



Lessons Learned from Summer Floods 2007

Phase 1 report - Emergency Response

Water UK's Review Group on Flooding

Version: Final

February 2008

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Summary

Recommendations of the Phase 1 report – Emergency Response

Whilst the water industry is used to dealing with floods and other emergencies and individual companies have contingency plans in place, there are clear lessons to be drawn from the extreme summer 2007 flooding events for the management of emergencies and their immediate aftermath. Many of these require the attention of water companies and the water industry as a whole, including working closely with regulators, consumer bodies, health agencies and emergency response organisations. Probably the most important conclusion to be drawn is that the sheer scale of the summer floods overwhelmed the existing emergency and flood management plans that the relevant water companies had in place.

Our first and principal recommendation is therefore that water companies put in hand a thorough review of their emergency response and contingency plans on the assumption that the sheer scale and severity of future floods may make current plans inadequate. (*Recommendation 1*)

The following sections outline the remaining recommendations made by the Review Group. These have been grouped to indicate those actions for the individual water companies and those for Water UK on behalf of the water industry.

Recommendations for the water companies

The following recommendations are made specifically for the attention of individual water companies.

Preparedness

Water companies should ensure that they are appropriately involved with all key agencies in planning, training and rehearsing for critical incidents. These would include public health bodies, social services, statutory consumer organisations and animal welfare agencies in addition to the emergency response organisations,

government departments and command structures. In particular we recommend that the relevant water companies be included in the Gold and Silver Emergency Command Structures in order that all parties can familiarise themselves with the working methods of such structures, ensuring that understanding of the roles and responsibility is constantly refreshed and takes account of staff turnover. *(Recommendation 4)*

Water companies, highways authorities, private asset owners and other organisations with responsibility for provision and maintenance of data should review the data and information that are available within the sector and that could be securely shared amongst key stakeholders to better aid the planning and response process. Areas where data may not be available should be identified and solutions proposed to redress these gaps. *(Recommendation 5)*

Water companies and any other organisations with a responsibility to provide equipment under Mutual Aid Scheme should ensure that this equipment is kept in a roadworthy and clean condition at all times to ensure that response times to emergency events are kept to a minimum. *(Recommendation 6)*

Water companies should take a fresh look at the potential vulnerability of their key assets, including the risks from other utility service failures, and then harden those sites as best they can against the higher levels of risk now emerging. In the short-term, this may involve the deployment of temporary measures. In the longer term substantial investment may be required. *(Recommendation 7)*

Water companies should review the efficacy of their emergency supply assets to cope with such minimum levels (e.g. bottled water supply chain, numbers and location of bowsers and tankers). Dialogue with supermarkets and other bulk providers of bottled water should also ensue to determine how best to ensure adequate supplies during emergency events. *(Recommendation 9)*

Water companies should ensure that they maintain a full and up to date register of key stakeholders and contact lists for organisations responsible for vulnerable consumers, and of any special communication requirements they may have. These registers

should be accessible by overflow call centres and emergency response teams. *(Recommendation 10)*

The registers should highlight in advance the appropriate actions required for each group of vulnerable consumers, including farm animals. Companies should also consider any limitations of bottled water supplies for consumers with specific medical needs or infants. *(Recommendation 10)*

Communications

Water companies should undertake to review their communication strategies for addressing customers, the wider public, other agencies and the media during emergencies to ensure that they are suitable for widespread service failure taking account of:

- The possibility of widespread disruption to channels of communication;
- The need for clear, simple and up to date information and advice;
- The likely weight of calls on web-sites and call centres;
- The demands on senior management time;
- The roles of the emergency services and other agencies;
- The particular needs of vulnerable consumers. *(Recommendation 11)*

Water companies should consider developing proforma standardised text and vocabulary to ensure that messages to consumers are consistent across and between water companies and that this consistency is maintained in the event of the use of emergency or overflow call centres. *(Recommendation 12)*

Mutual Aid Scheme

Water companies should rehearse emergency plans on a regular basis. This should include physically moving equipment within individual company areas and ensuring with other companies that provisions under the conditions of Mutual Aid Scheme are available. These rehearsals should include the emergency response organisations. Such rehearsals should include scenarios allowing for disruptions to access to sites and locations due to flooded roads and facilities. *(Recommendation 15)*

Public health and recovery

Water companies should give post-event clean up operations further consideration as an opportunity to recover service to customers including in situations where responsibility is not directly attributable. (*Recommendation 17*)

Recommendations for Water UK

The following recommendations are made for the attention of the industry as a whole and should be actioned through Water UK as the industry's representative body.

Assumptions

Water companies and Water UK should work closely with the Met Office and the environmental agencies further to develop specific industry requirements for weather information and advanced severe weather warnings and to obtain a better understanding of the potential severity of rain storms that might give rise to large scale flooding events. (*Recommendation 2*)

Water companies and Water UK should continue to work with the environmental agencies to build on existing generic and company specific flood forecasting tools to include, for example, depth as well as extent of flooding, and in particular to identify key infrastructure, such as treatment works, pumping capability, and the siting of emergency centres and supplies, that may be at greater risk than currently understood. (*Recommendation 3*)

Preparedness

Through Water UK water companies should review with drinking water regulators and public health organisations the likely scale of consumers' requirements for water during emergency events and how this requirement may change throughout an event. We recommend that plans for the provision of emergency drinking water supplies should take as their starting point that each person should be supplied with a minimum of 20 litres a day (i.e. twice the current assumption). (*Recommendation 8*)

Mutual Aid Scheme

Water UK should use its existing emergency planning and security network to review the state of preparedness of the industry for future events; in particular the industry's Mutual Aid Scheme should be reviewed with a view to ensuring:

- The technical compatibility of assets;
- The number and readiness of such assets;
- The means of deploying and managing staff made available under the Scheme;
- The resilience of the scheme to cater for simultaneous events.

(Recommendation 13)

Through Water UK the water industry should address the standardisation of emergency supply equipment to ensure that in the event of an incident equipment from other companies or organisations is compatible. *(Recommendation 14)*

Public health and recovery

Through Water UK the water industry should establish a standard approach to the temporary use of non-potable water to restore sanitation supplies, clearly outlining the conditions and situations in which it should be considered as an option. To deliver this standard the industry will need to work at a national level with government, statutory consumer organisations, public health bodies and drinking water regulators. *(Recommendation 16)*

Timetable and actions

The Review Group's final recommendation is that an appropriate group is established to oversee the actions on these recommendations, and those of other reviews, and to identify an appropriate method of reporting progress. This group should be governed by Water UK and should take its membership from water companies and other organisations with the appropriate knowledge and influence to complete the actions required. *(Recommendation 18)*

Phase 2 report – Longer Term Issues

The Review Group will carry out a phase 2 of its review into flooding considering the longer term issues facing the sector. The scope of the report will remain flexible but will cover the questions around long-term policy and investment issues highlighted so far. This will include but not be limited to:

- Climate change impacts and implications for investment;
- Resilience of water infrastructure and assets;
- The allocation of responsibilities for flood prevention and remediation;
- Sewers – automatic right of connection, sewer flooding, ownership / private sewers, suitability of design standards in a changing climate;
- Impact of EU Flooding Directive;
- Public expectations in the event of future flooding.

1 – Introduction

Through Water UK, the UK water industry is undertaking a review of the unprecedented flooding events that affected parts of the UK during 2007. A Review Group on Flooding (Review Group) was established under the independent chair of Sir John Baker. A full list of members of the Review Group is given in Appendix 1.

The report is intended to cover the whole of the UK water industry and as such recognises that different structures exist within the different administrations. The report uses generic language and terminology that should be read as applicable to each model unless specifically noted otherwise.

The water industry is used to handling floods; the events of summer 2007, however, were different. Each company has in place plans for dealing with floods or other emergencies (as part of the requirement of the Security and Emergency Measures Direction (1998)) but these were overwhelmed by the intensity and severity of the rainfall and the consequences.

“The scale and speed of the floods that affected people in summer 2007 came as a shock. In many cases, this reflects people’s limited awareness of risk, especially of surface water flooding, and limited engagement in preparedness planning” (Pitt Review, 1)

“Existing, well rehearsed, emergency plans were used and were generally considered fit-for-purpose but the scale and complexity of the summer incidents challenged the plans and highlighted where there were gaps or weaknesses. (Health Protection Agency response to Review Group)

The review examines the experiences of those who were involved in the exceptional events, and considers from the point of view of the water industry, its customers and all water consumers what went well, what went less well, and what lessons can be learned for the inevitable next time when drinking water supplies and waste water services come under threat from extreme weather events.

The review is not concerned with awarding praise or blame in relation to any of the people or organisations caught up in the floods, but focuses on the issues of how to ensure that the impacts of floods on water customers can be further mitigated next time. The Review Group is also considering wider policy issues such as the vulnerability of services and infrastructure to climate change, rising consumer expectations about the reliability of water supplies, the reduction of risk, and the possible further upgrading of the water and sewerage infrastructure.

The Review Group has invited contributions to its thinking from all key stakeholders, including all water companies, regulators, relevant government bodies, NGOs and business and academia contacts. Responses have been received from the organisations listed in Appendix 2 and the Review Group is grateful for their input.

The outcome of the review is to be published in two phases:

- This Report (the Phase 1 report) focuses on the industry's immediate responses to the flood emergencies and the recovery of normal services, and makes recommendations to both the industry and its stakeholders designed to ensure that the lessons that can be learned from the 2007 floods can be applied so as to ensure that, next time round, the water industry's response is even better prepared and carried out fully and effectively.
- A second report will be produced in spring 2008 that will address the wider strategic, infrastructure and policy issues.

The focus of these reports is not to review again the specific individual events of 2007 but to draw out from the reactions and responses to these events the implications of such events for the industry as a whole. Local reports have already covered the Yorkshire and Humberside events (2, 3) and the Gloucestershire event (4, 5) and the Review Group has benefited from direct discussion with Yorkshire Water (YW) and Severn Trent Water (STW) fully to understand the specific events in those companies' areas.

The Review Group also recognises that concurrent reviews are being carried out by other bodies - in particular Environment, Food and Rural Affairs (EFRA) Committee, the Cabinet Office, the Water Services Regulation Authority (Ofwat), and the Environment Agency (EA). Each of these organisations has been contacted during Phase 1 for their initial thoughts and the Review Group will seek further discussions in Phase 2.

2 – Background to the summer floods

Floods are natural and inevitable events whose effects can be devastating in terms of property, livelihood, and human and animal welfare. Non-coastal flooding is defined as occasions when land that is usually dry is covered with water as a result of a river overflowing or breaking its banks (fluvial flooding) or heavy rain (flash, pluvial or surface water flooding). Society can try to take precautions to reduce the circumstances in which heavy rain leads to flooding and the consequences of flooding when it occurs but we cannot prevent floods. Specifically, town planners and agencies can try to manage the manner in which water is moved around towns, and drainage authorities and water companies can try to manage the removal of run off and waste water.

The water industry is spending £16.8 billion on capital programmes to deliver infrastructure improvements in the current planning period, 2005-10. Of this it is spending £1bn on reducing the risk of sewer flooding. However, because of the diverse and numerous causes of flooding, it is not possible for the water industry or any other single body or agency to ensure that flooding never occurs.

It is simply not credible that the nation could afford the cost of ensuring there would be no more floods - a judgement has to be reached about how much prevention is worthwhile. That judgement needs to be revisited from time to time to see if the balance is right: rapid climate change, which will change the severity, frequency, intensity and impact of floods, suggests that that judgement needs revisiting now.

The meteorological events of the summer of 2007 were extraordinary and unprecedented. They resulted in flooding in many parts of the UK in June and July that was seen as unprecedented in both scale and location. Homes, businesses and agriculture were all adversely impacted on a scale that was outside the assumptions on which emergency plans had been prepared.

The most severe flooding occurred in:

- Northern Ireland on 12 June;
- East Yorkshire and the Midlands on 15 June;
- Yorkshire, the Midlands, Gloucestershire and Worcestershire on 24 - 25 June;
- Gloucestershire, Worcestershire, Oxfordshire, Berkshire and South Wales on 19 - 20 July.

The Environment Agency report into the flooding (6) notes that over 55,000 properties were flooded during these events and over 140,000 properties in Gloucester faced disrupted drinking water supplies. The Association of British Insurers (7) further notes that, in total, 165,000 insurance claims were made with an estimated cost in the region of £3.0 billion.

The immediate cost to the water industry in responding to the events has yet to be fully assessed by the companies. Not only will costs include the direct costs of dealing with the incidents but also additional staff costs and costs to other companies for providing support and logistics through the Mutual Aid Scheme.

The potential future cost to the water-bill payer of upgrading the water infrastructure to reduce the risk of flooding in the future and to make water supplies and sewerage more robust when floods occur will be significant, so debate will be needed between all the parties - water companies, government, other agencies and local authorities, and consumer representatives - to help determine where the balance between spending and protection is to be drawn.

2.1 - Meteorological background

The Met Office reported to the Review Group that the cumulative rainfall total in the UK for May, June and July 2007 was unprecedented. Records show that 414mm of rain fell across England and Wales, making it the wettest May to July since records began in 1766. This is in the order of 2.5 times the 1971-2000 average for England and Wales of 186mm.

Locally the effect was even more marked with some weather stations recording over four times the average rainfall for the time of year. Figure 1 shows the volumes of rain experienced across the UK between May and July 2007 and the variance from the average.

The prolonged nature of the wet weather meant that rain was falling onto ground that was already saturated, causing increased surface water run off. In urban areas paved surfaces prevent rainwater infiltrating the soil, increasing surface water run off and adding to the flooding.

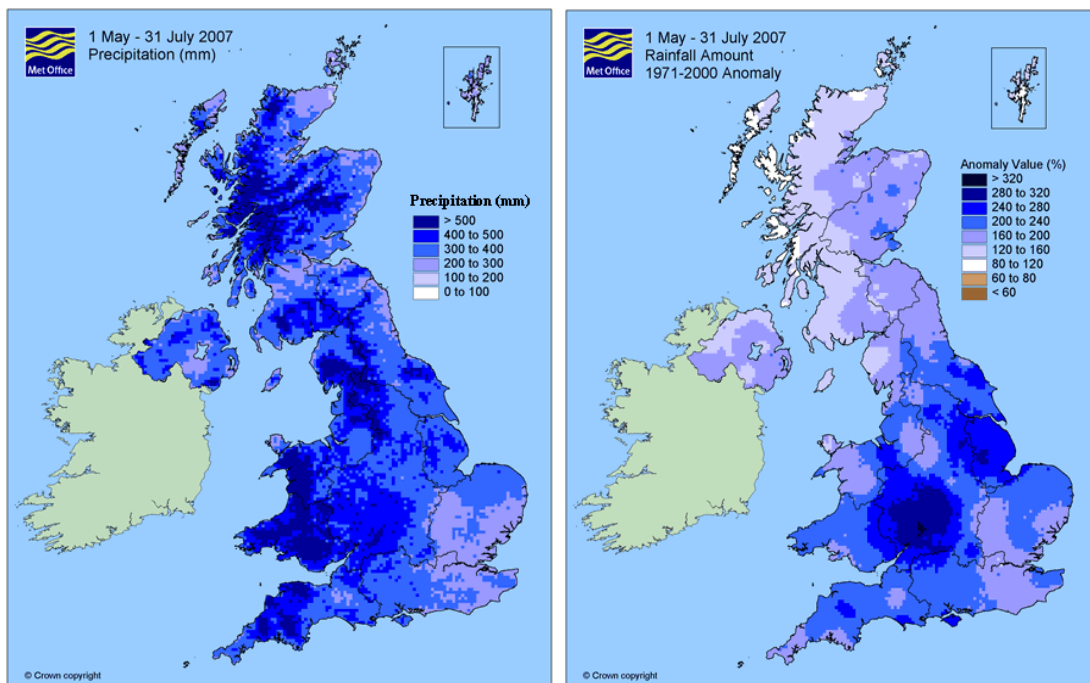


Figure 1 - Precipitation (mm) 1 May - 31 July 2007 and anomaly from the 1971 – 2000 average (from Met Office response to Water UK Review Group on Flooding, 16 November 2007)

On 24 -25 June, a deep and slow-moving area of low pressure brought a prolonged period of heavy rain, causing widespread surface water flooding in parts of Yorkshire and the Humber, Derbyshire, Lincolnshire and Worcestershire.

During the period of heavy rainfall pumping stations in the area continued to operate as designed. However on 26 June, flood water overwhelmed a pumping station in

Hull called Bransholme surface water pumping station (SWPS). The station operated throughout 25 June but was itself overcome by flood water on the morning of 26 June. Temporary pumping was introduced the same day.

Over the course of the two days Hull County Council reported that 7,800 properties were flooded and over 1,300 businesses had been affected by the flooding in the city.

Heavy rain moved northwards across the UK from late on 19 July throughout 20 July. Widespread surface water flooding occurred on the morning of 20 July across Southeast England, and later in the day across the Midlands as the system moved north-westwards, causing widespread disruption to the motorway and rail networks.

This heavy rainfall resulted in flooding which inundated the Mythe Water Treatment Works (WTW) which sits at the confluence of the Rivers Severn and Avon. This inundation required Severn Trent Water (STW) to commence a controlled shut down of the works commencing on Sunday 22 July. The phased and planned Mythe WTW shut down resulted in the loss of water supplies to some 160,000 properties, though some 20,000 of these were able to be switched to an alternative pressurised supply from an adjacent WTW (4). As a result some 350,000 water consumers had no piped drinking water for periods as long as 15 days whilst the recovery effort took place.

Measures to provide an alternative water supply to these consumers were taken through the provision of tankered and bottled water for the duration of the incident. The response to this event is considered the biggest mobilisation of equipment of this type faced in peacetime Britain.

2.2 - Expected impacts of climate change

In order to set these floods in context, the Review Group met with UK Climate Impacts Programme (UKCIP) on the predicted impacts of climate change on flooding at the start of its review.

The scientific expectation is for an increased frequency of extreme weather events, including localised heavy rainfall, especially in the winter months. But whilst the

trends may be clear, a large degree of uncertainty will remain about when severe events will occur, exactly where they will occur, and whether they will tend to bunch or occur on some more evenly spread pattern. These uncertainties are highlighted by the fact that the 2007 floods occurred after heavy summer rain when climate change forecasts predict for the UK generally drier summers and wetter winters but with more extreme events within this overall picture at any time of the year.

No specific event can be attributed to one particular aspect of climate change. Nevertheless, it is reasonable to assess the incidence and severity of future risks in terms of the return rate of similar events in the light of general understanding of the implications of climate change for weather in the UK.

It is also likely that rainfall events will intensify into shorter time periods but there is great uncertainty around where or when they will happen. This highlights how natural variability in weather can confuse or mask predicted climate change impacts.

UK climate models, especially with the improvements expected with the latest climate models being developed by researchers (e.g. the UKCIP08 models), are likely to provide increasingly useful tools for water resource management planning where the long term impacts and trends can be taken into account. However, for planning for flooding they are more likely to be useful as general statements that various intensities of events could be expected to become more frequent and thus drive generic policy or investment decisions, rather than giving the ability to predict just where or when a severe storm might strike.

The water industry is already carrying out much work on the impacts of climate change. The outputs of this research and more specific detail on climate change impacts will be presented in the Phase 2 report. At the same time, water companies are already factoring the implications of climate change into their strategic planning and need to ensure that they take account of the most up to date modelling and science available. The industry should build on this good work to ensure that it has a common understanding of the impacts of climate change for operational and emergency planning.

3 - Lessons Learned and Recommendations

First and foremost the water industry has learned that whilst it has plans in place for dealing with emergency events these can be overwhelmed by the sheer scale of the weather conditions such as those that affected the UK in June and July 2007. The events seen and the responses required involved the mobilisation of support and relief not previously seen in peacetime Britain.

The brunt of major floods is inevitably borne by the people caught up in them who may have to leave their homes, will see property damaged or destroyed, businesses where they work forced to shut down, livestock displaced or drowned and crops damaged or destroyed. For those directly affected, a flood is distressing and disruptive.

Two pieces of consumer research were carried out after the summer 2007 flooding; by GfK NOP Social Research for the Pitt Review (1) and by Accent for the Consumer Council for Water (CC Water)¹ (8). The outcomes of this research are revealing, and give some strong messages about the expectations of consumers in the future.

Customers do by and large understand that what happened was exceptional. In the STW region the public felt that STW were operating “under difficult and extremely unusual conditions” (8). They do accept that a lot was done by the authorities, including water companies, to deal with the emergency. However, they consider that the failure of assets under extreme weather events should not have happened and, when such weather events happen again, they expect the industry to have learned lessons to deal with the situation.

Loss of essential services causes distress and can lead to panic. In the GfK NOP (1) findings consumers rated water and power as top priority services that need to be restored or maintained in the event of an emergency of this nature. Consumers

¹ The CC Water research only focuses on the events in Gloucestershire associated with the loss of supply from the Mythe WTW.

generally accepted the provision of alternative supplies on occasions where supplies were lost. Indeed:

“ People appreciated the work carried out by those who provided them with water, but there were also reports of the scarcity of water causing arguments and tension in local communities” (Pitt Review, 1)

Criticism was made of organisations, including water companies, that there was little evidence of existing contingency plans either being in place or acted upon when the emergency developed. Under the Security and Emergency Measures Direction (SEMD) 1998 water companies do have plans in place to react to and deal with emergencies. These plans are approved by government and audited regularly. On this occasion however they were overtaken by the scale and unprecedented nature of the rains and floods.

Recommendation 1:

Water companies put in hand a thorough review of their emergency response and contingency plans on the assumption that the sheer scale and severity of future floods may make current plans inadequate.

To assist the water industry to achieve this level of expectation this Phase 1 report highlights key areas where lessons can be learned and existing water company practices improved: assumptions need to be revisited, plans revised, emergency operations upgraded and rehearsed, communications overhauled, and relationships with other emergency authorities put on a firmer footing.

3.1 – Assumptions

A recurring theme in many contributions made to the Review Group is the scale of the meteorological and flooding events of the summer of 2007, in particular in the intensity of the rain and the significance of preceding wet conditions on infiltration of rain into the ground. This rainfall was on a scale well beyond the existing assumptions or expectations of most of the relevant agencies, including the water companies. The emergency plans that the water companies had in place worked to the extent and in

the way they had been planned for but were soon swamped by the sheer scale of the events. This was highlighted in Gloucester but was also evident in the Yorkshire and Humberside events.

In their submission to the Review Group the Met Office noted that they successfully issued early warnings of severe weather. However, they noted that there was evidence that the underlying message was confused primarily over the distinction between “flood warnings” and “severe weather warnings”. The difference is that severe weather warnings and flood warnings do not necessarily occur simultaneously.

Recommendation 2:

Water companies and Water UK should work closely with the Met Office and the environmental agencies further to develop specific industry requirements for weather information and advanced severe weather warnings and to obtain a better understanding of the potential severity of rain storms that might give rise to large scale flooding events.

The water industry accordingly needs to stay close to the Met Office and UKCIP to understand future climate trends in greater detail and to review its current assumptions as to the scale, frequency and consequences of future potential floods. It should share its thinking and assumptions in detail with the other relevant bodies (local authorities, environment bodies, drinking water quality regulators, health authorities, etc.) to ensure that future preparations are relevant, coherent and consistent, and based on a common understanding.

Recommendation 3:

Water companies and Water UK should continue to work with the environmental agencies to build on existing generic and company specific flood forecasting tools to include, for example, depth as well as extent of flooding, and in particular to identify key infrastructure, such as treatment works, pumping capability, and the siting of emergency centres and supplies, that may be at greater risk than currently understood.

3.2 – Preparedness

There has been some criticism from consumers and other agencies caught up in the floods that the level of preparedness at outset of the 2007 events was not as full as it could have been, resulting in a slow or inadequate reaction to the unfolding situations. All water companies have existing plans for dealing with emergencies and these plans include being able to call on the support of other water companies through the industry's Mutual Aid Scheme. These plans are reviewed on a regular basis. However, the sheer scale of the summer 2007 floods meant that these plans left the water companies concerned unable to respond as effectively as they had expected to and planned for. Full preparedness is essential. In particular, attention needs to be given to:

- Emergency command structures and local resilience forums;
- Availability and sharing of critical data;
- Cleanliness and readiness of bowsers and tankers;
- Location of emergency centres and supplies;
- Loss of key assets;
- Emergency water supplies.

3.2.1 Emergency command structures and local resilience forums

The water industry's role within the formalised Gold and Silver command structures was raised as an issue by a number of respondents. A Gold - Silver - Bronze command structure is used by emergency services to establish a hierarchical framework for the command and control of major incidents and disasters. Within this structure water companies are classified as Category 2 responders and should be consulted as appropriate.

The experiences during summer 2007 showed a patchy and inconsistent picture in the level and timing of involvement of water companies in the developing emergencies. The degree of participation of water companies in emergency command structures ranged from none to full. The points at which water companies were invited to attend the command structure meetings also varied (and not just dependent on the type of event). Yet experience in summer 2007 showed that once a water company was

directly incorporated into the emergency command structure and reported to the command leader then both communications, understanding of needs, and decision-making rapidly improved.

It is evident that participation in and training with local resilience forums² will allow the development of working relationships with other emergency responders and local authorities during normal working conditions that will have benefits in the event of an emergency. Emergency response plans need to be exercised regularly to be fully effective. Water companies clearly ought to participate in such rehearsals and rehearsals need to be sufficiently frequent to ensure full familiarisation by relevant personnel, allowing for staff turnover.

The process of co-ordinating advice to the public was carried out by the establishment of Scientific and Technical Advisory Cells both locally and nationally (STAC). These were convened by the Health Protection Agency (HPA) as a Category 1 responder to develop agreed advice to the command structure that had the support of all organisations involved.

The creation of this group facilitated the production of consistent public information messages and minimised the risk of contradictory or confused advice being issued. The STAC included representation from the relevant water company, the HPA, the Food Standards Agency (FSA) and the drinking water quality regulator.

In general, this approach was seen to successfully co-ordinate public health advice and this arrangement should be a model for future events. It would be helpful if appropriate regulatory bodies present on a STAC ensure that the advice given assists

² The principal mechanism for multi-agency co-operation at the local level is the Local Resilience Forum. Local Resilience Forums are generally based on local police areas (with the exception of London), and bring together all the organisations that have a duty to co-operate under the Civil Contingencies Act, along with others who would be involved in the response to an emergency.

Local Resilience Forums ensure effective delivery of those duties under the Civil Contingencies Act that need to be developed in a multi-agency environment. In other words they ensure that preparing for emergencies is done in a co-ordinated, effective way by all local responders working together.
<http://www.preparingforemergencies.gov.uk/government/local.shtm>

the delivery of their statutory duties. In their submission to the Review the HPA noted that:

“Effective partnership working contributed to the response and the engagement of the water company on the STACs was a positive development.”

(HPA response to Review Group)

The HPA also however noted that whilst this was generally a success story there were causes for concern over a lack of clarity on statutory roles and responsibilities. This was evident during the efforts to restore supplies following the disruptions at the Mythe WTW. Section 3.5 provides more consideration on this issue.

Recommendation 4:

Water companies should ensure that they are appropriately involved with all key agencies in planning, training and rehearsing for critical incidents. These would include public health bodies, social services, statutory consumer organisations and animal welfare agencies in addition to the emergency response organisations, government departments and command structures. In particular we recommend that the relevant water companies be included in the Gold and Silver Emergency Command Structures in order that all parties can familiarise themselves with the working methods of such structures, ensuring that understanding of the roles and responsibility is constantly refreshed and takes account of staff turnover.

3.2.2 Availability and sharing of critical data

The water industry maintains comprehensive asset and location data for their above ground treatment assets and their underground clean water distribution infrastructure. The same cannot be said for the sewer and drainage networks due to the extent of private sewers and other asset owners. The data that would be required for a truly integrated planning process will require good quality data from water companies but also from other organisations such as environmental bodies, highways agencies and local authorities as well as private land owners.

Another area where better information was needed was in relation to records of the availability, location and readiness of emergency equipment, precisely what was deployed where, and what was still available in reserve.

During the course of the emergency response to the Mythe WTW disruption Water UK attempted to keep a record of the additional equipment provided by water companies under the Mutual Aid Scheme to help the STW effort. This information was then provided to the Department for Environment, Food and Rural Affairs (Defra) to assist in briefing ministers. It was difficult to ascertain how many bowsers were being held in reserve by companies and how many would still have been available had the magnitude of the event increased further. Water companies should maintain their own information and make it available through a centrally-maintained database during times of emergency.

Recommendation 5:

Water companies, highways authorities, private asset owners and other organisations with responsibility for provision and maintenance of data should review the data and information that are available within the sector and that could be securely shared amongst key stakeholders to better aid the planning and response process. Areas where data may not be available should be identified and solutions proposed to redress these gaps.

3.2.3 Cleanliness and readiness of bowsers and tankers

In some cases emergency equipment provided through the Mutual Aid Scheme could not be confirmed as clean and ready to deploy directly. In their submission to the Review Group Water Direct³ noted that they believed most utility stocks are not in a condition that enables them to be immediately deployed. In particular Water Direct stated that:

³ Water Direct was a best endeavours responder to Severn Trent Water during the flooding incident in Gloucestershire in July 2007.

“Dedicated drinking water tankers must be available for immediate despatch, again, clean, disinfected and sampled for assuring quality at the time of deployment and use.” (Water Direct response to Review Group)

It takes 24 - 48 hours to fully clean, drain and sample bowsers and tankers before use. Having to do this at the outset of an event will increase the response time in deploying the equipment and hence in getting alternative water supplies to affected communities.

Recommendation 6:

Water companies and any other organisations with a responsibility to provide equipment under Mutual Aid Scheme should ensure that this equipment is kept in a roadworthy and clean condition at all times to ensure that response times to emergency events are kept to a minimum.

3.2.4 Location of emergency centres and supplies

The scale of the summer 2007 events meant that some centres from which an emergency event was intended to be managed, and some of the equipment intended to be deployed, became the victim of flooding and could not be deployed. At the same time, especially in the events around Gloucester and Tewksbury, the widespread nature of the floods severely impacted transport and traffic, making it difficult for staff to carry out their assigned emergency roles. Again, the assumptions made in emergency plans as to the viability in all circumstances of locations, equipment and personnel need to be reviewed to take account of the possibility that future floods may be more extensive, the water deeper, and the duration longer than may be being currently assumed.

3.2.5 Loss of key assets

STW lost a key water treatment works to the floods and as a result 350,000 people were without mains drinking water for 15 days. Castlemeads electricity sub-station was shut down due to flooding, leaving approximately 42,000 people without power which was not restored for 24 hours. More significantly the Walham electricity sub-station was also at significant risk of flooding. If this had failed the whole of Gloucestershire and part of Wales and Herefordshire would have been without power.

Gloucestershire County Council Overview and Scrutiny Management Committee noted that:

“Only a concerted effort involving the Fire and Rescue Service, the Military, the Environment Agency, and National Grid prevented the flooding of this sub-station.” (Gloucester County Council, 5)

In none of these cases was such a loss (actual or potential) anticipated because none of the assets had come under serious threat in previous floods. The loss of such assets to floods was not assumed in emergency plans.

Recommendation 7:

Water companies should take a fresh look at the potential vulnerability of their key assets, including the risks from other utility service failures, and then harden those sites as best they can against the higher levels of risk now emerging. In the short-term, this may involve the deployment of temporary measures. In the longer term substantial investment may be required.

3.2.6 Emergency water supplies

The water industry's current planning assumption is that in the event of a breakdown in mains drinking water supplies consumers should be provided with ten litres of drinking water per person per day by alternative means. This is stipulated in the Security and Emergency Measures Direction (SEMD 1998). For bulk water, bowsers and tankers are a key means of provision. In the short-term, until bowsers and tankers can be deployed and kept well-supplied, bottled water is needed, and in some situations, bottled water may also be required longer term, for example to those consumers who may have physical difficulty accessing bowsers or where specific health requirements dictate.

Experience of the summer 2007 loss of drinking water supplies on a large scale suggests that the ten litres per head assumption does not in practice meet consumers' expectations. In their analysis of the event STW calculated that the demand for water during the event was closer to twenty litres per person per day. It also needs to be

recognised that loss of mains supplies is likely to lead to “panic buying” of bottled water, and hoarding of water. As STW told the Review Group, bottled water “flew off the shelves” in the initial stages of their emergency, stabilising only when the public acquired confidence that when they went to the bowsers there would be water there.

Water companies need to revisit their assumptions as to what consumers water requirements are in an emergency and their supply chain arrangements for bottled water and for deploying and for refilling bowsers. Learning specifically from the experience in Gloucestershire we suggest the requirement to provide ten litres/head needs to be at least doubled.

Water companies currently maintain registers of vulnerable consumers within their supply areas. The use of these registers allows prioritisation of provision of emergency water supplies in the event of an incident. However, questions were raised as to the extent and suitability of these arrangements. Companies need to consider the type and extent of data that is held on these registers and consider working with local health authorities, consumer organisations and other community groups to ensure that they are maintained in a secure, comprehensive and up to date manner.

Two issues particularly arose:

Not all bottled waters are suitable for the reconstitution of infant formulae. The HPA noted that the communication of this issue to consumers was not effective. It was suggested that health bodies and drinking water regulators work to develop an agreed position on infant formulae to avoid confused messages in future events. This would enable water companies to provide correct advice to members of the public.

The water requirements of farms and farm animals need to be included within the planning process. In the case of dairy cattle these are significant volumes with a requirement of between 70 - 90 litres of water per head per day.

The National Farmers’ Union (NFU) noted that as animals are removed from pastures and housed in barns to escape the floods they need to be provided with water. During

the summer 2007 floods farmers felt that they were not provided for by the water company or emergency responders and were left to source their own water supplies.

Recommendation 8:

Through Water UK water companies should review with drinking water regulators and public health organisations the likely scale of consumers' requirements for water during emergency events and how this requirement may change throughout an event. We recommend that plans for the provision of emergency drinking water supplies should take as their starting point that each person should be supplied with a minimum of 20 litres a day (i.e. twice the current assumption).

Recommendation 9:

Water companies should review the efficacy of their emergency supply assets to cope with such minimum levels (e.g. bottled water supply chain, numbers and location of bowsers and tankers). Dialogue with supermarkets and other bulk providers of bottled water should also ensue to determine how best to ensure adequate supplies during emergency events.

Recommendation 10:

Water companies should ensure that they maintain a full and up to date register of key stakeholders and contact lists for organisations responsible for vulnerable consumers, and of any special communication requirements they may have. These registers should be accessible by overflow call centres and emergency response teams.

The registers should highlight in advance the appropriate actions required for each group of vulnerable consumers, including farm animals. Companies should also consider any limitations of bottled water supplies for consumers with specific medical needs or infants.

3.3 – Communications

Good communications are the cornerstone of maintaining public health during a flooding event, both to advise consumers what they can and cannot drink, and how to deal with sewage flooding, and where to find potable water if necessary. Without such adequate, timely and appropriate communication the risk of public health breakdown is heightened. In none of the incidents this summer was there any breakdown in public health.

There was much national media coverage of the events highlighting drinking water issues, as well as local news stories through local radio and TV. As the events unfolded, the use of these media outlets by the water companies to inform consumers became central to their response. Traditional methods were also used by water companies - loud hailers, direct mail shots, call-centres, and company websites - but some of these were overwhelmed by the sheer and unanticipated weight of enquiries put on them.

When water consumers were interviewed after the event (1, 8) the main response was that they did not feel adequately informed of what was going on or what they should be doing. This was particularly evident in the case of the restoration of piped water supplies that involved the provision of non-potable water for sanitation purposes ahead of the provision of potable water.

The research carried out by the Consumer Council for Water noted that whilst local radio and Sky Television were particularly good sources of information they tended to focus more on victims of the flooding rather than the issues around the loss of water supply. In their response to the Review Group CC Water noted:

- Consumers felt that communication had been patchy.
- Consumers would have preferred to have been supplied with water ‘not fit for drinking’ so that they could flush the toilet.
- Not all consumers knew when water was back on or whether it was safe to drink.

To clarify this situation CC Water recommends (and we agree) that there should be:

“A clearly defined communications process in the case of a declared disaster involving national as well as local media, with clear bulletins and information being given at specific time slots.” (CC Water, 8)

Recommendation 11:

Water companies should undertake to review their communication strategies for addressing customers, the wider public, other agencies and the media during emergencies to ensure that they are suitable for widespread service failure taking account of:

- The possibility of widespread disruption to channels of communication;
- The need for clear, simple and up to date information and advice;
- The likely weight of calls on web-sites and call centres;
- The demands on senior management time;
- The roles of the emergency services and other agencies;
- The particular needs of vulnerable consumers.

Where water supplies are interrupted, keeping consumers advised of the availability and location of alternative water supplies is obviously paramount. This can be done by radio, TV, post, door to door leaflets, word of mouth, adverts in papers and websites. Technological solutions, for example, using a web-based application are being developed and deployed by a number of companies and show great promise. However, high-tech solutions on their own may not be the complete answer - for example, where consumers do not have access to the web or where an electricity supply breakdown disables electronic equipment. There is clearly a need for *diversity* in communication channels but *consistency* in the messages going through them.

Recommendation 12:

Water companies should consider developing proforma standardised text and vocabulary to ensure that messages to consumers are consistent across and between water companies and that this consistency is maintained in the event of the use of emergency or overflow call centres.

Water companies have a system in place whereby when their normal call centres become overwhelmed by the density of calls being made to them, an emergency call centre can be brought on line. The establishment of these centres will involve staff who do not normally have daily dealings with the water industry and its customers and, as such, it is imperative that full briefings are provided to ensure that customers can be told with justifiable confidence what is going on and what it means to that individual.

3.4 - Mutual Aid Scheme

Water companies have plans for deployment of alternative water supplies in the event of supply interruptions under the Security and Emergency Measures Direction (SEMD). To assist with this a Mutual Aid Scheme exists. The Mutual Aid Scheme is the means by which the resources held by the water industry as a whole can be made available to a specific water company in an emergency at any time. All the water companies are expected to play their part.

This was fully activated during the Gloucestershire incident and the logistics involved are well documented in the STW report (4). Bowsers and tankers were supplied to STW from 18 water companies and a range of food, logistics and supply chain companies.

It was felt by many respondents, especially those at the delivery end of the incident, that there were areas where improvement to the system of the Mutual Aid Scheme could be made. These include improvements in the compatibility of bowsers and other equipment between companies; the availability and provision of mid-sized tankers; and the manner in which the provision of personnel is handled under the Scheme.

3.4.1 Compatibility of bowsers and other equipment

It became apparent that as the Mutual Aid Scheme brought in tankers and bowsers from across the UK, there were problems of incompatibility amongst the range of different makes, components, and ages of the equipment supplied, particularly of bowsers. In particular, there is no standard specification for bower and tanker

couplings such as fittings, level indicators and security mechanisms. This resulted in problems with deploying and filling bowzers.

Recommendation 13:

Water UK should use its existing emergency planning and security network to review the state of preparedness of the industry for future events; in particular the industry's Mutual Aid Scheme should be reviewed with a view to ensuring:

- The technical compatibility of assets;
- The number and readiness of such assets;
- The means of deploying and managing staff made available under the Scheme;
- The resilience of the scheme to cater for simultaneous events.

Recommendation 14:

Through Water UK the water industry should address the standardisation of emergency supply equipment to ensure that in the event of an incident equipment from other companies or organisations is compatible.

3.4.2 Provision of appropriate sized tankers

It also quickly became clear that there is a shortage of appropriate tankers, particularly mid-sized tankers, available to the industry. These are particularly useful for filling smaller static bowzers in urban areas and accessing sites which can only be accessed by narrow or restricted roads. Bowser locations are planned by water companies based on distance from consumers. Water companies need to review their intended location for bowzers and ensure that suitable tankers are available to allow replenishment. Operational planning needs to ensure that only appropriately sized tankers are deployed to certain locations.

3.4.3 Provision of personnel

The Mutual Aid Scheme also needs extension to include a protocol for enabling and managing the provision of personnel from supporting water companies as well as equipment. This should cover operational staff and supervisors, call centre staff, communications and media staff; as well as technicians and tanker drivers, in order to clarify chains of command, communication links, and to whom such staff report.

Recommendation 15:

Water companies should rehearse emergency plans on a regular basis. This should include physically moving equipment within individual company areas and ensuring with other companies that provisions under the conditions of Mutual Aid Scheme are available. These rehearsals should include the emergency response organisations. Such rehearsals should include scenarios allowing for disruptions to access to sites and locations due to flooded roads and facilities.

3.5 – Public health and recovery

Mains water supplies were lost to 350,000 consumers in the Gloucester floods, their requirements being met by a combination of bottled water and water from tankers and bowsers. When it became clear that the Mythe WTW would be inundated by the ingress of flood water, STW managed the shut down of the plant in an orderly fashion to facilitate the eventual restoration of supplies. When the plant came back on stream, STW had a choice of advising consumers that supplies were initially suitable for sanitation purposes only or of waiting until potable standard had been re-established.

Opinions on the matter were divided amongst the relevant agencies (health authorities and drinking water regulators) and much to-ing and fro-ing took place before it was decided that the best approach was to advise consumers that non-potable mains water was again available in the first instance for sanitation purposes and then some days later restored to drinking quality.

We agree this was the best approach. However, various issues of conformity with drinking water regulations arise, and the views of local and national public health authorities need to be factored in. This requires resolving and formalising amongst all the relevant parties, together with the associated communication needs, so that, next time, there is an agreed approach and process available.

In their submission to the Review Group the HPA state that:

“There should be a clear statement of the role of DWI and the water companies in emergencies. In particular there must be clarity about roles and responsibilities in deciding on, agreeing and implementing a re-connection strategy. The risk assessment for this should be informed by appropriate public health advice but all agencies should be aware of where the statutory responsibilities lie. These issues should be clarified and rehearsed within Local Resilience Fora as well as centrally.” (HPA response to Review Group)

Recommendation 16:

Through Water UK the water industry should establish a standard approach to the temporary use of non-potable water to restore sanitation supplies, clearly outlining the conditions and situations in which it should be considered as an option. To deliver this standard the industry will need to work at a national level with government, statutory consumer organisations, public health bodies and drinking water regulators.

Whilst in most cases the physical clean up of damage caused by flooding (with the exception of sewer flooding) will not be the responsibility of the water company considerations such as availability of resources and positive public relations could influence decisions to engage with the clean up process.

Recommendation 17:

Water companies should give post-event clean up operations further consideration as an opportunity to recover service to customers including in situations where responsibility is not directly attributable.

3.6 - Emergency plans

As stated during the introduction to this report the water industry is used to handling floods and other emergency events. Each company has in place plans for dealing with floods or other emergencies (as part of the requirement of the Security and Emergency Measures Direction (1998)). The issues to which we have drawn attention in the preceding paragraphs all have implications for the viability of those plans in real, foreseeable emergencies.

All water companies need to revisit their emergency plans to take account of the lessons learned from the 2007 events and to which we have drawn attention above. In particular, water companies need to reflect on the potential scale, severity and frequency of future floods, to enhance their preparations and planning accordingly, and to rehearse those plans regularly, preferably as part of the local gold or silver command structures.

The need for such a review is the basis of the Review Group's key recommendation which we repeat here for emphasis.

Water companies urgently put in hand a thorough review of their emergency response and contingency plans on the assumption that the sheer scale and severity of future floods may make current plans inadequate.

The above paragraphs and recommendations cover those areas where the Review Group feels that immediate lessons can be drawn from the events of the summer of 2007 and the responses required by water companies individually and the water industry as a whole.

There are, however, a number of areas where the Review Group believes more long term consideration needs to be given. These will be addressed in more detail in the Phase 2 report. The discussion below introduces these areas and outlines some of the key issues.

3.7 – Drainage responsibility and sustainable options

The responsibility for drainage of water is a complicated issue. The summary below highlights the legal responsibilities for drainage of water (in England and Wales):

- Under the Building Act 1984 and the Building Regulations 2000, local authorities have powers to require the satisfactory drainage of buildings by their owners – with ministerial responsibility being with Communities and Local Government (CLG).

- Under the Water Industry Act 1991 (the Act) sewerage undertakers have a general duty to provide, maintain and operate systems of public sewers and works for the purpose of draining their areas. This is enforceable only by Ofwat, with ministerial responsibility being with Defra. Under Section 106 of the Act owners and occupiers of buildings have an automatic right to connect to the sewer system.
- Under the Highways Act 1980, highway authorities have responsibilities for the drainage of highways – with ministerial responsibility being with the Department of Transport (DoT).
- Under Part IV of the Water Resources Act 1991 and the Land Drainage Act 1991, powers to protect land and property from inundation by water is divided between the Environment Agency, Internal Drainage Boards and local authorities – with ministerial responsibility being with Defra.
- Under the Town & Country Planning Act 1990, planning authorities may impose conditions and enter into agreements relating to the drainage of developments – with ministerial responsibility being with CLG.

Sewerage undertakers are only responsible for drainage from customers’ properties, not surface water in general. Many sewers are still in private ownership and not the responsibility of the sewerage undertakers. Other responsibilities lie with the environmental agencies and local authorities as well as highway authorities, land owners and, in rural areas, internal drainage boards (Figure 2).

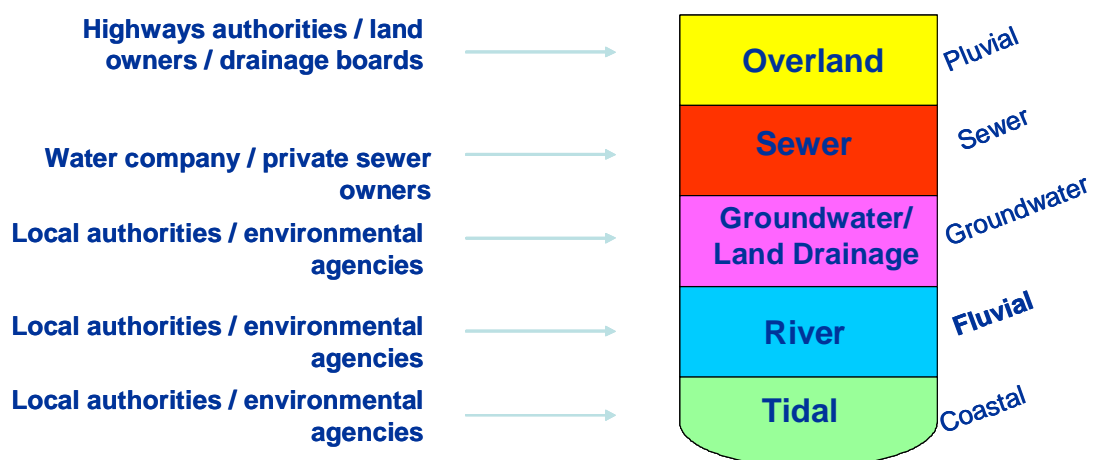


Figure 2 – Responsibility for components of urban drainage

Almost all responders to the Review Group noted that there needs to be some consolidation and rationalisation in the roles and responsibilities of organisations in relation to flooding. For example, Gloucester County Council in their Scrutiny Report notes:

“...there should be a single agency with overall responsibility for ensuring the maintenance of watercourses, as the current system is not effective, and therefore recommends legislative change to create a single agency with overall responsibility for ensuring the maintenance of watercourses. The new system must include clear signposting for members of the public on how to report problems and on who is responsible for addressing those problems.” (Gloucester County Council, 5)

The EA also notes that there is

“...the need for clarity of responsibility and a strategic overview of all inland flood risk, and improved coordination and action on management of risk from all sources of flooding.We need a strategic framework to understand, mitigate and manage urban flood risk. The Environment Agency is well placed to deliver that strategic role.” (Environment Agency response to Review Group)

The Review Group will consider the range of opinions on and options for allocating strategic responsibility for flooding in Phase 2 of the review.

In the event of a flood householders and businesses are not concerned with whose water it is, but with getting the water away and minimising future risks.

The water industry cannot deal with the impact of flooding of sewerage and waste water services on its own and will therefore need to involve other stakeholders to resolve issues associated with sewers, drainage and flooding. These will include the environmental regulators, highways authorities, local authorities and drainage boards. There are currently a number of projects underway to further understand and

implement sustainable drainage including Defra's Integrated Urban Drainage pilots and Making Space for Water programme.

In addition UK Water Industry Research (UKWIR) is currently completing its 21st Century Sewer Design research project which reviews the ability of sewers to cope with climate change impacts.

Key to delivering a long-term drainage strategy is the concept of sustainable drainage. This focuses on slowing down the transfer of water, particularly in urban areas where impervious surfaces and constrained channels move water quickly from where it falls into the drainage system. Whilst sustainable drainage alone would not have offered much assistance for events of the magnitude of summer 2007, the inclusion of sustainable drainage solutions into modern planning should be encouraged.

The water industry supports sustainable drainage initiatives and is involved in all 15 Defra Integrated Urban Drainage pilots. The Sustainable Urban Drainage System initiative (SUDS) is seen as a valuable tool to improve the manner in which the sector deals with surface water. However, SUDS are not flood defences. They can be used to ensure there is no increase in downstream flood risk but their primary purpose is providing surface water treatment. They are part of the solution but not sufficient on their own.

However, there are currently significant barriers to the design and implementation of SUDS:

- The right of water companies to refuse a design that is not appropriate;
- Health and safety issues associated with open water features that would be owned by private companies in residential areas;
- Many techniques are relatively new and the long term costs of maintenance are not well understood;
- Water industry responsibility for SUDS should be limited to those SUDS features that have connectivity with surface water sewerage systems (porous

pavements, isolated infiltration systems, soakaways and swales should remain in private/local authority ownership).

The water industry is keen to resolve issues preventing the implementation of sustainable drainage systems and, through Water UK, is lobbying Government to adopt legislation which reflects the existing Code of Practice, developed by the national SUDS working group. In this it is particularly important that the following points are addressed by legislation:

- Sewerage undertakers being involved in the planning process;
- Ownership and maintenance and funding of SUDS;
- Definition of works capable of constituting SUDS;
- Design standards;
- Restrictions on rights of drainage to SUDS and connection to surface water drainage;
- Rights of discharge from SUDS to watercourses;
- Protection of groundwater, and surface water quality, in accordance with the Water Resources Act 1991 and EC Directives.

Central to the issue of maintaining sewers is to ensure that they are used only for the purpose and products for which they are designed. Misuse of the sewer network through the disposal of inappropriate materials such as cooking oils, sanitary products and other waste can drastically reduce capacity or cause internal blockages that could lead to backing up and flooding in the event of heavy rainfall.

The Review Group proposes to carry out further discussions with the other parties involved around the issues of sewers and sustainable drainage for the Phase 2 report.

3.8 – Resilience

The flooding in the summer highlighted two very different issues – pluvial flooding associated with heavy rainfall and exceeding drainage capacity, and fluvial flooding caused by rivers exceeding their discharge capacity. In Yorkshire and Humberside

sewer flooding and drainage overflows due to sheer volumes of rainfall were key to the problem whilst in the Midlands river flooding overwhelmed the Mythe WTW, electricity sub stations and local rail and road networks.

Both incidents serve to highlight that parts of the water industry's infrastructure are susceptible to failure in the event of severe floods. In many cases if an asset fails there is sufficient back up available (for example when the Bransholme pump failed in Hull temporary pumping arrangements were put in place once the pumping station itself was overwhelmed). However there are areas of the infrastructure network where water companies recognise potential single points of failure, where there is no contingency to cover a failure of the asset. These can range from a number of customers at the end of a single piped supply through, to a water treatment works supplying a dedicated area.

The latter was the case with the Mythe WTW. This incident highlights the consequences of failure of single points of supply. In most cases there are engineering solutions that could secure the isolation of these assets: however, these will require (often significant) capital investment to accomplish. Gloucester County Council's Scrutiny Inquiry recommended that:

“...Severn Trent Water secure a secondary piped water supply for Gloucestershire, possibly via the Strensham Water Treatment Works, in order to ensure that they are able to maintain a piped water supply to Gloucestershire in the event of any future loss of the Mythe Water Treatment Works.” (Gloucester County Council, 5)

Discussions need to be held with the economic regulators to determine how such capital programmes should be assessed to ensure proper and appropriate funding. This will need to take the form of a risk based approach.

There are no generic standards for the resilience of the water industry's networks and guidance on this from the environmental regulators and government departments would be well received. Water companies already carry out flood risk reviews on assets, particularly above ground assets, though the understanding of the ability of

sewer networks to cope with excess water is less well assessed or understood. We agree that all water companies should revisit the identification of major assets whose loss would seriously imperil maintenance of water services to large numbers of customers, and should evaluate what options may exist to improve the resilience of the system.

However, the existing layout of water networks means that it is unlikely to be practical to provide backup supplies to all properties and, given that the investments required to provide duplicate means of delivering water services to even the majority of consumers are likely to be significant, it is far from clear that there would be an economic justification for a wholesale upgrading of infrastructure resilience or whether customers would be willing to foot the bill.

A co-ordinated approach by and with the water industry is also needed, not least because the effectiveness of these various networks is only likely to be as good as the weakest link. With such a co-ordinated approach, it should be possible to produce plans that will address vulnerable sites or the needs of major blocks of consumers on a prioritised basis thereby maximising the value of available capital.

Clearly any improvements to the resilience of infrastructure will require not only that significant capital investment, but stakeholder consultation and political involvement. The Review Group plans to study this issue further through discussions with key stakeholders for the Phase 2 report.

4 – Timetable and actions

Given the severity of the events in June and July 2007, the risk of similar events happening again in the near future and the timely nature of the report in the light of the water industry price review cycle, it is important that the water industry reacts promptly to address the recommendations made in this report, as well as those made by other reports both published and underway.

Water UK has an extensive network of working groups comprised of members of water companies with expertise in specific areas such as emergency planning; regulation; sewers and sewerage and asset management. Through these working groups Water UK can call upon knowledge and experience that will be essential in delivering the recommendations outlined in both this report and in those other reviews of the flooding that have taken place since June 2007.

Recommendation 18:

The Review Group's final recommendation is that an appropriate group is established to oversee the actions on these recommendations, and those of other reviews, and to identify an appropriate method of reporting progress. This group should be governed by Water UK and should take its membership from water companies and other organisations with the appropriate knowledge and influence to complete the actions required.

5 - Phase 2 – Longer Term Issues

The Review Group plan to follow up the Phase 1 report with a series of visits and discussions with key stakeholders to understand fully some of the key issues. As noted in part 1 of this report the aim is to publish the Phase 2 report in Spring 2008.

The scope of the report will remain flexible but will cover the questions around long-term policy and investment issues highlighted so far. This will include but not be limited to:

- Climate change impacts and implications for investment;
- Resilience of water infrastructure and assets;
- The allocation of responsibilities for flood prevention and remediation;
- Sewers – automatic right of connection, sewer flooding, ownership / private sewers, suitability of design standards in a changing climate;
- Impact of EU Flooding Directive;
- Public expectations in the event of future flooding.

Key References

1. The Cabinet Office, December 2007, “Learning Lessons from the 2007 Floods”
2. Hull Independent Review Body, November 2007, “The June 2007 floods in Hull. Final Report by the Independent Review Body 21st November 2007”
3. Yorkshire Water Services Ltd, December 2007, “Initial review of ‘The June 2007 floods in Hull’, Final Report by the Independent Review Body, 21st November 2007”, Confidential report.
4. Severn Trent Water, September 2007, “Gloucestershire 2007. The Impact of the July Floods on the Water Infrastructure and Customer Service – Final Report”
5. Gloucestershire County Council Overview and Scrutiny Management Committee, November 2007, “Scrutiny Inquiry into the Summer Emergency 2007”.
6. Environment Agency, December 2007, “Review of Summer Floods”.
7. Association of British Insurers, November 2007, “Summer Floods 2007: Learning the Lessons”
8. Consumer Council for Water, September 2007, “Response to Loss of Water Supply”

Appendix 1 – Membership of Review Group on Flooding

Sir John Baker - Independent Chair

Jim Marshall – Secretary to Review Group

Jonson Cox – Group Chief Executive, Anglian Water

John Cuthbert – Managing Director, Northumbrian Water

Ronnie Mercer – Chairman, Scottish Water

Colin Skellett – Chairman, Wessex Water

Appendix 2 – Organisations providing substantial responses

Anglian Water	Defra
Northern Ireland Water	Department for Regional Development
Northumbrian Water	Dumfries and Galloway Council
Scottish Water	Highways Agency
Severn Trent Water	Local Government Association
South East Water	Enterprise Plc
South Staffordshire Water	Flood Protection Agency
South West Water	Gloucestershire County Council
Southern Water	Gloucestershire Police
Sutton and East Surrey Water	Grampian Strategic Coordinating Group
Thames Water	Strathclyde Police
Three Valleys Water	Water Direct
United Utilities	Water UK Emergency Planners Network
Wessex Water	
	Association of British Insurers
Consumer Council Northern Ireland	Energy Networks Association
Consumer Council for Water	National Farmers Union
Environment Agency	Food Standards Agency
Natural England	Health Protection Agency
Water Services Regulation Authority (Ofwat)	The Met Office UKCIP