

Flood Risk Management in Kent

Select Committee Report

2007



Kent County Council
County Hall
Maidstone
ME14 1XQ
08458 247247
county.hall@kent.gov.uk



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Foreword

How we manage flood risk now, and the decisions we make in this regard, will have far reaching consequences for the people of Kent.

We have suggested small steps that can be taken to contribute to the overall reduction in flood risk and the better management of it. It is absolutely crucial that we follow guidance and take care where we site new developments; maintain defences to a good standard, incorporating a margin for climate change impacts; use sustainable drainage systems and put in place measures to make buildings more flood-proof and communities more resilient. More importantly, it is essential that we do not take our eye off the ball and become complacent about flooding. We must retain a constant focus on flood risk in Kent, and pull together expertise at all levels. We suggest oversight is provided by a standing flood risk committee and multi-level involvement is secured through Flood Liaison Advice Groups which bring together experts including those in the local community.

In an environment of tight budgetary control we will need to constantly ask ourselves: 'what are the potential costs of not taking a particular action?' We urge that the government give much greater priority to flooding, by ring-fencing funding and ensuring that important schemes are not delayed.

Having seen how Kent and other counties have been affected so adversely by intense rainfall we believe it is important to invest in a variety of measures as soon as possible, so that we are better prepared to cope with what we hope are rare, but may become increasingly frequent, severe weather conditions.

The risk of sea flooding is very real and it is acknowledged that a repeat of the set of conditions leading to flooding in 1953 could have dire consequences. It is therefore with the utmost urgency that we take action to ensure that people are aware of the risk, aware of what is being done to protect them and what they can do for themselves, and that our flood planning and warning systems are both comprehensive and flexible enough to ensure everyone's safety.

I would like to thank all those individuals who assisted the Select Committee by giving up their time freely to provide written or oral evidence during the summer break. I would mention particularly: Ted Edwards, Ingrid Chudleigh, Liam Woollorton, Richard Francis and David Nye who provided invaluable assistance during our visits and Phillip Merricks and his family for allowing us to visit his farm. Finally I would like to thank Research Officer, Sue Frampton, Democratic Services Officer, Christine Singh and colleagues for their assistance to the Select Committee.

Sarah Hohler – Chairman

1 Executive Summary

1.1 Committee membership

The Select Committee consisted of eight Members of the County Council: five Conservative; two Labour and one Liberal Democrat.



Mrs Sarah Hohler



Mr Godfrey Horne



Mr Ivor Jones



Mr Richard King



Mr John Muckle



**Mrs Paulina
Stockell**



Mr Martin Vye



**Mr Frederick
Wood-Brignall**

1.2 Terms of Reference

- To gain an overview of sustainable flood risk management in Kent in light of current government policy and funding
- To gain an overview of action taken since 2001 to minimise flood risk to the residents of Kent (with reference to recommendations of KCC's 2001/2006 Reviews)
- To gain an overview of issues relating to planning control, flood resilience and flood risk in Kent and consider local planning authority roles in influencing planning decisions
- To consider what action or initiatives by KCC could lead to greater flood protection and resilience for Kent residents

- To consider what action or initiatives might benefit Kent residents in terms of preparedness and emergency planning for flood events
- To make specific recommendations on the topic of flood risk management for Kent County Council and partner organisations.

1.3 Evidence gathering

The Select Committee were resourced for a three and a half month period over the summer and during this period gathered evidence through desk research and received oral and written evidence from range of stakeholders including local councils, the Environment Agency, DEFRA, Kent Highways Service, Southern Water and Natural England. A list of witnesses who attended Select Committee hearings is given as Appendix 1 and a list of those submitting written or supplementary evidence is at Appendix 2.

1.4 Visits

Members undertook visits to a number of sites representing different aspects of flood risk management. A one day itinerary included visits to the Isle of Sheppey (Elmley and Warden Point); Ingress Park in Greenhithe and the Leigh Barrier south of Tonbridge.

1.5 Glossary of terms and acronyms

ACE	Association for Consultancy and Engineering
ADA	Association of Drainage Authorities
CAP	Common Agricultural Policy
CFMP	Catchment Flood Management Plan
CLA	Country Land & Business Association
CIRIA	Construction Industry Research and Information Association
COW	Critical Ordinary Watercourse
CPA	Compulsory Purchase Act (2004)
CPRE	Campaign to Protect Rural England
CSO	Combined Sewer Overflow
Culvert	Covered structure that conveys a flow under a road, railroad or other obstruction. Culverts are mainly used to divert stream or rainfall runoff to prevent erosion or flooding on highways.
DCLG	Department for Communities and Local Government
DEFRA	Department for Environment Food and Rural Affairs
EA	Environment Agency
Enmainment	Designating a critical ordinary watercourse as a main river
EU	European Union
FLAG	Flood Liaison Advice Group
FRA	Flood Risk Assessment
GIS	Geographical Information System
GOSE	Government Office for the South East
GPS	Global Positioning System
Hereditaments	Property that can be inherited
HLT	High Level Target
KFRS	Kent Fire & Rescue Service
IDB	Internal Drainage Board
IT	Information Technology
KCC	Kent County Council
KHS	Kent Highway Services
KRF	Kent Resilience Forum
LDA	Land Drainage Act
LDD	Local Development Documents
LDF	Local Development Framework

LGA	Local Government Association
MAFF	Ministry of Agriculture, Fisheries and Food (now DEFRA)
MOD	Ministry of Defence
MSW	Making Space for Water
NAO	National Audit Office
NE	Natural England
NFCDD	National Flood and Coastal Defence Database
NFU	National Farmers Union
NGO	Non-Governmental Organisation
OFWAT	The Office of Water Services
OW	Ordinary Watercourse (any watercourse not a main river)
Pluvial	Relating to rainfall
RFDC	Regional Flood Defence Committee
Riparian	Relating to the banks of a river
RSS	Regional Spatial Strategy
SEERA	South East England Regional Assembly
SFRA	Strategic Flood Risk Assessment
SMP	Shoreline Management Plan
SSSI	Site of Special Scientific Interest
Soakaway	Structure to collect rainfall from a catchment area prior to discharge into surrounding soil
SUDS	Sustainable Urban Drainage System
Swale	A grassed depression which leads surface water overland to a storage or discharge system, typically using the green space of a roadside margin. (Source: EA)
SWG	Severe Weather Group
UNECE	United Nations Economic Commission for Europe
WFD	Water Framework Directive

1.6 Introduction

- a) The Environment and Regeneration Policy Overview Committee convened a Select Committee for a short period in early summer to gain a broad overview of the current situation regarding the management of flood risk in the county. Kent has one of the longest coastlines of any English county¹ with many important coastal settlements, a rich and varied landscape with 28,500 hectares of designated conservation sites and a good deal of key infrastructure on low-lying land. Over 70% of Kent comprises agricultural land hence its fame as the 'Garden of England'. Kent has two of the major growth areas in the south east region: Ashford and Thames Gateway and numerous smaller growth areas which are likely to undergo intense development. Substantial sections lie in flood risk areas and, despite earlier Select Committee recommendations, pressure for house building may mean that some development in these areas goes ahead. Effective flood risk management is clearly a key component of Kent communities if they are to be sustainable into the future.
- b) Sustainable flood management has been defined in many ways including that which:

'provides the maximum possible social and economic resilience against flooding, by protecting and working with the environment, in a way which is fair and affordable both now and in the future'

*Source: Scottish National Technical Advisory Group, 2004
(Flood Issues Advisory Committee)*

- c) While the review was at the planning stage in June 2007, unprecedented intense rainfall caused unseasonal flooding. Parts of Kent were affected but the most devastating and severe floods occurred in the south west midlands and tragic loss of life occurred. These floods highlighted several important issues, not least they served to illustrate to the Committee that flooding can happen at any time, in any season and with enough severity to overwhelm defences.

'Few, if any, surface water systems would have coped with the intensity or duration of rainfall experienced in other parts of the country; we in Kent were very fortunate to have escaped.'

Source: I.D. Oliver, Romney Marsh Area Internal Drainage Board, written evidence

¹ 217km

- d) However, bouts of heavy rainfall have continued to affect Kent, overwhelming drainage systems and causing flooding, particularly in Folkestone, Hythe and Whitstable. Media coverage has provided a graphic background to this review and while we need to acknowledge that no defences can provide absolute protection from flooding, and no individual in this country has the absolute right to be defended against flooding, we are reminded both that there are numerous sources of flooding and that an effective emergency response is required to deal with any eventual flooding and its aftermath.
- e) Some flooding is avoidable with intelligent forward planning and adequate funding. Many of the recent floods have been exacerbated by ageing drainage systems which cannot cope and 'flash floods' following heavy rain have become a familiar and unwelcome sight. Clearly, funding must be made available to update these systems and all new developments must incorporate sustainable drainage with integral flood storage to avoid increasing runoff and adding to flood risk downstream. Failure to invest now will inevitably lead to increased costs later on, both in human and economic terms. It is essential to plan for the long term, factoring in increased risk of flooding due to the effects of climate change. Where there cannot be a total avoidance of risk, there are a number of options for building flood resilience into new properties and a growing flood protection industry that, if developed, could save homeowners, businesses and government alike, millions in lost revenue, insurance claims and distress.
- f) It is worth restating that in terms of climate change impacts, it is evident that past experience is no longer a good indication of what is likely to happen in the future.
- g) Although the Environment Agency has responsibility for the bulk of flood risk management, KCC has a number of roles and functions principally as a drainage body and highway authority, but also in relation to environmental management, strategic and emergency planning. The county council can also make a key contribution to flood risk management by performing a number of 'non-structural' actions for example by raising public awareness of flood risks and helping to publicise what is being, and could be, done to mitigate against them.
- h) Other KCC Select Committees have reported on topics relevant to this review in 2001 (Flooding in Kent), in 2005 (Water and Wastewater, particularly in Ashford) and in 2006 (Climate Change). The recommendations of the Climate Change Report are currently being progressed and KCC has appointed a Project Manager to ensure that climate change is factored in to all future business plans. As the 2001 review took place in the wake of serious flooding, the majority of its recommendations related to the emergency response at the time. This Select Committee has taken a fresh look at flood risk management in Kent and while there was insufficient time to follow up on each of the earlier recommendations in detail, they were borne in mind throughout this review.

- i) For flood risk to be managed effectively in future it will be necessary to take account of flooding from all sources: fluvial (river), pluvial (rainfall)/flash flooding, groundwater, as well as drainage (including sewerage related) and, most importantly for Kent, the risk of flooding from the sea. Currently responsibility for various types of flooding lies with a number of different agencies and while there is in most cases a high level of co-operation between them there is the potential for confusion and delay both in the normal course of events and during emergencies. Responsibility for different aspects of drainage and flood risk management is highly complex and, for example, around 200 organisations have a management interest in sea defence and coastal protection.²
- j) The majority of funding for flood risk management comes from the government. However competing demands within the Department for Environment and Rural Affairs (DEFRA) have impacted adversely on funds available over the past two years and although, following recent floods, some of the 'lost' funds will be reinstated, there has clearly been an impact on the progress of plans, defence schemes and essential maintenance.
- k) Having heard from a range of stakeholders the Committee are confident that progress has been made in terms of structural flood defence since the serious flooding in the county in 2000/2001. It will be necessary to retain a focus on the topic and secure adequate funding in order to ensure that these advances are not lost and that the excellent relationships and co-ordination between partner organisations are maintained and enhanced.

1.7 Summary of Recommendations³

Organisational Responsibilities

R1 That KCC look into setting up and resourcing a permanent Flood Risk Committee, in partnership with District Councils, to monitor: organisational changes affecting the management of flood risk in order to minimise the effect of such changes; the KHS gully clearance programme; non-structural means adopted by KCC and District Councils to reduce flood risk, and the Environment Agency's progress on proposed flood defence works as well as maintenance of existing defences.

Funding for Flood Defences

R2 That there should be adequate, ring-fenced, direct government funding for flood risk management to provide a more transparent system which will reassure the public that vital plans, strategies and flood defence work will not be compromised by competing demands within DEFRA or elsewhere.

² Institute of Civil Engineers (2001) Land Drainage and Flood Defence Responsibilities

³ Those recommendations the Select Committee see as most important are in bold type.

R3 That KCC should lobby the government to consider re-designating the flood management arm of the Environment Agency as a dedicated flood risk agency as well as giving the EA a strategic overview of all types of flood risk.

R4 That KCC promotes the further development of an Engineering Consultancy led by Canterbury City Council Engineers to disseminate good practice and offer training/apprenticeships to build a practical skills-base and retain local knowledge/expertise in flood risk management.

Flood Risk Management plans

R5 That KCC supports development in brownfield and other areas subject to the rigorous application of site specific sequential and exception tests of Planning Policy Statement 25 (PS25).

R6 That KCC oversee the development of further sub-regional flood risk assessments, based on river catchments, and undertakes to monitor this development.

R7 That KCC ensures that its Environment and Waste Team are sufficiently resourced to enable them to: develop a county-wide coastal policy; maintain their oversight of Shoreline Management Plans (SMPs) to promote consistency across the county; and raise public awareness of plans.

R8 That KCC should lead on the co-ordination of work with landowners and other agencies to identify options for the funding of changed land-use or buy-out to ensure that plans to achieve more naturally functioning flood plains and coastline in Kent are arrived at equitably.

R9 That KCC works in partnership with the EA to ensure that River Basin Management planning is fully integrated with existing Catchment Flood Management Plans (CFMPs) and with regard to SMPs.

R10 That Kent Highway Services (KHS) and the EA seek to reconstitute Flood Liaison Advice Groups (FLAGS) in Kent (ideally catchment based), with representation from the insurance industry and local communities.

Urban Development, Drainage and Design

R11 That KCC instigates discussions between local planning authorities, Southern Water and others on the feasibility, benefit and cost implications of using non-return valves/sealed sewage systems in all new developments and existing developments where sewage flooding is proven to be a problem and requiring it to be a condition of planning consent.

R12 That KCC promotes the use of sustainable drainage systems (SUDS) throughout Kent with over-attenuation of surface runoff, guided by best practice adopted by

Canterbury and Ashford councils and findings of the integrated urban drainage pilots.

R13 That Kent planning authorities adopt the requirement for Drainage Impact Assessments for all new developments, following the Canterbury model.

R14 That the Fire & Rescue Service are included as an active partner in the planning process for new developments.

R15 That the Kent Design guide is revised to include information on mitigating flood damage and makes reference to innovative designs for the future, such as floating homes.

R16 That KCC lobbies government to produce a set of Building Regulations for use in flood risk areas so that planners are supported by increased but nationally consistent obligations to assist developers with a high level of flood proofing/mitigation.

R17 For KCC to work in partnership with the EA to publicise actions householders can take to increase the flood resilience of their homes.

R18 That KCC specifically allocate funding to enable the proposed road gully cleansing work to go ahead without delay and, where necessary, to enable the condition and capacity of highway drainage systems to be improved and the location of gullies and their characteristics to be recorded on GPS. That the KHS winter maintenance budget is readjusted to become an extreme weather budget.

R19 That KCC works in partnership with local authorities, the police and traffic wardens to inform the public about road drainage cleansing activities to address the issue of vehicles obstructing gullies and delaying vital works.

Condition of Kent Flood Defences

R20 That the government should urgently consider the EA's request for funding to enable vital works to proceed at Jury's Gap, Camber.

R21 That the EA should encourage the input of local authority and Internal Drainage Board (IDB) experts on local strategies and schemes and that IDBs gain representation on the Southern Regional Flood Defence Committee (RFDC) in order to optimise the benefit to be gained from local knowledge.

R22 That the EA develop and implement a phased rolling programme of maintenance to include 'low risk' areas (in collaboration with the Kent Internal Drainage Boards).

R23 That the EA prioritise clearance of waterways in the Romney Marsh Area.

Emergency Planning

R24 That the Kent Resilience Forum (KRF) Severe Weather Group (SWG) audit and promote the development of emergency plans/specific flood plans for at risk areas in liaison with the Environment Agency and develop a generic flood plan for Kent.

R25 That the government consider placing a duty (with funding) on the Fire & Rescue Service to respond to a flood emergency and further considers designating FRS as the lead body in charge of a flood incident.

R26 That the Kent Resilience Forum Severe Weather Group formulate and publicise an action plan in relation to flooding to raise public confidence in Kent's preparedness for flood events and consideration should be given to merging the SWG with the Flood Warning Planning Liaison Group to reduce duplication and avoid confusion as part of a wider streamlining of the group structure within the Resilience Forum.

R27 That KHS should send officers to work alongside local district colleagues in an emergency situation.

R28 That the Environment Agency, through its chairmanship of the KRF Severe Weather Group, should ensure there is a systematic survey of critical infrastructure (location and flood defences) and through the SWG promote work with utility companies to ensure supplies can be protected and maintained during flood emergency situations.

R29 That the Severe Weather Group liaise with partners in the Kent Resilience Forum and east coast authorities to formulate an emergency response plan for an extreme coastal event and, given the risk to life and property from sea flooding, assess whether the current warning system and communication processes are adequate or whether a siren system should be acquired for Kent, and that people are educated about what to do when they receive a flood warning.

Raising Public Awareness

R30 That KCC support the Environment Agency in raising flood risk awareness (including the appointment and training of flood wardens and to ensure that vulnerable people are identified and supported in emergency situations) via town and parish councils and similar community groups.

2 National Policy Development

- a) Legislation on land drainage (which does not include the flow from man-made surfaces) and flood management are historically intertwined and some of the current complexities around responsibility are largely inherited and due to the sporadic development of flood management policy in England and Wales. Land was originally drained to improve agricultural productivity (and this dates back at least to the 13th Century in Kent).
- b) Policy developed, in the main, in response to flood events and until the 1990s the focus was on hard flood defences and 'keeping water out'. Currently flood defences are seen as one, albeit vital, strand of sustainable flood risk management.
- c) The government's 1993 strategy for the management of flood and coastal defence in England and Wales signified an acceptance of flooding as a natural event to be mitigated against rather than avoided at all costs. It encouraged improved flood warnings, sustainable flood and coastal defence (in terms of environment, economy and technical developments) and an avoidance of risk by directing development away from areas prone to flooding or coastal erosion (Thorne et al 2007⁴).
- d) In 2000, the United Nations Economic Commission for Europe (UNECE) guidelines outlined 'Seven basic principles and approaches regarding sustainable flood prevention.'⁵
 - ≈ Flood events are part of nature and will continue to exist.
 - ≈ Human interference with natural processes has increased the threat of flooding and should where possible be reversed and in future prevented.
 - ≈ Structural measures are important elements of flood protection and prevention and should in future focus on human health and safety, valuable goods and property.
 - ≈ Requirements of nature conservation and landscape management should be taken into account.
 - ≈ Everyone who may suffer from the consequences of flooding should also take their own precautions assisted by appropriate information and forecasting system by the competent authority.
 - ≈ Human uses of flood plains should be adapted to the existing hazards and appropriate instruments and measures developed to reduce flood risk.
 - ≈ In flood-prone areas, preventive measures should be taken to reduce possible adverse effects of floods on aquatic and terrestrial ecosystems, such as water and soil pollution.⁶

⁴ Thorne, C.R., Evans, E.P., Penning-Rowsell, E.C., (2007) Future flooding and coastal erosion risks, Thomas Telford, London

⁵ The word 'prevention' is often now replaced with the words 'management' or 'risk management' since moving towards naturally functioning floodplains/coastlines involves allowing flooding to happen.

- e) Later UNECE work however, identified some of the challenges of this approach, not least the need for adequate funding to ensure all the strands could be brought together and the inequity of focussing on value of property to the detriment of farmers and rural communities.
- f) Increasingly conservation and environmental aims are at the forefront of policy and practice. The protection of wildlife habitats is assured through European Union Directives which reflect a growing worldwide concern for the natural environment. This has, however, introduced conflicts into flood risk management which some contributors to this review feel give greater prominence to the natural environment than to the safety and wellbeing of people.
- g) Following catastrophic UK floods in 1998 and 2000, the Office of Science and Technology commissioned the Foresight Future Flooding Project to underpin future policy over the next century. To account for uncertainty a number of possible scenarios, or variables, were used and a key conclusion was that:

'Under every scenario, our analysis suggests that if current flood-management policies remain unchanged, the risk of flooding and coastal erosion will increase greatly over the next 30 to 100 years.'

- h) 'Future Flooding' predicted that climate change impacts and economic development would cause the number of properties at high risk of urban flooding to rise more than fourfold from 200,000 to up to 900,000 and the number of people at high risk from river or coastal flooding to more than double from 1.6million to up to 3.6 million.⁷ However, although 'Future Flooding' considered flooding from all sources, it is evident that the fragmentation of management responsibilities for those different sources has in many ways hindered progress in this country.
- i) DEFRA and the Environment Agency are now engaged in a Joint Programme of Flood and Coastal Erosion Risk Management Research and Development to inform policy and link scientific research to operational aspects. Following a review in 2005, the programme takes into account the needs of all flood and coastal defence authorities and covers:

Strategy and Policy Development (SPD)

⁶ Economic Commission for Europe (ECE) (ed.) (2000), 'Guidelines on Sustainable Flood Prevention', September 2000, Geneva, submitted at the Meeting of the Parties to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Second meeting, The Hague, Netherlands, 23-25 March, 2000

<http://www.unece.org/env/water/publications/documents/guidelinesfloode.pdf>

⁷ Alison Cambray, DEFRA Seconded to KCC, oral evidence 23rd July 2007

Modelling and Risk (MAR)
 Sustainable Asset Management (SAM)
 Incident Management and Community Engagement (IMC)⁸

- j) A cross-government strategy 'Making Space for Water' (MSW) is now being implemented under the leadership of DEFRA through 25 projects under four key themes: a holistic approach; sustainable development; increasing flood resilience; and funding. Implementation will be completed in early 2008, building upon the 1993 strategy and ensuring that climate change and its impacts are integral to decision making.
- k) New non-statutory High Level Targets for the management of flood and coastal erosion risk were issued on 1 April 2005 to replace those issued in November 1999 in the context of the 1993 strategy and these are shown in Table 1 below. The targets were developed by DEFRA in consultation with the EA, the Association of Drainage Authorities (ADA), the Local Government Association (LGA) and others. A report on progress is made annually by the LGA and EA to DEFRA and the Department for Communities and Local Government (DCLG).

Table 1: High Level Targets on Flood and Coastal Erosion Risk Management

	Subject	Who?
Target 1	Policy Delivery Statements	All Operating Authorities
Target 2	Information on the National Flood and Coastal Defence Database	Certain/all Operating Authorities
Target 3	Shoreline Management Plans	Designated Lead Authorities
Target 4	Biodiversity	Certain/all Operating Authorities
Target 5	Development in areas at risk of flooding and coastal erosion	EA/Coast Protection Authorities
Target 6	Internal Drainage Board organisation and administration	Association of Drainage Authorities (ADA)/IDBs

- l) An output and performance measure relating to 'non-structural' actions which can be taken to contribute to flood risk management is also proposed.⁹ Throughout this Review the Select Committee have considered how KCC could contribute by these means, whether or not the Indicator is subsequently introduced.

⁸ The latest annual report can be accessed at: <http://www.DEFRA.gov.uk/environ/fcd-research-annualreport07.pdf>

⁹ [Indicator: Flood and coastal erosion risk management](#)

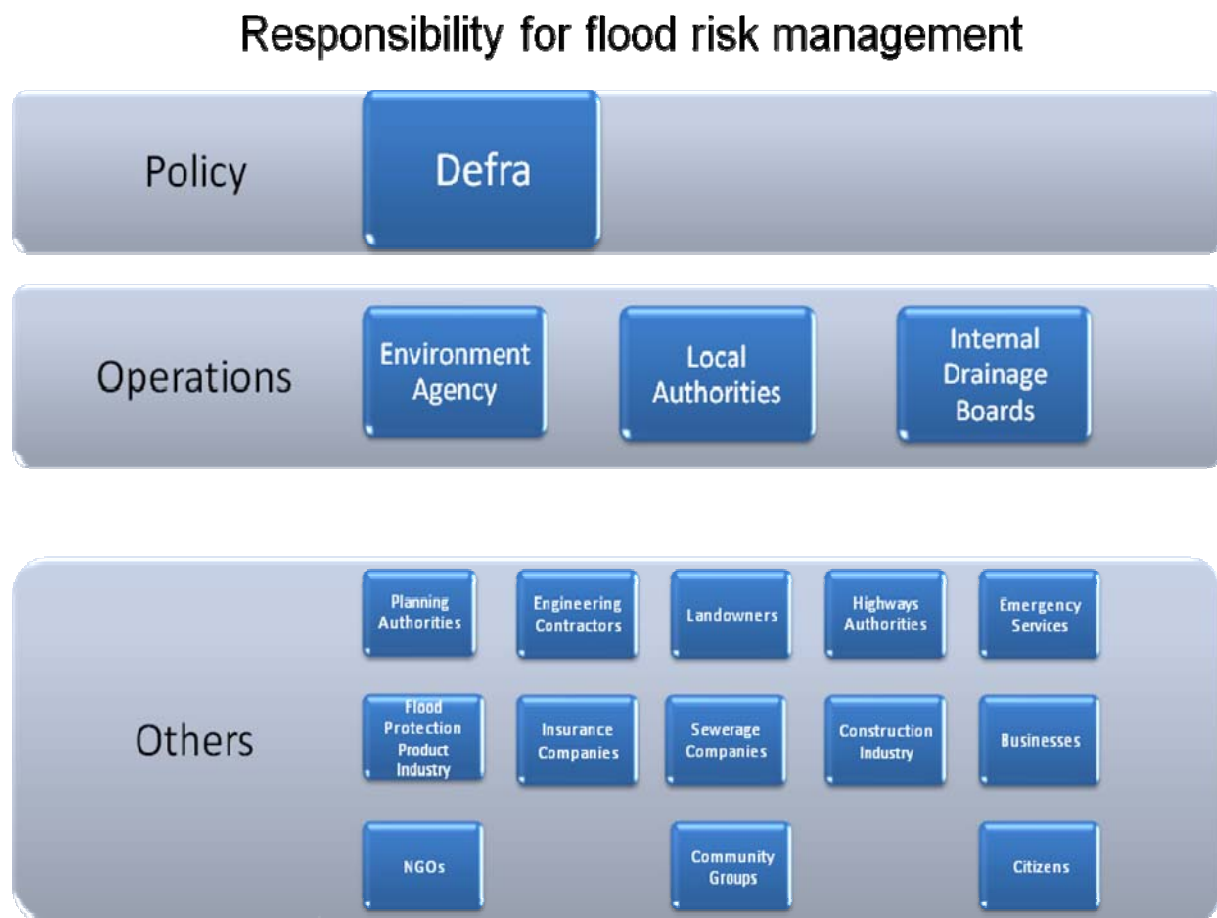
3 Organisational Responsibilities

R1 That KCC look into setting up and resourcing a permanent Flood Risk Committee, in partnership with District Councils, to monitor: organisational changes affecting the management of flood risk in order to minimise the effect of such changes; the KHS gully clearance programme; non-structural means adopted by KCC and District Councils to reduce flood risk, and the Environment Agency's progress on proposed flood defence works as well as maintenance of existing defences.

Explanation of recommendation follows:

a) Figure 1 below shows the numerous organisations and individuals involved in different aspects of flood risk management.

Figure 1: Responsibility for Flood Risk Management



b) DEFRA: policy responsibility

- i. The Department for Environment and Rural Affairs (DEFRA) is the lead government department with policy responsibility while operational responsibility lies mainly with the Environment Agency (EA), created in 1996, as the principal operating authority for England and Wales having inherited this part of their role from the National Rivers Authority. The supervisory duty of the EA covers:
 - ≈ Condition of flood and coastal defences and critical ordinary watercourses
 - ≈ Assessment of flood risk
 - ≈ Achievement of DEFRA High Level Targets (HLT)
 - ≈ Emergency response to flooding incidents
 - ≈ Awareness of flood risk in the community
 - ≈ Future development proposals that have potential impact on flood risk
 - ≈ Regulation of others
 - ≈ Application of conservation duty and environment impact

Each aspect of the duty is explained in detail on the DEFRA website:
[DEFRA, UK - Flood Management - Aims and Objectives](#)

c) Environment Agency: sea defences and works on main rivers

- i. The EA are empowered by the Water Resources Act 1991 to manage flood risk from main rivers and the sea. They also carry out flood forecasting and warning and now have a 'strategic overview for all issues' as part of the evolving government strategy on flood risk management 'Making Space for Water'. This is one aspect of the EA's overall function which is broadly environmental protection and enhancement, including pollution control and fisheries management. The EA are not operationally responsible for the management of coastal erosion which remains the domain of maritime councils; in Kent, these are Swale, Thanet, Dover and Shepway, plus other bodies on specific sections of coast.
- ii. The EA deliver (including allocation of defence scheme funding) through 11 Regional Flood Defence Committees (RFDCs) with membership and powers governed by statute. Local FDCs including Kent's were lost when RFDCs were rationalised under Schedule 4 of the Environment Act, effective from 1st April 1995. A single Southern RFDC now operates for Kent, Sussex, Hampshire and the Isle of Wight and KCC is represented by three Members.
- iii. The EA through RFDCs have statutory powers (permissive powers) to:
 - ≈ Maintain and improve main river flood defences
 - ≈ Maintain and improve sea or tidal defences
 - ≈ Install and operate flood warnings
 - ≈ Control the actions of riparian owner/occupiers (if they restrict the flow of watercourses)

d) Internal Drainage Boards: works on ordinary watercourses in their drainage districts

i. IDBs were set up in low-lying areas of England with ‘special drainage need’ following the Land Drainage Act 1930 (succeeded by 1991 and 1994 Acts). Recently, the number of IDBs has decreased due mainly to amalgamations and, in line with current High Level Target 6, the organisation and administration of IDBs is under continuous review. There are currently around 170 with 4 of these being in Kent: Medway IDB, River Stour IDB; Romney Marsh Area IDB and Lombards Wall to Gravesend Bridge which is managed by the Environment Agency. There were originally 10 IDBs in Kent, 5 of which amalgamated to become the Romney Marsh Area IDB; the Medway IDBs have also amalgamated.

ii. The duties of IDBs under the Land Drainage Act are:

general supervision over land drainage within the IDB district;
general duties with respect to the natural and built environment (including recreation and public access);
maintenance of a list of all hereditaments,

in addition to discretionary powers to:

undertake works to alleviate flooding;
improve and maintain the drainage system, including the operation of pumping stations, weed screens and sluices;
regulate and control the actions of riparian owners/occupiers in and alongside watercourses so that defences are not damaged nor flow impeded;
create bye-laws;
raise income through general charges to cover the cost of flood and water level management schemes and other land drainage.

iii. The bulk of IDB work involves maintenance of rivers (except main rivers), drainage channels and pumping stations and they are also involved in drainage for new developments and advising on planning applications. A recent national review of IDBs carried out by consultants on behalf of DEFRA¹⁰ found that apart from a few smaller boards, IDBs were working well and should be retained, preferably under the direction of the EA to whom they could offer substantial expert advice. Areas of weakness were identified around IT skills, accountability and environmental management and a detailed timetable for improvements is set out in HLT6.

iv. The Select Committee learned that despite the key role of the remaining IDBs in

¹⁰ <http://www.DEFRA.gov.uk/enviro/fcd/studies/idbrev/report.pdf>

Kent and despite requests on a number of occasions, none of Kent's Internal Drainage Boards have so far been able to gain representation on the Southern RFDC.^{11 12 13} The IDBs also pay a precept (collectively over £1 million) to the EA which is comparable to that paid by KCC, who have three member representatives. The Select Committee believe that this constitutes a loss of vital local input and advice on proposed spending, particularly given the regional focus of the FDC structure which also does not give a voice to local landowners.

- v. IDBs have a role currently and in the near future in undertaking a number of specific actions¹⁴ including, by 31st March 2008, 'a visual inspection of watercourses, raised defences and structures, culverts and pumping stations and inputting condition of assets' into the National Flood and Coastal Defence Database (NFCDD)¹⁵. In view of the EA's particular strengths in the areas of IT and environmental management a closer working relationship with the IDBs would seem essential and this, coupled with the expertise IDBs can offer, would suggest that the EA should review their decision not to allow representation from Kent's IDBs on the Southern Regional Flood Defence Committee. The Select Committee learned that a further 'shake up' of RFDCs would be taking place though it is not known at this stage what effect such reorganisation may have in Kent.

e) Local Authorities: works on ordinary watercourses outside IDB districts

- i. Local authorities (the district, borough and city councils in Kent) look after ordinary watercourses outside of IDB districts and five of the 12 districts are Maritime Local Authorities who are also responsible for the prevention of coastal erosion and may carry out sea defence works to prevent flooding. For example, 50% of Shepway is in the Romney Marshes Area Internal Drainage Board District; the other half is the responsibility of the local authority except for the main rivers which are the responsibility of the Environment Agency.

f) Kent County Council: network management, environmental management, land use and transportation and emergency planning

- i. KCC contributes to the overall management of flooding through its responsibility for network and environmental management, land use and transportation, and emergency planning which are detailed on the KCC website at: [Our responsibilities](#) and discussed in this report under the relevant topics.

¹¹ Mike Watson, Medway IDB, written evidence

¹² Derek Lewis, River Stour IDB, written evidence

¹³ I.D. Oliver, Romney Marshes IDB, written evidence

¹⁴ Detailed in the IDB Review Implementation Plan at:

<http://www.DEFRA.gov.uk/environ/fcd/studies/idbrev/impplan.pdf>

¹⁵ [DEFRA, UK - Flood Management - National Flood and Coastal Defence Database](#)

g) Responsibility for urban drainage

‘The fragmentation of drainage responsibility can lead to delay, confusion, cost and frustration in planning, construction, maintenance and flood incident response.’

Source: Sean Furey, CPRE, written evidence

- i. The Select Committee learned how the complex nature of responsibility for urban drainage epitomised flood risk management as a whole and explained some of the difficulties agencies have when co-ordinating their flood management activities. Sean Furey, Deputy Director of CPRE cited an example of flooding on a redevelopment site (on a flood plain) where the lack of clarity over who should pay for remedial works led to lengthy arguments between eight separate organisations. Mr Furey also provided Table 2, to illustrate this point.

Table 2: Responsibility for urban drainage

Drainage/ course type	Water- Activity	Responsible Body	Funding
Main River	New/ Existing Flood Defences	Environment Agency	DEFRA, local levies or developer contributions
Main River	Channel maintenance	1.Riparian landowner 2.Environment Agency	1. Private 2. DEFRA
Main River	Planning controls/ land drainage consent	1.Environment Agency 2.Local planning authority	Application fees
Main River	Navigation	Environment Agency	Navigation fees
Ordinary Watercourse	channel maintenance	1. Riparian landowner 2. IDB 3. Borough/District Council	1. Private 2. IDB fees 3. Council tax
Ordinary Watercourse	Planning controls/ land drainage consent	1. IDB 2. Local planning authority	Application fees
Roads and Highways	Adoption and maintenance	1. Kent Highways 2. Highways Agency 3. Private	1. Council Tax 2. Dept. of Transport 3. Private
Combined, Foul and Surface Sewers	Adoption and maintenance	Southern Water	Water Customers (regulated by OFWAT)
Private sewers	Adoption and maintenance	Landowner	Private
Sustainable Urban Drainage Systems	Adoption and maintenance	Varies	Varies
Land Drainage	Maintenance	Landowner	Private

h) Reorganisations within the EA

- i. The Select Committee learned that the EA have undergone and are continuing to undergo many reorganisations as shown in table 3¹⁶ and evidence from several sources suggested that, since reorganisations have included boundary changes and led to staff changes this had in some cases interrupted the good relationships that the EA had built up between councils¹⁷, the local drainage boards and organisations such as the CPRE, being, as they have been, in an almost constant state of flux.

Table 3: Reorganisations within the Environment Agency

Period	Reorganisation Name	Functions affected	Driver
1995-96	Formation of the Environment Agency	All	Environment Act 1995
1997-98	Next Steps	All	Further organisational integration
1998-2000	Changing Needs in Flood Defence (CNFDR)	Flood Defence, Flood Warning, Development Control, Direct Works	1998 Easter Floods and resultant Bye report.
2001-2003	Better Regulation Improving the Environment (BRITE)	All (except Flood Defence and Flood Warning)	Increasing regulatory duties without extra resource
2004 – 2005	Incident and Flood Risk Management (iFRM)	Flood Defence, Flood Warning, Direct Works	Efficiency gains
2006 onwards	More for the Environment, Better, Faster and for Less	Environment Management and Corporate services Functions.	Efficiency gains/DEFRA cuts
2007 onwards	More for the South (transfer from 3 Areas to 2 in Southern Region)	i. All in Southern Region	Efficiency gains/DEFRA cuts

- ii. Despite the commitment of individual members of staff within the EA, the Select Committee echo the concerns expressed by CPRE and others that flood risk strategy, planning and operations have suffered and may continue to be

¹⁶ Sean Furey, Deputy Director, CPRE, written evidence

¹⁷ Ted Edwards, Engineering Manager, Canterbury City Council, oral evidence 31st July 2007

compromised by 'a succession of internal reorganisations' and a 'near constant state of reorganisation'. Furthermore it is envisaged that yet more restructuring may result if in Kent the EA split into administrative areas to match River Basin Districts.

- iii. The Select Committee consider that the increased risk of flooding in Kent due to climate change impacts, coupled with the rapidly evolving policy and operational response, merit a mechanism of oversight by the county council and it is suggested that KCC should investigate the resourcing of a standing Flood Risk Committee to monitor the situation. Such a committee must have representation from district councils in order to gain maximise benefits and pool resources. The suggested committee could also oversee non-structural actions to be taken by KCC and local councils to contribute to flood risk management and its wider appreciation among Kent residents, whether or not a government indicator to this effect is forthcoming. It could work closely with the Severe Weather Group of the Kent Resilience Forum and maintain contact with local communities through a medium such as Flood Liaison Advice Groups (FLAGS) to ensure that the both the standard of defences and awareness of flood risk, are maintained at an appropriate level.

4 Funding for flood defences

R2 That there should be adequate, ring-fenced, direct government funding for flood risk management to provide a more transparent system which will reassure the public that vital plans, strategies and flood defence work will not be compromised by competing demands within DEFRA or elsewhere.

R3 That KCC should lobby the government to consider re-designating the flood management arm of the Environment Agency as a dedicated flood risk agency as well as giving the EA a strategic overview of all types of flood risk.

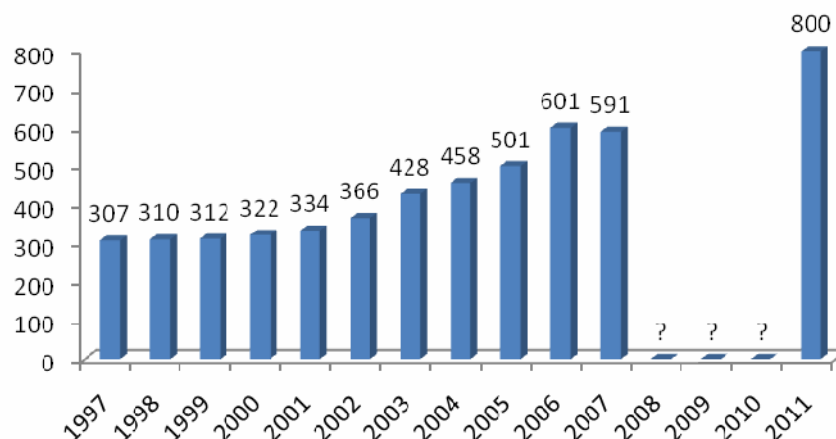
R4 That KCC promotes the further development of an Engineering Consultancy led by Canterbury City Council Engineers to disseminate good practice and offer training/ apprenticeships to build a practical skills-base and retain local knowledge/expertise in flood risk management.

Explanation of recommendations follows:

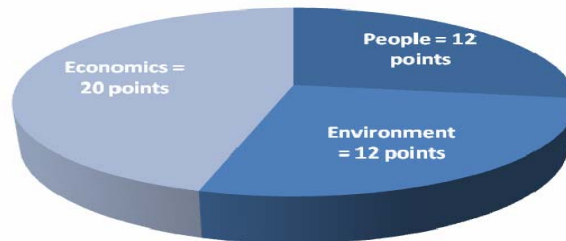
- a) Government spending on flood and coastal erosion management has risen over the last ten years from £307 million in 1997 to £600 million in 2006. The government has further committed to increase the total annual figure to £800 million by 2010/11. In Figure 2 below the 2007 spend is an estimate; 2011 a projection and final figures for 2008-2010 will be confirmed in the Comprehensive Spending Review (CSR07) Statement.

Figure 2: Government spending since 1997

Total central and local government spending on flood and coastal erosion management (£million)



- b) Since April 2006 funding has been simplified and eligible capital projects are now 100% grant funded (rather than a combination of grant and revenue as previously).
- c) In order to fund schemes RFDCs currently bid for a share of the finite national pot based on a Priority Scoring System which calculates the costs vs benefits of a scheme in economic, human and environmental terms. The maximum points score is 44, divided as shown below.



- Economics:** the cost of potential flood damage x the chance of it occurring must be 10.5 times the scheme cost;
- People:** the number of homes protected per £1000 scheme cost (8 pts) plus 4 points if the scheme reduces public safety risk and/or protects vulnerable people;
- Environment:** the scheme should maintain or improve wildlife habitats. Calculated using hectares of designated sites protected and hectares of habitat gain using Biodiversity Action Plan (BAP) guidance (400 species are protected) per £1000 scheme cost.

- d) Schemes scoring highest on the priority system are considered for funding subject to other considerations such as obtaining planning permission. The threshold for 'success' varies according to the amount of money in the national pot and is usually around 20 points. Due to the Southern Regional Flood Defence Committee's 'strong strategic approach to lining up the capital programme' Kent currently attract around 7% of the national pot of flood defence funding. In 2007/8 this equates to around £16 million for major capital schemes (double the investment for 2003/4).¹⁸ The Select Committee was further informed that the EA's total 'flood risk' budget this year includes a further £1 million local levy funding, £1.5 million for minor works and £7 million for maintenance bringing the Kent total to £25.5 million.¹⁹
- e) DEFRA are seeking to ensure that funding represents good value for money in terms of taxpayers' investment and will in future be using a system of outcome measures with associated targets, instead of the priority system. Outcome measures and targets will relate to:

¹⁸ Alison Cambray, DEFRA secondee to KCC, oral evidence 23rd July 2007

¹⁹ Clive Older, Environment Agency, oral evidence 31st July 2007

- ≈ Overall benefits
 - ≈ Households at risk
 - ≈ Deprived households at risk
 - ≈ Nationally important wildlife sites
 - ≈ UK Biodiversity Action Plan habitats
 - ≈ Flood warning
 - ≈ Contingency (emergency) planning
 - ≈ Inappropriate development
 - ≈ Long term policies and action plans (CFMPs/SMPs)
- f) Mr Older, Flood Risk Manager of the Environment Agency in Kent, told the Select Committee that extra money may be forthcoming to improve drainage since flash flooding had proved to be a key contributing factor in the recent floods in the Midlands, but could not confirm this. SEERA indicated to the Select Committee that 'significant investment' would be required in order to ensure that flood risk measures are fully integrated with proposed growth particularly in Ashford and Kent Thameside and to protect existing developments.

'To allow for anticipated climate change over the next 50 years, an overall increase of between 35 and 85% in flood defence spending would be required.'

Source: National Appraisal of Assets at Risk from Flooding and Coastal Erosion, including the potential impact of climate change. DEFRA, July 2001

g) Funding through DEFRA

- i. In the latter half of 2006 investment in flood risk management was affected by competing financial demands within DEFRA. DEFRA needed to recoup £200 million losses incurred from changes to accounting, preparations for avian (bird) flu and a complex revision to the single farm payment scheme (SFPS) leading to a 50% rise in claimants and huge administrative costs to DEFRA; and social and financial costs to farmers, (many of whom have still not received payments). The net result for flood risk management was a cut in funding of £14.9 million (Natural England suffered £12 million cuts). It was intended that construction of new defences would proceed and the bulk of cuts would come from a slow-down in maintenance. (Work at Dymchurch to maintain the sea wall has, for example, been delayed by a year.) While this has been the main effect in Kent, the budgets for flood warning and mapping have also been affected.
- ii. The Select Committee, having witnessed at first hand evidence of the effects of funding cuts, feel that flood defence is too important an issue to suffer delays of this sort. Climate change impacts are beginning to be felt and we need to have the necessary resilience. Policies and plans that have been put in place are a

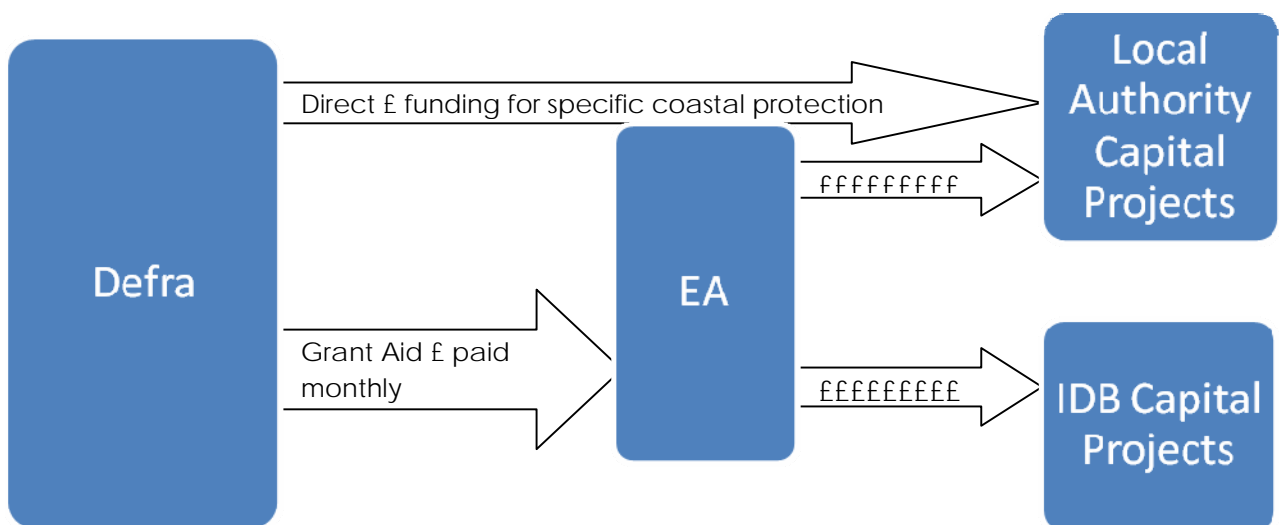
pragmatic approach to flood risk management based on firm scientific research and failing to progress them, or to maintain defences now, could at best lead to more costly remedial works later on and, at worst, to disaster for Kent communities and residents. For this reason the Select Committee would strongly suggest that ring-fenced flood defence funding should go direct to a single agency and if that agency is the EA then the system should be made more transparent by separating the environment and flood management 'arms' so that any future competing demands do not affect the efforts being made across the country to protect people, property, the environment and the economy from the effects of flooding.

- iii. The Select Committee also feel that separating and renaming the environmental and flood risk arms of the EA would help to raise the profile of flood risk management to an appropriate level and would reassure professionals and the public that the serious issue of flooding was being given a high priority.

h) Engineering Consultancy

- i. As part of MSW strategy DEFRA has restructured its Flood Risk Management Division and is gradually transferring more responsibility and the control of funds to the Environment Agency. DEFRA announced in March 2006 their intention to hand over to the EA in April 2008 responsibility for the prioritisation, approval and allocation of grant for all projects undertaken by operating authorities. In Kent this means that decisions effectively rest with the Area Flood Risk Manager, Clive Older, who gave evidence to this Select Committee. The mechanics of the changeover have not yet been fully worked out. Figure 3 shows how funding currently reaches projects.

Figure 3: Current route of funding (until April 2008)



- iii. From April 2008 the funding currently going directly to local authorities for the management of coastal erosion will be routed via the Environment Agency.²⁰ There is considerable concern that in Kent this may lead to increased difficulty obtaining money for schemes and that more will be spent on bureaucratic processes. However it should provide some clarity as currently local authorities can choose from two pots of money for a coastal scheme (either 'flood' or 'erosion') with different criteria.
- iv. Coastal defence schemes proposed by Canterbury and Shepway have generally been 'very successful' in their bids for DEFRA funding. The long-standing arrangements and co-operation of the voluntary South East Coastal Group are now being formalised into cluster arrangements which provide an opportunity for joint working and potentially joint contracts and procurement. Canterbury are currently taking a lead role with East Kent maritime districts (Canterbury, Dover, Thanet and Shepway) and, now that Swale have requested to join this group, it provides an opportunity for all the main coastal authorities in Kent to engage in partnership work. Ted Edwards, Canterbury City Council's Engineering Manager, said he felt that this partnership work would raise standards considerably making it less likely that the EA would wish to take over some or all of coastal management. Joint procurement could also reduce costs to the participating councils for both capital and maintenance works.
- v. A considerable body of expertise and local knowledge has been built up in Canterbury's Engineering section. Budgetary pressures have resulted in some local councils' engineering sections being depleted; Canterbury opted to take on outside work in order to retain and build upon their substantial experience. Most of the work they currently undertake relates to coastal defence work.
- vi. Substantial coastal defence improvements have been made since 2000 (strategically driven by the first stage Shoreline Management Plans). The main expenditure has been on schemes at:

Warden Bay, Sheppey	£1 million
Whitstable	£6 million
Tankerton	£2 million
Kingsdown/Deal	£1 million
Folkestone/Hythe	£12 million

with others at Folkestone Warren (Railtrack) as well as major EA schemes at Littlestone/St Marys, Dungeness and Dymchurch. Large capital schemes can be costly: the delayed scheme at Dymchurch will eventually cost £60 million and account for £11.5 million (72%) of the £16 million available to the EA this year.²¹

²⁰ Clive Older, Flood Risk Manager, Environment Agency, oral evidence 31st July 2007

²¹ Clive Older, Environment Agency, oral evidence 31st July 2007

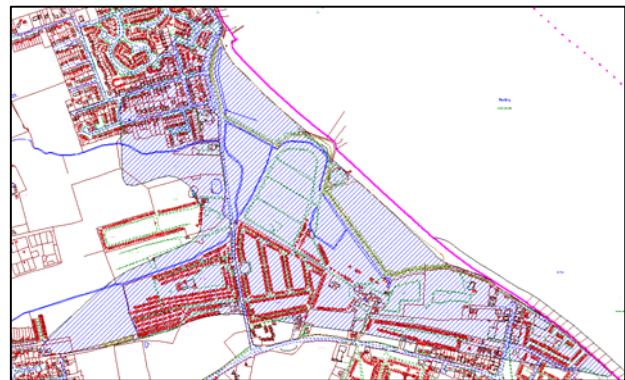
- vii. Canterbury acted for Swale Borough Council in obtaining funding for and supervising the works at Warden Bay and are currently engaged in partnership work with Thanet District Council regarding funding for defences at Margate Harbour. Other than through partnership working, local councils have worked with KCC on small jointly-funded inland schemes but do not approach KCC for levies. The EA can levy KCC through the Regional Flood Defence Committee and local councils can also raise funds for flood defences by entering into Section 106 agreements²² with developers. The Select Committee heard that this had been achieved by Canterbury City Council in relation to several sites including a site in Herne Bay where, following appeal, the landowner and developer were required, as a condition of planning permission for 293 dwellings, to construct attenuation lagoons to prevent the future flooding of Plenty Brook.²³
- viii. The Select Committee would like to see the consultancy role of Canterbury City Council extended in order to preserve the local focus of engineering expertise and ensure that less well resourced local councils are not disadvantaged by the absence of manpower or finance to invest in the preparation of comprehensive bids for funding. The Select Committee would not like to see the changes to funding of local authorities for coastal erosion schemes lead to a loss of local focus and expertise. The case studies on the next two pages demonstrate the success of two locally-managed schemes.

²² Section 106 of the Town and Country Planning Act 1990, whereby a local planning authority can enter into a (legally binding) agreement with a developer requiring them to take certain actions to minimise the impact of the development.

²³ Ted Edwards, Engineering Manager, Canterbury City Council, oral evidence 31st July 2007

Case Study: Rock Revetment at Warden Bay

Rock revetments are an engineering solution to the problem of eroding soft clay cliffs such as those found at part of the Sheppey Cliffs & Foreshore SSSI (Site of Special Scientific Interest), to the north west of the Imperial car park. Without intervention these cliffs erode at a rate of around 2 metres per year with occasional massive landslips such as occurred in 1971. As the photos and map below show around 210 houses would be lost as cliffs eroded and a further 200 would flood as the sea encroached onto low lying land behind (shown in blue).



Members of the Select Committee visited the site to see the progress of works which were designed and are supervised by Canterbury City Council Engineers and carried out by an experienced contractor.



The 260m long revetment, which will last for 100 years, will take around 6 months to complete at a total cost of £800,000. Although funded by DEFRA as primarily a coastal erosion issue, responsibility for the project lies with Swale Borough Council. SBC engaged Canterbury City Council's engineering team as consultants since they had expertise gained in managing similar clay cliff erosion at Herne Bay and Reculver.

17,000 1-3 tonne rocks were brought in by sea and are being laid precisely on a bed of polypropylene membrane and crushed rock base so that movement is minimised, the structure is safe and a small amount of erosion can still occur.



The public are involved through an on-site exhibition and noise, vibration and traffic are monitored. Environmental needs were taken into account through consultations with the EA, Natural England and others.

Case Study: Hythe-Folkestone Coast Protection & Lower Leas Coastal Park – combining sea defences with amenity benefits

Deterioration of defences built in the 1950s between Hythe and Folkestone placed 3,000 properties and £20m of commercial assets at risk of flooding. Having obtained grant aid from DEFRA (through the funding formula at that time) the District Council entered into a highly successful partnership with specialist, contractors Van Oord to renew defences. The scheme involved beach replenishment (with 326,000m³ shingle) and construction of 5 rock groynes with 210,000 tonnes of Norwegian rock armour. The area is now 'transformed' by the addition of a rock headland and structures enclosing static bays.



Residents were engaged in the process at open evenings and kept informed with regular newsletters, progress reports, information boards and notices. The second phase of works saw the complete restoration of the eastern Lower Leas Coastal Park, jointly funded by The Heritage Lottery Fund, SEEDA and Shepway District Council. The schemes won numerous awards and brought diverse benefits:

- Recreational:** wide shingle beaches and sheltered bays; 7km unbroken coastal walk, cycleways and footpaths; open space, play area and amphitheatre
- Environmental:** re-nourished shingle beaches have been colonised by maritime plants; rock structures provide sheltered habitat for marine life and for cormorants to feed; drought tolerant planting saves on watering
- Visual:** soft materials 'blend in'



The Select Committee believes that this scheme demonstrates well how flood defence works can be integrated with the wider aims of regeneration and, through effective, locally driven partnership working, bring excellent results to local communities.

5 Flood Risk Management Plans

R5 That KCC supports development in brownfield and other areas subject to the rigorous application of site specific sequential and exception tests of Planning Policy Statement 25 (PPS25).

R6 That KCC oversee the development of further sub-regional flood risk assessments, based on river catchments, and undertakes to monitor this development.

R7 That KCC ensures that its Environment and Waste Team are sufficiently resourced to enable them to: develop a county-wide coastal policy; maintain their oversight of Shoreline Management Plans (SMPs) to promote consistency across the county; and raise public awareness of plans.

R8 That KCC should lead on the co-ordination of work with landowners and other agencies to identify options for the funding of changed land-use or buy-out to ensure that plans to achieve more naturally functioning flood plains and coastline in Kent are arrived at equitably.

R9 That KCC works in partnership with the EA to ensure that River Basin Management planning is fully integrated with existing Catchment Flood Management Plans (CFMPs) and with regard to SMPs.

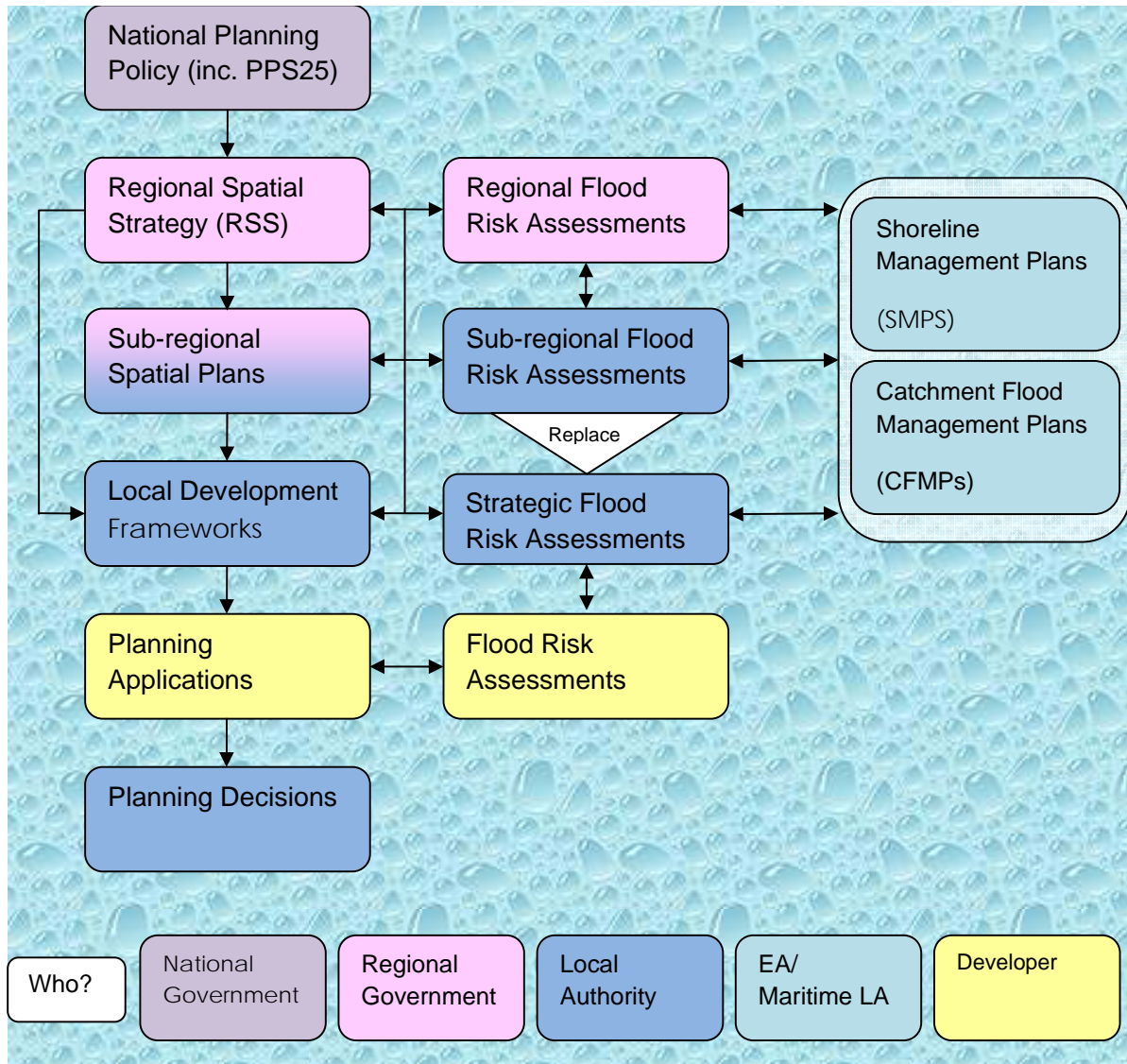
R10 That Kent Highway Services (KHS) and the EA seek to reconstitute Flood Liaison Advice Groups (FLAGS) in Kent (ideally catchment based), with representation from the insurance industry and local communities.

Explanation of recommendations follows:

- a) High Level Target 3 on Flood and Coastal Erosion Risk Management relates to Shoreline Management Plans.²⁴ Development in areas at risk of flooding and coastal erosion is covered by High Level Target 5.
- b) The system of planning as depicted in Figure 4 on the next page is a vital tool in reducing flood risk arising from, or affecting, new developments. The nature of the risk, its geographical distribution and the vulnerability of any development are taken into account throughout the process in order to avoid inappropriate development in areas prone to flooding.

²⁴ http://www.environment-agency.gov.uk/commondata/acrobat/hltreport0506_1579875.pdf

Figure 4: Hierarchy of flood risk planning



c) The above figure²⁵, shows the hierarchy of planning responsibility from national government policy down to shoreline and catchment management plans covering strategies and flood defence schemes. The overall planning system changed under the Planning and Compulsory Purchase Act 2004 and although local and structure plans and regional planning guidance have been replaced by Local Development Frameworks and a Regional Spatial Strategy (RSS) the Select Committee were told that the Kent and Medway Structure Plan, with robust policies in relation to flood risk, is still the active plan as the RSS is still in draft form and has not yet been signed off.²⁶ Under previous legislation KCC were the principal authority and now, under the Compulsory Purchase Act (CPA) 2004,

²⁵ adapted from Planning Policy Statement 25 (PPS25) Annex H

²⁶ Leigh Herington, Director of Strategy and Planning, KCC, oral evidence 30th July 2007

are strategic advisers and as such, contributed to the draft RSS. The Select Committee regret that the South East Plan, however, is less robust on flood risk than the Kent and Medway Structure Plan whose working paper WP14 deals specifically with flooding and flood risk.²⁷

- d) To assist decisions on where development should take place land is designated as being in one of four flood zones as shown in Table 4, according to the annual likelihood of flooding if there were no defences (even though there may be).

Table 4: Flood Zones

	Probability of flooding	Statistical chance/year	Description of flood
Flood zone 1	Low	Less than 0.1% chance	1 in 1000 year (extreme)
Flood zone 2	Medium (river)	0.1 – 1%	1 in 100 to 1 in 1000 year
	Medium (sea)	0.5 – 1%	1 in 200 to 1 in 1000 year
Flood zone 3a	High (river)	Greater than 1%	Greater than 1 in 100 year
	High (sea)	Greater than 0.5%	Greater than 1 in 200 year
Flood zone 3b	Functional Floodplain	5% or more	1 in 20 year or more (or designed to flood in extreme flood)

- e) In addition, sites are classified according to their strategic importance (vulnerability).



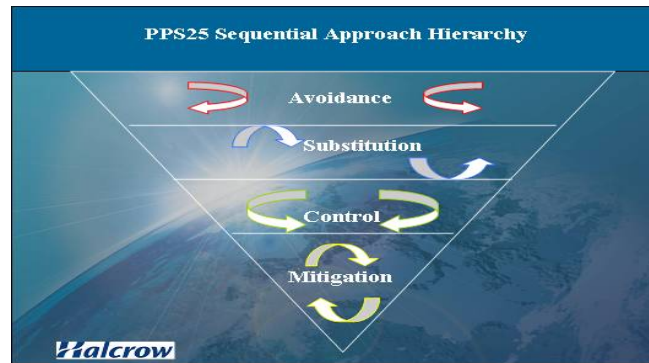
- f) 'Essential' infrastructure includes transport infrastructure and strategic utilities though not, curiously, water or sewage treatment plants which are classified at the other end of the scale as 'less vulnerable'. This is discussed further in the context of emergency planning.
- g) Flood risk planning policies are outlined in PPS25²⁸ which, in December 2006, replaced Planning Policy Guidance 25 (PPG25). PPS25 takes a more strategic approach and strengthens the 'Sequential Test' used to direct development away from high risk areas (i.e. consider the lowest risk flood zone 1 first). Figure 5 below shows that the sequential approach is one of avoidance of flood risk; substitution of

²⁷ <http://www.kmsp.org.uk/pdfs/KMSP-WP14.pdf>

²⁸ <http://www.communities.gov.uk/documents/planningandbuilding/pdf/154271>

location where possible; controlling the type of development and putting in place flood mitigation measures.

Figure 5: The sequential approach (Source: Halcrow, written evidence)



- h) PPS25 clarifies climate change policy and introduces an Exception Test²⁹ whereby development of a site is considered only if flood risk is outweighed by wider sustainability benefits to the community outlined in Local Development Document (LDD) objectives. It directs development to developable brownfield land, if available, and if not, to where it can be demonstrated by an FRA that residual flood risk to people and property is at a manageable level and overall the development contributes to reducing/managing flood risk. Consultation on draft PPS25 guidance closed on 20th August and the final document should be published later this year.³⁰
- i) Difficulties have arisen when decision makers are considering redevelopment sites in flood zones 2 and 3 as part of regeneration strategy, or infill sites in high risk areas behind defences, which are required to support the communities already there. In neither case would sequential testing come up with alternative sites. The position in these cases is clarified in a letter dated 2nd May 2007 from the Minister of Housing and Planning (appended to Reading Borough Council's Core Strategy background paper).³¹ These issues are exemplified by further development proposed for the growth areas of Ashford and Kent Thameside where substantial regeneration is planned in flood zones 2 and 3. In order to see an example of such development, members of the Select Committee visited Ingress Park which is being developed along the south bank of the Thames in Greenhithe. (Case Study on p37)

²⁹ See Annex D of the above document

³⁰ <http://www.communities.gov.uk/documents/planningandbuilding/pdf/324694>

³¹ http://www.reading.gov.uk/Documents/servingyou/planning/local_development_framework/Supp_Background_Paper_Flooding.pdf

Case Study: Ingress Park, Greenhithe

Members of the Select Committee visited Ingress Park to observe this part-completed development on a brownfield site on the south bank of the Thames at Greenhithe; part of Kent Thameside where a substantial proportion of 93,000 new homes may eventually be sited as part of the south east's regional development plans.



A variety of river defences protect the development visited – here soft banking and a rock-faced defence are crossed by a walkway along the river bank. The photo below (taken further east) shows how the existing wall was built up to ensure that predicted climate change impacts were taken into account. This part of the development is on the site of the old Empire Paper Mill.

Ground levels of the site were raised prior to building and the photos below show that properties were built with parking facilities underneath to raise accommodation levels still further. The open grilles would allow water to enter the car park in the event of a severe flood.



The site is downstream of the Thames Barrier opened in 1982 to protect London against a 1 in 2000 year flood. The barrier was for its first 20 years raised on average three times per year, but in 2003 it was raised 19 times. The level of flood protection for this area is still, however, 'the best in the country' at 1 in 1000, and in addition the government are conducting a feasibility study into the siting of a second Thames Barrier further east which would give greater protection to London, parts of Essex and Kent Thameside in the event of an extreme event. The last photo shows members receiving a talk from a senior engineer at the site regarding plans for development further east where the ground level is lower. There are opportunities here for environmental and biodiversity gains while also increasing flood storage to further improve safety and reduce flood risk.

- j) From 1st January 2007 a 'Flooding Direction'³² to accompany PPS25 gave much greater weight to the EA: ordering that planning authorities must notify the Secretary of State (via GOSE in Kent) if they decide to undertake a major development in a flood risk area against EA advice. There were 11 objections by the EA to planning applications in Kent between January and June this year and one relating to a proposal for sheltered accommodation at ground level within a flood plain. This case went to Judicial Review and planning permission was quashed with costs awarded against the local planning authority.

'Since the decision, the LPA and Environment Agency have been working closely together on a Strategic Flood Risk Assessment for the borough.'

Source: Environment Agency quoted by Sean Furey in written evidence.

l) Flood Risk Assessments (FRAs)

- i. There should be three levels of flood risk assessment:
- ≈ SEERA should look at FRAs broadly.
 - ≈ Districts are required to do strategic flood risk assessments.
 - ≈ Developers have to do site-specific FRAs for individual developments.
- ii. However, currently these three tiers are not joined up although SEERA have carried out a Regional Flood Risk Appraisal³³ to identify broadly where flood risk affects areas of proposed housing growth; for Kent this is Ashford and Kent Thames Thameside.³⁴ The appraisal provides a summary of the flood risk planning that has been taken into account when developing the South East Plan and sub-regional strategies.

m) Strategic Flood Risk Assessments (SFRAs)

- i. Around half of Kent districts have SFRAs and for the other half these are 'work in progress'. SFRAs are used to inform the sequential and exception tests required by PPS25 for the allocation of development, and development control and, as noted, the onus is on district councils as local planning authorities to carry out and fund strategic flood risk assessments. SFRAs should form part of the core evidence for Local Development Frameworks. An example of a comprehensive

³² Copies of PPS25 and the Circular and flooding Direction are on the Communities and Local Government website at: www.communities.gov.uk/index.asp?id=1504639
www.communities.gov.uk/index.asp?id=1504645

³³ http://www.southeast-ra.gov.uk/our_work/planning/sust_nat_res/regional_flood_risk_appraisal.pdf

³⁴ Jorn Peters, SEERA, written evidence

SFRA is one produced by Spelthorne Borough Council who have worked with the EA and consultants Jacobs to produce a document which will be incorporated in their development plan.³⁵

- ii. In Kent, practice around SFRA varies: some district councils pay the EA for an assessment; some obtain funding *from* the EA while others appoint consultants. The Committee learned that an SFRA would typically cost around £17,000-21,000. District councils can pursue other options for funding – for example KCC may contribute to the cost since the information is required for decisions on minerals and waste sites. The first (and so far the only) sub-regional SFRA in Kent was done for Kent Thameside in the Dartford/Gravesham area and this was funded by the Local Authorities and the Kent Thameside Delivery Board.³⁶ (This SFRA preceded PPS25.)
- iii. The Committee heard that there could be advantages to authorities working together on sub-regional (preferably catchment based) assessments. Firstly, considerable cost benefits could result: as mentioned the average cost of an SFRA would be around £19,000 and the Select Committee learned that, for example, 5 authorities working together could cut their costs by around half since the total cost of the sub-regional SFRA would be about £50,000. Such an assessment or appraisal would also be able to take into account a more geographically relevant unit, i.e. a river catchment. KCC's sub-regional role is important here, particularly as SEERA may be disbanded and this could potentially cause delays in progressing plans. An important role for KCC to undertake may therefore be to oversee the development of further sub-regional flood risk assessments.

n) Coastal Management Plans – SMPs

- i. Coastlines are naturally dynamic with land being eroded away in some areas and built up (accreted) in others as sediment is moved along the coast by the action of tides and currents. The effects of both flooding and coastal erosion are magnified for Kent by rising sea levels combined with a gradual tilting of the UK downwards north-west/south-east and the cumulative effect is an annual sea level rise of around 6mm.³⁷
- ii. The Thames Estuary TE2100 project, led by the Environment Agency, is looking at a number of scenarios for sea level rise in the next 100 years and tidal risk to the estuary from Sheerness to Teddington, from conservative to extreme

³⁵ http://www.spelthorne.gov.uk/a_main_report_and_appendices_a_and_b.pdf

³⁶ http://www.kent-thameside.org.uk/kts02/pdfs/FR_main.pdf

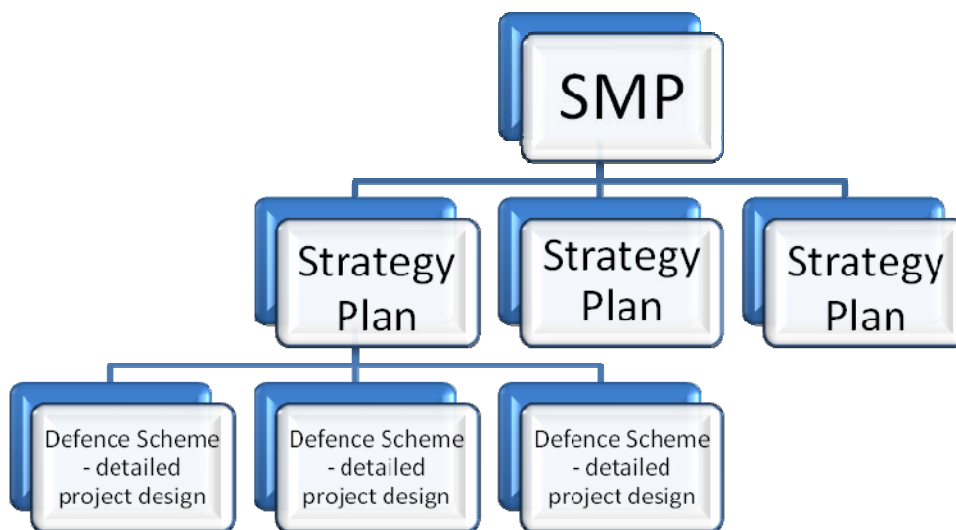
³⁷ Isostatic rebound is the vertical movement of the Earth's mantle due to melting ice in the north west at the end of the last glacial period. The removal of weight from the land causes it to slowly 'rebound' over geological timescales. Eustatic processes (melting of icecaps) cause a global sea level rise so far in the region of 2mm/yr. The south east is affected by both.

(accelerated melting of icecaps and increased storm surge heights). The EA completed the second phase of the study in May 2007 and the final plan, due in 2009, will look at what needs to be done to manage risk (where and when). Sea level rises considered are:

+0.94m -	DEFRA guidance November 2006
+1.51m -	UK Climate Impacts Programme (UKCIP) guidance
+2.6m -	TE21000 High (plus)
+4.2m -	TE2100 High (plus plus)

- iii. The final recommendations will be based on DEFRA guidance at the time but with future adaptability built in to account for extreme possibilities. Coastal and estuarine management is clearly of vital importance to the people and communities of Kent.
- iv. Shoreline Management Plans (SMPs) have been developed in consultation with key stakeholders to provide an assessment of risk and a (non-statutory) policy framework for risk reduction in the future. Each plan results in a number of defence strategies which focus on discreet geographical areas (coastal cells) with individual schemes or defence projects.

Figure 6: Hierarchy of coastal planning



- v. Coastal management policy options are considered for 0-20 years, 20-50 years and 50-100 years ahead. So it may be that while it is practical to defend an area for the next 20 years it is unsustainable to do so beyond that. The four policy options are:

≈ **No active intervention** (allow defences to fail)

- ≈ **Hold the line** (maintain present defences)
 - ≈ **Managed realignment** (planned move towards a more naturally functioning coastline by removing some sea defences)
 - ≈ **Advance the line** (build new defences seaward of the current line)
- vi. Progress on the three plans covering the Kent Coast is as follows:
- ≈ **Isle of Grain to South Foreland** (being revised, consultation period ends September 2007)
 - ≈ **Medway Estuary and Swale** (being developed, consultation period ends September 2007)
 - ≈ **South Foreland to Beachy Head** (being reviewed, consultation began 31st May 2007)
- vii. KCC championed coastal planning as the first county council to adopt an SMP (first generation plan for Beachy Head to South Foreland) but has little direct involvement in the SMP process except through its Environment & Waste Team's consultancy function. Natural England, who are also statutory consultees for the development of SMPs, act at each level of the process to ensure that plans comply with Habitats Regulations and that conservation issues relating to individual schemes are addressed.
- viii. Members visited a site where managed realignment is proposed at Elmley on the Isle of Sheppey and agree with the landowner, Mr Merricks, Natural England and the RSPB that the site is an ideal location for this management option since it would bring both amenity and biodiversity benefits. (Case Study p 43)
- ix. However, plans for managed realignment raise issues which need to be resolved in order to achieve a balance between complex environmental (including flood management) issues, as well as pressing economic and social factors. For example, some coastal plans involve the loss of valuable farmland but in rarer cases may involve the sacrifice of people's homes either now or in the future. Canterbury City Council, who play a key role in developing SMPs through their chairmanship of the South East Coastal Group,³⁸ have adopted a policy of alerting homebuyers to the possibility that their proposed purchase may not be defended from flooding in the future through the local authority 'search' process. (There is no legislation requiring searches to reveal details of flood risk to a property.) The Select Committee feel that this is helpful to prospective purchasers and should be adopted by other local authorities. However, the

³⁸ which co-ordinates the response to coastal erosion and flooding in Kent and East Sussex [South East Coastal Group](#)

detrimental effect on existing homeowners is obvious, so it is at the same time very unfortunate that, while there is no absolute right to be defended from flood in this country, important issues relating to compensation have yet to be resolved. A further Case Study on page 44 gives a local example, and details of a government project to address part of the problem. Issues of social justice in flood risk management were the topic of a cross-party parliamentary group in January 2007.³⁹

- x. Although the Kent Environment Strategy 2003 mentions inland flood risk management it does not define KCC's coastal flood defence and erosion policy which could set out the county's support for a more naturally functioning coastline which combined protection for densely inhabited coastal communities with options for managed realignment, where appropriate, to improve flood storage and provide environmental, social and amenity benefits.⁴⁰
- xi. It will therefore be important to ensure that KCC's Environment & Waste Team have the capacity to:
 - ≈ Undertake coastal policy development
 - ≈ Maintain oversight of coastal planning and ensure consistency of policy application
 - ≈ Work in partnership with the Environment Agency to raise public awareness about flood management strategies and their implications⁴¹
 - ≈ Facilitate discussions about changed land-use, buy-out and compensation in the light of the findings of the Essex project discussed on page 44,

and the Select Committee feel that the Team should therefore be resourced accordingly.

³⁹ [All Party Parliamentary Group on Coastal and Marine Issues, 3rd Meeting 25th January 2007](#)

⁴⁰ Liz Holliday, KCC Coastal Officer, written evidence

⁴¹ Ingrid Chudleigh, Natural England, written evidence

Case Study: Managed Realignment - Elmley

Managed realignment is a 'soft' engineering option, likely to be SMP policy for low-lying land that is economically unsustainable to defend. Moving defences landward in these areas can also produce valuable habitat gains to offset habitat losses elsewhere.

Members of the Select Committee visited Elmley at Minster on the south west coast of the Isle of Sheppey to observe a site where managed realignment is under consideration. This privately owned site is covered by the Medway and Swale SMP – the first to cover an estuarine environment. The area is adjacent to Elmley National Nature Reserve, of international significance for migratory waders, a large breeding bird population and raptors such as marsh and hen harrier. These birds are supported by the plants and animals of the watercourses landward of current defences and saltmarsh which could be subject to 'coastal squeeze' as the rising sea level reduces the inter-tidal zone.



The land which would be 'given up' is part of the south east's largest area of coastal grazing marsh: land reclaimed from the sea and now drained by a series of ditches (as shown below) supporting communities of freshwater invertebrates. Undefined, it would return to its earlier, natural wetland or saltmarsh state which would compensate for that being lost elsewhere in Kent.

The clay sea wall with a rock facing is not being maintained by the EA. Piles of rocks delivered 8 years ago were still visible nearby. In the photo below the defence has maintained its integrity.



In the photos below and inset it can be seen that the action of the sea is washing away the rocks facing the clay defence.

Making Space for Water strategy tries to balance demands so that flood defences are resourced while at the same time there can be environmental and amenity gains. This land is adjacent to an important nature reserve and while RSPB support plans for managed realignment here, they have expressed concerns about the benefits to be gained from other plans. (Source: RSPB written evidence)



Case Study: Issues of social justice and equity in flood risk management

Seasalter – north Kent coast

The preferred SMP plan for Faversham Creek to Seasalter on the north Kent coast would ultimately mean the sacrifice of around 60 homes with huge impacts on residents. This recommendation was made as maintenance of current defences beyond 2027 is felt to be economically unsustainable. Beachfront homes would be in a more vulnerable position than they are now: 'on the wrong side' of new defences. Following a public meeting on 27th July where plans were outlined, residents were given just over a month to comment, and consultation closed on 7th September 2007. A similar situation has arisen as a result of shoreline management planning for Happisburgh in Norfolk.

Compensation for landowners

SMP recommendations for no active intervention or managed realignment more often impact on agricultural land. The National Farmers' Union reminded the Select Committee that agricultural businesses do not receive flood warnings (even where livestock are at risk). When they receive compensation for land taken under managed realignment policies the value is reduced by 35% to account for subsidies which ended in 2005.^{42 43} The NFU feel that farmland, far from being protected as strategically important for food, renewable energy production and climate change mitigation, is dismissed as a 'sacrificial, free, temporary storage facility' which is 'not an equitable situation'. The Select Committee were told how the matter was complicated by the Habitats Directive and Water Framework Directive, as well as the conflicting advice and actions of councils and departments.⁴⁴

A landowner was happy to undertake a managed realignment scheme primarily to create new saltmarsh habitat. To remain economically viable he wanted to encourage ecotourism but was refused planning permission for holiday lodges as they were on a flood plain; neither could he gain agreement about a coastal footpath. Nothing was resolved! So: no additional flood protection, no new habitat, no tourism benefits and a footpath on a badly eroding seawall which will become unusable.

Source: Jane Burch, Regional Adviser, CLA, written evidence

The CLA is engaged with Essex County Council in a nationally significant, DEFRA-funded project

'Managing Coastal Change'⁴⁵ which looks at these issues and works with landowners to arrive at alternatives to Higher Level Stewardship⁴⁶ as a means of compensation such as groups of landowners using the profits of land sold for development to maintain their own sea defences. KCC could provide a similar lead to Essex in addressing these issues locally.

⁴² John Archer, NFU SE Region, written evidence

⁴³ Common Agricultural Policy (CAP) production-based subsidies

⁴⁴ Jane Burch, Regional Adviser, Country Land & Business Association (CLA) Eastern Region, written evidence

⁴⁵ [Managing Coastal Change Project](#)

⁴⁶ A scheme whereby farmers can receive funding for a change of land use

o) Inland Management Plans

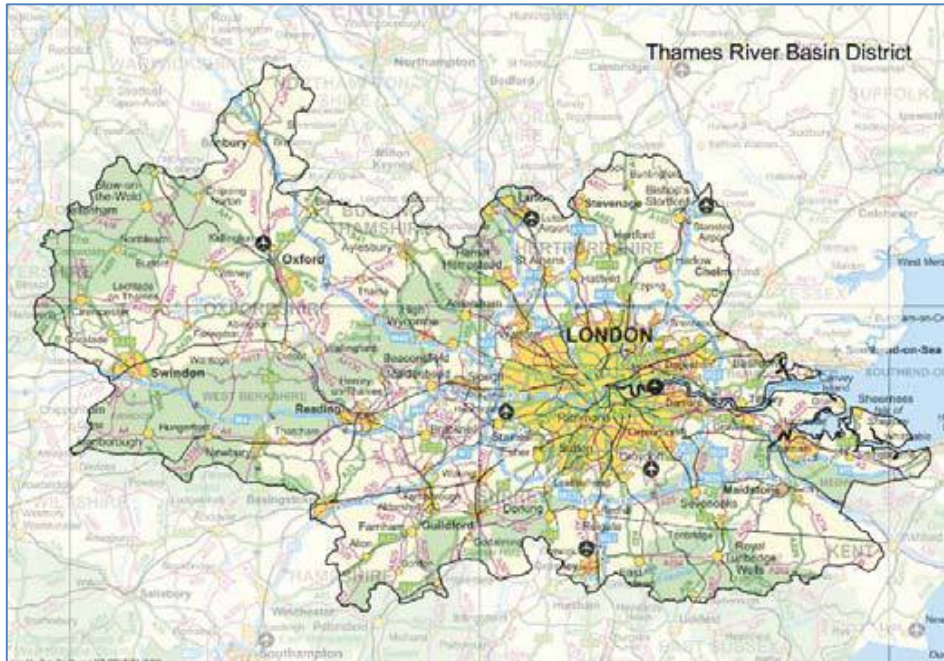
- i. Catchment Flood Management Plans (CFMPs) for the Medway, Stour, Rother & Romney and North Kent Rivers are at various stages of development:
 - ≈ **Medway CFMP** (Completed June 2004)
 - ≈ **Stour CFMP** (Completed March 2007)
 - ≈ **Rother and Romney CFMP** (Scoping Consultation closed February 07)
 - ≈ **North Kent CFMP** (Scoping Consultation closed September 06. Findings will inform the main stage document which will begin its public consultation period in mid-December 2007)⁴⁷
- ii. The EA have been delayed in completing the Kent CFMPs due partly to a lack of funding. As these key documents are required to inform the Flood Risk Assessments which must accompany planning applications for developments on sites with flood risk, it was suggested in written evidence from Halcrow that, pending the completion of all Kent's CFMPs, interim CFMPs from similar neighbouring catchments could be adopted. Consultation on the Thames CFMP closed in April 2007.
- iii. Although local authorities are involved in a CFMP working group in Kent, they have little input to strategy plans and schemes, these being led by the EA. There is a perception among some organisations contributing to this review that the EA may give too great a priority to environmental concerns and the Select Committee feel that all parties would therefore benefit from gaining a better understanding of competing demands. The greater involvement of local authorities, Internal Drainage Boards and local agriculturalists throughout the CFMP process would ensure that informed decisions and plans are made and improved partnership working can take place in Kent.

p) River Basin Planning

- i. The focus of the new Water Framework Directive (EU legislation) is at river basin level with the aims of reducing pollution, preventing deterioration, improving aquatic ecosystems, promoting sustainable water use *and* reducing the effects of floods and droughts. The EA are currently consulting on River Basin Management Plans which are likely to be the basis of water management business planning from 2009, superseding CFMPs.
- ii. Two of the eleven River Basin Districts (RBDs) in England and Wales cover parts of Kent. The 16,000km² Thames RBD covers the Thames from its source in Gloucestershire through London to the North Sea coast. In Kent it comprises the Rivers Darent, Medway and Swale and their tributaries as shown in Figure 7.

⁴⁷ Source: Environment Agency

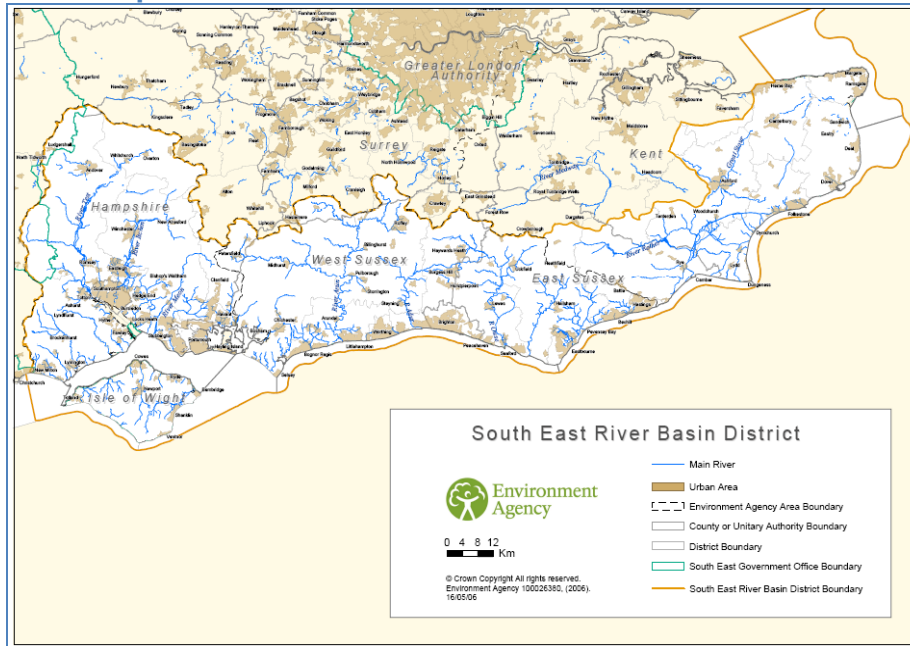
Figure 7: Map of Thames River Basin District



Source: Environment Agency

- iii. The South East River Basin District shown in Figure 8 below covers 10,000km² of Hampshire, the Isle of Wight, East and West Sussex as well as the Stour and Rother & Romney areas of eastern Kent.

Figure 8: Map of South East River Basin District



- iv. It is not yet clear how the Environment Agency will integrate river basin planning with current flood risk management and KCC have an important role in ensuring that these plans are developed in conjunction with CFMPs which already exist for overlapping areas and with regard to Shoreline Management Plans. Written evidence⁴⁸ would suggest that there is an assumption that River Basin Management Plans will be integrated with both CFMPs and SMPs however direct communication with the EA River Basin Planning Team indicates that this may not be the case. It is difficult to see how river basin planning could be holistic or effective unless it fully capitalised on and was informed by newly developed plans for coastal as well as inland areas.

- v. It is important that plans devised at this level are closely integrated with strategic flood planning at catchment and shoreline level so that conflicts between the management of flood risk, biodiversity and landscape quality can be minimised.⁴⁹ This echoes the view of Professor David Crichton of Dundee University: in Scotland major planning difficulties relating to a lack of community involvement in policy formation; site by site rather than strategic mitigation; balancing competing priorities and a lack of local relevance to national planning policy interpretation have been very successfully addressed by Flood Liaison Advice Groups (FLAGS). These groups are often catchment based and now cover 94% of Scotland's population. In addition many use an 'insurance template' based on insurance risk (e.g. 0.05% annual risk for houses and 0.001% annual risk for hospitals) to aid the formation of sub-regional strategies.^{50 51}

'At no cost to the local taxpayer, they provide advice and spread best practice and the latest research findings on SUDs, flood defences, Water Framework Directive, insurance availability, flood warning dissemination, emergency planning and community relations etc. It is interesting that not a single planning authority in England and Wales has yet established a Flood Liaison and Advice Group.'

Source: Crichton, David (2007)⁵⁴

- vi. However FLAGS based on catchment areas were piloted in Kent with the involvement of KHS, the EA and many other key players in productive

⁴⁸ Sean Furey, Deputy Director, CPRE, written evidence

⁴⁹ Sean Furey, Deputy Director, CPRE, written evidence

⁵⁰ Crichton, David (2005) Third National Conference on Sustainable Drainage: Perspectives from the insurance industry http://www.benfieldhrc.org/floods/perspectives_paper.pdf

⁵¹ Crichton, David (2007) AIRMIC Conference Paper: The Growing risks of climate change on households in England, kindly submitted by Prof. Crichton to assist with this review http://www.benfieldhrc.org/floods/Crichton_AIRMIC_2007.pdf

partnership work. Medway was one of the first and the group shared best practice. The reason for the demise of these pioneering FLAGS in Kent is not clear however it would appear that staff changes and reorganisations may have stopped their development. It would be extremely useful if KHS and the EA could pick up on some of the earlier work and determine whether FLAGS could again be a mechanism to promote cross boundary co-operation and the sharing of best practice. Central to the success of FLAGS in Scotland is the inclusion of representation from the insurance industry who can advise on insurability of properties and the design of SUDS. The Select Committee feel that 'resurrecting' FLAGS and improved partnership working would also help to resolve some of the ethical issues that remain.

6 Urban Development, Drainage and Design

R11 That KCC instigates discussions between local planning authorities, Southern Water and others on the feasibility, benefit and cost implications of using non-return valves/sealed sewage systems in all new developments and existing developments where sewage flooding is proven to be a problem and requiring it to be a condition of planning consent.

R12 That KCC promotes the use of sustainable drainage systems (SUDS) throughout Kent with over-attenuation of surface runoff, guided by best practice adopted by Canterbury and Ashford councils and findings of the integrated urban drainage pilots.

R13 That Kent planning authorities adopt the requirement for Drainage Impact Assessments for all new developments, following the Canterbury model.

R14 That the Fire & Rescue Service are included as an active partner in the planning process for new developments.

R15 That the Kent Design guide is revised to include information on mitigating flood damage and makes reference to innovative designs for the future, such as floating homes.

R16 That KCC lobbies government to produce a set of Building Regulations for use in flood risk areas so that planners are supported by increased but nationally consistent obligations to assist developers with a high level of flood proofing/mitigation.

R17 For KCC to work in partnership with the EA to publicise actions householders can take to increase the flood resilience of their homes.

R18 That KCC specifically allocate funding to enable the proposed road gully cleansing work to go ahead without delay and, where necessary, to enable the condition and capacity of highway drainage systems to be improved and the location of gullies and their characteristics to be recorded on GPS. That the KHS winter maintenance budget is readjusted to become an extreme weather budget.

R19 That KCC works in partnership with local authorities, the police and traffic wardens to inform the public about road drainage cleansing activities to address the issue of vehicles obstructing gullies and delaying vital works.

Explanation of recommendations follows:

- a) The impacts of climate change are expected to be more pronounced in the South East than elsewhere in the UK (UKCIP, 2002). The Select Committee was provided with some startling initial results from the project work KCC is undertaking to assess the impacts of climate change and these are included as Appendix 3.⁵²
- b) The Regional Assembly South East Plan suggests the following ways to adapt new developments to climate change impacts including measures to address flood risk:

Table 5: South East Plan - Climate Change Adaptation

Risk	Adaptation Measure to consider in new development	Principle
Pressures on Water Resources	Water efficient fixtures and equipment within developments Water meters to encourage demand management Water efficiency in gardens/communal greenspace through choice of species as part of landscaping schemes	Water Reduction
	Rainwater use systems	Water re-use
	Greywater use systems	Water recycling
Addressing flood risk	Development location Provision of safe access Land raising and raising floor levels Flood warning	
	Flood proofing walls (internal and external) and floors Flood proofing fixtures and fittings eg raising circuitry levels Temporary barriers (require developers to provide information packs) Flood proofing gardens	Flood proofing
	Design of channel and hydraulic structures Developer contributions to strategic flood risk management Compensatory flood storage	
	Filter strips, soakaways, swales, filter drains, infiltration basins, detention basins, retention ponds, permeable and porous paving surfaces, infiltration trenches Minimisation of directly connected areas Reed beds and wetlands Green roofs	Management of development runoff (SUDS type measures)
	Use of flood defences and pumping to drain the low-lying area behind defences	
Resilience to other water-related climate change impacts	Under-pinning buildings (cost depends on access, depth of soil, severity) Construct new buildings with deep foundations (in some cases may require the use of pile-and-groundbeam foundations)	Subsidence
	Rendering brickwork (protection to the building structure; reduces surface weathering) Damp courses (chemical damp-proof course to minimise dampness rising above the physical damp-proof course)	Responding to increased rain and damp

⁵² Early output material from KCC's draft Kent Local Climate Impacts Profile project, summer 2007. This information is still to be validated, should be interpreted as approximate only and is subject to change as the project continues

c) Sewerage systems

- i. England's 180,000 miles of public sewers⁵³ are out of date and do not have the capacity to deal with intense rainfall or modern sanitary products.⁵⁴ Coupled with this, culverting of watercourses⁵⁵ reduces their ability to convey runoff away from sites and these factors contribute to overload.⁵⁶ Until the 1960s there were combined foul and surface water sewers which in storms overflowed through CSOs (combined sewer overflows) causing contamination of watercourses and, although these are no longer used, many still remain. Modern sewers can still overflow particularly if downpipes are connected to the foul sewer by mistake and there is the additional contamination that may be caused by leakages from ageing sewers. There have been problems in mapping old systems but the Select Committee were informed by Southern Water that they now have sophisticated computer models covering 95% of major systems which could predict flooding. This does not however include the large number of sewers connecting to domestic properties, which are the responsibility of the householder. The government are currently looking into the adoption of these sewers by water companies.
- ii. The lack of investment by water companies in renewing systems is partly due to their planning cycle, determined by OFWAT and based on 8 year patterns, being out of sync with Structure Plans⁵⁷. Frequently they are constrained by not being able to support funding requests with enough detail about development locations, hence the funding is not committed. The Select Committee heard how it is particularly difficult where small developments of up to a few hundred properties are planned as this is significant in sewage terms, but sufficient detail of the developments may not be available for several years. The water companies have a duty under the 1991 Act to 'drain effectively' and usually adopt developments' drainage on completion. However the point of connection to the existing sewer is a bone of contention with developers as there are cost implications to water company and developer. Southern Water were asked about the problem of homes and environments becoming contaminated with sewage and if it was feasible to build sealed foul sewage systems in new developments. Barry Luck, Sewerage Strategy Manager for Southern Water, confirmed that though he believed this had not so far been done in Kent it was technically possible and

⁵³ A public sewer is defined under the Water Industry Act 1991 as one which is maintained, cleansed and emptied by a sewerage undertaker. It includes the drainage of buildings and the public can discharge to it.

⁵⁴ Crichton, David (2005) Third National Conference on Sustainable Drainage: Perspectives from the Insurance Industry

⁵⁵ A watercourse is defined under the Land Drainage Act 1991 and includes 'all rivers and streams and all ditches, drains, cuts, culverts, dykes, sluices, sewers (other than public sewers within the meaning of WIA 1991)

⁵⁶ Tony Norfolk, Bridge Manager, KCC – background information

⁵⁷ In Kent, the Kent & Medway Structure Plan

worthy of consideration in areas with a level of flood risk.⁵⁸ Such a system would substantially reduce the risk of flood water becoming contaminated with sewage. The Select Committee learned that sealed systems had been used to excellent effect in Lydd but that these had had to be paid for privately. In view of the success of these systems in alleviating sewer flooding the Select Committee feel that KCC could bring together key agencies to discuss whether this could usefully and practically be made a condition of planning consent.

- iii. The Select Committee was told that planning at catchment level gives a high level view of locations likely to attract development and Southern Water's latest bid for funding was 'quite successful'. Following a major study there will hopefully soon be a more flexible system which will bring the planning systems better into line and enable much needed improvements to sewer systems to take place. Southern Water are part-way through a £750 million environmental improvement scheme for Kent, Sussex, Hampshire and the Isle of Wight but, as recent floods show, there is much more to be done by water companies to resolve the problems. However, some actions can usefully be taken in the community as this Portsmouth campaign highlights:

Nearly two thirds of sewer blockages in the South East are caused by items flushed down the loo. Flooding caused by such blockages could easily be avoided.

'Prevention is better than cure,' said Geoff Loader, Southern Water's Director of Communications, who announced a public campaign in Portsmouth would shortly be launched to encourage people to 'Bag It and Bin It'. He said: 'Every day thousands of litres of fat are poured down sinks but the fat solidifies and blocks sewers, preventing wastewater from flowing. The wastewater is then forced out of the sewers and into gardens and homes.'

He said fat should be left to solidify in a disposable container and then put in the bin.

Mr Loader added: 'The problem is exacerbated by flushing bulky non biodegradable items, such as nappies, down the loo. The waste should be flushed down toilets and the nappies placed in disposable bags available at chemists or supermarkets.'

Source: Fighting the Fat – Southern Water News 8/3/07

⁵⁸ Barry Luck, Southern Water, oral evidence 3rd August 2007

d) Culverted Watercourses

- i. DEFRA has this year put in place 15 integrated urban drainage projects, at a cost of £1.7 million, to determine how to reduce the impact of urban flooding caused by one or a combination of factors including heavy rainfall, blockages and high river levels. This will include at least one project looking at the problem of ownership of culverted watercourses. This problem was highlighted in a briefing to KCC's Highway Leadership Team⁵⁹, provided as background information for the Select Committee. It is extremely important to sort out the issue of responsibility here since it impacts on maintenance (frequently disputed). It was suggested that a single managing authority needed to be responsible for each type. Southern Water have clear responsibility for public sewers and their culverts (though KHS would have an interest if these were under the highway). The other recommendations for managing authority were: culverted critical ordinary watercourses (COWs) – EA; other culverted watercourses – Southern Water or district council. KCC might appropriately be the managing authority where culverts protrude a little either side of a highway and were not under buildings, or where KCC is the riparian owner.⁶⁰ The Case Study that follows describes flooding in East Peckham and highlights how intense rain affecting a watercourse which runs through a culvert had devastating effects. It also notes how a solution was reached.

⁵⁹ Kent Highway Services Alliance Board: Cabinet Member for Environment, Highways & Waste, Managing Director for Environment and Regeneration, Director Kent Highway Services and national Managing Directors from Jacobs, Ringway and TSUK.

⁶⁰ Tony Norfolk, Bridge Manager, KCC – existing briefing document provided as written evidence

Case Study: East Peckham Dam

Source: Mike McCulloch, Tonbridge & Malling Borough Council, (TMBC) written evidence and Sue Chalkley, National Flood Forum, oral and written evidence

'Multi-agency action is essential to find solutions to flood risk'

East Peckham and other locations in the borough were severely affected by floods in 2000/2001. East Peckham lies on the Medway flood plain crossed by the River Bourne and the Coult Stream (which had flooded 13 times in 23 years).

East Peckham was hit again by flooding in January 2003 (the canoeist is on a road!) TMBC established the East Peckham Flood Relief Partnership and gave £250,000 to kick start research by KCC, the Upper Medway Internal Drainage Board, Southern Water, the Environment Agency, Parish representatives and others. The group 'walked the village' with local residents and quickly sorted out drainage responsibilities.

The primary cause of flooding was later found to be heavy rainfall draining from the catchment into the Coult Stream north of the village, increasing its flow to 4.5m³ per second. Flow had bottlenecked at a culvert and run straight through the village.

Following detailed GPS and other surveys and hydraulic modelling of the Coult Stream and the floodwater's route through the village an options appraisal was carried out and following extensive negotiations, technical research, impact assessments and cost benefit analyses, the EA applied for and obtained funding from DEFRA. KCC also contributed. The Upper Medway Drainage Board then began work on a dam 4 metres high by 300 metres long offering 1 in 100 year protection to the village; reducing the flow through the (now improved capacity) culvert from 4.5 to 1.5m³ per second.

Sue Chalkley of the National Flood Forum told the Select Committee how the most important lessons for success had been:

- One agency taking the lead (TMBC)
- Partnership working with clear goals
- Local focus
- Rapid investment in research and options appraisal



e) Sustainable Urban Drainage Systems (SUDS)

'...there is still a great deal of misunderstanding about sustainable drainage systems (SUDS) amongst local authorities in England and maintenance arrangements are not satisfactory. A 2005 survey of insurance companies showed great concern over the haphazard way in which SUDS are being implemented in England and many insurers indicated they would not accept risks in proximity to badly designed SUDS schemes.'

Source: Crichton, David (2007) Airmic Conference: The Growing Risks of Climate Change on Households in England

- i. The original aim of SUDS was to ensure that development sites generated the same runoff as when undeveloped (i.e. when a greenfield site), directing runoff to groundwater rather than sewers and incorporating features such as those highlighted in Table 5, to compensate for impermeable surfaces: roads, pavements, roofs and so on. If development occurs without SUDS this can lead to increased peak flood levels in communities further downstream. Climate change impacts are predicted to increase rainfall by 20% and the Select Committee heard how a precautionary approach to various aspects of planning, would be to incorporate a 20% margin when calculating drainage impacts to account for this. This 'over-attenuation', though it would incur additional cost at the outset, would represent a cost-saving in the longer term.⁶¹
- ii. The Select Committee heard from Canterbury City Council that as part of their planning application process they insisted upon developers carrying out a Drainage Impact Assessment,⁶² requiring developers to ensure runoff does not exceed 4 litres per hectare. They would like to see this practice adopted by other local authorities in Kent. Failing to adopt a county-wide approach with consistent standards could lead to cross boundary impacts: for instance the actions of Ashford in its development strategy will impact on Canterbury, further downstream on the River Stour.
- iii. Ashford Borough Council carried out an integrated water management study⁶³ in partnership with the Environment Agency and consultants, as part of their Core Strategy. They have made a decision to adopt SUDS features in developments in the Ashford Growth Area.⁶⁴ Guidance on the design, construction, operation and maintenance of sustainable drainage systems is available from CIRIA who undertook extensive research with HR Wallingford in order to provide best

⁶¹ Sean Furey, Deputy Director, CPRE, written evidence

⁶² Edwards, Ted (2003) Drainage Impact Assessment

⁶³ Ashford.gov.uk - Integrated Water Management Study

⁶⁴ Sean Furey, Deputy Director, CPRE, written evidence

practice guidance.⁶⁵ Paul Shaffer, Project Manager for CIRIA, told the Select Committee that he felt KCC had a key role in communicating this information more widely across the county, promoting best practice. A number of issues to be resolved have been highlighted during this Select Committee review: most importantly the need to determine at the outset who is responsible for maintenance. A strategic issue of great importance is the guidance necessary from Strategic Flood Risk Assessments; without this there is a danger that site-specific flood risk assessments carried out by developers will be 'tick-box exercises' and any badly designed or poorly maintained SUDS will not contribute to the sustainability of the development. Professor David Crichton cautions also about insurability issues related to SUDS and suggests that the insurance industry, with its wealth of expertise about flood management and risk, is routinely included in strategic discussions.⁶⁶ (FLAGS as recommended in R10 also relate to this issue.)

- iv. Further detailed and practical recommendations on SUDS were provided to the Select Committee by Sean Furey of CPRE and due to time constraints these are not all discussed here. An extract from this comprehensive evidence is attached as Appendix 4. Combined stormwater/rainwater harvesting was suggested independently to the review by the Kent Fire & Rescue Service⁶⁷ as being particularly appropriate for new developments since it offered opportunities for various sustainable uses such as car cleaning or putting out fires. However, while KFRS advocate the use of underground tanks, from the developer's point of view these are the least favoured option due to cost and ponds are felt by several contributors to this review to be a preferred option as, notwithstanding safety concerns, when properly designed they can provide flood storage and offer amenity, landscape and biodiversity benefits.
- v. Mr Hillier of Hillreed Homes indicated that SUDS options have yet to be fully embraced by builders and local authorities although Prof. David Crichton indicates that developers welcome them as they enhance property values.⁶⁸ There is therefore a clear need for the use of SUDS to be promoted throughout Kent.

f) Planning Applications

- i. Most planning decisions are made by local authority planners.
- ii. Members of KCC's Planning Committee have, following the Nolan report on standards of conduct in public life, received training on specific planning issues including flood risk and have had the benefit of training from the Environment

⁶⁵ Paul Shaffer, Project Manager, CIRIA, oral evidence 3rd August 2007 – further information from website: [SUDS - Sustainable drainage systems](http://www.benfieldhrc.org/floods/perspectives_paper.pdf)

⁶⁶ http://www.benfieldhrc.org/floods/perspectives_paper.pdf

⁶⁷ Bill Feeley, Deputy Chief Fire Officer, Kent Fire & Rescue Service, Oral evidence 27th July 2007

⁶⁸ http://www.benfieldhrc.org/activities/tech_papers/tech_paper1/flood_risk_and_ins_Mar05.pdf

Agency on PPS25 and its implications. In its own planning applications for premises, it is not possible for KCC to use S106 agreements to secure funding for maintenance of SUDS (as the county is effectively the developer).

- iii. However, the Select Committee heard how it could be of great benefit if KCC 'led by example' in creating an active partnership with Kent Fire & Rescue, involving them in discussions early in the planning process for KCC sites such as schools, libraries, social services buildings, highways and minerals and waste sites so that flood protection measures can be integrated with other safety considerations at the outset. Mr Feeley, Deputy Chief Fire Officer for KFRS indicated to the Select Committee that he would welcome this opportunity, stressing that he would not wish the service to be consulted on minor developments (and indeed is not resourced to be able to respond at this level), but could contribute to cost savings as flood protection considerations and measures incorporated early on would be far less expensive than retrospective works. KFRS could also offer an opinion on design features such as access roads. It was pointed out to the Select Committee that, for example, the design of developments could be much more flexible and not built around the familiar 'lollipop' turning points in cul-de-sacs if flood and fire protection measures were integrated through the design of rainwater storage, sprinklers, hydrants and so on.⁶⁹

g) Building & Design

- i. KCC's Director of Strategy and Planning advised the Select Committee that in mitigating climate change impacts relating to flood risk, KCC planners would be looking at new designs to reduce run-off from buildings and begin to look at past developments and what could be done to address flood risk retrospectively. Shaw et al (2007)⁷⁰ list some of the flood resilient building materials that can be used:

- Concrete
- Vinyl and ceramic tiles
- Pressure-treated timber
- Glass block
- Metal doors and cabinets

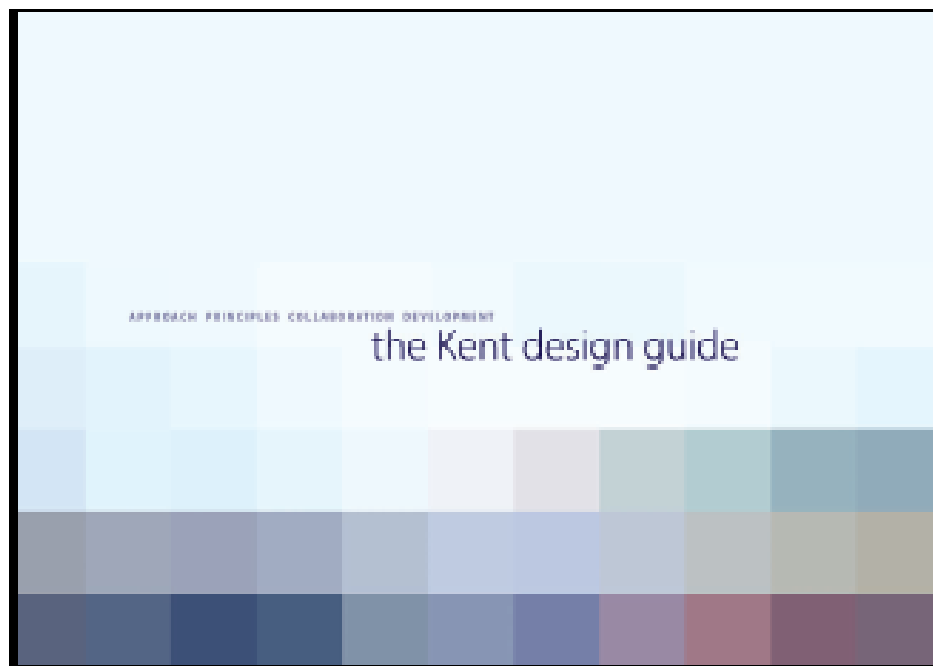
as well as measures already noted in this report (green roofs, managing flood pathways, one way valves on sewage systems and so on).

- ii. There are various design features that can be incorporated into new buildings to mitigate against both flood risk and flood damage including raising floor levels so that, for example, car parking is on the ground floor and

⁶⁹ Bill Feeley, Deputy Chief Fire Officer, KFRS, oral evidence 27th July 2007

⁷⁰ Shaw et al (2007) Climate Change adaptation by design: a guide for sustainable communities, TCPA London

accommodation is on the first floor and above (as it is at Ingress Park). However the Select Committee heard that the Kent Design Guide⁷¹, while it refers to PPG25 and PPS25, does not address flood risk and therefore feel that this document could be a useful tool in raising awareness throughout Kent of design features offering flood resilience.⁷²



h) Floating homes

- i. European countries such as the Netherlands, a country with a high proportion of its land (and 60% of its population) below sea level plan to give up large tracts of previously reclaimed farmland to river floodplains; building towns of floating and amphibious homes which have inbuilt resilience measures as well as the capacity to cope in some cases with a 4 metre rise in water level. A village east of Amsterdam has plans for 20,000 such homes and Dutch developers Dura Vermeer Groep NV built these homes in the village of Maasbommel⁷³ south of Amsterdam:

⁷¹ Produced on behalf of the Kent Design Initiative – a partnership between local councils, KCC, Medway Council, professional, academic and community groups

⁷² [Kent Design Guide 2005/6](#)

⁷³ [Inhabitat » DUTCH FLOATING HOMES By DuraVermeer](#)



- ii. It was pointed out to the Select Committee that floating homes already exist in the UK (example below) and several communities have built up around the country including on the Thames. Information provided to the Select Committee



by Aqua-Base Construction⁷⁴ indicated that pontoon based homes, as well as providing floating accommodation, are a viable option for building on floodplains in the future. They would have completely waterproofed cellars and would rise up on hollow concrete pontoons in the event of a flood.

See also: [Floating homes plan for Preston - Lancashire Evening Post](#)

i) Building Regulations

- i. There was consensus among those giving evidence to the Select Committee that developers would put in only those measures they were required to by law and do not generally view it as their responsibility to innovate or plan ahead for climate change impacts.⁷⁵ Furthermore, buildings are less resilient in the south, where there have historically been fewer storms. It is likely that storms will track further south more often in future and Building Regulations do not currently take account of the extra damage that is likely to result.⁷⁶
- ii. Building Regulations set out under the 1984 Act set the standard for building and construction in England and Wales. The Select Committee heard how several

⁷⁴ Michael Pemberton, Aqua-Base Construction, supplementary written evidence

⁷⁵ Tony Hillier, Hillreed Homes, oral evidence 30th July 2007

⁷⁶ Crichton, David (2007) Airmic Conference: The growing risks of climate change on households in England

aspects of the Regulations as they stand conflict with flood risk management. One particular aspect raised was the requirements for disabled access⁷⁷ which might result in developers lowering floor levels to reduce the cost of a ramp. Clearly this practice would put a disabled person at additional risk of flooding and so problems of access and managing flood risk need to be considered jointly. Both Leigh Herington, KCC Director of Strategy and Planning and developer Tony Hillier, Chairman of Hillreed Homes, agreed that new building regulations were needed to take into account the knowledge now built up about flood risk and practical measures that could be incorporated in new buildings to minimise both the risk of flooding and the damage caused if flooding does take place.

- iii. Having heard a range of evidence the Select Committee believe that the only way to ensure static flood resilience measures are incorporated in properties is to develop Building Regulations to take account of specific requirements relating to flood proofing properties at risk of flooding and in light of recent experience of pluvial events, consideration should be given to the fact that revised Regulations may need to apply to properties outside flood zones.⁷⁸

j) Resilience

- i. For existing homes and infrastructure there is an emerging industry in resilient materials and products specifically designed to reduce the damage and associated disruption that results from flooding especially as some residents in flood-prone areas can suffer repeatedly. Broadly speaking this is the responsibility of individual owners. However in acknowledging the national scale of the problem, DEFRA are investing £500,000 in making vulnerable homes more resilient. A grant scheme run by the Welsh Assembly Government has met with limited success, however pilot projects in England will assist decisions on whether to introduce a grant scheme more widely here.
- ii. One project in East Sussex will involve investing £30,000 (with a maximum of £5,000 available per property) to make 40 homes and businesses more resilient. This will entail installation of flood adaptation measures such as door guards, water resistant facing materials and floors and raised electrics. The range of measures therefore includes some static, and some temporary, or demountable resilience measures.
- iii. The Select Committee heard from the Flood Protection Association⁷⁹ that they had for some time been involved in setting and raising standards in this industry and were generally pleased that the government, and more specifically the Environment Agency, were at last 'thinking out of the box' and looking at innovative solutions to the problem.

⁷⁷ Also under Disability Discrimination Act (DDA) 1995

⁷⁸ See also the Kent Fire & Rescue data on page 71

⁷⁹ Gavin George, Flood Protection Association, oral evidence 30th July 2007

- iv. The National Flood Forum recently published a comprehensive guide to resilience products available for new and existing homes and developments: '[Blue Pages](#)'.⁸⁰ Ms Chalkley who represents the National Flood Forum informed the Select Committee that having suffered flooding herself on several occasions her home in East Peckham now had a number of resilience measures including an under-floor pump and cabinets replaced with shelving positioned high up on walls.
- v. An important point regarding demountable resilience products such as door guards is that elderly people or people with reduced mobility may not be able to handle the kit on their own. In these cases it would be extremely important for the local community to be involved in making sure all the available defences could be deployed in time.
- vi. The Flood Protection Association⁸¹ showed the Select Committee a range of literature that they produce to inform the public about resilience products and believed that it would be of value to residents if KCC raised the general level of awareness, among the public and professionals, about the kinds of products that exist and what homeowners could do for themselves, even in areas not traditionally thought of as flood risk areas. It may be worth investigating, for example, whether this could begin by raising awareness among KCC staff, perhaps by forging a link to the staff discount scheme.

k) Road drainage

- i. The particular problem of culverts (including some that are the responsibility of KCC) was highlighted earlier in this section.
- ii. Roads are drained by a number of means including gullies, grips and ditches. In Kent there are an estimated 180,000 gullies, 36,000 grips (channels cut through verges to drain water from roads to ditches), 300 km of ditches and a number of soakaways. Road gullies drain into watercourses in rural areas and into storm drains then foul sewers in urban areas.⁸² Soakaways are an alternative drainage method designed to drain water into the surrounding ground. The Select Committee learned how these are not always effective (for example they are of no use in the clay soils of north Kent) and would be extremely expensive to clean. It was estimated that soakaway cleaning could use 10,000 gallons of water and cost around £100,000. There are around 3-4,000 soakaways in Kent and there has been no cleansing programme in recent memory. The responsibility for maintaining these drainage features lies with the Highways Agency (trunk roads), private owners and Kent Highway Services⁸³. It was

⁸⁰ Sue Chalkley, National Flood Forum, oral evidence 23rd July 2007

⁸¹ [Flood Protection Association website](#)

⁸² Ian Walsh, KHS, oral evidence 31st July 2007

⁸³ Link to website: [Highway flooding](#)

pointed out that the ownership of roadside ditches is not always easy to establish, particularly where there are a number of 'absentee' landowners.

- iii. Kent Highway Services (KHS) have a duty of care to keep roads in a safe condition and part of this relates to maintaining and improving the drainage network for which they have approximately £1.9 million (revenue budget for maintenance) and £1.8 million (capital budget for improvements) per annum.⁸⁴
- iv. Several changes have occurred within KHS, the most recent beginning 18 months ago. There is now a countywide maintenance team with dedicated drainage engineers who will adopt a methodical, risk-based approach to locating and logging drainage gullies as currently, there is no reliable data about flooding on roads and this needs to be built up. Furthermore, it is important that the new centralised team maintain regular dialogue with their district and borough colleagues. The Select Committee were told that the team appreciate the value of local knowledge and that members of the public and community groups/parish councils can contribute by notifying the team of the location of gullies so that they can be mapped/checked. Matthew Sims, Divisional Manager for KHS in East Kent informed the Select Committee that KHS would be creating an online form that local people could fill in and also are looking into apprenticeships as a way of retaining and cascading local knowledge and expertise among engineers and inspectors.
- v. Ringway (part of the KHS partnership) have recently appointed a drainage champion to progress plans for a new cleansing programme. This will identify and target sites most affected by debris and most susceptible to blockage. Some gullies will be cleared perhaps four times per year, while others may require very little cleansing. The information, logged on a GPS, will be available to operatives in their gully cleansing vehicles. The Select Committee feel that the database should include all drainage features (such as soakaways) and not just gullies.
- vi. A new proposal has been put before the KHS Alliance Board which includes: making use of valuable mapping information from Kent Fire & Rescue to assist the rapid prioritisation of work; determining what level of work is needed and when (for example whether special 'deep cleansing' is required); increasing the number of 'super sucker' vehicles available to cleanse gullies; and a mobile store of sandbags/packing machinery (over and above those provided by emergency planners) that could quickly reach any area of the county in times of intense rainfall adding pressure to the road drainage system.
- vii. While the Select Committee wholeheartedly welcome these initiatives, it is of concern that this important work may be affected by budgetary pressures and therefore support KHS in moves to broaden the winter maintenance budget, redesignating it as an 'extreme weather budget' to allow more flexibility.

⁸⁴ Matthew Sims, Divisional Manager, KHS (East Kent)

- viii. It was pointed out to the Select Committee that it was a waste of resources for cleansing vehicles to arrive at a site to find cars parked over a gully. This can result in their having to return several times which is both time consuming and expensive. The Select Committee suggest that there needs to be greater public awareness about the gully clearance programme and its importance in reducing flood risk. In rural areas it may be appropriate to issue notices but in urban areas, where there are likely to be several vehicles parked in the area the maintenance vehicle needs to access, the Select Committee suggests there is prior notification to the police, local authority and traffic wardens so that the area is kept clear when the cleansing team need to gain access.
- ix. The Select Committee learned how important it is to ensure that water is not allowed to lie on roads. A new road in good condition absorbs only 10% of rainwater, the majority would run off. If water is allowed to lie on roads it reduces the strength of the top layer by 50%; the lower layers of the road losing up to 66% of their strength.⁸⁵ (In a flood emergency situation and its aftermath it is therefore important that roads are closed off quickly – this prevents the road surface from being degraded and also prevents the wake from vehicles pushing water over defences or thresholds into people's homes). It is also important to note that roads may convey water very quickly in intense rainfall and houses not normally considered at risk of flooding, even those on high ground/hillsides can be in the path of the resulting floodwaters.

⁸⁵ Ian Walsh, Senior Consultant, Jacobs, oral evidence 31st July 2007

7 Condition of Kent Flood Defences

R20 That the government should urgently consider the EA's request for funding to enable vital works to proceed at Jury's Gap, Camber.

R21 That the EA should encourage the input of local authority and Internal Drainage Board (IDB) experts on local strategies and schemes and that IDBs gain representation on the Southern Regional Flood Defence Committee (RFDC) in order to optimise the benefit to be gained from local knowledge.

R22 That the EA develop and implement a phased rolling programme of maintenance to include 'low risk' areas (in collaboration with the Kent Internal Drainage Boards).

R23 That the EA prioritise clearance of waterways in the Romney Marsh Area.

Explanation of recommendations follows:

a) Coastal defences

- i. Poor drainage is regarded to be the *most likely cause* of flooding in Kent but in terms of *outcomes* operating authorities are most concerned about sea defence and a storm surge⁸⁶ like the one experienced in 1953, which caused 307 deaths along the east coast of England and 1,800 deaths in the Netherlands. If similar conditions arose now the severity and extent of flooding could be worse, given rising sea level and climate change impacts. In Whitstable, for example, up to 3,000 homes could be flooded. In reality the day-to-day risk is low since on the whole coastal defences are in 'fair to good' condition.⁸⁷ In 1953 no warnings were issued and today there would be ample warning of a coastal flooding through the co-operation of the Met Office and Environment Agency.
- ii. The Select Committee were therefore keen to find out where coastal flood risk was the greatest in Kent and in his evidence Mr Older expressed the view that this was the low-lying land of Romney Marsh where 15,000 properties are vulnerable to flooding if sea wall defences breached. The condition of defences at Jury's Gap at Camber Sands in Sussex is of the most concern to him currently – being described as 'bad'. However, due to the proximity of a Ministry of Defence (MOD) firing range there are discussions currently under way between the MOD, Natural England and the Environment Agency to

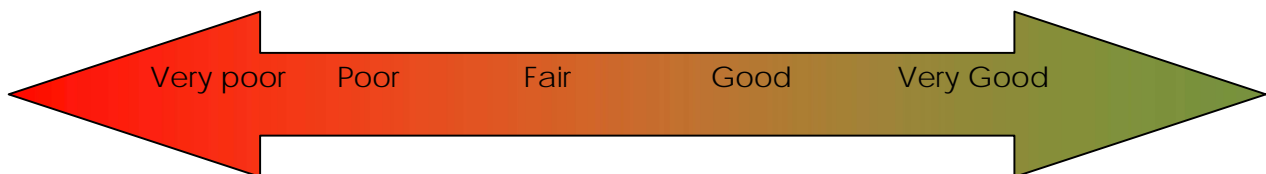
⁸⁶ [BBC - Weather Centre - Features - Understanding Weather - The 1953 East Coast Floods](#)

⁸⁷ Ted Edwards, Engineering Manager, Canterbury City Council, oral evidence 31st July 2007.

ensure an equitable solution is reached which will also meet government requirements. Flooding caused by failure of defences at that point would also affect neighbouring Kent. The Select Committee heard that the EA had made a special application to DEFRA for funding for this scheme, circumventing the usual process, since the condition of defences posed a threat.⁸⁸ Giving due weight to the expertise of the EA, and the danger posed by coastal flooding, the Select Committee would strongly urge the government to consider the EA's request for special funding to do whatever works are necessary at this site since it constitutes a weakness in sea defences (for both Kent and Sussex).

b) EA Asset Management

- i. The Environment Agency division which covers the whole of Kent and the upper Rother area of Sussex has a team dedicated to Asset System Management which deals with maintaining watercourses and infrastructure as well as new capital schemes. In 2006/7, in an effort to direct funding to where it was most needed, the EA designated their flood defences as high, medium or low (where 'high' would have the greatest threat to life and environmental impact if it failed). The EA carry out visual inspections of assets and note their condition:



- iii. A report by the National Audit Office in 2007⁸⁹ found that since 2001 the number of national assets has increased but their condition has not been greatly improved. The EA reportedly carry out 6 – 60 monthly asset inspections based upon 'target conditions' assigned to groups of assets called 'systems' which protect a discreet area. The EA has performance targets that require 63% of systems to be in target condition (which could be set, for example, at 'poor') by March 2007 and 100% by 2008/9.
- iv. Evidence from the Environment Agency highlighted that if one asset in a system does not reach target condition this means the whole system is classified as below standard and Mr Older, Kent EA Flood Risk Manager, confirmed that there were no data available on individual assets. The Audit Office looked at the number of structures in good or very good condition and found this had risen from 57% in 2000 to 61% in 2007 with the condition of linear defences (e.g. walls) decreasing over the same period from 64% to

⁸⁸ Clive Older, Flood Risk Manager, Environment Agency, oral evidence 31st July 2007

⁸⁹ http://www.nao.org.uk/publications/nao_reports/06-07/0607528.pdf

- 50%. Those classified as poor remained at a similar rate over the 7 year period (8% and 5% respectively). The data is somewhat unreliable in that it does not compare like with like due to changes in the assets included and the data input. Local EA area managers' estimates were felt by the Audit Office to be more accurate and using this method 46% of high risk assets, 62% of medium risk assets and 71% of low risk assets are said to be in target condition nationally.
- v. Kent residents may be reassured that the EA Southern Region, including Kent, has the most high risk systems in target condition - 60% - comparing very favourably with other EA Regions. However Audit Office analysis of the EA data for 2005-7 showed that a significantly lower proportion of Southern Region's maintenance expenditure was on high risk systems, spend being spread relatively evenly among high, medium and low risk systems: approximately 40% on high; 22% on medium and 35% on low (3% 'other') compared with the other regions who focused up to 70% of their expenditure on high risk systems. The concern of the IDBs in particular, about the recent cost-saving decision to undertake zero maintenance of low and some medium risk systems in Kent is discussed later on.

Focus: Insurance

Although the time constraints of this review did not allow for in depth discussion about household insurance, concerns were expressed that an area being labelled as flood-prone would cause hikes in insurance premiums. The Select Committee were reassured that the Association of British Insurers (ABI) have access to all EA flood maps and so the reluctance of some householders to admit to being at flood risk was unfounded (and more importantly should not prevent anyone from opting into a flood warning system). However, following recent flooding in Folkestone, Hythe and Whitstable, there is evidence that some homeowners are suffering not only from the effect of floods but potential loss of house sales. There are clear indications to government, local government planners and developers that in future flood risk, if not properly mitigated, may ultimately lead to decreasing property values.

a) EA Asset Management - inland

- i. The expert view of Engineering Manager Ted Edwards on the condition of flood defences in Kent is that coastal defences are generally quite good but river defences require further investment. He particularly commented that dredging of the River Stour needs to be undertaken (this would be the responsibility of the EA). Mr Edwards also expressed the view that the most likely cause of flooding if Kent experienced heavy rainfall would be the

- outdated highway drainage infrastructure which lacks capacity (proven, unfortunately, to be correct soon after his giving evidence). In his opinion, joint and individual work carried out by Kent Highways, local authorities, Southern Water and the Environment Agency has improved the situation since 2001 'in most of the blackspots'⁹⁰ but outdated drainage systems and flash-flooding are a problem of national significance.
- ii. Mr Older commented that Kent's 10,000 drainage systems had relatively few in the high risk category but that a good management plan was needed with some 'stand alone' schemes where risks were high in order to provide a flexible response.
 - iii. An issue of concern to the Internal Drainage Board Review referred to earlier, and one expressed to this Select Committee, was the effect of the enainment of critical ordinary waterways (COWs) on integrated water level management in Kent. Following serious flooding in 2000/2001 a number of watercourses were redesignated as COWs as they presented a high flood risk to people and property. Responsibility transferred from the IDBs to the EA for 3 watercourses in the Stour IDB district and around 15 in the Medway IDB district. Current EA policy means maintenance undertaken by the EA is often less frequent or effective than that previously undertaken by the IDBs. Rivers categorised by the EA as 'low risk' are receiving no maintenance (no weedcutting, de-silting or tree/shrub maintenance).
 - iv. There are specific locations where slowing down flow and recreating a more naturally functioning flood plain is beneficial and in certain areas there can be great environmental benefits. Where this is practicable Kent Wildlife Trust would advocate:
 - ≈ Impeding flow from land into receiving watercourses
 - ≈ Impeding flow in water courses upstream of vulnerable areas
 - ≈ Increasing flood storage capacity⁹¹
 - v. The Case Study on the next page is an example of using flood storage as a means of flood management. Currently, at the Leigh Barrier south of Tonbridge, there is a need to maintain the maximum storage capacity in the reservoir so it has to be kept dry. In 2005 the EA informed KCC of their plans to raise the height of the barrier by 1 metre which would provide additional safety downstream and reduce peak flood flow by 50%. It would also allow for an increase in biodiversity and amenity at the site, on creation of wetland habitat.

⁹⁰ Ted Edwards, Engineering Manager, Canterbury City Council, oral evidence 31st July 2007

⁹¹ Richard Moyes, Kent Wildlife Trust, oral evidence 1st August 2007

Case Study: Leigh Barrier – Flood Storage

Members of the Select Committee visited the Leigh Barrier south of Tonbridge, which was built at a cost of £3.6 million in 1981 to mitigate flooding in Tonbridge, Hadlow and East Peckham 3 miles downstream which are now defended against a 1 in 150 year event.



The barrier consists of an operator controlled sluice gate built into a 1300 metre long embankment across the River Medway.

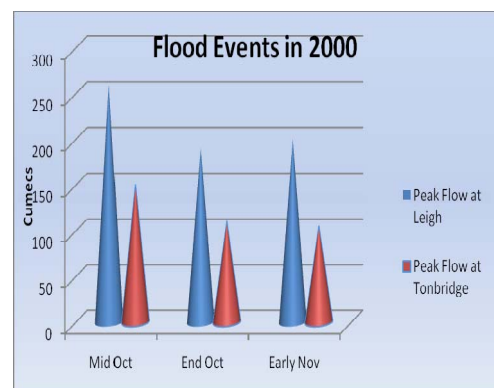


The 40 metre long reinforced concrete control structure has three radial gates like the one shown to the right.

The photo below shows part of the 278 hectares used for flood storage at times of intense rainfall, when it becomes the largest reservoir of its type in Europe. Compensation for use of this land represented around half the original cost of the defences.



The chart to the right shows the reduction in peak flow which was achieved by the Barrier in Autumn 2000, averting 3 major floods. In mid October for example it reduced flow by 110 tonnes of water per second.



- vi. The EA is urged to discuss with the IDBs a more considered, less broad-brush, approach to designation of low, medium and high risk. The Select Committee concur with the River Stour IDB's opinion that a 'phased rolling programme of maintenance' to include low risk areas should be introduced to replace the current system which is 'too simplistic and could lead to unnecessary flooding and adverse environmental impacts'. The Select Committee feel that better collaborative working would also be facilitated by inclusion of IDB representation on the Southern RFDC.

*'If the Environment Agency persist in their plans to reduce maintenance, should we experience similar rainfall (to that experienced this summer) next year the situation will be far worse.'*⁹²

- vii. The Select Committee learned that weed in a watercourse can raise the water level by around 1 ft per mile and that this effect was heightened in summer when flood dispersal would as a result be significantly slower. This particularly applies to the Romney Marsh area where many watercourses leading to pumping stations have been designated as low risk: '*which will lead to less efficient pumping or even breakdown due to blockages*'.⁹² Several instances were given where pumping station failure in the Romney Marsh area had led to localised flooding.
- viii. The Select Committee therefore consider that it is vitally important for regular clearance to be undertaken in Romney Marsh in order to safeguard marshland communities and infrastructure. Within the rolling programme already mentioned, these particular 'low risk' assets should have a much higher priority.

⁹² I.D. Oliver, Romney Marshes IDB, written evidence

8 Emergency Planning

R24 That the Kent Resilience Forum (KRF) Severe Weather Group (SWG) audit and promote the development of emergency plans/specific flood plans for at risk areas in liaison with the Environment Agency and develop a generic flood plan for Kent.

R25 That the government consider placing a duty (with funding) on the Fire & Rescue Service to respond to a flood emergency and further considers designating FRS as the lead body in charge of a flood incident.

R26 That the Kent Resilience Forum Severe Weather Group formulate and publicise an action plan in relation to flooding to raise public confidence in Kent's preparedness for flood events and consideration should be given to merging the SWG with the Flood Warning Planning Liaison Group to reduce duplication and avoid confusion as part of a wider streamlining of the group structure within the Resilience Forum.

R27 That KHS should send officers to work alongside local district colleagues in an emergency situation.

R28 That the Environment Agency, through its chairmanship of the KRF Severe Weather Group, should ensure there is a systematic survey of critical infrastructure (location and flood defences) and through the SWG promote work with utility companies to ensure supplies can be protected and maintained during flood emergency situations.

R29 That the Severe Weather Group liaise with partners in the Kent Resilience Forum and east coast authorities to formulate an emergency response plan for an extreme coastal event and, given the risk to life and property from sea flooding, assess whether the current warning system and communication processes are adequate or whether a siren system should be acquired for Kent, and that people are educated about what to do when they receive a flood warning.

Explanation of recommendations follows:

- a) Fourteen of the recommendations resulting from KCC's review of flooding in 2001 related to the emergency response as did four from the Climate Change review. A list of these recommendations with an indication of progress is given as Appendix 5. Some issues have been raised by stakeholders in their evidence to the review.

- b) In 2004 Exercise Triton⁹³, a virtual exercise, took place over 2 months to simulate a major flood event of 0.01% probability (1 in 1000 year flood) affecting England and Wales. This exercise was designed to look at a set of severe events that would not normally be planned for, to test the emergency response and provide valuable lessons for the future.
- c) A great deal of joint, cross-border and international work on emergencies already takes place. For example, Essex and Kent County Councils are holding a workshop in November this year to look at four major topics, including flooding, and considering key issues such as cross border communications and resources, and future developments.⁹⁴ HM Coastguard, who deal with both coastal and inland situations, are currently engaged in co-operation with Ireland and Sweden to develop international protocols and systems of information sharing and maritime search and rescue (SAR).⁹⁵ Such communication is vital in an emergency such as the 1953 disaster as, although the Netherlands had prior warning, there were no systems in place to disseminate intelligence, as occurred, tragically, in relation to the tsunami in Asia on Boxing Day 2004.
- d) Part 1 of the Civil Contingencies Act⁹⁶ 2004 has, since November 2005, covered local arrangements for UK civil protection. Part 2 which came into effect in December of that year (succeeding the 1920 Act) covers emergency powers necessary in a 'last resort' situation. Under Part 1 the Category 1 responders have the statutory duty to:

Assess the risk of an emergency happening
 Maintain and implement emergency plans
 Warn and inform the public⁹⁷

- e) A command and control system⁹⁸ is used to direct serious emergencies and warnings can also be disseminated via the media.

f) Kent Resilience Forum

- i. Each police area has a Local Resilience Forum, usually chaired by the Chief Constable, where local strategy, co-ordination and planning are determined. The Kent Resilience Forum (KRF) is responsible for assessing the risk from flooding and other types of emergency and have the statutory duty to produce a

⁹³ [UK Resilience - Exercises - Exercise Triton](#)

⁹⁴ Catherine Boyer-Besant, Joint Emergency Planning Officer, Essex County Council and Tendring District Council, written evidence

⁹⁵ Spike Hughes, Rescue Co-ordination Manager, HM Coastguard, written evidence

⁹⁶ [UK Resilience - Civil Contingencies Act](#)

⁹⁷ Trevor Cruttenden, Principal Emergency Planning Officer, KCC

⁹⁸ [Gold Silver Bronze command structure](#)

Community Risk Register.⁹⁹ In Kent the Emergency Planning Group have service level agreements with all of the district councils except Sevenoaks, who make their own arrangements, and there are local council emergency planners. Medway, though part of the Forum and subject to local co-ordination, also has its own emergency planning arrangements.

- ii. One of Kent's Principal Emergency Planning Officers, Trevor Cruttenden, informed the Select Committee that all KCC staff could potentially be involved in an emergency, providing support to district councils. A key role is played by Adult Social Services in providing for people displaced by an emergency and KCC also provide multi-agency training to staff, helping to raise staff awareness of each person's responsibility to appraise themselves of how they may be called upon to help.

g) Kent Fire and Rescue Service

- i. The Fire and Rescue Act 2004 introduced a duty to respond to road traffic collisions, which now takes up as much FRS time as responding to fires. There is, however, no duty to respond to a flood incident and this means senior fire officers have to make decisions based on 'civic concern', rather than clear guidance on when to exercise non-statutory responsibilities. Current legislation means that the Fire & Rescue Service 'would not compromise fire cover to support flood issues'.¹⁰⁰ Kent Police readily concede that KFRS are effectively the lead agency in a flood emergency and Emergency Planners seem somewhat resigned to this situation, reporting that due to the differing statutory requirements of each agency no-one really takes the lead; the police lead is nominal, and all parties co-operate as they know each other and work well together.

'Kent Fire and Rescue said it took more than 400 <flood related> emergency calls in a three hour period on Tuesday night.'

Source: BBC News 20th June 2007

- ii. Having said there is no duty for FRS to respond there is a clear expectation that if they are able to, they will. Since flooding in Kent in 2000/2001 KFRS have been equipped with high volume pumps (HVPs) for use in flood situations. Fire and Rescue Services nationally are building a wealth of experience in managing floods but have neither the duty nor funding to deal with them and so training and plans do not focus on the response of the FRS in a given flood situation.

⁹⁹ <http://www.kent.gov.uk/NR/ronlyres/0DBC2777-DD68-491E-A461-0024FF9C5799/10773/kentcommunityriskregisterjuly2007.pdf>

¹⁰⁰ Bill Feeley, Deputy Chief Fire Officer, Kent Fire & Rescue Service, oral evidence 27th July 2007

Although they have equipment and some personnel trained to manage floods there are limits to their capability. It is not clear for example, whether evacuation of residents is always the best option – it may be that in some instances being supported to remain at home would be preferable; however in times of emergency and without any clear duty or guidelines the ‘instinct to help’ is the main driver.

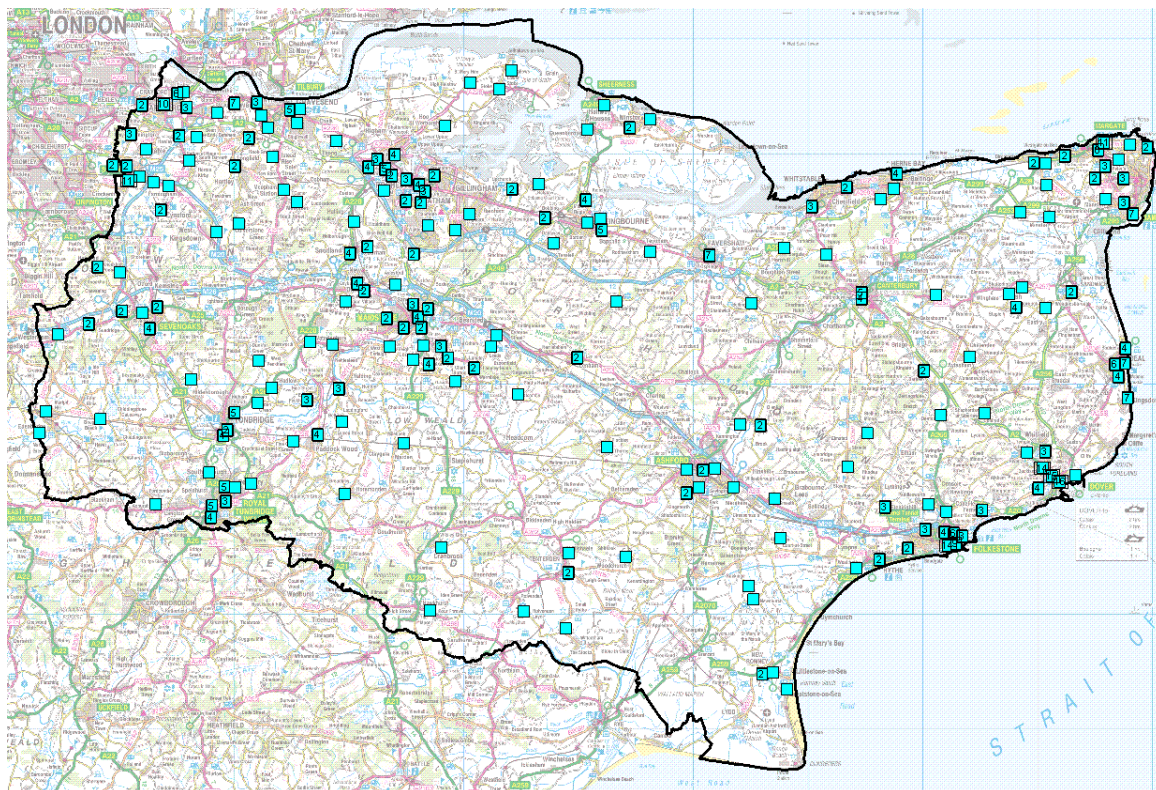
- iii. Emergency Planning regulations under the Civil Contingencies Act 2004 require that emergency services are consulted both during the preparation of Local Development Documents and on certain planning applications regarding evacuation. However, Mr Feeley, Deputy Chief Fire Officer feels that KFRS ‘*are not consulted as well as they should be*’ and the Select Committee believe that this may in part be due to their not having a clear duty to respond to flooding. KFRS would want to establish, for example:

- ≈ Under what circumstances is evacuation of residents desirable or necessary?
- ≈ How and where should HVPs be deployed and where should the water be pumped to?
- ≈ How do we work and engage with other agencies in a flood situation?
- ≈ Are we prepared?

and the placing of a duty on the FRS in relation to flood response would ensure that similar considerations were embedded in services across the country which would facilitate cross-border assistance. Furthermore, greater weight given to FRS opinion in strategic planning could cut costs and improve safety: KFRS has, for example been consulted at the design stage of new schools contributing to safety improvements (automatic sprinkler systems) and financial savings.

- iv. The map on the next page shows information kept by the Kent Fire & Rescue Service which has a level of local detail no other agency is currently able to provide.
- v. Lessons gleaned from floods in Kent and elsewhere suggest that, particularly when assistance is imported from other authorities, clear leadership would contribute to a more effective response. A duty for the Fire & Rescue Service would support this and the Select Committee feel that this change should be considered by central government, in the light of national experience.

Figure 9: Weather-related (pluvial) flood incidents since 2002 ¹⁰¹

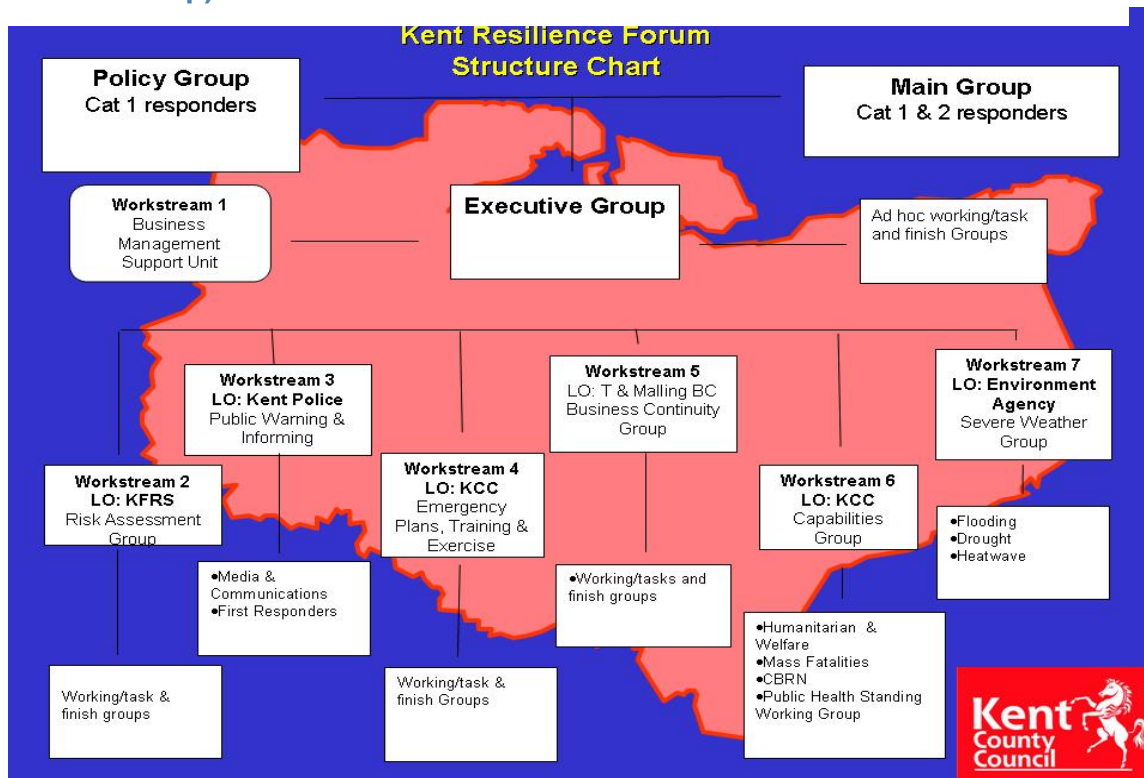


h) Severe Weather Group

- i. KRF Subgroup 7 is the Severe Weather Group (SWG), which looks at heatwave, drought and flooding emergencies. The Select Committee were informed by the EA, who have chairmanship of the SWG, that they find the current set up of the Resilience Forum confusing. This may partly be due to the retention in Kent of an existing, long standing flood warning group which has a slightly different remit to the SWG. Essex County Council provided written evidence indicating that their Flood Warning Planning Liaison Group was replaced by the Severe Weather Group last year and this would seem to be a more sensible option, drawing together strategic and operational discussions. The Select Committee feel Kent's SWG would benefit from a clarification of its responsibilities and renewed focus and hope that this action, and other suggestions from this review, may assist with this. Drawing together a plan of action, subsequently publicised, would also help to reassure Kent residents about the existence of flood plans and preparedness for severe events.

¹⁰¹ Provided by Kent Fire and Rescue Service to inform KCC's draft Kent Local Climate Impacts Profile project, summer 2007. The number of incidents per site is shown and these will be an underestimate of total incidents across the county as KFRS will not always be called.

Figure 10: Structure of the Kent Resilience Forum (including the Severe Weather Group)



i) Emergency Plans

- i. KCC's Emergency Planning website can be found at: [Emergency planning](#). The KCC team is well regarded and there is particularly good liaison between them, the police, and Fire & Rescue Service.¹⁰² KCC's Major Emergency Plan¹⁰³ is a generic plan to be used in the event of all types of major emergency; Kent has no generic flood plan. This differs from practice in Essex where there has been a county flood plan since January 2006¹⁰⁴ and the Select Committee feel that there would be benefit in having a generic flood plan, as well as specific flood plans for vulnerable areas. The Environment Agency told the Select Committee that they were aware of attempts by KCC to draw up a plan for Romney Marsh in 2000 but it was found that initial work to identify properties at risk of flooding was not completed, as agreement between all partners could not be reached.¹⁰⁵ One of the requirements of a local plan would be a record of key local contacts so

¹⁰² Clive Older, Flood Risk Manager, Environment Agency, oral evidence 31st July 2007

¹⁰³ <http://www.kent.gov.uk/NR/rdonlyres/94AD8385-E489-4A62-9C7D-83FE3CB8C325/0/EmergencyPlan.pdf>

¹⁰⁴

<http://www.essexcc.gov.uk/vip8/ecc/ECCWebsite/content/binaries/documents/FloodPlanVersion1.doc?channelOid=null>

¹⁰⁵ The Select Committee have been told that the plan was never finalised.

that communication in an emergency was possible but currently no such lists exist.

- ii. The vulnerability of Kent to a recurrence of the 1953 storm surge and the predicted sea level rises dictate that there should be specific planning for the county's response in the event that such an emergency occurred. This should take account of the vulnerability and potential effects of flooding on critical infrastructure. It may also be worthwhile to carry out testing/exercises to ensure that residents understand the warnings they receive and know how to respond. Unlike in Essex, there are no functional siren warning systems in Kent. Essex County Council provided written evidence to the Select Committee about siren tests they are carrying out in conjunction with Norfolk and Lincolnshire County Councils on 19th September 2007¹⁰⁶ and it may be of benefit for Kent emergency planners to liaise with those councils about the effectiveness of the sirens as a warning system, the lessons learned from the tests, and whether a similar system should be acquired for Kent.

j) Critical infrastructure

- i. The EA cannot currently comment on the security of Kent's water supply during an emergency, this being the domain of water companies. It may be that exception reporting by the SWG (what can we not verify?) would provide an overview of issues to be further investigated. The Select Committee were reassured to know that the EA intends to identify the location of 'hot spots': Kent has a large amount of critical infrastructure vulnerable to sea flooding including Lydd Airport, power stations, the port of Dover, several oil and gas terminals and numerous smaller locations key in the supply of water and electricity to the population of Kent. A major flood has implications for supply and even in the absence of a major flood, more frequent minor flood events could have 'serious economic and environmental consequences'.¹⁰⁷ Issues relating to the future re-location of any critical infrastructure, should this prove necessary, will be dealt with by planners rather than emergency planners.
- ii. The Select Committee feel that, in the light of experience in the central and west midlands, the EA and SWG should prioritise joint work with the utility companies in particular to ensure specific flood and contingency plans are in place. Southern Water also told the Select Committee that they now had sophisticated computer modelling covering 95% of sewage systems which could predict flooding to a certain extent. This is not currently shared with emergency services and perhaps could be explored through the Resilience Forum, which would seem to be the appropriate forum to draw together flood data from various sources. KHS efforts to identify sites of flood 'stress' would

¹⁰⁶ Catherine Boyer-Besant, Joint Emergency Planning Officer, Essex County Council and Tendring District Council, written evidence

¹⁰⁷ Sean Furey, Deputy Director, CPRE, written evidence

be greatly aided by data from these other agencies. The Select Committee believe that EA should give priority to identifying sites associated with electricity and water supply which are located in flood risk areas, and to ensure that contingency plans/defences are in place to enable them to maintain business continuity and supplies.

k) Kent Highways Service – emergency response

- i. Reorganisation has meant that on formation of Kent Highway Services¹⁰⁸ in April 2005, officers previously located in district council offices are now located in divisional offices and will shortly be subject to further centralisation. While this has advantages in terms of strategic planning and management, it was suggested by Ted Edwards, Engineering Manager of Canterbury City Council (CCC), that in an emergency, highways officers assigned to a particular district could temporarily relocate back to the district council office to aid communication and prevent delays. In Canterbury there are also priority telephone systems so officers can remain in phone contact with colleagues in an emergency. This service, although expensive, is worthwhile in emergency situations when mobile networks become quickly blocked, often by media correspondents.
- ii. As an example, on 12th February 2001, CCC had 1000 calls in one day and people dealing with highway drainage and the council worked together as they were co-located, and so could respond to road/river problems in a co-ordinated way. Most calls (about flooded roads) come to local councils, especially outside normal working hours; including calls which should be directed to Southern Water. This is exacerbated as drainage responsibility is unclear to the public (and professionals!). It is therefore important the public have a point of contact otherwise their experience in an already stressful situation is negative as they get passed around from organisation to organisation.
- iii. There are concerns that emergency planning resources would be too thinly spread in a major emergency as with 60-70,000 houses on the flood plain in Kent impact could be great, and most resources are directed at coastal, rather than other types of flooding.¹⁰⁹ Training among emergency planning staff as well as training of staff generally is essential as there has been no major flood incident in Kent since 2000-2001 and staff changes mean many have had no direct experience of such an emergency.

¹⁰⁸ KHS – KCC working with Jacobs, Ringway and TSUK in an Alliance Partnership

¹⁰⁹ Ted Edwards, Engineering Manager, Canterbury City Council, oral evidence 31st July 2007

I) Warnings

- i. Following Triton a great deal of government money is devoted to flood warnings: the EA are in the midst of a £200 million investment programme in flood warning systems, flood maps¹¹⁰ and campaigns to alert the public to the risk of flooding and what to do in an emergency. Flood warnings are issued via Flood Line Direct: an opt-in system. The EA have a duty to issue warnings giving 2 hours notice of flooding and are monitored by DEFRA on this matter.¹¹¹ A map showing flood warning areas in Kent is given as Appendix 6. Warnings are in four stages: Flood Watch, Flood Warning, Severe Flood Warning and All Clear although there are moves away from this tiered approach, towards notifying communities of imminent flooding and sending the initial alert to emergency planning partners only. Maritime District Councils also receive surge tide warnings from the Environment Agency. Public awareness about warnings and flood risk more generally, is discussed in the next section.

¹¹⁰ [Environment Agency - Flood Map](#)

¹¹¹ Brian Vinall, Flood Incident Manager, Environment Agency, oral evidence 27th July 2007

9 Raising Public Awareness

R30 That KCC support the Environment Agency in raising flood risk awareness (including the appointment and training of flood wardens and to ensure that vulnerable people are identified and supported in emergency situations) via town and parish councils and similar community groups.

a) The actions KCC can take to raise public awareness about different aspects of flood risk have been considered throughout this report and recommendations are made in the relevant sections.

b) In collaboration with the EA and Medway Council and the emergency services KCC have produced a leaflet, 'Be Prepared for Flooding', which gives advice to homeowners about what to do before, during and after a flood as well as useful contact numbers.¹¹²

c) EA Campaigns

i. Public awareness campaigns by the EA have suffered somewhat due to funding cuts and they have not been able to publicise their flood warning scheme as widely as they would have liked. Publicity is currently being sent to some but not all residents at risk. However with the promised increase in funding this work should now be able to proceed.¹¹³ This is significant as only 30% of people in Kent who should receive flood warnings have taken up the service. There may be a number of reasons for this including:

- ≈ Fears that opting in will affect insurance – as discussed earlier on this is not the case since the insurance industry already has all the flood map information;
- ≈ Lack of understanding about warnings – 'it wasn't even raining' an elderly resident is reported to have said on being sick of receiving telephone alerts (for sea flooding);
- ≈ Residents receiving too many calls that do not precede an incident (this is seen as 'crying wolf' and could lead to residents ignoring a warning and putting themselves at risk).

¹¹² [Be prepared for flooding leaflet \(2 sides\)](#)

¹¹³ Brian Vinall, Flood Incident Manager, Environment Agency, oral evidence 27th July 2007

- ii. The capacity of the system is not an issue – the EA would prefer an opt-out system, but this is not legally feasible, therefore communicating the importance of the scheme is vital. The EA are aware of the issues and are attempting to resolve them. Parish Councils and other community groups have been instrumental in helping to raise awareness and also receive mail shots about warnings. Local communities have a vital role to play particularly in helping to identify, and ensure assistance reaches, any vulnerable residents.
- iii. Kent Adult Social Services (KASS) are involved in the Kent Resilience Forum as they provide vital services to people made homeless in flood situations. Managing Director, Oliver Mills, informed the Select Committee that his primary concern in a flood situation was being able to maintain business continuity and gain access to clients. He further felt there would be merit in investigating whether a mapping program such as GIS could be used to assist services in rescue situations.
- iv. However, having heard evidence from Sue Chalkley from the National Flood Forum who had herself experienced flooding on a number of occasions, the Select Committee feel that building links with local communities is equally important, and may be more effective when quick, on the ground actions are needed. The potential role of Flood Liaison Advice Groups has already been mentioned and furthermore, the EA are looking to revitalise the flood warden scheme which would be an excellent way of ensuring that at local level, communities were involved in making sure their less able or elderly residents were safe. The Select Committee heard that the village of Yalding was an example of good practice, as there is a very good system of liaison with the Flood Action Group. If, as suggested earlier, residents would on occasion be better off staying in their own homes, it is vital that clear plans are in place to ensure that supplies of food, water and other essentials can be transported to where they are needed and in these circumstances local knowledge and co-ordination is vital.

d) Raising awareness among children

- i. School children now have the opportunity to study climate change as part of the new geography curriculum, which also allows a degree of flexibility to allow for the inclusion of topical issues.
- ii. KCC has information online to support the use of Pathe Films in the History Curriculum.¹¹⁴
- iii. The QCA have a website covering these units of web-based study¹¹⁵:

¹¹⁴ http://www.segfl.org.uk/library/1157386523/s4s_floods.pdf

¹¹⁵ [QCA - Innovating with geography - Geography matters - Rivers](#)

- ≈ The problem of flooding
- ≈ Understanding flood symbols
- ≈ Rivers that flood
- ≈ Investigating flooding in your area
- ≈ Flood Defences
- ≈ Flooding in the future
- ≈ Cross curricular and curriculum Links

and the above site has links to other flood study resources suitable for children such as the CBBC website:

[CBBC Newsround | FLOODS](#)

- iv. In Essex school children have been engaged using a flooding calendar – one of the aims was to get across the message that flooding no longer has a ‘season’ from September to April and different types of flooding may occur at various times of year.¹¹⁶
- v. The Select Committee feel that seizing every opportunity to raise awareness among local school children will contribute to raised awareness of flood risk in the wider community.

¹¹⁶ Catherine Boyer-Besant, Joint Emergency Planning Officer, Essex County Council and Tendring District Council, written evidence

Appendix 1: List of people giving evidence at Flood Risk Select Committee Hearings

Monday 23rd July	Alison Cambray – DEFRA secondee to KCC (Climate Change Project Manager)
	Yvonne Riedel – Policy Adviser - Environment Agency
	Sue Chalkley - National Flood Forum
Friday 27th July	Trevor Cruttenden - Principal Emergency Planning Officer - KCC
	Bill Feeley - Deputy Chief Fire Officer - Kent Fire & Rescue
	Brian Vinall - Flood Incident Manager - Environment Agency
Monday 30th July	Leigh Herington – Director of Strategy and Planning - KCC
	Neil McDermid - Flood Protection Association
	Tony Hillier – Chairman - Hillreed Homes
Tuesday 31st July	Ted Edwards – Engineering Manager -Canterbury City Council
	Clive Older - Flood Risk Manager - Environment Agency
	Ian Walsh – Senior Consultant - Jacobs
Wednesday 1st August	Ingrid Chudleigh - Natural England
	Bruno Venturini - Halcrow
	Richard Moyse – Senior Conservation Officer - Kent Wildlife Trust
Friday 3rd August	Matthew Sims – Divisional Manager - Kent Highway Services
	Barry Luck – Sewerage Strategy Manager - Southern Water
	Paul Shaffer – Project Manager - CIRIA

Appendix 2: List of people submitting written or supplementary evidence to the Flood Risk Select Committee

Archer, John	Environment and Land Use Adviser, NFU, South East
Boyer-Besant, Catherine	Emergency Planning Officer, Essex County Council
Burch, Jane	Regional Adviser, Country Land & Business Assoc.
Cambray, Alison	DEFRA, secondee to KCC
Chudleigh, Ingrid	Natural England
Crichton, Professor David	Dundee University
Davies, Sarah	Met Office
Furey, Sean	Deputy Director, CPRE
George, Gavin	Flood Protection Association
Giacomelli, Alison	Conservation Officer, RSPB South East
Gibbs, John	Contingency Planning Manager, EDF
Holliday, Elizabeth	Kent Coastal Officer, KCC
Heslop, Nicholas	Councillor, Tonbridge and Malling BC
Hughes, Spike	District Operations Manager, HM Coastguard
Trevor Irvine	Contracts & Performance Manager, KHS
Lewis, Derek	Clerk of the Board, Stour IDB
McCulloch, Mike	Chief Engineer, Tonbridge and Malling BC
Mills, Oliver	Managing Director, Adult Social Services, KCC
Moyse, Richard	Senior Conservation Officer, Kent Wildlife Trust
Norfolk, Tony	Bridges Manager, Kent Highways Service
Oliver, I.D	Romney Marsh Area IDB
Peters, Jorn	SEERA
Sims, Matthew	Divisional Manager, Kent Highways Service
Thomas, Allyn	Assistant Chief Constable, Kent Police
Wale, John	Assistant to Chief Executive, KCC
Watson, Mike	Medway IDB
Venturini, Bruno	Halcrow
Weatherall, Malcolm	Met Office

Appendix 3: Climate Change Impacts on Kent¹¹⁷



Kent impacts: did you know?

KCC has begun a *Kent Local Climate Impacts Profile*: by analysing recent extreme weather events (1997-2007) and combining with predicted future trends we can better understand how climate change will affect services, infrastructure and communities in Kent and take appropriate action. So far we have found...

At least 50 significant extreme weather events since 1997:	
18 heavy rain / flooding	13 freezing temps / snow
3 tornadoes	10 storms / gales
2 prolonged droughts	5 severe heatwaves

Significant +/- impacts on services & receptors e.g.	Roads (water / heat / closures)	Drains	Crime	Disease	Retail
	Property (Fire & Rescue to 544 floods since 2002 / subsidence)	Tourism	Trains	Farmers	
	Schools (closed due to floods, heat, snow)	Rivers (low flows, toxic algae)	Power / phone lines		
	Grassland fires	Water supply	Elderly (approx. 130 extra deaths in 2003 heatwave in Kent)		

Estimated costs so far (excluding Operation Stack) of the order of:	
~ £440m to the Kent community	~ £25m to KCC in direct costs

1

¹¹⁷ Early output material kindly provided by Alison Cambray from KCC's draft Kent Local Climate Impacts Profile project, summer 2007. This information is still to be validated, should be interpreted as approximate only and is subject to change as the project continues.

Appendix 4: Extract from comprehensive written evidence from Sean Furey of CPRE - (suggested recommendations)

Rural Flooding

- Parish councils should be encouraged and supported in developing village flood resilience plans.
- KCC and the Environment Agency could do more to promote increased flood resilience of rural properties.

Planning and Development Control

- That KCC and the Borough Councils rigorously enforce the PPS25 sequential test for preventing inappropriate flood plain development.
- That KCC ensures that all the Districts/Boroughs undertake a Strategic Flood Risk Assessment to inform land use allocation in their LDF Core Strategies and subsequent area action plan documents.
- To treat developer proposals for new flood defences from a position of scepticism given the future liability on the public purse to maintain any such mitigation measure, the impact if the defence were to fail and any residual effects on insurance and quality of life.

Climate Change

- That the fluvial flood outline used for planning decisions should be the 1-in-100 year undefended + 20% peak flow allowance for climate change.
- sea-level rise scenarios, of up to seven metres, especially on critical vulnerable infrastructure such as power stations, ports and coastal towns.

Drainage Planning and Management

- Sustainable Drainage Systems (SUDS) to be used throughout Kent, with over-attenuation of surface runoff to compensate for increased storm runoff caused by urbanisation and climate change. We recommend that KCC promote the best practice developed and adopted by Canterbury and Ashford councils.
- That SUDS systems should be designed to reduce point-source and diffuse urban pollution inputs into receiving watercourses.
- That integrated drainage system design is used in new and regenerated development areas, e.g. plan for excess flow, particularly in roads and car parks, for storm events that exceed drainage capacity.







- That where stormwater detention tanks are used to reduce runoff, the tanks should allow some storage for non-potable water uses, such as irrigation, cleaning, vehicle washing or public realm features.
- In regeneration areas, the opportunity should be taken to replace any old combined sewers with separate foulwater and surface water systems. Care should also be taken not to connect new systems onto old combined sewers where that increases the risk of sewer flooding or the operation of combined sewer overflows (CSOs)
- That KCC, and KCC Highways, review their drainage maintenance procedures to ensure that their drainage assets are adequately maintained and kept free from blockages.

Organisational responsibilities and co-ordination

- That KCC lobbies for greater clarity and consolidation of drainage responsibilities, and works with others to promote and educate landowners and homeowners on their rights and responsibilities for land drainage, riparian and coastal management.
- KCC can play a role in leading the way on overcoming problems associated with adoption and maintenance of SUDS and establishing some consistence across the county.
- That KCC and the EA monitor the development of River Basin Management Plans and their integration with Catchment Flood Management Plans (CMFPs) and Shoreline Management Plans (SMPs) to minimise the conflict between flood risk management, biodiversity and landscape quality.
- That KCC and the EA ensure proper and timely investment in keeping coastal and fluvial flood defences maintained to a good standard.
- The Environment Agency's flood warning and incident management service continues to develop and improve. KCC can help in the dissemination of flood warning information and make sure that vulnerable individuals and properties are registered and have access to the service.
- That KCC be aware that the Environment Agency's operational performance and strategic flood risk planning may be compromised by a succession of internal reorganisations.


Appendix 5: Recommendations of KCC Flood Risk and Climate Change Reviews

(Please take comments on progress as a guide only – indicators have not been researched in detail – some are left blank as there was insufficient time to confirm progress before the end of the select committee.)

Recommendations of KCC's 2001 Review:	
	Progress
1. that all agencies need to make sure that they take account of the likelihood of extreme events in dealing with planning applications, planning for future emergency situations or looking at the maintenance and construction of flood defences and drainage works.	
2. that the County Council supports the work of the Environment Agency and the Met Office in improving the quality of flood forecasting and urges them to make sure that this is maintained as a high priority.	
3. that the County Council engages with the Met Office to find a suitable solution to improving the quality of forecasting for the Kent Area by extending the radar network.	
4. that the Network Management Unit, together with the Borough and District Councils review the performance and appropriateness of the contract for gully clearance.	
5. that work is undertaken to estimate the extent of remedial or replacement action required to the highway drainage systems and that estimates of the extent of potential danger areas in future together with a scheme of priority and costs over and above the allocated budget should be submitted to the Strategic Planning Committee for urgent consideration.	
6. that the County Council works with District and Borough Councils to make sure that ownership of and responsibility for roadside drainage ditches is clear, and that authorities are clear about their responsibilities and powers relating to land drainage.	
7. that the County Council urges the Local Government Association and the Environment Agency to see how the monitoring of flood defences that are the responsibility of the private owner can best be achieved	
8. that the County Council, through the Strategic Planning Directorate, takes a lead role in bringing together the necessary organisations to work with landowners to develop flood protection schemes on an agri-environmental basis as set out above.	








9. that the County Council urges the Environment Agency to review its priority for modelling the River Medway so that appropriate remedial action can be taken.	☺
10. that the County Council should strongly urge the Department of Transport, Environment and the Regions (DETR) to strengthen PPG25 to give the Environment Agency greater influence in planning applications, and in particular by requiring that the Environment Agency should receive a notice of conditions imposed on planning applications and, where conditions put forward by the Environment Agency are not included, the reasons should be stated and published by the local planning authority.	☺
11. that the advice of the Kent Law Society and other professional bodies is sought to determine the best way to ensure that local authority searches include flood risk and that the DETR should be urged to legislate to make it mandatory that when searches are made with the local authority the enquiries include the risk of flooding.	☹
12. that the DETR should be urged to include water companies as statutory consultees in planning applications.	☺
13. that the County Council supports the Environment Agency in taking a firm stand against housing development on flood plains or in areas that will affect the flood plains, including areas at risk of coastal and estuarial flooding, and that this is emphasised in the Structure Plan and in community plans.	☺
14. that the Environment Agency are asked to attend the meetings of the Kent Planning Officers' Group on a regular basis to ensure that flood risk is kept as a high priority and that flood resistance is built into developments wherever possible.	☺
15. that the County Council adopts a more proactive approach to the Kent Local Flood Defence Committee and ensures that there is a clear mechanism for reporting back and for making sure that the County Council's priorities are put forward and recognised.	☹
16. that the Kent Local Flood Defence Committee reports on a regular basis to the Cabinet and County Council, and that the Cabinet makes clear where Member and Officer responsibility lies.	☹
17. that the County Council urges the Ministry of Agriculture, Fisheries and Food to make funding available to update the current flood warning system., and to make sure that all interested parties are kept informed.	☺

18. that the Network Management Unit work with Kent Police to see how better information on road closures and re-openings could be collated, and how best it could be disseminated to the public within adequate time scales.	
19. that the Kent Emergency Group be asked to consider the best way to provide a closer link between the broadcast media and Gold Command to enable the provision of the most accurate information possible to the general public.	😊
20. the Education & Libraries Directorate check the advice that has been issued to schools and, if necessary, reissue guidance to make sure that appropriate reception arrangements are in place.	
21. that the Education & Libraries Directorate work with Commercial Services to make sure that suitable communication arrangements are in place.	
22. that the Education & Libraries Directorate make sure that all schools have the contact details for Radio Kent, including the fax and email details, and that these are used if telephone contact is not possible.	
23. that the Kent Emergency Group is clear about the response that will be provided by different local authorities; that they work to ensure these responses are made as consistent as possible and that the public are aware of them.	😐
24. that the Kent Emergency Group is asked to review the provision of meals at rest centres during the recent events and make sure that appropriate cooked meals will be prepared by properly qualified staff in future emergencies.	😊
25. that the Kent Emergency Group consider what additional equipment and protective clothing might reasonably be required in similar emergencies, including consideration of storage facilities.	
26. that the Kent Emergency Group be asked to ensure that appropriate mechanisms exist to enable organisations to take account of flood victims' experiences.	😞
27. that all agencies consider the information set out in Appendix 1 to this report, to see what lessons can be learnt and whether there are outstanding matters that need to be resolved.	

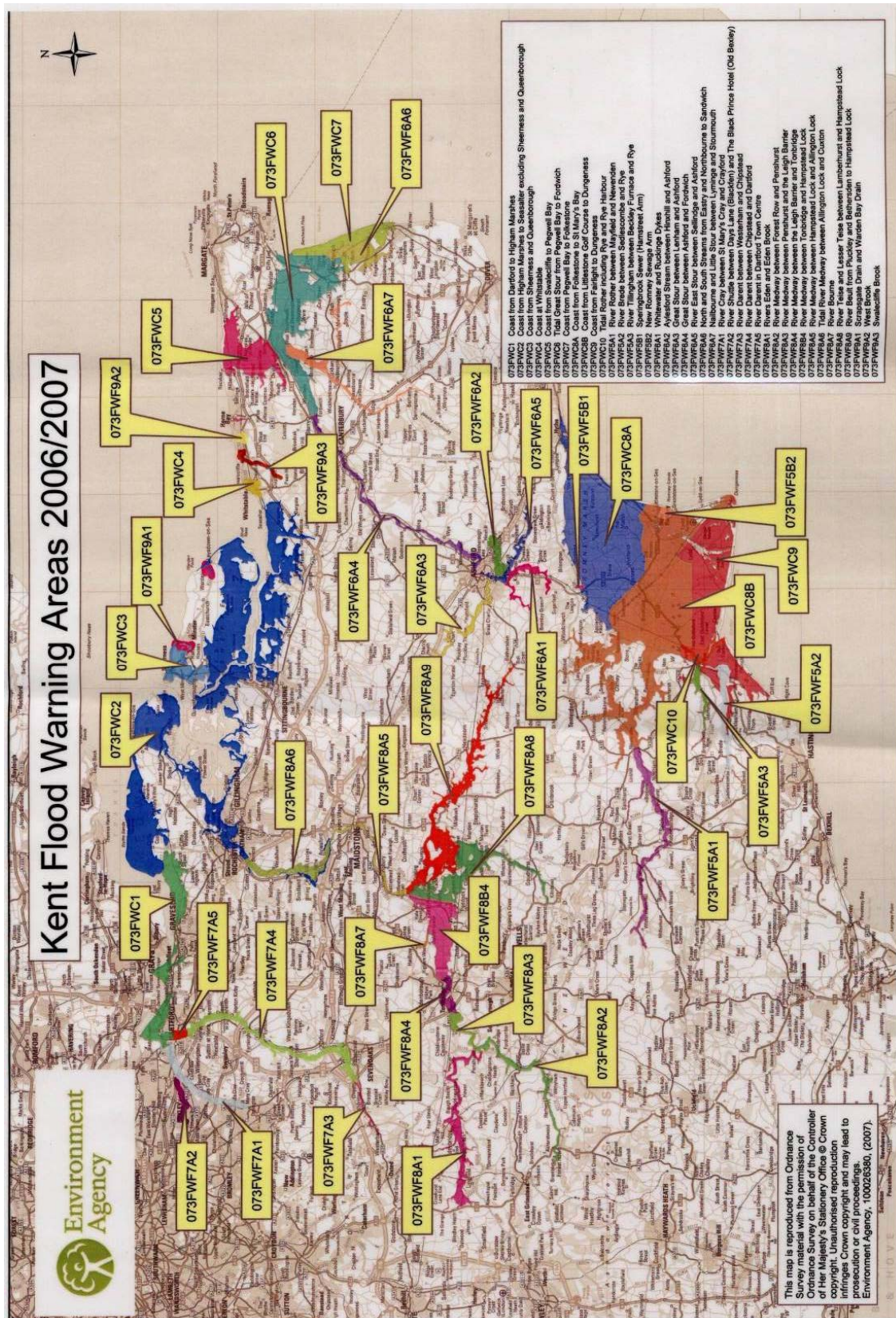
<p>28. that the Kent Emergency Group should be asked to consider how best to increase public awareness and provide additional information about what to do before, during and after flooding events; what services are available and what people can do to help themselves.</p>	
<p>29. that the County Council takes steps to make sure that the risks have been taken fully into account, including appropriate remedial measures, so that there would be no increase in the flood risk to the Lamberhurst area from the construction of the bypass.</p>	
<p>30. that arrangements are made to discuss with the Environment Agency, at a senior level, and with the Chairman of the Kent Local Flood Defence Committee the findings of the Scrutiny Committees' report and the Environment Agency's review.</p>	

Recommendations of Climate Change Review relating to Flood Risk:

(A meeting is currently being convened to follow up on progress of these recommendations)

	Progress
1. Strongly support the Environment Agency's efforts to promote sustainable approaches to flood risk management, to restrict building in areas at high risk of flooding and to ensure that flood resilience is built in to new development.	
2. Ensure that where development in the indicative flood plain goes ahead it is concentrated in well-defended areas at higher densities.	
3. Ensure that development pressure is not simply transferred from high flood risk areas to lower risk areas which may face other constraints, climate related or otherwise.	
4. Adopt a new statement of water policy, emphasising the importance of demand management and reflecting current concerns about water resources and long-term concerns about climate change impacts.	
5. Immediately review Kent's emergency planning framework to ensure that the latest evidence on climate change is fully taken into account.	
6. Call a high level meeting of the emergency services, local authorities and the Environment Agency to identify potential climate related emergencies and ensure that they are being adequately planned for.	
7. Ensure that specific emergency plans for climate related emergencies, such as evacuation plans for those areas of Kent facing high flood risk, are in existence and up to date.	

Appendix 6: Map showing EA Flood Warning Areas (KCC Licence: LA076708)



References

Ashford Borough Council: Integrated Water Management Study, August 2005

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