



ENVIRONMENT
AGENCY



Babtie Brown & Root

Medway Catchment Flood Management Plan

Example Inception Report



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Medway CFMP - Inception Report

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APPENDICES

- A – Relationship between CFMP and other plans
- B – Key information and data collected
- C – Programme for CFMP completion
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IMPORTANT NOTE

This Inception Report has been produced as a result of CFMP development, using the knowledge and hindsight gained from testing the CFMP procedures, through the pilot studies.

Although entitled the 'Medway Inception Report', it is more intended to provide an example of report format and content, modelled on the Medway, which may be used on future Inception Stage reporting.



1. EXECUTIVE SUMMARY

A primary aim of DEFRA and the Environment Agency is to reduce the risk of flood damage to property and people. Their objectives are to ensure best use of public money and better decision making, by a consultative appraisal of economic, environmental, technical and social issues.

Catchment Flood Management Plans (CFMPs) aim to provide a high level, holistic understanding of flooding and flood processes at a catchment level. It forms an important element of DEFRA's strategy for flooding and fluvial flood defence, as well as contributing to Water Framework Directive objectives in due course. A pilot study programme, consisting the Yorkshire Derwent, Irwell, Parrett, Severn and Medway catchments commenced in early 2001

The Medway is the largest river basin within the Southern Region of the Agency, and contains a wide range of geologies and terrains. It is predominantly rural but has significant development, ecological and social pressures. Maidstone and Tonbridge are major urban areas at risk of flooding.

The Medway CFMP is intended to identify the significant factors that influence flood flows and flood damages throughout the catchment, at an overview scale, whether they be part of the natural or built environment. It will determine how these factors may change with time (for example, by considering future climate change or changes in land use) and seeks to formulate the long term policies and measures for flood risk management at the catchment scale.

This Inception Report is intended to outline data collected and knowledge gained to date and forms an element of the consultee feedback, leading to the next stages of the Medway CFMP.



2. BACKGROUND TO CATCHMENT FLOOD MANAGEMENT PLANS

2.1 Purpose of the CFMP Inception report

This Inception Report provides an outline of what is already known on the Medway catchment, the information that has been collected, and what the Catchment Flood Management Plan (CFMP) aims to achieve.

In particular, the Inception Stage aims to:

- highlight the aims and boundary of the CFMP
- identify the key 'knowledge holder' personnel
- identify the available catchment data, the usefulness of it, how much of it has been collected to date, and further information required
- report on current understanding of the catchment which is significant to flood risk. This especially includes the key issue of flood hotspot locations.
- identify possible intervention measures which may be appropriate in the catchment and how they are likely to be assessed
- identify a timetable for completion of the CFMP
- highlight any significant project uncertainties and risks to the work
- provide a background on consultation from previous or on-going studies in the catchment, and outline a strategy for input from identified stakeholders during the CFMP process
- identify any key areas where Strategy Studies or other work should be progressed prior to CFMP completion

2.2 Flood risk management

The Department of Food and Rural Affairs (DEFRA) has overall ministerial responsibility for flood risk management in England. They aim to reduce flood risks by:

- encouraging the provision of adequate and cost effective flood warning systems
- encouraging the provision of adequate technically, environmentally and economically sound and sustainable flood defence measures
- discouraging inappropriate development in areas at risk from flooding.

DEFRA and the Agency have recognised the need to review the existing approach to flood management. Flood alleviation and flood management are being approached at several different levels. Appendix A shows how the various parts fit together.

The CFMPs sit at the highest level and provide a catchment-wide, high level overview to identify long term sustainable policies to manage flood risk. CFMPs will deliver a broad-brush assessment of the risks, opportunities and constraints, including areas of uncertainty associated with flood management policy.

The CFMP will identify and define areas where further, more detailed 'Strategy Studies' may provide better information on the flood risk management. For example, it may recommend further detailed hydraulic modelling and option assessment, or investigation of specific



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issues, such as more detailed assessment of agricultural run-off effects on the flood regime. The Strategy will deliver the preferred solution type, taking account of economic, environmental and social factors

The CFMP process may also identify pressing flood issues in the catchment, and recommend where further Strategy Studies should be commenced prior to the completion of the Plan. This may be in areas where flooding risk is known to be particularly high, and will ensure that there is no delay in assessing possible flood management solutions at a detailed level, if this is necessary. It should be noted, however, that background information and data is likely to be similar for various studies, and so it may be reasonable to pursue such action at the culmination of the Inception Stage of the CFMP.

The Strategy documents may provide the framework for 'local scheme plans'. They confirm the need for detailed analysis of particular flood alleviation schemes, showing their precise location, their economic viability and potential environmental constraints and opportunities. The scheme level plans must take into account the policies identified in the CFMP and the strategic objectives of the Strategy Plan. It is intended that Strategy Studies will form the 'pre-feasibility' stage for schemes

The preferred approach of the Agency is to prepare a CFMP in advance of a Strategy, which may lead on to individual schemes. This will ensure that the latter are developed to meet the objectives of the former. Where Strategy Studies have already been completed or are underway, these should provide a significant amount of the background material required for the CFMP.

2.3 CFMP approach

The aim of a CFMP is to provide a usable, policy-level document that summarises all major catchment wide flood management issues, concerns, opportunities and constraints (DEFRA CFMP guidelines, July 2002 - Ref. 2 and 3)

In particular, a CFMP will:

- provide a high level assessment of flood risks now and 50 years hence. Identify key flood 'hotspots'
- identify opportunities and constraints within the catchment for flood alleviation policies
- identify areas of uncertainty relating to existing knowledge and data, and define the scope of further Strategy Studies (where required)
- appraise the changes to flood regime from future climate, urban land use and rural land management scenarios
- incorporate the requirements of the Environment Agency (the Agency) national guidance on Strategic Environmental Assessment (SEA - Ref. 6)
- determine preferred flood risk management policies, in particular for flood hotspots, and the measures required to meet these

The CFMP will establish the Agency's approach for the catchment for the next 50 years. It will also provide a forum for co-operative work with other flood risk management stakeholders and will seek to influence the policy and actions of all who have an effect on flooding in the catchment, through inclusive and wide ranging consultation. These policies



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will aim to avoid tying future generations into inflexible and expensive options for flood defence (MAFF, 1993). The policies will also aim to have no significant detrimental effect on the environment and will seek opportunities for enhancement.

The DEFRA CFMP guidelines outline what should be assessed (Volume 1 - Ref. 2) and the methods which may be used in the assessments (Volume 2 - Ref. 3).

2.4 Input from consultees

This Inception Report intends to provide a basis for future consultation. It aims to provide consultees with an initial understanding of the CFMP process and what information is going to be required. It also aims to facilitate positive contributions to deriving a selection of sustainable policies for flood management within the Medway catchment.

The Inception Report is being issued to key organisations with an interest in the Medway. A joint Communications Plan has been drafted with the Medway Strategy project (Appendix E) and consultees have been designated as either Primary or Secondary Consultees, dependant on their involvement with the resolution of flood issues in the catchment. Primary consultees will be invited to workshop sessions, in addition to the correspondence, which all consultees are encouraged to participate in.

This report is also being made available in local libraries, on the Agency's website and on request to the Environment Agency.

The following questions are posed as an aid to consultees:

The information presented within the Inception Report:

- Do you have information on areas at risk of flooding ('hotspot' areas) or flood defences which are not highlighted in this report?
- Are you aware of other relevant information or documents on the catchment, particularly pertaining to your area of involvement? Can you advise on obtaining this?
- Are there other groups, campaigns or partnerships which we have not identified within the Communications Plan (Appendix E)

The issues presented within the report:

- What areas are you pursuing with regards to flood risk management?
- Are there other significant issues (opportunities/risks/constraints) that we should be considering within the CFMP?
- Do you have ideas for flood measures and interventions?

Consultees are invited to respond to Babtie Brown & Root in writing by [date]. The Agency hope this consultation will contribute positively to the generation of sustainable, effective flood management policies within the CFMP.



3. THE MEDWAY CATCHMENT

3.1 Medway CFMP study area

The Medway is the largest river basin within the Southern Region of the Agency (see study area location plan in Figure 1). The catchment is mostly in Kent, but also includes parts of Surrey and Sussex. The CFMP covers the entire catchment (including non-main rivers and watercourses, and non-river flood risks) as far downstream as Allington Lock which, under normal circumstances, is the tidal limit of the Medway Estuary. This is approximately 1,400 km²; a further 400 km² is below the tidal limit.

3.2 Current understanding of the catchment

3.2.1 Introduction to principal catchment features

The River Medway rises as a spring just above Turners Hill to the south-east of East Grinstead.

The Medway catchment is diverse in nature and has examples of many of the features found on UK inland waterways. Principal features include:

- A number of main tributaries – the Eden, Teise, Beult and Bourne. There are approximately 260km of 'designated main river' in the catchment. The Teise, Beult and Bourne tributaries converge just upstream of where the River Medway has cut a steep sided gap through the Ragstone Ridge, south of Maidstone.
- A range of geologies and topographies. These create relatively high gradient watercourses in the upper catchment to the south and west (Upper Medway, Teise), and very low gradient watercourses in the east (Beult).
- The catchment is largely rural in character, with high grade agriculture present
- Major towns include Tonbridge, Tunbridge Wells, East Grinstead and Maidstone. Approximately 6% of the study area is urbanised.
- The River Medway is a statutory navigation, with 10 locks and weirs 'penning' water levels upstream.
- Extensive flood inundation to property has been experienced across the catchment, particularly in the Autumn 2000 events. Yalding was the focus of national media coverage.
- The Leigh Barrier is one of the largest on-line flood storage reservoirs in the UK. It was principally constructed to protect Tonbridge, but also has an effect downstream. This forms the upstream navigation limit.
- The upper catchment has a number of pumped storage reservoirs (including Bewl Water), which store water for release during low flow periods such that abstraction can continue.
- The catchment has extensive environmentally significant areas, including the River Beult, the majority of which is designated a Site of Special Scientific Interest (SSSI).



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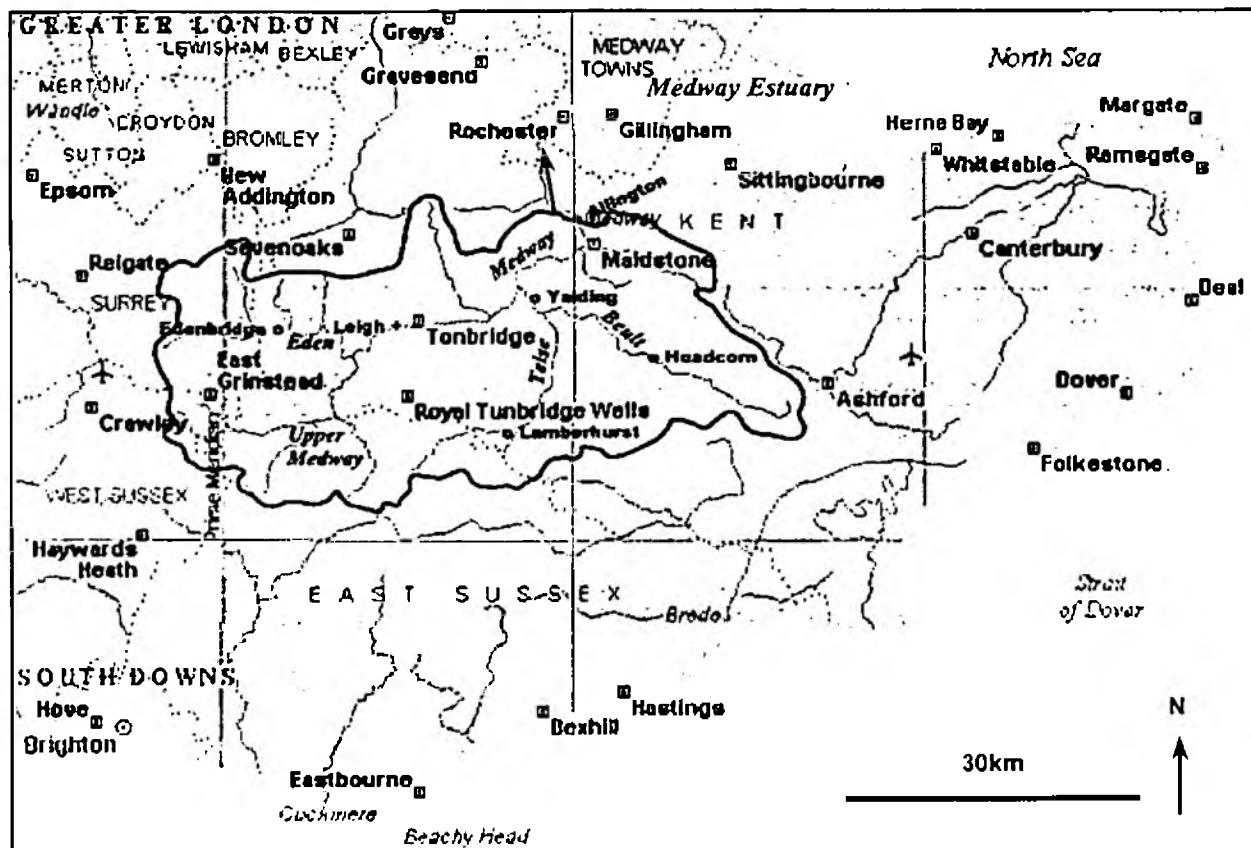


Figure 1 - The Medway CFMP study area and location plan

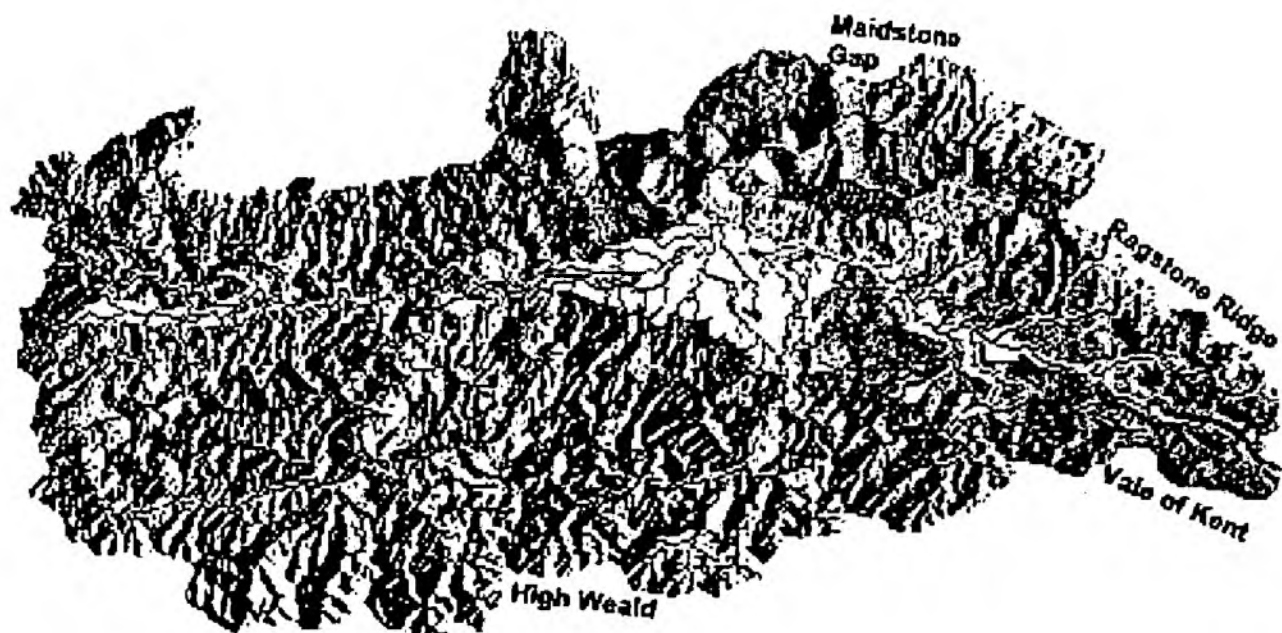


Figure 2 - Hill-shade relief plan of the Medway study area, showing main rivers and indicative flood outline. The distinction between The Weald (Vale of Kent) and High Weald can clearly be seen, together with the Maidstone Gap through the Ragstone (Greensand) Ridge.



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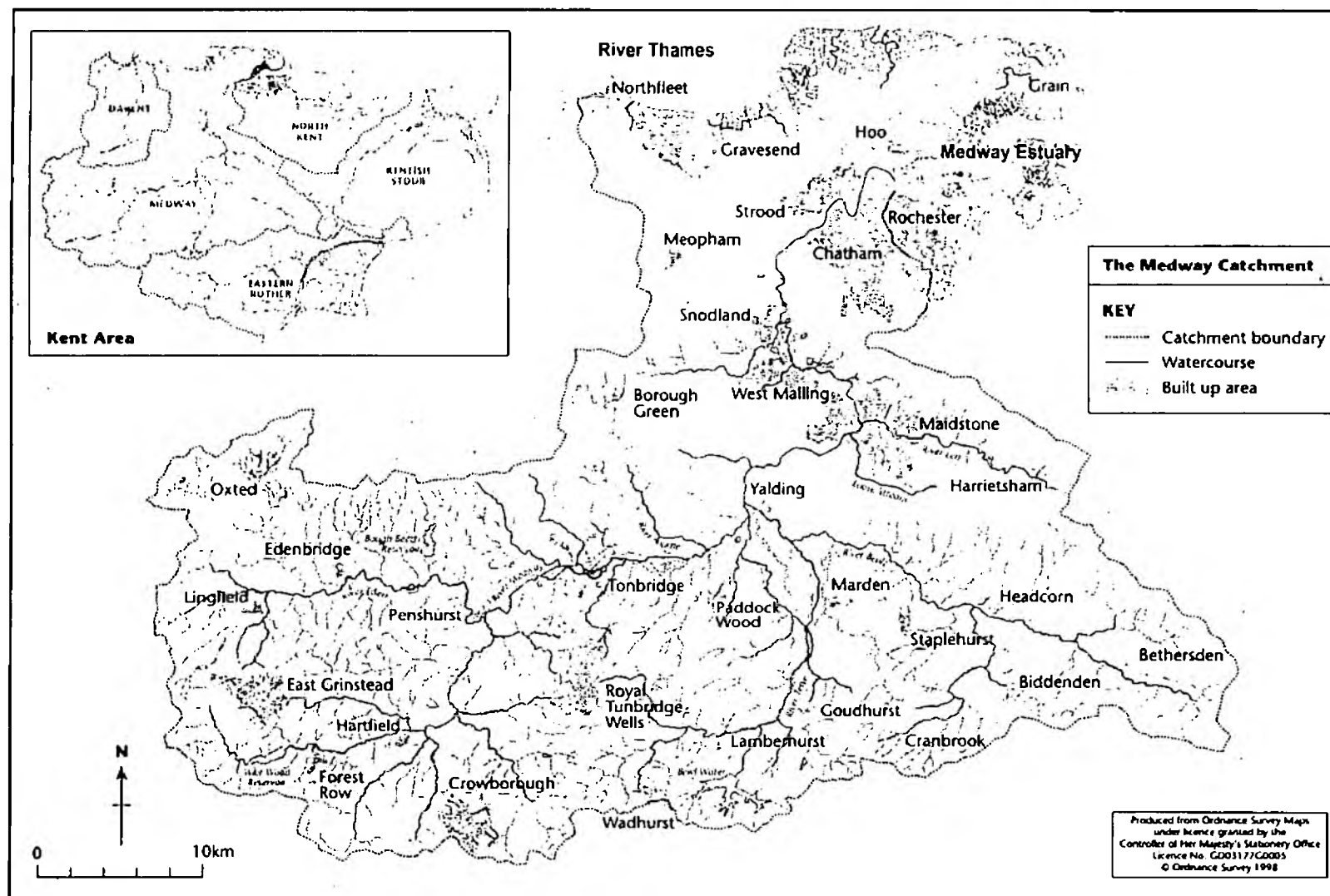


Figure 3 - The Medway catchment - location of major towns (from Environment Agency LEAP, 1999)



3.2.2 Topography, geology and geomorphology

The geology of the catchment dictates the character of the Medway and its tributaries (see Figure 2 and Appendix C). It can generally be visualised as east-west bands, with six distinct regions. Each of the tributaries flows over a range of these geologies:

- To the south, the river system is characterised by deeply incised tributaries that have cut through the underlying Hastings Beds. These are typified by silty sandstones, siltstones and clays and form the High Weald. The more permeable components are locally important aquifers that feed the numerous springs that provide baseflow for the headwater tributaries of the Medway and Teise. The alluvial plains in this region (upstream of Tonbridge) are generally less than 500m wide. Channel instability and widening occurs in this area resulting in an increase in sediment supply to the channel, which may cause problems further downstream
- North of the High Weald, the Vale of Kent consists of lowlands of weald clay. The Rivers Eden and Beult rise in the Vale of Kent and are largely fed by surface runoff from the clay. The alluvial plains in this region (downstream of Tonbridge) are generally greater than 1km wide. The Medway, Teise, Beult and Bourne converge on the weald clay, in the Yalding area. Sediment run-off from the floodplain is readily deposited in these reaches.
- The Vale of Holmsdale is a narrow tract of lowland formed by the softer sandier levels of the Lower Greensand and the overlying Gault Clay. The sequence dips north-east beneath the chalk of the North Downs.
- To the north of the Vale of Kent is the Ragstone Ridge, a prominent feature which rises to 120m AOD, south of Maidstone. This area marks the outcrop of the Lower Greensand, a sequence of water bearing limestones and sandstones that feed the River Len tributary and are the source of the River Eden.
- The Chalk of the North Downs forms the major topographical feature of the area, which rises from 180m AOD north of Maidstone to a maximum of 275m AOD. The North Kent coastal chalk aquifer feeds the River Medway in its lower reaches, north of Holborough.
- Downstream of Allington Lock, which is the downstream limit of the CFMP, there are also London Clay and Lower London Tertiaries.

3.2.3 Hydrology, water resources and conveyance

Average annual rainfall on the catchment varies from 756 mm in the headwaters to 667mm in the lower reaches. The average annual runoff from the catchment through Allington is in excess of 400 million cubic meters. Flows vary widely, with winter and spring producing three times the average during the summer and autumn months. For example, flood flows in the lower catchment may reach up to 300 m³/s, whilst summer flows can descend to 50 thousand cubic metres per day (approximately 0.6 m³/s).

The Agency maintains a network of rain gauging stations across the catchment. In terms of calibrated river flow gauging stations, 90% of the catchment above the Leigh Barrier and 54% of the catchment between the barrier and Allington Lock is gauged. Overall, 67% of the Medway upstream of Allington Lock is gauged (Reference 5). However, it is understood that



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most of the river gauging stations were constructed for optimum performance during low flows and are out of calibration during flood conditions.

The catchment includes three pumped storage water supply reservoirs namely, Bewl, Bough Beech and Weir Wood. Bewl, operated by Southern Water, is situated on the headwaters of the River Bewl, which is a tributary of the River Teise. The catchment of the reservoir is small in comparison to the overall catchment and the flood attenuation capability is understood to be insignificant. Bough Beech is located on a tributary of the River Eden and Weir Wood is on the Medway. These reservoirs are also unlikely to have a significant impact on flood flows. Groundwater abstraction for public water supply in the catchment constitutes over 50% of the total water abstracted.

A significant feature of the Medway is that it is maintained for navigation from its mouth to upstream of Tonbridge (Leigh Barrier). To provide sufficient draft, a cascade of 10 control structures control the river levels. This has a significant effect on the hydraulics and natural processes. Most importantly, in periods of low flow, the control structures maintain water levels in the river channel. Although this limits vegetation encroachment, which maintains the flood conveyance capacity of the river system, the control structures act as a constriction to flood flows. The constriction during periods of high flows causes increases in upstream flood levels.

3.2.4 Land use and major urban zones

The catchment includes both agricultural and urban land uses, with the urban proportion upstream of East Farleigh being approximately 6% (1995 figure). The catchment includes the urbanised areas of Oxted, East Grinstead, Crowborough, Tonbridge, Royal Tunbridge Wells, Hadlow, Smarden, East Peckham, Colliers Street, Headcorn, Yalding and Maidstone.

There has been considerable urban development in the last three decades, mainly of agricultural land. Table 3.1 highlights the urbanised extent in 1995.

River	Location (gauging points)	Upstream catchment (km ²)	Urban Proportion in 1995
Eden	Vexour Bridge	210	6.6%
Medway	Chafford	255	4.6%
Medway	Leigh Barrier	535	5.8%
Bourne	Hadlow	50	6.0%
Teise	Stonebridge	136	4.0%
Beult	Stilebridge	277	1.5%
Medway	East Farleigh	1291	5.5%

Table 3.1 - Urbanised area in the Medway catchment (After Ref 7)

The DEFRA Agricultural Land Classification (ALC) system provides a method to assess the quality of land for agricultural purposes with land divided into five grades, with 1 being the best quality agricultural land and 5 being the poorest. More than 90% of agricultural land within Kent is in the top three grades (best and most versatile land).



The agriculture in the catchment is predominantly mixed and exhibits a small field pattern. The principal agricultural practices include arable, semi-improved and improved pasture, orchards and woods. The central parts of the catchment, from Tonbridge to Yalding including the Teise and Beult, are subject to the most intensive agriculture in the catchment.

3.2.5 Known environmental opportunities and constraints

Water Quality

Periodic assessment of general water quality is made under the General Quality Assessment (GQA) scheme, which considers chemical, biological, nutrient and aesthetics aspects. Chemical and biological GQA results for the period 1990 to 1995 show that water quality within the catchment is generally satisfactory but ranges from very good to bad. Low classifications are most often due to the impact of sewage effluent. During periods of high flow, the inundation of sewage treatment works, and failure of pumping stations have been identified as sources of pollution.

At present there are only non-statutory River Quality Objectives for rivers within the catchment. These are based on the River Ecosystem (RE) classification: RE1 (water of very good quality suitable for all fish species) to RE5 (water of poor quality which is likely to limit coarse fish populations). An assessment of rivers in the catchment during the period 1995 to 1997 identified that, overall, 8% achieved Class RE1, 34% achieved Class RE2, 30% achieved Class RE3, 12% achieved RE4, 15% achieved RE5 and 1 site was unclassified.

The relationship between flood management and river water quality may offer both opportunities and constraints in the development of flood management policies. Implementation of the European Union Water Framework Directive will create greater interest in water quality and its impact on ecosystems, and flood flow situations are likely to form part of future assessment. Opportunities may include the reduction of pesticide and nutrient runoff from farms along with a reduction in flood peak runoff due to modifications to farming and drainage practices. Such opportunities and constraints will require further investigation and consultation.

Ecology and nature conservation

Ashdown Forest in the Upper Medway catchment is a Special Protection Area (SPA) under the EU Council Directive on the Conservation of Wild Birds (the Birds Directive; 79/409/EEC). There are a number of Sites of Special Scientific Interest (SSSI) within the catchment, as designated under Section 28 of the Wildlife and Countryside Act, 1981 as amended. In particular, a 25 km length of the River Beult from Smarden to the Medway confluence is classified a SSSI: it is one of the few clay rivers in England that retain a characteristic flora and fauna. There are a number of Local Nature Reserves (LNRs) and Sites of Nature Conservation Interest (SNCIs) within the catchment.

The River Beult is the only inland site within the catchment for which a Water Level Management Plan has been prepared. One of the primary recommendations of this Plan is the monitoring of biological biodiversity and water levels. It prescribes the required water level management practices to safeguard the nature conservation interests of the SSSI.



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The Kent Biodiversity Action Plan (BAP) has identified that the rivers and streams of the catchment are under threat from a number of pressures. Historic flood defence activities have removed riffle/pool sequences and meanders have been straightened.

The Medway catchment covers four Natural Area Profiles, as identified by English Nature. These are North Downs, Wealden Greensand, Low Weald and Pevensy and High Weald.

Landscape

Nearly three quarters of the Medway catchment is protected by the Kent Downs Area of Outstanding natural Beauty (AONB) and the High Weald AONB.

Special Landscape Areas (SLAs) within the catchment have been identified as the North Downs, Greensand Ridge, High Weald and the Eastern Low Weald.

There are four major Landscape Character Areas that are relevant to the Medway Catchment: The Greensand Belt, The Low Weald, The High Weald and The Kent Downs. Within each of these Landscape Character Areas, there are Local Landscape Character Areas.

Cultural Heritage

There are a large number of Scheduled Ancient Monuments (SAMs) in the catchment.

Wetlands can contain important archaeological and palaeo-environmental evidence within the alluvium of the wetlands. Preservation of such areas is dependent on the anaerobic conditions maintained by high groundwater levels.

There are several hundred more archaeological sites, including those considered to be of national importance, recorded under the National Monuments Record and Sites and Monuments Records

Recreation

The Agency has produced a Water Related Recreation Strategy for the Southern Region (Consultation Draft 1997) in order to promote good practice in the planning and management of water related recreation and to promote provision for recreation as an integral part of the Agency.

In the catchment, water related recreation predominantly takes place along the length of the River Medway, and in large water bodies, such as Bough Beech Reservoir, Bewl Water and Brooklands Lake. Types of recreation activities include coarse and game fishing; canoeing; power-boating; dinghy and yacht sailing; windsurfing and water skiing.

The non-tidal River Medway between Maidstone and just upstream of Tonbridge, is maintained by the Agency as a public right of navigation and is currently used mainly by recreational traffic.

3.2.6 Flooding history and known flood risk areas

The Medway has been subjected to many flood events and records of major events go back to the 1700's. The map in Appendix C highlights the identified flood 'hotspot' areas.



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Appendix F tabulates the hotspot areas and highlights other information, such as flooding mechanisms and number of properties affected. This table will be added to and completed as further information becomes available from consultees.

From the records assessed, it is clear that the flood of 1968 produced the greatest damage in recent times, when a large area of Tonbridge was inundated. The floods of autumn 2000 are the next biggest in recent history. In fact, based on rainfall and upper catchment discharges, the event was probably more extreme than that in 1968.

For the country as a whole, Autumn 2000 was the wettest since meteorological records began in 1766. For Kent, September was the wettest since 1981, October 2000 was the wettest since 1903 and prolonged rainfall led to flooding between 9 and 15 October. This affected much of Kent and was particularly severe over the mid Kent catchments of the rivers Medway, Beult and Teise. During this period, Yalding, in particular, suffered extensive flooding, with some 50 properties affected and road access closed. Flooding also occurred at East Peckham, Collier Street, Lamberhurst, and Smarden as well as other locations within the catchment. Flooding in Tonbridge and Maidstone, however, was limited. Further, but less extensive flood damage occurred in the following months.

Preliminary estimates of return periods for the mid-October event are given in Table 3.2.

Location	River	Peak Flow (m ³ /s)	Annual probability
Edenbridge	Eden	46	~20:1
Penshurst	Eden	56	~20:1
Penshurst	Medway	172	>200:1
Leigh Barrier	Medway	260	>100:1
Tonbridge	Medway	150	65:1
Hadlow	Bourne	9	3:1
Lamberhurst	Teise	52	>100:1
Headcorn	Beult	106	70:1
Yalding	Beult	?	50:1
East Farleigh	Medway	275	40:1

Table 3.2 Autumn 2000 Flood Details (After Ref 8)

It is apparent that the hydrological reasons for the severity of flooding during Autumn 2000 were the high antecedent moisture conditions, and the duration and sequencing of the storms.

The most extensive and severe flooding effects were associated with designated main rivers. However, other sources of flooding included:

- numerous incidents arising from minor watercourses.
- blockages of culverts and bridges by waterborne debris including boats which broke loose of their moorings.
- surcharging of combined sewerage systems, inundation of sewage treatment plants and failure of pumping stations created pollution risks



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- highway drainage with insufficient capacity, causing blocked roads, which creates difficulties for emergency services and severe disruption to travellers.
- road traffic wash into properties.

The Agency has produced an Indicative Floodplain Map for the Medway catchment, available to view on the Agency's website (www.environment-agency.gov.uk). This highlights floodplain areas which may be at risk from inundation.

3.2.7 Responsibilities for flood risk management in the Medway catchment

The Agency has statutory responsibilities in respect of flood defence and warning. It exercises a general supervision over all matters relating to flood defence, but has special responsibility for the management of 'designated main rivers', of which there are 260km in the catchment.

The Upper Medway and Lower Medway Internal Drainage Boards (IDBs), in addition to their main interest of maintaining agricultural land drainage, have powers under the Land Drainage Act 1991 to carry out measures to alleviate flooding in non-main river agricultural areas.

Kent County Council and local borough or district councils have operating authority responsibilities to undertake flood alleviation measures in urban areas and on non-main rivers not covered by the Agency or IDBs. Kent County Council highways authority has responsibility for road drainage.

Southern Water, the main water supply and sewerage company, has responsibilities to prevent flooding arising from its plant.

Other bodies, such as Railtrack, and also riparian owners, have a duty of care to ensure that their property and infrastructure is well maintained, and will not cause undue flood risks

3.2.8 Location of and known standards of protection for existing flood defences

The Medway catchment does not have an extensive system of flood defences. However, there are key areas where work has been undertaken:

- The headwaters of the river system are controlled by the Leigh Barrier, located 3km upstream of Tonbridge, which was commissioned in 1981. This attenuates floods and hence reduces the frequency and magnitude of flooding, principally in Tonbridge and other areas downstream. It protects Tonbridge from floods up to a 100 to 1 annual probability event. The barrier controls flows from 535 km² (38%) of the catchment and is the largest fluvial flood alleviation reservoir in the UK. The current storage capacity is 5.5 million cubic metres. During the Autumn 2000 event the Leigh Barrier was operated from early on 9 October to 14 October. The peak inflow into the Leigh Barrier was estimated at 260 m³/s, which is in excess of the 100 to 1 annual probability design flood inflow of 215 m³/s.
- Tonbridge has flood defences in the form of low flood walls along the banks of the Medway. Although these defences held during the October 2000 floods they were almost overtopped and there was serious leakage through the walls. Sections of the



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wall are to be rebuilt by Autumn 2001. The standard of protection for Tonbridge town centre is reported (Ref 8) to be in excess of a 150 to 1 annual probability.

- The village of Smarden on the Beult has some low defences comprising embankments and structural walls, which afford some buildings a reported 50 to 1 annual probability standard of protection.
- Edenbridge has low earth embankments and walls along the edges of the River Eden. The works were completed in 1981 to provide a 30 to 1 annual probability standard of protection for the town.
- Colliers Street on the River Teise has low earth embankments and an automatic radial sluice gate (Moors Sluice) which together protect a few low lying properties during minor flood events.
- Brook Farm, Marden has minor earth embankments which protect a few low lying properties adjacent to the Lesser Teise. The embankments were refurbished in 1997.

3.2.9 Flood warning

The Agency's Automatic Voice Messaging (AVM) system on the whole has worked well in the recent floods, with timely information being disseminated. However, a number of difficulties were highlighted, including:

- this is a voluntary system - residents have to register with the Agency and stipulate at what level they are to be informed.
- residents are informed every time the status changes. This can lead to 'warning fatigue' which causes some residents to upgrade the level at which they are warned, or remove their registration.
- in some areas where there is a confluence of rivers, such as Yalding, residents are informed for each watercourse. This can lead to conflicting warnings.
- business users are not informed out of normal business hours

In addition, the Agency operates Floodline, which acts as a public information telephone service. This was seen to operate effectively during the recent floods, although staffing with informed personnel was a major issue. Information is also available through the Agency's Floodline web pages.



4. DATA COLLECTION

4.1 Catchment data collected to date

The collection of key datasets is crucial to the success of the analysis stage of the CFMP. The DEFRA guidelines recommend data which is likely to assist in this work. The following information has been collected to date:

- Regional and Area flood reports
- Aerial and other photographs of flooding events
- Mapping, including Ordnance Survey (OS) background mapping, land cover data, geological mapping, administrative area boundaries, digital terrain mapping and the latest indicative floodplain mapping
- Previous flood related studies undertaken in the catchment, including the Catchment Management Plan Phase 1 (1991) and the River Medway Regime Study (1995)
- The National Flood and Coastal Defence Database (NFCDD) for the catchment (Asset Surveys including the DUCS database)
- Regional, County and Local Authority Plans
- 'Section 24 (5)' Land Drainage surveys and identification of Critical Ordinary Watercourses (COWs)
- River Habitat Survey (RHS) data
- Biodiversity Action Plans
- Economic damage data
- Other background data, such as the Water Resources Plan, Water Level Management Plan, environmental designations, the Medway LEAPs, and the Agency's policies on farming practices.
- Section 105 hydrodynamic model

Although some data gaps have been identified (see later), this is deemed sufficient to progress into the CFMP Assessment stage.

Sources of the data include the Agency's Southern Region Kent Area office, the Agency's National Centre for Environmental Data and Surveillance (NCEDS) at Twerton, local councils and Upper and Lower Medway Internal Drainage Board. Information formats include paper copies, digital and Geographical Information Systems (GIS) data. A data audit record and trail has been created (see Appendix B)

Key knowledge holders are personnel who have a detailed knowledge of information and its availability in the catchment. In the Agency, Richard Francis and Neil Gunn are identified. Within the IDB, Ian Palmer is identified.

Further historical flooding information has been obtained from the Kent Weather Book (Ref. 10), and Chronology of British Hydrological Events website:
(<http://www.dundee.ac.uk/geography/cbhe>).

Anecdotal information has been obtained by interviewing section leaders at the Agency's Kent Area Office at Addington. Further information is expected during consultation exercises.



4.2 Identification of data gaps

A number of issues have been identified in this Inception Report that will require further investigation during the main study. These include the following:

- completion of the breakdown of flood issues table in Appendix F. Consultees are invited to return comments and make additions. Blanks in the table highlight that further information is required.
- reconciliation of apparent discrepancies between flow gauging station data from the 1995 River Medway Regime Study and the Agency's database.
- determination of the reliable calibration range of the gauging stations (due to stations being constructed for optimum performance during low flows)

The existing Medway hydrodynamic model does not extend into the tributaries. Therefore additional information will be required to undertake the hydraulic modelling:

- river cross-section data
- floodplain survey data (digital terrain model - DTM)
- details of river gauging stations and rating curves
- hydrological data for relevant gauging stations

All catchment assessments will be presented via GIS. This includes the use of the Modelling Decision Support Framework (MDSF)



5. APPROACH TO MEDWAY CFMP STUDY

5.1 Preliminary assessment of major catchment flooding issues

From the evidence collected to date, it is clear that there are some significant issues concerning flooding in the Medway catchment. These include:

The extent to which the topography and geologies affect run-off in the catchment

The nature of the topography and geologies in the Medway catchment causes major floodplain inundation of the middle Medway area. This results from a combination of sub-catchment effects:

- Eden and Upper Medway - relatively high gradients and some impermeable geologies cause low run-off response time and relatively high flow velocities.
- Teise - similar to the Upper Medway in run-off and geologies, but with a shorter length of watercourse, flood peaks arrive at the middle Medway area earlier
- Beult - very low gradients and flat floodplains cause a slow response time and significant natural floodplain storage. The underlying impermeable weald clay does not allow significant infiltration.
- Middle Medway - the combination of flood peaks from the Teise, Beult, Bourne and Medway arriving in this area makes it very complex hydraulically. The flat nature of the surrounding floodplain and natural channel constriction through the Ragstone Ridge to the north, causes significant flood risks. An event in one sub-catchment can cause flooding in another, as catchment transfers from floodplain flows have been experienced, as have significant backing up from the Medway into the tributaries. This 'combination' of effects is likely to increase the risk of a major event in this area. The 'at risk' area highlights on the Agency's indicative flood map, is extensive in this area as a result.

The high numbers of properties at risk from a large flood event

The Autumn 2000 events highlighted that hundreds of properties are at risk right across the catchment, but especially in the middle Medway area. Significant damage will occur in a similar, or larger, event.

Flooding mechanisms

A variety of flooding mechanisms are apparent in the catchment, from direct overbank floodplain inundation due to incapacity of the watercourse, to natural and structural channel constrictions and failure of pumping stations.

The operation of the Leigh Barrier

This is a major flood control in the catchment and was designed to primarily protect Tonbridge. However, it is known that it affects flows further down the Medway, and therefore there may be scope for amendment of operating procedures to optimise the performance

The operation of the navigation structures on the Medway

The navigation arrangements produce constrictions on the Medway, and it is known that the weirs form backwaters in high flow situations. An assessment of the operating regimes may highlight any optimisation of performance.



Communications during flood events

Several roads were severed during the Autumn 2000 events, and this hampered assistance from the emergency services and councils. A breakdown of likely roads and railway inundation would assist the Silver and Bronze Controls in planning future events.

The operation of the Agency's AVM flood warning system

The events in Autumn 2000 highlighted areas where warning accuracy and timeliness may be improved. Assessment of the catchment risk with increased data availability may provide such opportunities for improvements.

5.2 Catchment processes

The flooding issues identified so far has shown that a better understanding of catchment processes is necessary to facilitate a holistic approach to flood management.

Previous work has focused on flood problems on the main River Medway upstream of Allington Lock as far as the Leigh Barrier. However, during the Autumn 2000 floods, flooding on the Medway tributaries was also severe.

The following outlines how the main catchment processes will be assessed.

5.2.1 Hydrological and hydraulic modelling

In order to understand the catchment processes and to test the impact of different catchment management policies and measures under various scenarios, it will be necessary to undertake hydrological and hydraulic modelling.

Hydrological modelling will be undertaken using procedures outlined in the Flood Estimation Handbook (FEH).

The extent and type of the hydraulic modelling is governed by the availability of data on river geometry and floodplain terrain. The study has obtained a copy of the current Section 105 hydrodynamic model, which provides river and floodplain cross-section data at suitable intervals on most of the middle and lower Medway. Upstream areas, including the entire Teise, Beult and Bourne are not included in this, and it is known that no river channel survey currently exists.

In view of the complex hydraulic features of the Medway catchment, including navigation weir structures, the Leigh Barrier, embanked and bifurcating rivers, and flat floodplains, a combination of modelling techniques may be required to obtain reasonable accuracy. It is expected that the Section 105 model will form the basis for the modelling.

Details of available hydrometric data which may be useful for the modelling has been obtained from the Agency. This includes availability of digital rainfall, river flow and groundwater levels together with current rating curves for the gauging stations. It is understood, however, that some of this data has not been verified (particularly the gauging station rating curves at high flows) and therefore its quality is uncertain. Other sources will be sought to substitute or verify data which has a low confidence of accuracy.



5.2.2 Strategic Environmental Assessment

Strategic Environmental Assessments (SEA) are now undertaken at the 'plan' and 'strategy' level of all Agency projects. A methodology was therefore developed to integrate SEA objectives into the CFMP. This includes a number of steps:

- Establish the existing ecology and heritage baseline (summary description of the environment)
- Identify environmental objectives, legislation and policy for the catchment (related to flooding)
- Input to the identification process of potential flood management policies
- Environmental input to the consideration of future change (for 50 years) scenarios
- Appraise the significant potential environmental implications of policies and measures selected
- Develop consultation and partnerships to facilitate implementation of the CFMP measures

5.2.3 Existing flood defence

The effectiveness of the major existing flood defence practices in the catchment will be assessed. The National Flood and Coastal Defence Database information, documentation from previous studies, and anecdotal evidence from consultations, will be used to undertake this.

5.2.4 Non-main river flooding

Extensive flooding arises in areas where the Environment Agency does not have direct authority to undertake alleviation works. These are either on 'ordinary' watercourses, which are the responsibility of the local councils, or Upper or Lower Medway Internal Drainage Board, or from operators' plant, such as Southern Water pumping stations.

From the identification of such areas, the CFMP will seek to identify the relevant operating authority's own flood control policy, will assess this in view of the overall catchment objectives, and will then recommend ways in which the Agency should seek to influence such policies in the future.

5.3 Potential catchment changes

A key component of CFMPs is the identification of possible future changes that will be used to form various scenarios. These scenarios will be used to test the robustness of the various flood risk management policies to future change.

At this stage of the CFMP, the following possible catchment changes have been identified:

- climate change
- development and land use change
- socio-economic changes

5.3.1 Climate change

It is widely accepted that climate change may increase the magnitude and frequency of fluvial floods. This view is supported by the work undertaken by the UK Climate Impacts



Programme (UKCIP). However, the magnitude or the exact nature of the impacts cannot at this stage be quantified in terms of changes to the duration and frequency of storms (Ref 4).

It is difficult to predict the effect of climatic change on fluvial flooding in the Medway catchment. This is mainly due to the coarse resolution of climatic change models resulting in a lack of reliable information relating to the likely changes in spatial and temporal characteristics of extreme rainfall events. However, research undertaken by the CEH Wallingford for the Severn and Thames catchments has indicated that increases of up to 20% in peak flows for a given return period flood event could be experienced within a 50 year horizon.

Guidance given by DEFRA in FCDPAG4 'Flood and Coastal Defence Project Appraisal Guidance, Approaches to Risk' suggests dealing with climate change in a sensitivity analysis by progressively increasing the flow estimates in the flood frequency curve by up to 20% over 50 years.

5.3.2 Development and land use changes

The development of land for housing, commercial and industrial use is widely believed to have a significant impact on flood conditions in the catchment, by the increase of impermeable areas and the speed of run-off.

Local, structure and regional development plans will be used to identify current development scenarios which may be applied over the lifetime of the plans and shortly beyond (up to twenty years). Trends will then be predicted for a fifty year time span for current development, as well as minimum and maximum growth scenarios. The scenarios will be identified with the assistance of local planning authorities, and may include indications of high and low requirement for future housing, capacity for recycling of brown field and other already developed sites, conceivable major future developments or amendments to planning constraints. Constraints to development, such as environmental designations (ie green belt areas) will be considered.

Agricultural practices may make a significant difference in rainfall run-off during flood periods. However, it has been identified that little information is currently available on the likely relationship between these practices and river flows (the Agency is presently undertaking more research), or the impact from future reforms to the Common Agricultural Policy. Historically rural land use has changed only slightly in the catchment, with the exception of the Medway valley. This suggests that future changes in the split between different types of agricultural land use may be very slight. Hydrological sensitivity will therefore be undertaken to determine whether such regimes are likely to have an impact.

CFMP methods will also demonstrate how long term changes to the hydraulic regime, caused by land-use and climate changes, may expose new areas to more frequent flooding.

The long-term projected scenarios are aimed at formulating broad estimates of possible land-use and management changes. They should be helpful in enabling the Agency to take a longer term view of flood management and to assist in developing new thinking by local planning authorities. They will also help the Agency in responding to future consultations on



development plans and can be used as a guide to sustainable locations for new development.

5.3.3 Socio-economic changes

Data obtained from the Agency provides information on locations of residential and business areas, along with flood depth-damage relationships calculated by the Flood Hazard Research Centre at Middlesex University. These will be used to carry out broad brush assessments of likely economic losses, from flood measures and in future change scenarios.

In addition, information is also available concerning social details of residential areas, such as population and age profiles and economic vulnerability.

5.4 Measures and policies

5.4.1 Measures

Measures are actions and interventions taken which will effect flood risk in the catchment. They are likely to include:

- **Increases in storage**
 - wetland and washland creation or re-creation
 - upstream storage to attenuate peak flows
- **Structural protection**
 - changes to maintenance policies
 - realignment of existing flood defences
 - construction of new fixed defences
 - new demountable defences
- **Land management**
 - changes in agricultural practice
 - land management changes
 - selective afforestation
 - incorporation of Sustainable Drainage Systems (SuDS) into development
 - greater influence and input to the Local authorities' development and planning processes
- **Conveyance management**
 - changes to maintenance policies (including removal of trash at identified pinch points)
 - widening channels to increase flood capacity
 - reduce channel capacity to promote storage on the floodplain
 - diversion channels
- **Flood warning**
 - identification of where further improvement and extension may be made to flood warning systems

The flood risk management measures must take into account both long and short-term issues (opportunities and constraints), traditional and more innovative approaches to flood management. The aim is to provide the documentary basis for a sustainable approach to flood management, which can be adopted and reviewed over the next 50 years, and which is flexible enough to respond to future changes. These, and others that emerge during



consultation, will be evaluated in the CFMP study using catchment process techniques. This evaluation will determine, in broad terms, the relative impact of each measure on flood risk management and flood peaks.

Consultees are invited to respond on these measures and to identify others.

5.5 Catchment policies

The effectiveness of the assessed and available flood measures, constraints and opportunities, will lead to the determination of a flood risk management policy for each flood hotspot, which the Agency will aim to fulfil. Generic policies have been adopted:

1. **Do nothing**
 - Allow flood risk to change as a result of lack of maintenance, natural and/or other man-made changes
2. **Maintain present flood risk**
 - Continuance of current maintenance practices in short term
 - Further intervention required to confront flood regime alterations caused by future change scenarios
3. **Reduce flood risk**
 - Intervention required both to reduce flood risk in short term, and confront flood regime alterations caused by future change scenarios
4. **Increase flood risk**
 - No intervention to confront increases in flood risk caused by future change scenarios.
 - Increase in risk caused by policy of managed retreat, or to gain benefits by decreasing flood risk elsewhere.

The likely effects of adopting each generic policy at each Medway hotspot will be briefly assessed, and a recommended policy identified. There may be several assessed measures, which provide suitable flood management techniques to fulfil the policy aim.

It is intended that such policies will direct future effort and expenditure to implementing measures that have the greatest benefit on flood risk management over the catchment, and for particular high-risk areas.

5.6 Detailed breakdown of flood issues

The Medway CFMP will deliver an understanding of all flooding issues in the catchment. To aid in the important process of amalgamating the available information, the table presented in Appendix F begins to identify flood hotspots and the major issues presently apparent at each one. It is envisaged that at the end of the study, that this table will be complete and up to date, will provide a useful summary of the issues addressed and will assist in the identification of areas where priority actions are required. Other columns will be completed through the various stages of the study; in particular, the identification of intervention measures and policy aims will occur in the Assessment Stage.



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Consultees are invited to review the table and return comments, alterations, suggestions and additions as soon as possible.



6. THE NEXT STEPS

6.1 Priority actions

The Inception Stage of the Medway CFMP has considered the priorities of the catchment, and areas that should be progressed prior to the completion of this study.

In order to avoid delay in implementing any identified flood alleviation measures, it is recommended that a Middle Medway Strategy be commenced as soon as possible. The background to this recommendation includes:

- A 'stand alone' scheme study was undertaken for the Yalding area following the floods of Autumn 2000. This concluded that no economically viable schemes could be identified, and that any flood alleviation must be considered from a catchment wide perspective.
- The operation rules of the Leigh Barrier were severely tested during floods of Autumn 2000, and opportunities for improvement of these should be assessed.
- Other 'middle' Medway areas experienced extensive flooding during the Autumn 2000 event, which will require detailed analysis, further to the scope of the CFMP, to determine flood alleviation opportunities.

The Strategy should 'shadow' the CFMP, taking the results of the broad-brush assessments where possible and pursuing only the likely successful measures identified.

6.2 Scope of work for CFMP Assessment Stage

The Assessment Stage of the CFMP, leading to the preparation of the CFMP, will be undertaken in the following steps:

- consultation on this inception report, and continuing throughout the process
- further understanding of the catchment physical processes (via further data collection and review, and consultation)
- determine further existing and future flood risk areas (via existing knowledge and modelling)
- understand the catchment's response to extreme events i.e. more than the 100 to 1 annual probability flood (which may be possible under future climate change scenarios)
- identify opportunities and constraints within the catchment (flood defence, environmental, physical)
- identify and collate future change scenarios relating to climate, development and land use, and socio-economic effects.
- use available modelling to understand the sensitivity of various catchment parameters and flooding processes to future change scenarios
- identify possible intervention measures and the areas where they may be applied
- determine catchment policies for each flood hotspot, and the measures by which these may be achieved.
- analyse the suitability of these policies under a range of possible future changes
- consult on and disseminate the CFMP report



6.3 Project risks and uncertainties

Several risks have been identified which may have an impact on the Medway CFMP programme or budget:

- the standard of the existing Section 105 model is unknown, and may require substantial work in order to utilise in the Medway broad scale modelling.
- the Modelling Decision Support Framework (MDSF) software is not yet complete
- acquisition of a DTM for the catchment is crucial in determining flood spreading and hence economic damages. At present, the Upper Teise and Beult are not covered in photogrammetry or LIDAR, and presently available national DTMs are deemed not accurate enough.

These factors will be accounted for in an updated programme.

In addition, uncertainties with some of the methods used, to assess scenarios such as climate change and land-use, will create uncertainties in the outcomes of the CFMP. Although it is intended to undertake sensitivity testing to understand the uncertainties, regular updating of the plan will be required in the future as better information becomes available.

6.4 Consultation

The communications plan is enclosed in Appendix E. In view of the Middle Medway Strategy following on closely behind the CFMP, a joint approach between the two studies has been adopted. The plan highlights key stages in each study, and when it is anticipated that consultees will be approached, either to attend a workshop meeting, or via correspondence.

An Environment Agency Project Board has been established to provide oversight to the study.



7. REPORT REFERENCES

The following references have been used as the main source of information for this Inception Report. They are in addition to the Medway data library identified in Appendix B

1. Interim guidelines for catchment flood management plans. Department for Environment, Food and Rural Affairs / Environment Agency, March 2001.
2. Guidelines for catchment flood management plans – Volume 1, Department for Environment, Food and Rural Affairs / Environment Agency, July 2002.
3. Guidelines for catchment flood management plans – Volume 2, Department for Environment, Food and Rural Affairs / Environment Agency, July 2002.
4. Flood and coastal defence Project Appraisal Guidance, 1 to 4, Ministry of Agriculture, Fisheries and Food, Various dates.
5. Core data requirements, Department for Environment, Food and Rural Affairs / Environment Agency, March 2001.
6. National Guidance on Environmental Impact Assessment (Environment Agency Internal Works and Activities) Consultation draft, Environment Agency, January 2001
7. River Medway Regime Study, Flynn and Rothwell, 1995
8. Regional and Area Flood Reports, Environment Agency, 2001.
9. Medway Local Environment Agency Plan (LEAP), Environment Agency, January 1999
10. Kent Weather Book, Bob Ogley, Froglets Publications, Kent, November 2000



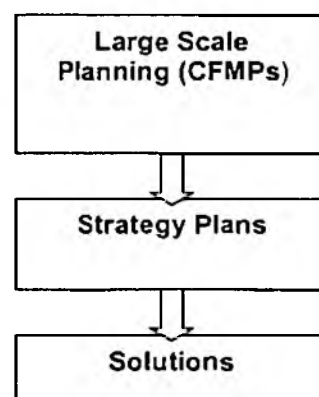
APPENDIX A -

RELATIONSHIP BETWEEN CFMP AND OTHER PLANS

Figure A1 – Hierarchy for Flood Risk Management (similar to table in Ref 2)

Hierarchy for Flood Risk Management

There are three stages in achieving fluvial flood risk management as shown on the right. Each stage requires an understanding of the hydrological, hydraulic, hydro-geological and geomorphological processes at work, flood defence needs, environmental considerations, planning issues and current and future land use, etc. but at a level of detail appropriate to the stage. The assessment of risks is an integral part of the appraisal process at each stage to ensure decisions taken at the right time are robust, and are based on an awareness of the consequences and appropriate mitigation measures.

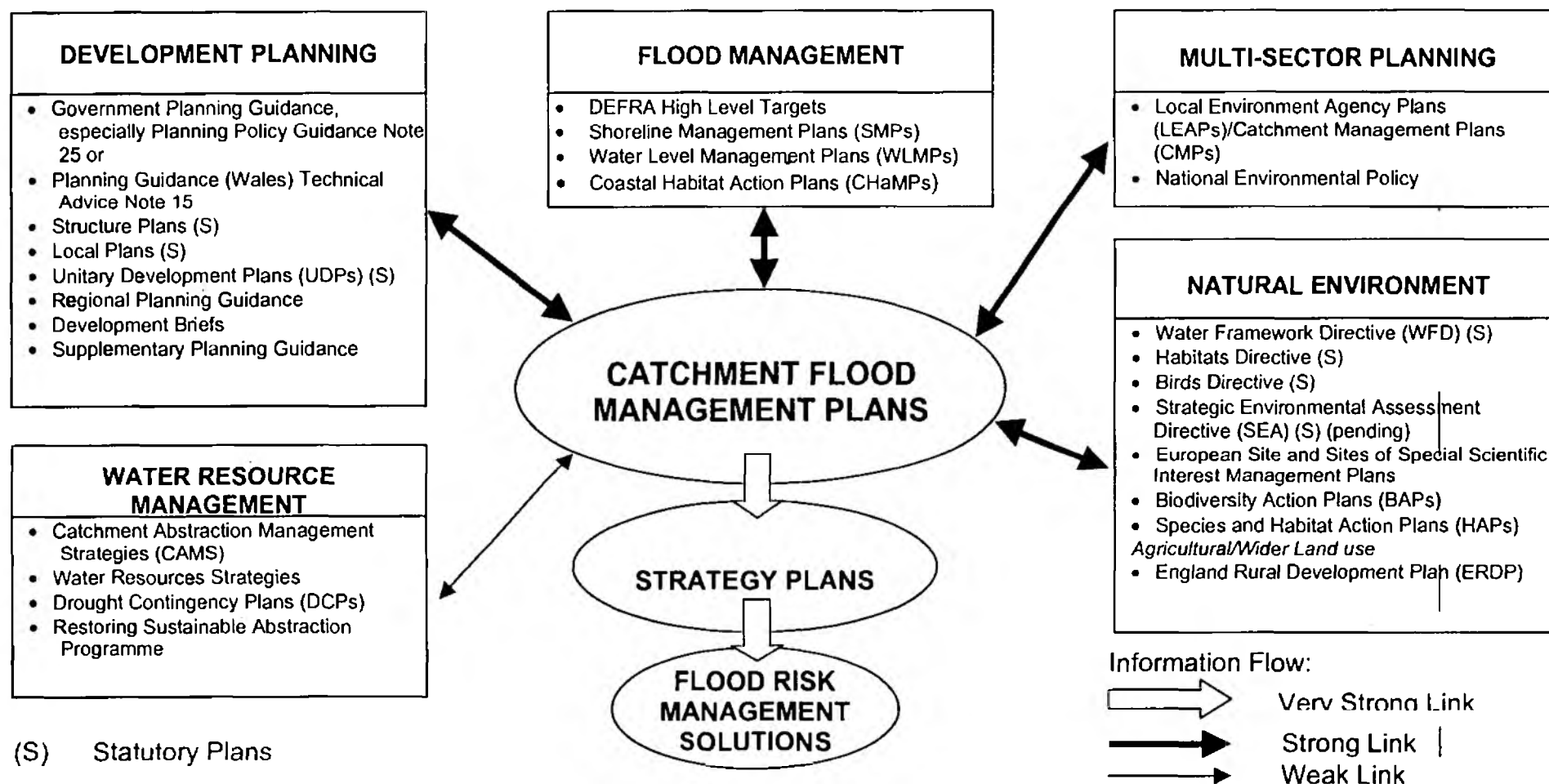


Stage	CFMP	Strategy Plan	Solution
Aim	To identify long-term, sustainable policies to manage flood risk throughout the catchment	To identify appropriate solution types to meet Strategy Plan aims and objectives (see FCDPAG2) established by the CFMP for specified area(s)	To identify the nature of works to implement preferred solution
Delivers	Broad-brush assessment of risks, opportunities and constraints, areas of uncertainty	Preferred approach (i.e. scheme type) including economic and environmental decisions	Comparison of different implementation options for preferred scheme type
Output	Complementary set of catchment flood risk management policies and possible measures for each flood risk area (e.g. do nothing, maintain, reduce, or increase, flood risk). Determination of requirements for future studies	Defined flood risk management measures (e.g. type and location of measure, standards of protection, channel capacities, etc.)	Specific details of flood risk management measure (e.g. design and operational details of works, channel dimensions, etc.)



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**Figure A2 – CFMP Links with EC Directives and Relevant Statutory and Non-Statutory Plans
(similar to figure in Ref 2)**





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APPENDIX B -

KEY INFORMATION AND DATA COLLECTED



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1. Local Authority

Structure Plans/UDPs

- Kent Structure Plan (1996)
- Surrey Structure Plan (1994)

Local Plans

- Ashford Borough Local Plan (June 2000)
- Kent Waste Local Plan (October 1994)
- Maidstone Borough-wide Local Plan (2001)
- Maidstone Borough-wide Local Plan Schedule of Modifications (June 2000)
- Maidstone Borough Local Plan (1993)
- Mid Sussex Local Plan, Deposit Draft (November 2000)
- Rother District Local Plan, Draft (2000)
- Rother District Local Plan, Written Statement (January 2001)
- Sevenoaks District Local Plan, Adopted (March 2000)
- Tonbridge & Malling Borough Local Plan, Adopted (December 1998)
- Tunbridge Wells Borough Local Plan, Adopted (March 1996)
- Wealden Local Plan Deposit Plan (January 1995)

Miscellaneous Local Authority

- A Natural Way Forward: A Nature Conservation Strategy for Tonbridge & Malling Borough (September 1998)
- Ashford Borough Council, New Green Corridor Action Plan
- Ashford Borough Council, Planning & Building Control Handbook (1997)
- Council and IDB Flooding Policy Statement
- Kent County Council, Waste Management Plan (1993)
- Kent Minerals Local Plan – Chalk/Clay/Oil/Gas – Adopted (December 1997)
- Shaping Surrey's Future, Deposit Draft (2001)
- Surrey Waste Management Plan, Consultation Draft (1995)
- Regional Planning Guidance, RPG9: South East Region
- Maidstone Landscape Character Assessment
- 'Section 24 (5)' Land Drainage surveys and identification of Critical Ordinary Watercourses (COWs) (various dates)

2. Environment Agency

Local Environment Agency Plans

- Kent Area LEAP: Environmental Overview
- Kent Area LEAP (September 1999)
- Medway LEAP: Environmental Overview (January 1999)
- Medway LEAP (November 1999)

Other Environment Agency published documents

- Agency Southern Region – Autumn 2000 Floods Review
- Lessons Learned : Autumn 2000 floods



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- Water Related Recreation Strategy for the Southern Region, Consultation Draft (1997)

Previous studies and projects

- Medway Regime Study, Flynn and Rothwell (1995)
- Catchment Management Plan Phase 1 (1991)
- The National Flood and Coastal Defence Database (NFCDD) for the catchment (Asset Surveys including the DUCS database)
- Digital aerial photos of Autumn 2000 flooding events
- Section 105 hydrodynamic model
- GIS mapping data
- OS 50k tiles – TQ22, TQ24, TQ42, TQ44, TQ46, TQ62, TQ64, TQ66, TQ82, TQ84
- OS Gazetteer at 1:50 000
- OS Roads at 1:250 000 (A Roads, B Roads, Motorway, Primary Route and Minor Roads)
- OS Railway at 1:250 000
- OS District boundaries at 1:10 000
- Topography at 50m resolution (OS Panorama)
- Digital Drainage Network
- Catchment Boundaries at 1:50 000
- Rainfall 1941 – 1970 (Points and Isohyets)
- Groundwater Vulnerability Zones at 1:100 000
- Geology (Solid and Drift) at 1:625 000
- AONB at 1:50 000
- Green Belt at 1:10 000
- SAC boundaries at 1:10 000
- SAMs at 1:250 000
- SSSI boundaries at 1:10 000
- SPA Boundaries at 1:10 000
- LEAP boundaries at 1:250 000
- Institute of Terrestrial Ecology Landcover 25m grid (1990)
- Indicative Tidal and Fluvial Flood Plains at 1:10 000
- Section 105 Map at 1:50 000
- LIDAR data

3. Other sources

- Bewl Water Pumped Storage Scheme Licence Application No. 169/40
- English Nature, Natural Area Profile: North Downs (1997)
- English Nature, Natural Areas in London and the South East Region (1999)
- English Nature, Natural Area Profile: Wealden Greensand (1997)
- Hydrometric Yearbook 1997
- Key conservation and recreation data
- Planning Policy Guidance Note, PPG3: Housing (March 2000)
- Planning Policy Guidance Note, PPG9: Nature Conservation
- River Habitat Survey (RHS) data
- Biodiversity Action Plans



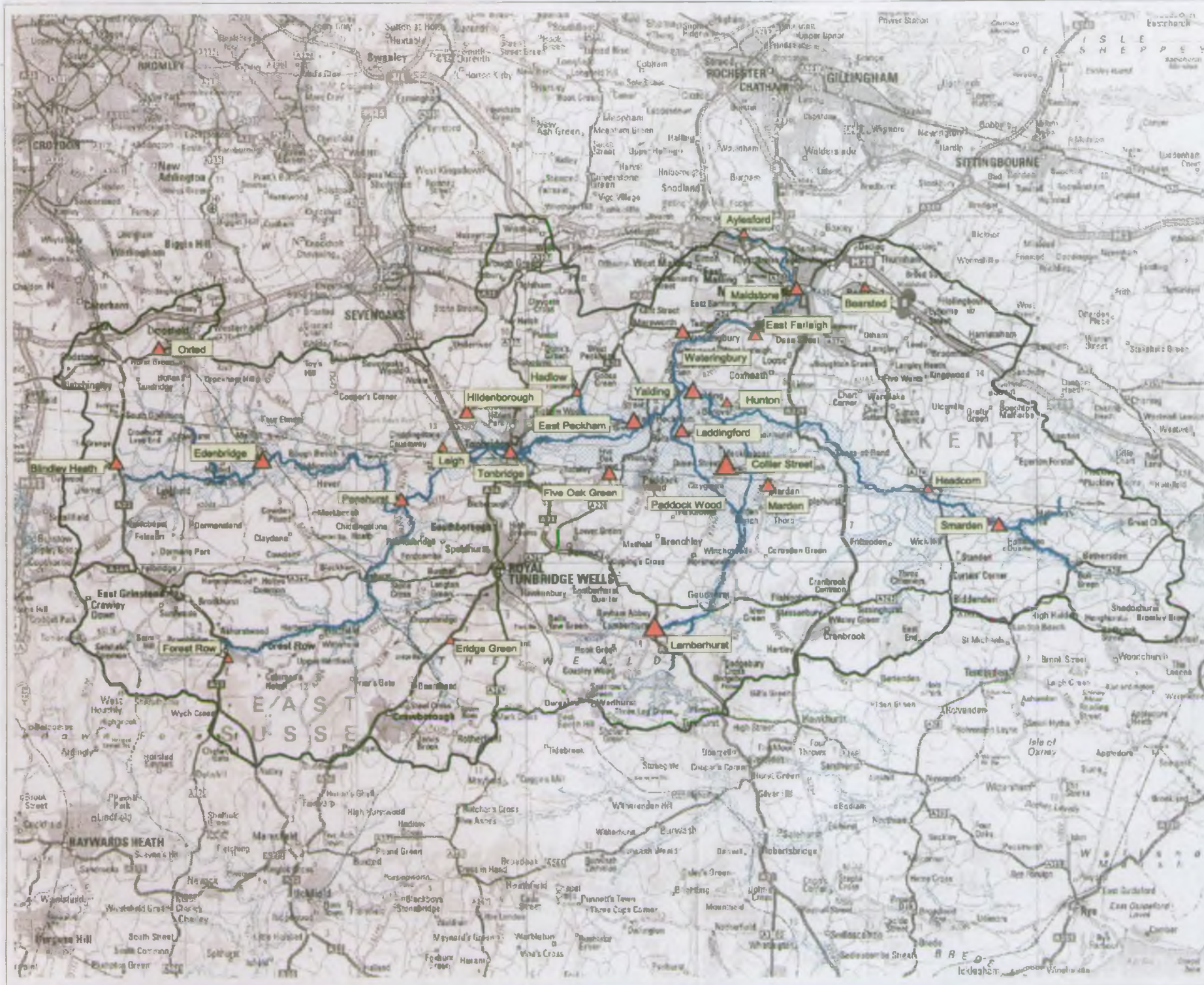
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APPENDIX C - CATCHMENT MAPS



LEGEND

Flood hotspots (inclusive of surrounding areas)

- < 5 Floods
- 6 - 10 Floods
- 11 - 15 Floods
- 16 - 21 Floods

Main rivers

Indicative Fluvial Flood Plain

Catchment Area

N

2 0 2 4 8

Kilometers

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PROJECT
Middle Medway Fluvial Strategy Study

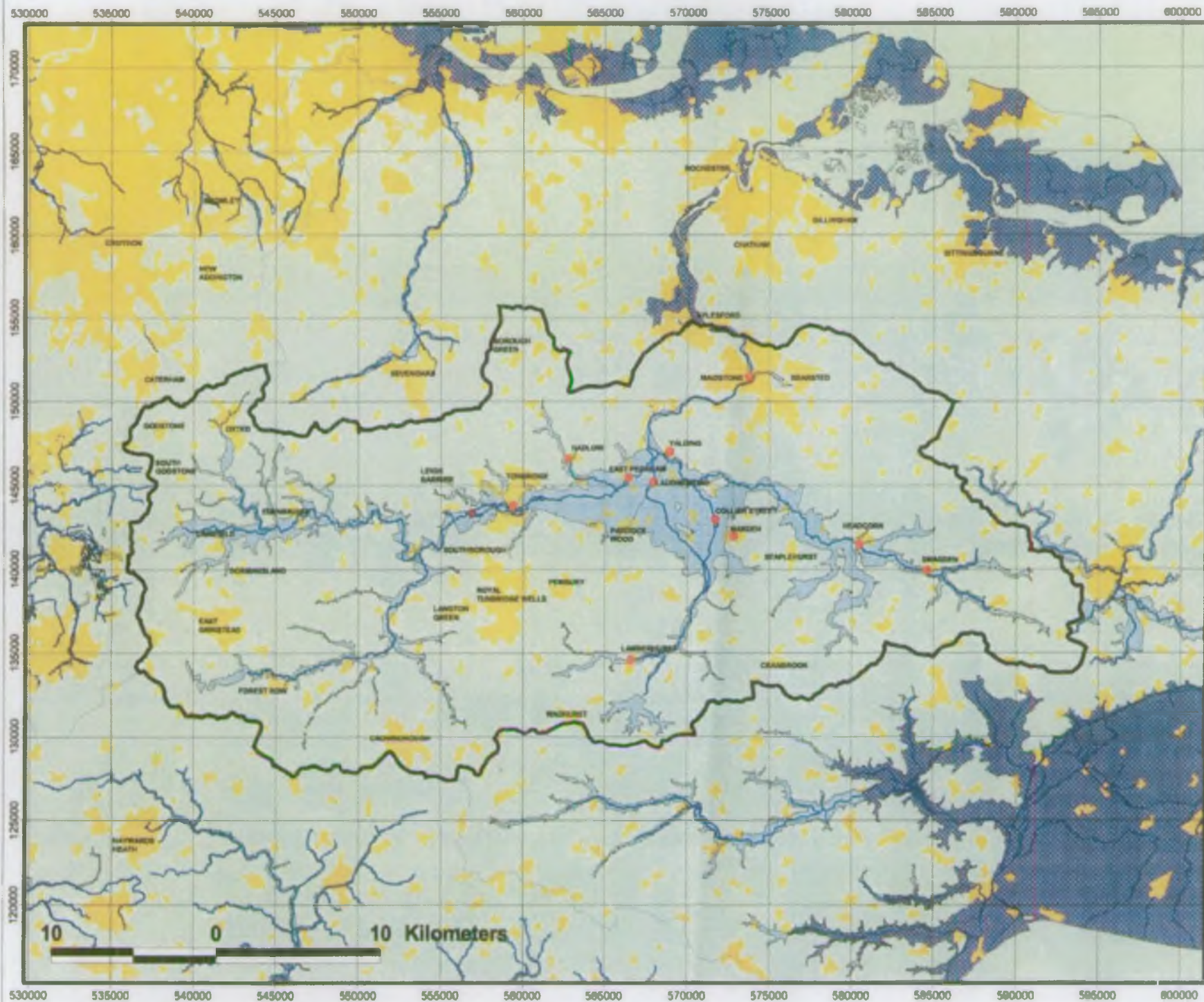
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Medway History of Flooding

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CATCHMENT LEGEND

- Medway Catchment
- Main Rivers
- Urban Areas
- Indicative Flood Area 2000
- Tidal flooding 2000
- Flooding Hotspots (Major ones only shown)
- Leighner ship



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PROJECT

**Middle Medway Fluvial
Strategy Study**

TITLE

MEDWAY CATCHMENT

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FIGURE 2

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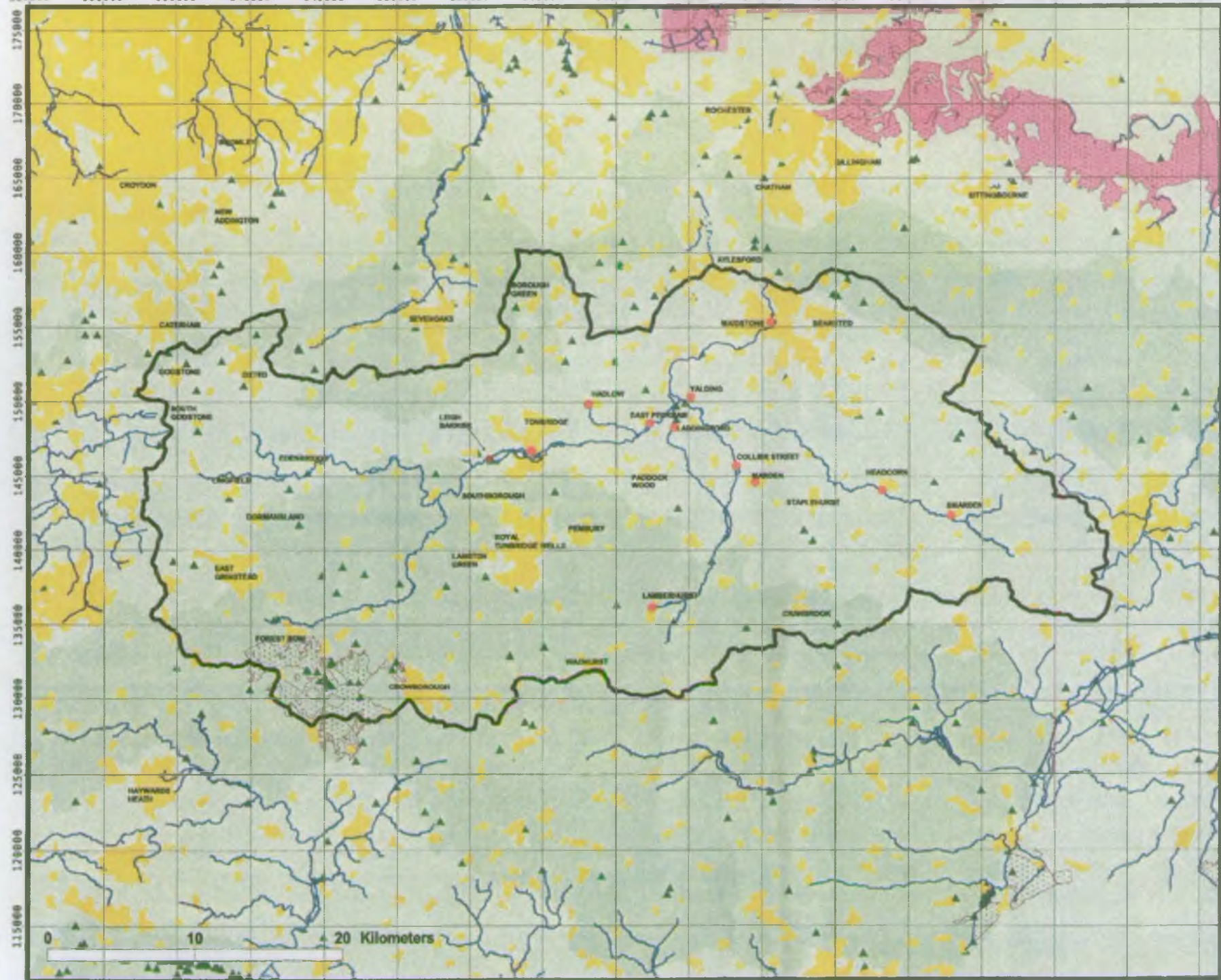
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ENVIRONMENTAL LEGEND

- Medway Catchment
- Main Rivers
- Large Urban Areas
- Flooding Hotspots (Major ones only shown)
- Leigh Barrier
- Sam Sites
- SPA Sites
- Ramsar Sites
- Areas of Outstanding Natural Beauty



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PROJECT **Middle Medway Fluvial Strategy Study**

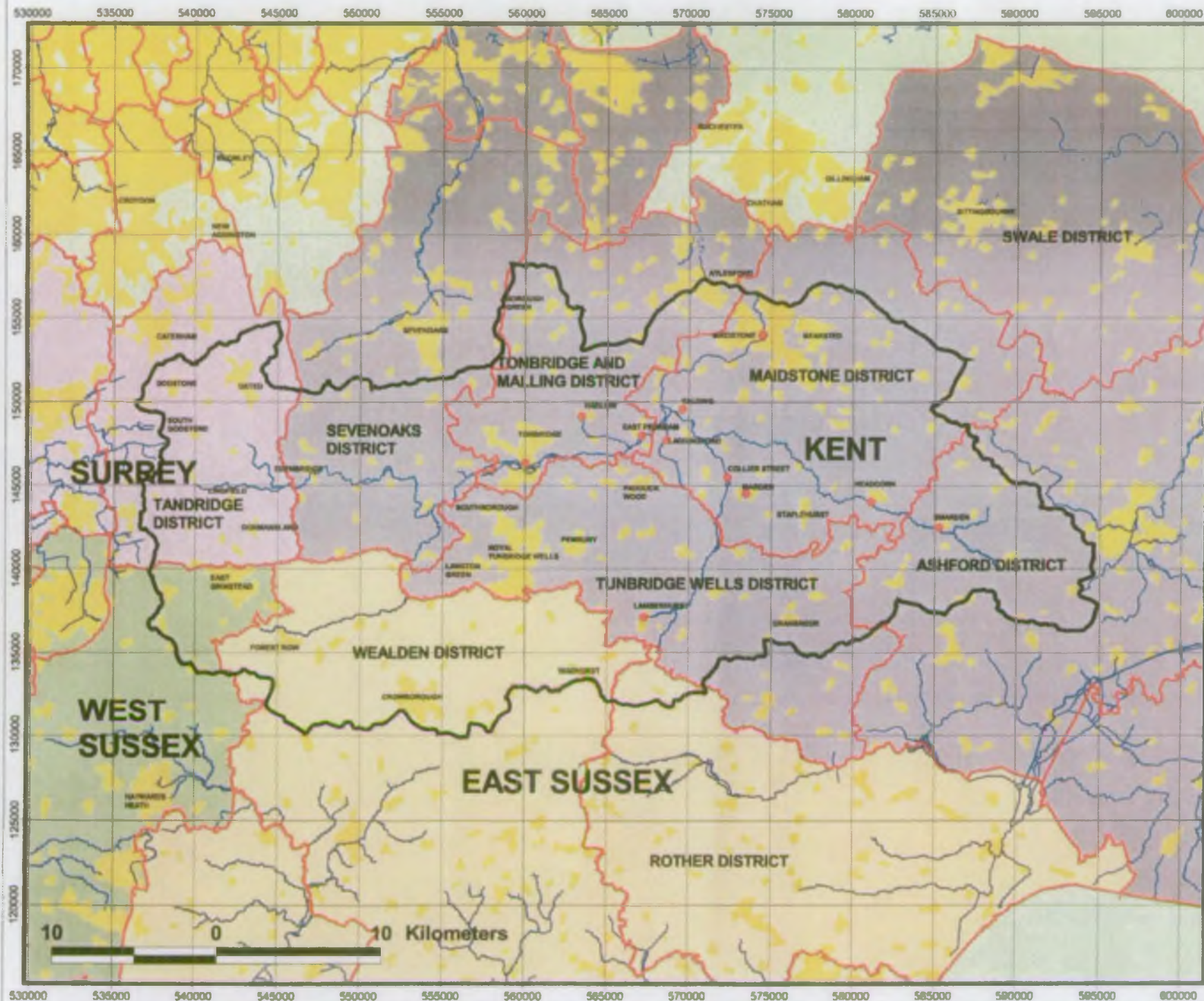
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ENVIRONMENTAL
DESIGNATIONS
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ADMINISTRATIVE LEGEND

- Medway Catchment
- Main Rivers
- Urban Areas
- District Boundary
- Flooding Hotspots (Major ones only shown)
- Leigh Bannier



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**Middle Medway Fluvial
Strategy Study**

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**MEDWAY
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FIGURE 6

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APPENDIX D -

PROGRAMME FOR CFMP COMPLETION



ENVIRONMENT
AGENCY



Babtie Brown & Root

Medway CFMP - Inception Report

APPENDIX E -

COMMUNICATIONS PLAN



**ENVIRONMENT
AGENCY**

DRAFT

**MEDWAY CFMP & MIDDLE MEDWAY FLUVIAL
STRATEGY STUDY
COMMUNICATION PLAN**

Revision R04, 18 December 2001



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DOCUMENT REVIEW / APPROVAL RECORD

Revision No	Prepared by	Checked by		Approved for Use	
		Consultants PM		Agency PM	
		CFMP	Strategy	CFMP	Strategy
R04	Andrew Nash	A Burton	A Bilgi	C Older	R Hull



1 INTRODUCTION

1.1 Studies covered by the communication plan

This Communication Plan has been produced jointly by the following studies which are running concurrently:-

Study Name	Agency PM
The Medway Catchment Flood Management Plan	Clive Older
The Middle Medway Strategy Study for Flood Risk Management	Richard Hull

Both studies are being undertaken by the Babtie Brown & Root Joint Venture.

1.2 Communication Plan Objectives

This Communication Plan sets out the arrangements for internal and external consultation with respect to the Medway CFMP and the Middle Medway Fluvial Strategy Study. The Communication Plan aims to:

- ☐ clarify the roles and responsibilities of the project team for specific aspects of internal and external communication (using a single named contact as far as possible);
- ☐ identify key consultees with a likely interest in the scheme; and
- ☐ establish a consultation programme to provide a detailed list of future consultation rounds.

This is version R04 of the Communication Plan and has been reviewed and updated as the scheme has progressed in line with adjustments to the project timetable and evolution of issues and ideas. The Communication Plan will again be amended as necessary after significant phases of the project. The Consultant is responsible for updating the Communication Plan on behalf of the Agency Project Managers.

2 PROJECT TEAM ROLES AND RESPONSIBILITIES

Role	Medway CFMP	Medway Strategy
Agency PM	Clive Older	Richard Hull
Consultants PM	Andrew Burton	Atila Bilgi
Consultants Project Director	Andrew Bell	Andrew Bell
Consultation Manager	Andrew Nash	
Agency SEA Officer	Phillipa Harrison	

Ultimate responsibility for the consultation process lies with the Agency and Richard Hull will act as the focus through which all correspondence is formally issued. All correspondence shall pass through the Agency and Consultants project managers for review and approval before being issued. The consultant will assist the Agency in drafting the correspondence and acting as the return addressee.



3 CONSULTTEES

Key groups of consultees for the scheme have been identified and are listed below. Different forms of consultation are appropriate for different groups (see section 4.0).

Internal Agency Consultees:

Name	Position
Phillipa Harrison	Conservation
Philip Decaux	Flood Warning
Clive Older	EA PM CFMP
Barrie Neaves	Strategic Planning
Bridget Thorn	Water Resources
Richard Francis	Operations / Leigh Barrier
Richard Hull	EA PM Strategy

External Primary Consultees

Organisation	Contact / Position
English Nature	Pauline Harvey
Medway Internal Drainage Board	Ian Palmer
Countryside Agency	Lynnette Leeson
English Heritage	Peter Kendall, Inspector of Ancient Monuments.
Medway River Project	
Kent County Council	Abigail Raymond, Principal Planning Officer
	Trevor Cruttenden, Emergency Planning Unit
	William Murphy, Strategic Planning Directorate
Tonbridge and Malling Borough Council	Phil Linskey, Planning
Sevenoaks District Council	Gene Morgan, Planning Officer
Tunbridge Wells Borough Council	N Eveleigh, Planning Services Manager
Maidstone Borough Council	Trevor Gasson, Planning & Development Director
Yalding Parish Council	Symon Wilson, Flood Committee Member
Smarden Parish Council	
Collier Street Parish Council	
National Farmers Union	
Southern Water	Chris Stewart
Upper & Lower Medway IDB's	Ian Palmer

Residents and business interests will be covered by the local councils.
DEFRA (Steve Jackson) will be kept informed of progress by letters.



External Secondary Consultees

Organisation	Name / position
Edenbridge Parish Council	
Penshurst Parish Council	
E. Peckham Parish Council	
Lamberhurst Parish Council	
Headcorn Parish Council	
Laddingford Parish Council	
Staplehurst Parish Council	
Marden Parish Council	
Tonbridge Town Council	
Maidstone Town Council	
All other district and borough councils within the area.	
E Sussex County Council	Carl Valentine, Planning
W Sussex County Council	John Kilford, Director of Planning
Surrey County Council	Tony Gould, Planning
Fluvial groups	
RSPB	Gavin Bloomfield
National Trust	
Forestry Authority	John Clarke, Area Manager
Kent Wildlife Trust	
Recreational Users (anglers, boater, ramblers etc)	

It is not intended to consult with boaters, anglers and other recreational users at this stage as the strategy and CFMP will not affect them.

4 CONSULTATION PROGRAMME

The following tables show a proposed programme for internal and external consultation. Members of the project team are nominated responsibility for preparing material and undertaking each round of consultation. This is based on the current programme for the scheme. A named contact is also given in each case.



Assignment No:	BR/SO/0079	Agency PM :	Richard Hull Clive Older	Communications Officer:	Andrew Nash
Project Reference:	H 2A1 K1401640 N71	Consultant PM:	Atila Bilgi Andrew Burton	Telephone:	01372 86 3970
Consultants Job No:	XU0128/BWA290100 XU0128/BWA290066	Consultant:	Babbie Brown & Root	Fax:	01372 86 3355
Start Date:	January 2002			e-mail:	andrew.nash@halliburton.com

Study Stage	Aim of Communication	Stakeholders	Method of Consultation (e.g. Letter/press release, meeting, etc.)	Dates:	Outcome or action (With dates, contact details)
Strategy start-up	Link CFMP in with strategy.	All Initial Consultees contacted by CFMP	Phone call to advise of forthcoming letter and request any feed-back to date.	7 Jan 02	
	Obtain buy-in to proposed communication plan & introduce strategy.	External primary consultees	Letter detailing consultation process and outlining aims and objectives of CFMP and strategy and how they link together along with a newsletter. Invitation to meeting on 24 th Jan and offering alternative forms of consultation.	7 Jan 02	
		External secondary consultees	Letter detailing consultation process and outlining aims and objectives of CFMP and strategy and how they link together along with a newsletter.	7 Jan 02	
CFMP Policy Options and Strategy Long List of options	Develop CFMP policy options and long list of strategy options	Internal Agency Consultees	Meeting	15 Jan 02	
		External primary consultees	Meeting at Addington. Notes of meeting detailing the CFMP policy options and strategy long list of options for comment. Follow-up with phone call.	24 Jan 02	
		External secondary consultees	Letter detailing the CFMP policy options and strategy long list of options for comment.	5 Feb 02	



Study Stage	Aim of Communication	Stakeholders	Method of Consultation (e.g. Letter/press release, meeting, etc.)	Dates:	Outcome or action (With dates, contact details)
Draft CFMP	Obtain internal Agency buy-in	Internal Agency Consultees	Workshop to present CFMP	End April 02	
	Inform of draft CFMP and obtain comments	External primary consultees	Letter	End April 02	
		External secondary consultees	Letter	End April 02	
	Inform public of progress	General public	Newsletter on web site Parish council newsletters	30 Mar 02	
Strategy Initial Consultees Report.	Obtain internal Agency buy-in	Internal Agency consultees	Presentation	July 02	
	Obtain external consultee buy-in to short list & strategy.	External primary consultees	Letter & copy of report		
		External secondary consultees	Newsletter & offer copy of report.		
Launch Final CFMP	Inform public of CFMP	General Public	Presentation	July 02	



Study Stage	Aim of Communication	Stakeholders	Method of Consultation (e.g. Letter/press release, meeting, etc.)	Dates:	Outcome or action (With dates, contact details)
Progress on strategy option appraisal	Inform about strategy progress	Internal Agency consultees	Presentation	Sep 02	
		External primary consultees	Newsletter	Sep 02	
		External secondary consultees	Newsletter	Sep 02	
Final Consultees Report (Draft Strategy Appraisal Report)	Obtain buy-in to strategy	Internal consultees and external primary consultees	Presentation of draft report	Nov 02	
		External secondary consultees	Letter and copy of executive summary	Dec 02	
		General public	Parish council newsletters Make draft strategy report available on web site and invite comments.	Dec 02	
		General public	Public exhibitions Web site Report made available at a number of key local authority offices	Jan 02	



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APPENDIX F -

DETAILED BREAKDOWN OF FLOOD ISSUES

Medway CFMP

Hotspots, flood issues, interventions and likely policy aims

Main river, non-main river and communications

MAIN RIVER			
Hotspot area	<ul style="list-style-type: none"> Flooding mechanism Approx standard of any defences Approx number of properties affected during Autumn 2000 events Approx total factored losses 	Possible intervention measures	Policy aim (flood risk)
Eden catchment			
Edenbridge	<ul style="list-style-type: none"> Overtopping direct from Eden Currently 30:1 annual chance embankments <p>Non main issues</p> <ul style="list-style-type: none"> Southern Water issues Surface drainage issues 		
Blindley Heath			
Lingfield			
Upper Medway			
Groombridge			
Forest Row			
Ashurst			

MAIN RIVER			
Hotspot area	<ul style="list-style-type: none"> • Flooding mechanism • Approx standard of any defences • Approx number of properties affected during Autumn 2000 events : Approx total factored losses 	Possible intervention measures	Policy aim (flood risk)
Penshurst	<ul style="list-style-type: none"> • Partly within Leigh Barrier impoundment • Possibly affected by Hever Castle lake 		
Fordcombe			
Upper Teise			
Lamberhurst	<ul style="list-style-type: none"> • Constriction from A21 bridge • 48 properties flooded : £498k • Non main river issues 		
Upper Beult			
Smarden	<ul style="list-style-type: none"> • Overtopping direct from Beult • Isolated properties have 50:1 annual chance walls • 22 properties flooded : £440k 		
Headcorn	<ul style="list-style-type: none"> • Overtopping direct from Beult • Only a few properties affected • 43 properties flooded : £876k 		

MAIN RIVER			
Hotspot area	<ul style="list-style-type: none"> Flooding mechanism Approx standard of any defences Approx number of properties affected during Autumn 2000 events : Approx total factored losses 	Possible intervention measures	Policy aim (flood risk)
Middle Medway and Bourne			
Leigh	Impoundment reservoir		
Tonbridge	<ul style="list-style-type: none"> Oertopping direct from braided Medway Tonbridge overtops at approx 150 cumecs output from Leigh 		
Collier Street	<ul style="list-style-type: none"> Overtopping direct from Lesser Teise (& indirectly from Beult) Approx 200 properties affected in 2000 46 properties affected : £3,977k 		
Marden	<ul style="list-style-type: none"> Overtopping direct from Lesser Teise Surface drainage backing up 		
Laddingford	<ul style="list-style-type: none"> Overtopping direct from Teise, and backing up from Medway 8 properties affected : £129k 		
Hunton			
East Peckham	<ul style="list-style-type: none"> Overtopping direct from Medway 		

MAIN RIVER			
Hotspot area	<ul style="list-style-type: none"> Flooding mechanism Approx standard of any defences Approx number of properties affected during Autumn 2000 events : Approx total factored losses 	Possible intervention measures	Policy aim (flood risk)
	<ul style="list-style-type: none"> and Bourne in high events Diversion of flow into Pinkham Lane from the Mill Stream East Peckham floods at approx 100 cumec output from Leigh 37 properties affected : £5,445k 		
Hadlow	<ul style="list-style-type: none"> Overtopping direct from Bourne Constriction from A26 		
Yalding	<ul style="list-style-type: none"> Overtopping direct from Teise, Beult and Medway . Backing up from Medway, Teise and Lesser Teise in smaller events 50 properties affected in 2000 156 properties affected : £7,666 		
Lower Medway and Len			
Teston	Overtopping direct from Medway		
East Farleigh	Overtopping direct from Medway		
Aylesford	Overtopping direct from Medway and through tidal influence.		

MAIN RIVER			
Hotspot area	<ul style="list-style-type: none"> Flooding mechanism Approx standard of any defences Approx number of properties affected during Autumn 2000 events : Approx total factored losses 	Possible intervention measures	Policy aim (flood risk)
Watlingtonbury	Overtopping direct from Medway		
Maidstone	Overtopping direct from Medway		

Usefulness of improved flood warning (based on time to peak of flood hydrographs) will be assessed for each hotspot

OTHER NON-MAIN RIVER

Hotspot area	<ul style="list-style-type: none">Flooding mechanismApprox standard of any defencesApprox number of properties affected during Autumn 2000 events : Approx total factored losses	Possible intervention measures	Policy aim
Eden catchment			
Oxted			
Godstone			
Dormansland			
Upper Medway			
Speldhurst			
Eridge Green			
Upper Teise			
Horsmondon			
Bells Yew Green			
Brenchley			
Staplehurst			
Upper Beult			
Warmlake			

OTHER NON-MAIN RIVER			
Hotspot area	<ul style="list-style-type: none"> Flooding mechanism Approx standard of any defences Approx number of properties affected during Autumn 2000 events : Approx total factored losses 	Possible intervention measures	Policy aim
Middle Medway			
Paddock Wood			
Hildenborough			
Brenchley			
Tudeley			
Five Oak Green			
Bourne			
Plaxtol			
Dunk's Green			
Lower Medway and Len			
Boughton Green			
Bearsted			
Maidestone			
Harrietsham			

Usefulness of improved flood warning (based on time to peak of flood hydrographs) will be assessed for each hotspot

**COMMUNICATIONS FLOOD
HOTSPOTS IN AUTUMN 2000 EVENTS**

Highway affected	Location	Watercourse	Intervention measures
A21 - Tonbridge to Hastings road	Lamberhurst	Teise	
A274 - Biddenden road	Headcorn	Beult	
A262 - Station road	Goudhurst	Teise	
A26 - Maidstone road	Hadlow	Bourne	
B2162 - Lees road	Yalding and Laddingford	Medway, Teise and (or) Beult	
B2010 - Teston to Yalding road	Teston Bridge	Medway	
B2188 - Penshurst to Fordcombe road	Colliers Land	Medway	
B2178 - Penshurst road	Penshurst	Medway	

Railways affected	Intervention measures
Tonbridge to Ashford	
Tunbridge Wells to Hastings	
Paddock Wood to Maidstone	