

# Out of sight - not out of mind

Ofwat and the public sewer network in England and Wales



REPORT BY THE COMPTROLLER AND AUDITOR GENERAL  
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# executive summary

- 1 The public sewer network is an essential part of the national infrastructure, comprising 189,000 miles (302,000km) of underground piping. Public sewers collect and remove waste water from customers and a proportion of surface water during rainfall. Being out of sight and long-lived, sewers can often be taken for granted. When sewers fail or become overloaded the environment and the public can suffer from pollution through discharges of sewage into watercourses and, most seriously, sewage flooding into or under houses, onto gardens or open spaces.
- 2 The ten regional water and sewerage undertakers in England and Wales<sup>1</sup> that were privatised in 1989<sup>2</sup> have responsibility for maintaining and extending the public sewer network. They have broadly-framed statutory duties to provide an effective system of public sewers, to maintain sewers so as to ensure effectual drainage, and to make provision for emptying of the contents of those sewers. Each water authority, now water and sewerage company, inherited its assets from a wide range of municipal bodies with differing systems for recording and maintaining their assets and differing standards of construction and maintenance.
- 3 The Director General of Water Services is the economic regulator of water and sewerage services in England and Wales and the head of the Office of Water Services (Ofwat), and is accountable directly to Parliament and to the National Assembly for Wales.<sup>3</sup> Ofwat has a statutory duty to ensure that each company carries out its functions properly and must use its powers in ways best calculated to ensure that each company, operating economically and efficiently, is able to finance its functions. Subject to these duties, Ofwat has a duty to protect customers' interests in relation to price and quality of service. Ofwat also has powers to enforce the companies' duties described in paragraph 2. The Environment Agency has responsibilities in relation to environmental regulation of sewerage services. The Department for Environment, Food and Rural Affairs (the Department) has general responsibility for the water sector, the overall regulatory regime, and water and environmental policy nationally. The Welsh Assembly Government has devolved responsibilities for most of these issues in Wales. WaterVoice represents the interests of customers of water and sewerage companies.<sup>4</sup>

<sup>1</sup> The arrangements for regulating the government owned company (Scottish Water) responsible for sewerage in Scotland are different and are not covered in this report.

<sup>2</sup> Under section 15 of the Water Act 1973 district councils undertook the sewerage function for the water and sewerage authorities. This arrangement continued beyond vesting of the new water companies but companies started to bring these functions in-house from the mid-1990s and some are still doing so.

<sup>3</sup> Ofwat is used as shorthand for the Director General in this report.

<sup>4</sup> WaterVoice operates through nine regional committees in England and a committee for Wales, and the ten WaterVoice committee chairmen form the WaterVoice Council. WaterVoice is currently a semi-autonomous part of Ofwat. The Government intend that it will become independent in 2005.

- 4 To meet its duties, Ofwat monitors the performance of each company and its sewerage networks and sets limits every five years on the prices that each company can charge. In terms of the performance of sewerage networks, Ofwat requires each company to maintain or improve performance. If a company performs below this level, Ofwat takes action to ensure that the company restores its performance.<sup>5</sup> As part of monitoring companies' service performance, Ofwat analyses and assesses the trends in each company's performance using four indicators that cover: sewer flooding incidents due to insufficient sewer capacity; sewer flooding incidents due to sewer collapses; the number of sewer collapses; and the number of pollution incidents at combined sewer overflows and at sewers.
- 5 We examined how Ofwat has fulfilled its role in relation to the public sewer network including:
  - A the performance of the sewer networks over the last ten years (Part 1);
  - B the challenges for sewerage companies and Ofwat from sewer flooding (Part 2);
  - C the scope for Ofwat to develop the way it regulates sewerage companies (Part 3).
- 6 Our report covers Ofwat's regulation of the public network of sewers owned by the ten sewerage companies. It excludes the connection of new properties to the public sewer network, and Ofwat's regulation of other aspects of sewerage company operations including sewage treatment works. It also excludes the management and maintenance of private sewers (sewers not owned by sewerage companies), which are not regulated by Ofwat. The Department has recently undertaken a consultation exercise with stakeholders on responsibility for private sewers, and the Water Act 2003 included enabling powers for the government to make regulations on the transfer of ownership of private sewers. Our methodology is at Appendix 1.



<sup>5</sup> Improvements in sewerage service performance generally form part of price limit determinations, these include stepped improvements in the removal of properties from sewer flooding risk registers.

## The performance of the sewer networks over the last ten years

### 7 Our main findings are:

#### A The indicators of sewer network performance show a fairly stable trend.

Overall these assessments show stability or slight improvement at industry level in recent years with some variations in performance between companies. In August 2003, Ofwat reported its preliminary assessments of the 'serviceability' of sewer networks as 'stable' for eight companies, and 'deteriorating' for two. Currently, Ofwat is reviewing its findings with the two companies and will then decide whether the action proposed by them is sufficient to rectify the performance shortfall.

#### B Around 5,000-7,000 properties each year are flooded internally by sewage, less than 0.1 per cent of all properties in England and Wales.

Sewer flooding is a key measure because it is one of the worst service failures customers can suffer. Flooding can be caused either because the capacity of the network is insufficient to cope with the level of flow, particularly during heavy rainfall, or because of blockages or, less commonly, collapses. The overall number of internal flooding incidents (including severe weather events) has remained fairly static since 1994. The number of properties at the highest risk of flooding (i.e. once or twice in ten years) has fallen since 1992-03 partly due to company action and partly due to changes in the assessment of properties at risk. As well as monitoring incidents, Ofwat monitors the number of properties likely to be at risk of repeat flooding due to overloading of sewers.

#### C Companies report that external flooding of gardens and streets is more common than flooding inside properties.

On the basis of unaudited company data, Ofwat estimates that there may be three times as many such incidents as there are of internal flooding. Some companies estimate that external flooding is as much as ten times more common than flooding inside properties in their area.

#### D In 2002-03 the companies spent over £650 million on the sewerage networks of which just under £190 million was spent on sewer network maintenance, including replacement of sewers.<sup>6</sup>

Investment varies from year to year and is currently on a slightly rising trend linked to work associated with the national environment programme decided by Ministers and progress in dealing with sewer flooding.

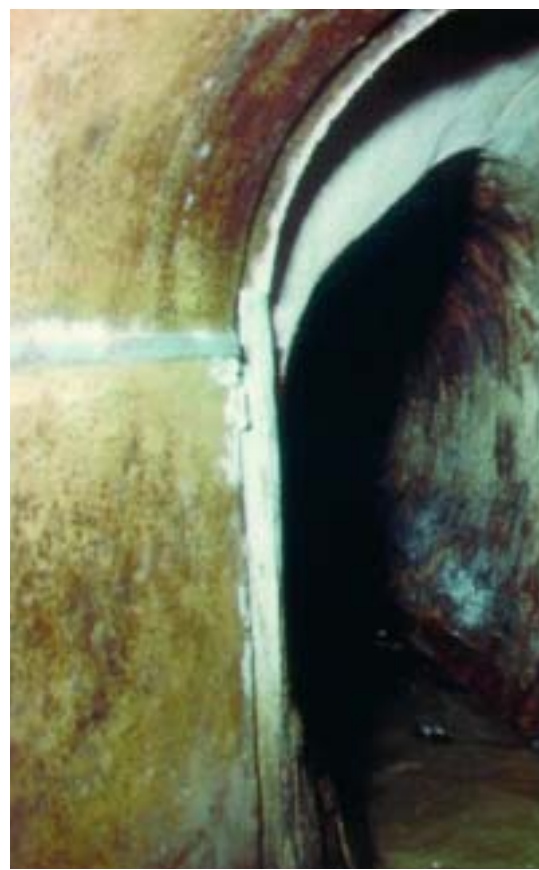


<sup>6</sup> Expenditure on maintaining the sewer network is recorded as "infrastructure renewals expenditure". The remainder includes expenditure on increasing the capacity of the system.

## The challenges for sewerage companies and Ofwat from sewer flooding

8 Our main findings are:

- A The unusually wet weather in late 2000 and early 2001 resulted in extensive sewer flooding and this raised the profile of the problem.<sup>7</sup> In 2002, Ofwat consulted water industry stakeholders and agreed on the need for more rapid progress on relief from sewer flooding.** During this period WaterVoice (and other bodies) increasingly raised the need for more rapid progress on the relief from sewer flooding. In response to Ofwat's consultation, WaterVoice called for companies to clear the backlog of properties known to be at risk of sewer flooding by 2010.
- B Companies report 11,600 properties (less than 1 in 1,000) as being at risk of internal sewer flooding at least once in every ten years.** Flooding from sewers can also be caused by relatively unpredictable factors such as more extreme weather events, and it would not be justified economically to eliminate the potential of flooding from these events. The risk of flooding to properties could increase in the future with many of the factors outside an individual company's control such as new development and increased storm intensities arising from climate change.
- C Compensation for sewer flooding is limited, and does not vary in proportion to the damage caused.** The statutory Guaranteed Standards Scheme provides for payments to be made to customers when a property is flooded internally with sewage. On Ofwat's recommendation the Secretary of State extended the arrangements in 2000, providing for a rebate of annual sewerage charges for each flooding incident. Customers receive the same rebate regardless of the damage caused to their property. Some companies choose to provide an ex gratia payment for external flooding and uninsured losses, and Ofwat and WaterVoice encourage them to do this, but the arrangements are not generally intended to substitute for household insurance. Owners of some properties blighted by sewer flooding are said to find it very difficult or even impossible to obtain household insurance against such a risk.
- D A recent court case has clarified responsibilities in relation to sewer flooding.** In 2002 the Court of Appeal upheld the claim for substantial redress by a customer who suffered repeated sewer flooding.<sup>8</sup> The case, if upheld, would have increased the incentive on companies to make redress and tackle sewer flooding. The case was appealed to the House of Lords and judgement was handed down on 4 December 2003. The Lords concluded that the appropriate route for dealing with such cases was that set out in the Water Industry Act which provided for the regulator to balance the interests of individual flooded customers and customers generally, who bear the cost of avoiding sewer flooding. There was no cause for compensation under the Human Rights Act or the general law of nuisance. The Lords also highlighted the issue of compensation for customers subject to flooding.<sup>9</sup>



<sup>7</sup> The unusually wet weather in this period also caused extensive fluvial flooding. Since then the Government has embarked on a major programme of further fluvial flooding protection.

<sup>8</sup> *Peter Marcic v Thames Water Utilities Limited* [2002 EWCACiv 65].

<sup>9</sup> *House of Lords, Marcic (Respondent) v. Thames Water Utilities Limited (Appellants)* [2003] UKHL 66.



- E The statistics on the number of properties at risk of sewer flooding are not fully consistent between companies.** The information companies provide to Ofwat to measure the risk of sewer flooding is not fully consistent from one company to another. These inconsistencies hamper direct comparisons between companies and may distort the national picture. Ofwat asked company reporters<sup>10</sup> to comment on the consistency of recording treatment, but wishes to minimise changes to the trend data for each company which it believes is vital to assessing company performance over time.<sup>11</sup>
- F Knowledge of the extent of flooding is incomplete.** Ofwat plan to collect data from companies on external flooding from 2004 to provide a more robust basis for tackling this issue in future price control periods. Companies try to identify all customers affected by sewer flooding incidents but the scale of under-reporting is unknown. Ofwat believes that the level of under-reporting of sewer flooding incidents is likely to be limited.
- G Ofwat has developed a number of regulatory tools to influence how companies meet their responsibilities.** Ofwat has established a comprehensive reporting regime to record and compare company performance both year-to-year and from company to company. Ofwat has developed an overall service incentive mechanism (Overall Performance Assessment or OPA) that financially rewards the best performing companies and penalises the worst performers through comparative competition. This incentive mechanism looks at measures across the sewerage service, including both environmental aspects and sewer flooding. Ofwat also sets output expectations for the networks in terms of their performance in providing sewerage services to customers. Ofwat has not taken enforcement action against any company for its performance because they have dealt with any potential problems by having informal discussions with companies.
- H Sewerage companies have removed the risk of sewer flooding from 3,300 properties since 2000.** In 1999 Ofwat set price limits which assumed that companies would remove 4,500 properties reported to Ofwat as "at risk" during the 2000-05 period. Following consultation in 2002, Ofwat sought an acceleration and an increase in the relief from sewer flooding and has undertaken to remunerate additional programmes covering both internal and external flooding risks. Ofwat has discussed proposals for additional work from all ten companies which would address nearly 2,000 more internally flooded properties and 800 external flooding problems by March 2005.
- I Companies currently forecast the cost of dealing with the most severe internal flooding problems at around £1.1 billion with the worst external cases costing a further £0.5 billion.** The cost of tackling all sewer flooding problems, including external flooding, would be substantially greater.
- J Companies have to prioritise remedial work and in discussion with WaterVoice and Ofwat have developed priority criteria for their work programmes.** We commissioned a report into estimating the benefits of sewer flooding work from Professor David Pearce<sup>12</sup>, an expert in environmental economics, which is available on the NAO website ([www.nao.gov.uk](http://www.nao.gov.uk)). He concluded that the justification for tackling many properties is clear-cut. For other less severe sewer flooding problems, however, only one company has a robust economic approach to assessing the balance between the costs and benefits of tackling sewer flooding. The position of properties affected by sewer flooding where the costs significantly outweigh the benefits is unclear. In commenting on their draft business plans Ofwat challenged companies to set out clearly the benefits to customers of the investment they proposed.

<sup>10</sup> Companies' licences provide for the appointment of independent professionals (known as reporters) to examine and test the information that companies are required to report to Ofwat, and to report their opinion to Ofwat.

<sup>11</sup> Ofwat's trend analysis of companies' performance over time relies on information being collected to the same definition, since any change in definition invalidates a time trend.

<sup>12</sup> Professor David Pearce of University College London.

## The scope for Ofwat to develop the way it regulates sewerage companies

9 Our main findings are:

- A **The relationships between operational and capital maintenance expenditure and the performance and condition of sewer networks are inherently complex.** Sewers are located underground, making them relatively inaccessible for monitoring and maintenance purposes. The sewer networks have been built-up over several generations and many sewers are well over 100 years old. A sewer's age is a poor guide to its condition or performance. Changes in the demands placed on sewers or differences in ground conditions may have a bigger effect.
- B **Company information on the performance and condition of sewer networks is imperfect but improving.** Building on a diverse and patchy knowledge base at privatisation the companies are continuing to develop robust information systems to improve their understanding of these relationships to inform operation, planning and maintenance of the sewer networks.
- C **Ofwat is developing the indicators it uses to assess the performance of the sewer networks and intends to keep them under review.** In 2002 Ofwat, following joint research with the Environment Agency, refined and extended the indicators of network 'serviceability' each company is required to report on year by year. Both regulators plan to keep the suite of indicators under review. Over time the longer data series will improve both company and Ofwat's ability to assess performance trends in the sewerage networks and so inform judgements as to whether a company is meeting its obligations.
- D **Ofwat does not believe that there is sufficient evidence available to say whether there is a problem with sewer networks.** Ofwat considers that problems would come to light well before there are any serious consequences for customers or the water environment. Assessments of past performance and condition may, however, give a limited view of the future performance of networks, and how much activity properly directed each company should carry out on maintaining its sewer networks.
- E **Since late 2000, the industry has been developing an economic risk based framework for the future maintenance needs of its networks (the "common framework"). Ofwat, the Environment Agency, the Drinking Water Inspectorate and the Department have all been involved in the research steering group and are all committed to its objectives and success.** At the 1999 price review the quality and robustness of most companies' forward plans for maintaining their asset systems led Ofwat to conclude that no company knew enough about its networks to provide reliable plans. Ofwat informed us that this was despite requiring each company to develop a coherent approach to asset management from as early as 1991. In 2000 Ofwat asked the industry to address the shortcoming and develop a sound economic basis for future capital maintenance needs.<sup>13</sup> Responding to Ofwat's concerns and following just under two years extensive research by the industry working with Ofwat, the industry's report on the common framework was published in May 2002. All the companies will use the common framework in part for their business plans for the 2004 price review using their own expert judgements where there are data gaps.

- F Ofwat has recognised that full implementation of the common framework is unlikely to be achieved by many companies at the 2004 review but considers even partial use of the common framework will be an improvement on the plans submitted at the earlier reviews.** Ofwat has confirmed that if and when implemented effectively by a company, the common framework will result in robust forward-looking assessments and provide Ofwat with assurance that the company has a robust understanding of its networks. Ofwat expects full implementation for the 2009 price review. Ofwat will assess the degree to which each company has implemented the common framework in its draft and final business plans for the 2004 review. Ofwat has said it will give each company detailed feedback on its assessment to ensure there is transparency and it recognises there is a risk that the development of the common framework may be hindered if its assessments are not conducted in a robust and transparent manner.
- G There is a need to develop fully longer term plans for the sewerage networks that reflect the likely implications of economic growth, climate change and the requirements of environmental legislation.** Each company currently produces longer-term plans, drawn from local drainage area plans, as required by Ofwat for the purpose of price setting. Ofwat also requires assessments of supply and demand over the longer-term. Companies will also use the common framework to generate robust assessments of future capital maintenance needs but these may need to be supplemented by reviews of the need to increase network capacity in some areas. For example climate change may have an effect on the capacity of sewers to maintain existing service levels, or there may be additional environmental demands arising from legislation such as the Water Framework Directive.





# RECOMMENDATIONS

## 10 Our recommendations are:

- A Sewerage companies have a duty to provide drainage and cannot stop additional flows into the network even though these may overload it and cause flooding. The Department should consult on the need for legislation to improve the planning and co-ordination of how additional burdens placed on the sewerage network are approved and on whom the cost implications should fall.
- B Companies apply Ofwat's guidance on categorising properties at risk of sewer flooding inconsistently, hampering comparisons between companies. The 'at-risk' measure is also difficult for customers to interpret. Ofwat should encourage meetings between the 'reporters' used to validate company data, to identify and reduce significant data inconsistencies in the information reported on properties at risk. Ofwat should also decide whether they wish 'at-risk' figures simply to be a record of the number of incidents over previous years or whether 'at-risk' figures should also provide an indicator of risks customers actually face and inform the scope for reducing flooding of properties.
- C Ofwat has encouraged companies to develop robust cost-benefit analysis techniques to inform decisions on which sewer flooding problems to address. Only one company has done so to date and our adviser Professor Pearce doubts whether the findings are transferable to other companies. Ofwat should encourage the industry to carry out co-ordinated studies on customers' willingness to pay that, according to Professor Pearce's paper, are needed to give a rigorous understanding of which more expensive schemes are worth pursuing in each company's particular circumstances.
- D WaterVoice and the industry can play a role in the dissemination of best practice around dealing with sewer flooding. The WaterVoice best practice register is a useful initiative in highlighting company good practice. WaterVoice should develop the register further and publicise it, to encourage the industry to improve by giving more detailed examples on matters such as methods of minimising underreporting and on company websites with respect to information for customers on sewer flooding. Although household insurance plays an important role, the industry could consider more formal arrangements for making payments to customers affected by sewer flooding above the rebate of sewerage charges that better reflect the damage and hardship involved.
- E Companies should develop a clearer understanding of the rate of deterioration of their sewerage network assets. The industry or individual companies could achieve this by instituting a long-term programme (over perhaps 25 years) of surveys of a selected sample of different types of sewer. Ofwat should consult on the benefits and costs of either an industry-wide initiative to research the rate of deterioration of sewers or a requirement for each company to include such a sample in its regular five-year asset inventory assessments. In the longer term, once there is a better understanding of the condition of these assets, Ofwat should place more reliance on this information in its assessment of the needs of the networks.

- F Each sewerage company needs to have a thorough risk-based understanding of its networks and the linkages between condition, performance and the likely impact of intervention options. The common framework provides a means by which each company can achieve such an understanding through a coherent and convincing forward plan. The importance of a successful implementation of the common framework to the industry, and ultimately to customers, should not be underestimated. Ofwat should continue to encourage each company to implement processes consistent with the common framework as quickly as possible. Ofwat should encourage companies by identifying where its judgements have been informed by robust early work by companies on implementing the common framework.
- G Full implementation of the common framework by each company at the 2009 review should enable them to make robust and convincing assessments of capital maintenance needs that can be largely relied upon by Ofwat when it sets price limits for 2010 and beyond. Ofwat should set out more good practice and give each company tailored feedback on weaknesses in their submissions. Companies can use this feedback to develop their understanding of what Ofwat expects of them in the years leading up to the 2009 review. Ofwat should also ensure that its process for reviewing company submissions is quality controlled and that the company reporters are used to quality assure the companies' common framework processes.
- H Developments such as climate change, the Water Framework Directive and new housing development will place new demands on the performance of the sewerage network and the way investment in the network is prioritised against other demands falling on the industry. Consequently, there may be a need for more robust assessments of future demands on the networks, as currently happens for clean water through water resource plans. There have been various previous initiatives where the industry, Ofwat and other interested parties have worked together successfully, such as the common framework and the tri-partite review of water leakage. The industry, Ofwat, WaterVoice, the Environment Agency, the Department, local authorities and other interested parties should work together to establish a framework so that each company can develop strategic, evidence-based assessments of the most likely longer-term requirements of their sewerage networks, how these will be met over time, and setting out the roles of the various interested parties.

