

A photograph of a storm drain with water flowing into it, overlaid with a teal circle containing text. The background shows a close-up of a concrete curb and asphalt road with water flowing into a series of rectangular drains. Some of the drains are partially blocked by brown and yellow leaves. The teal circle is positioned in the upper left quadrant of the image.

# 21st Century Drainage Programme

Protecting health, supporting communities,  
securing the environment now and for the future

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# WELCOME TO THE START OF A CONVERSATION.



Tony Harrington  
Chair of the Water  
UK 21st Century  
Drainage Programme  
Board

It's about the fundamentals of life – how and where we work and learn, how and where we live and play.

It's about the growth of the economy, and the protection and preservation of our incomparable countryside.

It's about us all, whether we live in the heart of the city or the heartlands of our rural communities. And it's about how we are going to prepare for a sustainable future.

Few of us think about what happens to the water that we use; when we flush the loo, or drain the sink, or step out of the bath or shower, or what happens every day beneath our feet. Billions of litres of water travelling through hundreds of thousands of miles of pipes, treated and returned to the environment. Once that treated water is returned, what's left is used as a renewable energy source for heat and light; and properly treated, is a clean and nutrient rich fertilizer for our crops and fields.

The water industry has invested billions of pounds over the last few decades on behalf of customers. Working in partnership with the UK's governments, regulators and community groups, we have rivers and streams that are now abundant with life. There is much still to do, but we have seen the benefits of that investment.

However, there are very real external pressures that we have to prepare for now, to ensure our children and grandchildren can build on this success. More people, bigger towns and cities and the effects of climate change will mean a greater demand for water when it's hot and dry, fewer green spaces to absorb the rain when it's wet, and more unpredictable weather.

Anyone who has been flooded knows how devastating it can be. Treasured personal possessions can be washed away within minutes and the place that should be a sanctuary quickly becomes a watery battleground. Those communities that have been hit by floods several times have had to keep rebuilding and renovating. Whilst no affordable drainage system could cope with the unprecedented amounts of rainfall that has impacted some of these communities, we must together find ways of ensuring that as much as possible, we can adapt, prepare and then recover.

Everyone in the water sector realises the scale of the challenge, and that is why more than 40 organisations from across the UK – governments, regulators, local authorities, environmental charities, academics and community groups – have joined Water UK for this 21st Century Drainage Programme. Since the programme started, the political landscape has changed significantly. Those involved in the programme believe it is the right thing to do, irrespective of whether we are subject to wider European legislation, which is why we are seeking to identify the major risks for drainage in the future, and to provide options for policy makers based on sound research and evidence.

We may have to think very differently about the future – about how we manage too much or too little water in our catchments, how we recycle water, how we use the precious resources that are in our wastewater to ensure that it is not wasted. It's about finding a balance between valuing and restoring the nation's natural capital, and supporting society's aspirations for more and better places to live and work.

Research and robust information will be the foundation of this programme and we want it to be as transparent as possible. Even with the large group of people involved in the programme, this needs to be a wider conversation, **and the aim of this document is to set out the past, the present, and the future of resilient drainage systems to facilitate that dialogue.**

Customers are broadly happy with the service they get at present, but the water industry will have to balance the significant costs of making the system resilient for the future with the need to keep their water and sewerage bills affordable.

As you will see later in this document, there are seven workstreams. They will give us some of the answers on which we can begin to shape the nation's future drainage strategy. Two pieces of work will report next year. One will develop a framework that more easily identifies the interventions that are needed to manage drainage capacity. Another will produce a cost benefit analysis of the impact of combined sewer overflows (CSOs). Other work, such as helping customers to understand what can and cannot go into the sewerage system continues, building on what water companies and environmental charities already do.

The programme has already generated a huge amount of work and debate within the industry, but we want to make sure that as many people as possible have a say in this vitally important debate. In particular, there are two we pose in this document:

**Question: Despite the Flood and Water Management Act, the sector has been criticised for still working in silos. How do we increase the pace of collaborative action across communities, stakeholders and those investing in infrastructure?**

**Question: How can we work together to make sure we can all understand the value of protecting our drainage systems?**

We would welcome your views, on these questions or any others, by email at [comms@water.org.uk](mailto:comms@water.org.uk), or on Twitter, using our hashtag [#21CDrainage](https://twitter.com/21CDrainage)

We look forward to hearing from you.



# SECTION 1

## Setting the scene

Introduction

The catalyst for collective action

So why do we need to act further?

### Introduction

The origins of the water industry lie at the heart of the Industrial Revolution. The mass movement of people from town to country meant that drawing fresh water from streams, wells and rivers and disposing of waste on surrounding fields was simply not feasible for rapidly growing populations. The spread of disease in new urban London, and the 'Great Stink' that caused MPs to flee Westminster and the banks of the Thames, led to a sewerage system that:

- catalysed investment for public infrastructure
- addressed the need for public health protection
- led to growing recognition of the role the environment played in protecting that public health.

Today, the vast majority of UK households have a continuous supply of high-quality drinking water and connection to a public sewer. There are 22 regional companies, 12 of which provide water supply and wastewater services while the remainder provide water supply services only. There are also several smaller regulated companies providing water supply and wastewater services (including recycling) to specific local areas.

The environmental quality of our rivers, estuaries and coastal waters are the best they have been since the Industrial Revolution although there is much more to do – only 17% of surface water bodies meet "good status" as defined by the European Union's Water Framework Directive (or WFD). The main water quality challenges that now need to be addressed under the WFD are posed by diffuse pollution caused by agriculture and land management activities.

### Why was the water industry privatised?

The country's failure to meet specific aspects of European environmental legislation, and the media interest and subsequent coverage, led to the UK being dubbed "the dirty man of Europe".

The government faced the challenge of balancing all the investment needs against the increasing cost to taxpayers.

It decided to privatise the 10 regional water authorities originally created in the early 1970s, as it recognised that private finance had an important part to play in securing the UK's environmental and economic fortunes.

This took place in 1989 and involved the transfer of assets and staff into limited companies. At the same time the 10 limited companies were floated on the London Stock Exchange.

Privatisation allowed these closely-regulated, stable companies to raise the finance they needed, at very competitive rates. Investors had confidence in these companies that planned for the long term.

392,000km  
PUBLIC  
SEWERS

#### FACT FILE

The network comprises 392,000km of public sewers and 9,335 wastewater treatment works

#### Did you know?

**Every single day the UK's water and sewerage companies treat 16 billion litres of sewage**

**The catalyst for collective action**

In 2013, the government laid down a challenge to the water industry to:

- monitor the performance of sewerage networks further
- determine whether this data was signalling a lack of capacity in the system
- consider better the links to drainage planning and the environment.

The devolved government in Scotland separately addressed investment priorities for Scottish Water through its own business planning process, as did the Welsh Government through its Water Strategy for Wales.

The catalysts for concern were combined sewer overflows (CSOs) as well as the risk that frequent discharges could not only impact the environment, but also lead us failing to deliver the standards set out in the EU Urban Waste Water Treatment Directive.

It became increasingly clear that investment in drainage infrastructure had struggled to keep pace with rapid housing development in some parts of the country; looking to the future, population growth and climate change would simply exacerbate this.

We as a sector had to find a way of balancing the competing needs of investment, customers, public health and the environment. To that end, the water industry committed to invest £400 million in tackling combined sewer overflows by 2020. This includes installing thousands of monitors so that, by this date, over 70% of overflows in England and Wales will be monitored to measure when, and for how long, they operate. This will give companies a far better understanding of what CSOs are doing and the impact that they are having on the environment.

But the industry cannot address the main drivers for change in isolation.

**So why do we need to act further?**

150 years after the first public sewers and drains were built there remains a complex landscape of ownership around sewers, highway drainage and flood protection infrastructure.

Unlike drinking water networks, sewerage systems are open to the use – and potential abuse – of the communities they serve.

They also reflect our changing society. When a new medicine or pesticide comes along, sometimes it takes time to assess the impact on the environment and, if needed, to find a way of cleansing it from the wastewater that companies receive.

There's also a lack of understanding about the impact of extra surface water, which is difficult to control. We need to understand the effect that more and better places to live will have on the systems we already manage and want to build for the future.

**Sewerage and drainage: who does what?**

The water and sewerage companies own the following types of sewerage infrastructure:

**Surface water sewers**

These carry rainwater that falls on our roads, drives and roofs directly to a local watercourse, river, soak away or combined sewer.

**Foul water sewers**

These carry wastewater from homes and businesses to a wastewater treatment works.

**Combined sewers**

These single pipes transport both wastewater from homes and businesses and rainwater to wastewater treatment works.

**Combined sewer overflows**

Combined sewer overflows are pipes and pumps which allow excess flows of highly-diluted wastewater, which in many cases passes through screens to remove plastic and rags, to be returned into watercourses, rivers and the sea to help prevent homes and businesses from being flooded. Many of these overflows are designed to agreed national standards, and any releases are consented to by the Environment Agency.

**Wastewater pumping stations**

These are often the first collection point for untreated wastewater. Some also have built-in overflows that allow screened, untreated wastewater to be returned into watercourses, rivers and the sea when high volumes of water simply can't be pumped and dealt with quickly enough.

**Wastewater treatment works**

Wastewater treatment works have four main stages of treatment – preliminary, primary, secondary and tertiary. The number of stages depends on what quality the treated wastewater needs to reach before it can be safely returned back into rivers or the sea.



**FACT FILE**

Over 95% of the UK is connected to a wastewater treatment works

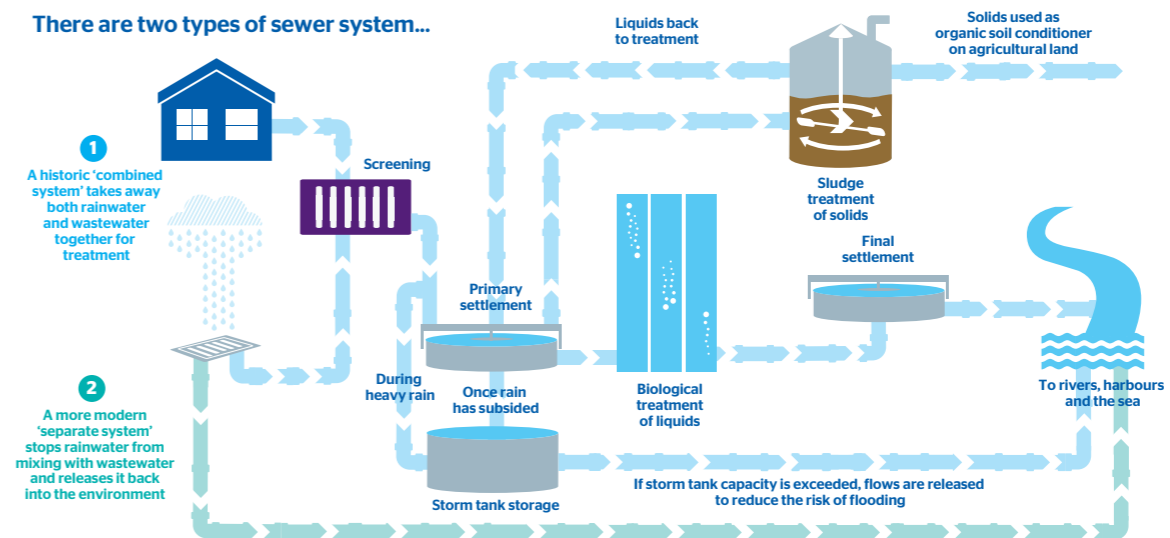
**Did you know?**

**The ownership of most private sewers and lateral drains that connect to the public sewer network recently transferred to the water and sewerage companies.**



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**There are two types of sewer system...**





## FACT FILE

Each person produces around 150 litres of wastewater per day

### Other parties in the drainage landscape

The water and sewerage companies are not the only bodies that have a role in drainage, and making sure the UK can deal with both existing and future challenges.

#### The Environment Agency/Natural Resources Wales/Scottish Environment Protection Agency/Northern Ireland Environment Agency

The Environment Agency, Natural Resources Wales, Scottish Environment Protection Agency and Northern Ireland Environment Agency are the UK governments' environmental regulators, responsible for protecting the environment from harm. They manage the risk of flooding from main rivers, reservoirs, estuaries and the sea, owning and maintaining key flood defences, including flood barriers and river pumping stations. They also monitor the water quality, for example, at designated bathing waters.

#### Lead Local Flood Authorities

County councils and unitary authorities are the Lead Local Flood Authorities that manage flood risks from surface water, groundwater and ordinary watercourses.

#### Highway Authorities

Highway Authorities are responsible for the public drains that deal with the surface water run-off from local roads, to help prevent flooding and protect the integrity of the highway itself. The systems these councils maintain and improve include gullies, culverts and open ditches.

#### District, Metropolitan and Borough Councils

District, Metropolitan and Borough Councils are key partners in flood risk management, carrying out work on minor watercourses, working with Lead Local Flood Authorities and others, and taking decisions on developments in their area to ensure that flood risks are effectively managed.

#### Internal Drainage Boards

Internal Drainage Boards are independent public bodies responsible for water level management in low lying areas. There are 114 Boards in England and Wales, which actively manage and reduce the risk of flooding. The Boards operate and maintain more than 500 pumping stations and 22,000km of watercourses.

**Private Owners/Industry/Supermarkets** often have large areas of drainage systems which are linked to foul sewers.

**Highways England/Transport Scotland/Welsh Assembly** are responsible for drainage from major roads.

As you can see it's a highly complex system, with different and sometimes overlapping responsibilities, standards and accountabilities. The view of the 21st Century Programme Board is that a simplified system, with clear lines of control and standards that are better aligned, would be a great step forward in developing better drainage for the future.

# SECTION 2

## The water industry: past, present and future

Reaping the rewards of 25 years' worth of investment

2015 – 2020: What the water industry is doing

2015 – 2020: What customers can expect

**Reaping the rewards of 25 years' worth of investment**

In the 25 years since privatisation, water companies have invested £130 billion both to catch up for past decades of under-investment in an ageing infrastructure and to meet new water quality and environmental obligations.

The result of this investment speaks for itself:

- the UK's drinking water is of the highest standard, at a record level of quality and among the best in the world. We can all turn on our taps with the certainty of a safe, clean supply as the following compliance rates shows:
  - England and Wales – compliance 99.96%
  - Scotland – compliance 99.89%
  - Northern Ireland – compliance 99.86%
- in 2015 95.4% of UK bathing waters met the minimum standard of the EU Bathing Water Directive – that is 595 out of 624. Some 60% of bathing waters met the excellent standard, and 29 bathing waters (4.6%) met the poor standard.
- cleaner, healthier rivers: Rivers are getting cleaner, starting the process of restoring the eco-systems that make up our natural capital. However, there is still much to do, and whilst chemical quality has improved, this has not been matched in some places by improved animal and plant life.
- putting the customer first: 91% of customers in England and Wales are satisfied with their sewerage service, while 77% believe it is value for money – a rise of 6% on 2015 and the first increase in four years, according to the Consumer Council for Water.



**Case study: Using nature to help customers and wildlife**

Wessex Water's Hanging Langford scheme addressed the winter flooding that affected customers and occurred most years. Heavy rainfall caused the water table – the level below which the ground is saturated with water – to rise up to ground level.

The Environment Agency agreed to permit a screened storm overflow only for periods when rising levels of groundwater were about to cause flooding. A condition of the permit was that Wessex Water provided a reed bed to filter, and effectively treat, the water prior to it being returned into the River Wylfe. This almost eliminates the bacteriological impact of the storm overflow on the river for the few days it is utilised each year. Wessex Water now works closely with Wiltshire Wildlife Trust to manage the reed bed, which provides a valuable habitat for a range of species such as dragonflies and warblers.

**Did you know?**

**Thames Water's Live Drainage Area Plan continuously monitors and updates the status of its sewer network. It provides a 'live' snapshot of the current health of all its drainage areas, allowing engineers to assess what interventions are needed to fix a problem - before it happens.**



**FACT FILE**

There are over 20,000 combined sewer overflows across the UK, with over 7,000 improved in the last 20 years

**2015 – 2020: What the water industry is doing**

The water industry plans in business cycles of five years – the current cycle will last until 2020 and will include significant drainage improvements as we now set out.

**Developing a Drainage Strategy Framework for the future**

In May 2013, Ofwat and the Environment Agency jointly published the Drainage Strategy Framework which sets out guidance and best practice for water and sewerage companies to follow to meet long-term sewerage and drainage needs.

It was an important step on the journey to more widescale, integrated, co-ordinated planning with partners. The work of the 21st Century Drainage Programme Board makes this operational, creating a framework of practical tools to help us identify priority catchments where the sector can develop Catchment Drainage Strategies by 2020 and beyond.

By following this framework, future pressures on sewers and drains will be proactively identified, and evidence collated. This valuable evidence will support what action needs to be taken to maintain and/or improve their performance as needed.

Understanding how well combined sewer overflows perform is a key part of this framework as it will help identify where to target investigations and improvements.

**Smart, innovative and targeted investment**

The water sector is already shifting its focus to predict and meet the challenges ahead while maximising opportunities to develop a more resilient and adaptable sewerage network. This is vital to ensure water companies protect and improve the environment, and support a thriving UK economy.

These plans will see more than £6 billion, including the Thames Tideway project, invested in sewerage services in the next five years, both building on improvements already underway and initiating new ways of working. About a fifth of this will be specifically related to combined sewer overflow improvements.

The work has a keen eye on the future – protecting previous investment from future challenges, while addressing new environmental and public expectations. Work, research and discussion in the next five years will also provide more understanding and guidance as water companies develop their next round of investment plans for 2020-2025.

The water industry is delivering multi-billion pound investments, ranging from upgrades at existing wastewater treatment works to increased storage for stormwater. Ageing sewers will continue to be replaced, although investment will be more targeted and effective as increased data and modelling will help water companies make more informed choices about what needs doing, where and when.

By far the most significant capital investment currently being delivered is the Thames Tideway project to tackle the million tonnes of untreated sewage being returned into the River Thames each year. This volume is predicted to double in the next 100 years without this investment. The project will deliver a new 20-mile underground tunnel that connects up 34 of the most polluting overflows. The flows will then be transferred to Beckton Waste Water Treatment Works for treatment.

It is the biggest investment in the sewerage system in the UK since the 1850s and an indicator that capital schemes still have a significant role to play – provided of course there is clear evidence that customers are willing to pay for such investment.



**Promoting stormwater management**

Whilst the quality of our river and coastal waters confirms that the sewerage network is performing well at the moment, we know already that it lacks the flexibility needed to adapt to the UK’s changing climate and a growing number of homes and people.

Coupled with more stringent environmental standards and new regulatory requirements, the effectiveness of these wastewater systems will inevitably come under greater strain in the future, with rising populations and the effects of climate change. This is likely to drive the need for both significant capital investment and greater innovation, such as in catchment management solutions.

We’ve had so much “freak” weather in the last few years that the term “unprecedented” is ceasing to have meaning.

In Northern Ireland we’ve seen a deep freeze followed by a quick thaw over the Christmas break in 2010 (temperatures rose from -10C to +10C in a little over 48 hours); while in the South and East of England many months of below average rainfall led to a drought in 2012, followed by floods in that and subsequent years which would have overtopped the most ambitious defences in some areas.



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The fact that the infrastructure is failing suggests to a sometimes sceptical public that the water sector is not stepping up to the plate when it comes to thinking ahead.

Water companies are not solely responsible for stormwater management; they are one of many organisations involved in ensuring communities stay protected.

The change in the weather is testing all sectors of UK society, and we are all moving towards changes in population and in weather conditions that we have never before had to plan for.

**Sustainable Drainage Systems**

Sustainable Drainage Systems, or SuDS as they are commonly known, are a vital part of the water industry’s long-term strategy to manage the impact of development and increasing amounts of rainfall entering the sewer and drains.

SuDS aim to mimic the way rainwater drains naturally, rather than forcing it through conventional piped methods, which can then cause flooding, pollution or damage to the environment.

The government has decided not to implement the parts of the Flood and Water Management Act 2010 in England which would have ensured a consistent approach to the adoption of SuDS on new developments. Its alternative involves changes to the planning policy and guidance to give local authority planners responsibility for ensuring any new developments are drained in a sustainable way. The impact of this new approach is not yet clear but the government has committed to undertake an early review of the impact of the new approach.

**Increased partnership working**

Greater collaboration has to play a major role in the long-term sustainability of sewerage and drainage services.

One successful example of where this has already happened is on the Fellgate estate in Jarrow where residents have had their homes flooded on a number of occasions.

Northumbrian Water and South Tyneside Council quickly recognised that a partnership project was the best way to deliver work that would reduce the flooding risk; however, there were difficulties in aligning their investment programmes and resources to deliver the solutions as a single project.

The answer was to package the works in phases, with Northumbrian Water delivering the sewer flooding work in advance of the surface water improvements. This meant that whilst the ‘sewer’ works were on site, the Council were able to develop their own project and secure funding for the surface water works to seamlessly follow.

Using the same consultants and contractors for both phases of work meant there were no contractual hurdles to overcome either.

Residents were regularly kept informed of progress and were supportive of the joined up approach to their problems – in fact one wrote to say the following:

**“As a resident for 43 years and a flood victim in 2012 we have been awaiting the work anxiously for the past few years. The work has progressed very well and the Northumbrian Water project has been carried out very sympathetically and really looks good. I would be grateful if you could pass on my thanks (all my neighbours are of same opinion). It has been difficult getting all parties together to arrange the project and we do realise this.”**

This award-winning partnering approach saved £3 million on a more conventional engineering solution, and provides flood risk reduction for the wider estate and a natural semi-wet habitat.

**Case study: Schools and SUDs join forces**

Ten schools in the Pymmes Brook catchment in London have been fitted with SuDS by the Wildfowl and Wetlands Trust, in partnership with Thames Water and the Environment Agency.

The SuDS have helped improve the health of the Pymmes Brook and they’ve also made the schools’ outdoor spaces greener and more natural, brought more wildlife into the school grounds, and become a focus for pupils to learn about the environment and conservation.

And they work. In July 2013 there was a heavy downpour that would have previously forced the cancellation of the Hollickwood Primary school fair the next day. Instead, the water drained away thanks to the wetland that had been built along the edge of the playing field, leaving behind just a few puddles. Data shows that water runoff is delayed at least an hour before it enters the main drain, thanks to the SuDS.



**Case study: RainScape project leads the way**

Welsh Water is developing new, innovative solutions to manage surface water entering its sewers through its £80 million RainScape project.

RainScape schemes aim to reduce the amount of surface water entering the public sewers in the first place by catching, redirecting and slowing it down, at the point where it enters the sewers.

It is doing this in a number of ways including through the use of specially-landscaped basins and channels, porous paving, and dedicated soakaways and grass strips.



**Question: Despite the Flood and Water Management Act, the sector has been criticised for still working in silos. How do we increase the pace of collaborative action across communities, stakeholders and those investing in infrastructure?**

**Northern Ireland Living with Water Programme**

In 2015, and following approval from the Northern Ireland Executive, the Northern Ireland Department for Regional Development initiated the Living With Water Programme (LWWP) to develop a Strategic Drainage Infrastructure Plan for Belfast, and also inform the future investment across Northern Ireland through the development of an 'Integrated Drainage Investment Planning Guide'.

The key objectives of the Belfast Strategic Drainage Infrastructure Plan are to:

- protect against flooding
- enhance the environment
- enable the economy to grow.

Due to the complex drainage infrastructure of Belfast, and the number of different organisations that operate and maintain it, a cross-sectoral approach has been taken to develop the optimum solutions that can be efficiently delivered. This approach aims to:

- facilitate the development of 'shared solutions' (projects which deliver a number of different types of benefits to a number of stakeholders)
- facilitate the development of innovative sustainable solutions (projects that have reduced environmental impact, and which future generations can afford to operate and maintain)
- reduce disruption during construction;
- reduce initial capital cost
- reduce ongoing operating costs
- develop drainage solutions that also provide enhance amenity value
- secure the necessary community and stakeholder support.

**High profile public campaigns**

Water and sewerage companies continue to invest in high-profile campaigns to raise awareness of the impact of flushing away unsuitable products – such as nappies, cotton wool buds, fats, oils and grease – via the kitchen sink or toilet.

Scottish Water has created a national TV and radio advertising campaign to highlight the impact of what Scots put down their toilets and sinks. With 80% of the 45,000 blockages in its sewer network caused by household waste each year, the investment has the potential to make a real impact.

But there are more bizarre examples of finding things in the sewer that simply shouldn't be there. Severn Trent Water recently discovered a blocked sewer in Gloucester, which was nearly full to the brim with fully-formed concrete.

The whole sector recognises that information can sometimes be hard to come by and everyone who has a stake in this – retailers, manufacturers, water companies, community and environmental groups – need to make sure their different messages are not confusing and that customers have clear information.

But the rewards if we align our messages and information are tangible. A healthy drainage network will help reduce flooding and save customers money – currently it costs between £60-80 million pounds a year to clear blockages caused by wet wipes, fat and the like.

**Did you know?**

**There are an estimated 20,000 tonnes of fats, oils and greases in the sewer network at any one time – that's around eight Olympic swimming pools of fat.**



**Case study: Wet wipes labelling campaign by the Marine Conservation Society (MCS)**

The Marine Conservation Society has launched a campaign to persuade retailers and manufacturers to clearly label their wet wipe products with a 'DON'T FLUSH' message on packaging so they go in the bin, not down the loo.

The MCS 'Wet Wipes Turn Nasty When You Flush Them' campaign highlights the monster issue that flushing unflushables is becoming, and urges the public to get behind its call for better wet wipe labelling. Some wet wipes are labelled flushable or biodegradable, but even those labelled flushable are failing to meet the water industry standard.

There is an impact on the UK's coastline and marine life too. In 2015, MCS Great British Beach Clean volunteers found nearly 4,000 wet wipes around the UK coastline – roughly 50 for every kilometre cleaned – and a 400% rise in a decade.

Dr Laura Foster, MCS Head of Pollution, said: "Our sewerage systems weren't built to cope with wet wipes. When flushed they don't disintegrate like toilet paper, and they typically contain plastic so once they reach the sea, they last for a very long time. They can cause blockages in our sewers, and then, everything else that has been flushed can either back up into people's homes, or overflow into rivers and seas.

"Wet wipes also pose a massive threat to marine life. Containing plastic, these squares never go away – they just get slowly broken down and become microplastics which are then ingested. Organisms negatively impacted range from the small zooplankton to larger marine animals such as fin whales and they've been found in mussels heading for human consumption.

"The MCS is looking to work in partnership with all water companies to help spread this message as we strongly believe that if they work with us we can reduce not only the problem of wet wipes on beaches, but also sewer blockages."



**Case study: Keep It Clear**

Unflushables – cooking fats, oils and greases, sanitary waste and wipes – are responsible for thousands of avoidable sewer blockages each year.

More than half of the 30,000 blockages Anglian Water clears each year are caused by these products, costing it over £7 million a year to put right.

The company's 'Keep It Clear' campaign works with customers and businesses to achieve dramatic reductions in these avoidable blockages. The campaign encourages everyone to make small changes at home to help stop this very big and expensive problem, while helping to protect the environment.

The Keep It Clear pilot campaign in Peterborough has achieved a sustained 82% reduction in these types of blockages, significantly reducing the possibility of flooding and pollution.

**Question: How can we work together to make sure we all understand the value of protecting our drainage systems?**

#### Counting the cost of misconnections

Misconnections are also posing an increasing problem – plumbing mistakes mean that households are misconnecting many of their waste appliances direct to the surface water system, which lead directly into watercourses, rivers and the sea.

Recent research by UKWIR, the water industry research body, has shown a startling lack of knowledge among professional trades and DIY enthusiasts about the risk and consequences to customers and the environment from misconnections.

Builders, plumbers, kitchen fitters, white-goods installers and DIY amateurs alike are likely to misconnect household surface water drains into the wrong system.

In most cases, the research showed misconnections stem from a lack of knowledge about the role the various drainage systems play; many are unaware that a misconnection might mean sewerage getting into storm drains that ultimately release into local waterways and the sea:

*“I wouldn't say that's a problem really [foul drain from toilet connected into guttering drainage] because you've got the fresh water coming down washing it [waste from toilet] all down”*

Plumber, employed, <2 years' experience, no formal qualifications

However, a minority of self-confessed misconnectors were not concerned about the consequences:

*“I think it [misconnections and malpractice] is quite extensive. I mean who goes round checking it? Nobody... And if the customer is getting a cheaper job out of it then they're not bothered as long as all the wastewater is being taken away”*

Self-employed kitchen fitter, <5 years' experience, no formal qualifications.

ConnectRight ([connectright.org.uk](http://connectright.org.uk)) was launched by water companies, Water UK, the Environment Agency, Defra and other industry bodies to raise awareness of the environmental pollution that misconnections to the sewer network can cause.

However, the UKWIR research showed that there is very little awareness amongst most trades that it even exists.

We know there is some way to go on raising awareness of ConnectRight and its important messages to both trades and DIY enthusiasts.



#### Technology, innovation, trials and research

The next five years will prove pivotal in shaping the future of the UK's sewerage and drainage infrastructure as the results of trials, pilot studies and innovative thinking and solutions start to underpin the solutions being suggested.

While some will be driven by new operational approaches, others will harness advances in technology, particularly the ability to collect and understand data.

Technology has the ability to transform ways of working, from communication to monitoring, predictive analytics and modelling. Many companies are working on increasing the availability of real-time data, which will allow water and sewerage companies to become more responsive to targeting maintenance when it is needed.

#### 2015 – 2020: What customers can expect

Water companies consulted and engaged with more customers and stakeholders than ever before for their 2015-2020 business plans.

This was supported for the first time by the involvement of Customer Challenge Groups. These independent groups scrutinised water companies' engagement with their customers to ensure the companies understood customers' priorities, and planned to deliver the services they wanted, at a price they could afford and were willing to pay.

As a result, customers' priorities about their sewerage service were embedded in water companies' final business plans for 2015-2020.

In general, the majority of customers are content with the service their water company provides, as long as they do not suffer any personal difficulties, such as internal or external sewer flooding, or visible impact on their environment.

This view is backed by the Consumer Council for Water's annual 'Water Matters' survey – 91% of 5,700 customers surveyed said they were satisfied with their sewerage services, an increase on previous years.

It's a good starting point, and the reflection of investment and progress in the industry to date.

#### Delivering customer outcomes by 2020

As a result of the widespread customer consultation and new approaches to planning their future investment, water companies have clearly set out a number of customer outcomes to deliver by 2020.

These outcomes result in the service delivered by water companies becoming much more customer-focussed and transparent. It is easier to recognise good performance, or hold companies to account for poor performance.

For most companies providing sewerage services these outcomes cover the key areas of:

- reducing the cases of internal and external flooding
- reducing the number of pollution incidents
- improvements in coastal (e.g. bathing and shellfish) water quality
- improvements in river water quality.

In turn, these integrate with wider outcomes that have been set for carbon emissions, greater resilience, better information and advice, and meeting the wishes of customers around improving the environment and sustainability.

This will lead to:

- a greater focus on outcomes, and the strategic direction of travel for companies
- investment that continues to reduce the impact of flooding and to increase water quality
- monitoring that will produce more detailed and richer information on the network's capacity
- more collaborative ventures and partnerships which are vital for sharing data, expertise and experience.



**Case study: Measuring and protecting bathing water quality**

Changes to the way bathing water quality is measured is a good example of an increased focus on delivering customer-led outcomes.

The revised Bathing Water Directive sets more stringent standards for bathing water quality, replacing those established in 1976. After four years of monitoring the new standards, the first results were published in autumn 2015. These revealed:

- 95.4% of UK bathing waters met the minimum standard
- 60% of bathing waters met the excellent standard
- 29 bathing waters (4.6%) were classified as only meeting the poor standard.

In addition to reclassification of water quality as Excellent, Good, Sufficient and Poor (with the Excellent category nearly twice as onerous as the standard of the previous highest category) the updates focus on more information for customers.

Using data supplied by the water and sewerage companies, the environmental regulators have created an online bathing water profile for each designated bathing water in the UK, including:

- a description, map and photograph of the bathing water
- the bathing water quality classification
- potential pollution sources and risks to bathing water quality
- measures being taken to improve water quality.

Information about water quality and potential sources of pollution is already displayed at designated beaches. From 2016, this will also include the classification of the bathing water based on the previous season.

In addition, at many bathing waters, the Environment Agency now alerts the public, in near real time, when water quality may be lower because of rain washing pollution into rivers and seas. Many local authorities act on this by putting up warning signs.

**Keeping water affordable**

Affordability was top of the agenda for both customers, water companies and regulators in helping to determine the investment that would be needed over the next five years, and the level of customers' bills that would help fund that investment.

As a result, average water and sewerage bills will fall by 5% in real terms between 2015-2020, resulting in a decrease in the average bill across England and Wales of £20.

Customers expect more cost effective and efficient services than ever before, at a price they can afford. While they are willing to pay for environmental improvements, they would not want to pay for the sort of investment required to replace or remodel the entire sewer and drainage systems so that all risks are removed – quite understandably, as the costs would run into many billions of pounds.

Water companies will have to be more than simple providers of water and sewerage services in future. They will have to work in partnership to ensure the UK is making the very best use of available water when there is too little, and dealing with too much water as effectively and cost-efficiently as possible. Nevertheless, investment may be required in future to meet the big challenges we face.

**Recognising the growing public interest in sewerage and drainage**

The move to link water company performance to customer outcomes, and the growth of instant communication, is prompting customers to develop a keen, interactive, awareness in their sewerage and drainage services.

The media, and groups such as Blueprint for Water, the Marine Conservation Society and Surfers Against Sewage, have also raised the level of public scrutiny, particularly around sewerage and the environment.

As a result, the way in which our sewerage and drainage infrastructure works has become much more instant and transparent. A good example is the Safer Seas Service mobile app, which delivers free service alerts to water users when combined sewer overflows are actively releasing into the sea. This allows people to make more informed decisions about the optimum times and places to swim or take part in water-based activities.

Quite rightly the water industry is expected to know how often a combined sewer overflow operates, what the likely impact might be, and what it needs to do to fix any unsatisfactory performance of that overflow.

It is also reasonable to expect the industry to work with others to plan and take action to accommodate future pressures on the system, and proactively manage any deterioration in performance.



With the best will in the world, however, there will always be circumstances that exceed our ability to protect society. There's a growing need to help customers protect themselves by giving them the information they need to make informed choices. The relationship between customers and companies is likely to change, and part of this is the information companies provide about the strength and capacity of our built and natural systems.

An open and transparent relationship allows customers to be involved in the pace of investment and change. In a world where customers expect hourly deliveries from their online supermarket, instant access to films through their broadband provider and same day delivery from Amazon, the industry should aspire to a similarly engaged relationship.

It's up to us to develop the tools for society to be able to actively engage with water, and for customers to play an active role in managing the quality and availability of water.



**Performing for customers in the future**

The Environment Agency has a clear set of outcomes that customers should be able to expect from water and sewerage companies by 2020.

In the Agency's 2014 report on water and sewerage companies' performance examples include:

- reduce Category One and Two pollution incidents, trending towards zero by 2020
- trend to minimise all pollution incidents (Categories One to Three) by 2020, with at least a third reduction
- ensure a plan is in place to achieve 100% compliance for all licences and permits
- manage sewage sludge treatment and re-use in a way that does not cause pollution
- by 2020, the vast majority of storm overflows should have event duration monitoring.

It is clear that in the development of the Business Plans for 2015-2020 the bar has been raised for delivering services for customers, an important step forward in defining the framework that will deliver long-term sustainable sewerage and drainage systems for the next century.

# SECTION 3

## Drainage of the future

Introduction

Climate change and changing rainfall and weather patterns

A growing population and urban creep

Protecting the environment and public health

Possible future pressures

**Introduction**

The UK faces an ever changing set of aspirations and challenges:

- better protection for the environment and public health
- a growing population and “urban creep”
- climate change.

The water industry is at the forefront of helping to make the UK more resilient to this changing landscape.

But it cannot do this alone – everyone in society needs to be part of the debate and the solutions that emerge when facing the following challenges.

**Climate change and changing rainfall and weather patterns**

As well as the extremes of weather already discussed, we are seeing subtler impacts. For example, there is evidence of saltwater getting into coastal groundwater sources during droughts – and when river levels are low there is less water in the river to dilute treated wastewater. This in turn means the wastewater needs more energy-intensive treatment.



**A growing population and urban creep**

The UK’s population is expected to rise by 10 million by the 2030s and another 10 million by around 2050 – bringing the UK’s population close to 85 million (up from the current 65 million).

In addition, the country’s built environment is constantly changing and “urban creep” – home extensions, conservatories and paving over front gardens for parking – can all add to the amount of water going into our sewers and drains. The soil and grass that would absorb rain is covered over by concrete that will not.

**Real time monitoring**

**United Utilities is combining models, different sources of data and operational responses to map the future running of its wastewater network.**

**The Preston project is using historic, modelled, real time and forecast data to predict at risk areas and homes, and provide clarity on how an area drains; how networks and assets are monitored in real time with trigger levels and interventions appropriate for each asset; and where maintenance can happen proactively ahead of events such as intense rainfall.**

**A new IT system is receiving real-time data from over 130 flow, depth and rain gauge monitors, installed at strategic locations, and Met Office radar rainfall data (6hr forecast). A simulation of the impact can be run every two hours against a set of agreed parameters, which also allows for predicted flows into the local treatment works to be understood.**

**If the technology is proven, it will be rolled out across the rest of United Utilities’ north west region to deliver benefits such as identification of unusual/unwanted network behaviour, predicted network performance, improved decision making and improvements to network models.**

In fact, studies show that “urban creep” results in a larger increase in predicted flooding than new housing, because it adds more rainwater to these systems.

While all water companies have long term plans to set out what investment is needed, we have tended to plan for the future based on the past. It’s clear that we need a new way of modelling how our systems will work, which will take account of rapidly changing circumstances.

**Protecting the environment and public health**

Expectations for environmental and public health standards are increasing, supported by legislation.

The European Union Water Framework Directive is the primary legislation that protects rivers and lakes, estuaries, coastal waters and groundwater, and determines what action needs to be taken to ensure all aquatic ecosystems meet ‘good status’ (or ‘good ecological potential’ for heavily-modified water bodies) by 2027.

Protecting people who use coastal bathing waters is also paramount and so the new European Union Bathing Water Directive has two new bacterial indicators (E. coli and intestinal enterococci) to measure the quality of the water. Bathing waters will be classified against these new standards so people can make informed decisions about where to swim and use the water for leisure activities.

**Did you know?**

**Recycled water systems are being installed on new developments that reduce average potable water demand by up to 40%.**

**Coastwatch delivers real-time data for bathers**

In 2011 Wessex Water launched a system called Coastwatch – the first of its kind in the industry – to provide regularly updated data on spills from combined sewer overflows.

Monitors say when a spill starts and stops and send this information as an email to local authorities and interest groups. The information also goes on an interactive map on the Wessex Water website, showing whether spills have taken place over the previous seven days.

Surfers Against Sewage (SAS) welcomed Wessex Water’s transparency over CSO spills. Andy Cummins, its campaign director, said: “SAS have campaigned long and hard for water companies to share information in real time after sewer overflows discharge untreated sewage into our seas.

“It’s great to see Wessex Water provide information at all their bathing waters, allowing beach users in the region to make more informed decisions about how and when they use the water.”

**Possible future pressures**

One of the challenges raised by our growing aspirations and expectations is that we could face a growing number of products that could have a significant impact if allowed to flow unchecked through the water cycle, including:

**Endocrine disruption**

Some concern has been expressed about the potential for certain chemicals that may be present in river water to disrupt hormone systems in both humans and wildlife.



**85**  
MILLION

**FACT FILE**

The UK’s population is expected to rise by a further 10 million by 2050 to around 85 million people



**Rainfall**  
DEPOSITS

**FACT FILE**

Every millimetre of rainfall deposits a litre of water on each square metre of land. A day of even modest rain can deposit several million litres of water on a town’s drainage systems



**48**  
DEGREES

**FACT FILE**

According to the Met Office, climate change predictions could mean regular summer temperatures of around 48 degrees Celsius in the south and east of England by the end of the 21st Century



**Climate**  
CHANGE

**FACT FILE**

Climate change is predicted to bring drier summers, wetter winters and longer high-intensity rain, together with more intense storms

European Commission research was carried out on these chemicals (termed endocrine disruptors) which showed wastewater treatment processes are currently effective in preventing such chemicals reaching drinking water supplies. As a result, experts concluded it is not necessary or practical to set any formal legal standards for endocrine disruptors in drinking water.

It will, however, be important for the water industry and environmental sectors to work and act together to assess the impact of these chemical substances getting into rivers in the first place.

#### Pharmaceuticals

The European Commission is considering additional measures to control the levels and types of pharmaceuticals in the environment, as a further layer of protection to people and wildlife.

More stringent wastewater treatment may be the answer, but this would clearly add extra costs to the bills of both water companies and their customers.

#### Carbon

Water industry operations require large amounts of energy for treating drinking water, processing wastewater, and pumping large volumes around an extensive network.

Wastewater treatment processes use about half of the total operational energy across the water sector.

Greenhouse gas emissions from the operational side of the water industry are around 0.7% of UK emissions (Ofwat, 2010). In 2011-12 companies reported that they emitted the equivalent of about 4 million tonnes of carbon dioxide.

#### The European Court of Justice judgment

**In October 2012 the European Court of Justice found that the UK failed to fulfil its obligations under the European Union Urban Waste Water Treatment Directive.**

**This related to not having adequate collecting systems in place because large volumes of sewage and surface water were frequently being returned, untreated, into the environment. Action is already being taken to reduce the volumes and frequency of releases from combined sewer overflows into the River Thames and North Sea at Whitburn.**

**The directive refers to 'unusually heavy rainfall' as an example of when flows need not be fully treated. The court agreed, however, the more frequently an overflow operates the more likely it is that its operation is not meeting the requirements of the directive.**

#### Ageing infrastructure and infiltration

Much of the public sewer network across the UK is in excess of 50 years old.

As a result, despite record investment, some public sewers are deteriorating and can be infiltrated by either rising levels of groundwater, or flooding.

Whilst high levels of investment have seen many thousands of miles of the sewerage network replaced since privatisation, this is a challenge. The sector is ready to find sustainable, affordable and progressive ways to balance the needs of public health and the environment, while keeping the service affordable and accessible to all.

# SECTION 4

## How we are responding

Developing a new drainage framework  
The Programme Board's workstreams

### Developing a new drainage framework

In late 2014, Defra, the Environment Agency, Ofwat and Water UK discussed how best to deliver the water industry's business plan ambitions to improve the sustainability and resilience of the UK's wastewater infrastructure, while delivering better customer service and minimising its carbon footprint.

From those early discussions it was recognised that both water policy and regulation had a key part to play in designing the UK's drainage network going forward.

It was also agreed that the scale of the challenges being faced meant it was strategically important for all government bodies in the UK to take part in the debate, just as it is for a number of political, environmental and economic stakeholders.

A Programme Board was formed to identify and deliver evidence-based research and other work, as required, to:

- support the development of resilient sewerage and drainage systems. This includes highlighting ways that regulation, legislation and technology may need to change to meet the clear expectations of customers and society
- enable the affordable and practicable control of all releases from sewerage and drainage systems
- set out how, and at what cost, we will begin to address the various longer-term external pressures that the UK's sewerage and drainage systems face.

### The Programme Board's workstreams

The Programme Board is overseeing seven workstreams that will underpin the successful delivery of the new drainage framework.

#### Workstream 1 – Communications and Engagement

##### What this work is about

This workstream will communicate not just the work we are doing, but the scale of the ambition the water industry and its partners want to deliver to improve customer service, protect customers and communities from flooding and pollution.

##### Why this work is important

There is a positive story to tell about the billions of pounds invested in our sewerage and drainage systems, but communicating that is not something water companies have always done well in the past. It is essential decision-makers and customers know about the challenges the UK faces, and what we as a sector are doing about them, to ensure the widest possible support for this programme of work.

##### How we are going to deliver

This document is the start of the conversation about what we need to do together if we are to prevent more widespread and devastating floods on impacts on people and places, customers and communities, our environment and the economy.

It is aimed at decision makers and opinion formers with a vested interest in the UK's drainage infrastructure and its performance. We will also share materials and other documents which will present a united position from the whole sector.

##### How it will benefit customers

There will be greater clarity and transparency for customers, communities and key stakeholders about what the water industry and its partners are trying to achieve, and how we are going to do it.

For the water industry itself, the document will provide strong, collaborative and consistent messages about our work to shape the UK's future drainage strategy.

#### Workstream 2 – Defining and managing drainage capacity

##### What this work is about

It will define a best practice approach to utilising drainage capacity, both in dry and wet weather. We can then identify how much of the capacity is currently being used, and how much will be used in the future, and what is taking up the available capacity.

We will develop a framework that more easily identifies the interventions that are needed to manage drainage capacity. In turn, this will help us start the conversations we need to have with key partners and other stakeholders about what needs to happen, why and when.

##### Why this work is important?

Without this framework, or understanding how it will function in practice, we cannot completely understand the current and future challenges faced by our drainage networks; or be clear in explaining those challenges to our key partners and stakeholders about what needs to change in our current collective approaches.

With future challenges around population growth and climate change in particular, we may need to approach the future in significantly different ways to how we currently do. We will need to be clear to everybody on why this is the case.

##### How we are going to deliver

Some of the information we need is either already available, or very close to being available, and so an immediate activity is to pull all of that information together. We will also hold workshops to make sure the approach we're taking is clear and adequately developed.

The deliverables of this workstream will come from a series of UKWIR projects, and will require the active input of everyone with pertinent data and modelling information from across the UK.



##### How it will benefit customers

We want to provide our customers - and indeed all our stakeholders - with sound and readily-understood information about the current and future state of our drainage networks.

As it is likely we will have to make significant future investment in our drainage infrastructure, we must secure the support of customers for this work. This will ensure water companies are in a strong position to include any initial activity in their 2020 – 2025 business plans.

#### Workstream 3 – Addressing overflows that operate frequently

##### What this work is about

Combined Sewer Overflows (CSOs) are a vital part of the UK's drainage system and protect properties from flooding.

They are required due to the way in which foul and surface water flows have historically been drained together in combined sewers. The design and operation of CSOs should be such that they do not spill frequently; and, if they do have to operate, they need to limit environmental pollution and must not adversely impact amenity use of water.

CSOs that spill frequently are more likely to adversely impact the environment and/or society. This workstream will produce both a process and guidance that will utilise the event and duration monitoring data currently being installed at CSOs to prioritise and address those overflows that spill frequently.

The process being developed will consider the impact of the overflow operation on both the environment and wider society and place a value on reducing the impact against the cost to do so. With a cost benefit analysis, investment decisions using best technical knowledge but not exceeding excessive cost, will be determined and implemented.

#### Why this work is important

European legislation recognises that combined sewer systems may have overflows, but requires that the operation of such overflows should only happen in unusually heavy rainfall and should not pollute the receiving waters.

Up until now there has not been a process for valuing the benefits of reducing the impact of CSOs operating. This work will enable the UK to demonstrate that it meets the requirements of UK legislation and will frame a process for wastewater companies and environmental regulators to follow in order to tackle overflows where additional measures to reduce the consequence of CSO operation are cost beneficial.

#### How we are going to deliver

A group representing government, environmental regulators and water and sewerage companies is working together to develop the process. Specialist consultants are being engaged to develop the benefits valuation process.

#### How it will benefit customers

We want customers and the environment to be protected from pollution when it rains. The disruption and cost associated with separating foul and surface water drainage systems (which continued to be constructed up until the 1960s) would be extremely high. The process being developed by this workstream will enable investment to happen where it is really needed and in an affordable way.

#### Workstream 4 – Sewer misuse

##### What this work is about

The UK's sewers are expected to cope with a range of waste material above and beyond just sewage and wastewater. Sewers also have to deal with fats, oils and grease (FOG), food waste and flushable products i.e. tampons and their applicators, wet wipes and even nappies.

Commonly referred to as sewer misuse, collectively these are a major cause of why sewers become blocked and overflow.

With sewer misuse accounting for the majority of flooding and water company pollution incidents in the UK, this workstream will research solutions that can prevent non-sewage waste entering the sewers in the first place, and provide the evidence base to shape the best approach to dealing with these products and materials.

##### Why this work is important

Currently there is no national co-ordinated campaign with a clear message being delivered by water companies to their customers - or indeed to third parties such as manufacturers, retailers, NGOs and government - about the importance of keeping sewers clear, and what products and waste materials must be kept out of the sewers.



#### Case study: Sewer misuse campaign in Salisbury

Wessex Water experience more than 13,000 sewer blockages a year across its region due to inappropriate items, such as fats, oils and wet wipes entering the sewerage network. It costs the firm around £5 million to resolve these blockages.

In 2014 the company ran a targeted campaign in Salisbury, which had a high rate of blockages per population. It aimed to change customer behaviour on the way wet wipes and so-called "flushable wipes" are disposed, through education, awareness and 'social nudging'.

##### #LoveYourLoo

The 'Be Smart, Love Your Loo' campaign involved targeting four different types of wet wipe users – those who purchase baby wipes, cleaning wipes, hygiene wipes and facial wipes.

Company staff spoke to community organisations and baby and toddler groups as well as visiting Salisbury hospital, libraries and schools. To ensure the campaign had maximum reach it also used billboards, posters in wash rooms, set up a bespoke website, used social media and worked with local businesses, including cafes and restaurants.

Wessex Water partnered up with local media while also writing to manufacturers and retailers of "flushable" wet wipes to express concern around the marketing of these products. It had a poor response from both supermarkets and manufacturers.

##### Changing behaviour

Independent customer research was carried out before and after the campaign to understand awareness among local people. It revealed that:

- general awareness regarding sewage blockages had increased from 26% to 31%
- a quarter of residents recalled the campaign when prompted
- the radio advert effectively communicated the 'love your loo' message (65% heard the radio advert)
- half of residents were using wipes before the campaign – this usage fell by almost 10% following the campaign.

#### How we are going to deliver

Many customers still recall the 'bag it and bin it' campaign and logo and so we plan to build on that awareness, but with a subtle shift in the message.

We will move to using the 'do not flush' logo that has already been agreed by retailers and manufacturers who are members of two key associations – the International Nonwovens and Disposables Association (INDA) and the European Disposables and Nonwovens Association (EDANA).

This logo, which is similar to the original 'bag it and bin it' logo, will be adopted on the different campaign materials used by all UK water and sewerage companies, and supported and promoted by Water UK.

#### How it will benefit customers

Customers will get a clear, consistent logo and messaging from water companies, retailers and manufacturers about what cannot be flushed down the toilet or disposed of via the kitchen sink.

This will increase better awareness and, ultimately, deliver the behaviour change that is needed.

Having an agreed logo and messaging will help facilitate joint campaigns between the water industry and individual retailers who want to do more than just promote the Do Not Flush logo.



### Workstream 5 – Groundwater inundation of drainage systems

#### What this work is about

There needs to be greater understanding, across multiple bodies, about the increasing risks from groundwater inundation of drainage systems – both private and public – in wet winters, which can then cause flooding.

#### Why this work is important

We have seen major flooding in the south of England in 2001, 2013 and 2014 which has been caused, in part, by high groundwater levels inundating the local drainage systems. The resultant flooding can happen for several weeks as it takes time for high groundwater levels to subside naturally.

Furthermore, private drainage systems that are not watertight allow groundwater to enter public sewers during wet winters. Is it right that the water and sewerage companies and, by default, their customers should fund the repair of these private pipes?

#### How we are going to deliver

Taking into account recent rainfall patterns and climate change predictions, we will develop an appropriate industry standard to minimise groundwater inundation and manage the flood risk.

We will also assess alternative sewer designs that have the potential to provide longer-term protection from groundwater inundation.

In tandem with that, groundwater strategies are required for vulnerable locations so that we can influence the design of the development infrastructure. We will engage with planners, building control officers and the housebuilding sector to ensure any new vulnerable assets are watertight.

We will also seek the views of governments on allowing water and sewerage companies to be granted powers to make private drainage systems watertight, and recover the cost of this work.

#### How it will benefit customers

We will have better policies, frameworks and practical solutions that better manage the risk of flooding from groundwater inundation of drainage systems.

### Workstream 6 – Enablers to progress

#### What this work is about

The UK's drainage landscape is complex and so progress to make it more resilient can be hampered by social, regulatory, legal and financial issues. This workstream will identify and prioritise any obstacles to making our drainage systems more resilient, and ensure they are able to meet the long term needs of customers and the environment.

#### Why this work is important

The growing issue of sewer flooding and pollution, coupled with regulatory pressure, is driving the need to find more innovative solutions and progressive ways of financing the investment that is needed.

Water companies need to prepare for the unexpected and be able to respond quickly to change and external circumstances; working in the same way and hoping conditions will improve simply won't work as a drainage strategy.

Long term investor funding is also critical - 'future shocks' could have a damaging effect on the financeability of water companies and dent investor confidence in a sector renowned for stability, both financially and operationally.

#### How we are going to deliver

We will tackle each obstacle and assess its likely impact or known consequences, and the ease with which it can be overcome so progress can be made.

We will produce a set of options for each obstacle; this will kick-start the dialogue with UK and devolved governments on what option will best drive the change that is needed.

This workstream will also bring together the solutions from all other workstreams – and previous drainage studies – into a single, one stop "prioritisation shop".

The resulting framework will provide visibility of all the challenges, what is most important to address, and allow an objective assessment of what needs to happen next. It will also amplify the voice of a sector which has a unique opportunity to make further advances in sustainability, resilience and economic growth.

#### How it will benefit customers

This workstream will enable policy makers and governments to chart a new course towards delivering a more effective, cost efficient, sustainable drainage system in the UK, for the benefit of everyone.

### Workstream 7 – Drainage infrastructure deterioration

#### What this work is about

This workstream will produce evidence that demonstrates the rate at which our drainage infrastructure deteriorates, and the impact that deterioration then has on customers and the environment.

#### Why this work is important

Better understanding is needed around the relationship between the condition of our drainage networks, and how reliable and effective they are in delivering the service customers expect. That will allow us to anticipate the impact of future challenges and develop robust and sustainable long term investment plans.

#### How we are going to deliver

Data collection and analysis will be required to identify the current state of drainage infrastructure, and the anticipated rate of deterioration of assets and their performance. This will lead to an understanding of the underlying resilience of the network to present and future pressures.

Much of this data is already available at individual company level, but the purpose of this work stream is to collate the information so that a common understanding of the resilience of the sewer network is visible at a national level.



#### How it will benefit customers

It is more expensive to reactively respond to failures than it is to proactively rehabilitate the sewer network.

By being able to anticipate failure we can predict future investment needs with increased certainty making it possible to plan work across a number of years, maximising the benefits of expenditure whilst minimising the impact on customer bills.

# SECTION 5

And finally....

## It's good to talk – however difficult the conversation

The industry has spent many years catching up on investment in infrastructure so old that it had earned us the tag of the “dirty man of Europe”.

We are in a better place now, but those across the sector who have joined this unique collaborative venture recognise that the challenges of the future will require us all to work together.

Organisations that have in the past found themselves arguing across the table have now joined a programme that aims to deliver an affordable, co-created way forward.

Transparency and collaboration are at the heart of it; we want to hear your views on how we should manage this vision for the future. Thank you for your time – and please get in touch.

**Question: Despite the Flood and Water Management Act, the sector has been criticised for still working in silos. How do we increase the pace of collaborative action across communities, stakeholders and those investing in infrastructure?**

**Question: How can we work together to make sure we can all understand the value of protecting our drainage systems?**

We would welcome your views, on these questions or any others, by email at [comms@water.org.uk](mailto:comms@water.org.uk), or on Twitter using our hashtag [#21CDrainage](https://twitter.com/21CDrainage)

## Programme partners

Yorkshire Water  
 Anglian Water  
 Wessex Water  
 Kent County Council  
 Environment Agency  
 Welsh Water  
 Natural Resources Wales  
 Defra  
 Southern Water  
 Scottish Water  
 Severn Trent  
 Thames Water  
 Northern Ireland Water  
 Northumbrian Water  
 East Sussex County Council  
 The Welsh Government  
 South West Water  
 UKWIR  
 United Utilities  
 Water UK  
 Institution of Civil Engineers  
 Blueprint for Water  
 Republic of Ireland Government

