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South East RBD

Article 5 economic analysis of water use supporting document

Water Framework Directive
Article 5

Economic Analysis of Water Use

Supporting Document
South East River Basin District

March 2005

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1 Introduction

1.1 Article 5 reporting requirements

This report is a supporting document to the Article 5 report for the South East River Basin District (RBD). It provides contextual economic and cost recovery information that provides background to the Article 5 report on the South East RBD.

This report provides information relevant to the reporting guidance of the *Water Framework Directive* (WFD)¹. The report summarises work undertaken on behalf of the Economic Advisory Stakeholder Group (England and Wales) and the UK Economics Steering Group for the WFD². It takes account of various guides and other documentation produced through *the Common Implementation Strategy* (CIS) including the recent *ECO1 Reporting Sheet* produced by the European Commission³. In line with this latest guidance, the following areas are covered in the report:

- An overview of the socio-economic importance of water uses in the South East RBD;
- An assessment of the current level of cost recovery for water services for households, agriculture and industry, with some indication of a first picture of cross subsidies;
- Information relating to how the cost recovery analysis was carried out and how it may be improved in the future; and
- A summary of the work completed to date to establish a base-line scenario including details of work required in the future, particularly covering more complex sectors.

¹ A copy of the *Water Framework Directive* is available at http://europa.eu.int/eur-lex/pri/en/oj/dat/2000/l_327/l_32720001222en00010072.pdf

² Annex 1 provides a summary of related outputs including the reports on *The Economic Importance and Dynamics of Use, Cost Recovery and Incentive Pricing* and *Cost-Effectiveness Analysis and Developing a Methodology to Assess Disproportionate Costs*.

³ Other relevant guidance includes the WATECO guidance and the Information Sheets produced by the Eco1 and Eco2 drafting groups of working group 2B of the CIS.

1.2 Structure of the report

This report contains the following sections:

- **Driving forces:** This section sets out the socio-economic characteristics of the South East RBD and provides forecasts for population, number of households, output (in gross value added terms) and employment to 2015;
- **Pressures:** This section reports on the attempts to link economic information with the most important activities for the characterisation of water bodies and the associated risk assessment;
- **Water services and cost recovery:** This section presents information received from the Office of Water Services (Ofwat) on public water supply and sewerage services within the South East RBD in terms of financial cost of water services. Details are also provided on the level of environmental expenditure by the companies within the RBD;
- **Cost-effectiveness:** This section details the progress made towards ensuring cost-effectiveness in implementing the Programme of Measures (PoMs). The gaps that exist are also identified; and
- **Improving knowledge and the information base:** The final section sets out a research programme to support further work under the WFD.

1.3 Data sources

A number of data sources have been used in compiling this document.

Information on the economic importance of water uses and their dynamics has been taken from the report on the *Economic Importance and Dynamics of Water Use Relevant for River Basin Characterisation* (ref 1). This report includes a comprehensive review of data sources relevant to the economic analysis of water use, profiles of the main sectors associated with pressures in water bodies and contextual information supplied by a number of interested stakeholder groups in the form of stakeholder templates. Information relevant to this report was provided by:

- Electricity Industry Joint Environment Programme (Powergen, RWE, Innogy, AEP, Drax Power Ltd, British Energy, EDF Energy, International Power, Scottish Power);
- British Ports Association and United Kingdom Major Ports Group;
- WaterVoice;
- British Hydropower Association;
- Royal Society for the Protection of Birds (RSPB); and
- British Waterways.

Sector profiles were compiled for:

- Power generation;
- Petrochemicals;
- Other chemicals;
- Metal manufacturing;
- Paper industry;
- Other manufacturing;
- Extractive industries;
- Quarries and aggregates;
- Transport;
- Public water supplies;
- Private water supplies;
- Wastewater treatment; and
- Recreation.

Economic forecasts for the most important activities related to water uses have been produced by Experian Business Strategies Ltd, based on output

and employment information from the Office of National Statistics (ONS). Full forecasts for this RBD are provided in Annex 2. Further information related to relevant trends in the agriculture sector has been provided in a study undertaken by Cambridge University on behalf of the Environment Agency (ref 2).

Information related to the recovery of the costs of water services has been taken from the report on *Cost Recovery and Incentive Pricing* (ref 3) with updated information provided by Ofwat and the Environment Agency following the Final Determination of water prices for the period 2005 to 2010.

Information relevant to the analysis of the cost-effectiveness of actions to be taken under the PoMs within River Basin Management Plans (RBMPs) has been taken from the report entitled *Cost-Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Costs* (ref 4). This has been supplemented with a review of progress in implementing the *UK Collaborative Research Programme on River Basin Management Planning Economics* (CRP).

Throughout the report various descriptions of geographical areas are used e.g. ward, local authority district, etc. A definition of these can be found in Annex 1. All data and forecasts have been undertaken at RBD level. To do this, all wards have been allocated to RBDs. Where alternative geographic areas are used this is clearly noted.

2 Driving forces

This section provides an overview of the socio-economic characteristics of the economy of the South East RBD relevant to the economic importance and dynamics of water use. It includes the following information:

- General profile: Presents an introduction to the South East RBD in terms of location, major urban centres and distinguishing characteristics;
- Population and households: Presents an outline of the historical change in the South East RBD population, number of households and population per household. This information assists in understanding the levels of domestic water use specific to the RBD;
- Economy: Output and employment levels are used to assess the South East RBD economy. Using historical trend data the areas of the economy that have expanded or contracted in recent years are identified. This allows an appreciation of the key sectors that are driving the economy of the South East RBD;
- Other socio-economic characteristics: Presents information for the South East RBD specifically relating to the level of deprivation, the level of the working age population claiming Job Seeker Allowances (available to those unemployed persons who are both available for and actively seeking work) and the level of working age population with no qualifications. This information helps to build an understanding of the potential need for Government intervention; and
- Area based initiatives: Presents area based initiatives specific to the South East arising from Government area based policies.

2.1 General profile

The South East RBD covers an area of approximately 10,195 km² and comprises the counties of East Sussex, Hampshire, the Isle of Wight, West Sussex, and parts of Kent and Surrey.

The major urban conurbations within the district are Southampton (population 217,445), Portsmouth (population 186,701) and Brighton (population 247,817)¹.

The RBD contains a major passenger and container port at Southampton. It is the leading vehicle handling port and is the UK's principal cruise port, handling almost half a million passengers in 2003. The port is also a major handler of liquid and dry bulks and containers. Each year the port refineries handle around 23 million tonnes of oil and petroleum-related products. Dover, Folkestone and Newhaven are also important ports, catering for cross-channel ferry services.

The map on the following page (Figure 2.1) shows the boundary of the South East RBD and indicates the principal urban settlements. Regional Development Agency (RDA) boundaries have been included.

RDAs are non-departmental public bodies. There are nine RDAs in the English Regions and their primary role is to promote economic development in their region. The RDAs were established under the *Regional Development Agencies Act 1998*.

RDA boundaries have been included as these are the most relevant regional policy areas from an economic point of view. The most relevant economic information is also available on a RDA basis, not a RBD basis. Two RDAs, the South East of England Development Agency and the South West of England Development Agency cover the South East RBD.

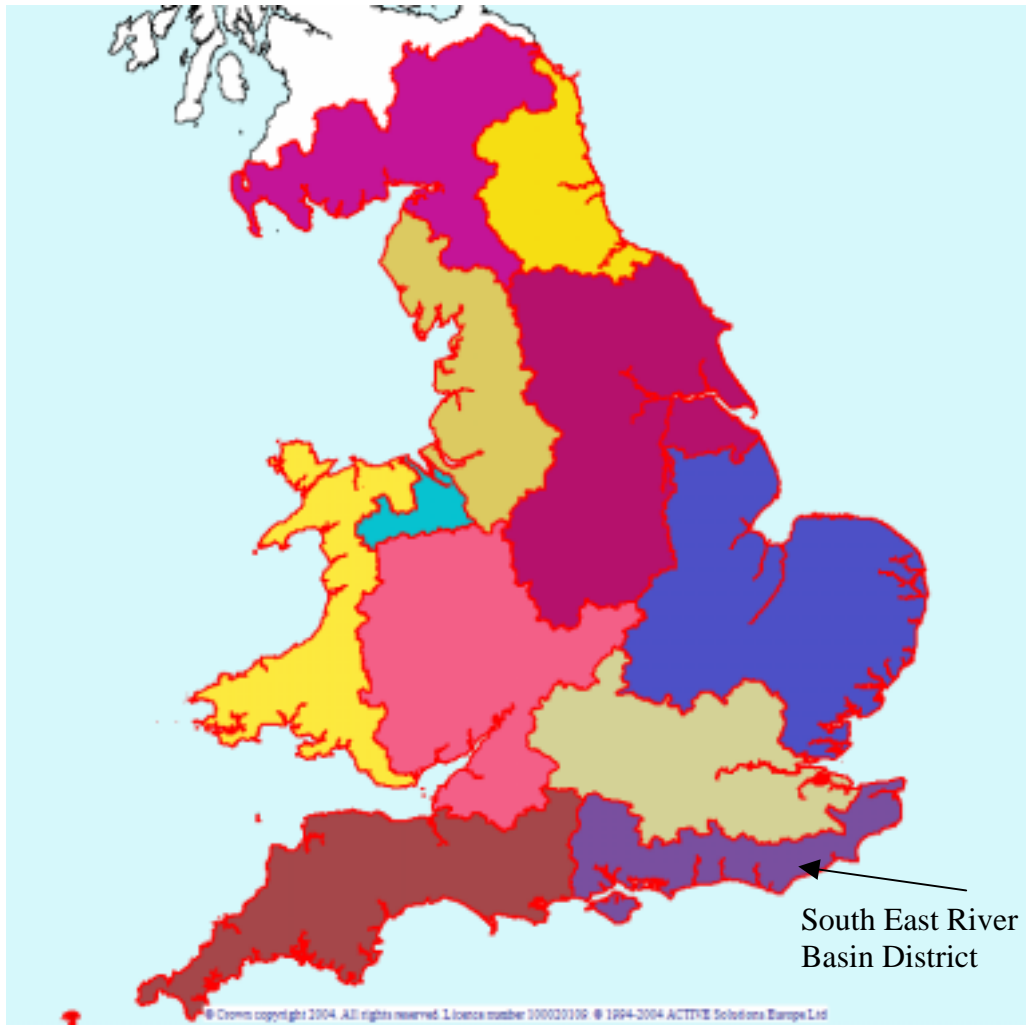
¹ Census 2001

Figure 2.1: South East RBD and RDA boundaries



For additional context, the location of the South East RBD within England and Wales is illustrated in Figure 2.2 over.

Figure 2.2: South East RBD location map



2.2 Population and households

Table 2.1 indicates the South East RBD population in 1995 and 2002 based on NOMIS¹ Ward 2002 datasets. The percentage changes in the South East RBD are compared against the average percentage population changes for all RBDs.

Table 2.1 South East RBD population, number of households and population per household

	1995	2002		Change 1995-2002 (Percentage)
Population (000s)				
South East	3,074.3	3,176.9	South East	3.3
			All RBDs	2.1
Households (000s)				
South East	1,256.8	1,350.8	South East	7.5
			All RBDs	6.9
Population per household				
South East	2.5	2.4	South East	-3.9
			All RBDs	-4.5

Source: Experian Business Strategies Ltd

The South East RBD population increased between 1995 and 2002 at a much higher rate than the average for all RBDs. Population grew by 3.3 per cent in the South East compared to 2.1 per cent across all RBDs.

There were 1.26 million households in the RBD in 1995 and this increased by 7.5 per cent to 1.35 million households in 2002. This rate is similar to the growth across all RBDs.

The number of households within the RBD also influences levels of water use. With no change in population, water use per capita will generally increase if the number of households increases. The size of households in the South East RBD has declined since 1995.

¹ The UK's web-based database of labour market statistics, see www.nomisweb.co.uk

2.3 Economy

To understand the economy of the South East RBD changes in output and employment are considered between 1995 and 2002. Both output and employment have been broken down into broad industry categories based on 30 Standard Industrial Classification (SIC) codes. Employment and output categories are also broken down into more detailed SIC codes. The disaggregated codes were chosen on the basis of an assessment of the main activities associated with pressures on water quality, including pressures from abstraction, discharges and hydromorphology as revealed by the Environment Agency's *Pressures and Impact Analysis*¹.

Detailed information on output and employment categories is presented in Annex 2.

2.3.1 Output

Table 2.2 illustrates output for the South East RBD by the 30 SIC codes. The summation of these 30 SIC categories provides a measure of the total output of the South East RBD in value added terms. Total output was £38.8 billion in 2002.

Between 1995 and 2002 output from the South East RBD increased by £9.3 billion, or 31 per cent. This equates to an average growth rate of 4.0 per cent per annum, which is above the average rate for all RBDs of 2.9 per cent per annum.

Further detail on the output in the most important water use related disaggregated SIC categories is provided in Annex 2.

¹ This work will be built upon in later stages of the risk assessment. It is based on the identification of correspondences between the lists of activities which have been associated with pressures (for example through the analysis of the National Abstraction Licensing Database and Charges for Discharges Database) with Standard Industrial Classification categories. Analysis reveals that correspondence is highly variable across the main activity-pressure categories.

Table 2.2: South East RBD (2002) output ranked by 30 SIC categories

Rank	SIC Category	Output 2002 (£ millions at 2000 prices)	Per cent of total output	Per cent average all RBDs
1	Business services	4112.3	10.6	13.4
2	Wholesale & distribution	2985.0	7.7	7.5
3	Retailing	2850.2	7.3	6.1
4	Health	2722.5	7.0	6.7
5	Construction	2646.1	6.8	6.0
6	Public administration & defence	2641.7	6.8	5.5
7	Banking & insurance	2266.0	5.8	5.9
8	Education	2265.0	5.8	5.8
9	Other financial & business services	2040.1	5.3	4.2
10	Other services	1968.3	5.1	5.3
11	Transport	1847.7	4.8	5.4
12	Hotels & catering	1443.7	3.7	3.4
13	Electrical & optical equipment	1170.9	3.0	1.9
14	Communications	1132.6	2.9	3.6
15	Chemicals	1119.7	2.9	2.0
16	Paper, printing & publishing	966.1	2.5	2.6
17	Gas, electricity & water	920.1	2.4	2.0
18	Food, drink & tobacco	608.1	1.6	2.4
19	Transport equipment	565.6	1.5	1.9
20	Machinery & equipment	542.3	1.4	1.5
21	Agriculture, forestry & fishing	436.5	1.1	1.0
22	Metals	432.1	1.1	1.9
23	Rubber & plastics	352.7	0.9	0.9
24	Other manufacturing	180.3	0.5	0.9
25	Minerals	169.4	0.4	0.6
26	Wood & wood products	146.4	0.4	0.3
27	Textiles & clothing	115.5	0.3	0.6
28	Other mining	108.7	0.3	0.3
29	Fuel refining	41.9	0.1	0.3
30	Oil & gas extraction	18.1	0.0	0.1
Total South East 2002 RBD output		38 815.6	100	100

Source: Experian Business Strategies Ltd

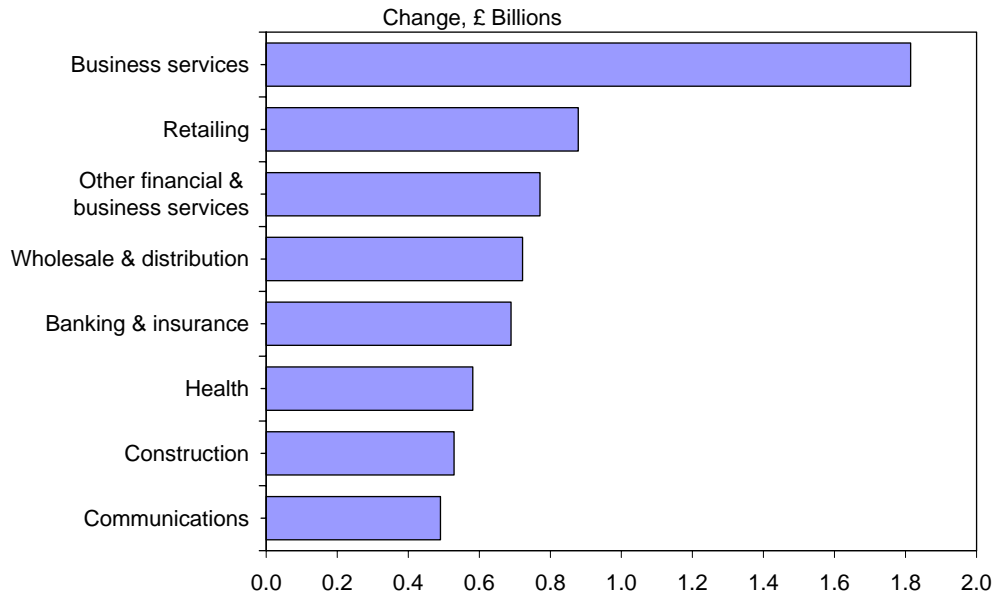
The Business services sector is the largest sector in terms of output in the South East RBD. The Wholesale & distribution, Retailing and Health sectors also contribute significantly to the RBD's output. Electrical & optical equipment is the largest manufacturing sector.

Sectors which provide significantly above average contributions to the output of the South East RBD include:

- Retailing;
- Public administration & defence;
- Other financial & business services; and
- Electrical & optical equipment.

Figure 2.3 illustrates the sectors that have experienced the greatest changes in output between 1995 and 2002. The greatest change in terms of value was in the Business services sector which grew by £1.8 billion.

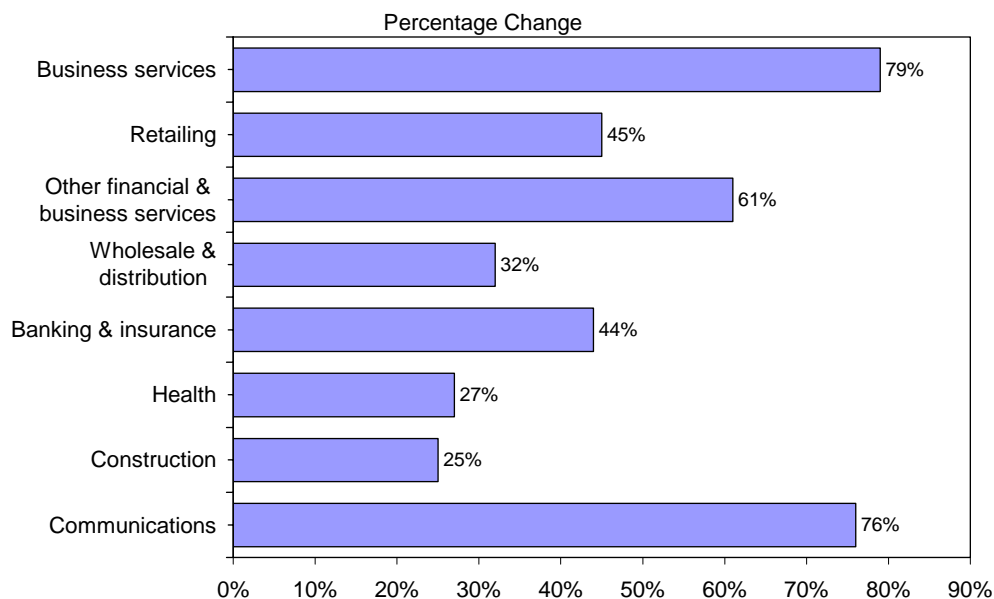
Figure 2.3: Changes in output, South East RBD, 1995 to 2002



Source: Experian Business Strategies Ltd

Figure 2.4 below illustrates the percentage change in output between 1995 and 2002 for the sectors illustrated in Figure 2.3. Business services, which had the largest increase in value terms, grew by 79 per cent during this period. This also represents the greatest percentage increase.

Figure 2.4: Percentage Change in output, South East RBD, 1995 to 2002



Source: Experian Business Strategies Ltd

2.3.2 Employment

Retailing, Health and Business services are the most significant employment sectors for the South East RBD. Health is likely to be linked to a higher than average dependent population within the RBD.

Sectors which provide significantly above average levels of employment for the South East RBD include:

- Retailing;
- Transport; and
- Agriculture, forestry & fishing.

The number of employees in each of the 30 SIC categories is illustrated in Table 2.3 below. Further detail on the employment in the most important water use related disaggregated SIC categories is provided in Annex 2.

Table 2.3: South East RBD (2002) employment ranked by SIC category

Rank	SIC Category	Employment (000s)	Per cent of total employment	Per cent average all RBDs
1	Retailing	155.7	12.1	10.9
2	Health	154.7	11.6	10.6
3	Business services	149.5	9.3	13.3
4	Education	119.5	7.2	8.5
5	Hotels & catering	92.2	6.6	6.7
6	Wholesale & distribution	84.9	6.1	6.8
7	Public administration & defence	78.5	5.2	5.4
8	Other services	66.9	4.5	5.2
9	Banking & insurance	57.3	4.1	4.1
10	Construction	52.5	3.2	4.3
11	Transport	41.6	3.2	1.5
12	Other financial & business services	41.4	2.2	2.6
13	Electrical & optical equipment	28.6	1.7	1.6
14	Communications	21.5	1.2	2.1
15	Agriculture, forestry & fishing	19.0	1.5	0.9
16	Paper, printing & publishing	15.5	1.2	1.8
17	Machinery & equipment	15.4	1.2	1.3
18	Metals	15.2	1.2	1.8
19	Transport equipment	14.8	1.2	1.5
20	Chemicals	13.5	1.1	0.9
21	Rubber & plastics	9.5	0.7	0.9
22	Food, drink & tobacco	9.2	0.7	1.8
23	Other manufacturing	9.1	0.7	0.8
24	Gas, electricity & water	5.8	0.5	0.5
25	Minerals	4.0	0.3	0.5
26	Wood & wood products	3.3	0.3	0.3
27	Textiles & clothing	3.0	0.2	0.8
28	Other mining	1.0	0.1	0.2
29	Fuel refining	0.4	0.0	0.1
30	Oil & gas extraction	0.2	0.0	0.1
Total employment South East RBD		1283.7	100	100

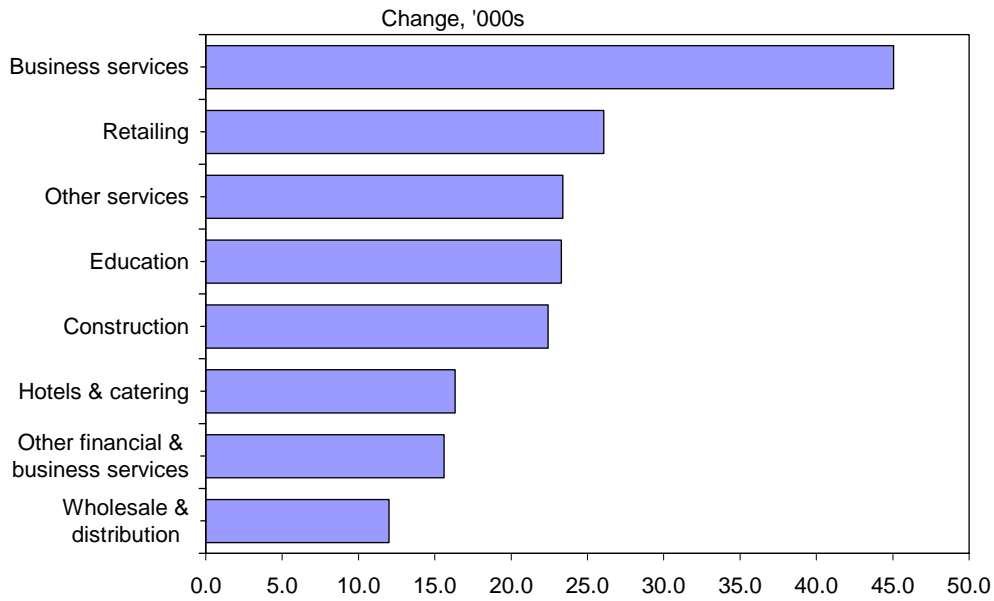
Source: Experian Business Strategies Ltd.

Between 1995 and 2002 employment within the South East RBD grew by almost 200,000, this equates to a growth in employment of 2.4 per cent per annum.

The major changes in employment are illustrated in Figure 2.5 below.

In terms of numbers of employees the largest growth sector between 1995 and 2002 has been the Business services sector which has increased by 43,000.

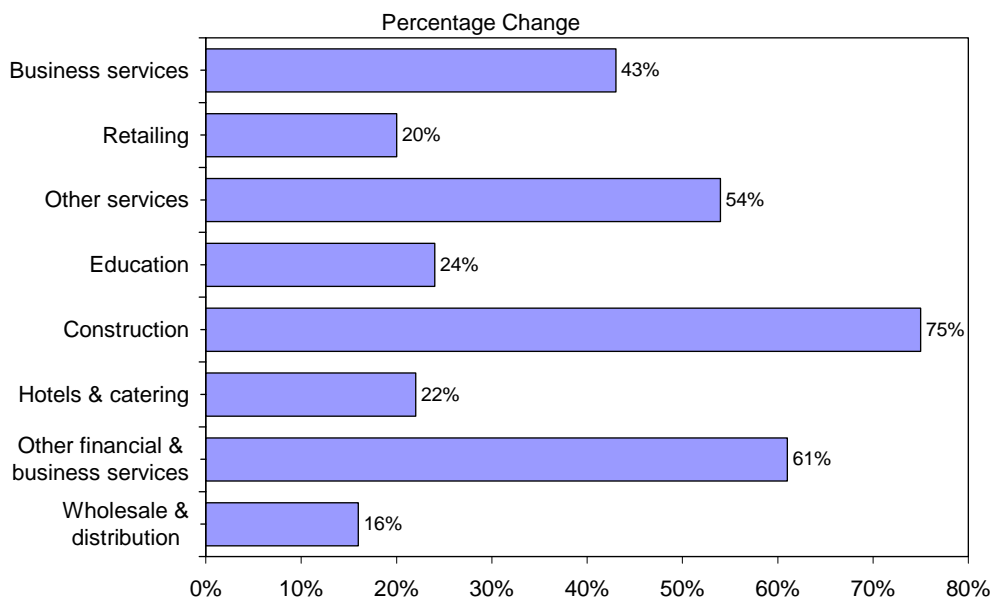
Figure 2.5: Change in employment, South East RBD, 1995 to 2002



Source: Experian Business Strategies Ltd

Figure 2.6 details the percentage change in employee numbers between 1995 and 2002 for the sectors illustrated in Figure 2.5. The Construction sector grew at the greatest rate, increasing employment by 75 per cent.

Figure 2.6: Percentage change in employment, South East RBD, 1995 to 2002



Source: Experian Business Strategies Ltd

2.4 Other socio-economic characteristics

Apart from output and employment, there are a number of other indicators that present important economic information on the distribution of wealth and economic opportunities in a region. These include information on deprivation (which includes information on relative income, employment, health, education, housing and child poverty), unemployment and qualifications. Information on Government area based policies is also presented. These provide an indication of Government programmes that may impact on development in the RBD, and therefore may have an impact on water use.

2.4.1 Deprivation indices

Using the *Indices of Multiple Deprivation for England and Wales*, produced by the Office of National Statistics (ONS), a collation of the 50 most deprived and the 50 least deprived wards by RBD can be used as an indicator of deprivation within each of the RBDs. It should be noted, however, that ward boundaries are not consistent with RBD boundaries. Consequently, some of the most/least deprived wards may be in more than one RBD.

The Index of Multiple Deprivation is comprised of six parameters:

- Income;
- Employment;
- Health deprivation and disability;
- Education, skills and training;
- Housing; and
- Geographical access to services.

The South East RBD has no wards within the 50 most deprived wards in England and Wales and two wards in the 50 least deprived wards in England and Wales. The least deprived wards are in Mid Sussex and Horsham. This suggests that a reasonable standard of living and quality of life is enjoyed in the South East RBD.

2.4.2 Claimant count and qualifications

The South East RBD crosses several administrative districts and therefore a single district cannot be used as a proxy to assess the level of unemployment in the RBD. Instead, Job Seeker Allowance (JSA) claimant count as a proportion of working age population has been assessed for the major centres within the South East RBD.

To measure qualifications the percentage of the working age population within the South East RBD without any qualifications is assessed for the same major centres within the RBD.

Table 2.4: Claimant count and qualifications for major centres in the South East RBD

Local Authority District	Claimant Count (percentage)	Percentage of working age population with no qualifications
Southampton	1.9	12.3
Portsmouth	1.7	12.6
Brighton	3.4	9.2
Hastings	3.1	14.4
Canterbury	1.3	12.5
Thanet (Margate and Ramsgate)	3.0	17.8
Winchester	0.7	7.6
UK Average	2.2	15.1

Source: NOMIS

Levels of claimants and working age populations without any qualifications vary within the South East RBD considerably. Brighton, Hastings and Thanet, which includes Margate and Ramsgate, all have above average levels of JSA claimants. Winchester and Canterbury both have claimant count levels below the national average.

All of the considered areas, with the exception of Thanet, have below average proportions of working age populations with no qualifications. The proportion in Winchester is particularly low, with less than half the UK average level.

2.5 Area based initiatives

Area based initiatives (ABI) represent the main source of geographically targeted Government interventions into the economy and communities in England. An appreciation of the extent and coverage of ABIs is therefore important in understanding the Government led dynamics of the RBD's economy. While ABIs remain very significant sources of change, there is an increasing trend towards mainstreaming area based policies (so that main Government programmes help to fulfil the ABI objectives).

Figure 2.7 shows the main renewal initiatives and activities in the South East RBD: the Neighbourhood Renewal Fund; Coalfield Communities; and the Sustainable Communities Growth Areas.

The relationship between ABIs and pressures and impacts in terms of the River Basin will not always be clear. There are complex interactions between the initiatives, main Government programmes, the wider economy and environment policy. They remain, however, an important component of the socio-economic profile of areas and will need to be considered in the further development of characterisation and risk assessment particularly in terms of the baseline and the subsequent development of PoMs.

As the map reveals, the RBD contains several areas eligible for the *Neighbourhood Renewal Fund* (NRF) around Southampton, Portsmouth, Brighton and Hastings. The NRF aims to enable England's 88 most deprived authorities, in collaboration with their Local Strategic Partnership, to improve services, narrowing the gap between deprived areas and the rest of the country¹. Such regeneration focused initiatives aim to encourage new residents to the areas and will thus have an impact on levels of water use within the RBD.

Under the Government's *Sustainable Communities Plan*, the Ashford area of the South East RBD has been designated a growth area. This programme aims to deliver additional housing and infrastructure in a sustainable way. The Ashford growth area is expected to see substantial additional growth in housing over the period to 2012. This is likely to have an impact on the level of water use within the RBD.

1 Neighbourhood Renewal Unit, ODPM website.

2.6 Trends in the South East RBD economy

Forecasts for the South East RBD have been conducted by Experian Business Strategies Ltd up to 2015. Forecasts have been undertaken for population, households, output and employment. Detailed forecasts, for the most important water use related SIC categories, and a description of the forecast methodology are found in Annex 2.

The Experian forecasts were developed specifically for the economic analysis for the WFD. They represent the only nationally consistent RBD based forecasts of the main economic parameters of currently available. In addition to the standard sectoral splits, additional sub-sectors have been forecast for output and employment based on the results of the analysis of impacts and pressures in the *River Basin Characterisation* (RBC). Discussions with stakeholders reveal in many cases that these forecasts could be improved upon as they may not have been able to take into account some sector specific parameters relating to likely future trends. Further work on rationalising these forecasts is planned.

2.6.1 Population and households

The South East RBD population is forecast to increase over the forecast period by 8.6 per cent. This is significantly above the average rate across all RBDs and is likely to be linked in part to the Ashford Growth Area within the RBD.

An increase in the number of households, again likely to be linked to the Ashford growth area, is forecast at a rate significantly above the anticipated rate across all RBDs.

The population per household in the South East RBD is forecast to continue to decline between 2002 and 2015 at a rate slightly below the average across all RBDs. Since smaller households tend to have higher per capita water use, this trend may increase overall water consumption.

Table 2.5: Forecast change in population, households and population per household, 2002-2015

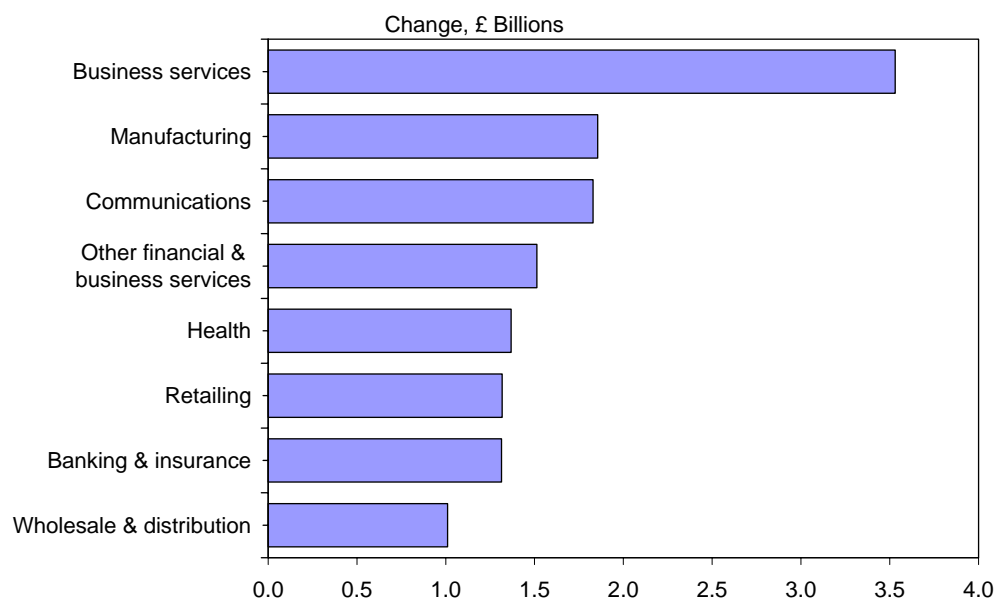
	2002	2015		Percentage Change 2002-2015
Population (000s)				
South East	3,176.9	3,450.3	South East	8.6
			All RBDs	4.6
Households (000s)				
South East	1,350.8	1,542.8	South East	14.2
			All RBDs	11.2
Population per household				
South East	2.3	2.2	South East	-4.9
			All RBDs	-5.9

Source: Experian Business Strategies Ltd

2.6.2 Output

The forecasts show a continuing increase in output across almost all sectors, the most significant of which are shown in Figure 2.8. Output is predicted to grow strongly in Business services and Manufacturing. For the Business services sector this continues the trend since 1995.

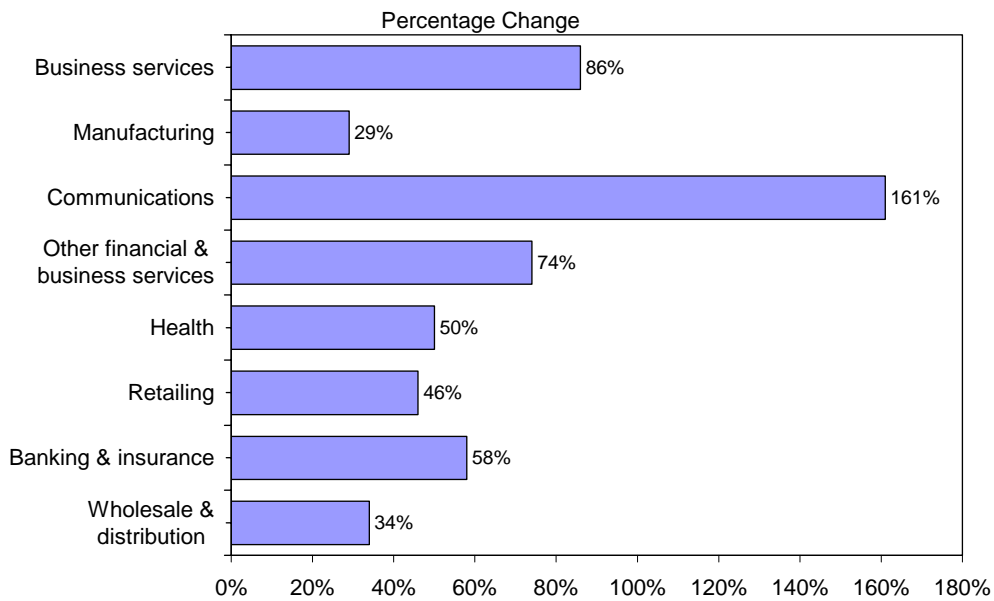
Figure 2.8: Forecast change in output, South East RBD, 2002 to 2015



Source: Experian Business Strategies Ltd

Figure 2.9 illustrates the percentage growth rates for the sectors illustrated in Figure 2.8. Business services, the sector anticipated to increase by the greatest value is forecast to increase by 86 per cent. The highest rate of growth is forecast in the Communications sector, which is anticipated to grow by 161 per cent.

Figure 2.9: Forecast percentage change in output, South East RBD, 2002 to 2015



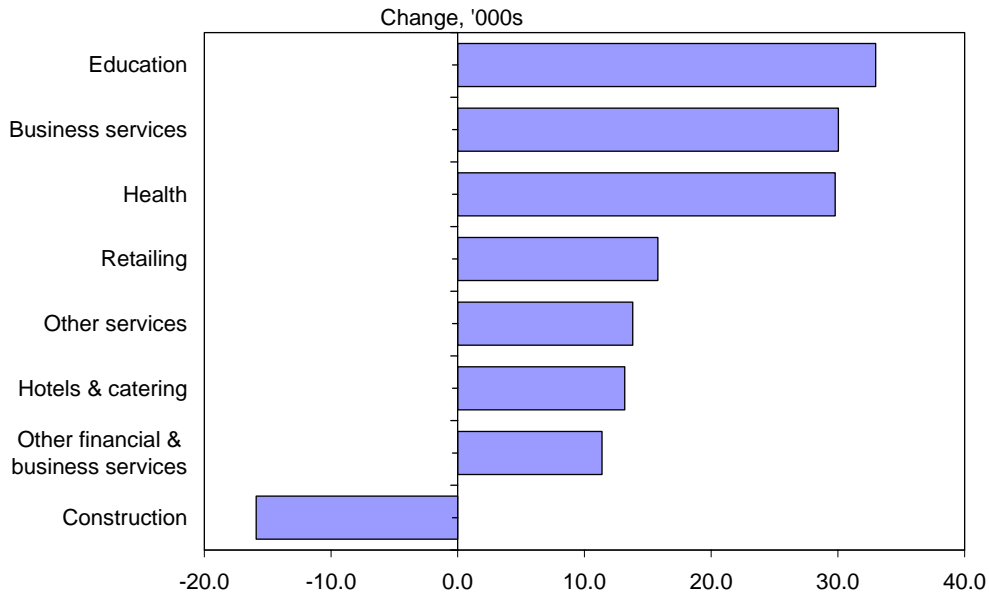
Source: Experian Business Strategies Ltd

2.6.3 Employment

Overall, the economy of the South East RBD is forecast to increase employment by 91,100 between 2002 and 2015. This equates to a growth rate of 0.5 per cent per annum. Figure 2.10 shows the forecast changes in employment by industry during this period.

The largest growth sector is anticipated to be the Education sector, which is forecast to increase employment by 33,000. The greatest fall in employment is forecast to be in the Construction sector which is anticipated to reduce employment numbers by 15,900 by 2015 (but this follows a big increase in employment in recent years).

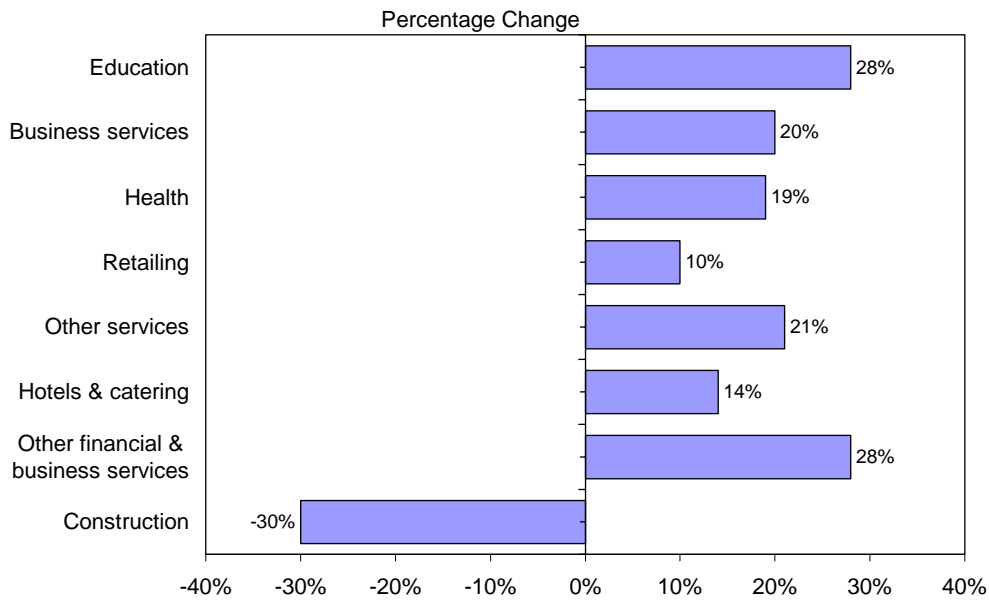
Figure 2.10: Forecast change in employment, South East RBD, 2002 to 2015



Source: Experian Business Strategies Ltd

Figure 2.11 outlines the percentage change in employee numbers between 2002 and 2015 for the sectors illustrated in Figure 2.10.

Figure 2.11: Forecast percentage change in employment, South East RBD, 2002 to 2015



Source: Experian Business Strategies Ltd

A full list of both employment and output for the South East RBD is attached in Annex 2. This contains a greater level of disaggregation of SIC codes based on the analysis of impacts and pressures.

These trends are consistent with the South East *Regional Economic Strategy* (*Regional Economic Strategy for South East England 2002 – 2012*¹) which identifies eleven clusters which have major significance for the future of the region. These are based on emerging technologies (pharmaceuticals, biotechnology and healthcare, information and communication technologies, media/creative industries, and environmental technologies), major employment concentrations (tourism and leisure, freight transport and logistics, construction and property services, financial and professional services, and land based industries) and high value added manufacturing (advanced engineering (including automotive), aerospace and defence, and marine technologies). Areas likely to see significant priority in terms of development include the Ashford growth area and the Hastings and Bexhill areas which have been earmarked for significant regeneration activity.

¹ http://www.seeda.co.uk/res/docs/RES_Main_Web.pdf

3 Pressures

This section presents information on water use, covering the main pressure categories related to abstractions, discharges and hydromorphological alterations. This information has been assembled on the basis of the analysis of impacts and pressures. There are currently limits to the extent to which specific activities (e.g. farming) can be linked to pressures (e.g. morphology). This is a main component of future work on characterisation, which will improve the analysis in later years. The following analysis is based on currently available information on an RBD basis where this is possible. These sections should be read in conjunction with the RBC risk analysis to provide a better understanding of the main activities associated with pressures in this RBD.

3.1 Characteristics of water use

3.1.1 Abstractions

Abstractions from water bodies are undertaken for a number of purposes, including providing drinking water for households and use of water in industrial processes.

Table 3.1 illustrates the South East RBD abstractions by purpose in order of magnitude. The basis for the table is the Environment Agency's 2001 water abstraction dataset. This dataset was originally derived from the *National Abstraction Licensing Database* (NALD). The abstraction source's annual total has been expressed as a daily rate (megalitres per day), however it should be noted that these daily figures do not reflect seasonal variations in water use¹.

For all abstraction sources, estimated returns to watercourses are excluded. Some industries, in particular the electricity industry, use water for cooling purposes and return the water to its source after it has been used. The table also excludes abstractions from saline estuaries and coastal waters, which is a substantial source of cooling water for some power stations. For these industries, total abstractions are higher than those presented in Table 3.1.

The way in which water is abstracted can vary. This can also impact on water status. Low flow schemes can reduce the impact of abstractions on the environment. These schemes present costs to water companies.

The Environment Agency has developed sustainable abstraction levels which are going to be applied to water companies in the next business planning period, 2005-2010. In future years, sustainability reductions are likely to impact on abstraction levels.

¹ This data relates to abstractions within the RBD area. It does not cover abstractions from other RBDs which are used within the RBD (and vice versa) as a result of bulk supply arrangements.

The main water abstractions in the South East RBD are by the water and agricultural industries. Abstractions by water companies supply water for both household and non-household consumption, which include some industrial and commercial uses, as well as consumption by schools, hospitals, etc.

Table 3.1: South East RBD abstractions

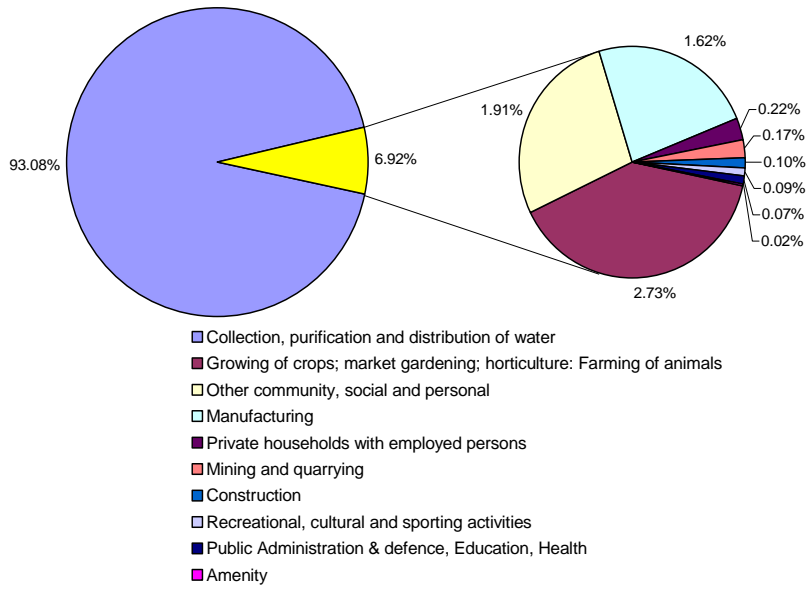
SIC Section	SIC description	Additional information	Volume abstracted (Ml/d)	Per cent of South East RBD abstractions
E41.00	Collection, purification and distribution of water	Public Water Supply (total abstracted)	656.7	93.08
A01	Growing of crops; market gardening; horticulture: Farming of animals	Spray Irrigation included	19.2	2.73
O (excluding O92)	Other community, social and personal	Other (including Environmental)	13.5	1.91
D	Manufacturing	General Industry (Manufacturing)	11.4	1.62
P	Private households with employed persons	Other Potable Uses	1.5	0.22
C	Mining and quarrying	Mining & Aggregates	1.2	0.17
F	Construction	Construction	0.7	0.10
O92	Recreational, cultural and sporting activities	Recreation (including sports)	0.6	< 0.10
L	Public Administration & defence, Education, Health	Public Administration & defence, Education, Health	0.5	< 0.10
	Amenity	Amenity	0.1	< 0.10
H	Hotels and restaurants	Hotels, Public Houses and Conference centres	0.0	0
E40.10	Production and distribution of electricity	Power Generation	0.0	0
E41.00	Collection, purification and distribution of water	Licensed transfers for PWS	0.0	0
Total			705.4	100

Source: Environment Agency, 2004

Note: Abstractions are from freshwater bodies (i.e. they exclude tidal and coastal waters) and are not adjusted for water returned to the local environment.

Figure 3.1 provides a graphical representation of this information.

Figure 3.1 South East RBD abstractions



Source: Environment Agency, 2001

3.1.2 Discharges

Discharges into water bodies also have important impacts on water status.

Table 3.2 below summarises the main categories of consented discharges for the South East RBD. The table shows the number of consents rather than volumes. The major sources of discharges for the South East RBD are related to the treatment of sewage. The number of such consents is in part a function of the number of households in the South East RBD and the level of household water use.

Table 3.2 Number of consented discharges for the South East RBD

Discharge	Number of Consents	Percentage of Total Consents
Sewage – treated effluent	2877	70.72%
Sewage – undefined	839	20.62%
Sewage treatment works	100	2.46%
Trade – treated effluent	64	1.57%
Undefined	45	1.11%
Trade – undefined	25	0.61%
Trade – fish aquaculture	16	0.39%
Incineration	12	0.29%
Petroleum processes	11	0.27%
Trade – condensate water	11	0.27%
Trade – plants aquaculture	10	0.25%
Recovery processes	8	0.20%
Other – surface water (uncontaminated)	7	0.17%
Trade – site drainage (contaminated)	7	0.17%
Trade – swimming pool contents	7	0.17%
Trade – cooling water (direct)	6	0.15%
Manufacture and use of organic chemicals	4	0.10%
Petrochemical processes	4	0.10%
Combustion processes	2	0.05%
Trade - leachate	2	0.05%
Treatment/processing of animal or vegetable matter	2	0.05%
Other – swimming pool contents	1	0.02%
Sewage – storm effluent	1	0.02%
Trade – boiler blowdown	1	0.02%
Trade – effluent from aquaculture	1	0.02%
Trade – filter backwash	1	0.02%
Trade – groundwater – as raised	1	0.02%
Trade - minewater	1	0.02%
Trade – potable water	1	0.02%
Trade – tailings effluent	1	0.02%
Total	4068	100%

Source: Environment Agency, 2004

1.3.1 Hydromorphology

Physical alterations to transitional or coastal waters can cause habitat damage or loss, resulting in a loss of, or decline in, species. These waters can be affected by land reclamation, shoreline reinforcement or physical barriers such as flood defences, barrages and sluices. Activities such as navigation, some types of commercial fishing and dredging can also damage physical habitats.

Where the presence of a hard defence is not currently impacting the status of a water body, consideration must be given as to how, or if, defences are likely to cause a deterioration in those elements that define Status, and thus impact on the objectives of the WFD. Of particular concern is the phenomenon of coastal squeeze, where rising sea levels meet an artificial fixed landward boundary and cause or exacerbate the erosion of saltmarsh.

There can also be morphological alterations in inland waters, including those due to dredging, the construction of barrages and inland navigation. In addition, there are some morphological changes to facilitate land drainage, including straightening, deepening and culverting.

In the South East RBD, land reclamation, shoreline reinforcing and fishing are significant morphological alterations in transitional and coastal waters. Land reclamation is human activity that may have reclaimed low-lying areas from the sea and includes coastal flood defence structures. Shoreline defences include embankments, sea walls and culverts. Areas on the coast of the South East RBD may have been impacted by commercial fishing.

There is an SIC category that covers the construction of all water projects and includes ports, jetties, lochs and dredging. This sector is small in the South East RBD but has grown strongly between 1995 and 2002. Moderate growth is expected over the period to 2015.

3.2 Sectors impacting on water status

The following sections provide more detail on a number of sectors which are particularly important to water status in the South East RBD. These are grouped in terms of households, industry and agriculture.

3.2.1 Households

Housing growth is a significant issue in the UK with an estimated 189,000 new households likely to form per year over the next 20 years. However, it should be noted that population growth accounts for only 57 per cent of this growth, with the remainder coming from changing household patterns, including smaller households, later marriage and or cohabitation and a growing proportion of adults of all ages choosing to live in single person households.

Moreover, this household growth is strongly regional in nature, with the southern English regions experiencing higher trend household growth and population growth, through a combination of natural growth (fertility but mainly increased longevity) and migration. Housing figures are not currently available on a river basin basis, but rather are produced on a Government Office Region basis. In the South East Government Office Region these show a net under supply of homes over new households of 50,000 in the period 1999-04.

As a result, there is now a serious shortfall in housing provision across many of these areas causing affordability problems, contributing to homelessness and putting strain on the supply of social housing. The Government has signalled its wish to achieve a better balance between supply and demand and to this end will, through influencing the planning system, seek to construct some 1.1 million new homes in the South East area between 2002 and 2016. Around 900,000 of these homes will be in line with trend growth in existing settlements, and over 60 per cent will be brownfield redevelopment. The remaining 200,000 will be higher-than-trend growth in four areas. The Government is also considering what reforms might be necessary in response to the work on the UK housing supply undertaken by Kate Barker¹.

The environmental implications of increasing the housing supply in the UK have been analysed in terms of a number of scenarios up to 2016² in a study for Defra. These scenarios are not presently available on an RBD basis but will be analysed as part of future work on defining baselines for *River Basin Management Plans* (RBMP). On a UK basis, under the Baseline Scenario in the environmental impact study, it is estimated that approximately 47,500 hectares of greenfield land would be lost between 2001 and 2016. This

¹ See http://www.hm-treasury.gov.uk/consultations_and_legislation/barker/consult_barker_index.cfm

² Entec (2004) *Study into the Environmental Impacts of Increasing the Supply of Housing in the UK* <http://statistics.defra.gov.uk/esg/reports/housing/default.asp>. These scenarios are the result of a research project and do not represent agreed Government figures.

increases to 77,500 hectares under Scenario 3¹ - although this scenario is not currently likely to be implemented.

In addition to the *Integrated Water Management Study* undertaken for the Ashford, Kent Growth Area (which looked at the entire water cycle) two further major research projects are underway looking at the environmental impacts of such a step-change in housing supply. The first examines the existing growth proposals as laid out in *Sustainable Communities: Building for the Future*, and looks, via case studies, at a range of impacts including water supply, sewerage, waste water treatment standards and run-off. This is being undertaken by the Environment Agency and is due for publication in April 2005. The second is a study to explore the environmental, social, economic and fiscal impacts of different housing growth scenarios, linked to different level of affordability. The study will provide a summary of the impacts at national and regional level and is due for completion in June 2005.

Water companies provide water services to households, to commercial premises as well as to some industrial customers. The largest volume of water abstracted in the South East RBD is by water companies and future trends in the level of water demanded by water users may have important impacts on water status.

Water demand forecasts have been undertaken and incorporated into the risk assessment. In the case of the South East RBD, forecasts are related to the following companies: Southern Water, Bournemouth and West Hampshire Water, Folkestone and Dover Water, Mid Kent Water, Portsmouth Water and South East Water. The forecasts are based on the World Markets Scenario in Environment Agency's water resources strategy report '*A Scenario Approach to Water Demand Forecasting*' 2001². The risk assessment could not use water industry forecasts of demand in their *Water Resource Plans* (WRP) because of timing and confidentiality issues.

The Environment Agency's strategy forecasts, however, have been compared to the water companies' recent forecasts to validate them and highlight qualitatively any differences between the forecasts and their supporting information. In general, it was concluded that the growth rates for per capita consumption used in the Environment Agency's strategy report are higher than the growth rates used by the water companies in their final *Water Resources Plan* (WRP) in April 2004 as part of the periodic review.

The key explanation for the differences in per capita consumption growth rates in the Environment Agency's strategy report and the companies' WRPs is in the assumptions behind the Beta Scenario used in the strategy report.

¹ The Baseline represents largely a continuation of current trends and is consistent with the - *Communities Plan* launched by the Office of the Deputy Prime Minister. Scenario 3 represents a much greater expansion in housing consistent with assumptions developed for the *Barker Review* of the housing supply and in terms of meeting targets about affordability of housing by reducing the real trend in house prices.

² www.environment-agency.gov.uk/subjects/waterres/286587/286599/286911/?lang=_e

The Environment Agency is reviewing how to refine these per capita water consumption projections in the near future to inform the risk assessment and the analysis of options for the PoMs. This will involve taking account of the major changes in demand forecasts in the companies' WRPs and the major anticipated changes in the agriculture sector from the Environment Agency's *Business as Usual* (BAU) agriculture projections. In addition the water implications of housing development and regeneration policies (see Area based initiatives) that the Government has recently announced will be examined carefully. This will also involve taking into account any other relevant forecasts, including those in this document.

3.2.2 Industry

As indicated in Table 3.1 abstractions for Manufacturing are the fourth largest source within the South East RBD accounting for 11.4 mega litres per day. This is 1.62 per cent of the total water abstracted from within the RBD.

The NALD code Manufacturing covers SIC codes 15-37. Output and employment data for the following broad categories has been provided by Experian Business Strategies Ltd:

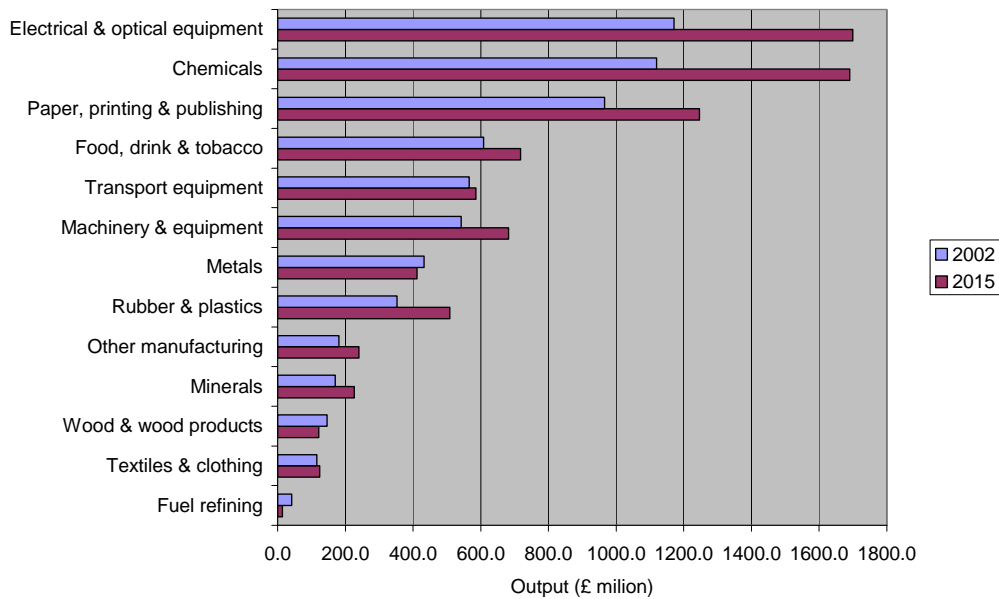
- Food, drink & tobacco;
- Electrical & optical equipment;
- Transport equipment;
- Paper, printing & publishing;
- Machinery & equipment;
- Metals;
- Other manufacturing;
- Rubber & plastics;
- Textiles & clothing;
- Minerals;
- All chemicals;
- Wood & wood products; and
- Fuel refining.

Forecasts for manufacturing output in these sectors are indicated in Figure 3.2 below.

Both the Chemical and Electrical & optical equipment sectors are forecast to increase output considerably over the forecast period.

Only the Metals, Wood & wood products and Fuel refining sectors are forecast to decline during this period. These sectors comprise a small proportion of the South East RBD's manufacturing output.

Figure 3.2: Forecast change in manufacturing output, South East RBD, 2002-2015



Source: Experian Business Strategies Ltd

The South East RBD has a number of important ports including Southampton, Dover and Portsmouth. Shipping relies on safe access to water of an adequate depth for access to markets. Some ports have statutory duties to maintain waters to specified depths and undertake dredging activities to maintain and deepen channels. Ports and marinas can be directly affected by discharges upstream, leading to water quality issues. In some cases, navigation by vessels may also influence water quality. Abstractions upstream can have potential impacts on port water levels, leading to navigational issues in some instances.

Ports and marinas undertake an extremely broad range of activities. Cargo and passenger handling are the most important but ports also supply services to industries such as oil and fishing. Marinas can have a major influence on tourism activity. Ports and marinas provide important regional infrastructure supporting local economies and businesses.

Ports handle approximately 95 per cent of UK trade in tonnage terms. Domestic coastal freight services contribute to reducing road congestion and provide a more environmentally friendly mode of transport than road or rail. A major concern to the transport industry is the lack of additional deep-water container port capacity in the UK. The UK port industry expects that overall tonnage handled at the UK's ports will, at least, continue to grow in line with GDP for the foreseeable future. This will necessarily require further sustainable development, dredging and disposal of dredged materials.

Nationally, the ports industry has direct employment of approximately 25,000 and it is estimated that a further 380,000 jobs are indirectly dependant on port activity.

Table 3.3 details the goods and passenger movements within the South East RBD.

**Table 3.3: Port foreign and domestic traffic, passenger movements
South East RBD: 2002**

	Flow (000s tonnes)	Percentage of all RBD port movement	RBD rank
Goods In 2002	42 709	15.62	3 rd
Goods out 2002	22 023	15.57	2 nd
All foreign & domestic traffic 2002	64 730	15.83	3 rd
Passenger movements 2002	20 231	70.43	1 st

Source: British Ports Association

The main ports within the South East RBD include:

- Southampton – throughput (2002) of 34,156,000 tonnes;
- Dover – throughput (2002) of 20,212,000 tonnes; and
- Portsmouth – throughput (2002) of 4,365,000 tonnes.

Southampton is a leading container port and also handles large volumes of liquid and dry bulks. The port is also the UK's principal cruise port, handling almost half a million passengers in 2003. Each year the port handles approximately 24 million tonnes of liquid bulk fuels. Deep water means the port can accommodate the largest ships providing worldwide shipping links.

Dover is the UK's largest ferry port. Ferry services operate to ports on the near-continent and Dover is also the UK's second largest cruise port

A British Marine Federation report on marinas and moorings for both inland and coastal sectors illustrated that the demand for moorings exceeds the supply in coastal waters. For inland waters, there is a strong demand for moorings for current and mid term requirements, with current waiting lists indicating an overwhelming demand for power moorings.

Output forecasts have been conducted by Experian Business Strategies Ltd under the following relevant categories:

- Sea and coastal water transport (covering passenger sea and coastal water transport and freight sea and coastal water transport); and
- Inland water transport.

In the South East RBD output from sea and coastal water transport is forecast to decrease from £161.7 million in 2002 to £158.6 million in 2015. This is an anticipated fall of 1.9 per cent.

Output from inland water transport is forecast to remain fairly constant at £0.8 million between 2002 and 2015.

3.2.3 Agriculture

The Agriculture sector has the potential to impact on water quality in a number of ways. Agriculture is an abstractor of water, as well as a source of diffuse pollution (mainly nitrates, phosphates and pesticides). Diffuse pollution can impact on water courses and water bodies. Static waters can be particularly vulnerable. Sediment run-off can also impact on hydromorphology.

There are two sources of forecasts for the agricultural sector – forecasts undertaken by Cambridge University and those by Experian Business Strategies Limited.

The Experian forecasts are based on output for SIC categories. A brief summary of the methodology used is found in Annex 2. The forecasts predicted an overall decline in agricultural production over the period between 2002 and 2015. An average fall in output of 1.2 per cent per annum is forecast over this period.

An in-depth agriculture *Business as Usual* study for the WFD was undertaken by Cambridge University (ref 2). The study provides quantitative percentage changes of key agricultural activities to 2015 at a national level and at a regional level for Government Office Regions in England and for Wales (see Tables 16-18). The report used a top down approach, essentially looking at overall changes in England and Wales and adjusting these based on knowledge of the region and expert opinion to reflect regional changes.

The projections are based on a hybrid approach involving projections of current trends (adjusted for known developments in the drivers), institutional projections, available models, expert opinion, stakeholder meetings and a peer review process. The impacts of a wide range of drivers are considered including market forces, political (including *Common Agriculture Policy* reform), rationalisation within the industry, technological change and macroeconomic factors.

The South East RBD includes the southern portion of the South East Government Office Region. The key projected trends for major commodities in the South East RBD are:

- Removal of set-aside brings land into arable production;
- Small increase in cereal production (particularly wheat, oilseed rape and maize) due to set aside changes;
- Continued decline of dairy herd as yields increase;
- Decline in beef and sheep herds; and
- A continued decline in fruit and horticultural crops (especially sugar beet and potatoes).

Overall a small fall in agricultural area is predicted. However, this may hide potentially significant changes in the structure and intensification of the industry and how businesses are managed. This may have impacts on water

quality. For instance, more intensive cropping through greater use of fertilisers may impact on diffuse pollution.

In the future, in order to inform the development of the PoMs, the Environment Agency hopes to refine these projections to reflect differences within RBDs and important local aspects such as changes in intensity of farming methods. This future work will provide the basis for local baseline risk assessment and for the appraisal of options for water bodies at risk of not meeting good ecological status due to agricultural activities. The projections will then be refined and developed so that they can be applied at a local level.

4 Water services and cost recovery

4.1 Introduction

The WFD aims to ensure that pricing policies improve the sustainability of water resources and requires pricing policies to perform the following functions by 2010:

- Take account of the principle of the recovery of the costs of water services, including environmental and resource costs;
- Embody the polluter pays principle;
- Provide adequate incentives to use water resources efficiently; and
- Ensure that water use groups (separated into at least industry, households and agriculture) make an adequate contribution to the costs of water services.

The Government's view, expressed in previous consultations on the WFD, is that there is no need at present to alter present pricing policies to meet the requirements of the WFD. The present arrangements deliver charges by water and sewerage undertakers that recover the costs of these services, both overall and by sector of customer. This system takes account of the principles and objectives of the WFD and the provisions of Article 9 in particular.

However, as revealed by the *Cost Recovery and Incentive Pricing (CRIP) Report* (ref 3) this is not the same as recovery of cost by broad user group (households, industry and agriculture). It is not currently possible, given existing data and bearing in mind the cost of additional data collection, to identify recovery of costs of water uses by these water user groups. In addition, some of the costs imposed by water uses such as diffuse pollution from roads, agriculture etc. may not be adequately recovered from the relevant users, but further research is required to establish this.

Additional work is planned in relation to the recovery of financial, environmental and resource costs ahead of the 2010 deadline for demonstrating an adequate recovery of costs of water services.

Article 5 requires that future pricing policies will be further informed by the economic analysis of water use undertaken in accordance with Annex III of the WFD. This section provides information on the current levels of the recovery of the costs of water services in the South East RBD to assist in this process¹. The following sections outline:

¹ This section follows the guidance (Information Sheet) produced by France/UK/Commission on behalf of Drafting Group ECO1 under the auspices of Working Group 2B of the Common Implementation Strategy. The information sheet builds on the WATECO guidance published in 2002. The section draws on research undertaken in January to September 2004 by ERM on behalf of the England and Wales Economic Advisory Stakeholder Group (EASG) and with input from members of the UK wide Economics Steering Group.

- How water services are defined and how they relate to the South East RBD;
- Who provides and who contributes to the cost of water services (users and polluters) in the South East RBD;
- The current level of financial cost incurred in providing these services;
- The current level of environmental and resource costs associated with providing the services;
- The revenues of water services and how the costs are recovered;
- Given the revenues and costs , the overall level of financial cost recovery; and
- Within this overall recovery of costs, how the costs are allocated between broad user groups.

The information provided in this section is based on the CRIP report (ref 3) which is available to download from the Defra website.

4.2 Water services and the South East RBD

Water services are defined by the WFD in Box 4.1.

Box 4.1: Definition of water services

“All services which provide, for households, public institutions or any economic activity:

(a) abstraction, impoundment, storage, treatment and distribution of surface water or groundwater;

(b) waste-water collection and treatment facilities which subsequently discharge into surface water.”

Source: WFD Article 2 Paragraph 38

In England and Wales the definition of water services encompasses the water industry together with activities providing similar services. For the sake of transparency, it is also important to consider self-services in addition to water services.

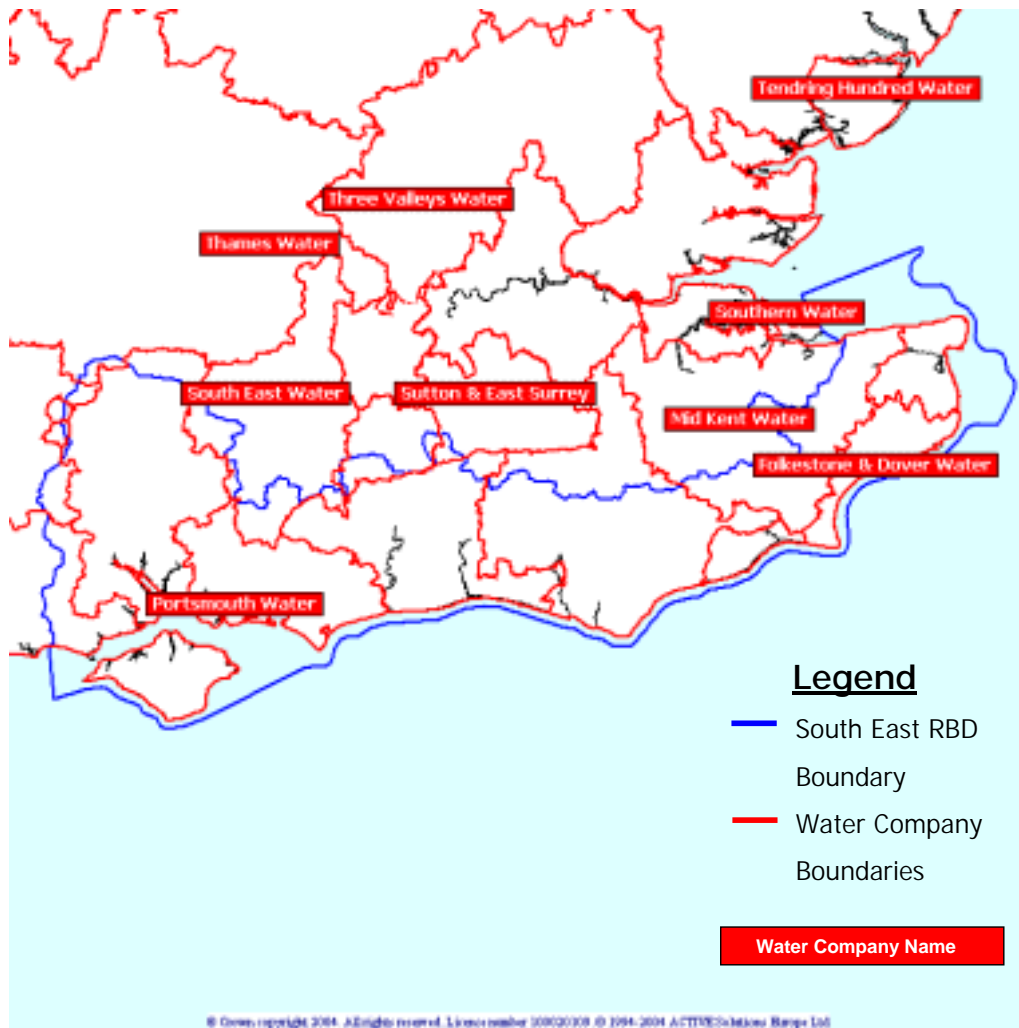
Six water companies operate in the South East RBD. The estimated proportion of each company’s customer households falling within the South East RBD is provided in brackets:

- Southern Water (72.5 per cent);
- Bournemouth and West Hampshire Water (40 per cent);
- Mid Kent Water (42 per cent);
- Folkestone and Dover Water (100 per cent);
- Portsmouth Water (100 per cent); and
- South East Water (35 per cent).

There is one sewerage service company operating in the South East RBD – Southern Water. The proportion of households serviced within the South East RBD for this company is estimated at 74.9 per cent:

The water service areas of these companies do not coincide with the South East RBD. For instance, the majority of Southern Water, Folkestone and Dover Water and Portsmouth Water customers are within the South East RBD, with small proportions of customers covered by the remaining providers.

Figure 4.1: Water company boundaries, South East RBD



Ultimately, the analysis of cost recovery needs to be undertaken at RBD scale, however for Article 5 reporting it is possible to report rates of cost recovery on the basis of water service areas. Hence, in the following analysis of cost recovery in the South East RBD, figures are presented for all water companies. In addition an indicative “RBD allocation” is provided. This is based on a simple pro-rata allocation and may not reflect well the actual costs and revenues associated with particular geographic areas. It is provided for indicative purposes only.

4.3 Water service providers, users and polluters

4.3.1 Service providers

Southern Water, Bournemouth and West Hampshire Water, Mid Kent Water, Folkestone and Dover Water, Portsmouth Water and South East Water all provide water services within the South East RBD. Details of the services provided can be found in the CRIP report (water sources, treatment works, length of mains, sewage loads and facilities etc.). In addition information related to business plans, investments, costs and prices for the period 2005-10 can be found in Ofwat's *Future Water and Sewerage Charges 2005-10: Final Determinations* report¹

In addition to the water service companies in the South East RBD listed above, there is a range of private water and sewerage services. Private water services cover any water service that is not supplied by a statutory water or sewerage undertaker. In addition to private water services there are also self-services².

In the United Kingdom, private water supplies are governed by the *Private Water Supplies Regulations 1991* which transpose the *1980 European Drinking Water Directive (80/779/EEC)* in relation to private water supplies. These regulations place responsibilities on local authorities to monitor and improve private supplies to reflect the number of private water supplies in a particular area and the specific priorities of the local authority.

Recent local authority surveys are inconclusive about the likely extent of private water supplies in England and Wales. The estimated number of supplies ranges between 50,000 to 100,000 and the population served between 300,000 to 1 million, with this concentrated in rural locations. A majority of supplies for domestic water use purposes (about 70 per cent) serve single properties. Larger commercial uses of private supplies are concentrated in the Food & drink manufacturing sector.

Recent analysis of the 2001 *English House Condition Survey* also suggests around 700,000 household properties in England are not connected to the mains supply for drinking water purposes.³ Based on typical household occupancy this would suggest a population of around 1.5 million do not receive mains water supply. No comparable estimates are currently available for the South East RBD, but estimates are available for the South East Government Office Region the boundaries for which include the South East RBD. The estimated number of households that do not receive mains water from the statutory water service companies in this region is 61,000 or 1.8 per

¹ http://www.ofwat.gov.uk/aptrix/ofwat/publish.nfs/Content/pr04FD_CompanyLetters

² The approach to defining water services is set out in the *Cost Recovery and Incentive Pricing* (CRIP) report (ref 3).

³ *Private water services and self-services: A review of current information and trends for England & Wales*, A Report for DEFRA, Stone & Webster Consultants, January 2005.

cent of households, which is low compared to other regions in England and Wales.

Private sewerage can involve the collection of wastewater, the treatment of sewage effluents and the discharge of treated wastewater to watercourses and the safe disposal of sludge (waste products from treatment processes). It has been estimated that there are between 80,000 to 200,000 kilometres of private sewers in England and Wales and nearly half of all household properties are served by private sewers or lateral drains¹. The vast majority of private sewer connections ultimately discharge wastewater to the public sewerage network.

Septic tanks and cesspools represent the most common form of private sewerage for household properties that are not connected to the public network. It is estimated that around 400,000 (1.9 per cent) household properties in England are served by septic tanks, cesspools or private sewerage systems. No direct estimates are currently available for the South East RBD, although for the nearest equivalent Government Office Region the figures are about 59,000 (1.8 per cent) household properties.

Within the manufacturing and industrial sectors, private and in particular self-services are well established in respect of effluent treatment and disposal. One direct measure of this is provided by Environment Agency data on the direct discharge of effluent to watercourses (which requires authorisation by the Environment Agency in the form of discharge consents). These are collectively termed trade discharges as opposed to discharges from treatment works operated by sewerage companies.

About 30 per cent of total consented discharges in England and Wales are made by trade sources. The equivalent figures for the Southern Environment Agency region is lower at 17 per cent. Consent compliance is lower for trade discharges compared to sewage discharges.

One example of a significant private supplier is British Waterways, which has sold water to canal-side industries for over 100 years. Watergrid is a British Waterways' joint venture that uses the country's network of inland waterways to provide water services to industry, agriculture and developers. In many cases the water is returned to the canal. Further information on British Waterways can be found in the stakeholder template in the *Economic Importance and Dynamics of Water Use* report (ref 1).

Further work on identifying the characteristics of private water suppliers is ongoing. In particular, the information is not currently collected in the correct geographical units to provide more detailed information in this report. In general, the abstractions and discharges from industries other than the public water suppliers (see Tables 3.1 and 3.2) are related to private abstractions and discharges, including self-service water users.

¹ A lateral drain is part of a private drain or sewer that is located beyond the curtilage of the property to connect it to the public sewer. The curtilage is the normal boundary between private drains and the public sewer.

4.3.2 Water users

Water use is defined by the WFD in Box 4.2.

Box 4.2: Definition of water use

“Water use” means water services together with any other activity identified under Article 5 and Annex II having a significant impact on the status of water.

Source: WFD Article 2 Paragraph 39

Article 9 of the WFD specifies that the water uses should be disaggregated into at least households, agriculture and industry.

An attempt is made as far as possible to report the information on water uses into these categories, however some uses cannot be disaggregated in this way and this will need to be subject to further analysis. This further work will also consider the appropriate sub-categorisation in the context of water pricing and PoMs. Current sub-categorisation is on the basis of the uses identified in the impacts and pressures analysis.

Some water uses, such as land reclamation, drainage etc. do not fit easily within the categories of households, industry and agriculture. As recognised in the reporting guidance it is necessary to include these “other uses” which are identified on the basis of the river basin characterisation.

Households and non-households (commercial properties)

These are the customers of the licensed water undertakers (including some commercial, non-household), other providers and households with private water supply and wastewater systems.

Tables 4.1a and 4.1b below provide the number and population of households and non-households receiving water and sewerage services from the main water service providers, as well as the volume (Ml/day).

There are estimated to be 1.4 million households and 107,000 non-households provided with water services by water companies in the South East RBD.

Table 4.1a: Characteristics of water services, 2003-04

	A:	B:	C:	D:	E:
	H/holds	Non-h/holds	Population (H/holds)	Population (non-h/hold)	Volume
Company	('000)	('000)	('000)	('000)	(Ml/day)
Bournemouth and West Hampshire Water	173	16	401	23	165
Folkestone and Dover Water	67	6	154	3	50
Mid Kent Water	221	23	556	24	166
Portsmouth Water	274	18	678	13	186
South East Water	549	45	1,321	68	394
Southern Water	947	70	2,211	69	599
Total	2,231	178	5,321	200	1,560
Allocated to South East RBD	1,382	107	3,291	109	944

Source: Annual Returns submitted by water companies to Ofwat

There are estimated to be 1.2 million households and 74,000 non-households provided with sewerage services by water companies in the South East RBD.

Table 4.1b: Characteristics of sewerage services, 2003-04

	A:	B:	C:	D:	E:
	H/holds	Non-h/holds	Population (H/holds)	Population (non-h/hold)	Volume
Company	('000)	('000)	('000)	('000)	(Ml/day)
Southern Water	1,662	99	4,062	445	796
Total	1,662	99	4,062	445	796
Allocated to South East RBD	1,245	74	3,042	333	596

Source: Annual Returns submitted by water companies to Ofwat

Industry – trade effluent and large users

These are the large user and trade-effluent customers (including some agriculture) of the licensed water undertakers, plus direct industrial dischargers and abstractors, plus the customers of other third party water services. Tables 4.2a, 4.2b and 4.2c summarise the number of customers and volumes for large volume water users, trade effluent and large volume sewerage service users for each of the water services in the RBD. The tables also note the number of customers and volumes associated with special agreements. This information is provided on a water service area basis as an RBD allocation of trade effluent and large users is not possible given there is no currently adequate variable for apportioning data (unlike population in the case of households).

Table 4.2a: Large Users (>50MI pa) and special agreements - water

Company	Customers	Water delivered (MI pa)	Special agreement customers	Special agreements water delivered (MI pa)
Southern Water	61	10,088	1	1,767
Bournemouth & West Hampshire Water	5	560	2	19,166
Folkestone & Dover Water	8	2,747	3	156
Mid Kent Water	19	2,034	0	0
Portsmouth Water	39	4,710	0	0
South East Water	34	4,766	0	0

Table 4.2b: Large Users (>50MI pa) and special agreements - trade effluent

Company	Customers	Trade effluent (MI pa)	Special agreement customers ¹	Special agreements trade effluent (MI pa) ¹
Southern Water	47	2,513	3	0

Table 4.2c Large Users (>50MI pa) and special agreements - sewerage

Company	Customers	Sewage collected (MI pa)	Special agreement customers ¹	Special agreements sewage collected (MI pa) ²
Southern Water	78	5,260	0	0

Agriculture

These are the agricultural customers of the licensed water undertakers, as well as those that directly abstract water for agricultural purposes. Direct abstractions from the agriculture sector make up around 13 per cent of all abstractions in England and Wales, with the fish farming sector accounting for most abstractions.

Other

These are users that do not fit into the above categories, such as transport, infrastructure etc.

¹ Consumption per annum is not specified as above 50 MI for these customers.

² Consumption per annum is not specified as above 50 MI for these customers.

4.3.3 Polluters

There are different types of pollution in the context of the WFD and it is useful to identify polluters who give rise to increased costs of providing water services. This is a technically difficult area and a large number of assumptions are required to arrive at an answer. The approach adopted is explained in the CRIP report (ref 3).

Data reported by the water companies to Ofwat can be used to identify some costs that can be associated with polluting activities. In the case of water supply the company's costs reflect capital and operating expenditure on nitrate and pesticide removal, removal of other contaminants (metals, phosphates, soil, and arsenic) and reducing the risk of *Cryptosporidium*.

Table 4.3 summarises the capital and operating expenditure in terms of annualised costs. The table also provides an indicative estimate of how much of these annual costs are attributable to external sources, in this case the agricultural sector¹.

The estimates suggest that currently around £326.7 million of annual remediation cost is incurred by water companies to deal with standards on nitrate removal, pesticide removal, other contaminants and *Cryptosporidium* risks. This equates to about 10 per cent of total public water supply costs in these companies. About £227.5 million of this is attributable to the external impacts of the agricultural sector on raw water quality. Based on the population allocation procedure, around £8.8 million of these costs arise within the South East RBD itself.

The following table shows that water treatment capital expenditure has been and continues to be a significant proportion of the total capital expenditure for water quality enhancements. The balance of this expenditure has been shifting from issues such as nitrate and pesticide removal to the reduction of *Cryptosporidium* risks.

¹ Pretty (2000) provides the source for the assumptions on the shares attributable to this sector.

Table 4.3: Estimated annual costs in 2002-03 associated with external impacts on raw water quality

	Annual costs borne by water company customers	Percentage contribution due to external sources	Total annual remediation costs attributable to external sources	Costs allocated to the South East RBD
Capital costs				
Nitrates	18.1	80%	14.5	0.5
Pesticides	72.1	89%	64.2	4.3
Other parameters	126	50%	63.0	0.6
Cryptosporidium	37.2	90%	33.5	1.9
Subtotal	253.4		175.1	7.3
Opex				
Deteriorating raw water quality	64.7	69%	44.6	1.2
Cryptosporidium	8.6	90%	7.7	0.3
Total	73.3		52.4	1.4
Grand total	326.7		227.5	8.8

Source: Cost Recovery and Incentive Pricing (CRIP) report (ref 3)

For the sewerage service one of the key sources of pollution giving rise to elevated costs is diffuse run-off containing hazardous substances received at sewage treatment works.

Hazardous substances may also be present in urban drainage and sewers where substances are inappropriately disposed of, or indeed released by households in their legitimate use of, for instance, cleaning products.

It is not presently possible to quantify the level of costs involved. The sectors responsible for these costs are domestic (disposal of household and DIY chemicals or use of products containing hazardous substances) manufacturing, transport and construction. These sectors contribute differently towards the recovery of those costs with households and industries that are customers of sewerage companies bearing the treatment costs.

4.4 Current financial costs of water services

The financial costs of the water and sewerage service companies operating in the South East RBD are summarised in Tables 4.4 and 4.5. These costs include the remediation costs identified above. Costs and figures in Tables 4.4 through to 4.7 are based on work done for the CRIP report (ref 3) and information collated by Ofwat from water companies.

In 2003-04 the financial costs of the water and sewerage services were £193.5 million and £250.9 million for the South East RBD. These are based on population allocation.

Table 4.4: Public water supply: total financial costs (£m, 2003-04 prices), South East RBD

Water Company	Percent age of populati on in RBD	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Southern Water	72.5%	149.3	157.0	128.0	123.7	124.3	120.5
Bournemouth & West Hampshire Water	40.0%	28.6	29.5	28.2	28.1	27.1	28.4
Folkestone & Dover Water	100.0%	12.6	13.6	12.9	13.5	13.6	13.8
Mid Kent Water	42.0%	43.7	45.5	38.2	38.6	39.9	41.0
Portsmouth Water	100.0%	31.6	31.6	30.3	31.0	30.4	30.6
South East Water	35.0%	110.8	111.3	94.0	93.6	91.6	94.9
Allocated Total Financial Costs		221.0	228.9	196.3	194.4	193.7	193.5

Source: Ofwat

Table 4.5: Sewerage service: total financial costs (£m, 2003-04 prices), South East RBD

Sewerage Companies	Percenta ge of populati on in RBD	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Southern Water	74.9%	338.6	362.0	319.9	325.0	330.4	335.0
Allocated Total Financial Costs		253.6	271.1	239.6	243.4	247.4	250.9

Source: Ofwat

The following tables summarise the unit financial costs of the companies operating in the South East RBD for the water and sewerage service. The table shows an indicative, population based allocation of these unit costs. In 2003-04 the unit water supply cost was £0.72 per m³ and for the sewerage service £1.14 per m³.

Table 4.6: Public water supply: unit financial costs (£/m3, 2003-04 prices), South East RBD

Water Companies	Percentage of Pop in RBD	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Southern Water	72.5%	0.79	0.83	0.68	0.64	0.65	0.63
Bournemouth & West Hampshire Water	40.0%	0.59	0.57	0.56	0.56	0.53	0.53
Folkestone & Dover Water	100.0%	0.81	0.86	0.83	0.83	0.85	0.86
Mid Kent Water	42.0%	0.86	0.88	0.76	0.76	0.79	0.78
Portsmouth Water	100.0%	0.57	0.55	0.54	0.54	0.54	0.51
South East Water	35.0%	0.99	0.97	0.82	0.80	0.78	0.76
Allocated Unit Financial Costs		0.77	0.79	0.68	0.66	0.66	0.64

Source: Ofwat

Note: Unit financial costs for 2003-04 in this report might differ from those in Ofwat's *Unit Costs and Relative Efficiency 2003-04 Reports*. This is because of different assumptions used in the two reports in eliciting the financial cost. For more information contact www.ofwat.gov.uk.

Table 4.7: Sewerage service :unit financial costs (£/m3, 2003-04 prices), South East RBD

Sewerage Services	% of Pop in RBD	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
<i>Southern Water</i>	74.9%	1.15	1.23	1.07	1.11	1.13	1.15
Allocated Unit Financial Costs		1.15	1.23	1.07	1.11	1.13	1.15

Source: Ofwat

Note: Unit financial costs for 2003-04 in this report might differ from those in Ofwat's *Unit Costs and Relative Efficiency 2003-04 Reports*. This is because of different assumptions used in the two reports in eliciting the financial cost. For more information contact www.ofwat.gov.uk.

Part of the financial costs represent costs incurred by the water companies aimed at improving water quality.

Since privatisation (1989), water companies in England and Wales have incurred capital and operating expenditure in order to mitigate the environmental impacts of the sewerage services and to investigate and alleviate the impacts of their abstractions on the aquatic environments. Ofwat has analysed the sewerage services costs on a RBD level and Table 4.8 illustrates the results for the South East RBD.¹

Column 1 shows the percentage of the water companies costs which are attributed (on an indicative basis) to the South East RBD. Column 2 shows the capital expenditure recorded as being spent on environmental mitigation of sewerage services. In Southern Water Services Ltd, these have amounted

¹ Note that the results are sensitive to the assumptions that Ofwat adopted in its analysis.

to £1.6 billion between 1989 and 2003. Column 3 shows the incremental annual costs associated with operating these assets (operating expenditure and capital charges). Column 4 and 5 show the figures on the basis of the South East RBD. As Table 4.8 shows, total capital expenditure incurred in the South East RBD is in the region of £1.2 billion. Taken together with the operating expenditure this means that around £103 million of the water service providers' costs are associated with mitigating environmental impacts of sewerage services per annum.

Table 4.8: Environmental mitigation expenditure/costs, South East RBD

Company	% of company costs allocated to RBD	Capex (1989-03)-£m	Cost pa-£m	Capex (1989-03)-allocated-£m	Cost pa-allocated-£m
	1	2	3	1 x 2	1 x 3
Southern Water Services Ltd	75%	1,621	137	1,214	102.75
Total				1,214	102.75

Source: Ofwat

4.5 Revenues and financial cost recovery

The identified water service providers recover the costs of providing water services from customers within their water service areas.

The structure of charges in the water companies varies. Where metering is in place, tariffs (for both water and sewerage services) have two components: a standing charge which is irrespective of consumption and is the same for all customers on the tariff; and a volumetric charge, which varies according to how much water is consumed.

Unmeasured tariffs (for both water and sewerage services) usually comprise a fixed charge, which includes the customer related costs of supply; and a rateable value (RV) related charge (based on the monthly rental value of the property). The structure varies with the water company and zones or geographical districts, for example some water companies do not charge a fixed fee, whereas others only have a fixed charge. In all cases, the amount customers pay is not related to levels of water consumption. Detailed information on these tariffs for the relevant water companies operating in the South East RBD can be found in the *Ofwat Tariff Structure and Charges 2004 – 2005* report¹.

The breakdown of metered and non-metered households for 2003-04 and forecasts for 2009-10 are given in Tables 4.9a and Table 4.9b below. These tables present metering information for all water and sewerage companies operating in the South East RBD, rather than for all households and non-households in the South East RBD. As such, the tables below provide indicative information only on the level of metering in the South East RBD.

¹Available at [www.ofwat.gov.uk/aptrix/ofwat/publish.nsf/AttachmentsByTitle/tariff_report04.pdf/\\$FILE/tariff_report04.pdf](http://www.ofwat.gov.uk/aptrix/ofwat/publish.nsf/AttachmentsByTitle/tariff_report04.pdf/$FILE/tariff_report04.pdf)

Table 4.9a: Percentage of water and sewerage customers taking metered supplies: 2003-04, South East RBD

South East RBD	Southern Water	Bournemouth and West Hampshire Water	Folkestone and Dover Water	Mid Kent Water	Portsmouth Water	South East Water
Water						
Household	25.1	32.4	38.1	30.0	3.8	27.2
Non-household	78.4	92.1	83.4	91.2	85.2	84.0
Sewerage						
Household	23.5					
Non-household	76.9					

Source: Ofwat, Tariff Structure and Charges 2004-05.

Table 4.9b: Percentage of water and sewerage customers taking metered supplies: 2009-10

South East RBD	Southern Water	Bournemouth and West Hampshire Water	Folkestone and Dover Water	Mid Kent Water	Portsmouth Water	South East Water
Water						
Household	42.6	54.6	67.9	45	12.2	37.9
Non-household	78.4	93.7	85	93.4	88.1	85.3
Sewerage						
Household	40.7					
Non-household	76.9					

Source: Ofwat, Tariff Structure and Charges 2004-05.

Revenue in the companies arises from the provision of a range of services which make up the overall water service. These include measured and unmeasured charges for:

- Water consumption;
- Sewerage and trade effluent;
- Surface water and highway drainage; and
- Connection.

There are also a variety of other minor charges discussed in the CRIP report. For each of the charges, the cost recovery mechanism is slightly different but for each source of charge income, prices are generally cost reflective.

Tables 4.10 and 4.11 are based on work done for the CRIP report, which found that cost recovery was generally around 100 per cent¹. These tables have been updated for more recent data collected by Ofwat in annual water company returns.

In any specific year, because of the five year regulatory cycle, water companies' total costs and total revenues do not always match exactly. Broadly speaking, this is because the revenue profile is closely related to the economic regulator's (Ofwat) assumptions on companies' costs (e.g. depreciation of assets, investment time profile, specific levels of operating expenditure) when setting the price limits at Final Determinations and on projected *status quo* revenues.

Companies' incurred costs might differ from the Ofwat assumed ones, in any given year, giving origin to some of the discrepancies between costs and revenues. Furthermore, changes, for instance in the assumptions underpinning revenue projections used at Final Determinations, could result in lower revenues than expected and thereby create an imbalance between total costs and total revenues in specific years.

However, the balance between costs and revenues is necessarily achieved over a longer time horizon in the economic regulatory regime in England and Wales. The licensed providers of water and sewerage services are totally financed by revenues from customers.

In some years, some water companies receive grants (subsidies) from, for instance, the European Community. These however are negligible (they are generally well below 1 per cent of total costs for any specific year. In addition such subsidies are dealt with in the price setting process so that they do not affect the cost recovery rate as reported in Tables 4.10 and 4.11.

**Table 4.10: Public water supply: cost recovery
South East RBD (£m, 2003-04 prices)**

Cost Component	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Total revenues	217.2	224.2	192.9	192.5	188.9	190.3
Subsidies	0.0	0.0	0.0	0.0	0.0	0.0
Total Financial Costs (inclusive of taxes)	221.0	228.9	196.3	194.4	193.7	193.5
Cost Recovery Rate	98%	98%	98%	99%	98%	98%

Source: Ofwat

¹ The approach to defining the cost recovery rate is explained in the report on Cost Recovery and Incentive Pricing (CRIP) (ref 3). This is a complicated area, but in very general terms the rate is defined as revenues less subsidies divided by cost

**Table 4.11: Sewerage service: cost recovery
South East RBD (£m, 2003-04 prices)**

Cost Component	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Total revenues	253.3	267.4	237.3	241.6	242.9	247.3
Subsidies	0.0	0.0	0.0	0.0	0.0	0.0
Total Financial Costs (inclusive of taxes)	253.6	271.1	239.6	243.4	247.4	250.9
Cost Recovery Rate	100%	99%	99%	99%	98%	99%

Source: Ofwat

Water companies (and other abstractors and dischargers) pay abstraction and discharge fees for the water they abstract to use and on-sell and the discharges they make to water bodies and courses. The Environment Agency administers the abstraction and discharge licensing system for all water users, including the water and sewerage service companies. The Environment Agency levies administrative charges to recover its costs of managing water resources in line with the *Water Resources Act 1991*.

Abstraction charges are calculated according to the total volume authorised by the licence, adjusted for:

- The season of authorised abstractions;
- The 'loss factor' (or degree to which water is returned directly to the environment); and
- The degree of environmental 'support' provided to the source of abstraction.

In addition, there is an annual charge and an application charge for every new or varied licence application (with the exception of a simple reduction in volume).

The discharge consents scheme includes an application charge and an annual charge. The annual charging system gives greater weight to larger volumes, more sophisticated effluents (since higher monitoring costs are incurred due to greater complexity) and the complexity of monitoring given the nature of receiving waters (sampling and analytical problems being most associated with estuaries).

The Environment Agency also recovers part of its costs in dealing with water pollution incidents from some polluters.

4.6 Current level of environmental and resource costs

This section uses the available information to assess the environmental costs of current water pollution and abstraction in England and Wales. This provides contextual information indicating the importance of the environmental and resource costs of water use and highlights the need for their careful and serious consideration. This contextual information **cannot and should not** determine any specific measures since this will require careful appraisal of feasibility, scope and costs and benefits of reducing the environmental impacts of water use.

Environmental and resource costs arise where water uses affect water bodies and contribute to water bodies failing to achieve good status. As there is no definition of good status nor a classification scheme for it at present, it is difficult to measure the gap between current and good status and hence the level of environmental and resource costs. However, it is still possible to infer their significance.

It is possible to use the available assessment methods and information from the *Overall Benefits Assessment* for the current *Periodic Review of Water Prices* (PR04) to indicate the significance of environmental and resource costs; but it should be recognised that further work is needed to update the assumptions in the existing studies.

After the implementation of the environment programme recently agreed in the PR04, the remaining quantified environmental damage costs caused by water pollution and abstraction in England and Wales will be about £1- 1.5 billion per annum. The water industry and agriculture contribute equally to about 85 per cent of this total. Other diffuse and point sources such as diffuse urban pollution, landfill sites and contaminated land account for the remaining 15 per cent¹.

These estimates do not include:

- Impacts of water pollution (other than eutrophication) on lakes;
- Impacts on fishing and recreation of abstraction in causing low flow problems in rivers and lakes; and
- Impacts of abstraction on the quantity of groundwater.

These impacts are likely to be significant. They will be assessed as far as possible as part of the appraisal of options affecting such water bodies for the draft RBMPs in 2008-09.

¹ For information on these estimates and the methodology applied to derive them, see *The Environmental damage costs of current water quality and flows in England and Wales and the contribution of PR04 in reducing them*, Environment Agency, 2004. Forthcoming on www.environment-agency.gov.uk/economics.

These estimates do not relate fully to the issues to be addressed in the WFD. They do not include important issues and environmental pressures identified by the *River Basin Characterisation* exercise as affecting risks of achieving good status (e.g. morphology pressures such as flood risk management, impacts on coastal and transitional waters and lakes, and release of priority hazardous substances). These issues are likely to be significant and they will be considered as far as possible as part of the appraisal of options for the draft RBMPs in 2008-09.

Due to the above factors regarding the scope of our estimates, they might underestimate the environmental and resource costs of water use. On the other hand there are countervailing methodological and empirical reasons why they might be over-estimates. More work is needed on this subject.

These estimates provide contextual information that highlights the importance of this subject and the need for its careful and serious consideration. However, on their own, they **cannot and should not** determine any specific measures since this will require careful appraisal of the feasibility and scope for reducing these environmental impacts, for which the potential costs could rise significantly to achieve greater reductions. Moreover, it will require careful appraisal of the costs and benefits of the options to determine the cost-effectiveness of options across all sectors and whether the options are disproportionately costly. Being based on a pre-WFD approach to the assessment of the impacts of environmental pressures, this assessment should only be seen as an initial marker.

Collaborative research programme

In this vein, various Government departments, agencies and stakeholders in the UK are carrying out research to develop the economic analyses and appraisal techniques for efficient implementation of the WFD. In particular, this includes a current study to develop methods to assess the costs and effectiveness of options. This will build on a recent report for Defra on *Cost Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Costs* (ref 4).

This research will assess the environmental and resource costs to aid in the assessment of disproportionate costs as part of drawing up the PoMs and to aid the examination of pricing policies and the adequacy of the recovery of costs, including consideration of environmental and resource costs.

5 Cost-effectiveness analysis

The pressures and impacts analysis reveals that a large number of activities contribute towards pressures in the South East RBD. Many water bodies are at risk from multiple pressures. Information on costs and benefits, including environmental and resource costs and benefits, is needed to inform the design of cost-effective PoMs and the consideration of less stringent environmental objectives.

It is important that a common approach to assessment of cost-effectiveness and information on disproportionate costs is adopted. A method has been developed in a study entitled *Cost-Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Costs* (ref 4). Work is underway as part of the *UK Collaborative Research Programme on River Basin Management Planning Economics* (CRP) to develop this into a practical approach (the CRP is outlined in more detail in section 6).

6 Improving knowledge and the information base

A draft programme of work on assessing the costs and benefits of options in River Basin Management (RBM) for implementing the WFD has been developed. This is entitled the *UK Collaborative Research Programme on River Basin Management Planning Economics* (CRP).

The draft CRP builds on the three scoping studies that Defra commissioned in 2003-004 on:

- *Cost-Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Costs* (ref 4);
- *Cost Recovery and Incentive Pricing* (ref 3); and
- *Economic Characterisation and Dynamics of Water Use* (ref 1).

Each of these reports identified a list of actions. These actions have been prioritised, and the CRP is taking forward those that are most important for implementing the WFD.

It identifies and justifies the need for research, outlines the key collaborative requirements and prioritises and schedules the research in the light of the time and likely resources available. A key feature of the process is the collaborative involvement of a wide range of stakeholders from the start.

The draft CRP has the following sequential tasks:

1. To set out an initial identification and illustration of the issues related to the economic analysis and its role in the decision making for PoMs under the WFD (2004-05);
2. To determine how to assess costs and economic impacts for each of the main types of options affecting the major different sectors that will need to be appraised in River Basin Management Plans (RBMPs) in an even handed manner (2004-05);
3. To scope and characterise the potentially disproportionately costly cases in RBMPs and the main gaps in information to draw up an appropriate process for assessing them and making best use of original and existing work to fill these gaps. This will include exploring alternative assessment methods (2005-06);
4. Focus group analyses to specify clearly environmental damages of concern in these cases (2006);
5. Development, trial and refinement of guidance on benefits assessment for RBMPs (2006-08); and
6. New studies to provide better assessments and related demand information of the major environmental benefits of RBMPs (2006-08)

A more detailed summary of the projects is available from the Defra website¹.

¹ <http://www.defra.gov.uk/environment/water/wfd/economics/index.htm>

7 References

1. *Economic Importance and Dynamics of Water Use Relevant for River Basin Characterisation(England and Wales) Final Report*; July 2004; (<http://www.defra.gov.uk/environment/water/wfd/economics/pdf/userreport.pdf>).
2. *Business as Usual Projections of Agricultural Outputs; Final Report for Environment Agency*; Centre for Rural Economics Research; University of Cambridge; July 2004 (http://www.environment-agency.gov.uk/commondata/103599/busiasusualwfd_854912.doc).
3. *Assessing Current Levels of Cost Recovery and Incentive Pricing*; Defra; August 2004; (<http://www.defra.gov.uk/environment/water/wfd/economics/pdf/cripreport.pdf>).
4. *CEA and Developing a Methodology for Assessing Disproportionate Costs; Final Report*; Defra; July 2004 (<http://www.defra.gov.uk/environment/water/wfd/economics/pdf/ceafreport.pdf>).

Annex 1 – Background data

Data sources

A number of data sources have been used in compiling this document.

Economic forecasts have been produced by Experian Business Services Ltd, based on output and employment information from the Office of National Statistics.

Various economic information sources were reviewed and summarised in the 2004 report *Economic Importance and Dynamics of Water Use Relevant for River Basin Characterisation (England and Wales)* (ref 1). Data sources were identified in Annex G – Data Audit File of this report. In addition, profiles of economic sectors and trends in their water use were compiled and included in Annex E of the report. These data sources have been used for compilation of this *Article 5 Supporting Document*.

Stakeholder templates were completed by a number of industry groups and these have also assisted in the compilation of this document. These are found in Annex I of the above mentioned report. Profiles were provided by the following groups:

- Electricity Industry Joint Environment Programme (Powergen, RWE, Innogy, AEP, Drax Power Ltd, British Energy, EDF Energy, International Power, Scottish Power);
- British Ports Association and United Kingdom Major Ports Group;
- WaterVoice;
- British Hydropower Association;
- Royal Society for the Protection of Birds (RSPB); and
- British Waterways.

Information on abstractions and discharges has been sourced from the Environment Agency.

Information on water companies has been provided by Ofwat and draws on work completed for the *Cost Recovery and Incentive Pricing* report (ref 3).

Geographical areas

Throughout this document several terms are used to describe geographical areas. To aid comprehension these are briefly defined:

River Basin District

Individual river basins have been identified and assigned to River Basin Districts, referred to within the document as RBDs. There are 11 RBDs within England and Wales, this document concentrates on the South East RBD.

Government Office Regions

England has been subdivided into nine Government Office Regions. These are the primary statistical subdivisions of England and contain a number of local authorities.

County

There are 34 non-metropolitan counties in England and they form the upper tier of the two-tier local Government structure found in many parts of England.

Local Authority District

Local authority districts form the lower tier of the two-tier local Government structure.

Electoral Wards

Electoral wards are the spatial units used to elect local Government councillors in the UK. For the *Article 5 supporting documents* key information for each of the RBDs, for example population and employment numbers, have been built up from ward level data.

Super Output Areas

Super Output Areas (SOAs) are a new geography designed to improve the reporting of small area statistics. Due to the stability and consistency limitations of the electoral ward geography, a range of areas that are of consistent size and whose boundaries will not change was put forward. These have been built from groups of 2001 Census Output Areas (OAs) and are known as Super Output Areas (SOAs). Three layers of SOA were created.

Annex 2 – Experian Forecasts

The following table summarises the population, household, employment and output forecasts undertaken by Experian Business Strategies Ltd for the South East RBD. Employment and output forecasts have been undertaken for 30 SICs as well as a number of disaggregated categories that have some link to water status.

Actual and forecast output is measured in constant price terms (based on 2002 prices). Prices are assumed to remain constant within the forecasts, so that forecast changes in output are net of price movements. Output is defined as a value added measure of production (i.e. net of input costs).

Experian's industry forecasts for RBDs in the UK are summations of ward level forecasts. These forecasts are informed by two key sources of information. The first is historic estimates of employment by industry at the ward level between 1995 and 2002. The second is Experian forecasts for employment and output for industry categories for local/unitary authority districts. The first step is to forecast ward level employment for each industry by using the past relationship in employment in the ward compared to its wider district. The second step is to estimate output in each industry for each ward by applying district level productivity trends to the employment forecast. These ward level forecasts are then aggregated to the relevant RBD boundaries.

For employment and output, data are presented for 30 SIC codes, as well as for a number of disaggregated SIC codes. These disaggregated categories were chosen on the basis of the impacts and pressures analysis and as being the most relevant in terms of the risk assessment.

Population and households	1995	2002	2015	Share of economy			Annual average growth	
				1995	2002	2015	1995-2002	2002-2015
	(000s)	(000s)	(000s)	(%)	(%)	(%)	(%)	(%)
Total population	3,074	3,177	3,450				0.5	0.6
Total households	1,257	1,351	1,543				1.0	1.0

Employees in employment	1995	2002	2015	Share of economy			Annual average growth	
				1995	2002	2015	1995-2002	2002-2015
Standard 30 categories	(000s)	(000s)	(000s)	(%)	(%)	(%)	(%)	(%)
Agriculture, forestry & fishing	17.2	19.0	14.2	1.6	1.5	1.0	1.4	-2.2
Oil & gas extraction	0.0	0.2	0.1	0.0	0.0	0.0	37.0	-9.6
Other mining	0.6	1.0	1.0	0.1	0.1	0.1	7.9	0.2
Gas, electricity & water	7.6	5.8	3.9	0.7	0.5	0.3	-3.8	-2.9
Fuel refining	0.9	0.4	0.1	0.1	0.0	0.0	-10.2	-9.4
Chemicals	12.5	13.5	11.5	1.1	1.1	0.8	1.2	-1.3
Minerals	3.9	4.0	4.0	0.4	0.3	0.3	0.3	0.0
Metals	15.2	15.2	12.2	1.4	1.2	0.9	0.0	-1.7
Machinery & equipment	13.2	15.4	13.5	1.2	1.2	1.0	2.2	-1.0
Electrical & optical equipment	30.3	28.6	18.6	2.8	2.2	1.4	-0.8	-3.2
Transport equipment	15.3	14.8	8.6	1.4	1.2	0.6	-0.5	-4.0
Food, drink & tobacco	10.5	9.2	8.0	1.0	0.7	0.6	-1.9	-1.1
Textiles & clothing	4.3	3.0	2.2	0.4	0.2	0.2	-5.0	-2.5
Wood & wood products	2.8	3.3	1.9	0.3	0.3	0.1	2.5	-4.0
Paper, printing & publishing	16.5	15.5	15.1	1.5	1.2	1.1	-0.9	-0.2
Rubber & plastics	8.0	9.5	8.6	0.7	0.7	0.6	2.5	-0.8
Other manufacturing	8.6	9.1	9.0	0.8	0.7	0.7	0.7	0.0
Construction	30.1	52.5	36.6	2.8	4.1	2.7	8.3	-2.7
Retailing	129.6	155.7	171.5	11.9	12.1	12.5	2.7	0.7
Wholesale & distribution	73.0	84.9	81.6	6.7	6.6	5.9	2.2	-0.3
Hotels & catering	75.8	92.2	105.3	7.0	7.2	7.7	2.8	1.0
Transport	39.5	41.6	39.0	3.6	3.2	2.8	0.8	-0.5
Communications	21.6	21.5	28.4	2.0	1.7	2.1	0.0	2.2
Banking & insurance	51.4	57.3	58.9	4.7	4.5	4.3	1.6	0.2
Business services	104.5	149.5	179.6	9.6	11.6	13.1	5.3	1.4
Other financial & business services	25.8	41.4	52.8	2.4	3.2	3.8	7.0	1.9
Public administration & defence	82.0	78.5	71.0	7.5	6.1	5.2	-0.6	-0.8
Education	96.2	119.5	152.5	8.8	9.3	11.1	3.1	1.9
Health	146.8	154.7	184.5	13.5	12.0	13.4	0.8	1.4
Other services	43.6	66.9	80.7	4.0	5.2	5.9	6.3	1.5
Total employees	1087.2	1283.7	1375.1	100.0	100.0	100.0	2.4	0.5

Employees in employment-disaggregated categories	1995 (000s)	2002 (000s)	2015 (000s)	Share of economy			Annual average growth	
				1995	2002	2015	1995-2002	2002-2015
				(%)	(%)	(%)	(%)	(%)
Electricity, gas, steam & hot water supply (SIC40)	6.2	4.9	3.3	0.6	0.4	0.2	-3.4	-2.9
Production & distribution of electricity (SIC40.1)	4.8	3.2	2.0	0.4	0.2	0.1	-5.7	-3.5
Manufacture of gas (SIC40.2)	1.4	1.7	1.3	0.1	0.1	0.1	2.7	-1.9
Steam & hot water supply (SIC40.3)	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Collection, purification & distribution of water (SIC41)	1.4	0.9	0.6	0.1	0.1	0.0	-5.9	-3.0
Manufacture of basic chemicals (SIC24.1)	2.5	2.6	2.0	0.2	0.2	0.1	0.9	-1.9
Manufacture of pesticides & other agro-chemicals (SIC24.2)	0.2	0.2	0.1	0.0	0.0	0.0	-5.5	-1.7
Manufacture of paints & varnishes etc. (SIC24.3)	1.3	1.0	0.8	0.1	0.1	0.1	-3.6	-1.8
Manufacture of pharmaceuticals (SIC24.4)	3.9	5.5	4.9	0.4	0.4	0.4	5.2	-0.8
Manufacture of soaps & detergents (SIC24.5)	3.2	2.7	2.2	0.3	0.2	0.2	-2.5	-1.5
Manufacture of other chemical products (SIC24.6)	1.4	1.6	1.3	0.1	0.1	0.1	1.8	-1.3
Manufacture of man made fibres (SIC24.7)	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Manufacture of basic metals (SIC27)	1.1	1.0	0.8	0.1	0.1	0.1	-1.1	-2.1
Manufacture of pulp, paper & paper products (SIC21)	2.7	2.1	2.0	0.3	0.2	0.1	-3.6	-0.5
Mining of coal & lignite (SIC10)	0.0	0.0	0.0	0.0	0.0	0.0	-2.5	-4.6
Mining of uranium & thorium (SIC12)	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Mining of metal ores (SIC13)	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Other mining (SIC14)	0.6	1.0	1.0	0.1	0.1	0.1	8.1	0.3
Sewage & refuse disposal (SIC90)	2.2	3.5	4.2	0.2	0.3	0.3	6.9	1.4
Agriculture, hunting & related activities (SIC01)	15.0	16.8	12.7	1.4	1.3	0.9	1.6	-2.2
Growing of crops (SIC011)	6.9	8.2	6.5	0.6	0.6	0.5	2.5	-1.8
Growing of cereals (SIC0111)	0.4	0.5	0.4	0.0	0.0	0.0	2.8	-2.0
Growing of vegetables (SIC0112)	5.4	6.4	5.1	0.5	0.5	0.4	2.4	-1.8
Growing of fruits, nuts & spices (SIC0113)	1.0	1.2	1.0	0.1	0.1	0.1	3.0	-1.4
Farming of animals (SIC012)	3.7	3.8	2.6	0.3	0.3	0.2	0.2	-2.7
Farming of cattle (SIC0121)	1.8	1.8	1.2	0.2	0.1	0.1	-0.3	-3.1
Farming of sheep, goats etc. (SIC0122)	0.5	0.5	0.4	0.0	0.0	0.0	0.2	-2.5
Farming of swine (SIC0123)	0.1	0.2	0.2	0.0	0.0	0.0	5.4	-0.4
Farming of poultry (SIC0124)	1.0	1.0	0.7	0.1	0.1	0.1	0.0	-2.5

Employees in employment-disaggregated categories	1995	2002	2015	Share of economy			Annual average growth	
				1995	2002	2015	1995-2002	2002-2015
				(000s)	(000s)	(000s)	(%)	(%)
Other farming of animals (SIC0125)	0.2	0.3	0.2	0.0	0.0	0.0	1.4	-3.2
Growing of crops combined with farming of animals (SIC013)	1.1	1.3	1.0	0.1	0.1	0.1	2.4	-2.4
Agricultural & animal husbandry service activities, except veterinary (SIC014)	3.3	3.5	2.5	0.3	0.3	0.2	1.0	-2.5
Hunting, gaming & game propagation (SIC015)	0.0	0.0	0.0	0.0	0.0	0.0	-6.0	-7.6
Forestry, logging & related activities (SIC02)	2.0	2.0	1.4	0.2	0.2	0.1	-0.1	-2.4
Fishing (SIC05)	0.2	0.2	0.2	0.0	0.0	0.0	-0.9	-3.3
Fishing (SIC0501)	0.1	0.2	0.1	0.0	0.0	0.0	0.6	-3.5
Operation of fish hatcheries & fish farms (SIC0502)	0.1	0.1	0.1	0.0	0.0	0.0	-3.3	-3.0
Production, processing and preserving of meat (SIC151)	1.4	1.4	1.1	0.1	0.1	0.1	-0.3	-1.3
Processing and preserving of fish (SIC152)	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.0
Manufacture of dairy products (SIC155)	0.7	0.6	0.4	0.1	0.0	0.0	-1.5	-3.8
Manufacture of beverage products (SIC159)	0.9	1.0	1.0	0.1	0.1	0.1	0.7	-0.2
Production of mineral waters and soft drinks (SIC1598)	0.5	0.5	0.6	0.0	0.0	0.0	1.2	0.9
Manufacture of rubber products (SIC251)	1.0	1.0	0.9	0.1	0.1	0.1	-0.3	-1.1
Manufacture of cement, lime and plaster (SIC265)	0.0	0.0	0.0	0.0	0.0	0.0	7.8	-1.9
Manufacture of articles of concrete, plaster and cement (SIC266)	0.8	0.9	0.9	0.1	0.1	0.1	1.7	-0.1
Manufacture of basic iron and steel and ferro-alloys (SIC271)	0.0	0.0	0.0	0.0	0.0	0.0	0.7	-0.3
Manufacture of basic precious and non-ferrous metals (SIC274)	0.1	0.1	0.1	0.0	0.0	0.0	-0.1	-2.3
Manufacture of parts and accessories for motor vehicles and engines (SIC343)	1.7	2.2	1.5	0.2	0.2	0.1	3.8	-3.0
Manufacture of aircraft and spacecraft (SIC353)	4.6	4.9	2.9	0.4	0.4	0.2	0.9	-4.0
Camping sites and other provision of short-stay accommodation (SIC552)	2.3	3.0	3.3	0.2	0.2	0.2	3.9	0.9
Sporting activities (SIC926)	9.8	15.5	18.8	0.9	1.2	1.4	6.7	1.5
Manufacture of industrial gases (SIC2411)	0.1	0.1	0.1	0.0	0.0	0.0	4.5	-0.6
Manufacture of dyes and pigments (SIC2412)	0.1	0.1	0.1	0.0	0.0	0.0	3.0	-1.1
Manufacture of other inorganic basic chemicals (SIC2413)	0.2	0.1	0.1	0.0	0.0	0.0	-7.7	-4.5

Employees in employment-disaggregated categories	1995 (000s)	2002 (000s)	2015 (000s)	Share of economy			Annual average growth	
				1995	2002	2015	1995-2002	2002-2015
				(%)	(%)	(%)	(%)	(%)
Manufacture of other organic basic chemicals (SIC2414)	0.6	0.8	0.7	0.1	0.1	0.1	3.6	-0.6
Manufacture of fertilizers and nitrogen compounds (SIC2415)	0.0	0.0	0.0	0.0	0.0	0.0	2.7	-4.4
Manufacture of plastics in primary forms (SIC2416)	1.3	1.3	0.8	0.1	0.1	0.1	-0.7	-3.1
Manufacture of synthetic rubber in primary forms (SIC2417)	0.1	0.2	0.2	0.0	0.0	0.0	5.5	-0.6
Casting of light metals (SIC2753)	0.2	0.2	0.2	0.0	0.0	0.0		
Casting of other non-ferrous metals (SIC2754)	0.4	0.3	0.2	0.0	0.0	0.0	-2.2	-2.8
Sea and coastal water transport (SIC6110)	4.4	3.8	3.0	0.4	0.3	0.2	-2.2	-1.8
Inland water transport (SIC6120)	0.0	0.0	0.0	0.0	0.0	0.0	-0.5	-1.3
Washing and dry cleaning of textile and fur products (SIC9301)	1.4	2.0	2.4	0.1	0.2	0.2	5.5	1.4
Construction of water projects (SIC4524)	0.2	0.3	0.2	0.0	0.0	0.0	10.2	-3.6

Output (£million, 2000 prices)	1995	2002	2015	Share of economy			Annual average growth	
				1995	2002	2015	1995-2002	2002-2015
Standard 30 categories	(£m)	(£m)	(£m)	(%)	(%)	(%)	(%)	(%)
Agriculture, forestry & fishing	355.2	436.5	370.4	1.2	1.1	0.7	3.0	-1.3
Oil & gas extraction	4.2	18.1	7.1	0.0	0.0	0.0	23.2	-6.9
Other mining	90.0	108.7	147.3	0.3	0.3	0.3	2.7	2.4
Gas, electricity & water	715.8	920.1	1170.6	2.4	2.4	2.1	3.7	1.9
Fuel refining	119.5	41.9	14.2	0.4	0.1	0.0	-13.9	-8.0
Chemicals	726.4	1119.7	1690.8	2.5	2.9	3.0	6.4	3.2
Minerals	137.6	169.4	226.3	0.5	0.4	0.4	3.0	2.3
Metals	344.4	432.1	411.3	1.2	1.1	0.7	3.3	-0.4
Machinery & equipment	471.4	542.3	682.2	1.6	1.4	1.2	2.0	1.8
Electrical & optical equipment	970.8	1170.9	1699.4	3.3	3.0	3.0	2.7	2.9
Transport equipment	556.8	565.6	585.9	1.9	1.5	1.1	0.2	0.3
Food, drink & tobacco	618.1	608.1	717.6	2.1	1.6	1.3	-0.2	1.3
Textiles & clothing	106.3	115.5	124.4	0.4	0.3	0.2	1.2	0.6
Wood & wood products	94.8	146.4	121.2	0.3	0.4	0.2	6.4	-1.4
Paper, printing & publishing	869.6	966.1	1245.8	2.9	2.5	2.2	1.5	2.0
Rubber & plastics	260.6	352.7	508.2	0.9	0.9	0.9	4.4	2.8
Other manufacturing	122.1	180.3	239.7	0.4	0.5	0.4	5.7	2.2
Construction	2116.9	2646.1	3214.0	7.2	6.8	5.8	3.2	1.5
Retailing	1971.6	2850.2	4167.3	6.7	7.3	7.5	5.4	3.0
Wholesale & distribution	2263.2	2985.0	3995.4	7.7	7.7	7.2	4.0	2.3
Hotels & catering	1220.2	1443.7	1912.1	4.1	3.7	3.4	2.4	2.2
Transport	1356.9	1847.7	2117.3	4.6	4.8	3.8	4.5	1.1
Communications	641.7	1132.6	2961.3	2.2	2.9	5.3	8.5	7.7
Banking & insurance	1576.4	2266.0	3579.8	5.3	5.8	6.4	5.3	3.6
Business services	2298.0	4112.3	7643.5	7.8	10.6	13.7	8.7	4.9
Other financial & business services	1269.2	2040.1	3552.9	4.3	5.3	6.4	7.0	4.4
Public administration & defence	2820.5	2641.7	2572.5	9.5	6.8	4.6	-0.9	-0.2
Education	1833.2	2265.0	3224.2	6.2	5.8	5.8	3.1	2.8
Health	2140.8	2722.5	4090.5	7.2	7.0	7.3	3.5	3.2
Other services	1480.9	1968.3	2787.5	5.0	5.1	5.0	4.1	2.7
Total Output	29553.3	38815.9	55780.7	100.0	100.0	100.0	4.0	2.8

Output- disaggregated categories (£million, 2000 prices)	1995	2002	2015	Share of economy			Annual average growth	
				1995	2002	2015	1995-2002	2002-2015
				(£m)	(£m)	(£m)	(%)	(%)
Electricity, gas, steam & hot water supply (SIC40)	582.4	779.4	989.4	2.0	2.0	1.8	4.3	1.9
Production & distribution of electricity (SIC40.1)	444.8	499.1	596.9	1.5	1.3	1.1	1.7	1.4
Manufacture of gas (SIC40.2)	137.6	280.3	392.5	0.5	0.7	0.7	10.7	2.6
Steam & hot water supply (SIC40.3)	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Collection, purification & distribution of water (SIC41)	133.3	140.6	181.2	0.5	0.4	0.3	0.8	2.0
Manufacture of basic chemicals (SIC24.1)	147.4	221.0	307.2	0.5	0.6	0.6	6.0	2.6
Manufacture of pesticides & other agro-chemicals (SIC24.2)	12.4	11.9	16.9	0.0	0.0	0.0	-0.6	2.7
Manufacture of paints & varnishes etc. (SIC24.3)	79.1	87.5	124.2	0.3	0.2	0.2	1.4	2.7
Manufacture of pharmaceuticals (SIC24.4)	225.9	456.1	731.1	0.8	1.2	1.3	10.6	3.7
Manufacture of soaps & detergents (SIC24.5)	182.3	216.3	320.6	0.6	0.6	0.6	2.5	3.1
Manufacture of other chemical products (SIC24.6)	79.4	126.9	190.9	0.3	0.3	0.3	6.9	3.2
Manufacture of man made fibres (SIC24.7)	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Manufacture of basic metals (SIC27)	24.7	28.6	26.4	0.1	0.1	0.0	2.1	-0.6
Manufacture of pulp, paper & paper products (SIC21)	150.3	135.4	164.1	0.5	0.3	0.3	-1.5	1.5
Mining of coal & lignite (SIC10)	1.3	0.7	0.5	0.0	0.0	0.0	-7.4	-2.7
Mining of uranium & thorium (SIC12)	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Mining of metal ores (SIC13)	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Other mining (SIC14)	88.7	108.0	146.8	0.3	0.3	0.3	2.8	2.4
Sewage & refuse disposal (SIC90)	93.9	131.4	182.2	0.3	0.3	0.3	4.9	2.5
Agriculture, hunting & related activities (SIC01)	305.1	383.1	326.6	1.0	1.0	0.6	3.3	-1.2
Growing of crops (SIC011)	135.0	179.5	162.8	0.5	0.5	0.3	4.1	-0.7
Growing of cereals (SIC0111)	9.5	12.2	10.7	0.0	0.0	0.0	3.7	-1.0
Growing of vegetables (SIC0112)	104.9	141.6	127.4	0.4	0.4	0.2	4.4	-0.8
Growing of fruits, nuts & spices (SIC0113)	20.6	25.7	24.6	0.1	0.1	0.0	3.2	-0.3
Farming of animals (SIC012)	82.1	91.7	73.4	0.3	0.2	0.1	1.6	-1.7
Farming of cattle (SIC0121)	39.4	44.4	34.1	0.1	0.1	0.1	1.7	-2.0
Farming of sheep, goats etc. (SIC0122)	11.7	12.1	9.8	0.0	0.0	0.0	0.4	-1.6
Farming of swine (SIC0123)	2.5	4.5	4.8	0.0	0.0	0.0	8.8	0.6
Farming of poultry (SIC0124)	23.6	23.7	19.6	0.1	0.1	0.0	0.1	-1.4

Output- disaggregated categories (£million, 2000 prices)	1995	2002	2015	Share of economy			Annual average growth	
				1995	2002	2015	1995-2002	2002-2015
				(£m)	(£m)	(£m)	(%)	(%)
Other farming of animals (SIC0125)	5.0	7.1	5.1	0.0	0.0	0.0	5.3	-2.5
Growing of crops combined with farming of animals (SIC013)	19.3	29.5	23.0	0.1	0.1	0.0	6.2	-1.9
Agricultural & animal husbandry service activities, except veterinary (SIC014)	67.9	81.8	67.0	0.2	0.2	0.1	2.7	-1.5
Hunting, gaming & game propagation (SIC015)	0.7	0.6	0.3	0.0	0.0	0.0	-2.1	-6.6
Forestry, logging & related activities (SIC02)	43.9	47.6	39.5	0.1	0.1	0.1	1.1	-1.4
Fishing (SIC05)	6.1	5.8	4.4	0.0	0.0	0.0	-0.7	-2.2
Fishing (SIC0501)	3.6	4.0	2.9	0.0	0.0	0.0	1.6	-2.5
Operation of fish hatcheries & fish farms (SIC0502)	2.6	1.9	1.5	0.0	0.0	0.0	-4.5	-1.6
Production, processing and preserving of meat (SIC151)	82.3	89.3	103.7	0.3	0.2	0.2	1.2	1.2
Processing and preserving of fish (SIC152)	1.9	2.2	3.4	0.0	0.0	0.0	2.2	3.1
Manufacture of dairy products (SIC155)	42.8	42.4	34.0	0.1	0.1	0.1	-0.1	-1.7
Manufacture of beverage products (SIC159)	54.9	65.5	86.7	0.2	0.2	0.2	2.6	2.2
Production of mineral waters and soft drinks (SIC1598)	27.6	34.4	52.5	0.1	0.1	0.1	3.2	3.3
Manufacture of rubber products (SIC251)	33.4	37.1	50.9	0.1	0.1	0.1	1.5	2.5
Manufacture of cement, lime and plaster (SIC265)	0.1	0.3	0.3	0.0	0.0	0.0	9.1	0.3
Manufacture of articles of concrete, plaster and cement (SIC266)	28.4	38.4	51.3	0.1	0.1	0.1	4.4	2.2
Manufacture of basic iron and steel and ferro-alloys (SIC271)	0.6	0.8	0.9	0.0	0.0	0.0	4.5	1.0
Manufacture of basic precious and non-ferrous metals (SIC274)	3.2	3.9	3.4	0.0	0.0	0.0	3.1	-1.0
Manufacture of parts and accessories for motor vehicles and engines (SIC343)	61.3	84.8	101.0	0.2	0.2	0.2	4.7	1.4
Manufacture of aircraft and spacecraft (SIC353)	169.7	186.6	197.1	0.6	0.5	0.4	1.4	0.4
Camping sites and other provision of short-stay accommodation (SIC552)	39.6	50.1	64.7	0.1	0.1	0.1	3.4	2.0
Sporting activities (SIC926)	325.9	436.1	614.3	1.1	1.1	1.1	4.2	2.7
Manufacture of industrial gases (SIC2411)	3.9	7.7	12.6	0.0	0.0	0.0	10.2	3.9
Manufacture of dyes and pigments (SIC2412)	5.2	9.3	14.4	0.0	0.0	0.0	8.8	3.4
Manufacture of other inorganic basic chemicals (SIC2413)	10.7	8.6	8.4	0.0	0.0	0.0	-3.1	-0.1

Output- disaggregated categories (£million, 2000 prices)	1995	2002	2015	Share of economy			Annual average growth	
				1995	2002	2015	1995-2002	2002-2015
				(£m)	(£m)	(£m)	(%)	(%)
Manufacture of other organic basic chemicals (SIC2414)	37.8	70.3	114.9	0.1	0.2	0.2	9.3	3.8
Manufacture of fertilizers and nitrogen compounds (SIC2415)	2.2	3.7	3.7	0.0	0.0	0.0	7.6	0.0
Manufacture of plastics in primary forms (SIC2416)	78.3	101.5	120.5	0.3	0.3	0.2	3.8	1.3
Manufacture of synthetic rubber in primary forms (SIC2417)	9.4	19.8	32.7	0.0	0.1	0.1	11.3	3.9
Casting of light metals (SIC2753)	4.9	5.8	5.5	0.0	0.0	0.0	2.4	-0.4
Casting of other non-ferrous metals (SIC2754)	7.2	7.6	6.5	0.0	0.0	0.0	0.9	-1.3
Sea and coastal water transport (SIC6110)	156.3	161.7	158.6	0.5	0.4	0.3	0.5	-0.1
Inland water transport (SIC6120)	0.6	0.8	0.8	0.0	0.0	0.0	3.5	0.1
Washing and dry cleaning of textile and fur products (SIC9301)	47.4	60.5	84.2	0.2	0.2	0.2	3.5	2.6
Construction of water projects (SIC4524)	9.9	15.3	16.0	0.0	0.0	0.0	6.4	0.4