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Impacts of proposed housing growth in South and East England: water quality

Science Summary SC040047/SR5

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Our work includes tackling flooding and pollution incidents, reducing industry's impacts on the environment, cleaning up rivers, coastal waters and contaminated land, and improving wildlife habitats.

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- **Funding science**, by supporting programmes, projects and people in response to long-term strategic needs, medium-term policy priorities and shorter-term operational requirements;
- **Managing science**, by ensuring that our programmes and projects are fit for purpose and executed according to international scientific standards;
- **Carrying out science**, by undertaking research – either by contracting it out to research organisations and consultancies or by doing it ourselves;
- **Delivering information, advice, tools and techniques**, by making appropriate products available to our policy and operations staff.



Steve Killeen

Head of Science

Impacts of proposed housing growth in South and East England:

Water quality - summary report

This document summarises the water quality component of the Environment Agency's 2005 publication, *Impacts of Proposed Housing Growth in South and East England: Water Resources and Water Quality*, which reports on the potential environmental impacts of proposed new housing in south and east England. It outlines the expected impacts on water quality of the 530,000 proposed new homes in the Sustainable Communities Plan growth areas (see map 1) and makes recommendations on reducing the impacts of development.

The full report can be ordered through the Environment Agency's national publications catalogue together with the other research reports in this series, under product code: SCHO0706XXXX-E-C

The reports, focusing on the anticipated impacts of new development on waste, water, flooding and air quality, were published by the Environment Agency, Bristol, in 2005.

1. Conclusions

The chief conclusions of the report are that:

- Increases in homes and in population will lead to increased volumes of sewage, and will require improvements to a number of sewage treatment plants to prevent deterioration in river water quality. However, since treatment at some of the plants identified is already at the limits of current technology, further improvements here may either not be possible, and/or could be large-scale and expensive.
- Any plans for development must take into account the potential for significant costs to cover increased sewage treatment and/or alternative solutions for dealing with increased loading on the environment. Alternative solutions might include export of sewage to another catchment or the construction of new sewage works.
- Focussing on the Government's growth areas in the south and east of England, this study identified 38 sewage treatment works likely to require improvement. However, other studies examining the effects of proposed development in the Environment Agency's Thames and Southern Regions (a different and larger study area) have identified 73 works requiring improvement to prevent significant deterioration of the environment.

- Given its anticipated effects in the UK (particular in terms of lower summer rainfall), climate change is likely to make both existing and any new water quality standards harder to achieve.
- A fuller understanding of the potential impacts of population growth and the possibilities for alleviating those impacts, will require a more sophisticated evaluation. Such evaluation should be carried out in close collaboration with the relevant water companies.

2. Policy background

Water quality has been the focus of several European directives including the Freshwater Fish Directive, the Habitats Directive, the Dangerous Substances Directive, the Surface Water Abstraction Directive, and the Urban Waste Water Treatment Directive. In addition, the Water Framework Directive which is currently being implemented aims to prevent deterioration of aquatic ecosystems and to restore polluted waters to ecological and chemical “good status”.

While these various directives directly and indirectly require that agreed water quality standards are met across Europe, the UK Government has also set national River Quality Objectives (RQOs) – a series of public service agreement targets for non-statutory water quality standards. Together, these national and EU legislative drivers require both that water quality in rivers meets specific targets and that it does not deteriorate.

Implementing the Water Framework Directive will see more stringent water quality standards requiring higher levels of sewage treatment. Any plans to improve sewage treatment to cope with housing and population growth must therefore take into account the requirements of both current standards and the more stringent future standards. Moreover, protecting water quality in the south and east of England is likely to become more difficult if, as predicted, climate change results in lower summer rainfall.

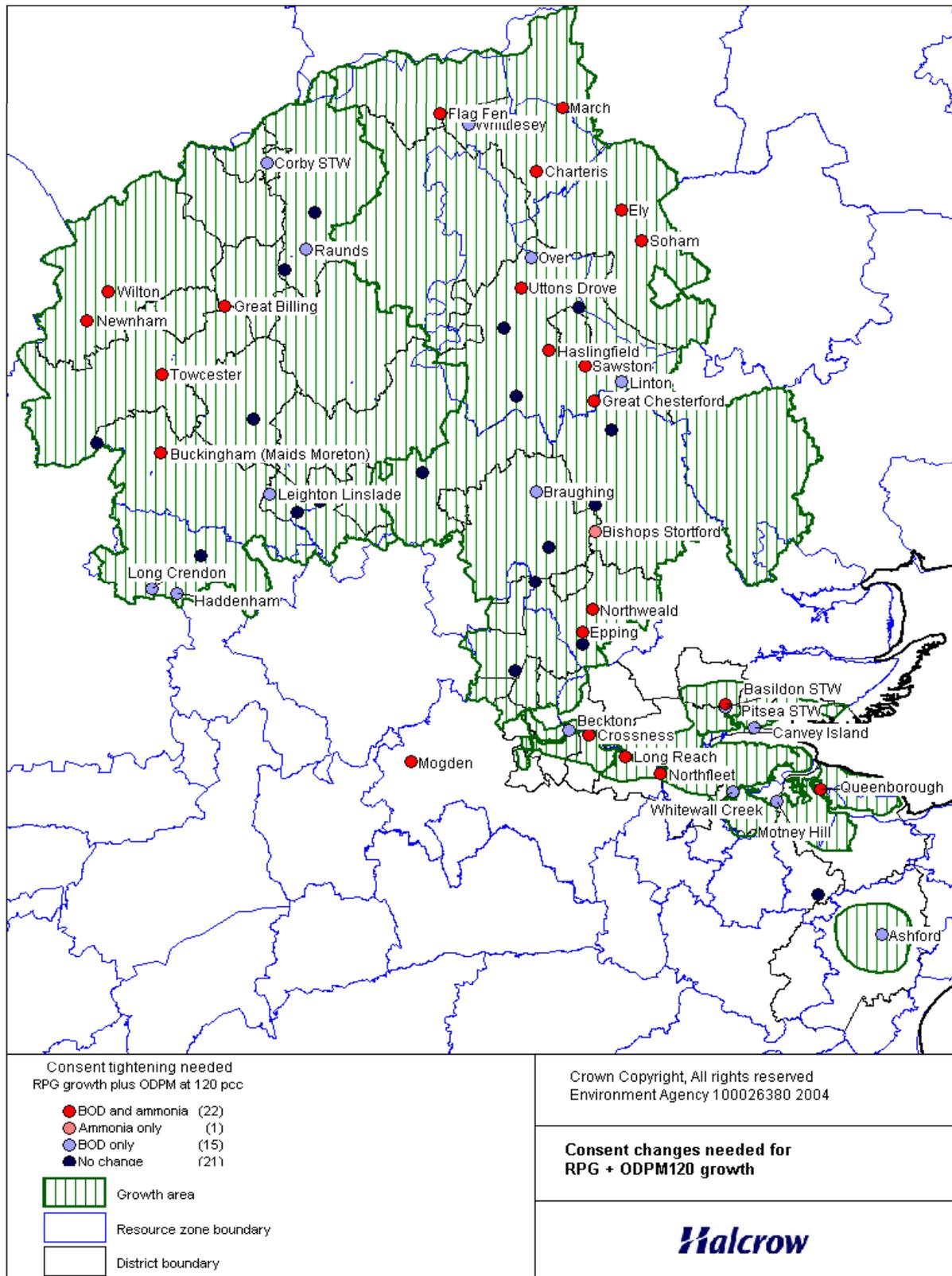
Protecting water quality is crucial to protecting its use – from leisure activities to water supply and its role in maintaining ecosystem function. The issue of providing adequate water protection is particularly important in the south and east of England where the pressures on water are unusually high given the population density in this part of the country.

3. Objectives and methodology

The study was carried out to estimate the scale of sewage plant improvements required to maintain river quality to current standards in the face of proposed new housing development. The study looked at the Sustainable Communities growth areas (Map 1).

The research involved using a standard Environment Agency method – the River Quality Planning programme. The programme calculates the quality that is required of any discharge entering a water body in order to meet the water quality objectives of the water body receiving the discharge.

Map 1: Study area (ODPM growth areas) and waste water treatment works requiring tighter consents to cope with expected population increases



Using geographical information systems (GIS) to establish the location of significant waste water treatment plants in the growth areas (Map 1), we assigned population growth to these plants based on their proximity to urban centres. We assumed that

no new sewage treatment works would be constructed and calculated the discharge quality necessary to prevent any deterioration of the rivers receiving the increased discharge flows.

For the purposes of this study, we assumed an average consumption of 160 l/h/d (litres per head per day) and used current water quality standards – rather than more stringent standards anticipated on implementing the European Union’s Water Framework Directive. We also assumed an occupancy rate of 2.4 people per household, and made predictions based on a period of the present up until 2016 (Table 1). However, insufficient information, or levels of detail exceeding the scope of this analysis, meant that we were unable to take account of either nutrients or storm discharges in our calculations.

Table 1: Housing growth figures 2003 – 2016 used for this study

Growth Area	Sustainable Communities Plan Housing 2003 – 2016	Regional Planning Guidance Housing 2003-2016	Regional Planning Guidance + ODPM Housing 2003- 2016
Milton Keynes/South Midlands	45,901	105,735	151,636
London/ Stansted/ Cambridge/ Peterborough	31,162	138,789	169,951
Thames Gateway	44,010	151,425	195,435
Ashford	6,100	7,100	13,200
Total	127,173	403,049	530,222

We used housing data from both Regional Planning Guidance and the Office of the Deputy Prime Minister (ODPM)¹. Combined, these gave us an approximation of what the Regional Spatial Strategies for the study area would be likely to recommend.

4. Main findings

Our study reveals several sites where population increases linked to proposed housing growth will result in a need for further investment in sewage treatment works. All improvements will be required to meet current standards; some will be large scale and expensive. Moreover, future trends in water quality standards and management are likely to require further improvements in sewage treatment plants – driving costs up even further. For the moment, we have not carried out cost estimates as part of this study, but the expenditure implications for the south and east could be considerable – and will be passed on to the customer bills of the relevant water companies. Climate change is likely to result in drier summers; this will mean less dilution capacity in rivers, making water quality standards even harder to meet.

In some cases we may now be approaching the limits of traditional sewage treatment. In addition, it is important to consider the wider sustainability implications of treating higher volumes of waste at the required high standards. These include

¹ ODPM housing data (August 2004)

increased energy use, higher levels of sludge requiring treatment and disposal, and greater resource use such as chemical treatment and building new treatment plants.

Changes in building standards to reduce water consumption (eg water efficient appliances) are unlikely to affect water quality, since they will not affect the overall load of organic matter produced by each household. While this reduced volume of sewage would result in less frequent discharge of storm water outfalls the magnitude of the impact, in the context of the proposals studied in this report, is likely to be minor.

5. Recommendations

- Proper understanding of the potential impacts of population growth, and the possibilities for alleviating its impacts, will require more sophisticated evaluation for the whole of the south and east of England. This should be carried out in close collaboration with the relevant water companies.
- Longer term planning for the provision of sewerage infrastructure within the water industry should take into account the pressures from population growth and development, climate change and the EU Water Framework Directive; it should consider the wider sustainability implications such as energy and resource use.
- Close collaboration with the water industry and others is needed to support a longer term planning framework for water quality investment.

We welcome views from our users, stakeholders and the public, including comments about the content and presentation of this report. If you are happy with our service, please tell us about it. It helps us to identify good practice and rewards our staff. If you are unhappy with our service, please let us know how we can improve it.