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Wet policies wither in face of Water Wise campaign

Parts of the UK are drier than some countries of the Middle East, yet the urgent need to use water efficiently has nowhere near the profile that energy-related issues are getting in policy and publicity terms, creating a Cinderella sector according to Nick Reeves, Executive Director of the Chartered Institution of Water and Environmental Management (CIWEM).

When did we fall out of love with water and begin to take it for granted? Will the spectre of global warming, fears over scarcity and growing demand make us value it more? It's time to wise-up on water and learn to love it again.

Because when we talk about water in the UK, the dominant factors are economic and political. Matters of intrinsic value, ethics and social justice just don't figure. This means that millions of gallons of expensively - and extensively - treated drinking water flood away every day due to consumer wastage and profligacy. This reflects badly on the values of a modern 21st century economy committed to sustainability.

CIWEM's 'Value of Water' campaign sets out in detail how we can change this so that water is treated not just as an economic good, but a valuable and, in some parts of the UK, increasingly scarce resource.

We should not be surprised that there is intolerable public profligacy with water.

Our attitudes have been distorted by UK Governments, past and present, that encouraged discredited 'predict and provide' solutions to water supply and failed to invest.

Yes, it's possible to supply water anywhere, but only if demand can be managed to match supply - taking wider social and environmental matters into account.

In this respect the Government's Sustainable Communities Plan for the south-east of England seems particularly perverse with its promise of half a million new homes and population growth in an area drier than Syria.

So, as Gordon Brown assumes all of the levers of power, CIWEM is looking for much stronger Government leadership. We call for a new water strategy for a better informed public, and for a fitter-for-purpose infrastructure that will also contribute to the war on climate change. There are many areas where water should feature prominently but currently does not - as a material issue in the planning system, for example.

Swift action is necessary to ensure that housing - particularly new build - meets the highest standards of water efficiency to reduce demand. This will require tougher Building Regulations and changes to the Water Act and other relevant legislation, as soon as possible, to ensure that planners and developers are obliged to implement the best available technology in water efficiency, both for new-build and in retrofitting.

There is also a need for further incentives to promote the installation of water efficiency and demand reduction technology, including rainwater harvesting mechanisms and dual pipe systems within domestic dwellings that allow greywater to be used. Otherwise, as ever, cost will drive development decisions and water will stay low on the list of priorities.

Evidence shows that after enjoying decades of cheaply available water, the public's behaviour will change if they can see what their consumption is and match it to expenditure - in other words, if they have water meters.

Households with meters use, on average, 10 - 15 percent less water than unmeasured dwellings. But so far, only about a quarter of households in England and Wales have meters. And to make water efficiency at home and the installation of meters more attractive, water utilities should promote innovative water tariffs with protections for the vulnerable.

There are plenty of technological devices around to help with water-use efficiency in buildings, including techniques where rainwater can be harvested and used for washing machines, garden irrigation, car cleaning and other domestic needs etc. These should be fitted as standard - now!

However we must not just rely on technological solutions because current trends in consumption will almost certainly swamp any benefits that new technologies bring.

In the long term, though, the only thing that will change attitudes to water is improved public



Nick Reeves, executive director, CIWEM

understanding of the effects of climate change, the water cycle and its importance to life and health.

The Government and the water industry will have to act now to kill off the perception that water can continue to be a cheap and limitless resource.

Getting across the message about how much money is spent to keep water quality high and to improve the environment would be a good start. The public needs to understand the link between demand for intensively-produced cheap food, water pollution, and their water bills.

There must be a high profile public information and awareness campaign geared to increasing acceptability of the use of greywater and wastewater re-use, otherwise expensive and energy-intensive de-salination plants and reservoirs will be needed in the near future to meet ever-increasing demand.

CIWEM continues to call for an independent body, a Water Saving Trust (like the body for energy conservation), that would co-ordinate messages and initiatives to educate the public, carry out research, and recommend policy and legislative change.

Wising-up on water is a priority. It behoves us all to understand its true value. No longer can we assume inexhaustible supplies - on tap.

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Just because it is raining do not think the leaks have disappeared

It might be hard to focus on the possibility of water shortages following the horrendous weather this June when torrential rain and gale force winds have brought chaos to parts of the country but the supply problems have not gone away and will soon return to haunt us.

The entire month's average rainfall – more than two inches was predicted to fall in an area stretching from Yorkshire to north east Wales last Monday (25 June) and the Environment Agency put in place four severe flood warnings and 21 standard flood warnings for the day.

In the event hundreds of homes were flooded and drivers were forced to abandon their cars as the downpours deluged huge sections of the country. How different from last June when London mayor Ken Livingstone told Londoners not to flush

their lavatories, saying that dramatic action was necessary to prevent an acute water shortage. He went on to paint a vision of standpipes in the streets if nothing was done.

Of course he was in reality responding quite properly to critical changes in climate, population growth and lifestyle changes which were placing increasing demands on London's water supply.

An average of 165 litres of water are used by each Londoner every day, this is higher than the national average of 150 litres and about one

third higher than other European cities. He also wanted the Government to bring in "compulsory water-metering" in the capital to reduce water consumption in the long term and to help manage demand better. Demand could outstrip supply by 6 to 10 per cent by the end of the decade.

The United Nations shares the concerns and has warned that more than 2.7 billion people world-wide will face severe water shortages by the year 2025 if the world continues consuming water at the same rate.

There have been times recently when then fates have not been kind to the water companies. Yorkshire Water, for example, in 1995 -1996 was forced to reduce supplies to its customers after failing to predict early enough in the season that it would come close to running out of water.

After an inquiry by the water regulator Ofwat, Yorkshire Water was forced to waive £40 million in charges to its customers after being found responsible for 'serious failures' over leaks, interruptions of supply and erupting sewers.

Mark Fletcher visiting Professor in Engineering Design for Sustainable Development at Bradford University reviewed the operation of the UK water industry following the water resource problems of 1995-96 com-



Londoners use an average of 165 litres of water every day

enefit from the water taken from the environment" he says.

"We depend on a Victorian plumbing system in London and the south-east which currently loses one third through old and leaking pipes," says David Bellamy, the environmentalist.

Learning from previous experience is essential too. Professor Fletcher states that the drought in Yorkshire in 1995-6, led to a greater flexibility for water resource management as the water company developed a more secure water supply grid, which enabled the production of water where it is available and transportation to where it is needed.

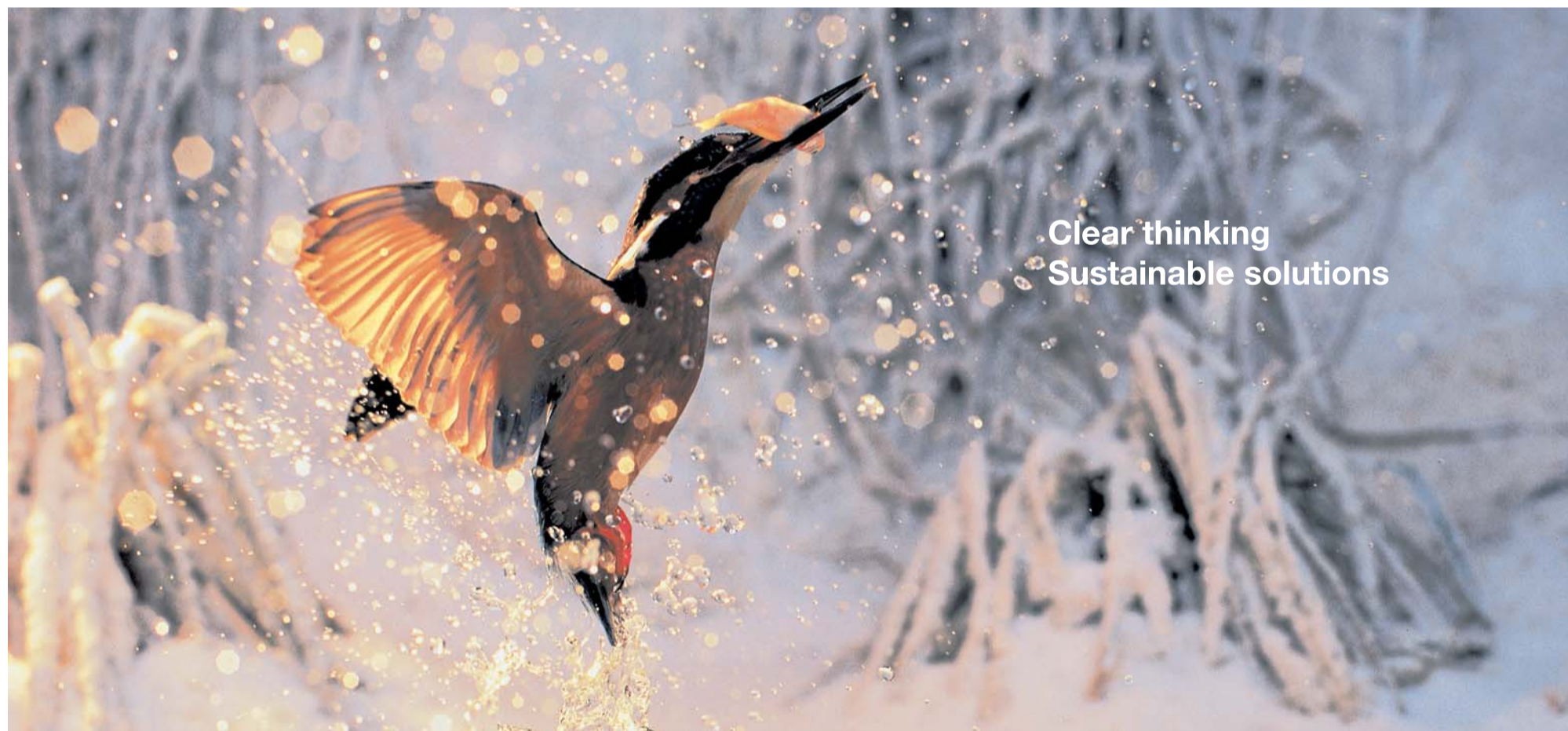
While the 2006 drought in South East of England achieved both a significant reduction in water use and a high level of cooperation between water companies and consumers.

Water technology is improving argues Professor Fletcher. Improvements in reverse osmosis technology mean a reduction in the energy costs of desalination. Smart meters with enhanced functionality and the potential to find leaks acoustically will help prevent interruptions to supply.

bined with the drought and resulting water use restrictions in summer 2006.

He firmly believes that our climate is changing and this impacts on how we manage water for the future and that clear strategies are needed to address the threat of water resources reaching the sustainable limit.

"The starting point is obviously to achieve the maximum possible ben-



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SUDS stops the water from just going down the drain

The very latest drainage technology goes back to nature to help prevent catastrophic flash floods.

Originally dismissed as the crackpot notion of treehugging hippies, drainage systems that mimic the natural environment are going mainstream.

The orthodox way of handling rainwater is to channel it down storm drains to a river or lake. This is easy and cheap, but water that used to permeate into the earth and replenish the aquifers now flows straight to the sea, often contributing to dangerous and destructive flash floods on the way.

Critical

The problem has now reached a critical stage. An area the size of a hundred football pitches is built over each day in England alone and global warming is bringing rainier weather.

For decades, environmentalists have championed sustainable urban drainage systems or SUDS, which aim to retain rainwater where it falls rather than directing it down the storm drain network.

Green roofs absorb a large proportion of the rain that falls on them, and car parks made with permeable paving laid on gravel beds can store huge amounts of water

which gradually drains into broad, shallow ditches called swales and through reed beds into ponds. Very little water actually goes down the drain at all.

Problems

SUDS pose problems however. They need to be very carefully designed to follow the lie of the land, to avoid the need for expensive and power-

hungry pumps. And civil engineers could not get their heads round systems that actually use living plants. But SUDS have finally gained official acceptance. Last year, the government's Planning Policy Statement 25 recommended the use of SUDS to control rainwater runoff.

Paul Shaffer of the Construction Industry Research and Information Association (Ciria) believes the time has come for SUDS. "It is a philosophy to treat drain-age water as close as possible to where it hit the ground," he says. "The idea is that if

a field is built on, the same amount of water should come off it as before."

SUDS is not a single technology but a toolbox that developers can use to control rainwater runoff, Shaffer says. "Green roofs, permeable paving on beds of crushed rock, and reed beds and ponds all help store water," he says.

One of the best opportunities for SUDS is in retail parks. Current designs are almost entirely impermeable, sending all the rainwater down the storm drains, but green

roofs and car parks using pavements with gaps between, laid on beds of crushed rock, could almost eliminate runoff, Shaffer says. Retailers such as B&Q, Tesco, Sainsbury and Marks & Spencer are looking closely at SUDS, partly under pressure from the public to be seen to be doing something for the environment.

Several pioneering SUDS have been built in the unlikely location of motorway service areas, notably at Hopwood on the M42 where water from the vehicle parks is directed through a series of landscaped ponds to a wetland park for wildlife. The ponds are very popular with weary travellers, who can even take an ecological walk to learn about the system.

Extension

One of the first housing developments to use SUDS is Lightmoor Village, an extension of Telford new town. The new village has a network of filter beds and wet and dry ponds linked by landscaped swales designed to maximise the amount of water returning to the aquifers and eliminate runoff into local streams.

Adoption of SUDS has been slow, mainly because the system was an unknown quantity that did not feature in any design guide, says Alex Stephenson, convener of the storm water group at British Water.

"There has been a lack of joined-up thinking, so SUDS have been held back by legislative problems and disputes over responsibility for long term maintenance, but Britain is now getting its act together," he says.



Traditional drains carry water straight to rivers or the sea, often contributing to dangerous flash floods

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Throw out the bath water – onto the garden

Grey water recycling. Households could reduce their water bills by as much as one half just by using water that currently goes straight down the drain, never to be seen again.

Last year's hosepipe bans have changed people's attitude to water, focussing attention on rainwater harvesting and grey water recycling in the home.

The last six months has seen a dramatic increase in demand for water saving systems, partly from gardeners anxious to save their gardens from the ravages of drought but also from householders who want to save the planet (and save money on water bills).

The new demand has lured companies that used to install only big industrial system into the domestic market.

Pims Pumps in Farnborough, for example, launched a system for houses a few months ago. Sales director Stuart Challacombe says: "There has been huge interest in rainwater harvesting and grey water recycling systems over the last six months. Rainwater harvesting systems are being installed when people are getting extensions done, when they take the opportunity to install a below-ground tank."

Grey water systems that clean used water from sinks, baths and washing machines for reuse watering the garden and flushing the loo are also in hot demand, but mainly in new houses.

"Grey water systems can be difficult and expensive to retrofit, but we are getting a lot of interest from self-builders who are interested in reducing their environmental impact," Callacombe says.

Barrier

One of the major barriers is people's ignorance of how much water they actually use, says James Moldon of H2O Group.

"People don't realise that if you put out the sprinkler for a couple of hours it will use two tonnes of water," Moldon points out.

To feed this need, rainwater harvesting systems need large tanks to store enough water to survive a couple of month's drought. As a result, people are thinking more seriously about grey water purification systems.

"People can see the benefits of having a continuous supply of water 365 days a year," Moldon says.

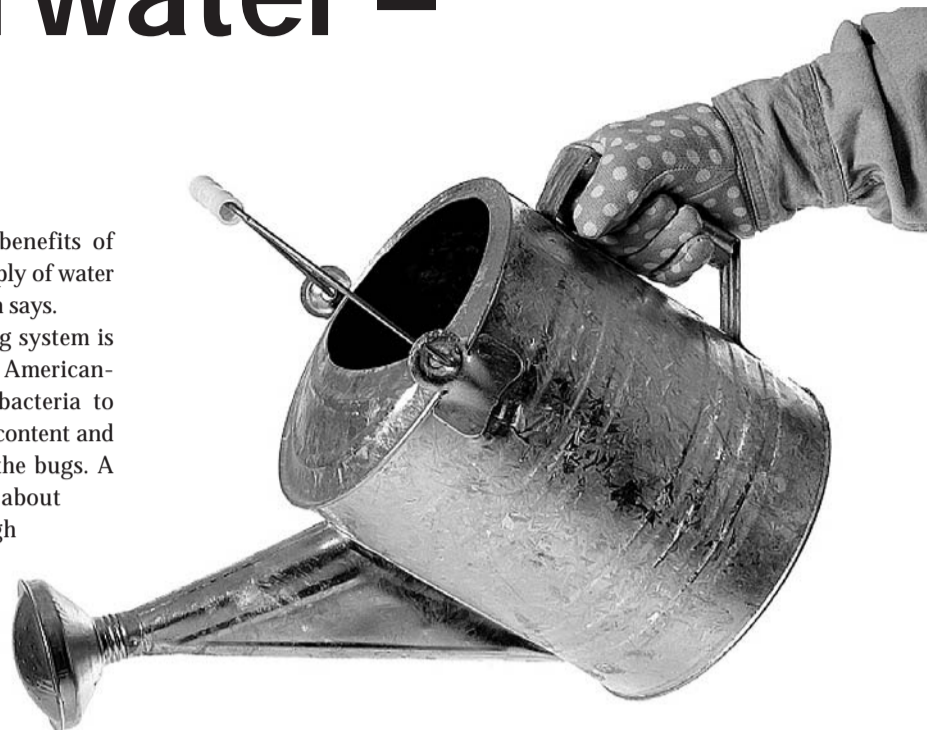
A grey water recycling system is about the size of a large American-style fridge, and uses bacteria to break down the organic content and ultraviolet light to kill the bugs. A basic system costs about £3,500 at present, though Moldon expects prices to come down rapidly as demand increases.

Gardening

Installing a grey water recycling system simply to circumvent a hosepipe ban is probably overkill except for the most fanatical gardener, but if a house is being entirely refurbished the system can also supply water to flush the loos and fill the washing machine as well.

This will cut the average household's water consumption by a half. Further savings are limited by legislation. "The EU does not allow recycled water to be added to the potable water supply at all, so unless that changes we will never be able to recycle the other half," Moldon says.

However, grey water recycling technology is developing fast, and systems will eventually appear that



Households can save up money by reusing water that goes down the drain

are capable of purifying not only the grey water from baths and sinks but also the 'brown' or 'black' water from lavatories as well.

This will not reduce water consumption but it will dramatically cut the amount of sent down the foul drains, relieving the pressure on sewage treatment plants and potentially alleviating pollution in rivers and on coasts.

"Technology will eventually make each house self-sufficient in water," Moldon predicts. "Grey water recycling is just in its very early stages."

Right now, a grey water recycling plant is a major project, so many

gardeners recycle their grey water by taking bathwater out to the lawn in buckets. An easy and instant option is to use the Droughtbuster from Watergreen.

Siphon

It is a siphon pipe – just dip one end in the bath and run the other end out of the window into a water butt or onto a flower bed, give the built-in pump a few firm squeezes and the water passes rapidly to where it is needed most. The device costs just £20 – see www.droughtbuster.co.uk for more details of operation and purchase.

Tapping into new water technology

Investment in new technology is desperately needed if the water industry is to tackle the challenges it will face in years ahead.

An initiative designed to deliver multi-million pound funding and turn the water industry's best ideas into effective and commercial solutions holds the key according to one of the UK's leading professional support service providers to the utilities.

Mouchel Parkman has been pioneering the cause for 18 months and launched an industry-wide consortium known as TAG – Technology Approval Group – to bridge the gap between the water sector and investors.

TAG comprises technical and engineering experts from across the sector. Their role is to review the latest products and technology and recommend the best and most relevant innovation to prospective

investors. Among TAG consortium members are leading water companies including Anglian; Northumbrian; Severn Trent; South East Water; Southern; Thames; Wessex; and Yorkshire Water.

"The UK is recognised as a world leader in water innovation. Yet, traditionally, external investment in water technologies has been deficient due largely to a lack of knowledge in the sector from potential investors," explains Dr Piers Clark, managing director of Mouchel Parkman Utilities and a driving force behind the initiative.

"There's never been a more critical time to attract investment given the environmental, infrastructural and management issues confronting the



TAG turning the tap on investment in new water sector technologies

industry with global requirements of more than £50 billion over the next five years.

"The industry needs this forum and funding opportunity to ensure that innovation currently being lost to our marketplace is allowed to see the light of day and deliver the sustainable solutions that we need to be

implementing now for the future," says Dr. Clark. Funds available for investment through TAG's venture capital community are reported to be in excess of £500 million for the 'cleantech' sector (water, waste, energy and environment).

Since inception, TAG has reviewed more than 200 new technologies from around the world. Thirty companies have been selected for a formal presentation to the consortium with 80 per cent of these receiving an industry endorsement.

These companies have raised in excess of £10 million from venture capital for their technologies which improve efficiencies and tackle operational challenges without requiring asset operators to divert resources into non-core, product development, activities.

One new technology to emerge recovers large volumes of wasted energy from water distribution net-

works and could soon be operational in the UK. Untapped renewable energy is generated through the use of micro-turbines operating in existing water and wastewater distribution systems where there is a measurable difference in pressure and available flow.

The technology, which is supported by UK Trade and Investment, has prompted the launch of Rentricity Limited, a company intent on delivering the clean energy potential to the UK water industry. One site generating just 30kW of power has the capacity to supply electricity to 70 homes.

Another development attracting interest in the UK from New Zealand company Derceto optimises water distribution energy requirements. Designed for use across large networks, it has the potential to reduce a water company's energy bill by as much as 15 per cent.

Water's grand design

An innovative rainwater collection system has been showcased on a stylish pair of new houses in the elegant suburb of Dulwich, South London.

In London leaks from ageing water mains are wasting 300 Olympic swimming pools' worth of water every day and in South London

water availability is amongst the lowest in the country.

Saving water at home makes a real difference. Installing a rainwa-



ter harvesting system will not only reduce water bills but will benefit everyone and the environment.

The StormBank™ rainwater recycling system from Hydro International was seen recently on Channel 4's 'Grand Designs' where it was used by Bill and Sarah Bradley when they built two timber houses in South London.

Storage tanks buried under the courtyards of the two houses collect water from the roof, after leaves and other debris have been filtered off.

When the toilet is flushed or the outside taps are run, a pump in the tank comes on automatically.

The system holds about three weeks of water and because the tap can also be topped up by the water mains it should not run dry. If the tank gets too full after a lot of heavy rain an overflow pipe discharges the excess to a soakaway.

Bill a master carpenter came up with the idea of building two identical houses on the site of his old

Eco-houses featured on C4's Grand Designs have StormBank™ rainwater harvesting from Hydro International

wood workshop and selling one to finance the building of the other.

The scheme was architect designed for a RIBA competition entitled the Future House of London, and encouraged architects to design houses suited to making better use of brownfield sites. Space was limited on the site and the houses were sandwiched between two rows of surrounding buildings leaving them overlooked.

Oblique windows

To get round this problem Bill incorporated oblique windows, skylights and double height glazed courtyards to create privacy in these two houses. The timber houses have been clad in stylish Western Red Cedar sourced with help from the Canadian Timber Association, and are surrounded by a huge Massandubra deck and lush tropical gardens designed by a Silver-medal Chelsea Flower Show winner. The houses are both 4-bed detached homes and Kevin McCloud has nick-named them the "Furniture Houses" or "Jewellery Box Houses" as they do rather resemble beautiful hand-crafted cabinets.

'It's everyone's responsibility to use precious water resources carefully,' says Bradley, whose water harvesting was not the only environmentally friendly feature of the

build. All the wooden fixtures and fittings throughout the house are all manufactured from carefully selected FSC woods. All aspects of the design were researched thoroughly – from the flat roofs that drain into the rain-harvesting tank to the kitchen worktops which are made from recycled wine bottles and crushed shells. Even the television is green, made by Philips, and the appliances are all energy efficient from Neff.

Walkway

On the ground floor there is a large living room connected by a glass walkway to a kitchen-dining room. Between the two is the courtyard almost entirely enclosed and walled in by glass giving the illusion of space. Around 45 per cent of the first floor is glazed and, as they are built around the U-shape atrium, they are light, bright and modern.

Upstairs there are four bedrooms and two bathrooms with 14 ingeniously different angled roof windows in each house. The upper floor is reached via a floating staircase which appears to be suspended against the steelwork and the rooms are joined centrally by a linked glazed bridge overlooking the courtyard. The floors are all made of bamboo with efficient underfloor heating powered by new landscape solar panels.

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Sarah Budd, Business Group Director, Royal Haskoning

Life returns to long lost river of London

One of London's lost rivers has been rescued from subterranean obscurity by an award winning restoration scheme.

Like many of the capital's ancient waterways, the River Quaggy was increasingly channelled along man-made drains and through culverts beneath the ever-growing city.

Its return has transformed what were once featureless playing fields into a watery haven for wildlife and scooped its rescuers the prestigious Living Wetlands Award, run jointly by the RSPB and the Chartered Institution of Water and Environment Management (CIWEM).

For years, a section of the river was lost in a tunnel under Sutcliffe Park in Greenwich, until a review of flood defences prompted a dramatic revival in its fortunes.

Increasing development in Lewisham and Greenwich had led to an ever-increasing risk of flooding and traditional remedies called for further widening and deepening of the artificial channels that took much of the river's 17km length.

Instead, the Environment Agency chose to bring the river back above ground, cutting a new channel for it

through the park using historical information on the Quaggy's course.

A culvert remained below ground to take excess water in times of flood and a new lake was created to take over when that too became full. The park itself was lowered and shaped to create a floodplain where water could collect instead of rushing downstream to flood Lewisham town centre.

The reappearance of the Quaggy's meandering waters has attracted a stunning array of birds and insects, including grey heron, jack snipe, wagtails and large numbers of dragonflies.

It is also pulling human visitors into the once neglected park where they can wander paths and boardwalks through reedbeds, wildflower meadows and trees.

Richard Copas from the Environment Agency, said: "Sutcliffe Park is an integral part of the Quaggy flood alleviation scheme. In times of flood, it can now hold the equivalent of 35 Olympic swimming pools of water,

reducing the flood risk to 600 homes and businesses in Greenwich and Lewisham.

"It is fantastic how much the wetland environment has established itself in such a short space of time and some of the species it is now attracting to this part of inner London."

He added: "This award means a lot to us. As one of our flagship projects Sutcliffe Park is one of the most dramatic examples of how a flood alleviation scheme can not only reduce the risk of flooding, but also create significant recreational and environmental benefits. We are very proud of it, and thrilled that it has been recognised in this way."

Local people have welcomed the change. Ray Manchester, from the Quaggy Waterways Action Group (QWAG), which campaigns for the river to be restored, said: "I think it's brilliant the way it has turned out and the habitats that have been created.

"Before, it was dead in terms of wildlife and the variety of birds there now is amazing. We were particularly pleased to see kingfishers there."

Rob Cunningham, head of water policy at the RSPB, said: "This project proves that wetlands can play an



The revitalised Quaggy has attracted a large number of birds and insects, including the grey heron

important role in reducing urban flooding as well as providing vital natural habitat. It shows that by working with rather than against nature, both people and wildlife can benefit. It is a worthy winner."

Justin Taberham, Director of Policy at CIWEM said: "This is a fantastic example of an urban restoration project that has multiple benefits for biodiversity, flood defence, recreation and leisure. The judging panel was unanimous in its support for this project to be this year's winner. What was a fairly degraded site has become an urban oasis for wildlife."

SOUTH-EAST OF ENGLAND DRIER THAN SUDAN

The South-East of England has less water per person than the desert states of Syria and Sudan, according to official figures.

The statistics show there are 58,000 gallons of water available for every person in south-east England per year, while in Syria the figure is 95,000 gallons and in Sudan - a country wracked by civil war - 269,000. Even the national average in Britain - 293,000 gallons per head of population - is only slightly more than in Sudan and less than half the figure for Spain, where each person has 610,000 gallons.

The Environment Agency said that the "surprising statistics" showed that Britain faced "a serious water shortage" and called for measures to conserve supplies, reduce water use and cut waste.

THE £6 BILLION RIVER AND CANAL CLEAN UP

During the water price-setting round for 2000-2005 ministers and the water regulator, Ian Byatt, were persuaded to spend an extra £6 billion from customers' water bills on cleaning up a century of dereliction in rivers and canals.

The settlement won a tremendous improvement and helped to raise water quality in the former industrial cities, bringing architects back to develop places such as Salford Quays.

Clean water at an affordable price

Providing safe water cheaply to developing communities transforms their prospects and now a UK company has come up with a low cost system which does not damage underground sources.

Digging wells might be an effective method of providing clean water at low cost but it is inevitably a short term solution that leads to the depletion of the local underground water sources and puts water stocks under increasing strain as populations grow or move and the risk of contamination increases.

A British company has developed an innovative alternative that can produce safe water through the recycling of surface water and rainwater runoffs or by using water from rivers, lakes, small dams and the like. In water stressed areas it can be used to recycle water.

A single unit can provide up to 2,500 people with daily drinking water without using any electricity,

chemicals or disposable filter elements. It has been designed specifically to meet the needs of developing countries.

Gravity fed

The Potapak 250 is a gravity-fed, packaged water treatment system, providing potable water from highly polluted raw water sources. It uses layers of specially treated fabrics to improve and simplify the process of slow sand filtration.

One unit can supply up to 12.5m³ of potable water per day, sufficient for 500 people using 25 litres per day or 2500 people if used for drinking purposes only.

A combination of the modular units can be linked to service as

many people as required. Installation is quick and maintenance involves simple cleaning routines, which can be taught to a member of the local community leading to job creation.

Potapak eliminates over 99.9 per cent of deadly organisms, ensuring protection against water-carried diseases including cholera, typhoid, paratyphoid, bilharzias and amoebic dysentery.

The system has already been supplied to major NGOs including Oxfam and to multi-nationals such as BP says the British businessman who set up the company, Ranabir Chanda.

Its strength is its cost effectiveness, simplicity of installation and operation, durability and independence from chemicals and power. It is equally at home in remote, rural areas or urban settings.

The system has also been taken up by municipal authorities and small-scale private sector organisations,



"If children and teachers are in bed with diarrhoea, education is the first casualty," says Mr Chanda. The Potapak upflow Gravel Filter provides a simple and effective means of pre-treatment for the Potapak 250 when water turbidity regularly exceeds 10 NTU. It can be used to treat water for

agricultural purposes. The system is already in use in many countries including Indonesia, Honduras and Yemen. "Maximising the beneficial effects of safe water, through integrating water projects in the wider development process, is an essential aim of Potapak," explains Mr Chanda.

Savings put industry on competitive footing

Saving water is low on the list of priorities of many businesses but if they can be persuaded to carry out a water audit then there are big savings possible.



It is estimated that a third of all of the water supplied goes to industrial and commercial users and that many of them could save up to three-quarters of their water.

The Environment Agency points out that although all commercial organisations consume water remarkably few know exactly how much of this precious resource they are using. In a manufacturing industry the water bills could be costing a company over one per cent of business turnover, while in the retail, hospitality or service sectors firms could save up to 50 per cent of water bills.

Even if water use is only for the offices a company occupies there are ways to save water with pay back periods measured in months, says the agency. The first thing you need to do if you want to save water is to work out how much you use.

What can we do to make our water future more secure?

A manifesto for change from ARUP which argues there is no silver bullet and a more pragmatic, sustainable and integrated management of water resources is required.

The obvious starting point is to manage our existing assets more effectively to achieve the maximum possible benefit from the water we are already taking out of the environment. Reducing leakage is essential.

Then we need to ensure demand is accurately assessed, losses from the system reduced and that water resources are well managed based on sound science and pragmatism.

Where absolutely necessary, major regional resources have to be developed to address the supply-demand gap, particularly in critical periods.

Learning from previous experience is useful in shaping a more effective water resource strategy. The 1995-96 drought in Yorkshire led to the water company developing a more secure water supply grid, enabling production of water where it is available and transportation to where it is needed. This has been very successful in providing greater flexibility for water resource management. The 2006 drought in the South-East of England achieved sig-

nificant reduction in water use and a high level of co-operation between water companies and consumers.

Lessons should also be learned from elsewhere. Australia is currently struggling to cope with a severe drought, and the UK and other nations should look at this experience, share learning and develop more robust and sustainable water management strategies.

Collaboration

Last year's drought in South-East England highlighted the benefits of water company collaboration. This resulted in consistent messages regarding the scale of the problem, expected effects and required actions. Formal and informal links exist between companies and stakeholders such as local governments, consultants, environmental groups and consumers, but these need to be reinforced and broadened. Regional and international groupings to share learning and best practice should play a bigger role in overall water resources management.



Mark Fletcher FICE FCIWEM FGS FRSA
Water Business Leader – Europe, Royal Academy of Engineering Visiting Professor in Engineering Design for Sustainable Development to Bradford University

Legislation

Changes are necessary to bring about required change from water companies and their consumers. Government has an important role to play here as positive changes to legislation would help to close the gap between knowledge and actions required to effect change e.g. demand management. Some utilities are taking the initiative and increasing their level of metering to help manage demand better.

Acting Now: Positive action is required now. Globally, pressure on water resources is evident with current and recent droughts in Australia, the UK and Africa.

THE TRUE COST OF TREATED WATER

UK Mains supply (2004/2005 figures, standard metered tariff)	£0.42 - £1.00/m ³
Chlorinated water	£0.75 - £1.50/m ³
Softened water	£2 - £3/m ³
Demineralised/deionised water	£2 - £3/m ³
Condensate	£3 - £4/m ³
Steam	£10 - £12/tonne

Source: Environment Agency

The Environment Agency's guide, "Waterwise good for business, great for the environment" shows how to conduct a water audit and produce a water management plan that will deliver savings while also helping the environment. You might expect to save an average of 40 per cent of your water use by making simple, low cost changes to toilets, showers urinals etc.

Minimise waste, maximise profit
Envirowise offers UK businesses free, independent, confidential advice and support on practical ways to increase profits, minimise waste and reduce environmental impact.

The true cost of water is more than just the water charges you pay. There are many other, hidden, indirect costs that determine the total cost of water to your company. These include:

- Disposal costs, either as a percentage of the amount you receive or by the strength of effluent

- The energy used to heat or cool water
- Pumping, storing and additional treatment costs;
- Staff time spent wasting it (eg excessive washing down)
- Materials or products lost with the wasted water (e.g. metals lost by poor control at metal plating firms)
- Your meter, the size of which determines the level of standing charges you pay

The size of these cumulative costs depends on the amount of water used – so reducing your use reduces ALL these costs.

Any leakage that occurs on your site will also increase your costs and bring you no benefit at all.

Treating water or heating it can rapidly increase your overall costs. If you can reduce the amount of treated or heated water you use, your overall savings will be much higher than just the cost of your water.

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the driving
force of all
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Leonardo da Vinci

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Agency criticised by watchdog as flood waters rise

The Environment Agency, now responsible for the major part of flood defences in Britain, has been criticised in a report from the National Audit Office, published as crisis reaches high water mark.

There are an estimated 1.8m homes in England and Wales at risk of flooding. By the year 2075 flooding could be costing an extra £1bn a year. The Environment Agency failed to meet its target to maintain 63 per cent of England's flood defence systems in their target condition, says a report by the National Audit Office.

The report published on 15 June highlights a number of failures to the management of flood risk made by the Environment Agency which has taken on greater oversight of flood risk in England, including the management of important rivers which were previously managed by local authorities and internal drainage boards.

The condition of flood defences has deteriorated since 2001 says the

Audit Office. "The general conditions of assets have not improved significantly, with 50 per cent of linear defences and 61 per cent of flood defence structures in good condition or better in 2007 compared to 64 per cent and 57 per cent respectively at the time of the NAO's previous report.

There are several reasons for this. The number of recorded assets has increased significantly since 2001. And the Environment Agency has adopted a risk based approach which sets less demanding condition targets for those assets considered lower risk, says the NAO report.

In practice, the Agency's investigation of the autumn 2000 floods found that instances of flood defences failing were rare (less than one per cent of flooding was due to such instances).

Nevertheless only 57 per cent of all flood risk asset systems, and 46 per cent of high risk systems, such as those protecting urban areas, had achieved their target condition by March 2007 says the National Audit Office, with potential risks should a flood occur.

Spending on locally managed construction and maintenance work

continues to vary across the country and does not yet adequately reflect the risk of flooding in each region.

The Agency estimates it will need a further £150 million a year to bring all flood defence systems up to their target condition.

Sir John Bourn the Auditor General said, "If the Environment Agency has any chance of meeting its future targets it must now focus more consistently on improving the condition of its high risk flood defences. Its work in the best performing regions shows that this is possible."

Scientists are warning that Britain will have to prepare for more catastrophic weather as global warming disrupts rainfall patterns.

With the ground saturated by torrential rain further downpours would not only hamper the clean-up operation but bring renewed flooding.

The transport system was heavily affected by flooding with motorways and other roads closed and many train services suspended. Insurers said that claims for damage caused by the torrential rain in the past few weeks would run in to hundreds of millions of pounds.

Rotherham Metropolitan Council warned that there was still a "significant" risk of a dam wall at the 35-acre Ulley reservoir failing after weaknesses were detected. About 700 people have been evacuated from homes in nearby villages. Engineers described the situation as "critical but stable".

The Government has confirmed emergency financial assistance will be made available to councils dealing with the flooding across England. David Miliband, the Environment Secretary, told the Commons that around 1,000 properties had been flooded after up to four inches of rain fell in 24 hours.

"I know that flooding is every householder's nightmare ... they are a traumatic event especially for any older people," he said.

While Yorkshire - in particular Sheffield and Hull - suffered the worst effects of the monsoon-like weather, parts of the Midlands have also been swamped by rising flood waters. Dozens of people were evacuated from their homes in Ludlow, in Shropshire, when a bridge collapsed, severing a gas main.

Britain may have to brace itself for more catastrophic weather



Biosolids: a key issue for the water industry

Mott MacDonald investigates and develops water resources, assesses water needs and implements appropriate supplies. The firm also specialises in the treatment and disposal of wastewater and biosolids (treated sludge). It is a leading engineering, management and development consultancy operating across all sectors of the water industry, for a wide spectrum of clients around the world.

Providing safe and cost-effective wastewater treatment is a fundamental part of Mott MacDonald's business. It has experienced process engineers who are able to assess any potential wastewater and determine an appropriate treatment process. This is based on both theoretical and practical knowledge, and a detailed understanding of the legislative background and institutional

requirements. The company works with most of the UK's water utility companies, providing experienced resources with a long track record of addressing the problems faced in these ever changing times. For wastewater and sludge treatment, the company is able to provide anything from traditional process solutions to more advanced and innovative ways of improving performance.

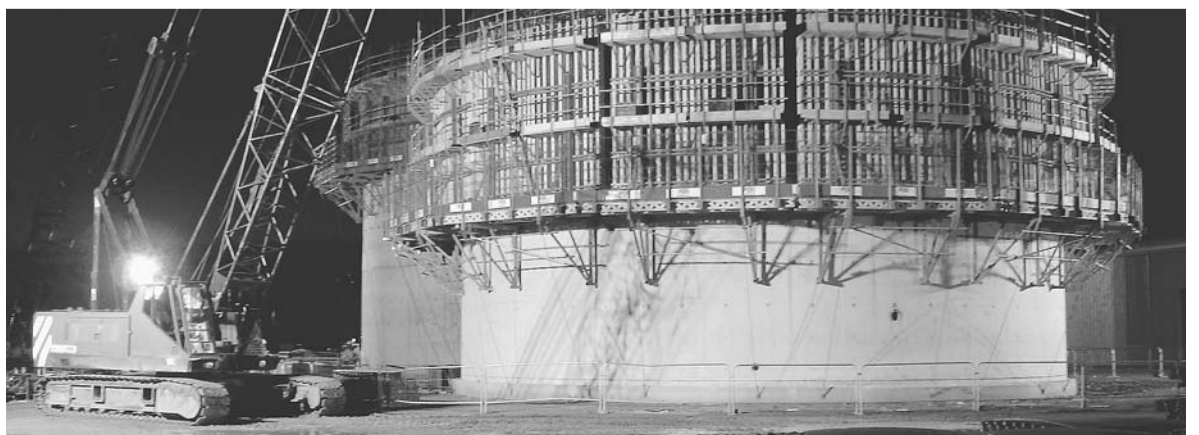
Sludge is an inevitable end product of wastewater treatment and has historically been seen as a problem rather than an opportunity. Ever tighter legislation, pressure to improve product quality and the need to reduce carbon footprints all mean that there is an increasing focus on treating sludge sustainably.

Integrated

As part of an integrated project team, Mott MacDonald is helping Anglian Water to meet these challenges with a £100 million programme of work to provide leading edge biosolids treatment at four key sites across the Anglian region. At the core of the schemes are new hydrolysis pre-treatment facilities that break down the sludge at a molecular level, so that when it reaches the existing digestion plants it produces more gas, which is used for fuel - green energy. At the same time, it reduces the quantity of biosolids that need to be transported. All this makes the schemes both

environmentally and financially sustainable. Mark Enzer, Mott MacDonald's framework manager said, "The integrated team with Anglian Water, GallifordTry Meica and Black & Veatch is working really well together to deliver enhanced biosolids treatment for an equivalent of 3.3 million people. Not only are we producing more green energy and improving the quality of the biosolids product, but we're also reducing operating costs, which is a genuine win-win."

One of Anglian Water's biosolids treatment facilities at Kings Lynn



We perform when we integrate



Strength and technical ability are the fundamentals of rowing but on their own cannot achieve a first class performance. It's the same in the water industry; resources and expertise will not deliver all they could unless they work together efficiently. That's no easy task for a water company with complex operations and a huge asset base to manage.

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