the “do nothing” or other baseline option is a critical step in the process to identifying sustainable options. The assumption that “something must be done” is a common mistake and can lead to the introduction of a non-sustainable regime of work.
- Considering and adopting a broad portfolio of structural and non structural solutions for managing flood and coastal erosion risk including approaches suitable for the management of all types and frequency of flood risk. Planning controls, resilience and resistance measures will have a greater role in managing risk than in the past. (See also section 2.3) Approaches that work with natural processes and adapt to them rather than fighting against them can improve both the resilience and sustainability of protection measures and river and coastal habitats. In some cases this will mean that natural processes such as coastal erosion should be allowed to continue. This will sometimes involve difficult decisions to be made where property cannot be protected. Government is developing new policies on to help individuals and communities adapt to these circumstances.
- For technical soundness when it comes to looking at construction processes the relative maintenance demands of technical solutions, the long-term availability of equipment, sourcing of materials and even the mode of failure or ease of demolition and potential for eventual recycling of materials are aspects of sustainability that may need to be considered in the design process.

Sustainability is an issue which affects all aspects of project appraisal. If appraisal is undertaken in a way that is consistent with the principles above it is likely that the development and selection of sustainable options for risk management will be achieved on merit.

Health considerations for sustainable development.

Appraisal has always included the valuation of things that are important to people such as the financial losses from damage to homes and belongings or disruption to transport and services and the value of flood warning services. Recently this has been broadened to include values for health and well being, through:

- Valuation of health and stress impacts that can result from flooding.
- The value of risk to life where particular hazards could pose a threat or where people are particularly vulnerable.
- The use of Multi-Criteria Analysis techniques (see Section 5.2) can help the decision process take more account of issues where there may be difficulty in quantifying them

Social justice and fairness considerations.

Social justice and inclusion issues can be addressed both in the way that impacts are valued and in the way that those undertaking risk management communicate and involve people in the process as follows:

- Adjusting damage values to enhance those in disadvantaged areas and lower them in affluent areas provides a more equal comparison and hence improves social equity. Treasury guidance provides information (use of distributional impacts) on the relative values to different income groups. Having information on the benefits and costs of solutions separated (disaggregated) can help ensure that different groups or individuals are identified as winners or losers and that other social equity issues can be considered (see Section 8. of headline policies).
- Improved public participation, engagement and openness will enable more involvement of people who may be affected in the development of risk management solutions (see section 6.1).

As our understanding of these issues improves it is likely that approaches may change in the future.

Environmental Considerations for Sustainable Development.

Considerable progress has been made towards better understanding of the vital role that the natural environment has in contributing to the economic performance of the country and wellbeing of people. Environmental assets, e.g. wetlands, woodlands and healthy rivers – like other assets – can provide benefits which enhance economic performance, offer new opportunities for investment and employment, and improve living standards and quality of life.

Appraising the impacts of flooding and erosion on the natural environment is a different proposition to accounting for the effects on property and the built environment. Flooding and erosion are natural processes which give rise to much of the diversity and character of the landscape. Without these processes the world would be a very different place. Resisting or stopping flooding and erosion can be a mixed blessing for the natural environment. Whilst there may be some benefits there are also likely to be more general adverse effects. Natural systems are adapted to and in many cases rely on flooding or erosion to sustain them.

Defra's natural environment Public Service Agreement (PSA) to secure a healthy natural environment for today and the future, explicitly calls for the value of the services provided by the natural environment to be reflected in decision-making through use of the ecosystems services approach (see Section 4.4). Environmental Impact Assessments (EIA) and Strategic Environmental Assessments (SEA) are legislative requirements that can apply to FCERM activities. These requirements should be used to ensure that impacts on the environment and opportunities to improve it are properly assessed and taken into account.

Technical soundness

Appraisal and the development of sustainable solutions for the management of flood and coastal erosion risk require a high level of understanding across a range of technical and scientific skills. Flood and coastal erosion risk assessment involves understanding combinations of dynamic natural processes that occur with uncertain statistical probabilities and assessing the damages that these can cause. The planning and design of risk management infrastructure and approaches has to take these factors into account and others such as impact on wildlife and habitats, health and safety to the public, long term performance under extreme conditions. Effective risk management will only be achieved through competent application of these skills by experienced practitioners. Operating Authorities will have to ensure that an effective skills base is maintained to take overall responsibility for flood and coastal erosion risk management supported by skills and knowledge of specialist consultants, industry and the academic community.

Taking account of climate change

Climate change is thought to be very likely to increase flood and coastal erosion risk. How we react and respond has the potential to affect our exposure to risk and may even be able to help mitigate the effects of greenhouse gases. It is therefore very important that both adaptation and mitigation to climate change is given full consideration in appraisal. Defra provides guidance on how to value greenhouse gas emissions in government appraisal, which currently adopt the idea of the shadow price of carbon and how it can be considered to ensure that climate change impacts are taken into account.

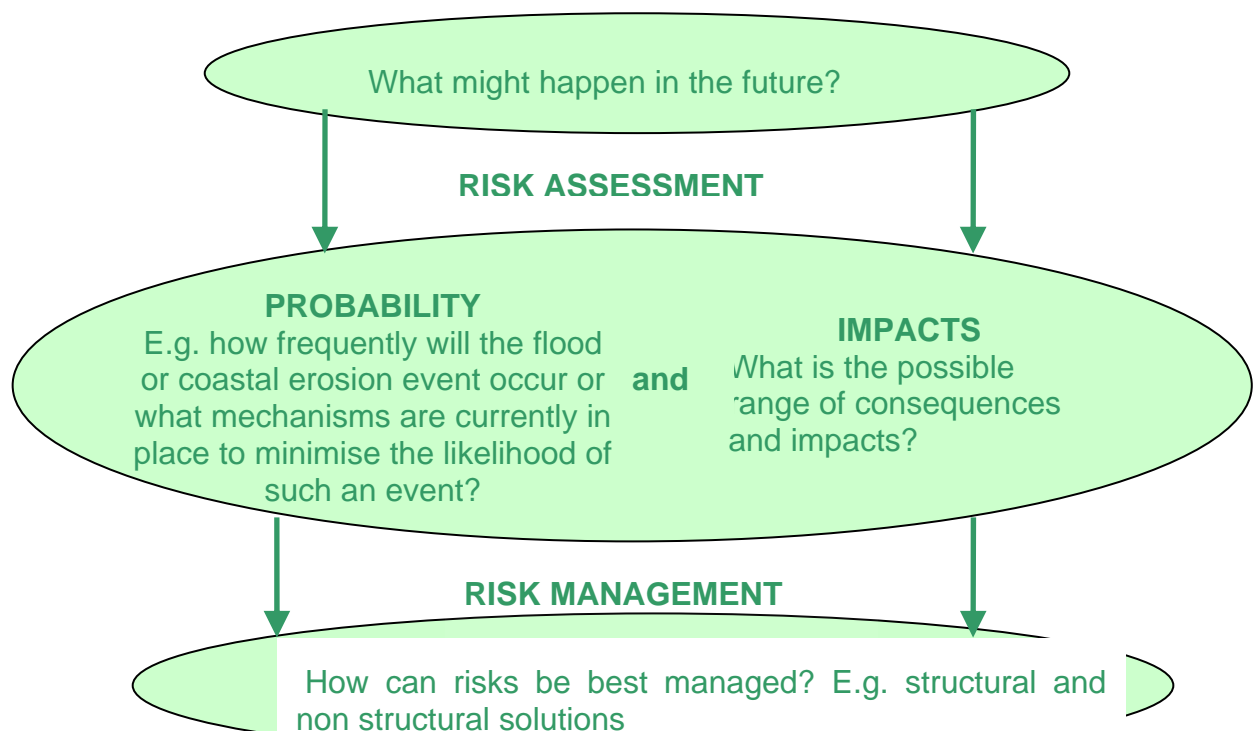
2.0 Appraisal within a Risk Based Approach

2.1 The Risk Based Approach

A risk based approach is regarded as the most effective and proportionate way of assessing and managing the potential dangers and harmful consequences of natural phenomena such as flooding and coastal erosion. It can be used for new proposals as well as reviewing existing assets.

Managing risks from flooding and coastal erosion is not only about seeking to defending people and property in the short term. By looking to understand risk more fully and use a broader range of solutions that give a range of long term benefits, responses that are not sustainable should be avoided. This includes ensuring that neither flood and coastal erosion risk management actions nor those of others, are allowing people, the economy or the environment to unknowingly put itself at additional risk without considering the consequences.

The risk based approach is concerned with the following questions:



Risk is a well established concept and usually defined as a combination of the probability and consequences of an event.

The diagram above shows how asking the initial question of- "what might happen in the future?" first requires an assessment of the risk in terms of both the type of impacts and their chance of happening (e.g. probability). Subsequently consideration is given to what could be done to change one or both of these to manage the risk in an acceptable way.

Adopting this risk based approach to managing flood and coastal erosion requires a good understanding of the relative risks from a national to a local scale over long time periods. This is a fully pro-active and informed approach

as opposed to a reactive one e.g. reactive would be that we only did things after flooding has occurred. It is unreasonable to expect to remove all flood and coastal erosion risks, however use of a risk based approach should lead to a range of measures to manage and reduce the risks before they happen and prioritised so as to deal with higher risks first.

To be effective, the operating authorities should assess the risks (the aggregation of probabilities and consequences), decide how to manage these (striking a balance between social and environmental needs and costs), implement their decisions to achieve best value and review from time to time both the outcomes and the ongoing implementation and have processes in place to monitor risks and ensure access to reliable, up-to-date information about risk.

Understanding Probability

Assessing how often rare events such as severe flooding and coastal erosion are likely to occur is complex and unlikely to be precise. The effects of climate change are likely to add to this uncertainty. Currently it is not possible to predict how weather systems will behave over years or decades into the future, however statistical analysis of weather records can indicate how likely different rainfall or sea storms are within these periods of time – this is called their probability. An understanding and correct use of the concepts of probability for rainfall, river flows and sea levels that result in flooding or collapse of cliffs is essential to undertake effective risk management and long term Investment decisions . If climate change does cause historical probabilities of rainfall or sea storms to be less representative of the future, new methods will be needed to adjust for these effects.

Assessment of consequences of flooding or coastal erosion

The purpose of this assessment is to identify all the possible consequences that result from a flood or coastal erosion for events with different frequencies. Where possible actual consequences such as the cumulative value of damages to property (building and contents), health impacts (stress or risk to life) and benefits to wildlife should be assessed. Operating Authorities should use credible and objective approaches to identifying and evaluating these impacts. A lot of work has been done in providing guidance on this in the past. More is said on this in Section 4.

Combining Probability and Consequence

There is no firm rule on combining probability and consequence as a measure of risk. Methods described in the Middlesex Multicoloured Manual (ref) such as using damage probability curves provide a good standard for comparison where risk is calculated in terms of expected annual damages (ref glossary) over the valuation period (e.g. usually the life of the scheme). The aim is to calculate all risks on an equivalent basis so that the relative costs and benefits of different options can be effectively compared. Using this principle for all appraisal means that risks in different parts of the country can be compared on the same basis and the funding of risk management activity can be shown to be distributed fairly. The possible exception for very large national losses applies when these might distort the fair distribution of investment and direct a significant proportion of it to a single location. In such circumstances an

appropriate level of investment and risk management would have to be agreed by government.

2.2 Risk Assessment

Operating Authorities undertake appropriate national and local risk assessments for flood and coastal erosion as part of their wider duties and to enable them to have a holistic and informed approach to risk management and to inform Government policy.

Comprehensive risk assessment should build up a picture of impacts (degree of harm resulting to people, property or other assets) for a range of different probabilities of flooding and coastal erosion to identify where risks are sufficiently high to require active management and inform priorities. Risk assessment reduces the chance of surprise and enables consequences to be planned for and managed in advance. In particular operating authorities are expected to understand the risk of flooding and coastal erosion, from the viewpoint of public safety and wellbeing.

Risk Assessment provides the information on risk (most usefully on maps and in plans) to be communicated to relevant stakeholders. The EU Directive on the Assessment and Management of floods (ref) reflects in its requirements the importance that England and Wales have placed on risk assessment. Risk assessments made for large-scale planning and strategic studies should be readily available to those responsible for subsequent studies and scheme design, so that the risk assessment is progressively improved.

Climate change brings additional uncertainty over future storm and flood design conditions. The use of probabilistic and risk-related methods in the design and management of coastal and flood defence schemes with a clear understanding of how these will perform under a range of extreme conditions will help in the determination of appropriate standards.

Range of risks to be considered

Effective management of flood and coastal erosion depends on an appropriate understanding and mitigation of all types of risk at all stages in the management cycle

Risk should be considered at the planning, design, construction and operational stages. Types of risk to be considered include those resulting from natural hazards associated with flooding and erosion and also those resulting from management actions and interventions. The overall outcome of a policy, programme or activity depends on the consideration of all these types of risk in combination.

2.3 Role of risk management

The role of risk management is to identify and carry out activities which aim to contain the level of risk by addressing outcomes established by Government. As already stated (Sect 1.3), there is generally no legal requirement in England to provide flood and coastal defences. Publicly funded risk

management activities should only be undertaken where they are identified and justified through the process of appraisal.

Risk Management Approaches (Structural and Non Structural)

A full range of risk management mechanisms should be considered either individually or in combination and including consideration of how these may be best phased over time to adapt to changing risk- it includes:

Risk Avoidance approaches

- Influencing the planning system to understand the magnitude and impact of flooding or erosion on new development to try and avoid new risks being created.
- Relocation of some activities or assets outside of flood risk areas or finding alternative uses for flood risk areas e.g. adaptive approaches.
- Actions to avoid risks occurring such as carrying out appropriate training procedures or public awareness.

Risk Mitigation, reduction and adaptation

- The provision of flood and coastal defences, both longer term and temporary (reducing the probability and hence the impact) including resistance measures such as installing domestic flood gates.
- Warning and forecasting (trying to avoid the impact and reduce risk to life from flooding and the loss of assets through erosion by timely action to remove people and valuables from the risk area and reducing the risk to life);
- Resilience measures to reduce the impact of flooding and shorten recovery time e.g. concrete floors, special wall plasters, raising electric circuits.
- Emergency response (trying to minimise the loss of assets and life during the event as provided by emergency services and local authorities);
- Post-event response, such as pumping out, cleanup and reinstatement (includes the role of the insurance industry);
- Post-event review to learn lessons and change for the future.

Most mitigation measures only reduce the risk, few remove the risk entirely. . The residual probability and consequence must always be considered. If the residual risk is too high to be accepted, then other mitigation measures should be considered. (See section on designing for exceedence.)

Risk acceptance

Risk acceptance is a form of management (also applying to residual risks which may remain after the justified level of risk reduction has been carried out) that implies the risks are either unlikely or of low impact (e.g. sufficiently low risk to be acceptable), or beyond control.

Risk acceptance is not an option that short circuits' assessment. If risks are determined as "acceptable" it must be on the basis of an informed judgement, not ignorance.

Insurance can be regarded as a way of managing the residual risk of flooding to the extent that it can compensate individuals for financial losses to enable

them to replace and rectify damage. In England individuals are encouraged to have insurance to help reduce the impact on them if they are affected by flooding.

Particular forms of risk management (and where they might be used)

Managed realignment

Due to rising sea levels there are many existing sea walls that prevent inter-tidal habitats such as salt-marsh, mudflat and saline lagoons from migrating landwards. This process is called coastal squeeze and results in substantial losses of these important habitats. The EU Habitats Directive requires such losses to be replaced and in response Habitat Action Plans in England include ambitious targets for creating new habitats. The only way in which this can be achieved is through moving existing defences. Flood and coastal defence operating authorities therefore have a significant part to play in relation to these habitats. Managed realignment can also be a viable option for rivers where setting back an embankment or wall may increase local flood conveyance and lower water levels and provide extra flood risk reduction. Large scale plans SMPs and CFMPs should look for opportunities for realignment where this is beneficial. Realignment should always be considered as a part of maintenance programmes or when considering new risk management options in areas with existing defences.

Flood Warning

Flood warning is an important risk management tool. Generally it works in tandem with other risk management approaches. The aim of flood warning is to help people protect themselves and their property and hence reduce the impact of flooding. In England the service is provided by the Environment Agency as part of a combined local and national service aiming to have comprehensive coverage where practicable. Warnings are issued through radio and television, are available on the EA website and are issued directly and at no cost to households and businesses¹⁹ and to all local authorities and emergency services.

Relocation of assets. (Adapting to Flood Risk)

Relocation of assets either outside of a flood or coastal erosion risk area or to an area of lower and acceptable risk should be fully explored as an option for risk management when it appears to be a viable and more sustainable option. Such options are likely to need close co-operation with local planning authorities and the needs of those who own the assets. This could include structural assets such as buildings or infrastructure or rural assets such as growing of crops. Long term options which offer opportunities for partial, progressive or total relocation should be considered. Identification of suitable alternative uses for land in flood risk areas may support the process. Such options may offer benefits both in risk reduction of assets moved and widen opportunities for risk management if flood conveyance routes can be increased possibly in association with options for managed realignment.

¹⁹ The Pitt review recommends that all properties should receive warnings unless they choose to opt out.

Resilience Measures (Adapting to flood risk)

Resilience measures are actions that adapt buildings or other infrastructure so that they suffer less damage as a result of flooding. Government regards resilience measures as an important element of the portfolio of risk management options particularly where it offers a risk management solution to areas where other options could not be justified. Consideration of the social and economic benefits of shorter recovery times are particularly relevant to this option.

2.4 Managing Residual Risks

Defra requires operating authorities to include in their management approaches arrangements to deal with residual risks when the design standard event is exceeded. The presence of defences can result in worse consequences in severe floods compared to the “no defence” case if flooding occurs suddenly and unexpectedly. Such effects should be recognised and arrangements incorporated into the scheme design, such as preferential flooding of recreation areas, the creation of safe flow paths or water evacuation routes where appropriate and justified. The need for flood warning systems, and emergency response arrangements should always be considered. It is also important that the results from such analysis of “above design standard events” should be actively promoted for use in plans for flood warning and emergency planning.

Managing for failure includes the situation where the design standard is reasonably certain to reduce over time as in the case of sea level rise. Arrangements should be in place to monitor the performance of risk management measures and take action when these are no longer considered acceptable.

3.0 THE STRATEGIC FRAME WORK APPROACH

3.1 A strategic approach to Flood and Coastal erosion risk management.

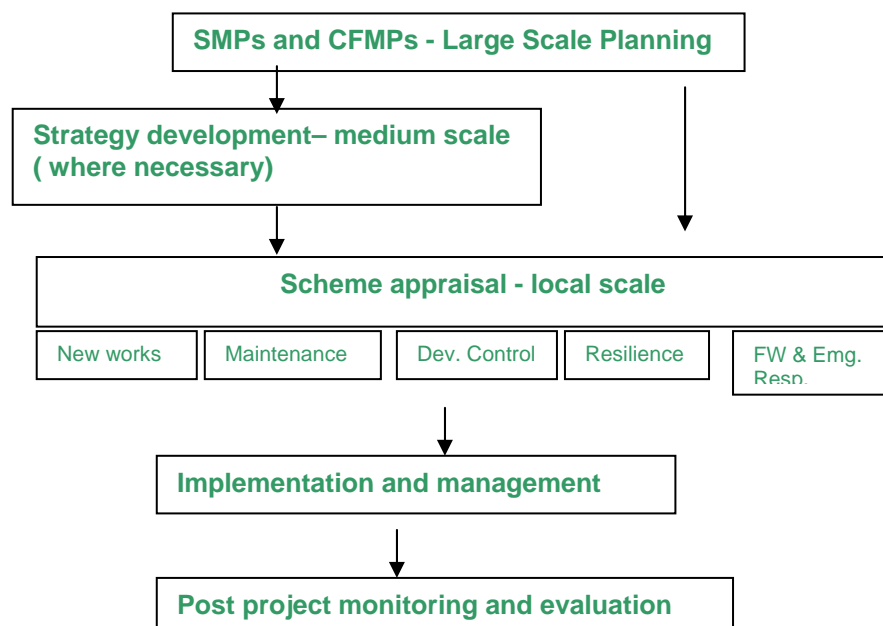
A strategic approach and long term view is promoted so as to encourage risk management solutions that are sustainable in the long term and work with natural river and coastal processes.

Defra has encouraged the development of a strategic framework for flood and coastal defence management based on shoreline management plans (SMPs) and Catchment Flood Management Plans (CFMPs). From 2009 these large-scale plans will become a requirement under the EU Directive for the assessment and management of flood risk. CFMPs and SMPs also provide valuable information for effective public consultation and other related activities such as local and county planning and environmental planning under the Water Framework Directive. Such matters can often only be considered by having the long term coherent view of a large interrelated length of coastline or a whole river catchment.

3.2 Stages in the Strategic Framework

A Strategic Framework should start with large scale planning that builds a guiding framework within which layers of smaller scale sub-plans (strategies or schemes) and other flood and coastal erosion risk management activities can be developed. Appraisal is an iterative process where ideas go through a cycle of being developed, reviewed, and refined through planning stages. Each stage of planning in a strategic framework has a context and is consistent with a wider defined picture. Appraisal should be used in each stage of the framework where decisions need to be made, with all potential impacts and options considered to a level of detail and geographic scale that supports this. Strategic planning is essentially a thought process and it is not possible to be prescriptive on a precise approach.

The main planning stages are shown below:



CFMPs and SMPs cover the whole of the country and provide a comprehensive and high level view of flood and coastal erosion risk management requirements. Where a CFMP or SMP identifies that flood or coastal erosion risks need to be managed in an area more detailed work may be required to identify how this should be taken forward. If the area is quite large and the issues complex and inter-related a strategy may be the best way of identifying how risks should be managed. With effective high level plans strategies are likely to be the exception rather than the rule. If the issues are relatively straightforward and localised local schemes may be promoted directly from the CFMP or SMP.

The principles set out in this section should be considered by Operating Authorities in relation to all forms of flood and coastal erosion risk management activity (including maintenance) and not just major investments in structural solutions. The management of the majority of flood and coastal erosion risks will benefit from being part of a strategic solution, application of these principles should facilitate the planning and management of all subsequent activities.

Hierarchy of Decision making

There should be a hierarchy of decision making within the strategic framework enabling decisions and findings made at the higher level to feed down and inform lower levels. This will improve the efficiency of the planning process, avoid duplication of work and double counting of benefits and facilitate more sustainable solutions to be implemented.

Development of smaller scale sub-plans (strategy plans or projects) will be expected to be consistent with the recommendations of the large-scale plan unless more detailed appraisal indicates an alternative approach is appropriate. Risk assessments within the strategic framework will encourage an increasingly proactive approach in identifying potential problem areas well in advance of either flooding or FCERM infrastructure failure. This should enable better prioritisation of resources nationally and minimise national losses.

3.3 Co-ordination with other plans

Other plans may contain data, analysis work and other information that can be essential for flood and coastal erosion plan development. Use of this information will avoid duplication, help establish appropriate objectives, opportunities and constraints, boundaries or the time frame Large-scale statutory plans such as Regional Spatial Strategies and Management Schemes for Special Areas of Conservation (SAC's) or large-scale non-statutory plans such as national Biodiversity Action and Coastal Habitat Management Plans are likely to be relevant. There are particular requirements for co-ordination of plans under the EU Directive for the assessment and management of flood risk with Water Framework Directive River Basin Management Plans. (see Annex 1)

Other plans, in particular Water Level Management Plans (WLMPs) may constitute a strategy for the catchment, or part catchment, although they

usually have more limited objectives. Similarly other plans such as those relating to water quality, water resources or small scale environmental plans should also be fully utilised if relevant, as they may have been subject to extensive consultation and data gathering.

3.4 Responsibilities for planning ²⁰

Under the EU Directive for the Assessment and Management of Floods it is the role of the designated Competent Authority to ensure the preparation of high level plans including CFMPs and SMPs. In England this role will be delegated to the Environment Agency. Other operating authorities best placed may actually prepare the plans. For example- the first two rounds of SMPs have been prepared by Coastal Groups lead by maritime local authorities. CFMPs have been lead by the Environment Agency in liaison with other operating authorities and stakeholders.

Responsibility for developing subsequent plans should be mutually agreed and identified in CFMP and SMPs. Individual organisations or consortia of groups or partnerships of, for example, local authorities, Environment Agency areas and/or Internal Drainage Boards may be involved. The particular arrangements for sharing the work and funding will be a matter for local negotiation though it will always be necessary to identify a lead organisation and individuals with a clear brief and terms of reference to guide the strategy or project development.

In some circumstances where, for example, there are extensive interests or other private owners it may be appropriate for local strategies to be initiated by groups of those owners or others with a significant interest in the maintenance or development of defences. However, such studies would not normally be publicly funded and it will be important that such initiatives involve representatives from the main public bodies if all interests are to be fully considered.

3.5 Periodic review of plans

Periodic reviews will ensure that plans are kept up to date and relevant both for the primary and other users. A periodic review should focus on whether there are any significant developments, any lessons learnt from scheme implementation, or other changes or major assumptions that are likely to affect the future direction of the plan and that would necessitate a need for any change in strategic direction. They are a vital link in the feedback chain, which should ensure that the benefit of expertise and knowledge gained is actively used in the development of future strategic planning including reviews of large scale plans (e.g. SMPs and CFMPs).

Each review should follow the procedures for large-scale plan/strategy development. A proportionate approach should be taken to reviews. If circumstances have not changed the review would be relatively quick and

²⁰ Responsibilities are subject to confirmation in the government response to the Pitt Review due in autumn 2008.

might only comprise of a report of progress made and objectives yet to be achieved.

Summary of outcomes expected of a strategic framework approach.

- *The ability to be proactive rather than reactive and achieve best long-term value for money and environmental and other benefits through a planned approach to integrated investments in major works, management and maintenance, resistance, resilience, flood warning and emergency planning. Authorities will be better able to plan and prioritise their work if assets and risk management approaches are regularly reviewed at a strategic level. National losses will be minimised if risk management activities are carried out before flooding or erosion takes place.*
- *Providing sound decision making and balanced sustainable solutions based on a wide ranging appraisal which takes account of all the key issues, including all impacts or consequences and opportunities. This will include environmental assessment at the strategic level and identifying opportunities for enhancement, and complying with legislative requirements.*
- *Encouraging co-operation and partnerships between operating authorities and other stakeholders and interested parties. Large scale plans or strategies will be a useful platform for opening a rational debate and open the way for opportunities or joint action to be identified.*
- *Promoting long-term sustainability through strategic thinking and planning. This can often avoid fundamental unforeseen weaknesses in detailed scheme implementation and avoid the assumption that works are inevitable or that short term solutions are viable in the long run.*
- *Providing the opportunity to undertake assessments of risk and sensitivity at the widest levels, for example assessment of the sensitivity to climate change or changes in planning or investment policy.*

4. PRINCIPLES FOR APPRAISAL

4.1 Requirements for the Appraisal process Basis for Appraisal

The justification for all public expenditure should be consistent with the approaches recommended in the Treasury Guidance - “Green Book, Appraisal and Evaluation in Central Government. Where expenditure forms part of a large programme of work in a particular area such as Flood and Coastal erosion risk management - it is appropriate for a Department to provide more specific guidance.

Treasury Green Book – The Role of Appraisal. (2.3)

“Appraisals should provide an assessment of whether a proposal is worthwhile, and communicate conclusions and recommendations. The essential technique is option appraisal whereby government intervention is validated, objectives are set and options are created and reviewed, by analysing their costs and benefits. Within this framework, cost-benefit analysis is recommended, with supplementary techniques to be used for weighing up those costs and benefits that remain unvalued (in monetary terms). “

4.2 Understanding the problem and setting objectives Setting Objectives

Strategic aims and objectives should be established jointly through consultation with all stakeholders and consultees and be expressed in suitable terms, which address the identified problems without presupposing any specific solution. Ideally, consensus should be reached between the stakeholders within the constraint of the overall aim of reducing flood and coastal erosion threat to people and property in a sustainable manner. Alongside the principal objective for flood and coastal erosion risk management of “reducing the threat to people and property” will be a set of other outcome objectives contributing to “- deliver the greatest environmental, social and economic benefit consistent with the Government’s sustainable development principles”

These are likely to be represented by the following broad categories.

Sustainability objectives including:

- Economic aspects –, economic efficiency, best value for money, affordability etc.
- Opportunities for working with natural processes and for environmental improvements.
- Enhancing amenity, public and sociological aspects.
- Consideration of long term issues, climate change and adaptation.
- Knowledge and innovation - improving uncertainty in data through acquisition or R&D.

Contributing to and collaborating with other organisations objectives.

It is anticipated that adopting a strategic approach to planning will result in more opportunities being identified for progressing joint projects on a partnership basis. Therefore in some instances at a strategy or scheme level flood and coastal erosion risk management may not be the only principal objective. Such collaboration is encouraged although there should be a basic premise to this that the cost to FCERM should not be greater than a standalone project and should be seeking to improve value for money. Contributions from other parties in the collaboration must also be forthcoming in proportion to their individual benefits. Collaborative projects should not delay the progress of essential works to an unacceptable degree.

Identification of problems and key issues

Understanding the natural processes causing flood and coastal erosion risk is key to the successful development of sound strategic solutions. The real flood or coastal erosion problems must be identified in a way which does not presuppose any particular outcome or solution. The existing situation should be analysed in a rational manner to determine, for example, points of weakness, realistic mechanisms for failure and likely probabilities of damaging events. Often this will involve logical consideration of risks and consequences. Public perception of risk does not however always coincide with technical assessments and careful consideration and understanding of local needs and attitudes may be required if the final outcome is to gain public support and confidence. The process of identifying problems and key issues to be considered should include:

- Co-ordination with higher level plans (If suitable plans exist, these should have already identified the majority of key issues and problems and may have set objectives).
- Establishment of appropriate area boundaries.
- Establishment of an appropriate time frame.
- Review of current data and knowledge.
- Evaluation of baseline scenarios e.g. “do-nothing” or “do minimum”.
- Identification of significant opportunities/constraints.

Information should be regularly updated, collated and stored in a secure, accessible and visually available manner to aid effective appraisal. The presentation of information for engagement of stakeholders should be considered at this stage. The key issues listed above are considered in turn in the sections below.

Establishment of appropriate boundaries

Geographic boundaries for an appraisal need to be set in relation to the objectives. The main aim should be to ensure that all major processes, impacts and consequences of the risk management strategy are captured within the area considered. As a minimum, the area should take account of the main morphological, hydraulic and hydrological processes which are likely to influence the solution of any flood or coastal erosion risk and any impacts that might result from a solution. Other factors, such as accounting for the loss or gain of habitats may also help define the boundaries. Within the strategic

framework, information on appropriate boundaries is likely to be available from higher level plans.

Establishment of an appropriate time frame

The timeframe chosen for appraisal is one of the most critical aspects for achieving sustainable development. It is not possible to be definitive over what this timeframe should be as the choice will depend on a number of factors. High level plans should investigate and take into account relevant long term physical and morphological processes and the probability characteristics of flood and coastal erosion of the plan area including climate change predictions. The expected lifespan of FCERM infrastructure is another important aspect to consider and the whole life appraisal of these solutions must be undertaken.

It would be usual to expect physical process studies for CFMPs or SMPs to consider a 50- year timeframe and in some cases up to 100 to 200 years. Policies that can be shown to be effective over this period are more likely to be sustainable.

Other factors such as planning policy, economic activity and social attitudes and expectations have shorter and more uncertain timeframes of even 10-20 years and these will be relevant to assumptions made when determining solutions. With FCERM now expected to have a more proactive and strategic approach it should be seeking to inform and guide other policy areas of the long term risks as well as seeking to address their shorter term needs.

Review of current data and knowledge

An initial review of current knowledge of forms and processes, both natural and man-made, should be carried out. This should use all available sources in-house, private or published. Sensitivity testing can inform the level of detail required and relevance of information. Information from local stakeholders should be considered.

There are requirements of the EU Directive on the Assessment and Management of Floods for co-ordination of information with the Water Framework directive (see Section 7)

Operating Authorities are encouraged to concentrate effort on understanding the relevance of data and knowledge to achieving the objectives and making decisions. The presentation of data in appraisal reports without clear explanation of its relevance should be avoided. In some instances it will be as important to demonstrate to stakeholders and the public that potentially contentious issues are not relevant to a situation as when they are highly relevant.

4.3 Identifying potential solutions and Appraising the Options

Baseline Option

The baseline option is what all other options are compared with to test the case for making any new investment. The ‘do-nothing’ or “no active intervention” scenario will often form the best baseline which all other scenarios, including continuation of present maintenance practice (often the do-minimum option), are tested against in terms of economic, technical and environmental performance. In some circumstances it can be appropriate to use an alternative baseline case such as ‘do-minimum’ in order to avoid exaggerating benefits.

A realistic ‘do-nothing’ scenario should always be developed where it helps assess the sustainability of a proposed course of action particularly where long term natural processes including climate change are important- even if it does not form the baseline option. In both ‘do-nothing’ and ‘do-minimum’ cases the assumptions underlying the scenario should be recorded.

Identification of significant opportunities/constraints

It is important to ensure that constraints are real and do not unnecessarily limit the choice of possible options for further study. Innovative approaches and lateral thinking can lead to identifying potential opportunities appropriate to the objectives being considered. These might include environmental enhancement, recreation, or phasing of work to fit in with other party’s activities. When the main aim is to minimise flood or coastal erosion risks the study should avoid being unnecessarily distracted by third party objectives whilst being alive to the opportunities which could be offered by joint projects or integrated approaches.

Identification of Options

There is a need for creative and lateral thinking in the development of alternative options, which should not be constrained by previous assumptions or past practice. The degree of detail in which each option is considered should be appropriate to the strategic nature of the decisions required. At more detailed levels of planning - as well as considering a technically viable range of different types of option, a range of different levels of risk reduction should be considered taking into account both the probability and consequences to enable the highest standard justifiable to be determined. Compliance with Water Frame Directive regulations means that particularly at more strategic planning levels – consideration is given to radically alternative ways of achieving FCERM objectives where proposals could lead to the possibility of ecological deterioration. It will be important for Operating Authorities to provide an appropriate level of justification for their decisions in this aspect and where deterioration is unavoidable.

Short listing and development of viable options (Screening out unviable options)

From the full list of possible options considered a short list of viable options must be identified progressively to take forward for detailed consideration. The use of appraisal summary tables is recommended to record the assessment of all options and provide a rationale for those options not short listed for further evaluation.

The development and appraisal of options is an iterative process leading to a set of alternative solutions where technical aspects, costs, benefits environmental and other impacts have been assessed and appropriate allowances made for any uncertainty. The appraisal should take account of any wider implications and processes identified in high level plans but should not be unduly constrained by solutions if these are from large-scale studies which have not considered all reasonable alternatives in sufficient detail. Consultation is advisable at this stage with relevant stakeholders so that locally acceptable options and local knowledge are considered. (see also Section 6.)

4.4 Appraising the Options

Valuation of Costs and Benefits

The purpose of this valuation is to allow a systematic comparison of the (net) costs and benefits of the alternative options. Reference to the term “net” here is important because it represents the difference between the costs and benefits of the different options compared with the chosen baseline option. Comparison with a baseline ensures that only those benefits and costs that result from the option are counted and not other benefits that would have occurred anyway.

The value of economic, social and environmental impacts in terms of costs and benefits should be valued in monetary terms wherever possible because this provides a common unit for comparison. Discounting is used to bring all costs and benefits that may occur during the life of a project to a present value. This present value is theoretical but enables alternative options and phasing and different projects to be compared and is crucial to making decisions on a level playing field.

Standard approaches to valuing benefits such as those used in the Middlesex Manual are recommended as this will also ensure that all projects are assessed consistently and fairly.

Depending on circumstances or the objective of an option, impacts can vary as to whether they are considered a cost or a benefit. Costs can be wider than the amount of money a project is expected to spend. For example: Where an option is considering new activity for the prevention of flood damage to property, the value of damage avoided is considered as a benefit. If on the other hand the option was considering withdrawing an existing activity, similar flood damage value would be regarded as a cost.

Use of appraisal summary tables (AST) will provide a systematic way of accounting which impacts are valued in monetary terms and which are not. Descriptions of the beneficial consequences or negative impacts in the AST can ensure that benefits and costs are correctly allocated and help stakeholders understand the pros and cons of a project.

Depending on the significance of the unvalued impacts (i.e. those benefits and costs for which there is no accepted monetarised value) the AST may be used as the basis of a formal multi-criteria analysis (MCA) see Sect 5.)

Ecosystem services are a new way of valuing the natural environment in appraisal by looking at the range of (hidden) benefits it provides to people and how these might change. These include regulation of the climate, purification of air and water, soil formation and nutrient cycling, as well as food, timber and the amenity that natural open space and species provide. If the environment is affected by FCERM proposals the change - often a reduction in services provided, (e.g. the service provided by occasionally flooded land to wading birds) can be measured and provides a value of the impact. The benefits of environmental improvements can also be valued in the same way. In this case the change is likely to be an increase in ecosystem services provided. This enables appraisal to take a more comprehensive assessment of all the risks relating to flood and coastal erosion management actions. Operating Authorities (EA) have developed guidance on the Ecosystems services approach.

Accuracy of valuations

The valuation of flood and coastal erosion damages for appraisal purposes , can only be an estimate because it is not possible to predict what property or fixtures individuals have in their homes, what stock that businesses are holding or what traffic disruption might occur (particularly when floods or cliff falls are considered to occur at different points in the future). The effort put into valuing impacts should be proportionate to their likely effect on the decision process and in relation to the planning level and the scale of the value of other impacts. Sufficient allowance for error should be made for the uncertain nature of monetarised estimates. Wider areas of risk and uncertainty should also be considered.

Where a decision between very different approaches is finely balanced then the costs and benefits may have to be evaluated in detail but in other cases there may be greater scope for refining cost estimates at detailed scheme appraisal stage within a broader range of strategic options..

Some costs have previously not been readily quantifiable such as the loss of habitat, loss of human life. New guidance is available on the Ecosystems Services approach to environmental valuation and the valuation of loss of life (refs)

Sensitivity Testing

The purpose of sensitivity testing is to inform those deciding which option or project to select, how uncertainty in some factors of the appraisal could affect their choice. An initial broad assessment of sensitivity at the start of any appraisal process will identify those areas that are critical for decision-making and therefore need greatest attention. Sensitivity testing is therefore a valuable tool for achieving effective and streamlined appraisal when combined with good judgement and experience. Although it may be difficult with present knowledge to assign particular probabilities of failure to different standards of

activity such as beach management, it is important that the sensitivity of different options is considered against a reasonable range of likely (probabilistic) outcomes. Assessment should include the sensitivity testing of a range of alternative policy scenarios.

5.0 Principles of Decision Making

5.1 Selecting and promoting the preferred option

Promoting good decision-making is one of the main driving forces behind the use of project appraisal techniques. Each element of project appraisal, from developing a strategic framework to economic and environmental assessments, technical soundness and a full consideration of risks is drawn together in the final decision making stage to achieve the selection of the best overall option. Good decision making should not rely on chance but on a full and informed consideration of all the relevant factors influencing the outcome. There are accepted tools and approaches available to help weigh up the factors of different options against the defined objectives and select the one that best meets them.

5.2 The Decision Process –The use of Benefit-Cost Analysis (BCA) and Multi-Criteria Analysis (MCA)

The use of Benefit-Cost analysis to identify the preferred option is recommended because it is founded on logic and is transparent and promoted by the Treasury Green Book. The benefits and costs considered should be all those significant factors to ensure sustainable decision making and include social, economic and environmental factors. New approaches have extended the monetarised valuation of social and economic factors and reduced the elements that were once regarded as unquantifiable.

The normal approach is to calculate the ratio of benefits over costs e.g. divide the value of the benefits by the costs. The result - expressed as a ratio - indicates how many benefits are obtained for one unit of cost. E.g. a ratio of 3:1 indicates that benefits are three times the costs. The higher the value of the ratio the better the value returned from the expenditure.

Where a proposal is judged as having a significant portion of benefits or costs that cannot be easily valued a Multi-Criteria-Analysis (MCA) technique can be used. An MCA approach suitable for use in FCERM has been developed in research and tested that helps compare monetarised and non monetarised impacts on an equivalent basis. The use of MCA should aid the process of screening options or build a consensus between project participants with possibly divergent objectives. For each project potential options should always be assessed against the baseline scenario, i.e. do nothing or do minimum as appropriate. This provides a consistent base line against which other options are tested and also means that different projects can be compared. It also reduces the risk of presuming that works are inevitable and promoting unsustainable options.

Whether B/C or MCA is used the general objective of the decision process is to maximise the ratio of benefits to costs for each project by considering different options or solutions, by implication this should achieve the best return on any programme of investment.

Defra has introduced new outcome measures and targets to monitor this (see Section 5.3) and which will provide a range of objectives to be achieved from

the investment programme over a period of years and indicate the overall rate of return expected from the public investment.

Where there are potentially significant uncertainties in factors in the project appraisal (often the situation in flood and coastal defence appraisals) the use of sensitivity analysis is recommended to support decision making. In analysing alternative options it is important that all major risks and uncertainties that could affect the final choice are identified, even if they cannot all be evaluated.

5.3 Other considerations for making decisions

Legal Obligations

In some circumstances there may be clear legal obligations to undertake some course of action. Where the principle reason for a project is a legal requirement to protect the environment selecting the least-cost option that satisfies the legal requirement (known as cost-effectiveness analysis) is generally the most appropriate means of appraising the options. However there is still a need to consider the wider implications of such decisions. For example if Health and Safety requirements for operating a pumping station are going to cost more than the whole life benefits derived from the station then the option to abandon and demolish should be considered. In this case there may be no need to appraise the impact on the feature that must be conserved. However, the impacts of alternative options for meeting the legal requirement on other aspects of the environment may be relevant to the choice of option and should be appraised.

Where FCERM policy or investment decision is constrained by a legal requirement to avoid damaging an environmental feature, the normal approach should be followed for the valuation of all impacts and only those options that comply with the basic legal constraints should normally be considered.

Transparency and Accountability

The purpose of the project appraisal process is to enable good and consistent decision-making. It is important that the system for project development demonstrates this by including:

- clear procedures for appeals and formal adjudication;
- informed consultation and negotiation;

Effective appraisal should aid these processes with credible supporting technical and economic evidence that is clearly documented, communicated and made available to interested parties at appropriate stages. Section 6 looks at approaches to public participation and consultation.

The role of government outcome measures and targets

A suite of Outcome Measures for flood and coastal erosion risk management has been developed, and is published on the Defra Flood Management website. The measures have been developed to provide relatively simple means of assessing the effectiveness of the expenditure on flood and coastal erosion programme. The measures should also improve consistency between different levels of the strategic framework and contribute to the consistency and equity of approach between different types of risk, locations and delivery bodies. Outcome measures reflect some of the key expectations of government of the flood and coastal erosion programme. However by their nature they do not express all the myriad of possible beneficial outcomes that could be achieved. Neither do the outcome measures express possible negative consequences that could result from inappropriate actions.

The Outcome Measures are being used by Defra to set targets. However, not all of the measures will necessarily have targets associated with them – this will depend for example upon the scope of the measures and availability of data. It is intended that the delivery periods for these targets will align with Comprehensive Spending Review periods.

Outcome Measures are intended to primarily operate at the programme level. The delivery of targets should principally arise from the combination of projects selected to take forward in the national investment programme. The choice of preferred option for any particular project should always be on the basis of sound appraisal and what is most sustainable for the particular local circumstances. This combination of seeking to achieve key outcomes from a package of projects, each developed on the basis of a robust and sustainable business case should ensure that all kinds of positive outcomes result and perverse outcomes are avoided.

The scope of the Outcome Measure definitions will vary over time, in response to changing requirements and data availability. Further, targets will change over time to reflect Ministerial priorities, and will also align with changes to the measures. The Defra Flood Management website should be used to confirm the current suite of measures and associated targets.

Prioritisation of Projects

As there is a finite supply of money in any year to fund flood and coastal erosion risk management activities, a fair and transparent system is required to determine how and where this money should be allocated in order to achieve agreed priorities. Defra and the Environment Agency will agree arrangements for prioritisation²¹.

If the package of schemes being prioritised includes some that have attracted contributions an additional measure of cost efficiency to the B/C ratio should be evaluated for all of the schemes and used to compare the benefits per pound of expenditure from the Flood and coastal erosion budget for each scheme. This information should be taken into account in prioritisation.

²¹ At the time of writing -the EA have published a new proposal for prioritisation.

The suggested additional measure is NPV / C_g and is also recommended for use in option choice of a scheme that includes contributions.

Where Net Present Value (NPV) = (total value of benefits minus the total costs) and C_g = Costs to Government only.

6.0 PUBLIC CONSULTATION, GOVERNANCE AND SCRUTINY

6.1 Public Participation

The aim of public participation and consultation is to:

- seek information,
- enable the views of stakeholders to be heard
- expose preliminary understanding and options to scrutiny and
- enable constraints to be explained so as to help manage expectations

Public participation and consultation will contribute to achieving transparency and accountability in investment of public money that reflects local needs and conditions and reduces the risk of projects and plans failing to meet their objectives or leading to unintended consequences.

Opportunities for meaningful public participation should be incorporated into the appraisal process at appropriate stages. Current guidance for CFMPs and SMPs requires local participation. Local consultation is expected to feature in the delivery of such plans through the development of strategies for their implementation and the schemes that put them into effect.

Local knowledge should be sought to inform understanding of issues. Local and stakeholder views should be used to help identify and develop options for risk management. Multi-Criteria Analysis techniques can take account of local knowledge or preferences and use these to help select a preferred solution. Inevitably local choice will operate in the context of national funding and competing priorities between different communities for limited funds. It is important that this situation is explained to those participating and that Operating Authorities will have responsibility for determining the quality of information received and should ensure a balance of views that reflect the local communities and interested parties proportionately.

Consultation

Formal and informal consultation should be undertaken in the development of plans and projects. Large scale plans such as CFMPs and SMPs should be available for public consultation, this will cover the requirements for plans covered by the EU EIA and SEA Directives and those of the Directive for the Assessment and management of flood risk. The development of smaller scale strategies and projects should include adequate opportunity for local and other interested parties to comment on final proposals in addition to any informal consultation or public participation undertaken during their development.

Operating Authorities have the responsibility for determining how consultation responses will affect the final proposal taking into account local and national priorities, policy and sustainable development issues. The way that consultation responses have been taken into account should be reported.

Transparency and Communications

At a local level transparency in appraisal and decision-making will ensure that information is in an accessible form to enable stakeholders to have a better

understanding of planning and appraisal that affects them and enable them to participate more and at different stages.

Good practice should be demonstrated in communications with stakeholders and the public and staff engaged in this should be trained and competent. Clear communication of relevant information and what decision criteria and methodologies are being used is crucial. The use of plain English will help this process.

At the national level the introduction and publication of outcome measures with targets, will enable the comparison of investment decisions against these more clearly.

6.2 Governance and Scrutiny

It is important that the effectiveness of operating authorities to manage flood and coastal erosion of which appraisal is a part is scrutinised and that they are held to account for their actions and decisions. This is achieved in a number of ways as follows:

- Openness in communications, greater stakeholder participation and publication of information will put decisions in the public eye.
- Operating authorities are required to undertake in house quality assurance checks of all proposals and post project evaluation recommended by the Treasury Green Book.
- Defra will undertake reviews of a sample of appraisals for plans and projects including CFMPs and SMPs, strategies and projects to monitor how they are following the principles in this policy statement.
- Defra provides guidance to operating authorities on financial regularity, accountability and reporting in the Financial Memorandum (ref).
- Operating Authorities will publish information on the achievement of outcome measures and targets.
- Operating Authorities are subject to Parliamentary scrutiny. The EFRA Committee, and Public Accounts Committee have undertaken regular reviews.

References

1. SEA – Strategic Environmental Assessment – A process set out in European legislation similar in nature to EIA but covering statutory plans and strategies.

www.english-nature.org.uk/pubs/publication/PDF/SEAbiodiversityGuide.pdf

2. MSW – Making Space for Water, The Cross Government strategic approach to flooding and coastal erosion management co-ordinated as a programme of work within the Department of Environment, Food and Rural Affairs (Defra)

<http://www.defra.gov.uk/environ/fcd/policy/strategy.htm>

3. CFMP – Catchment Flood Management Plan – A high level plan recommending long term and sustainable policies for flood risk management across a river catchment. The plan is based on a comprehensive understanding of flooding processes and an assessment of risk to people, property and the environment. There is a programme in place to develop CFMPs for all catchments across England and Wales and the Environment Agency are leading this work.

http://www.environment-agency.gov.uk/subjects/flood/1217883/1217968/907676/?lang=_e

4. SMP – Shoreline Management Plan – A high level plan recommending long term and sustainable policies for flood and coastal erosion risk management for a length of coastline.

Similar in nature and purpose as CFMPs and developed by Coastal Groups.

<http://www.defra.gov.uk/environ/fcd/policy/smp.htm>

5. WFD – Water Framework Directive – European Legislation which fully applies to the UK since Dec 2000 and aims to achieve stringent ecological and chemical water quality standards for all bodies of water (e.g. rivers, streams, canals, lakes, estuaries and the coast)

<http://www.defra.gov.uk/environment/water/wfd/index.htm>

6. FCDPAG – Flood and Coastal Defence Project Appraisal Guidance. A series of five volumes of guidance on Appraisal for Flood and Coastal Defence in England published by MAFF (now Defra) between 1999-2001.

<http://www.defra.gov.uk/environ/fcd/pubs/pagn/default.htm>

7. European Directive on the Assessment and Management of Flood risk.

<http://www.defra.gov.uk/environ/fcd/eufldir/default.htm>

8. The Benefits of Flood and Coastal Risk Management: A Manual of Assessment Techniques – Flood Hazard Research Centre- Middlesex University 2005.
9. FD 2015 R&D project – “Sustainable flood and coastal erosion risk management “, January 2006
10. Government Foresight Report - (Dept. of Trade and Industry, April 2004)
<http://www.foresight.gov.uk>
11. Appraisal and Evaluation in Central Government. HM Treasury 2003.
http://www.hm-treasury.gov.uk/economic_data_and_tools/greenbook/data_greenbook
12. PPS25 –Planning Policy Statement 25 : Development and Flood Risk (Dec 2005.) Department of Communities and Local Government
13. R&D project FD 2015 – “Sustainable flood and coastal erosion risk management”, Defra Flood Management - January 2006
14. Defra appraisal Guidance Notes.
<http://www.defra.gov.uk/environ/fcd/guidance/pagn/default.htm>

Glossary of Terms

Adaptation Approach	An approach being taken by government to deal with climate change in the UK. The principle is to assess potential impacts considering different climate change scenarios and then develop strategies, where appropriate, which enable society to adapt in a planned and appropriate manner and rate.
Benefit/Cost Analysis*	Comparison of present value scheme benefits and costs as part of an economic appraisal. The benefit/cost ratio is the total present value benefits divided by the total present value costs.
CFMP Catchment Flood Management Plan	A high level plan recommending long term and sustainable policies for flood risk management across a river catchment. The plan is based on a comprehensive understanding of flooding processes and an assessment of risk to people, property and the environment.
Climate change	Long term changes in climate specifically linked to those changes resulting from human intervention in atmospheric processes through, for example, the release of greenhouse gases to the atmosphere from the burning of fossil fuels.
Do-nothing option (also) Minimum active intervention	An option used in benefit/cost analysis to act as a baseline against which all other options are tested. It assumes that no action whatsoever is taken. In the case of existing works it assumes walk-away: cease all maintenance, repairs and other activities immediately. In the case of new works it assumes that there is no intervention in natural processes. Politically this is often seen as a non-viable option but it is an important comparison tool in benefit/ cost analysis.
Economic Appraisal	An appraisal that takes into account a wide range of costs and benefits, generally those which can be valued in money terms.
Environment	Where environmental issues are referred to in this document, this term is used to encompass landscape/natural beauty, flora, fauna, geological or geomorphological features and buildings, air, water, human interests, sites and objects of archaeological, architectural or historical interest.
Environmental appraisal	The process whereby the effects of a proposal, on the natural environmental or heritage sites are identified, measured and assessed to determine their significance.
EIA Environmental Impact Assessment	A process set out in European legislation that must be followed and reported on when proposing specific types of work and will typically include most forms of flood and coastal

	erosion risk management scheme.
Greenhouse gases	Naturally occurring gases, such as carbon dioxide, nitrous oxide, methane and ozone, and man-made gases like chlorofluorocarbons, which absorb some of the sun's radiation and convert it into heat.
Managed Realignment	The management of a process of establishing a new defence line, often set back from the existing position, with the aim of improving the long-term sustainability of the defence, or contributing to other aims such as habitat creation.
MCA - Multi-Criteria Analysis	Techniques used to support decision making when there are a number of factors to be taken into consideration for different courses of action.
No-regrets action	Actions taken to respond to perceived climate change impacts whose consequences both economic and environmental will be beneficial (usually in the short term) without imposing any long term commitments.
Operating Authority	A body with statutory powers to undertake flood defence or coast protection activities, usually the Environment Agency, Local Authority or Drainage Board.
Post project evaluation	A procedure to review the performance of a project with respect to its original objectives and the manner in which the project was carried out .
Precautionary Principle	This requires that where there are significant risks of damage to the environment precautionary action to limit the use of potentially dangerous materials or the spread of potentially dangerous pollutants is taken, even where scientific knowledge is not conclusive, if the balance of likely costs and benefits justifies it. An approach which takes avoiding action based on the possibility of significant environmental or other damage, even before there is conclusive evidence that the damage will occur.
Present value	The value of a stream of benefits or costs when discounted back to the present time at a prescribed discount rate.
Project	The undertaking of any discrete item of work (or inter-related elements of work) for a specific purpose. The nature of work can take many forms such as procurement, design, construction, investigation, or management.
Risk	A combination of both the likelihood and consequences of an event.

Risk assessment	An assessment of the risks inherent in a situation or from a hazard.
Risk neutral	Neither risk averse nor risk seeking.
Scheme	In the context of Flood and Coastal Erosion risk management a scheme usually relates to the implementation of works on the ground. It is normally the case that a scheme (or schemes) is identified as a consequence of a broad based investigation and has quite specific objectives. Stages of schern development may include pre-feasibility studies, detailed appraisal and construction.
Sea level rise	The rise in sea levels relative to the land due to global warming causing thermal expansion of the oceans and to a lesser extent from melting of the ice caps and glaciers.
SMP Shoreline Management Plan	A high level plan recommending long term and sustainable policies for flood and coastal erosion risk management for a length of coastline.
Strategic Framework	A planning structure which has been developed using strategic (high level) principles within which layers of consistent and interrelated plans and strategies can be developed.
Strategy Plan	A documented strategy which, is developed from a strategic study into a problem and describes the course of action which has been determined to implement the preferred option.
Sustainability	The degree to which flood and coastal defence solutions avoid tying future generations into inflexible and or expensive options for defence. This will usually include consideration of inter-relationships with other defences and likely developments and processes within a catchment or coastal cell. It will also take account of long- term demands for non-renewable materials.
Whole life costs	The total costs associated with a scheme for its full design and potential residual life span, taking proper account of all aspects of design, construction, maintenance and external impacts. A particularly useful approach in helping to determine economic sustainability when used to compare the relative costs of long life schemes such as flood defences and where decisions between short term capital costs and long term maintenance costs need to be made.

Targets

Targets set for operating authorities to ensure and demonstrate the delivery of the Government's stated policy aims and objectives for Flood and Coastal Erosion risk management.

Part 3: Impact Assessment on Policy Statement on appraisal for flooding and coastal erosion risk management

This policy statement (PS) largely comprises a restatement of existing policy contained within previous guidance FCDPAG volumes 1-5 which has been extracted for the purpose of better regulation and clarity in terms of separating policy aspects from those of best practice. Some aspects of policy have greater emphasis within the new PS including consideration of human health, welfare and environmental impacts of flooding in order to achieve more sustainable outcomes. More emphasis has been placed on requirements for the transparency of the decision making process and engagement of stakeholders.

The new PS also sets out the preferred context of appraisal using a risk based approach and within a strategic planning framework based on river catchments and coastal process units. The strategic framework and risk based approaches reflect policies that have been promoted separately for a number of years but are now brought together under this PS.

The timing of the PS also makes it appropriate to update the requirements of new EU legislation that is relevant to appraisal including the Water Framework Directive and the Directive for the Assessment and Management of Flood Risk. Separate arrangements apply for undertaking impact assessments on the implementation of these.

There are no significant new policy elements contained within this PS that require an impact assessment to be undertaken.