

Environment Agency

**CREATING A BETTER PLACE:
PLANNING FOR WATER QUALITY AND GROWTH IN
THE SOUTH EAST**

Version 11 (FINAL)

Water Quality and Growth in the South East

Executive summary

- 1 The purpose of this report is to influence the distribution of houses built in the area of the South East of England Plan in order to safeguard environmental water quality. It is based on assessment of potential impacts.
- 2 Housing development in the wrong locations could adversely affect water quality in our rivers and streams. As well as damaging stream ecology and other wildlife, this could pose risks to water uses including water abstracted for public supply.
- 3 The Environment Agency has been working with the South East of England Regional Assembly (SEERA) and the water companies to identify sensitive locations where sewage treatment technology may not be capable of protecting the waters which would receive effluent arising from new housing.
- 4 We have carried out studies, using computer models, to predict effects on rivers and to define limits on acceptable effluent flows and housing in some locations.
- 5 We conclude that there are 7 locations where a limit needs to be imposed on housing beyond that already connected. (These sites are shaded amber on the attached map).
- 6 Our recommendations reflect this conclusion and also that in all cases, provision of adequate sewerage systems and sewage treatment facilities should precede the connection of flows from new development.
- 7 For all locations place names in this report refer to sewerage catchments that do not necessarily coincide with administrative areas of the same name. Although we recommend constraints on development there may be potential for redirecting effluent to less sensitive receiving waters where some or all of the constraints would be removed.

1.0 Introduction

- 1.1 Good water quality is essential for the people, businesses and wildlife in the South East. Our rivers and groundwater are used for public drinking water supply. Good quality water is also essential to maintain fisheries, recreation, navigation and biodiversity. It is fundamental to sustainable development, health and quality of life in the South East.
- 1.2 This report assesses the distribution of houses in the South East Plan to ensure we improve and protect our water environment. Housing development needs to be in the right place and supported by the right infrastructure otherwise it will cause harm to water quality, wildlife, drinking water and recreational uses.
- 1.3 Planning Guidance presumes that planning controls should not be used to achieve pollution prevention when water pollution legislation can be used. Also, there has been a presumption in Planning/Development Control that pollution problems can always be solved by the installation of appropriate treatment facilities/technology and that they should not therefore impede development.
- 1.4 With the pressure for development in the South East, it is considered that future protection of the water environment cannot be secured on this basis and that proactive planning to secure the necessary water infrastructure is essential. The most important aspect of this in relation to water quality is the provision of adequate sewerage systems, sewage treatment and disposal.
- 1.5 If housing development is allowed to proceed in inappropriate locations there is a significant risk of deterioration in environmental water quality, potentially leading to:
 - failure to achieve River Quality Objectives;
 - failure to comply with statutory EC Directives, including a risk of costly infractions against the UK;
 - adverse effects on drinking water supplies;
 - detrimental effects on ecology/biodiversity;
 - reduction in amenity and recreational value.
- 1.6 The Environment Agency has been working with SEERA and the water companies (Thames Water and Southern Water) to identify locations where there is a risk that the sewage treatment works will be unable to treat the sewage from the proposed new housing to the standards required to protect water quality. Computer models have been used to predict the effects of the extra housing on river water quality.
- 1.7 Our studies have assessed the chemical effects of the increase in sewage effluent. Further studies may need to assess the impact on river ecology that could arise from significant increases in volumes of sewage effluent at a few locations and further investigative work is planned. Early indications do not suggest any river flooding problems will be caused by the proposed increases in sewage effluent flows.

- 1.8 This analysis assumes that the sewage from new housing is accommodated through expansion or upgrade of existing sewage treatment works (STWs). As part of the planning process, other solutions, such as discharging sewage effluent at different locations, need to be fully investigated in future work.
- 1.9 This report concentrates only on sewage treatment works placing a constraint on development due to a lack of available treatment technology. Adequate protection of water quality may also require infrastructure improvements to carry increased sewage flows. In particular sewerage systems that are well designed and incorporate up to date storm overflows and flow balancing facilities must be in place ahead of development.
- 1.10 Increased urbanisation will bring with it additional effects on water quality, such as diffuse pollution from road run-off. This report has not considered this impact. However, it is assumed that general pollution prevention policies contained within the South East Plan, such as those relating to sustainable drainage systems (SUDS), will help to address these impacts.
- 1.11 All place names in this report refer to sewerage catchments that do not necessarily coincide with administrative areas of the same name.

2.0 Initial Assessment

- 2.1 In order to identify potential areas of constraint, screening criteria were developed by the Environment Agency, based on the stringency of sewage treatment works (STW) discharge standards. A stringent consent¹ is an effective indicator that an effluent receives little dilution and/or discharges to a high quality watercourse. Tightening these already strict standards is likely to be an expensive treatment option.
- 2.2 The two-tier system developed by the Environment Agency for identifying sewage treatment works locations potentially constrained by water quality is shown in the table below. The table shows two sets of effluent standards (expressed as concentrations of pollutants). The first (criterion 1) are difficult and expensive to meet. The second (criterion 2) are even more expensive to meet and are at the limits of known treatment capability.

Table 1

	STW consent standard		
	Biochemical Oxygen Demand	Ammonia (N)	Phosphate (P)
Criterion 1	<10mg/l	<3mg/l	1mg/l
Criterion 2	<5mg/l	<1mg/l	1mg/l

- 2.3 The two sets of environmental criteria determine the scale of our concern and are defined as follows:

Criterion 1 Locations where growth may be constrained by environmental water quality, but which require further analysis. Development in these locations may require special technical measures and additional expenditure.

Criterion 2 Locations where significant development is likely to lead to an unacceptable risk of deterioration in water quality and where solutions that would protect the environment/water resource appear to be beyond the scope of established technology.

3.0 Refined Approach

- 3.1 A joint meeting between the Environment Agency, SEERA and the water companies in June 2005 concluded that a more detailed study would be needed in order to inform decisions on district level housing allocations.

¹ The Environment Agency issues a discharge consent for all discharges of sewage to controlled waters.

- 3.2 The initial assessment identified 67 STWs for further study out of the STWs within the SE Plan boundary.
- 3.3 Mathematical models were either built or modified from existing models for the 67 STWs with the Environment Agency's SIMCAT model being used for most locations. A small number of cases were examined using the Environment Agency's River Quality Planning tool. Southern Water's works at Tenterden and Playden/Iden were examined using an existing Entec Integrated Lake and Catchment model. The work was carried out by the Environment Agency, WRc plc and Entec Ltd.
- 3.4 These models were used to examine the impact of the projected housing growth to 2026. Originally, where available, we used location specific housing numbers derived from water company discussions with sub-regional planners. Where these were not available, we used the standard growth rate proposed by the South East Plan i.e. 28900 per annum across the region.
- 3.5 However, since May 2006, we have obtained more housing information from County and District Planning Authorities. Use of this information has led to reduction of the number of STWs which cause us concern from 25 to 7.
- 3.6 We also calculated how many additional houses² could be connected to each prioritised sewage treatment works without requiring effluent standards that can not be achieved using currently established technology. We assessed the following parameters as being indicative of the 'load' on the environment: biological oxygen demand (BOD), ammonia, nitrogen and phosphorus.
- 3.7 These determinands were selected because they are the ones most likely to require constraints to protect water quality in the receiving waters. The table below sets out the relevant environmental quality standards (EQS) used in this report.

² The number of additional houses was calculated from additional flow by assuming average house occupancy of 2.5 people and a population equivalent flow of 200 litres per person per day (which includes an allowance for unaccounted flow). It is assumed for the purposes of this report that these numbers will stay the same to 2026.

Table 2.

EQS	BOD ₅ (mg/l) (90 %ile)	Amm. As N (mg/l) (90%ile)	Ortho as P (mg/l) (annual average)	Nitrate as N (mg/l) (95%ile)
RE1	2.5	0.25		
RE2	4	0.6		
RE3	6	1.3		
RE4	8	2.5		
FWFD Cyprinid		0.78 (95%ile)		
FWFD Salmonid		0.78 (95%ile)		
HD Headwaters			0.06	
HD River			0.1	
SWAD				11.3

- EQS = Environmental Quality Standard
- BOD₅ = Biochemical Oxygen Demand over 5 days
- Amm. = Ammonia
- Ortho = Orthophosphate
- Nitrate as N is the same as Total Oxidised Nitrogen as N for the intents and purposes of this report
- RE1 = River Ecosystem class 1
- FWFD = Fresh Water Fish Directive
- HD = Habitats Directive
- SWAD = Surface Water Abstraction Directive
- All targets used are in accordance with Environment Agency policy

4.0 Results

4.1 Table 3 shows the locations where growth projected to 2026 can be accommodated, but stricter discharge consents will be required to protect water quality. Upgrades to the sewage treatment facilities will be needed to meet these tighter standards. The water companies have provided estimated cost bands. However, some of these will include an element of environmental improvement where work is also needed to improve already unsatisfactory rivers. It has not been possible to separate the costs of this environmental improvement from those attributable solely to growth. Costs quoted are capital expenditure only. In addition to these costs of STW improvements, there will be additional capital costs for upgrading sewers and additional costs for operating enhanced treatment facilities.

Table 3: Locations where growth projected to 2026 can be accommodated with stricter discharge consents.

Sewage treatment works name	Capital cost band for wastewater treatment
Arborfield	L
Ascot	L
Ashford	L
Banbury	L
Beddington	L
Bicester	L
Bracknell	M
Brockenhurst	L
Canterbury	L
Charing	H
Chertsey	L
Chilbolton	M
Dambridge	M
Eastry	M
Eden Vale	H
Felbridge	L
Fleet	L
Guestling	M
Guildford	L
Harestock	L
Hartley Wintney	M
Herne Bay	L
Hockford:Pirbright	M
Hungerford	L
Kings Somborne	L
Leatherhead	L
Lenham	M
Long Crendon	M
Maidenhead	L
Maple Lodge	L
Oxford	L
Pagham	M
Playden & Iden	L
Pulborough	L
Reading	M
Romsey Greenhill	L
Scaynes Hill	L
Sidlesham	L
Slough	L
Stockbridge	M
Tangmere	M
Tenterden	M
Wargrave	L
White Waltham	M
Wisley	M

Costs assessed in bands as follows:

£k/ additional housing unit
H = >10
M = 5 – 10
L = < 5

Information for Ashford has been derived from a more detailed separate study.

Explanation of Table 3

- i) Table 3 shows the locations where growth to 2026 can be accommodated. For each of these works, our calculated allowable number of additional houses exceeds the number of extra houses that are likely to be built to 2026.
 - ii) The number of extra houses likely to be built to 2026 has been derived in a number of ways. In some cases Local Planning Authorities (LPA) have provided estimated figures. In the majority of cases, however the LPAs have only confirmed that the number of extra houses to 2026 will be less than the allowable number of houses we have calculated.
 - iii) In the absence of any information from LPAs, the number of extra houses anticipated has been obtained from the water companies. The water companies data has been provided as follows:
 - For Southern Water – application of the standard growth rate of 28,900 per annum between 2006 and 2026.
 - For Thames Water – predictions based on their SOLAR model have been used.
- 4.2 The total estimated cost of providing treatment to the required standard, to accommodate the houses to 2026, for the works listed in Table 3 is approximately £1.5 billion. This is the sum of the cost band multiplied by the extra houses likely to be built to 2026 for each works. Calculating costs for each STW is complicated as each is based on different sources of housing data. We have presented an overall cost estimate since individual STW costings would represent a level of accuracy which cannot be justified using the available data.
- 4.3 Table 4 lists sites where we recommend a limit to be imposed on housing beyond that already connected. (These sites are shaded amber on the attached map). With the exception of Chickenhall, Hailsham North and Hailsham South, there are no costs associated with these works as they are already funded to accommodate this housing limit.
- 4.4 We examined the effects that increasing flows of effluent (resulting from increasing house numbers) would have on river quality downstream of the relevant sewage treatment works. We took the quality of the effluent to be the best achievable with established technology. Based on this approach, the number of houses which could be accommodated without causing the Environmental Quality Standard in the river to be exceeded is the allowable number which can be connected to the relevant sewage treatment works.
- 4.5 In addition to achieving Environmental Quality Standards any new permit conditions set at Best Available Techniques limits must not allow greater than a 10% deterioration of the current planned downstream river quality. The number of houses that could be accommodated without exceeding this deterioration in downstream river quality is the allowable number that can be connected to the relevant sewage treatment works. We oppose development that would cause exceedence of the Environmental Quality Standards or an unacceptable deterioration of the current planned downstream river quality.

- 4.6 In the case of orthophosphate EQS failures, we applied two further tests before deciding whether or not to oppose development. Firstly, we would not oppose the relevant development if the works would only contribute a small percentage (< 10%) of the phosphate load carried by the river below the discharge. Also, we would not oppose development unless it would cause a greater than 10% increase in phosphate concentration in the river. This is because it is not necessary to obstruct development in areas where the receiving water fails the EQS if it can be demonstrated that controlling other point and/or diffuse sources will provide a more cost effective means of achieving long-term EQS compliance.

Table 4: Locations where a limit should be placed on additional housing

Sewage treatment works name	Capital costs for wastewater treatment	Allowable number of additional houses	Cost £k
Chickenhall (Eastleigh)	Partially funded in AMP	4,000	?
Fullerton (Andover)	Already funded in AMP	4,500	0
Hailsham North	Partially funded in AMP	2,800	?
Hailsham South	Partially funded in AMP	1,900	?
Hogsmill Valley	Already funded in AMP	3,500	0
Horsham	Already funded in AMP	3,800	0
Newbury	Already funded in AMP	2,700	0
	Total	23,200	0

Notes

- (i) Where Local Planning Authority data predicts that the number of additional houses to 2026 will exceed the “allowable number of additional houses” for a sewage treatment works (STW) the STW has been listed in Table 4. The following assumptions have been made for this purpose: The “allowable number of additional houses” was calculated from the allowable additional flow (see paragraph 4.3 above) by assuming average house occupancy of 2.5 people and a population equivalent flow of 200 litres per person per day (which includes an allowance for unaccounted flow).
- (ii) If in the future, it is demonstrated that per capita water consumption has decreased, consideration will be given to increasing the allowable number of additional houses.
- (iii) We are awaiting better information from Southern Water on actual flows from Chickenhall (Eastleigh) and the allowable number of additional houses figure may change in the light of that information.

4.7 The following list shows those works which can treat flows to 2026 without requiring extension or enhanced treatment.

Table 5 Locations where growth to 2026 can be accommodated without incurring capital cost.

Sewage treatment works name
Ash Ridge, Wokingham
Burghfield
Cranleigh
Esher
Kintbury
Woking

4.8 The following list shows works where further study is required. It is therefore not possible at this stage to decide whether there should be a limit on future housing or, of course, what that limit should be. More information on further work is contained in Section 6.

Locations requiring further study

Sewage treatment works name
Aldershot
Ash Vale
Aylesbury
Basingstoke
Camberley
Crawley
Eversley Cross
Eversley Lower Common
Sandhurst

4.9 The total additional housing for sites in tables 3 to 5 has been subtracted from the total additional housing proposed in the South East Plan (578,000) to calculate the residual housing (i.e. housing which will be connected to other STWs). A cost for this final residual housing has been derived using the lowest cost band and is as follows:

Sewage treatment works name	Capital costs for wastewater treatment	Number of extra houses	Cost £k
Residual STWs (excluding 59 with studies completed)	L	248,000	1,200,000

4.10 Total Costs

Adding the above cost for residual housing to the total costs from tables 3 to 5 gives a **grand total cost for provision of sewage treatment facilities for the proposed housing of £2.8 billion** (£140 million per year for the period of the plan). This does not include provision of enhanced sewerage systems or any operational costs. This figure for wastewater treatment could increase by up to £0.4 billion depending on the results of further studies relating to those STWs requiring further study. The cost of the residual housing represents approximately 43% of the total costs.

4.11 Note.

The selection of locations mentioned in this report is based on the current proposals of the draft South East Plan. If house numbers and distribution should change significantly, the findings of this study will need to be re-visited.

Alternative discharge locations

4.12 We have carried out some studies with the water companies to identify possible new sewage effluent discharge locations which could be used for the discharge of the flows arising from new development. This would remove the need for restriction on housing numbers. The relevant STWs for the period of the SE Plan are those listed in table 4.

4.13 There are many considerations to be taken into account, but it seems likely that significant new discharges of effluent into the ground will be unacceptable. This means that to date we have not identified any alternatives for Fullerton (Andover). There are similar difficulties for Chickenhall (Eastleigh).

4.14 There may be viable alternatives for the other works in table 4, but it is too early to draw any conclusions. In any event, alternatives are likely to be costly.

5.0 Recommendations

The following recommendations assume that the sewage treatment takes place in the existing locations, discharging to the same rivers as they do now. However, it may be possible to look at relocating the discharge points to less sensitive rivers in some cases.

5.1 A limit on housing growth connected to the existing sewage works should be placed on those locations listed in Table 4. The Environment Agency may object to any planning applications for housing in excess of these limits unless the developer can demonstrate that there will be no significant adverse environmental impact.

5.2 When allocating housing targets, due consideration should also be given to the costs shown in Section 4 above.

- 5.3 In all cases, adequate sewage collection and treatment facilities must be provided before new houses are built.

6.0 Further Work

- 6.1 During assessment of sewage treatment works discharging to the River Blackwater catchment, we have encountered problems related to unidentified ammonia sources. We therefore need to carry out further study on the following works:

Aldershot Town
Aldershot Military
Ash Vale
Sandhurst
Camberley
Eversley Cross
Eversley (Lower Common)

- 6.2 The present study has revealed a new concern about phosphorus concentrations downstream of Basingstoke. Further, more detailed, work is now needed to assess:

- i) the impacts of housing growth to 2011 on a nature conservation site downstream; and
- ii) the impacts of additional housing growth proposed in the South East Plan.

- 6.3 It is recommended that this work should form part of an integrated water cycle study already proposed (see below).

- 6.4 Integrated water cycle studies involving detailed investigation of all water management issues are proposed at the following locations:

Aylesbury (funding secured)
Basingstoke (partial funding secured)
Crawley (partial funding secured)

- 6.5 For catchments where the allowable number of additional houses is likely to be less than the projected growth (see Table 4) we propose further work as follows:

- i) Investigate the possibility of alternative treatment options and/or discharge locations
- ii) For feasible options determine cost of treatment and sewerage.

- 6.6 It is anticipated that the results of the studies for Aylesbury and Basingstoke will be available in time for the sub-regional debate of the EiP. The studies for Crawley and the Blackwater Valley, however, are unlikely to be completed in time.

7.0 Important Notes

- 7.1 The information and data contained in this report are without prejudice to the full determination of consent conditions in response to any future applications for consent to discharge.
- 7.2 Cost bands have been provided for indicative purposes only (see tables). They have been prepared using broad assumptions without reference to site specific factors such as land availability and power supply.
- 7.3 This study has not covered any requirements for additional or upgraded sewer networks. The scale of these is dependent on the precise location and magnitude of new development; information that is not currently available.
- 7.4 Constraints on connecting houses to sewage works discharging to groundwater could possibly be required in future years as a result of investigations related to regulations under the EC Groundwater Directive and the EC Water Framework Directive.

*Environment Agency
28th Sept 2006*

8.0 Annex 1 - Assumptions & Decisions

Assumptions

For the purposes of this project it has been assumed that:

- 9.1 River Quality Objectives will continue to be used for water quality planning purposes despite the fact that Ministers advised against using them to drive investment during the periodic review of water and sewerage company price limits in 2004. Currently where river quality does not meet the objective, an improvement plan has to be established. Throughout England and Wales, a Public Service Agreement has stipulated that 91 per cent of assessed river length should be compliant with their RQO by 2005.
- 9.2 Wastewater will continue to be collected and then treated at municipal treatment works as at present.
- 9.3 There is the potential for new works to replace or supplement existing facilities, but this has not been studied.
- 9.4 The per capita production of wastewater from the **existing** connected population will not increase from current levels.
- 9.5 The per capita consumption of water and production of wastewater from **new** development will stay the same up to 2026 as the figures provided by the water companies.
- 9.6 Wholesale adoption of sustainable drainage systems and water efficiency measures has not been assumed.
- 9.7 The impact of housing was assessed at sites in isolation to one another. Therefore housing growth at upstream locations may affect the ability of downstream locations to accommodate housing growth.
- 9.8 In the absence of more definitive figures, and in accordance with advice from the Regional Assembly, the rate of increase in housing growth has been based on Regional Planning Guidance for the South East Plan at 28,900 houses per year.
- 9.9 Housing figures for EA Thames Region have been supplied by Thames Water Utilities Limited. For the original 9 key growth hotspot sites identified within the Thames Water region population projections were supplied by the company based on the information contained within the SEERA planning consultation document. This was further refined by discussion with Sub Regional planners to ascertain the likely scale and location of growth. In general the highest potential population was projected. For the additional sites for which projections were sought Thames Water were only able to supply flows based on the latest update of the population estimate tool, SOLAR. Due to timescales of supplying this data the information within SOLAR was not verified against the overall growth levels for SEERA and should be regarded as indicative growth.
- 9.10 In EA Southern Region AMP 4 projected flow (2015) has been used as a base and housing numbers have been projected using a standard growth rate.
- 9.11 The following are the sewage treatment works standards achievable using best available technology for the determinands modelled:
 - Ammonia as N= 1 mg/l (95%ile)
 - BOD₅= 5 mg/l (95%ile)
 - Total Nitrogen as N= 10 mg/l (Annual Average)
 - Total phosphorus as P= 1mg/l (Annual Average)These values were agreed with the water companies.

Decisions

For the purposes of this project, the following represent decisions taken:

- 9.12 This report does not contain indicative costs for sewerage improvements
- 9.13 Current planned consents were used in the modelling work. This includes agreed AMP4 consents.
- 9.14 Consented flows were used as the basis for the modelling
- 9.15 Models were run with housing figures provided by the water companies when known: if unavailable, the assumption 30% above housing planned in RPG9 would be used. However, predictions were subsequently based on figures provided by Local Planning Authorities where available. Otherwise, a default of approximately RPG9 growth rate was used.
- 9.16 For locations affected by Urban Waste Water Treatment Directive sensitive areas, uniform emission standards would be applied for phosphorus in conformity with the directive.
- 9.17 The list of sewage treatment works modelled was ranked using priorities derived from:
 - potential stringency of consent conditions (derived from initial Environment Agency screening approach)
 - SEERA's list of preferred development locations
 - The water companies' top priority recommended works
- 9.18 We decided not to include dangerous substances in our studies since current knowledge and policy would not support constraints on housing development.
- 9.19 Total Oxidised Nitrogen (TON) could be a limiting factor to increased growth (flows). Nitrate modelling would be carried out for sites involving the Surface Water Abstracted for Drinking (SWAD) Directive. For sites involving the Habitats Directive and/or those which are Urban Waste Water Treatment Directive sensitive areas, no modelling is required for TON since the STW effluent standard will be the appropriate standard taken from the Directive or relevant regulations.
- 9.20 Phosphate was modelled using the environmental quality standards agreed with English Nature related to receiving water characteristics. This was only done for Habitats Directive (HD) or Sites of Special Scientific Interest (SSSI) in line with the Environment Agency's AMP4 approach. If a prioritised sewage treatment works does not discharge to a SSSI or a HD site and does not involve the SWAD Directive and has lots of "headroom" in relation to ammonia and BOD, it was de-prioritised.
- 9.21 For Southern Water STWs, average house occupancy of 2.5 and a population equivalent flow of 200 l/hd (which includes an allowance for unaccounted flow) were used. (These figures were supplied by Southern Water) For Thames Water STWs, the company supplied site specific flow increases.
- 9.22 Possible requirements of the Water Framework Directive have not been taken into account in this report.

10.0 Annex 2 - Glossary

Amm. - Ammonia

AMP4 - Asset Management Plan 4

BAT - Best Available Technology

BOD₅ - Biochemical Oxygen Demand over 5 days

Diffuse Pollution - Pollution which originates from various activities, and which cannot be traced to a single source e.g. atmospheric deposition, run-off from agriculture, erosion, drainage, groundwater flow and originates from a spatially extensive land use (e.g. agriculture, settlements, transport, industry).

EA policy - Environment Agency policy

EC - European Commission

EC Directive - European Community Directive (e.g. FWFD) which requires Member States to take all necessary measures to ensure identified waters meet certain quality standards prescribed for the protection of the environment and public health

EQS - Environmental Quality Standard

FWFD - Fresh Water Fish Directive

HD - Habitats Directive

N - Nitrogen

NDR - No deterioration requirement: new permit conditions set at Best Available Technology must not allow greater than a 10% deterioration of the current planned downstream river quality.

Ortho - Orthophosphate

P – Phosphorus

Point source pollution - Pollution arising from an identifiable and localised area, structure or facility, such as a discharge pipe.

RE1 - River Ecosystem Class 1 (Water of very good quality suitable for all fish species)

RE2 - River Ecosystem Class 2 (Water of good quality suitable for all fish species)

RE3 - River Ecosystem Class 3 (Water of fair quality suitable for high class coarse fish populations)

RE4 - River Ecosystem Class 4 (Water of fair quality suitable for coarse fish populations)

RE5 - River Ecosystem Class 5 (Water of poor quality which is likely to limit coarse fish populations)

RPG9 - Regional Planning Guidance for the South East

RQO - A River Quality Objective is an agreed strategic target, expressed in terms of River Ecosystem Standards, which is used as the planning base for all activities affecting the water quality of a stretch of water. It is the level of water quality that a river should achieve in order to be suitable for its agreed uses.

SEERA - South East England Regional Assembly

SIMCAT - Simulated Catchment model

SSSI - Site of Special Scientific Interest

STW - Sewage Treatment Work

SWAD - Surface Water Abstraction Directive

TON - Total Oxidised Nitrogen