

Strategic water planning for South East England: preparing for proposed development

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Abstract The South East of England has one of the fastest growing and economically active populations in Europe, with associated significant pressures from development, particularly housing and transport. Sustainable water management has been identified as a major issue for future development of the region. The South East England Regional Assembly and the Environment Agency have carried out a study to investigate the potential constraints that flood risk, water resources, and water quality may pose on development. The study aims to improve understanding in order to inform the revision of regional planning policies and suggest practical guidance for local authorities to implement such policies. Wide technical consultation was carried out with the Environment Agency, local planning authorities and development agencies. Threshold Assessment was investigated as a technique to assess the potential impacts on the environment of various levels of forecast growth within selected parts of the region. Initial results indicate the need for more strategic and better integrated planning which recognises environmental and development boundaries.

Keywords Environmental impact; regional development planning; South East England; sustainable water planning and management; threshold assessment

Introduction

The South East region of England, bordering the North Sea and the English Channel, is one of the most densely populated areas in Europe. It is the most successful region in the UK with a current economy close to £130 billion and problems for future development are largely a result of this success – transport congestion, skills shortage, and lack of affordable housing (SEEDA, 2002). Housing needs and demand have become a particular issue in recent years and the number and type of required dwellings remains a subject of debate. Estimates for the period 1996–2016 range from 39,000 to 43,000 houses per annum in the South East (RPG9 DETR, 2001 and see also Holmans, 2001). Inward migration and the continuing development is placing further pressures on natural resources and an environment already under stress.

The Region has a high quality environment with significant areas of land statutorily designated in recognition of their ecological, landscape or cultural value. Water is a scarce and often overcommitted resource such that the variety of demands place serious challenges to water resources (EA Southern Region, 2001). The demand for water arising from the large and expanding population, within one of the driest regions in the UK, is a cause for concern. Management is further compounded since water is supplied by nine different water companies. The South East is also particularly sensitive to the effects of climate change and the recent update for predicted effects suggests that potential problems for water resources may be more acute than previously thought (UKCIP, 2002). Around the region's coastline the sea level is rising, threatening important coastal habitats and increasing the risks of coastal flooding. The situation is compounded by geological tilting to the south-east.

The South East of England Regional Assembly (SEERA) is responsible for preparing regional planning guidance and it identified natural resources and climate change as major

issues facing the continuing development of the region. The Regional Planning Guidance for the South East (RPG9) (DETR, 2001) guides local authorities in the preparation of their development plans and includes a policy INF1 on flood risk and a policy INF2 on water resources, together with water quality. As a result of conflicting opinions regarding proposed housing numbers raised at the public inquiry for the current RPG9, government has required an early revision of the RPG for the end of 2003. The Regional Assembly needs to know the implications of implementing the current policies in order to inform the revision of policies and to offer guidance to the local authorities.

The Environment Agency is the UK government regulator in England and Wales generally responsible for the protection and management of the water environment, with an overarching duty to further sustainable development. Other organisations also have duties relating to the water environment and these include the Department for Environment, Food and Rural Affairs (DEFRA, responsible for regulation of marine activities), local authorities, the Highways Agency, and the water companies who treat wastewaters and/or supply water. Regulation is provided through a complex variety of UK and European legislation which is shortly to be integrated through the implementation of the EU Water Framework Directive (EC, 2002) with a more holistic approach based on river basins. The Environment Agency is a statutory consultee to the planning process and it is increasingly being proactive in strategic and forward planning in order to inform the process and further its own interests.

The Agency and the Regional Assembly have undertaken a joint study in order to:

- improve the understanding of the potential severity of the constraints that flooding, water supply and the quality of water may pose on development
- show how such constraints may be managed to facilitate development in a sustainable form
- investigate methods for assessing the potential environmental impact of planned growth
- provide guidance on the implementation of current policies INF1 and 2
- inform the revision of policies for the next RPG

The study initially focused on water resources, flood risk and water quality issues although it is recognised that other factors, especially biodiversity, interact with the water environment.

Methods

Pilot areas

The study was carried out with particular reference to two pilot areas with contrasting development and environmental issues. The Thames Valley is an economically buoyant area to the west of London where growth is adding pressures on the land, infrastructure and the environment. It is the fastest growing sub-regional economy outside of London and characterised by high-tech, knowledge-based industries (TVEP, 2002). It is estimated that by 2016 there could be a deficit of 100,000 more jobs available than economically active people to fill them. Thames Gateway to the east (London and the Thames Estuary) is the largest regeneration area in the UK and the study focused on that part within the South East Region and including areas in Kent and Medway. The Gateway is subject to its own supplementary planning guidance (RPG9a, 1995) and regeneration is encouraged through a partnership with ministerial backing. However, the existing transport structure is limited and sites are difficult to develop; many are brownfield and waterside with high costs for land remediation and flood defences.

The environmental issues in each area also offer marked contrasts as follows:

- short-term water supply issues in the east compared with longer term issues in the west
- fluvial flooding risks in the west compared with provision and maintenance of tidal defences in the east
- water quality issues in the west

Technical consultation

A major element of the study was technical consultation with the local planning authorities, development agencies, and specialist staff in the Agency dealing with planning, water resources, water quality, and flood risk. Both individual and interactive meetings were held and participants were invited to debate and share their experience as follows:

- difficulties and opportunities for implementing planning policies on water
- links with other strategies and plans
- implications for revision of RPG
- suitable areas within the pilots for testing impact assessment techniques

Case studies to illustrate implementation of sustainable water planning and management were also sought in order that these might be shared throughout the region.

Threshold assessment

Threshold Assessment is a pragmatic technique which has been shown to assist planning authorities in reaching informed decisions on alternative locations for development; it can also guide the form of development on specific sites. The method builds upon earlier work (Barton *et al.*, 1995) and has been developed by the Agency with local authorities in various parts of England (EA, 2002). It has been shown to be particularly useful for integrating environmental factors within a sustainability framework so that planning authorities may be advised of the relative environmental risks and consequences of development choices. It considers the capacity of the receiving environment to absorb land-use change and has been shown to be useful at county and local levels. Its application at the regional level was less clear, although certain environmental factors, such as water resources, are more relevant at the strategic level. The approach was tested in the two pilot areas.

The method is a sequential approach set within the framework of environmental objectives and appropriate environmental boundaries. Relevant environmental issues (criteria) are scoped and thresholds at which an environmental impact occurs are identified together with a score. The Spectrum Score ranges through five categories from red (absolute constraint to development) to blue (development encouraged because it will resolve an existing environmental problem). For the orange and yellow categories with predicted impacts on the environment, management options may be identified in order to offer choices for mitigating impacts. Thus the method goes further than traditional sieve mapping techniques since it can identify options for constraints management and resolution of conflicts, and help prioritise actions and the search for creative solutions. The approach is a useful screening method which uses existing information and professional judgement, and it is compatible with Strategic Environmental Assessment (SEA) and Sustainability Appraisal (SA).

Issues arising for implementation of sustainable water management

Water resources

Consultation indicated that, despite the potential shortages in supply, the issue of sustainable water resources is not currently exerting much influence on the distribution of development. This is thought to be primarily due to the statutory obligation on water companies to supply water on demand. Such demand-led planning may conceal actual problems and encourage a perception that adequate supply is available. This can also contribute to inconsistencies in sustainability analyses, such as the energy requirements associated with transfer of water over long distances. Should the absence of adequate local water resources act as a constraint, or should the view be taken that it is the cost of delivery that is the issue?

The difficulties of providing infrastructure ahead of development was another factor impeding implementation of sustainable water resources management. Since water compa-

nies tend to wait until there is a demand before providing new facilities, some of the more sustainable options may no longer be available. The benefits of supplying water in a sustainable manner would be shared amongst all those whose water supply is protected, such that it would seem reasonable for water companies to increase their charges to fund the necessary infrastructure, but this is subject to approval from the regulator Ofwat and may be politically unpopular.

The methods of forecasting supply and demand for water are based on water company supply zones which rarely correlate with administrative, environmental or development boundaries. Furthermore, the predicted population and housing numbers remain uncertain such that calculations of need for water resources are complicated. The Water Resource Strategies from the Agency (EA Thames and Southern, 2001) which cover the South East make clear the need for demand management in order to safeguard water supplies and integrate environmental needs. It was interesting that few examples of demand management were found; concerns over costs and risks to public health appeared to be contributory factors.

Flood risk

Planning policy guidance in England seeks to direct development away from greenfield land towards brownfield sites (PPG3, 2002) and to avoid development in the floodplain (PPG25, 2001). Furthermore, a Sustainability Appraisal is required of development plans (PPG12, 1999). The issue of potential conflicts was identified since in some parts of the South East it is not possible to accommodate the required provision of new dwellings while satisfying both PPG3 and 25. The Thames Estuary is characterised by sites which are brownfield and waterside. Accordingly, developers and planners are seeking means to minimise risk from flooding and this includes consideration of floodproof buildings, form and arrangement, access, sensitivities of the population, insurances and mortgages. Some examples of floodproof building and innovative masterplanning were found, although it is the initial high costs of tidal defences that are impeding development in the Estuary. These are required to meet with the higher standards needed to defend against the predicted effects of climate change.

In the Thames Valley area there is sufficient land in the short-term to 2006 to accommodate proposed development outside the floodplain, however planners considered that this had placed significant restrictions on development that is desirable for other reasons. This suggested the need for stronger Sustainability Appraisal. It was also considered that the Threshold Assessment approach would be a useful and flexible screening method to assist in difficult locational decision-making.

Such decision-making would need to be made on a more strategic level that recognised whether development was justified on social and/or economic factors. Planners and developers need to know relative risk from flooding. Similarly, strategic and not site by site decision-making is needed to safeguard key sites for flood storage capacity. The Agency has recognised this need and instigated a cross-organisational project "Planning for Flood Risk in the Thames Estuary" as part of the development of a strategy for the Estuary. However, this will take several years to prepare and decision-making needs to be informed now. The Agency will also be preparing Catchment Flood Management Plans during 2003–5 which should take a more holistic view and consider future development needs. The extent to which they will inform the land-use planning process remains to be established.

The issue of how to share the costs of infrastructure amongst all those who would benefit was raised by consultees in each sector. This is exacerbated in the Estuary area by the high costs of tidal defences and is a particular issue for sites which are catalysts for further devel-

opment. This issue of provision and funding of infrastructure ahead of development was common to water resources and water quality, as well as flood risk.

The differing timescales of land-use and flood risk planning were found to be causing anomalies between flood risk mapping and development plan allocations. Sites previously allocated for development may have to be de-allocated (or different policy applied) if they fall within the revised floodplain, causing problems of finding alternative sites for local authorities and causing uncertainties/lack of compensation for developers. This situation will continue as flood risk mapping is refined through the requirements of PPG25 which now includes a sequential test and identifies three categories of risk – high, medium and low. Furthermore, issues were found associated with inconsistencies and difficulties of interpreting PPG25. These should reduce as experience is gained and the Agency is preparing guidance on interpretation. Nonetheless decisions on development planning need to be taken now.

The predicted effects of climate change are expected to have a greater impact in the South East than the rest of the UK. This is exacerbated by the geological tilting to the south-east and recent updates (UKCIP, 2002) suggest that summers will become drier and spring/autumn become slightly drier. The Agency has taken precautionary advice and is adding 20% to river flow in flood risk calculations to allow for the predicted effects of climate change in the future. Consultation amongst flood risk managers and engineers was divided with some advising that the impact of climate change will generally be minimal although significant at specific locations; others believe that it will have a profound effect on spatial planning.

It was clear that the contribution of Sustainable Urban Drainage Systems (SUDS) to sustainable water management is being compromised through problems associated with adoption and long-term maintenance. Uncertainty regarding the long-term risks and costs of maintenance exacerbates the problem – and such uncertainty of commitment is difficult to negotiate into legal agreements between local authorities and developers. This situation has been recognised by the Agency which has set up a national working group with representatives from government and those with responsibilities for drainage to resolve such issues. However, safety issues may now prove a more significant deterrent to implementation since there have been a number of recent drownings in balancing ponds which are frequently featured in SUDS. Whilst risk can be minimised through different design, such as more gentle slopes, there is a concomitant issue of landtake.

Accepting a certain level of flood risk, and designing development to cope with occasional flooding events, would seem to provide a potential solution to the lack of land outside the floodplain. However, such an approach is rarely being implemented because the local authorities are concerned with regard to their responsibilities for public safety and the Agency is working with the precautionary principle. A further factor is the insurance industry and the extent to which it will insure properties in the floodplain. Planners and developers want absolutes; flood risk planning can only work with indicatives, although provision of relative risk will better inform.

Water quality

Local authorities and development agencies have not yet considered water quality to be an issue in the implementation of sustainable water management. However, this study identified that this is an emerging issue which will gain in significance as the Water Framework and the SEA directives are implemented into UK legislation. The characteristics of the rivers and estuaries in the Thames Gateway are such that water quality is unlikely to limit development (pollution risks are covered by EIA and other legislation).

However, examples were found in the Thames Valley area which demonstrate a

situation which is likely to occur more frequently in the medium-term future (10–15 years) and apply particularly to urban areas in the headwaters and at the watersheds of river catchments where dilution of effluents, maintenance of flow, and ecological quality are so finely balanced. The preferred location for proposed housing would necessitate more sophisticated treatment at the wastewater treatment works in order to ensure that there was no deterioration in the quality of the receiving watercourse. Such treatment is available technically but at high capital cost and high energy running costs. This raises inconsistencies for Sustainability Appraisal and choices for society – is energy usage or river water quality the issue for sustainability? Furthermore, should the high costs of the new treatment process be met by a local charge or spread amongst all the water company's customers?

Options for resolution of issues

More integrated planning at strategic levels

It was agreed that many of the issues impeding implementation of sustainable water management could be resolved with more integrated and strategic planning that takes account of the relationships between developments – and considers the appropriate boundaries with regard to both the environment and the requirements of development. Earlier and more iterative collaborative working is needed to ensure environmental protection and sustainable use of natural resources. Small working groups of local authority planners, development agencies, Agency specialists and water company planners could be an efficient way of progressing integration. These could link to other groups working on other water and development plans and strategies. This will also facilitate better understanding of the roles and responsibilities of all parties. Threshold Assessment was considered to be a potential tool for helping integration of issues within a sustainability framework.

Sub-regional planning policies

Many of the consultees in each sector felt that sub-regional planning policies would help guide the practicalities of development/regeneration needs whilst recognising the different characteristics of the receiving environment. It was suggested that there could be an overarching water policy which recognises fundamental principles and the interconnectedness of water factors and their relationship with other factors, such as ecology and amenity. Separate sub-regional policies on water resources, water quality, and flood risk could then guide development planning within specific areas.

Provision and funding of key infrastructure

This is applicable to water resources, water quality, and flood risk, and requires a more strategic approach, which considers environmental and development boundaries, and seeks to share the costs amongst all those who would benefit. Resolution requires legislative changes and is beyond the responsibilities of the Agency and the local authorities. However, more certainty in household/population predictions would assist in long-term planning of infrastructure.

Encouragement of demand management and leakage control; implementation of SUDS

Local authorities can encourage demand management and implementation of SUDS through policies, supplementary planning guidance, and clear advice in planning and development briefs. There is a need for more case examples and better information on costs and public health risks.

Assessment of the relative severity of flood risk

This will better inform development planning and may enable development in the flood-plain with appropriate safeguards. Probability has been used as an indicator for risk, however, now we need differentiation into probability and magnitude of impact in order to assess the relative severity of the risk. The Agency will need to contribute professional judgement until more detailed information is compiled.

Sustainability appraisal and threshold assessment

Stronger SA should help with difficult decision-making, for example, between energy and water quality. Threshold Assessment can be a useful tool for locational choices and to identify management options to mitigate environmental impacts. The approach can help with prioritisation and identifying where further studies are needed; it also promotes collaborative working.

Conclusions

The study identified a number of constraints to the implementation of sustainable water management. Technical consultation with all three sectors – environmental, planning and development – confirmed the need for bold, clear and innovative planning supported by pragmatic, integrated and informed advice. There was a very strong message for more integration of development planning and water management – and at the appropriate strategic level – recognising the needs and boundaries of both the environment and development. Similarly there is a need for strong and clear planning and development briefs.

A number of approaches to resolve issues were identified; some involve earlier and more iterative collaborative working between forward planners and water specialists, others require legislative change and commitment from central government. A pragmatic technique in Threshold Assessment has been identified to help inform decision-making now. There will be a need for bold decision-making and society will have to make choices. Water is the fundamental natural resource and we have to find mechanisms to implement sustainable water management.

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