ENVIRONMENT AGENCY

SERPLAN DEVELOPMENT SCENARIOS: THE POTENTIAL IMPACT UPON WATER RESOURCES IN THE SERPLAN REGION

April 1998

Summary

This paper provides an interim commentary on the current status and potential for water resources and supply within the SERPLAN region and on the position in those areas adjacent to the region which depend on the same water resources systems. The issues and uncertainties regarding growth in demand for water, opportunities to manage demand, the potential impacts of new development proposals and the sustainability of available water resources to meet new development pressures is considered. In many instances, the effect of increasing the current rate of household provision is to bring forward an already anticipated potential deficit in water resources. Demand management actions carried out over the short to medium term will be critical in offsetting supply - demand imbalances.

Nevertheless, the need for a number of major new strategic water resource schemes may still be brought forward within the planning period to 2016 as a result of increasing demand for water arising from new development. Many of these schemes will be environmentally contentious, have long promotional lead times, and cannot be guaranteed to be available to meet the demands of anticipated new development. The timing and scale of development will be critical in many locations and it will be essential to manage and review the distribution and programming of development across the region to ensure that it does proceed ahead of the provision of secure and sustainable water resources and supply infrastructure to supply it.

A regionwide summary is provided for the SERPLAN region accompanied by a breakdown on a county by county basis. The information is primarily related to public water supply and housing/population growth issues. Wastewater disposal and river quality issues are not addressed in this paper but may be equally significant.

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1. INTRODUCTION

1.1 Current and prospective water resources and demands are currently subject to a major review by water companies, OFWAT and the Agency in the lead up to the periodic review of prices and long term water resources strategies in 1999 / 2000. The debate on integrating water and land use planning is still at a stage where it is not possible to reach any firm conclusions. There are two fundamental issues:

- whether the availability of water resources is likely to become an environmental constraint to future housing development in the South East; and,

- the uncertainty of future housing requirements and, therefore, of the scale and location of new development.

1.2 The future carrying capacity of the Region's water resources and supply systems will depend on the extent to which growth in demand for water can be managed, through leakage control and new water conservation measures; the enhancement of infrastructure; and, the development of new water resources. As pressures on the Region's water resources increase, new water resources schemes are likely to become increasingly contentious and more challenging to promote. Whilst an indication of the scale and location of new housing development will be critical in assessing if and when such schemes may be needed, it would be unwise to plan on the basis of those schemes being available to meet new demands. In recognition of the potential for constraints on development, Regional Planning Guidance would now appear to be changing from the earlier premis that the availability of water should not be regarded as a long term constraint.

1.3 As will be seen below, whilst there is considerable uncertainty on these matters at the present time, this is likely to change in the course of the coming months and a more informed debate between the Environment Agency, SERPLAN and the Government Offices will be possible. This paper, therefore, provides an interim commentary, following consultation with water companies, on the current status and potential for water resources and supply within the SERPLAN region. The paper also comments on the position in those areas adjacent to the region which depend on the same water resources systems. A regionwide summary is provided for the SERPLAN region accompanied by a breakdown on a county by county basis. The information is primarily related to public water supply and housing/population growth issues. The paper does not address related wastewater disposal and river quality issues which could be equally significant.

2. WATER RESOURCES AND WATER SUPPLY

2.1 THE REGIONAL CONTEXT

2.1.1 The need to balance the growing demand for water with the essential needs of the environment and those of other users is crucial. Maintaining that balance is a particular challenge in the South-east of England given the need to satisfy increasing pressures of demand for water for public supply, industry, commerce, agriculture, navigation and recreation.

2.1.2 Advice to the planning authorities in the South-east on current and prospective water resources issues needs to consider both the immediate supply and service capabilities within any proposed development area and the longer term overall supply - demand balance. In the short to medium term at least, the key to ensuring that planning and development pressures do not tip the supply - demand balance lies in guiding the timing of new development alongside the implementation of measures for managing water demand and the provision of new water resources and/or supply infrastructure.

However, in the medium to longer term, increasing demand may lead to the need for major new strategic water resource schemes. In all likelihood these will be environmentally contentious and subject to protracted public inquiries and successful promotion can not be guaranteed. It will be essential, therefore, to ensure that development plans are phased inline with the water resources capability to supply it.

2.1.3 It does appear that a significant shift has taken place in the Regional Planning Guidance. RPG9, published in 1994, indicated that the ability of existing infrastructure to meet the demands should not be regarded as a long term constraint, since the necessary infrastructure can be provided, given a sufficient lead time. By contrast, the following policy appears in *'A Sustainable Development Strategy For the South East: Pre consultation Draft' (1998)*:

> *The demand on existing water resources and supply infrastructure and the need for new resource development should be minimised through management and the appropriate distribution and programming of development across the Region. Draft Policy EE8.*

2.2 ROLES AND RESPONSIBILITIES

2.2.1 The Environment Agency is responsible for the management and sustainable use of water resources. Its principal aim in water resources is:

> *To ensure that the existing management and future development of our water resources is carried out in an environmentally sustainable manner through balancing the needs of abstractors with those of the environment.*

2.2.2 It has a key role in the planning and assessment of water resources and, therefore, in advising Government through the DETR and planning authorities on current and prospective water resource issues. The Agency is also responsible for the granting and monitoring of abstraction licences which is particularly relevant in this context. In so doing, the Agency seeks to secure the proper use of water resources and to balance the needs of abstractors with those of the environment. Maintaining this balance is particularly challenging given the continuing pressures in the South-east of England. In granting any new or varied licence, the Agency must be satisfied that a reasonable need can be demonstrated by the applicant; that the environment and existing uses are protected; and, that the proposed abstraction quantities are environmentally sustainable. Continuing development pressures, therefore, do not in themselves provide sufficient justification for licensing new resources.

2.2.3 Water companies have a duty to make supplies available to those domestic consumers who demand them and as commercial businesses may seek to compete to supply new developments. Since 1995, the water companies have had a duty to promote the efficient use of water. This duty extends from leakage reduction from companies' own distribution systems and customer supply pipes to new water conservation measures within buildings, including promotion of new water efficient appliances and technologies, and through water conservation-based landscaping. Enforced by OFWAT, water companies' water efficiency plans should play a key role in managing growth in demand for water and in ensuring new development follows sustainable principles.

2.2.4 Local and strategic planning authorities also have a vital role to play, not least in ensuring that planned new developments do not outstrip the availability of water for supply. In addition, the planning authorities can play a vital role in promoting water efficiency in industrial, commercial and domestic premises through the planning process, Agenda 21 and other broader environmental and community activities.

2.3 WATER RESOURCES STRATEGY & OFWAT PERIODIC REVIEW

2.3.1 The Region's position regarding both strategic and tactical supply - demand balances is currently the subject of a major review by the water companies and the Agency in the lead up to the periodic review of the cost of water by OFWAT in November 1999. This work will include:

- a reassessment of source yields;
- the sustainability of existing licensed abstractions;
- the review of water demand forecasts;
- the potential impacts of climate change; and,
- an appraisal of options and strategies is to be undertaken.

2.3.2 The Agency will be reviewing its published water resources strategies following this work in 1999 - 2000. As a result, the commentaries presented here should be taken as an initial view of the resource - supply situation. A more authoritative view will become available during the development of the water companies proposed water resources plans in 1998/99.

3. PRESSURES IN THE SOUTH-EAST

3.1 POPULATION AND HOUSEHOLD GROWTH

3.1.1 Planned growth in the South-east as expressed in Regional Planning Guidance (Table 1) amounts to some 1,425,000 new dwellings over the 25 year period 1991 - 2016 (or 57,000 per annum). However, the 1992 Household Forecasts have indicated that this estimate could increase by approximately 10%, resulting in an additional 214,000 dwellings or 1,638,000 new dwellings in total over the plan period to 2016. This amounts to 65,500 new dwellings per annum, approximately 8,500 more per annum than had previously been planned. Potential shortfalls in the water supply - demand balance have already been identified for housing growth levels indicated in RPG9 for some parts of the region. These are also identified in the Agency's published Water Resources Strategies

3.1.2 There is considerable uncertainty over the significance of the 1992 Household projections. The Government has indicated its intention of moving away from the traditional policy of 'predict and provide'. There is therefore likely to be more scope for local determination of appropriate levels of household growth with greater emphasis on economic demand for housing as opposed to theoretical need. This does introduce a greater degree of uncertainty for water resource planning. The Agency will be looking to SERPLAN to provide guidance on this as and when it becomes available.

3.2 DEMAND FOR WATER

3.2.1 Growth in population and increasing pressures for new development across the region together with changing trends in water use will lead to an increase the demand for water. Further increases in demand for water are likely to arise from the anticipated division of household size - leading to a larger number of 1 and 2 person households in the future. Because of the natural economies of scale, per capita water use tends to increase significantly with lower occupancy properties and may be typically 20% higher than average. This increase in demand for water needs to be considered in addition to the rate of growth in per capita consumption of the existing population in the region, which water companies suggest has been growing at a rate of approximately 1% per annum over the last 20 years.

3.2.2 Forecasting water demand is inherently uncertain, particularly over the longer term. Assumptions need to be made regarding the nature of components of demand and trends in water use some 20 to 30 years ahead, and regarding the potential impact of demand management and water efficiency

measures which are fundamentally new to the industry. For example, the extent to which metering, water conservation measures and new charging tariffs may impact on demands for water and, therefore, upon the supply - demand balance and potential need for new water resources to meet future demands from new developments.

3.3 SUSTAINABILITY OF WATER RESOURCES

3.3.1 Concern about the environmental sustainability of licensed abstractions has particularly increased over recent years. In 1993, the National Rivers Authority published details of the 20 priority cases of where abstraction was considered unsustainable albeit within licensed limits. Of these, 8 were in the South-east area. Progress has been, and continues to be, made on resolving these issues. In many cases this has led to a reduction in abstraction and therefore of the resource available to meet new demands. However, further cases continue to be identified, the resolution of which is will have significant ramifications for the resources available to meet future demands in some parts of the region.

3.4 DROUGHTS

3.4.1 The pressures on water resources have become abundantly clear over recent years through the effects of prolonged droughts in the period since 1988. Clearly the pressures from demand for water must be balanced against the needs of the environment and its ability to sustain those levels of demand. To date planning for droughts has included the need to implement restrictions on water use; the severity of restriction depending upon the nature and severity of the drought circumstances that arise. The continued use of restrictions as a drought management measure has, however, been questioned in view of customer expectations of a newly privatised water industry.

3.4.2 The effect of changing standards of service, without substitution of some alternative demand management measures, is to increase demand on available licensed resources, potentially bringing forward the need for alternative resource - supply measures. This has not been explicitly included within this assessment but could make a substantial difference to the views presented.

3.5 CLIMATE CHANGE

3.5.1 It is now generally acknowledged that climate change is occurring, although the rate and extent of change remains uncertain. Its impact on water resources is likely to be two-fold:

- on the hydrological cycle due to changes in rainfall patterns and quantity, temperature and evapotranspiration i.e. the availability of resources.
- on the frequency of hot and dry summers and, in particular, recurrent years of drought conditions i.e. summer or peak demands.

3.5.2 The impact upon the availability of water resources from any hydrological change is uncertain but could potentially lead to a reduction in water resources availability in the south-east. However, this may be compensated by the effects of wetter winters in groundwater dominated resource areas, resulting in an increase in groundwater recharge and water available for use. An increase in the frequency of long, hot and dry summers is likely to lead to an increase in potential demand for water - particularly for non-essential uses such as garden watering and irrigation. New water management strategies will be required focussing on new water efficiency measures and water conservation-based tariffs and, where necessary, the development of new water resources. In consequence, planning authorities should observe the precautionary principle in the allocation of new development, particularly in areas where the reliability of water resources is already identified as a potential constraint.

4. THE IMPLICATIONS OF GROWTH

4.1 Existing water company plans have assumed RPG9 growth rates for planning new infrastructure and water resources. Even on this basis, demand in parts of the region could be dependent upon the successful promotion and development of contentious new water resource proposals. Demands above these levels may mean that these plans will need to be modified. In particular, bringing forward the need for new schemes, which may not be feasible, and increasing the overall costs to new development. Conversely, new responsibilities and the current focus on demand issues means that water companies are developing new strategies for reducing demand. The outcome of these measures, although at present uncertain, could release a considerable resource for meeting growth and new pressures in demand.

4.2 Table 1 summarises the household / population growth scenarios under consideration by SERPLAN, and the potential increases in average public water supply demand which could arise as a result. Only modest growth in per capita consumption of water has been accounted for within the estimates. Industrial and commercial demands that may also arise in conjunction with new development have not been assessed, but may be significant in some areas (or development would be unlikely to continue) and could increase the estimated demands significantly.

4.3 In some instances, the driver for new water resources development is the impact of increasing demands during peak conditions. That is, the demand typically experienced during warm, dry summer months. This is a particular issue for areas supplied solely by groundwater or which have limited interconnectivity between sources. Peak demands can typically be up to twice the average in the absence of any concerted water conservation measures and, therefore, the impact of new development proportionally greater than is estimated here.

4.4 Growth external to the Region will also be important drivers to water resources. In particular, ongoing development to the west of the Region in Swindon will be an additional consideration in defining the need for any new strategic water resources schemes for the Thames Region, in conjunction with growing demands in Oxfordshire and London.

5. WATER MANAGEMENT STRATEGIES

5.1 THE TWIN TRACK APPROACH

5.1.1 It is clear from the foregoing that there are many uncertainties to deal with in making predictions of the impacts of growth on the supply - demand balance and the requirement for new water resources. The extent to which leakage can be reduced or other water conservation measures taken, has yet to be determined. In addition, there are uncertainties surrounding the forecasts of demand and of the sustainability of resources under changing climate patterns.

5.1.2 The Agency has, therefore, proposed that companies adopt a flexible, twin-track approach. This allows companies to undertake some of the preliminary investigations required to progress the provision of major new strategic resource schemes, the promotion of which is likely to be controversial and protracted in many cases, and the tactical development of local resource schemes alongside clearly committed efforts to reduce leakage losses and to promote waste minimisation and water conservation measures.

5.2 WATER CONSERVATION

5.2.1 Water resources strategies published by the NRA in 1994 stressed the importance of options for managing growth in demand for water in its strategy for the sustainable management of water resources. However, data published by OFWAT in 1997 indicated that progress made by water companies in reducing leakage, which is a key element of this, has been variable across the Region. Total leakage rates for each company within the SERPLAN area are shown in Table 2.

5.2.2 Reducing leakage losses to practical and economic limits is vital in ensuring that proper use is made of available licensed resources. In addition it can release a significant resource to meet new demands for water. However, from Table 2 it is clear that some companies in the region have a substantial challenge ahead.

5.2.3 Since the Government's Water Summit in May 1997, reducing leakage has been given renewed impetus. In particular, OFWAT has imposed new leakage targets upon water companies to 1998-99 and companies are required to establish the economic extent of their leakage control activities in the longer term. The Government's resulting '10 Point Plan' re-emphasised the water companies' duty to promote water efficiency, signalling its expectation for the industry to minimise undue consumption and waste of water. In so doing, water companies are expected to take all practical steps to manage long term growth in consumption.

5.2.4 Key water conservation initiatives should include:

- influencing white goods manufacturers (washing machines, dishwashers etc) and the bathroom and plumbing industry to design and make available more water efficient appliances;
- providing incentives to encourage the take-up of water efficient fixtures and fittings;
- the promotion of water efficient landscape (and garden) design and management;
- water audits and waste minimisation schemes;
- selective metering of consumers and the development of new water conservation based tariffs.

5.2.5 A range of measures is being developed. The Agency has recently published *'Saving Water on the right track'* which provides a summary of many current water conservation initiatives. Similarly, *'Efficiency On Tap - Making Water-wise Homes Together'* is an initiative in which Crest Homes has joined in partnership with Thames Water and Three Valleys Water to launch water conservation in new homes, comprising practical measures for reducing the amount of water consumed in everyday domestic living.

5.3 WATER RESOURCE DEVELOPMENT OPTIONS

5.3.1 In many locations across the region, year round reliable water resources are already fully utilised. As a result, new water resources schemes are likely to involve the development of storage of available winter water, for example as reservoirs or utilising the natural storage within underground aquifers for artificial recharge and recovery of water.

5.3.2 In the short to medium term, some local and / or tactical resource development may be feasible in some parts of the region alongside enhancements to infrastructure to reinforce and redistribute

available resources. Potential tactical resources may include the development of new groundwater sources, enhancement of surface water resources, development of artificial recharge schemes and possibly desalination, indirect re-use of water and / or greywater re-use.

5.3.3 A number of major new strategic water resources schemes have been identified to meet demands under high and / or long term growth scenarios. Water company proposals include major new reservoir developments and enhancements to existing schemes, such as :

- the proposed new reservoir scheme near Abingdon in the Thames Region;
- the raising and enlargement of Darwell and Bewl reservoirs and construction of the Broad Oak reservoir in the Southern Region; and,
- the raising of Abberton Reservoir or the proposed new reservoir near Feltwell in Anglian Region.

5.3.4 Experience of previous reservoir promotions has shown that it could take as long as 20 years from planning to commissioning major new schemes. Major new water resources schemes are becoming increasingly more contentious and experience suggests that it would be unwise to rely on successful promotion within that time period, if at all. In particular, schemes in both the Anglian and Southern Regions have already been subject to public scrutiny (the Broad Oak scheme was subject to a public inquiry) at various times during the last 20 years and have yet to be successfully promoted. This situation conflicts directly with Regional Planning Guidance for the South-east (RPG9) which states that water resources should not be seen as a constraint on development in the longer term. Whilst in theory this may have been appropriate at that time, RPG also states that new development must take into account the ability and timescales in which water resources and supplies can be made available.

5.3.5 Clearly, water companies have a duty to supply to meet all reasonable demands for domestic use. However, this duty assumes that, all things being equal, water resources can be made available as and when required or that the supply - demand balance can be managed to provide supplies within existing licensed resources. In the South-east, there are uncertainties under both circumstances. This document explores the nature of those uncertainties and the potential timing of any imbalance in resources and supplies across the South-east

6. REGIONAL OVERVIEW

6.1 TIMESCALES AND ACTIONS

6.1.1 Local and strategic shortfalls occur at varying times across the region over the plan period. In most instances, the effect of the 1992 household projections is to bring forward an already anticipated potential deficit in water resources. In other words, across much of the Region, standards of service for water resources are already at risk and further development will increase pressure on the Region's water supplies and available water resources. Demand management actions carried out over the short to medium term will be crucial in offsetting supply - demand imbalances.

6.1.2 The need for a number of major new resource schemes across the Region is likely to be brought forward within the plan period to 2016 as a result of increasing demand for water arising from new development in line with the higher growth scenarios. Many of these schemes will be environmentally contentious, have long promotional lead times, and cannot be guaranteed to be available in good time to meet the needs of anticipated new development.

6.1.4 Key actions required to safeguard water supplies and water resources and to sustain new development in the Region fall into 3 broad categories:

Water Conservation and Demand management Measures: reducing leakage; promotion of water efficiency, waste minimisation schemes, metering and water conservation tariffs.

Tactical Development: of new water resources (where available) and enhancement of infrastructure links and bulk transfer arrangements.

Strategic Development: of major new regional and inter-regional water resource schemes (artificial recharge, transfer schemes, new / enlarged reservoirs, desalination, re-use).

6.1.5 The key priority will be for companies to ensure that efficient use is being made of available licensed resources and of the water supplied; the immediate focus for all companies being the reduction of leakage from their distribution systems and from customer's supply pipes down to economic levels. Pressures arising from demand at peak times (summer and / or drought use) will require new water conservation initiatives, which in the long run may include metering and new charging mechanisms to encourage more efficient use of water.

6.1.6 Successful implementation of water conservation initiatives will require much greater development of partnership arrangements with home appliance and bathroom manufacturers, industry, local authorities and customers. Whilst water companies have a duty to play the lead role in this, there are also significant opportunities for local planning authorities both through the application of planning consents and through the promotion of energy and water efficiency; for example, through local agenda 21 initiatives.

6.1.7 The timing and scale of new development will be critical in many locations. Because of the close balance between supply and demand across the region, the Agency would strongly caution against new development being allowed to proceed ahead of the provision of secure and sustainable water resources and / or supply infrastructure.

6.1.8 Should new development proceed ahead of the ability of available water resources to supply it, standards of service for water supply will be compromised requiring more frequent imposition of restrictions on water use for all customers during drought periods and in all likelihood imposing unsustainable pressures on the water environment.

6.1.9 In reviewing RPG9, the GOSE and GOL should consider staging or potentially restricting development in line with the ability of water companies to provide a reliable level of water supply to meet anticipated demands.

6.1.10 Given the current intitaitives by the Environment Agency and water companies in reviewing water resources plans, there is a critical window of opportunity for SERPLAN, strategic and local planning authorities to provide greater guidance on what may be the potential outcome of the current considerations for growth in the region.

6.2 KEY PRESSURE AREAS

6.2.1 Essex: shortfalls in water resources are already envisaged in the short to medium term. The county has no significant new indigenous water resources to develop; it is already dependent on imports to the county and existing public supplies are already heavily committed. Of the companies supplying water in the county, Essex & Suffolk Water are in the most constrained position, but none of the other companies have large surplus resources either.

6.2.2 **Oxfordshire & London:** combined medium to longer term pressures (beyond 2011) require urgent attention to demand management measures, particularly reduction of leakage, water conservation measures and the extension of domestic metering and water conservation tariffs. Current indications are that major new strategic resource schemes may be required in the longer term; the provision of which will be contentious and will have associated long lead times. Development of groundwater, particularly through the use of artificial recharge, will be a key short to medium term resource for the London area, twin-tracked alongside continued attention to demand management.

6.2.3 **Kent & Sussex:** shortfalls envisaged in the short to medium term will require the development of strategic bulk transfers of water between companies. There may be a need to raise Darwell Reservoir in the medium term to meet projected demand levels within the South East Water supply area. Continued growth in the longer term may bring forward the need for new strategic resource schemes.

6.2.4 **Hertfordshire:** local resources are already under pressure and further development and growth in demand over the medium to long term will need to be met from enhanced bulk transfer arrangements across the company, including transfers from Anglian Water's Grafham reservoir. Increasing pressures for environmental benefits may have a significant bearing on the availability and need for future water resources. Further strategic resource development may still be required in the longer term.

6.2.5 **Berkshire:** shortfalls in parts of the west of the county in the medium term will require the development of new bulk transfer arrangements from areas of surplus elsewhere in the county.

6.2.6 **West of the Region:** ongoing development in Swindon and the west of the region increase pressures on the region's water resources in the Thames catchment which supply it. These add to the criticality of those pressures refered to in section 6.2.2 for other parts of the Thames catchment.

6.3 ELSEWHERE IN THE REGION

6.3.1 **Bedfordshire:** current resource surplus and potentially easier access to other existing resources via infrastructure development. The predicted rates of growth both in RPG9 and the higher scenario are relatively modest and could be accommodated more readily. However, localised constraints and peak demands could still be issues needing co-ordinated planning, particularly under higher growth scenarios.

6.3.2 **Hampshire:** planned levels of development across much of the county should be met through existing or planned resource and supply developments. Local shortfalls are anticipated in the north of the county in the short to medium term, which will require the development of new infrastructure links to enable bulk supplies to be made available to key growth areas.

6.3.3 **Surrey:** constraints at peak demand are expected which will require a combination of demand management and infrastructure / supply enhancements.

6.3.4 **Buckinghamshire:** existing and planned resources twin-tracked alongside demand management measures should ensure that demands are sustained over the plan period.

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TABLE 1. RPG 9 AND 1992 HOUSEHOLD & POPULATION FORECASTS TO 2016 AND RESULTING IMPACTS ON DEMAND FOR WATER.

County	RPG9 dwellings increase	RPG 9 population increase	Additional demand Ml/d	1992 Projected dwellings increase	1992 Projected population increase	Additional demand Ml/d	Increased additional demand Ml/d
Bedford-shire	61,700	70,895	14.5	75,000	98,895	19.8	5.3
Berkshire	66,700	43,750	10.1	81,100	73,750	15.8	5.7
Buckingham-shire	81,700	112,513	22.4	99,300	152,513	29.9	7.5
East Sussex	58,300	80,553	16.0	70,900	107,553	21.1	5.1
Essex	133,300	140,423	29.2	162,000	203,423	41.1	11.9
Hampshire & Isle of Wight	166,600	155,876	33.2	202,500	232,876	47.7	14.5
Hertford-shire	83,300	76,170	16.3	101,300	115,170	23.6	7.3
Kent	145,000	145,127	30.5	176,300	212,127	43.1	12.6
Oxford-shire	61,700	106,420	20.6	75,000	136,420	26.2	5.6
Surrey	60,000	34,000	8.2	72,900	63,000	13.6	5.4
West Sussex	73,300	85,710	17.5	89,100	119,710	23.9	6.4
London	433,000	458,300	95.2	433,000	458,301	95.2	

TABLE 2. Leakage Rates in South East England

Water Company	Total Leakage (Ml/d) 1996-97	Distribution Losses (Ml/d) 1996-97	Total Leakage as % of DI 1996-97*	OFWAT Target (Ml/d) 1998-99
Anglian	212.6	136.6	18.0	186.0
Bournemouth & West Hants	28.5	20.0	17.5	24.3
Cambridge	15.9	11.7	20.7	14.7
Essex & Suffolk	84.8	53.2	17.0	76.6
Folkestone & Dover	11.6	8.1	21.6	9.3
Mid Kent	38.2	28.7	22.9	26.8
Mid Southern	58.0	41.3	26.0	50.0
North Surrey	27.5	20.2	20.0	23.5
Portsmouth	30.5	16.6	16.6	26.2
South East	40.9	25.8	23.7	35.9
Southern	112.7	77.1	18.1	95.0
Sutton and East Surrey	27.2	16.0	16.8	25.2
Tendring Hundred	6.3	4.1	18.5	5.5
Thames	1082.9	782.5	37.9	781.0
Three Valleys	171.9	116.4	23.8	136.3

Source : OFWAT '1996-97 Report on leakage and water efficiency'

* DI - distribution input (or quantity of water put into supply)

APPENDIX A: COUNTY / WATER COMPANY SUMMARIES

BEDFORDSHIRE

Water supply companies: mainly Anglian Water Services (AWS) but Three Valleys Water (TVW) supply parts of the southern fringe of the county, including Luton and South Bedfordshire.

Anglian Water Services

Water resources are dominantly surface water supplied. Grafham Water is the main source and part of AWS's integrated 'Ruthamford'[1] system which the Agency believes should have an adequate overall surplus during the planning period. This includes the major resource of Rutland Reservoir, located in Rutland (Leicestershire). However, there are constraints within the system, both in terms of treatment plant and infrastructure to distribute the water. Information currently available to the Agency indicates that there is comparatively limited headroom in the Grafham part of the system and that further infrastructure development could be necessary in the medium term (ie within the period to 2016). The predicted increase in demands arising from the higher of the two SERPLAN scenarios for Bedfordshire is small, and unlikely to significantly affect the timing of this need.

The yield of Grafham Water benefits from increasing treated effluent returns with any development located upstream of the reservoir intake at Offord on the Bedford Ouse. This could to some extent offset the impact of household, population and associated demands growth.

Groundwater is a minor resource for AWS from the Greensand aquifer in the east of the county, but there is unlikely to be scope for significant further abstraction.

Three Valleys Water

TVW have a shared supply arrangement with AWS from the Grafham reservoir under the terms of the Great Ouse Water Act, which is of vital importance to their supplies in this area. One option to meet future needs would be to increase the quantity transferred. However, this would have potential infrastructure implications and its viability would depend upon the outcome of a re-appraisal of demands and the balance of needs to be met from Grafham for both companies and would be subject to complex negotiations.

The Chalk aquifer in the south east of the county is an important source of water for TVW. There is unlikely to be scope for further groundwater development as resources are already committed to existing abstractions and the environment. Concern regarding the sustainability of a number of abstractions in the area is already a significant issue for the company to resolve, particularly in relation to certain groundwater sources in the Chilterns area. Actions already taken on the River Ver have resulted in reduced abstraction of groundwater (in all but exceptional drought conditions) and, therefore, a reduction in resources locally available to the area. This shortfall has been made up by increasing transfers into the area from the AWS Grafham reservoir.

The SERPLAN scenarios generally make little difference in terms of timing or overall water resource constraints (beyond 2011). It is possible that peak demands could become an issue earlier under the higher

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To serve the counties of Bedfordshire, N Buckinghamshire, Northamptonshire, Cambridgeshire and Northern Hertfordshire, Anglian Water relies on an integrated system of three reservoirs - Rutland, Grafham and Pitsford - otherwise known as the RUTHAMFORD system.

growth scenario, requiring resolution by demand management measures and/or infrastructure improvements. A disproportionate concentration of household and population growth in the TVWS part of Bedfordshire would exacerbate this, but is unlikely given that planning policies currently steer development towards north and mid-Bedfordshire. In the absence of a secured solution with AWS from the Grafham reservoir, a supply - demand imbalance may occur earlier, potentially requiring the development of regional strategic water resources schemes earlier than is currently considered necessary.

BERKSHIRE

Supplied mostly by Thames Water, with parts of central and east of the county supplied by Mid Southern and North Surrey.

Thames Water Utilities Ltd

The company's supply area is broadly split into three separate supply systems: the Slough area, Reading and Newbury / West Berkshire. In general the demand from the additional level of development in the Reading and Slough areas should be met with existing and planned resources. However, additional development and growth in the Newbury / West Berkshire area is unlikely to be sustained by existing licensed resources within the area. Company plans, based on RPG9 scenarios, indicate that there may be a shortfall in resources within the planning period (to 2016) in this area and any further development is likely to make the situation more critical. Depending upon the extent and success of leakage control and other water conservation measures, new resources are likely to be required within the next 10 years. However, new sources in the area are unlikely to be licensed without appropriate environmental constraints on summer and drought use. Therefore further growth in demand in the area is likely to require the development of major new infrastructure to transfer water from sources supplying the Reading area. The return of high quality treated wastewater upstream of the point of abstraction should provide a benefit to flows in the River Kennet at times of drought and enable the resource to continue to be used, as is currently the case, downstream at Reading.

Mid-Southern Water

The company supplies the Windsor and Maidenhead area and parts of the boroughs of Wokingham and Bracknell. The company's demand forecasts figures are broadly in line with the housing / population scenarios provided by SERPLAN.

To ensure that sufficient resources are available to meet the anticipated demands in the long term, the Company strategy focuses on the development of metering and new water conservation tariffs; the promotion of water efficiency measures; the development of new treatment and distribution facilities from the Bray, River Thames source; and, re-negotiation of the bulk supply quantities provided by North Surrey Water. However, increasing demand over the longer term will contribute to the need for a major new strategic water resource scheme for the region.

North Surrey Water

The company supplies parts of the east of the county and is predominantly surface water dependent. The company's own planning figures are broadly in line with the scenarios provided by SERPLAN and, therefore, resources should be sufficient to meet the anticipated higher levels of growth overall.

BUCKINGHAMSHIRE

The county is supplied by Anglian Water Services, Thames Water Utilities Ltd (TWUL) and Three Valleys Water (TVW). Concerns regarding overabstraction from existing licensed sources affect both TWUL and TVW. Plans to reduce abstraction by both companies from groundwater sources in the Misbourne catchment have been agreed and should be progressed during the next year. Additional low flow alleviation schemes affecting resources available to Three Valleys are currently being examined by the company and the Agency and are expected to result in further decreases in abstraction in the period to 2005.

Anglian Water Services Ltd

Water resources are predominantly surface water supplied. Grafham Water is the main source and part of AWS's integrated Ruthamford system which should have an adequate overall surplus of resource over demand during the planning period. This includes the major resource of Rutland Reservoir, located in Rutland (Leicestershire). However, there are currently constraints within the system, both in terms of treatment capacity and infrastructure to distribute the water, particularly from Grafham which will require further infrastructure development within the medium term. However, the predicted increase in demands arising from the higher of the two SERPLAN scenarios for Buckinghamshire is small, and unlikely to significantly affect the timing of this need (which is more likely to be brought forward by demands in neighbouring counties).

The yield of Grafham Water benefits from increasing treated effluent returns with any development located upstream of the reservoir intake at Offord on the Bedford Ouse. This could to some extent offset the impact of household, population and associated demands growth.

Thames Water Utilities Ltd

The company supplies the Wycombe, South Bucks and Aylesbury Vales areas. The company's own planning figures are broadly in line with the RPG9 and 1992 projections and existing licensed resources should be sufficient to meet the anticipated growth in demand at least into the medium term. The shortfall in resources available to the company as a result of the Misbourne alleviation of low flows scheme is expected to be met from existing, but underutilised, groundwater sources close to the River Thames at Medmenham. The company is also evaluating other potential abstraction sites in the Remenham / West Marlow area should further resources be required to meet anticipated demands for water in the longer term.

Three Valleys Water

The company mainly supplies the Chilterns and South Bucks areas and is reliant mainly on local groundwater sources. The shortfall in resources available to the company as a result of the Misbourne low flow alleviation scheme is to be made up from existing sources further down the Colne Valley. However, recovery of the Misbourne is not expected before 1999 at the earliest. Groundwater sources in the area are operated conjunctively with abstraction from the River Thames at Iver and these, together with new sources in the Colne Valley should be sufficient to meet anticipated growth in average demand for water. Further development within the area is likely to place additional burden on water resources available to meet demands, including new environmental demands; the company has already expressed concerns regarding its ability to meet peak demands beyond 2011. In the interim period, the company is focusing its efforts on leakage control, metering and water efficiency measures in order to create more headroom in the supply - demand balance. Alternative strategies may need to be considered, including new charging and /or metering policies to influence demand at times of resource stress. In the longer term (beyond 2011), further growth in demand within the company area may need to be met from major new strategic resource schemes. The timing of any new development in the longer term, therefore, will need to be in phase with any new resource

provision.

ESSEX

Essex & Suffolk Water (ESW) supply the largest and most developed southern part of the county. However, significant parts are supplied by other companies: the Tendring peninsula by Tendring Hundred Water Services (THWS), the northern part of the county by Anglian Water Services (AWS), and the west of the county by Three Valleys Water (TVW). Minor fringes at the west of the county are also supplied by Thames Water Utilities Ltd but in the main these are already well developed and the scope for further development is considered to be limited and have not, therefore, been considered below.

Essex & Suffolk Water

ESW currently have a very slim margin of resources over demands in Essex, and with continued growth are under considerable pressure to keep pace in meeting this. This is of concern to the Agency. Within the company, Essex is a completely separate resource zone from Suffolk as until recently there were two separate supply companies.

Surface water resources dominate the supply system, with much of the supply coming from Hanningfield and Abberton Reservoirs, supported by the Ely Ouse to Essex Transfer Scheme and a large bulk supply from Thames Water Utilities. A temporary (5 year) licence variation has now been granted to increase transfers through the Ely Ouse to Essex scheme. This will allow the company sufficient time to develop other options, including leakage control and demand management. The variation is contentious with concerns being expressed about potential impacts on the environment, fisheries and navigation in the 'donor' area of Norfolk (eg. the Wash SPA/SAC) and is subject to strict conditions to protect the environment, monitor and mitigate any effects. Were this variation not granted, the company would have been reliant on the continued use of drought powers to maintain supplies even to the existing base population and this would be at the direct expense of the environment.

Some chalk groundwater is also used, but there is no scope for further abstraction and concerns have been expressed regarding local low flow issues associated with some abstractions.

The company is continuing to improve its record on leakage control and its water efficiency plan was recently commended by OFWAT. Nevertheless, it will need to be a national leader on water efficiency as it is the driest part of the country and is already heavily reliant on imports of water. The Agency believes that ESW could make further improvements to its metering policy as part of its demand management which could significantly improve its resource and supply - demand balance in the medium term.

In addition, the company is actively investigating and pursuing a whole range of medium to long term options including aquifer storage and recovery, effluent re-use, bulk transfer arrangements and reservoir developments backed by the Agency transfer scheme. All these will take time to investigate and promote and some may not prove to be acceptable when a full environmental assessment is made. The two main reservoir options under consideration are raising Abberton Reservoir in Essex or construction of a new reservoir at Feltwell in Norfolk, from which water could be transferred. Reliance on these new resource development options being successfully promoted would be subject to significant risk.

The timing and location of development could be significant in this context, with both average and peak demands equally affected. The difference between the two scenarios is relatively small in relation to other currently forecast increases in demands, but would cause additional pressure on an already difficult water

resources situation at least within the next 10 year period. It will be essential for county strategic planners to liaise closely with the Agency and company to ensure water resources and supplies can be made available in good time to serve new developments.

Anglian Water Services

Anglian Water are more dependant on groundwater sources in the north of the county, but have a half share in Ardleigh Reservoir and some linkage to Alton Water surface supplies. Their margins to meet increased development are small and subject to similar constraints and opportunities to those for Essex & Suffolk Water.

Further infrastructure development and intensified demand management are already likely to be necessary to meet the RPG9 scenario; the effect of the higher growth scenario would be to bring forward the need for these marginally, with a greater emphasis on demand management to deal with peak demands.

Tendring Hundred Water Services

Groundwater sources dominate, but the company also has a half share in Ardleigh Reservoir. Again there are limited margins for growth and the same underlying resource position applies as above. The company's success to date in leakage control and demand management will need to be continued. The difference between the two scenarios, although a small absolute quantity in overall water resources terms for Tendring Hundred Water, could accelerate the need for a small new resource by the end of the planning period (2016).

Three Valleys Water

TVW provides supplies to a population of 300,000 in Uttlesford, Epping Forest and Bishops Stortford. The area is predominantly groundwater supplied but supplies can be augmented from other parts of the company supply system. Further development pressures, such as in the Stanstead and Harlow areas, would be met by increasing transfers across the company, enhanced leakage control, metering and water conservation programmes. There is some potential for further local resource development from the confined aquifer in the southern part of the County, which could also have positive environmental benefits. However, in the longer term because of limits on the overall availability of water resources to the company growth in demand may contribute to the need for the development of a new strategic water resource scheme in the Thames or Anglian region. It will be essential, therefore to ensure that development plans are phased in line with the company's capability to supply it.

HAMPSHIRE & ISLE OF WIGHT

Supplied mainly by Southern Water Services (SWS), Portsmouth Water (PWC) and Mid-Southern Water (MSW).

Southern Water Services & Portsmouth Water

The water resources position for both companies in the Hampshire area is relatively strong and existing ground- and surface-water resources in these areas should be sufficient to meet projected demands based on the SERPLAN growth scenario to beyond the year 2016. New strategic resource schemes may be needed in the longer term.

In the short term there is a need for the companies to improve their water supply infrastructure in order that existing resources can be effectively utilised to meet anticipated local shortfalls in resources towards the east of the SWS Hampshire and Portsmouth supply areas.

Mid-Southern Water

The company supplies the North-east Hampshire areas of Basingstoke & Deane, Hart, Rushmore and East Hampshire. The Alton supply area is already a cause for major concern given its dependency upon sources in the Upper River Wey catchment which the Agency has formally recognised as being over-abstracted. Licensed sources in the area have been used fully during recent drought years. No new abstraction in this area is likely to be granted and, therefore, the company's developing strategy currently depends upon the development of metering and water conservation-based tariffs, new water efficiency measures and the development of new infrastructure to transfer resources into the area. Additional development in this area is likely to result in major new strategic infrastructure projects being brought forward based on the development of major trunk mains links utilising the new Bray source.

HERTFORDSHIRE

Most of the county is supplied by Three Valleys Water Services.

Three Valleys Water

The chalk aquifer is the main local resource and is already fully committed, to the extent that over-abstraction is a major concern in the area. The River Ver was formally recognised by the Agency as an overabstracted river and negotiations with the company have resulted in the closure of licensed sources within the catchment. Similar schemes for the Misbourne and Hiz have also been implemented. Redressing the sustainability of licensed abstraction in other catchments within the county is likely to further reduce the overall resource availability to the company to meet future demand. The company is also reliant on major strategic bulk transfers of water from the Anglian Water Services' Grafham Reservoir but a significant element of the current allocation of this resource is already being taken up in redressing low flow concerns.

The company has already indicated to the County its concerns regarding the balance of development pressures in the Stevenage area and increasing environmental demands on resources available to the company, at least in the short term. Beyond 2005, the company expects to secure additional supplies through its arrangement with AWS Grafham. The company's forecasts have indicated, generally, pressures across the company supply area to meet peak demands beyond 2011. The 1992 projection indicate a major increase in population and households compared to the forecasts currently used by the company and, therefore, a significant increase in forecast demand for water in the area. In the short to medium term this should be met from enhanced leakage control and water conservation programmes. Beyond 2005, increased demand should be met from the re-negotiation and increase in the Grafham supply arrangement. Continued increases in demand in the longer term, however, are likely to be reliant upon the development of an alternative strategic resource scheme in the Thames or Anglian region. It will be essential, therefore to ensure that development plans are phased in line with the company's capability to supply it.

KENT

The County is supplied by South East Water, Mid-Kent Water, Folkestone and District Water, Southern Water Services and Thames Water Utilities. Resources available to the area are currently subject to a major

review following recommendations from the Monopolies and Mergers Commission in 1996 and the comments provided below should be taken as an interim position and not prejudge the outcome of the current review.

Thames Water Utilities Ltd

Resources area mainly groundwater derived locally, supported by a major transfer of resources from the London reservoirs - River Thames system. Because of the reliance on bulk transfers from the London reservoirs and River Thames, the area must be considered in the context of Thames Water's London supply area and the potential water resources pressures faced by the Capital (see below). Locally, resources have already been constrained as a result of the alleviation of low flows in the River Darent. The shortfall created will be substituted by the conjunctive use of bulk transfers via the London Ring Main and Thames - London reservoir system with local groundwater resources. Some local enhancement of groundwater resources is currently being assessed by the company, including the potential for artificial recharge of the London Basin aquifer to the south of London.

South-East Water

South East Water supplies the Kent towns of Sevenoaks, Tonbridge and Tunbridge Wells. The company is dependent on a combination of surface and groundwater resources. Headroom in the company's resources and supply - demand balance is already limited and, according to recent reports from the Company, a shortfall in resources is anticipated by the year 2000 based on current projections. In the short term, it is likely that additional supplies will be obtained through increased bulk supply arrangements with neighbouring companies. However, in the medium to long term, there may be a need to raise the Darwell Reservoir, which would need to be promoted jointly by Southern Water and South East Water. The effect of the SERPLAN growth scenario is to bring forward the need for any major new resources for South East Water in the medium term and this will be reflected in infrastructure costs to new developments.

Mid-Kent Water

Mid Kent Water has a combination of surface and groundwater resources and supplies approximately 40% of the Kent population including the towns of Maidstone, Ashford and Canterbury. The company has a small resource surplus and existing resources should be sufficient to meet average and peak demands to the year 2010 based on RPG9 projections before any new resource development is required. The SERPLAN growth projections would have the effect of bringing forward the need for new local resources, probably to within the period 2005 - 2010. In the short to medium term, there may be some limited scope for local groundwater development in the area, but in the longer term it is likely that a new strategic resource scheme would be required, such as the raising (or enlargement) of Bewl Reservoir or possibly development of a new reservoir at Broad Oak.

Folkestone & Dover Water Services

Folkestone & Dover Water have no surface water resources and are dependent upon groundwater abstraction from the underlying chalk aquifer. The resource/demand balance is already very tight and during drought years the company depends upon bulk imports from neighbouring companies in order to meet peak demands. Increased drought yields from the Dover Priory and Holmestone groundwater sources have helped to improve the situation but it is anticipated that further resources will be required in the short term within the next five years. There is very little scope for further groundwater abstraction in the area and any demand increase is likely to be met in the short-term by increased bulk imports negotiated with neighbouring companies

(Southern & Mid-Kent Water); in the medium term by a joint promotion with Southern Water to redevelop Bewl and / or Darwell Reservoirs or the development of a new reservoir at Broad Oak in the longer term.

Southern Water Services

SWS has two water supply areas in Kent, Kent Medway, supplying the areas of Chatham and the Isle of Sheppey, and Kent Thanet supplying Deal, Ramsgate and Margate. The Kent Medway area has both surface water (the River Medway Scheme) and groundwater sources. Surplus resources from Kent Medway are used to support the SWS Kent Thanet area, via a bulk transfer main, and the SWS Sussex East supply area via the Bewl/Darwell reservoir link.

In view of the demand management measures now being implemented by the company, existing water resources within the Kent Medway and Kent Thanet supply areas should be sufficient to meet projected demands based on the SERPLAN growth scenario to beyond the year 2016. Resources in the Southern Water supplied area would appear to be crucial to maintaining the long-term security of supplies to much of Kent. New strategic resource schemes potentially required by the company in the longer term may need to be brought forward significantly in time to support bulk transfers of water to meet anticipated demands across the county.

OXFORDSHIRE

The county is supplied mainly by Thames Water Utilities Ltd.

Thames Water Utilities Ltd (TWUL)

The area is supplied by conjunctive use of groundwater with the Farmoor Reservoir which are operated to supply both Oxfordshire and the Swindon / E Wilts area - referred to as the Upper Thames supply area. Because of the conjunctive management of resources in the area, the comments here refer to Thames Water's Upper Thames Supply area and, therefore, extend beyond Oxfordshire and include reference to parts of Gloucestershire and Wiltshire which are dependent upon the same resource system. Resources have recently been enhanced by the licensing of the Gatehampton groundwater source, one of the largest groundwater sources in the UK, although the capacity of existing infrastructure links across the area (to Oxford, to Swindon etc) are constrained and will require enhancements to meet increasing demands, particularly planned development of the five Oxfordshire growth towns and new development in the Swindon area.

The scope for releasing resources through leakage control and water conservation practices has yet to be fully explored in this area by the company but on the basis of published information would appear to be significant. On the other hand, concerns regarding the sustainability of abstractions in this area (particularly affecting the Cotswolds streams) may result in the reduction of available resources and, therefore, increasing pressures on the supply - demand balance. TWUL have already indicated the potential requirement for a major new resource scheme to be developed in the county to meet growth in demand beyond 2011/2016 and the company is undertaking resource planning studies of potential options to meet projected demands in the Region. Further development in the county will result in the need for such a scheme being brought forward; although the difference between the two scenarios is small in relation to other forecast increases, it would cause additional pressure on an already difficult water resource situation. A major new scheme in the region will be contentious, is likely to be subject to a lengthy public inquiry and its successful promotion cannot be guaranteed; experience of promotion of similar schemes suggests that it would be unwise to assume such a scheme could be made available in less than 15 years. It will be essential, therefore, that development plans are regularly reviewed and remain in line with the company's resource capability to supply it.

SUSSEX

The water companies supplying Sussex include South East Water, Southern Water Services and Portsmouth Water.

South-East Water

South East Water, which supplies the Sussex towns of Haywards Heath, East Grinstead, and Eastbourne, has a combination of surface and groundwater resources. Headroom in the company's resources and supply - demand balance is already limited and a shortfall in resources is anticipated by the year 2000 based on the current and RPG9 projections. In the short term, it is likely that additional supplies will be obtained through increased bulk supply arrangements with neighbouring companies. However, in the medium to long term, there may be a need to raise the Darwell Reservoir, which would be promoted jointly by Southern Water and South East Water. The effect of the SERPLAN growth scenario is to bring forward the need for any major new resources for South East Water in the medium term and this will be reflected in infrastructure costs to new developments.

Southern Water Services (SWS)

Southern Water has three areas of supply within Sussex, Sussex East, Sussex Coast, and Sussex North.

SWS Sussex East Supply Area

The Sussex East area, which extends along the Sussex coast and includes the town of Hastings, is predominantly dependent on Darwell reservoir as a source of supply. The current resource/demand balance is tight, and it is likely that with the SERPLAN growth scenario an increase in the licensed abstraction from Darwell will be required by 2005 - 2010, with an associated increase in the transfer of resources from the Kent Medway supply area via the Bewl/ Darwell link , although pressures on SE Water may potentially bring this forward.

In view of the demand management measures now being implemented by the company, existing resources within the Kent Medway area should be sufficient to support projected demand increases in the Sussex East area based on the SERPLAN growth scenario to beyond the year 2016. New strategic resource schemes, such as the raising of Bewl or Darwell reservoir, may be needed in the longer term and it is important that such schemes are carefully planned to ensure adequate resources are available in time to meet future development.

SWS Sussex Coast and Sussex North Supply Areas

The Sussex Coast area includes the towns of Worthing and Brighton and is predominantly dependent on groundwater sources. The Sussex North area which has a combination of surface water and groundwater sources supplies the towns of Crawley and Horsham. A transfer main allows the transfer of surplus resources between the two supply areas.

These areas are dependent upon groundwater and direct river abstractions and as a result, peak demands during the summer months are a major concern. New local resource developments or bulk transfers from adjacent supply areas are required in the short term to meet peak demands. New strategic resource schemes, such as the raising (or enlargement) of Bewl or Darwell reservoir, may be needed in the longer term. The effects of the SERPLAN growth scenarios are to bring forward this requirement and, therefore, the costs of new water resources development.

Portsmouth Water

Portsmouth Water supplies the West Sussex towns of Chichester and Bognor Regis. The water resources position for Portsmouth Water is relatively strong and existing ground- and surface-water resources should be sufficient to meet projected demands based on the SERPLAN growth scenario to beyond the year 2016. However, in the short term, there is a need to improve water supply infrastructure in order that surplus resources can be effectively utilised to meet anticipated local shortfalls.

There is some concern over potential water quality problems at the Havant, Bedhampton and Itchen sources, which may have an impact on source yields, but it remains unlikely that new strategic resources will be required before 2016.

SURREY

The county is supplied mainly by North Surrey Water, Sutton and East Surrey Water and Thames Water Utilities Ltd with a small fringe at the west of the County being supplied by Mid-Southern Water. The county is typified by a higher demand for water than average in the region, particularly by high seasonal water requirements such as summer garden watering which place significant pressure on the supply system.

North Surrey Water

The company is dependant primarily upon abstraction from the River Thames but also three groundwater sources. The company's own planning figures are broadly in line with the scenarios provided by SERPLAN and, therefore, resources should be sufficient to meet the anticipated levels of growth. The impact of development is more likely to be pronounced on peak demands for water and may require either the development of new tariff or demand management techniques or significant supply enhancements.

Sutton and East Surrey Water

The company is reliant on a blend of chalk groundwater sources and supplies from its Bough Beech reservoir. The Company's East Surrey supply area is generally better resources than its neighbouring Sutton zone; significant savings through leakage control have resulted in additional supplies being available to meet planned development and growth in demand. However, peak demands are already a major issue for the company and additional development over the longer term is likely to require new approaches to managing demand through metering, tariffs and water conservation programmes to be phased in. Further growth in demand in the longer term would need to be managed in line with the promotion of a new strategic resource and bulk transfer arrangements.

Thames Water Utilities Ltd

Thames Water supplies the Guildford and surrounding area. Existing licensed sources should be sufficient to meet planned growth in demand over the plan period.

LONDON

The resources system for the Capital is dominated by the surface water abstractions and reservoir systems on the Thames and Lee which are used in conjunction with local groundwater resources and strategic management of artificial recharge of groundwater operated by Thames Water (TWUL). Three Valleys Water also supplies a significant part of North London (1.75million people in the Hillingdon, Brent, Harrow and Ealing areas) and Sutton & East Surrey and North Surrey supply smaller fringes to the south. The scope for releasing resources through active leakage control and water conservation measures is a significant issue, particularly for TWUL whose plans include (at least) halving the current reported level of leakage, which at 38% is amongst the highest in the country. Significant progress has been made over the last twelve months towards this target. Further leakage control and active promotion of water efficiency measures alongside the development of local groundwater sources in SE London and of artificial recharge in the London Basin aquifer should together provide sufficient resources to meet planned growth in demand to 2011 / 16. However, both leakage control and resource development bring with them local conflicts in the capital not least due to the temporary disruption from infrastructure works or the release of land for the development of borehole and treatment works.

The impact on demand from further development within London is likely to be small relative to the demand arising from the existing population. Nevertheless, new development will bring forward the need for further demand management measures and / or new resource schemes. The company's forecasts suggest that there will be a need for major new resource development beyond 2011-2016 and the company is currently undertaking studies into a major new reservoir in Oxfordshire which could be used to supply directly the TWUL Upper Thames supply area and, by augmentation of the River Thames, London. A major new scheme in the region will be contentious, is likely to be subject to a lengthy public inquiry and its successful promotion cannot be guaranteed; experience of promotion of similar schemes suggests that it would be unwise to assume such a scheme could be made available in less than 15 years. It will be essential, therefore, that development plans are regularly reviewed and remain in line with the company's resource capability to supply it.

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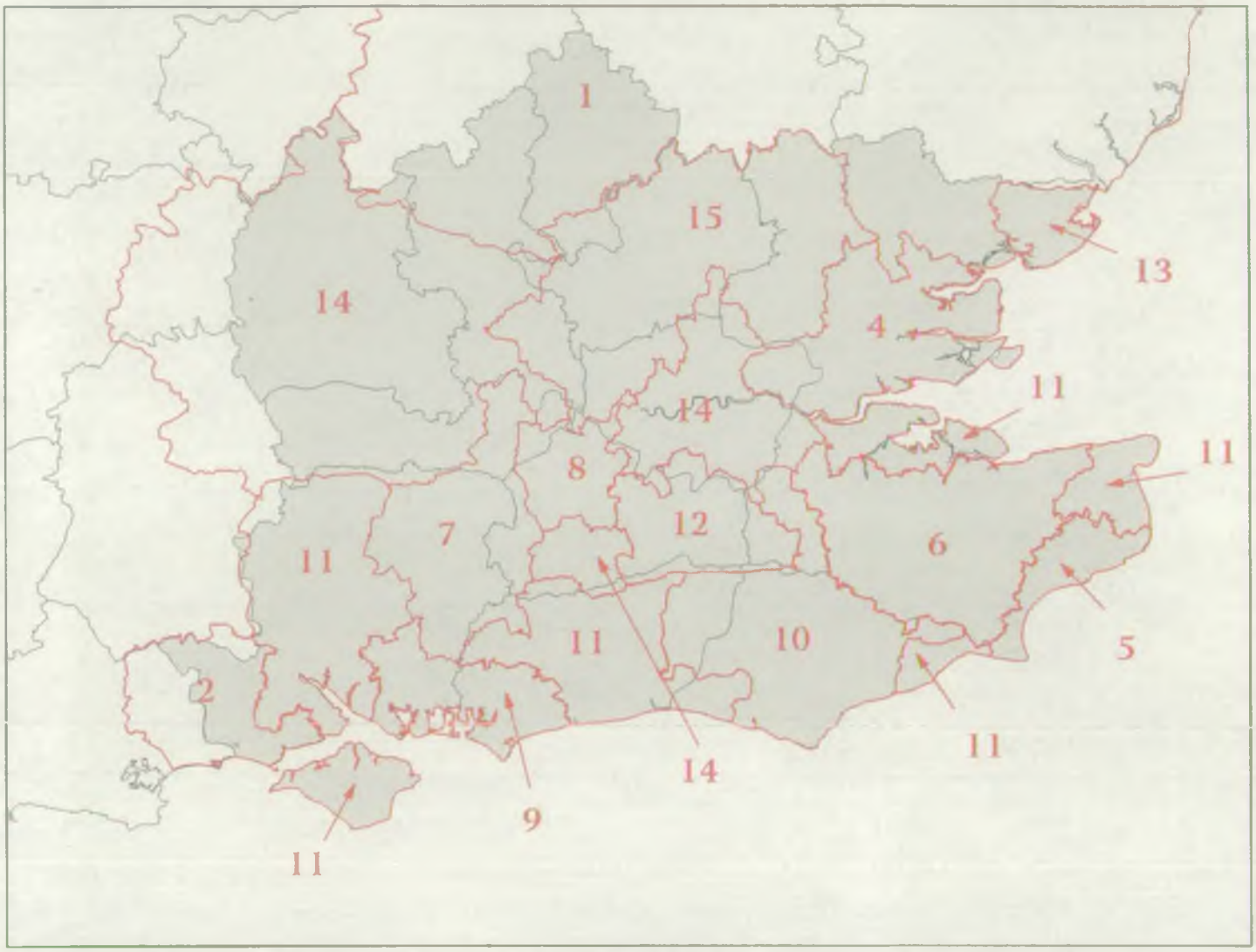
South East England - Water Companies



Key :

SERPLAN counties

Water Company boundary

County boundary

Water Companies :

1. Anglian
2. Bournemouth & West Hants.
3. Cambridge
4. Essex & Suffolk
5. Folkestone & Dover
6. Mid Kent
7. Mid Southern
8. North Surrey
9. Portsmouth
10. South East
11. Southern
12. Sutton and East Surrey
13. Tendring Hundred
14. Thames
15. Three Valleys