

BRICKS

&

WATER

A PLAN OF ACTION FOR BUILDING HOMES AND MANAGING WATER IN ENGLAND

“Building the number of homes we need has become a pressing issue – we haven’t built enough in this country for a long time. As we increase the number of new homes, we must manage water sustainably and efficiently on a catchment-scale.

WSBF’s in-depth year-long inquiry into housing, water and planning policy strongly concludes that the government needs to act now to improve guidance and standards for the houses that are being built. Water is a precious resource and we must use it wisely.

The government needs to ensure we are building the green, water-efficient, flood-resilient communities that our children and grandchildren deserve.”

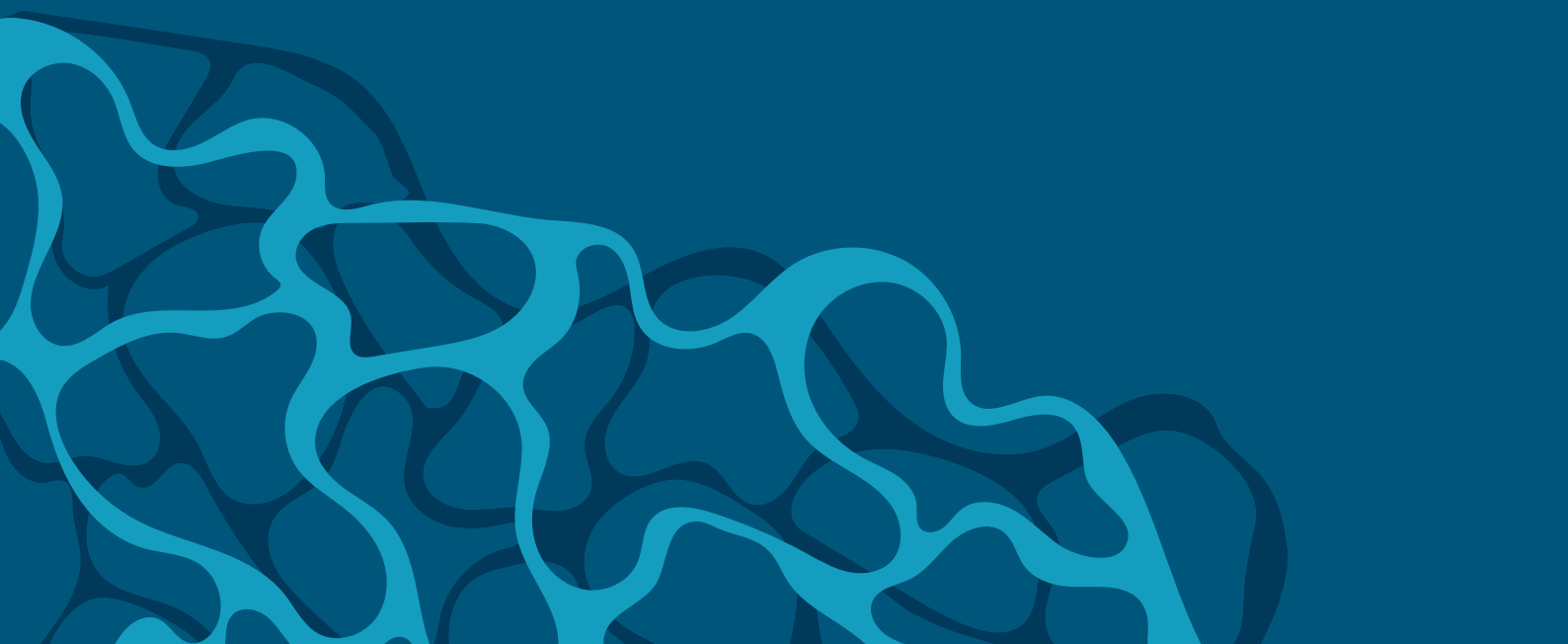
Baroness McIntosh of Pickering and Angela Smith MP
Inquiry Co-Chairs

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Foreword

Bricks and Water is a report that addresses tough and complex issues – how to build the number of homes we need in England while at the same time ensuring we improve flood resilience and water availability, and avoid putting costs on future generations. The Westminster Sustainable Business Forum (WSBF) is unique in bringing together the housebuilding, water and planning sectors, and we are most grateful to all those who gave their expertise – both across and within all these sectors. Such collaboration is essential as we go forward with this conversation to improve the housing we build and safeguard our water resources for the long term. We would particularly like to thank the sponsors of this report: headline sponsor Anglian Water, and co-sponsors Affinity Water, Thames Water, the British Board of Agrément, Yorkshire Water and the Wildfowl & Wetlands Trust.



As inquiry co-chairs, we recognise that there are strong views within the WSBF and expect that not all consultees may agree with all of the report's recommendations. Indeed, we would have been astonished to have found consensus within each of the sectors let alone across the sectors; if there were simple answers they would have been found already.

As politicians we are passionate about this agenda, and have long been frustrated by the lack of a clear strategic framework and rules, and the diminishing capacity to take the right planning decisions. This report makes firm recommendations on a tougher and simpler planning framework, action at scale on both catchment management and water efficiency, and on a strategic, truly independent body to make these things happen in practice. It does not pretend to have all the answers, but the implementation of its key recommendations by the government is an essential first step. The time is right for this, with the introduction of an Environment Bill as part of our exit from the EU, and with consideration given to how best to spend public money for public goods post-Common Agricultural Policy (CAP).

As this report makes clear, the government needs to go further and faster in that work and in setting up the mechanisms to turn ambition and frameworks into reality. For our part, we propose to continue this conversation across the sectors, and to drill down into specific aspects in follow-up work on this complex and difficult issue of how to achieve housing growth and successfully address water management challenges.



**Baroness McIntosh of Pickering,
Inquiry Co-Chair**

A handwritten signature in white ink that reads "Anne McIntosh".



**Angela Smith,
Member of Parliament for
Penistone and Stocksbridge,
Inquiry Co-Chair**

A handwritten signature in white ink that reads "Angela Smith".

Key Findings

The challenges and barriers

1

The existing housing shortage will be exacerbated by a projected 8.7 million increase in the population in England by 2050. The homes needed for these people will place a significant additional demand on water and sewerage services. By 2050 water demand could exceed supply by up to 22%.

2

Flood risk will also be severely exacerbated by population and housing growth. 4.48% of homes in England are currently at risk of flooding. By 2050, 129% more homes are projected to be at risk of flooding – nearly 2.5 million in total. This is as a result of climate change trends, a 15% increase in population in England, and the large number of new homes that will be built which adds particularly to the risk of surface water flooding.

3

At the same time, water shortages will become an increasing problem in London and the South East of England, as well as the Yorkshire, Humber and East Anglia regions. An extra 4 billion litres of water is estimated to be needed every day by 2050 to ensure that the water network is resilient, and there is currently a planned resilience shortfall in the water sector of 1,000 Ml/day.

4

Most of the houses that we are building now will be around for the next 50-100 years at least. Unless these houses are designed to be water efficient and flood resilient, it will be future generations who have to pay, and the costs of retrofit or crisis responses are inevitably higher. These houses need to be built in the right locations to the right design standards. For example, the cost to the taxpayer of dealing with the damage caused by flooding is already over £1bn every year.

5

The Environment Agency has suffered 19% staff cuts in the past five years, including 40% of the 'planning and development control' staff. Natural England's budget has been cut 60% since 2009, losing many of its policy specialists. At a local council level, Lead Local Flood Authorities (LLFAs) are also struggling with a lack of funding and expertise. Some LLFAs do not even employ specialist flood management experts. This casts doubt on the capacity and independence required by environmental bodies to fulfil their responsibilities.

6

Progress on adapting English communities to climate change has been very limited and any prior momentum has stalled. Fewer than half (42%) of local authorities have a climate change strategy or adaptation plan. We are building hard urban catchments, thereby increasing the risk of surface water flooding in many places, as the water has nowhere to go. For example, urban greenspace in England has shrunk 7% since 2001, and in the last ten years across UK 22,000 hectares of green spaces has been lost: an area of land twice the size of Liverpool has been turned from green space to hard surface.

7	Relationships between water companies, housebuilders and local authorities are complex and disjointed, with no designated forum to initiate strategic discussions about how to tackle problems at scale or nationally. Each sector has a different planning horizon leading to incoherence of approach. There is palpable distrust between some housebuilders and water companies, which is evidenced by their breakdown in communication, and this is causing costs and delays to both parties.
8	The planning system is overloaded and focussed on issues of local impact and importance to communities, with limited wider relevance. Authorities typically have a low planning eyeline- only 43% of authorities plan at least 15 years into the future. Some local planning authority budgets have almost halved (46%) since 2010, and over a third (37%) of planning policy staff have been lost.
9	Water is a low cost utility, which is shown in institutional and individual decisions. At the institutional level, the wider public benefits of green infrastructure are not sufficiently factored into value-for-money decisions, nor are the costs to the government and taxpayer of future flooding events. At the householder level, individuals do not appreciate flood risk nor are they sufficiently concerned about the importance of water efficiency measures.
10	Houses also aren't as water efficient as we think they are—evidence from Thames Water suggests that new homes built to a standard of 105 Litres per person per day (Lppd) actually tend to be using between 5-25% more than expected.
11	Sustainable Drainage Systems (SuDS) still haven't 'become the norm' with developers, drainage engineers and housebuilders, and there was a perception among the majority of respondents that a pervasive preference for traditional belowground concrete drainage solutions remains in the sector. Overground 'green' SuDS can be up to 86% cheaper to build and offer many additional benefits, but viability concerns remain over the land take of SuDS and the resulting negative effect on developer profitability.
12	The financial incentive at government level to avoid Court of Justice of the European Union (CJEU) fines and infractions (e.g. for poor water quality) will be potentially lost post-Brexit, which raises questions over who will provide the independent oversight. There is a risk the UK will revert to being the "dirty man" of Europe if environmental standards are no longer legally enforced independently.
13	UK's ability post-CAP (Common Agricultural Policy) to set its own environmental goods in return for public subsidy provides an opportunity to include water-related public goods, in the shift of public money from the current Pillar 1 to Pillar 2 type payments to payments for improving water quality and quantity, and managing flood risk can be brought up the agenda.

Executive Summary and Key Recommendations

Driving up the quantity of new houses we need in England while tackling problems of water quantity, quality, and flooding risk is a significant challenge for all involved. The factors we need to address, set out in Section 1 of this report, make stark reading. They point to the need for urgent action now to ensure our housing stock – the 1.5 million new homes planned by 2022, not forgetting the existing stock – provides quality homes now and over their lifetime of the next 50-100 years. For example, by 2050 there could be 2.5 million homes at high risk of flooding, at an annual cost of £2.2bn, and over the same timeframe the current water surplus of 12% is due to change to a water deficit of up to 22% of total water demand. Coupled with the effects of climate change, we conclude that, without urgent action, the Government's commitments on protecting citizens from flooding and on reversing the decline of nature cannot be achieved.

There are however many opportunities to put things right. Section 2 sets out examples of good practice and techniques to manage and improve our use of water. These include sustainable drainage systems, water efficiency in the home, and natural flood management. We do not need to wait for new technological solutions – they already exist.

Grasping existing opportunities and applying patchy good practice universally is not straightforward or simple – if it were there would already be systematic action in hand across England, which is not the case. Section 3 of this report sets out a number of critical barriers to achieving the Government's ambitions on water and housing: complex, inconsistent and unclear "rules" in planning and building regulations which results in a general disincentive to all builders; confusion and overlapping responsibilities hindering robust accountability; governance and leadership gaps at the national and sub-national level; loss of capacity and skills in public bodies and at the local authority planning level; inconsistency in the time horizons of the plethora of plans; and lack of information to water consumers to allow them to make informed decisions on water efficiency and flood resilience measures. All these factors hinder a joined-up and systematic approach to decision-making and implementation.

Section 4 describes what needs to be done to achieve the ambition of 1.5 million new homes in England by 2022 while improving water management and resilience. It sets out that the Government needs to provide an unambiguous, consistent and clear planning framework – housebuilders are willing to accept tougher rules providing they are applied equally and fairly across the industry. Tougher and simpler regulation should set ambitious minimum standards on water efficiency of 100 litres per person per day (taking the lead from what some developers and water companies are already doing to drive water efficiency and reuse in the

home), and the provision of green infrastructure becoming the norm. To deliver change quickly, we are pressing for a clear, unambiguous ‘Bricks and Water’ Sustainability Code to be introduced as a matter of urgency, with building regulations amended in due course to provide a stable long-term planning framework.

Strategic leadership on water management will be needed through the new environmental body proposed by the Environment Secretary. The inquiry agrees with the Government that the new body needs to provide national level input to the government’s policies and plans—especially in the Housing Ministry and Environment Department, and have the independence, authority and powers to assess the impact of the government’s work across England and advise the Supreme Court of the UK or whichever element of the judicial system takes over the CJEU role on delivery against statutory targets and infraction action.

In addition, however, capacity is needed at the sub-national level, to create partnerships across the country at what we have called the water catchment level. It is at this level that there is a serious gap in proactive planning and decisions on housing and water management at scale, and in the provision of strategic planning advice to democratic leaders (local planning committees) on water and green infrastructure at scale. We have suggested the proposed new body could provide a leadership role, with water companies given statutory consultee status on individual planning applications, helping them to work with developers from the early stages of an application.

The legislation to establish the new environmental body must provide true independence, power and authority to hold the whole of government to account on sustainable housing and water, secondly, the capacity to provide the leadership needed to make things happen on the ground, and thirdly be future-proofed to allow for further innovation in water management.

More can and must be done to adapt new and existing housing to the challenges faced by climate change, by making them flood resilient and water efficient, and to maximise water reuse. The targets set out in our proposed ‘Bricks and Water’ Code will only be sustained if consumers are provided with a practical understanding of the costs and benefits of water management, through the introduction of a mandatory Property Resilience Certificate (covering a home’s flood risk and water efficiency) and a mandatory water efficiency labelling system for water fixtures and fittings, building on good international examples in the EU, USA and Australia.

Green infrastructure such as SuDS is a nationally important asset; a register needs to be established and monitored, to drive at-scale decisions including retrofit. Existing guidance (such as the “SuDS for Adoption” standards being developed by Water UK) on incorporating green infrastructure into developments and communities, and their subsequent management needs to be firmed up and included in the ‘Bricks and Water’ Sustainability Code.

Section 4 finally seeks to address water management issues up-stream, noting that this is relevant to housing due to the great potential for improving water quantity and quality, and reducing flooding risk. It sets out that improving the up-stream quality of water and reducing the risk at source of river flooding should be brought up the agenda when considering public money for public goods, in the government’s introduction of a post-CAP framework.

Recommendations

The key recommendations arising from this inquiry are set out below; but these are not the end of what is a highly complex and long-term issue. Section 4 of the report therefore also touches on some of the issues that should be addressed as the report is taken forward and as the Westminster Sustainable Business Forum drills down into particular findings and recommendations in this report. The WSBF has not attempted in this report to cost the recommendations, though a key theme has been to recommend action to avoid pushing costs onto future generations.

Recommendation 1

The Government should urgently introduce a fairer, tougher and simpler planning framework supported by building regulations. This will level the playing field to current best industry practice and support all developers, large and small, to deliver the very highest water efficiency and flood resilience standards. To make this happen quickly the Government should introduce a mandatory 'Bricks and Water' Sustainability Code.

Recommendation 2

The new strategic body proposed by the Environment Secretary must be truly independent, have the powers to fully hold the government to account, and provide the leadership on water management to make things happen on the ground. It should face the Housing Ministry as well as the Environment Department.

Recommendation 3

Water issues need to be addressed at sub-national as well as national level (we've called this catchment scale) in order to address the challenges of flooding, water quality and quantity; ensure strategic engagement between housebuilders, water companies and other bodies; and provide strategic advice to democratic decision-makers about planning decisions. This could be achieved through the proposed new environmental body.

Recommendation 4

Water efficiency, reuse and flood resilience needs to be driven up the agenda through mandatory Property Resilience Certificates (based on the BRE Home Quality Mark), and mandatory water efficiency labelling for fixtures and fittings.

Recommendation 6

Post-CAP incentives being developed by DEFRA should prioritise the management of water as a public good, to ensure up-stream action in river catchments is taken to reduce flooding and improve water quality.

Recommendation 5

Green infrastructure must be the norm for homes and communities, not concrete infrastructure. A national register of significant sustainable drainage systems needs to be developed to inform decisions and prioritise action, and the proposal in the draft National Planning Policy Framework on maintenance responsibility for green infrastructure should be firmed up and included in the 'Bricks and Water' Sustainability Code to ensure it becomes embedded quickly.

1

The challenges: Where are we now?

“Climate change is causing more extreme weather. Extended periods of drought punctuated by intense rainfall will become the normal. A growing, wealthier and more urban population will require more water.”

Environment Secretary Rt Hon. Michael Gove MP,
March 2018

Population and housing growth in England

'Estimates put the need for additional housing in England at between 232,000 and 300,000 new units per year, a level not reached since the late 1970s and 2-3 times the current supply.'—Department of Communities and Local Government, 2016

England's population of 55.3 million people is projected to grow by 5.9% over the next 10 years, and to almost 64 million by 2050, an increase of nearly 15%¹. These 8.7 million people will need places to live, water and sewerage services. Currently 10.2 million live in the Thames Water service area, and this is projected to increase by over 50% to 15.4m by 2100, putting substantially increased burden on water and sewerage infrastructure in the South East region², much of which is already at least 50 years old³.

The Government has set a target of building 1 million new homes by 2020, and 1.5 million by 2022. This is planned to be achieved by increasing housebuilding to 300,000 homes per year⁴. According to the Ministry of Housing, Communities and Local Government (MHCLG), an additional 183,570 new homes were completed last year in England, plus 33,780 conversions from office space.

Whilst it is difficult to measure how long the average house stands, as old parts of buildings are refurbished and replaced on an ongoing basis, the average house can be expected to last at least 50-100 years, meaning that action is needed as we build new houses, not some time in the future.

Increase in flooding risk and costs

'More than 5.2 million people in the UK live and work in 2.7 million properties that are at risk of flooding from rivers or the sea, 3 million are also at risk of surface water flooding, and a 200,000 are at risk of groundwater flooding. The UK's annual flood damage costs are around £1.1 billion. These could rise to as much as £27 billion per annum by 2080.'
— Environment Agency, 2018

1.8 million⁸ houses in England and Wales are at high risk of flooding⁵ (4.48% of total dwellings⁶). According to WWF calculations, by 2050 this could more than double to 2.5m, an increase of 129%^{7,8}. There is an average annual cost to the taxpayer of over £1bn in flooding damages, with an additional £439m spent annually by the government on flood management in England and Wales⁹. WWF calculate this could rise to £2.2bn per annum by 2050. The 2015-16 floods of Storm Desmond cost the taxpayer approximately £1.6bn¹⁰, of which the largest proportion was damage to residential properties (£350m). When all repairs and

- 1 National Population Projections, ONS, October 2017
- 2 Thames Water, 2018
- 3 21st Century Drainage Programme, Water UK, 2016 21st Century Drainage Programme, Water UK, 2016
- 4 Housing White Paper – Fixing our Broken Housing Market, 2017
- 5 'High risk' defined as at risk of flooding more frequent than 1:75 years
- 6 Dwelling stock estimates, DCLG, April 2017
- 7 Developing & Piloting a Natural Capital Stress Test, AECOM & WWF, September 2017
- 8 Climate Change Risk Assessment, Committee on Climate Change, 2017
- 9 Future Flooding, Foresight, Government Office for Science, 2004
- 10 Estimating the economic costs of the 2015 to 2016 winter floods, Environment Agency, January 2018

insurance claims are taken into account, some estimated the cost to the economy as over £5bn¹¹. The damage caused to water infrastructure can have serious knock-on effects, including the failure of sewerage networks and occasionally even causing the cut-off of water supply. Total annual damage costs to the taxpayer from flooding are expected to increase by 22-78% by 2050³⁸. Surface water flooding is now the biggest threat to homes and business, over 3 million homes are already at risk of it, and its unpredictability causes planning problems as it doesn't show up on flood maps¹².

Land use change

“The increase in development at the expense of natural green land can result in flash flooding. Water rushes along concrete, tarmac and other impervious surfaces straight into drains and rivers without having the opportunity to be absorbed into the land naturally.”

– Rose O’Neill, WWF, February 2017

Increasingly we are building hard, dense urban catchments in England. Satellite mapping has shown that over 225,200 hectares of UK land area experienced a change in cover or use from 2006 to 2012 – an area almost twenty times the size of Manchester. More precisely, an area twice the size of Liverpool, 22,000 hectares, was converted from green space to ‘artificial surfaces’, most of which was housing¹³. Urban green space has shrunk 7% since 2001¹⁴.

When heavy rain falls on hard surfaces such as tarmacked roads and concrete buildings it cannot soak naturally into the soil, and this increased runoff is instead channelled down drains, which can lead to fluvial, surface water and sewer flooding downstream, as well as river pollution. In England, natural landscapes like wetlands, grassland and woodland have been reduced by such an extent that only 10% of floodplains continue to function correctly to attenuate flood risk¹⁵. 42% of floodplains in England and Wales are separated from their rivers, largely by engineering¹⁶. Part of this problem arises from housebuilding – residential development of floodplains has grown by 1.2% since 2011, 0.5% faster than other areas¹⁷. Some engineering respondents felt that until the impact of housing growth and land use change on flooding and drought risk was fully appreciated by government, there would be little change to legislation or guidance.

Water scarcity

‘The north west of England and the Yorkshire and Humber region are projected to be highly susceptible to supply-demand deficits [by 2050], as well as London and the south-east.’

– The Committee on Climate Change, September 2017

Despite a prevailing belief amongst the public that England is a notoriously damp country, it is in the lower quartile globally of available water resource per capita¹⁸. London has a population

11 KPMG 2015

12 Evidence submitted by Chartered Institution of Water and Environmental Management, 2018

13 Large scale changes in environment revealed through land cover map of the UK, University of Leicester 2015

14 Managing climate risks to well-being and the economy, Climate Change Committee, 2014

15 The changing face of floodplains, Co-Op Insurance, June 2017

16 UK National Ecosystem Assessment, June 2011

17 Preparing for climate change: 2015 Progress Report to Parliament, Committee on Climate Change, June 2015

18 The state of the environment: water quality, Environment Agency, February 2018

of 8.8 million people but receives less rain on average than Rome, Istanbul and Dallas, and less than half the per capita rainfall as Sydney. The last major drought in England was in the summer of 1995 and greatly affected Yorkshire, with water having to be brought at great expense by road tanker for many miles from Kielder Reservoir.

'There is a 1 in 4 chance over the next 30 years that large numbers of households will have their water supply cut off for an extended period because of a severe drought.' – Sir John Armitt, 2018¹⁹

UK households use an average of 141 Lpppd²⁰, 14% less than households in France (164 Lpppd)²¹ but 14% more than Germany (121 Lpppd)²². The problem is that the biggest consumers of water also happen to be situated in regions at greatest water stress and risk of drought. The average Londoner uses 164 litres of water per day²³, which equates to about 12 buckets of water, or 1.5 bathtubs, and 14% more than the national average. Thames Water projects a 348 million litre per day supply deficit by 2045. But this is not just a South East issue, 7 out of 18 water companies in England are operating in regions classified by the Environment Agency as moderately–or seriously–water stressed.²⁴

Demand for water will increase due to population and economic growth: the current water surplus of 12% is due to change by the 2050s to a water deficit of 8-22% of total water demand²⁵. Extreme water shortages could cost the economy £1.3bn per day, with a 37% loss in Gross Value Added, but taking measures to make the water network more resilient to drought now would only cost an additional £4 per household-customer per year²⁶. Whilst drought has been of increasing public concern recently, there has been some emphasis on creating supply rather than demand management²⁷.

River health

55% of the water abstracted from the environment is used to supply homes²⁸, with a quarter of rivers at risk of over-abstraction²⁹. The number of rivers in 'good' ecological condition has continued to decline in the past two years from 17% to 14% (2014-2016³⁰). The quality of surface water bodies such as lakes and ponds has almost halved–26%³¹ to 16% (2011-2016³²).

A number of reasons have been given for this including over abstraction, agricultural, sewage and urban pollution, waste water, invasive species and a change in the way that this information is collected. There is some dispute among different groups over the exact figures, but it is clear that England's current performance on river and lake health is not good. A

- 19 Preparing for a drier future: England's water infrastructure needs, NIC, April 2018
- 20 The state of the environment: water resources, Environment Agency, May 2018
- 21 Water prices in Europe need to rise substantially to encourage more sustainable water consumption, LSE, 2012
- 22 Discover Water, 2018
- 23 State of the Environment Report for London, Environment Agency, February 2013
- 24 Water stressed areas – final classification, Environment Agency, July 2013
- 25 Affordable resilient water supplies, DEFRA, March 2017
- 26 Water resources long-term planning framework (2015-2065), Water UK, September 2016
- 27 Drought planning as a proxy for water security in England, Cook C, Current Opinion in Environmental Sustainability, November 2016.
- 28 Water abstraction statistics: England, 2000 to 2016, DEFRA, February 2018
- 29 WWF, 2017
- 30 The state of the environment: water quality, Environment Agency, February 2018
- 31 Water Framework Directive: achieving good status of water bodies, HoC Library, November 2015
- 32 State of the Environment report for London, Environment Agency, 2013

contributing factor is rain washing pollutants from agricultural and urban settings into rivers, where runoff can be high in phosphorous, pesticides, nitrates, microplastics and oils which damage the river ecosystem.

Climate change: extremes of temperature and precipitation

Climate change is not a future threat, it is here already. The UK's climate has already undergone warming—the most recent decade (2007-2016) has been on average 0.3°C warmer than the 1981-2010 average, and 0.8 °C warmer than 1961-1990. Summer 2016 was 0.5°C warmer than 1981-2010. Eight of the ten warmest years on record have occurred since 2002 (Met Office). Higher temperatures have a threefold multiplier impact on increasing water demand (evaporation, transpiration and demand).

The climate is projected to warm further in the future by another degree Celsius or more, depending on carbon emission scenarios. Heatwaves, like the record-breaking one experienced in 2003 when temperatures got up to 38.5°C in Kent and caused 2,000 heat-related deaths across the UK³³, are more likely to become the norm by 2040³⁴.

By the end of the 2030s, over half of water resource zones in England and Wales are projected to have climate change impacts on their water supply³⁵. The National Infrastructure Commission has drawn this out very clearly in its April 2018 report, calculating that an extra 4 billion litres of water is needed every day by 2050 to ensure that the water network is resilient, and there is currently a planned resilience shortfall in the water sector of 1,000 Ml/day³⁶.

Sea level rise has serious implications for increased flooding in England. UK sea levels have risen approximately 14cm in the past 100 years³⁷ and are projected to rise by a further 25-100 cm by the end of the century³⁸. While there is a great deal of uncertainty around estimates because of the difficulty in modelling the effects of different carbon emission scenarios, under any scenario it will seriously affect coastal communities and cities such as Hull and Portsmouth. Some 200km of coastal flood defences in England could³⁹ become highly vulnerable to failure in storm conditions⁴⁰.

Future climate change is set to amplify both flood and drought risk in the UK, with warmer, drier summers, more intense storm events, and wetter winters, a process that has been going on since the mid-eighteenth Century⁴¹. By the end of the century we will see longer dryer periods and a 25% increase in heavy precipitation⁴². Extended periods of extreme rainfall are already seven times more likely than pre-industrialisation⁴³. By 2050⁴⁴, the number of people

33 Case Study—The summer of 2003, Met Office, May 2015

34 Met Office, March 2014

35 CCRA 2: Updated projections for water availability for the UK, The Climate Change Committee, August 2015

36 Preparing for a drier future—England's water infrastructure needs, National Infrastructure Commission, April 2018

37 Temperature-driven global sea-level variability in the Common Era, PNAS, January 2016

38 Future of the Sea: Current and Future Impacts of Sea Level Rise on the UK, Foresight, Government Office for Science, August 2017

39 Based on a projected sea level rise of 0.5-1m

40 Climate Change Risk Assessment, Committee on Climate Change, 2017

41 The state of the environment: water resources, Environment Agency May 2018

42 Managing climate risks to well-being and the economy, Climate Change Committee, 2014

43 Explaining extreme events of 2014 from a climate perspective, Bulletin of the American Meteorological Society Vol. 96, No. 12, December 2015

44 Under a 2°C, low population growth, current levels of adaptation scenario

living in areas at significant risk of flooding will rise by 800,000 to 2.6 million⁴⁵. Even if no new houses are built in flood risk areas and climate change impacts are moderate, the number of people living in high flood risk areas will increase 45,000 by 2050⁴⁶.

The government's ambitions on housing and water won't be delivered

The Climate Change Committee has rated flooding and coastal change as a high priority both now and in the future, with more action needed from the government⁴⁷. Water scarcity is rated as a medium priority now and a high priority in the future, with again more action required. While the revised National Planning Policy Framework (NPPF) and 25 Year Environment Plan provides some good ideas, more ambitious specific targets are needed rather than vague ambitions and a strong framework to deliver them.

The Government has made a number of welcome commitments about water and housing. On flooding protection, the Government has committed to a '£2.5 billion flood defence programme that will put in place protection for 300,000 existing homes by 2021⁴⁸. The Government also has a goal for 'reduced risk of harm from environmental hazards such as flooding and drought'³⁹, although exact figures on how much they are looking to reduce this risk by is not mentioned.

More broadly, the Government has an ambition to 'reverse the decline of nature within a generation'⁴⁹. This ambition is not reflected in planning guidance, however, so on current plans won't be fully delivered. For example, five new 'garden towns' were outlined by the Chancellor in his November 2017 Budget, but the draft revised NPPF published for consultation on 5 March 2018, has deleted reference to naturalised solutions and the principles of Garden Cities (TCPA⁵⁰). Whilst previous guidance stated that developments should be 'appropriately flood resilient and resistant...and give priority to the use of sustainable drainage systems'⁵¹, there were concerns among consultees that the framework wasn't strong or clear enough, for example the draft NPPF⁵² isn't clear on SuDS adoption.

'True blue-green cities should be where we are heading' –HR Wallingford 2018

Many respondents considered that, notwithstanding guidance issued in 2011⁵³, there are still no clear expectations from government, nor roles and responsibilities to deliver. Consequently, there must be serious question-marks over what actions will be driven forward by the government to mitigate flood and drought vulnerability, and to ensure that these actions are integrated into the way that new settlements are built. More leadership and action is needed from the government if it is to deliver on its ambitions on housing and water.

45 UK Climate Change Risk Assessment 2017, Committee on Climate Change, July 2017

46 Daniel Johns, Committee on Climate Change, 2015

47 UK Climate Change Risk Assessment 2017, Committee on Climate Change, July 2016

48 (Homes for All, Conservative Party Manifesto 2017)

49 A Green Future: Our 25 Year Plan to Improve the Environment, DEFRA, January 2018

50 Building the Future, Town and Country Planning Association, April 2018

51 National Planning Policy Framework, MHCLG, 2012

52 National Planning Policy Framework (draft), MHCLG, March 2018

53 The national flood and coastal erosion risk management strategy for England, Environment Agency, September 2011

2

What does a resilient water management system look like?

“It is increasingly clear that we need to build more houses in England and we wholeheartedly support that objective. However if we build those houses in the wrong place, to a poor standard, without the consent of local communities we are only storing up future misery for the people in those houses and others nearby.”

—Baroness O’Cathain, February 2016

Instead of ever denser hard urban catchments, with limited green space and drainage systems already at or over capacity, the government should look to increase urban green space coverage and the use of Sustainable Drainage Systems (SuDS).

SuDS features include rain gardens, swales, attenuation basins, floodable green space, wetlands, reed beds, ponds, permeable paving, green walls and roofs, and green buffer strips. SuDS can be designed to manage and use water close to where it falls, using green spaces and vegetation which deliver additional benefits for biodiversity and pleasant spaces to live and work in. This will:

- Manage water quantity and quality. Foul sewage will continue to be collected in the sewer network, but surface water can be collected and treated through the SuDS and then either discharged to ground, watercourse or sewer in a controlled manner. This will avoid overloading the sewer network which causes surface water flooding, and will reduce the risk of raw sewage contaminating homes during flooding or being dumped into rivers during heavy rainfall.
- Recharge groundwater through increasing infiltration. By allowing water to soak naturally into the soil, some types of infiltration SuDS (basins, soakaways) recharge the underground water table and aquifers in a way that hard surfaces do not, thereby capturing more rainfall for future use and not letting freshwater be lost as a resource by just washing out to sea.
- Enhance and support biodiversity. Urban green planting at scale provides corridors for species, and creates more blue and green habitats for flora and fauna. This can be enhanced through design, sensitive management and use of native plants.
- Create better places for health and happiness. It is proven that access to green spaces enhances mental health, speeds up health recovery and generally contributes to well-being⁵⁴.
- Reduce building costs. Depending on the site and the volume of drainage required, SuDS were found to be up to 10-86% cheaper on total construction costs than standard drainage⁵⁵, and can enhance house sale prices by 10%^{56,57}. These benefits need to balance with the 'cost' of the land take of sustainable drainage. Some builders refute that SuDS are cheaper to build, given that rubble and soil can be classified as contaminated waste by the EA that needs to be disposed of, and it has been claimed that this could affect up to 70% of sites.
- Mitigate overheating of buildings and towns/cities, as Polypipe informed us. SuDS features like green roofs can be used to keep buildings cool in the summer and warm in the winter. Green roofs that are irrigated by harvested rainwater can improve the heat retention of the building, and evaporation from vegetation has been used to cool solar energy units.

54 [Briefing Note 538, Parliamentary Office of Science and Technology, October 2016](#)

55 [Comparative costings for surface water sewers and SuDS, Water Availability and Quality programme, DEFRA February 2011](#)

56 [Whole life costing for sustainable drainage, HR Wallingford, March 2004](#)

57 [Water, people, places, AECOM, September 2013](#)

Whilst many water companies now ask developers to attenuate surface water on-site and to maintain greenfield run off rates, Willmott Dixon said that many respondents wanted to see green infrastructure and natural flood management techniques become the ‘de-facto best option’ when designing and constructing new communities. **Ofwat as the regulator needs to do more through pricing mechanisms and rules for developer charging, to incentivise infrastructure investment from water companies where appropriate, and to drive the reinstatement of natural processes through sustainable drainage in new housing developments**, in all but exceptional circumstances. Ofwat should also be looking to mandate water companies to design incentives schemes for developers to promote sustainable housing, and should assess water companies’ performance on this.

Catchment-scale action supported by plans, legislation and regulation

“Catchment management of water is very important in managing flood risk. If we are serious about reducing the number of homes at risk of flooding, we need a more comprehensive and holistic approach to managing water along the entire river catchment. There are also additional benefits such as increasing water supply, improving water quality and the environment.” – Peter Bide, Catchment Based Approach (CaBA), April 2018

Taking a more holistic approach to restoring river catchments has been a government aspiration for over a decade⁵⁸. Over this period, however, the relatively isolated examples of good habitat restoration, natural flood management and water sensitive urban design have occurred despite not because of policy and legislation⁵⁹. The need for an integrated catchment management planning process was recently highlighted by the Rivers Trust, the Angling Trust and WWF⁶⁰.

Integrated water management – slowing the flow and reusing flood water

‘By working with natural processes, we can better protect ourselves from hazards such as flooding. Natural Flood Management involves the use of a variety of measures including tree planting, river bank restoration, building small-scale woody dams, reconnecting rivers with their flood plains and storing water temporarily on open land.’
–25-year Environment Plan, DEFRA, January 2018

The EA has worked to protect 500,000 homes from flooding since 2005, but there was a perception among some respondents that flood defence priorities have for too long been about hard defences and channelling water away from housing and communities. Creating straighter, deeper rivers with steep and bare banks have been intended in the past to make rivers more effective and efficient conveyers of water off the land, like a gutter on a house. However, this past policy agenda is flawed and has increased flood risk in places. Rivers naturally meander and flood nearby fields during heavy rains for a purpose. On the other hand, housebuilders have advised that new build properties are very rarely flooded, and that there are protections in place already. They point out that if the development is in Flood Zone

58 Making Space for Water: Taking forward a new Government strategy for flood and coastal erosion risk management in England, DEFRA, March 2005

59 Localism Act 2011

60 Costing the Earth, The Rivers Trust, April 2018

2, 3a or 3b a Flood Risk Assessment must be completed and the Environment Agency is consulted.

Natural flood management (NFM) uses ‘soft engineering’ techniques to increase flood storage in the upper reaches of catchments, mimicking how they would have behaved before man-made interventions increased rates of discharge. Trials are underway to demonstrate the benefits of this approach, including the re-creation of natural dams⁶¹ by felling timber into rivers to slow the flow of water, reducing flooding in towns and cities downstream. These measures can reduce peak flood flows by 20%⁶². Whilst the EA and their assorted partners have pursued NFM for some time, some respondents advised that there are considerably more societal benefits that could be generated from it with a stronger framework and a shift of funding to prioritise these solutions.

Surface water capture and natural flood management would be part of ‘integrated water management’ across a catchment so that no water is ‘wasted’, a scenario favoured by a large majority of respondents. Whilst the Government has pledged £15m to fund natural flood management⁶³, this should be regarded as a start rather than what will be needed to deal with growing flooding risk.

Water efficiency in the home

“It has never been more important for Government, house builders and water companies to work together to promote and deliver water efficiency in the home. Anglian Water is leading the industry when it comes to reducing leakage and we’re well on our way to achieving our target of 95% customers on a meter. New build homes present an unrivalled opportunity when it comes to making sure that new communities are using water as efficiently as possible, with design standards and labelling offering great water saving potential. Collaboration between Government, planners, developers and water companies is essential if we are to meet this goal and we are ready to play our part.”– Jean Spencer, Anglian Water, June 2018

The current ambition in Water Resource Management Plans (WRMP) (from 2014) is to reduce national water consumption to 133 litres per day by 2025⁶⁴ (from 141), and 123 Lpppd in dry years by 2045⁶⁵. The evidence shows that the government needs more ambitious targets if we are to protect people and the environment from drought and over-abstraction. New WRMPs for 2019 have been submitted with targets, **but Government should make sure that the following measures have been considered and are being used to achieve more ambitious targets:**

- Designing homes to be lighter on water usage, designed to a standard of 100 Lpppd. Recommendations from NIC are for a 118 Lpppd water efficiency national target⁶⁶, but

61 Environment Agency, January 2017

62 University of Birmingham and Southampton, March 2016

63 A Green Future: Our 25 Year Plan to Improve the Environment, DEFRA, January 2018

64 The Committee on Climate Change, September 2017

65 Draft Water Resources Management Plan 2019 Supply-Demand Data at Company Level 2020/21 to 2044/45, Environment Agency, March 2018

66 Preparing for a drier future: England’s water infrastructure needs, NIC, April 2018

it was viewed by many respondents that more ambitious targets are feasible and necessary. 100 Lpppd should be considered the minimum water efficiency aspiration for new build considering that 22% of households already use less than 75 Lpppd⁶⁷. There are many solutions and innovations available such as efficient fixtures and fittings (e.g. showerheads and low flush toilets) that reduce water usage. **Such fittings do however need to be properly designed and labelled through a mandatory Water Efficiency Label** so that the consumer is incentivised to purchase them. For example, to remove problems that dual-flush toilets have with leakage. Also, anecdotal evidence suggests that some householders end up replacing low-flow showers due to poor experience. 25%⁶⁸ of water used in the home is for showering, but only a quarter of showers have a water efficient head. Many housebuilders had concerns over long term water efficiency as the homeowner could change low flow showers, and some thought that a 'water-efficient home' could actually be less attractive to prospective buyers for this reason. These factors all place a premium on consistently good designs that give the consumer a great experience.

- **Moving more quickly toward as close to 100% water metering as is possible,** especially smart meters which allow the customer to monitor their water usage more closely – 82% of people with a water meter reduce their water usage to save money⁶⁹. Metered households use 15-20% less on average than non-metered households – 127 Lpppd compared to 160 Lpppd⁷⁰. This would need to be accompanied by financial assistance to the vulnerable in society.
- Homes aren't as water efficient as we think they are; evidence from Thames Water suggests that new homes built to a standard of 105 Lpppd actually tend to be using between 110.31–140.75⁷¹ Lpppd, 5–25% more than expected. This performance gap needs to be investigated further to determine why and what might be done.
- Much more needs to be done on consistent and co-ordinated messaging on the importance of water efficiency to create a 'water saving culture' among the public⁷², and to counter beliefs that it is not necessary or of little value.
- For housing in flood risk areas, encouraging techniques such as floodable ground floors that are easy to design, saving money by reducing flood damage and getting the community back up and running quickly when the flood has receded.

67 The long term potential for deep reductions in household water demand, Artesia Consulting, April 2018

68 At Home With Water, Energy Saving Trust, July 2013

69 Waterwise and Ideal Standard Water Efficiency Annual Tracking Survey Waterwise, 2016

70 Discover Water, Water UK, 2018

71 Thames Water internal review of new build homes water use, Thames Water, 2018

72 Water Efficiency Strategy for the UK, Waterwise, June 2017

3

Barriers to progress: What's stopping us?

'As a nation, our aspirations for the quality of the built environment have been routinely too low.'

House of Lords Select Committee on National Policy for
the Built Environment, February 2016

The planning and building development framework – “Development at any cost”?

‘One priority has become dominant in debates concerning built environment policy. Increasing the overall supply of housing, and the speed at which housing is delivered, is a central part of the Government’s policy agenda.’ – House of Lords Select Committee on National Policy for the Built Environment, February 2016

The government’s new homes ambition is driven by the shortage of housing and the spiralling house price increases that – especially but not solely in the South East of England – have put house purchase out of reach of many families and young people. There is anecdotal evidence of housing developments being delayed because of objections from water companies, and in some cases not happening at all. Both housebuilders and water companies complain that lack of early engagement creates delays and hence cost increases – that water companies don’t work on water infrastructure plans sufficiently early ie before planning applications are developed and submitted, and that housebuilders don’t engage with water companies about water infrastructure ownership and management until too late in the construction process. Problems would be avoided by consistent pre-planning application engagement.

The goals on housing growth have created a culture of ‘development at any cost’, through the ‘presumption in favour of sustainable development’⁷³. Although plans are expected to consider environmental sustainability, this aspect is often deprioritised by the drive for housing growth. Many respondents to this inquiry voiced concerns over the quality of houses that are being built, and whether sustainable development is occurring. **The government should ensure that the International Institute for Sustainable Development⁷⁴ definition is actually used in assessing environmental, social and economic benefits⁷⁵ of a development:** ‘Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.’ Many respondents had concerns about the Government’s commitment to sustainable development, with much more perceived emphasis on the latter rather than the former.

“There has been an overreliance on the big eight housebuilders to deliver the housing that we need. The quality of houses that are being built isn’t good enough – purchasers are actually expecting the quality to be bad.” – Lord Best, April 2018

Intergenerational equity is often used as a reason that we must build more houses quickly, so that affordable housing is available for young people to get on the housing ladder. However, if these new houses and communities are not designed to address flooding and drought, it is our children and grandchildren who will bear the cost. **The UK Government should monitor the effect and merit of the Welsh Government’s Well-being of Future Generations Act 2015 landmark legislation, which looked to address intergenerational equity on social, economic, environmental and cultural grounds.**

73 Paragraph 14, National Planning Policy Framework, DCLG 2012

74 International Institute for Sustainable Development

75 National Planning Policy Framework (draft), MHCLG, March 2018

Too much overlapping legislation and too many bodies with confused responsibilities

Complexity of regulation and the number of bodies involved—with weak or overlapping responsibilities—has caused poor compliance and confused objectives. This is both true for water legislation (nine bills since privatisation in 1989 and 357 pieces of secondary legislation for water management in England), and for building planning and water (25 pieces of relevant legislation).

The roles and responsibilities of water management organisations to enforce many different pieces of legislation are needlessly complex. This creates confusion, and crucially, lack of authority for providing strategic advice and holding organisations to account.

For building, planning and water there are five enforcer/regulator bodies (UK Government, Local Authorities, Ofwat, EA and Drinking Water Inspectorate), plus the EU until the end of the Brexit transition period. There are nine principal and secondary duty and power holders (UK Government, Ofwat, Canal and River Trust, the Local Authority or LLFA, the Water and Sewerage Company, the developer, the riparian owner, the land owner and the property owner). For example, Anglian Water has to engage with 65 different planning authorities in their region.

This makes for a complex matrix of rules, confusion over who is enforcing and monitoring them, who has powers given by the legislation, and which bits of legislation are paramount. It also makes it difficult for the public to understand who should be held to account. For example, managing surface water flooding falls to the Lead Local Flood Authority (LLFA), who work with a variety of other organisations (EA, Internal Drainage Boards, District Councils, Highways Agency) on managing risk but the Environment Agency is the public-facing body and is so often the first to be blamed when surface flooding occurs, even though this is not its primary responsibility.

A confusion of plans and lack of leadership continuity means no joined-up, sustained approach

There is a lack of clear direction because of the many actors in the sector. Whilst many of the stakeholder groups are required to produce plans for water management and flood alleviation now, the fit of different responsibilities makes for confusion and hence inaction. The figure below shows the complexity of how the different plans overlap and interact. This is not helped by plans being produced on different timelines, with some produced every five years and some every six.

How the different areas of policy (planning, flood risk management, WFD and water) fit together

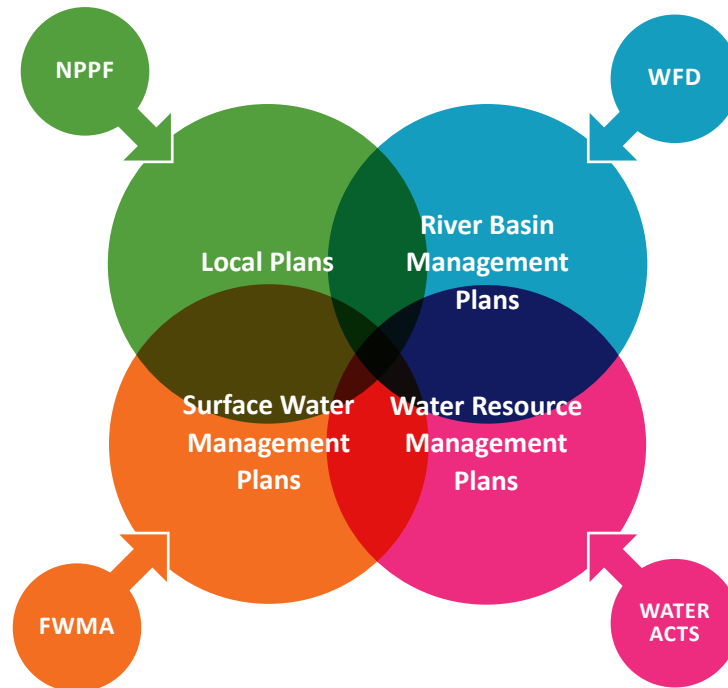


Figure 1, Planning Advice for Integrated Water Management, Cambridge Institute for Sustainability Leadership, June 2014

The interaction of different plans is shown above in Figure 1. Not shown in the diagram is the additional complexity of the interaction between flood risk regulation and flood risk management plans. This muddle is compounded by the lack of continuity and hence in-depth knowledge at the government level. Many consultees for this inquiry remarked on the short lifetime of the post of Housing and Planning Minister. There have been seven Housing and Planning Ministers in less than eight years. Currently a post held by Dominic Raab MP, previous Ministers have included Alok Sharma MP, Gavin Barwell MP, Brandon Lewis MP, Kris Hopkins MP, Mark Prisk MP, and Grant Shapps MP. This does not favour a consistent approach from government, and perhaps shows a lack of prestige for the role.

Some respondents felt that this had resulted in a more superficial approach taken by Ministers (with political messages stressing quantity of housing over quality), and has made it easier for the housebuilding industry, with its strong reach into government, to influence the approach on regulation, resulting in perceived widespread deregulation on environmental standards. The lack of incentives from government for housebuilders to do the right thing on sustainable housebuilding was acknowledged by respondents from the housing sector. One housebuilder spoke to this inquiry of his impressive political connections, whilst another commented:

“Why should we do any of this stuff [sustainable housebuilding]? No one is asking us to do it. The government just wants us to build lots of houses, our shareholders just want us to make a profit, and house buyers just want an affordable house.”

Furthermore, existing agencies which should be helping to fill the governance gap, and provide strategic continuity and a sustained approach (the EA, Natural England, Homes England, Ofwat, the Drinking Water Inspectorate) have their own missions and priorities for delivery; clear targets for housing and water policy are not effectively aligned with their priorities and responsibilities.

A number of parliamentary committees have acknowledged these governance issues. The EFRA Select Committee recommended the creation of a new ‘National Floods Commissioner for England’⁷⁶ responsible for long term flood risk reduction. The House of Lords Select Committee for National Policy for the Built Environment recommended the Government should appoint a ‘Chief Built Environment Advisor’ to foster collaboration between Government departments on policy delivery, and act as a champion for higher standards⁷⁷.

What is certain is the lack of continuity and knowledge at Ministerial level, coupled with the absence of a strategic body to join up priorities across agencies, makes it all the more important that for the future government is advised and held to account by a strong independent body with a long-term perspective and real teeth, as promised by the Environment Secretary in November 2017.

The financial model drives short-term decisions

The private developer finance model is based on drip feeding the new housing stock onto the market to ensure a good sale price and reduce financial exposure. The developer then moves on to the next project, without any long-term interest in the finished site, such as the management of any green infrastructure. There are no particular incentives for developers or landlords to install water efficiency measures in their properties, as the reward of lower water (metered) bills are received by the householder or tenant.

The often strained relationship between developers and utility companies is causing delays to housing delivery (time and unit reduction), and costs to both sides. There is currently a lack of data that might help decision-making, for example water company spend from the developer infrastructure charge was not consistently recorded before 1st April 2018, which was a concern raised by several developers, saying that in effect they have been asked to pay twice for network reinforcement⁷². Developers believe that in building new houses, they are gifting chargeable infrastructure to the water companies of approximately £73m⁷⁸ per year. House builders also have raised concerns over Ofwat’s limited ability to intervene and act as an adjudicator between water companies and developers as it has no legal jurisdiction in the planning system⁷⁹, and developers have been told by Ofwat that ‘network improvement’ dispute resolution is not its responsibility, and to contact the judicial system.

⁷⁶ Future Flood Prevention, EFRA Select Committee, October 2016

⁷⁷ Building Better Places, HoL Select Committee on National Policy for the Built Environment, February 2016

⁷⁸ Average water bill (£405) and house builds per year (180,000)

⁷⁹ Foul sewerage infrastructure availability v new housing delivery, Home Builder Federation, October 2015

Nor are householders financially incentivised to help themselves in preparing for flooding or to tackle drought. Dr Angela Connelly, Manchester University, told us that:

“Because of the way that we talk about risk, homeowners think that flooding, ‘1-100 year flood events’, may happen once in their lifetime. It is therefore a very low priority to prepare their house for, and something that the vast majority never get round to”.

Although a number of documents have been produced to inform and advise homeowners about protecting their homes from flood risk⁸⁰, awareness amongst the general public is low. There is the start of some good work in this area—DEFRA’s Property Flood Resilience roundtable is looking to implement the DEFRA Resilience Action Plan⁸¹ to increase housing resilience, and will be producing a ‘Voluntary Code of Practice’ by the end of 2018⁸². CIRIA’s Property Flood Resilience Code of Practice⁸³ is working on standards and accreditation to avoid flood victims being at risk of cowboy installers. However, respondents to this inquiry stated their concern that the uptake of property-level resilience measures is vanishingly small.

The “Viability” principle (i.e. ‘plans should be deliverable... and not be subject to such a scale of obligations and policy burdens that their ability to be developed viably is threatened’) is too ambiguous and subjective a test, and looks only to the short-term not to long-term public benefits. It is not therefore surprising that planning decisions do not consistently address long-term infrastructure obligations such as the provision of green infrastructure. Concerns were raised by housebuilder respondents that the land required to include green, above-ground SuDS affects development density, profitability, and in some cases the viability of sites. Although greener communities are better places to live and may therefore attract a premium price, some respondents raised concerns about risks to the affordability of such homes. Other respondents argue that SuDS can be multi-functional urban green spaces, or converted unused land and can actually save space. At present the emphasis on viability makes it difficult for LPAs to justify and encourage high standards (RTP1), or the type of building which is right for their area. Cambridge City Council told us that:

‘Viability assessments should not only consider the profitability of a development project to the developer and landowner but also the wider and long-term benefits of, for example, climate resilience measures for wider society and ultimately the public purse’.

Removal of financial penalties – new incentives needed to avoid reverting to the ‘dirty man of Europe’

There will be a governance gap for water management after the UK leaves the EU and the auspices of the European Commission and the CJEU after the Brexit transition period. After this time, there will potentially be no financial penalties or infractions on the government for poor environmental performance. This enforcement is needed: 67% of environmental cases taken to the CJEU since 2003 have found in the Commission’s favour⁸⁴.

80 Six steps to property level resilience, Manchester University & BRE, August 2013
 81 The Property Flood Resilience Action Plan, DEFRA, September 2016
 82 A Green Future: Our 25 Year Plan to Improve the Environment, DEFRA, January 2018
 83 Code of Practice and guidance for property flood resilience, CIRIA, March 2017
 84 Institute of Government, November 2017

The UK must replace this capacity to hold the powerful to account and drive policy and regulation through infraction action on government. At the catchment level, there is no statutory obligation for a joined-up approach with the developers required to fully participate in catchment partnership initiatives. In this report we have assumed that the CJEU functions will need to be taken over by the UK's judicial system, but the advice will need to come from the new body currently being consulted on by DEFRA.

Lack of Capacity and Skills

'Additional duties and responsibilities have been undertaken without additional funding being provided... Reductions in grant in aid income mean a reduced capacity at the same time as EU exit which increases the demand on our expertise.'—Environment Agency, annual accounts 2016/17

Respondents to this inquiry were very concerned that the Environment Agency is overstretched, does not have the capacity to carry out its role of catchment management regulator, and that its independent voice—and that of other Agencies—to hold the government to account has been diluted. The EA manages flood risk along 36,000 km of rivers⁸⁵, a huge task. Its environmental protection budget has been cut by 55% since 2010⁸⁶. The Environment Agency staffing has been cut 19% since 2012/13, and has lost 40% of its 'planning and development control staff', and 'flood incident management' has also lost 20% of its staff (2010-2014)⁸⁷.

Natural England, an organisation set up to improve England's environment and champion green infrastructure has also seen its budget cut—by 60% since 2009⁸⁸ and its advisory role lost. The experienced and dedicated staff lost from both of these agencies will not easily be replaced.

'The Government at times seems to regard planning as a restriction on growth and housing delivery that requires further deregulation and a more complete reliance on market forces... In fact, the reverse is true.'—Lucy Hawthorne, CPRE, May 2018

The problem of lack of capacity and skills is even greater at local level. Local Planning Authorities are responsible for Local Plans, for considering planning applications, and for enforcing local planning conditions. However, these are not statutory functions and the planning service has been subject to swingeing cuts. According to the National Audit Office, councils have made 46% real-terms reductions in spending on planning and development services (2010-11 to 2014-15)⁸⁹. A study by the RTPi in the North West found a drop in planning policy staff of 37%, and a reduction in development management staff of 27%⁹⁰. These are significant cuts to LPA budget and staffing, and they found services surviving only on

85 Sir James Bevan, EA 2018

86 Greener UK, 2018

87 Environment Agency figures, from 'Managing climate risks to well-being and the economy, Climate Change Committee, 2014'

88 Greener UK, March 2018

89 The impacts of funding reductions on local authorities, NAO November 2014

90 Investing in Delivery, RTPi 2015

'the goodwill and professional integrity of officers'. Critical elements such as proactive plan-making and enforcement are being put at risk.

There is no strategic advisory capacity to provide proactive input into local plans at catchment scale, or to provide catchment-level advice to local planning committees. This is exacerbated in two-tier local authority areas, although the mayoral system may in some areas be starting to provide capacity to advise local politicians. Advice to councils on development in flood risk areas from LLFAs is also under threat. Lead Local Flood Authorities are struggling with a lack of funding and expertise. Some LLFAs do not even employ specialist flood management experts.

CIWEM said:

'LLFAs...only receive approximately a quarter of what it costs them to operate as a statutory consultee for planning... having lost skills and resources, authorities are experiencing significant challenges with the recruitment of people with the relevant skills, in particular drainage engineers.'

Government grant funding is in theory available to compensate for LPA budget cuts. However, requiring authorities to apply for increased funding risks the grants being allocated to those with the capacity to apply, rather than to those most at need of extra funding but who do not have the expertise or spare capacity to bid for it. In two-tier areas the District Council is the LPA and there are particular concerns in the planning service that small rural LPAs are not able to make allowances for the effects of climate change and planning for the future.

It is not surprising that all respondents agreed that planning services have been under significant and growing pressure due to a lack of resources, lack of staff time and technical skill. Morale is also reportedly poor among planning officers due to their workload. Whilst many planners do a good job under difficult circumstances, the planning service is struggling.

There is also an issue of skills within the housebuilding sector. As indicated above, many respondents raised concerns that the multiple benefits of green infrastructure was not translating into adoption on the ground, perhaps due to these benefits being difficult to quantify. Whilst we were not able to obtain statistics, many respondents indicated a lack of will and knowledge amongst architects, designers, drainage engineers and builders to embrace sustainability innovations.

4

What needs to be done

‘Current flood risk management structures are fragmented, inefficient and ineffective, and although there are many examples of successful local partnerships, current arrangements do not encourage widespread use of catchment scale approaches.’

– EFRA Select Committee, October 2016

Tougher and simpler planning bringing all developers up to the level of best industry practice

“The imperative to build more homes was overriding anything that might get in the way, and I think the housebuilders got at the Department for Communities and Local Government to say all of this is going to be costly and difficult. It isn’t [costly] really, but they just want to get on and build homes according to the bog-standard, simple template and not have to worry about whether the development is sustainable in terms of carbon footprint and flood risk. In 20 years’ time, people will look back and say, ‘What were they thinking?’” – Lord Krebs, December 2016

The Government has made clear that new housing needs to be sustainable: ‘Building the right homes in the right places’⁹¹. This should mean affordable, resilient and sustainable homes which meet the needs of the community, enhance wellbeing, reduce pressure on the water and sewerage system, are energy efficient and reduce greenhouse gas emissions from domestic buildings. Designing in these requirements is the only way of avoiding passing costs on to the next generation, and needs strategic long-term thinking in the planning of housing developments, and in the management of water at a strategic spatial scale.

Many respondents took the view that the current planning system is ‘broken’ and ‘unfit for purpose’⁹² and unable to deliver on the government’s ambition. This widely taken view is based on a number of problems. One problem widely cited is the lack of a national policy or planning framework for what types of houses and where they should be. There is a lack of capacity in the local planning system and a leadership and capacity and at the sub-national level – to which we return below.

A key problem is because planning rules and building regulations are out-of-date, complex, and full of ambiguity. Developers told us that they are very used to regulation, but what they cannot abide is lack of certainty in government approaches, and rules that permit inconsistent application and hence price undercutting from competitors.

For example, the removal of the Code for Sustainable Homes, despite its shortcomings, sent out the wrong signals to the market on sustainable build quality for things like water and energy efficiency. Builders said they had been ready to implement Level 5 in 2015 in accordance with the Code when it was abolished at short notice. National advice has also not always been consistent, with government being told by the Climate Change Committee in 2015⁹³ to restrict development in high flood risk areas, and then advised in 2016⁹⁴ that development was fine as long as the developers, local authorities and property owners were aware of the risks. The Committee clarified their view with us that: ‘Development should be restricted in high flood risk areas, however if there is a need to build on this sort of land... then these houses should be built to be resilient to the sort of flooding possible, or flood defences built to protect them, and not leading to increased flood risk elsewhere.’

91 Planning for the right homes in the right places, MHCLG 2018

92 Raynsford Review – interim findings, Town and Country Planning Association, May 2018

93 Reducing emissions and preparing for climate change: 2015 Progress Report to Parliament, Committee on Climate Change, June 2015

94 Flooding: Cooperation Across Government inquiry, EAC Select Committee, January 2016

“Willmott Dixon supports the adoption of higher building standards for water efficiency and sustainable urban drainage systems. What is most important is the consistency of standards and requirements applied across the industry, for large and small, new and refurbished housing developments.” – Willmott Dixon, 2018

The national planning framework should create mandatory sustainability standards for water, to remove existing glaring loopholes and provide a level playing field for developers. Developers should be very clear what is expected of them, and know that they will not be undercut by competitors. Achieving this quickly could be through a new mandatory ‘Bricks and Water’ Sustainability Code. To ensure rapid action, it could start by addressing water issues around flood resilience and water efficiency before including other aspects of sustainability. For example, the test for building on floodplains could be zero net increase in flood risk overall in the catchment, particularly in relation to the risk to existing housing stock. Housebuilders recognise the potential reputational damage that could be caused if one of their homes floods, and the HBF have a primary ‘customer care’ requirement on this matter for their members⁹⁵.

“House builders and a number of their retained engineering consultants are frustrated with the current framework that they have to work within, in particular when dealing with water & sewerage companies, LLFAs and local planning authorities and where resources, both intellectual and numerical are sometimes compromised. However, house builders in general are very keen to work collaboratively to deliver better outcomes.

In the context of flood risk mitigation and potable water resilience what is needed is a non-fragmented approach with core design principles for all new developments that are based on the best available, robust scientific evidence from the Environment Agency and other key partner/stakeholder interests. In other words, the correct balance between scientific rigour and engineering pragmatism.

New regulations can introduce increases in construction cost and/or result in unintended consequences but these outcomes can be mitigated, to a degree, by adopting a more holistic, informed approach underpinned by representative viability considerations and robust Regulatory Impact Assessments. Moreover, what all partner and stakeholder interests need are consistently applied, practical and achievable standards that provide not only technical and cost certainty but wider societal confidence.” – Home Builders Federation, June 2018

At present housebuilders have an automatic right to connect surface water run-off from new developments to the traditional drainage system, subject to meeting current standards in Building Regulations 2010. Consultees from the water sector said that this put strain on the already overloaded drainage system. On water efficiency many respondents to the inquiry, including housebuilders, believe the current standard in Building Regulations 2010 of 125 litres of water per person per day (Lpppd) could be more ambitious. CIWEM pointed out that many local authorities already require houses to be built to a standard of 110 Lpppd, but only in water-stressed areas.

The recent initiatives by Anglian Water and Severn Trent Water to discount the infrastructure charge (£750 per house) to developers if they built to tighter water efficiency standards (100 and 110 Lpppd respectively), and/or do not connect to the surface water system⁹⁶ shows that tighter targets are wholly achievable, and indeed even drastic reductions to 50-70 Lpppd are feasible by 2065⁹⁷, and the technologies to achieve this already exist. Rather than rely on welcome but ad-hoc initiatives by individual water companies, **the government should mandate a requirement of a maximum of 100 Lpppd** (as per the Anglian Water initiative) in all areas, not just those as deemed under water-stress as it currently the case. **This should be set out in the proposed mandatory ‘Bricks and Water’ Sustainability Code.**

The government should similarly build on the Anglian Water and Severn Trent Water initiatives by **encouraging more companies to offer discounts on the infrastructure levy for building water efficient houses. The government should trial the removal of the automatic right to connect to the public sewerage network for developers – making it a requirement for access to sewerage to be at minimum via a green, sustainable drainage system compliant with a national SuDS standard.** The existing initiatives show that such a scheme is workable. This has been a recommendation to government for over ten years⁹⁸. Developers should be given a discount on their infrastructure charge, and for hitting targets on a water efficient house design as part of an overall sustainability deal.

Government should also, over time, continually revise ambition as new technologies and water efficiency innovations emerge.

Strategic leadership, accountability and independence, to make things happen on the ground

“There is currently a vacuum at the heart of the English planning system which is having profound social, economic and environmental consequences. No thought has been given to a wider view of planning which tackles cross-boundary issues for local authorities.”

– Clive Betts MP, Chair of the Housing, Communities and Local Government Select Committee, May 2018

The UK faces a national and strategic governance challenge on water, housing and infrastructure which will have financial and quality of life impacts on current and future generations. The Government has in principle accepted this challenge in its consultation on a new Environment and Governance Bill launched on 10th May 2018 by the Environment Secretary, proposing a new body to hold government to account.

Our interlocutors strongly share the Secretary of State’s view⁹⁹ that exiting the EU leaves a strategic policy, delivery and enforcement gap. Although the EU Withdrawal Bill is intended to carry across to UK statute environmental directives like the Water Framework Directive, these directives need to be brought into a housing and water policy framework that provides the

96 Press Notices: “Anglian Water set to waive connection charges for developers delivering on water efficiency for new homes”, 6th November 2017; “You can get up to a 100% discount on your clean water and sewerage infrastructure charge – this means you pay nothing” Severn Trent, 1 April 2018.

97 The long term potential for deep reductions in household water demand, Artesia Consulting, April 2018

98 Learning lessons from the 2007 floods, Sir Michael Pitt, June 2008

99 Evidence to the EAC, Rt Hon Michael Gove MP, November 2017

necessary ambition and accountability at national and sub-national level to deliver ‘the right homes in the right places’.

To underpin the new environmental bill proposed by the government to replace EU legislation we have proposed a mandatory ‘Bricks and Water’ Sustainability Code. This Code, setting out national housing and water policy with statutory targets for environmental public good – **must be the responsibility of the Ministry of Housing**, in conjunction with the Environment Department. However, the accountability and strategic leadership gap to make things happen on the ground also needs to be filled, alongside a mandatory code.

To fill these gaps the outcome of a consultation on the new environmental body needs to address the following functions. The new body must:

- a. Have truly independent powers and authority to hold the whole of government to account on sustainable housing and water management, including the Ministry of Housing in relation to the delivery of the new homes needed across England.
- b. Proactively contribute to national (and sub-national) plans in relation to green infrastructure and water/flood management.
- c. Assess environmental compliance by government to allow the national replacement for the CJEU (which we have assumed needs to be a judicial body ie the Supreme Court of the United Kingdom) to take any necessary infraction action to drive good behaviour across government.

The Secretary of State has pledged that the new independent environmental body will be created to ‘hold the powerful to account’ and deliver a ‘green Brexit’¹⁰⁰. To achieve this ambition – which is both laudable and essential to provide for future generations – the new body must have real independence and statutory authority to do the functions set out above. The functions should be written into its statutory duties, in the new Environmental Principles and Governance Bill¹⁰¹.

There is precedent for creating a body to oversee not manage rivers: from 1989-1996 there was a National Rivers Authority, which had responsibilities for managing river health. The EFRA Select Committee recently recommended the creation of an ‘English Rivers and Coastal Authority’, to take over the EA’s flood management responsibilities¹⁰². Before 2011, the government was advised by the Sustainable Development Commission – the Environmental Audit Committee now tries to pick up some of the policy and scrutiny slack.

The proposals in this report do not seek to re-impose earlier models or to tinker with existing bodies, but to fill the gaps in the current structures. For example, a key difference from the EFRA proposal is that under either option we envisage the EA continuing its implementation and enforcement functions, with the new body operating at the strategic policy and delivery leadership level. In order to be able to hold relevant bodies and the government to account, the new body would monitor impact by drawing together and analysing results from other

100 Rt Hon Michael Gove MP, Telegraph, 11 November 2017

101 Rt Hon Michael Gove MP and Department for Environment, Food & Rural Affairs consultation published 10 May 2018

102 Future flood prevention, EFRA Select Committee, November 2016

bodies such as inputs from the Environment Agency’s extensive monitoring network. If the Government’s good intentions are to be achieved, it will be critical to avoid simply recreating the Royal Commission of Environmental Pollution (disbanded in 2011), and the new body and the EA need to be appropriately funded to fulfil their responsibilities.

The new body must crucially have the greatest possible level of independence from the government set out in statute. The body would **provide strategic leadership to ensure practical implementation of environmental targets around homes and water, and would make an annual report on policy and implementation issues to the Secretaries of State for Housing and the Environment which would be publicly available to Parliament.** It would advise the National Infrastructure Commission, and through its strategic monitoring of progress against the Water Framework Directive and its replacement post-Brexit, including the new Environmental Principles and Governance Bill. It would **provide the evidence to the UK’s Supreme Court for the kinds of decisions on infraction currently taken by the CJEU.**

Water management needs to be addressed at a sub-national ('catchment-scale') level in planning and development

“The duty to co-operate among Local Planning Authorities is overwhelmingly focused upon housing growth, with little to no emphasis placed on cross-boundary climate change issues.” – Town and Country Planning Association, November 2016

‘The nation faces an unacceptable risk of severe supply limitations and even homes and businesses being cut off...The Commission recommends that ensures government plans are in place to deliver additional supply and demand reduction of at least 4,000 million litres per day.’ – National Infrastructure Commission, 2018¹⁰³

Planning the housing needed across England while managing water as a public good needs to have a range of local and regional actors in the room, addressing issues at the right spatial level so that longer-term as well as immediate planning issues can be addressed. There is a currently a leadership gap at the sub-national level: local authorities do not have the capacity or remit to fill this, but are valuable partners in sub-national partnerships. Nor is there likely to be a single model at the sub-national level.

To drive cross-boundary and cross-sectoral engagement at sub-national level we propose this planning be carried out at a ‘catchment scale’. Every catchment is different, with differing geologies, hydrologies, users and demands. Catchment partnerships should look to solve problems across individual (and multiple where necessary) catchments. The knowledge of 100+ local catchment groups in England such as the Rivers Trust and the Catchment Based Approach (CaBA) partnership groups is invaluable, and whilst many LPAs do engage with catchment partnership groups, some have reported difficulty engaging with developers.

What is currently missing, if we are to have a sustained and systematic approach across England, is strategic capacity and leadership. Local groups have neither the capacity nor authority, nor do LPAs, even if it were possible to free them up from some of their local planning burdens by a significant increase in permitted development. An analysis of 39 Local

¹⁰³ Preparing for a drier future: England’s water infrastructure needs, NIC, April 2018

Plans showed that 17 (44%) of the plans did not include a specific policy on sustainable drainage, and 12 (30%) included policies that were heavily caveated by terms such as ‘where viable’ or ‘feasible’¹⁰⁴. At a local level, policy and legislation on climate change is poorly understood, and climate change has been de-prioritised as a significant local planning issue¹⁰⁵. Less than half (42%) of LAs have a climate change strategy or adaptation plan¹⁰⁶. The catchment group in Cumbria is currently working on a pilot ‘one plan’ for more joined-up decision making¹⁰⁷, this promising work is in a very preliminary phase but could be taken up by the new body as good practice for all catchment groups, including considering capacity and funding issues.

If progress is to be made consistently across England, new strategic input is required. This could be provided by the new body providing leadership at the catchment management level, to ensure the necessary actors come together to consider water management holistically.

Drawing on the results the body could provide strategic advice to democratic decision makers on the water management aspects of development applications that require a catchment-scale perspective.

By acting in a sub-national leadership role this new body could be the convenor that brings together different LPAs into bigger ‘Catchment Partnerships’, to ensure the individual LPAs fit into an overall catchment plan. Statutorily based Catchment Partnerships would work with water resources groups, who have done some fantastic work on drought resilience in their respective areas (WRSE, WRE and others). At a local level, the Catchment Partnerships would coordinate catchment restoration works with LLFAs (and Internal Drainage Board if applicable).

‘Local authorities have a critical role to play in delivering many aspects of the current National Adaptation Programme. However, council budgets are stretched, and in the context of other priorities, climate change adaptation is often overlooked... momentum in the sector is at risk of stalling. Pressure to meet the need for more housing has led to climate change in effect being deprioritised in the land-use planning system.’

– Adaptation sub-committee, Committee on Climate Change, June 2017

Catchment Partnerships with official backing from the new statutory body would provide LPAs a place to engage with other neighbouring authorities on flood risk management and climate change adaptation issues, something that happens only rarely at the moment, save for cross-boundary planning applications. The Catchment Partnership could develop an ‘adaptation framework’ for water to make the catchment more resilient to climate change challenges such as flooding and drought, with common goals and clear expectations on stakeholders. The creation of Catchment Partnerships is in line with the findings of the EFRA Select Committee¹⁰⁸, which recommended the creation of ‘Regional Flood and Coastal Boards’ to coordinate action on a local level with LLFAs and Regional Flood and Coastal Committees.

104 Planning for the Climate Challenge? Understanding the performance of English Local Plans, Town and Country Planning Association, November 2016

105 Planning for the Climate Challenge? Understanding the performance of English Local Plans, Town and Country Planning Association, November 2016

106 Research to survey Local Authority action on climate change adaptation, JBA Consulting, June 2015

107 Cumbria Catchment Pioneer Pilot Project

108 Future flood prevention, EFRA Select Committee, November 2016

“It is common knowledge that there is no requirement for a local Flood Authority to have a water or flood management expert on the team, so the technical knowledge in local authorities on these issues can be almost non-existent.” – LPA representative

In short, while some good work is being done on long-term planning of water resources, the scale of the challenge means a systematic approach is needed across multiple organisations.

There are two other problems that need to be fixed.

The first is that not all bodies engaged in planning decisions have the status of statutory consultees. Respondents from all sectors advised that water companies in particular need to be statutory consultees, and we agree this is essential to smooth the interaction between house builder and water provider, and to ensure long-term planning and sustainable decisions are taken at catchment scale. **The new statutory body and the Catchment Partnerships should bring together house builders, water companies and major landowners and other interested parties into a single forum, with water companies given statutory consultee status on individual planning applications.** Whether there should be a de minimus level for the size of the development application (e.g. 10 units) should be determined by the water companies and Ofwat.

The second problem is that planning time-horizons across all the ‘catchment partners’ are mis-aligned. Consultees told us that consistent time horizons would help to align the content of Local Plans and ambition, and to manage inevitable tensions. Local Authorities produce a Local Plan every five years which is informed by the National Planning Policy Framework. River Basin Management Plans are produced every six years, and are produced by the Environment Agency in consultation with all catchment stakeholders in order to comply with the EU Water Framework Directive. Water Resource Management Plans are 25-year plans produced by water companies, updated every five years as statutory duty to be reviewed by the EA, Secretary of State and Ofwat, and similarly new drainage and waste water management plans work to a similar timeframe. Flood Risk Management Plans are produced every six years by LLFAs and EA, and are required under the Flood Risk Regulations (2009). Surface Water Management Plans are produced by LLFAs and the EA every six years, and required by the Flood and Water Management Act 2010. Housebuilders generally have a much shorter planning timelines (or indeed plan only by development site) though some advised that they were starting to look longer-term.

At the moment, we are not planning for the future – the majority (57%) of LPAs planning horizon is 1-15 years¹⁰⁹. Only 23% plan for a horizon of at least 30 years. The development of national directives post-Brexit provides a positive opportunity to align planning timeframes.

Moving to a 25-year strategic horizon to fit with the 25-Year Environment Plan 2018, in 5-year ‘chunks’, would seem the best option for such alignment, with the transition from current timelines helped through the leadership of the new body in the ‘Catchment Partnerships’.

In establishing the new body in legislation it will be important to provide future proofing to allow Catchment Partnerships to develop further. For example, Catchment Partnerships might wish to designate ‘flood belts’, which recognise the need to make space for rivers and wetlands, and which will act to restore functional floodplains holding water back and preventing flooding downstream by slowing the flow. This ambition would fit with the government’s existing ‘Making Space for Water’ agenda¹¹⁰ and could build on existing best practice such as the Life project¹¹¹, Aquitecture¹¹², Home for all Seasons¹¹³, using communal green infrastructure areas such as ponds, swales and detention basins that provide space for water when needed, and when dry provide community green space. **The new Principles and Governance Bill should be future-proofed to allow for such developments in the role of the new body.**

Water efficiency and reuse in the home, and flood resilience, the norm not the exception

“Water efficient products have been widely available for many years and are often used in new homes, but this appears to have had minimal effect on overall national water usage. We need widespread uptake of new innovations like greywater reuse and rainwater harvesting if we are to see radical reductions in water usage nationally to 100 litres pppd and below”. – Dr David Balmforth, MWH, May 2018

Homes need to be built to a more ambitious efficiency template, with a standard of 100 Lpppd set out in the new ‘Bricks and Water’ Sustainability Code. Standard water saving devices in the home will need to be combined with new innovations, as 24%¹¹⁴ of domestic water is used flushing WC, only 4% is used for drinking water¹¹⁵.

Public enthusiasm for water efficiency measures is coloured by performance on water leakage – “why should I use less when the water company allows so much to be wasted?” Current leakage of potable drinking water in England is on average 20% of total water put into the system, amounting to over 3.1 billion litres lost every day¹¹⁶, and the performance on leakage in the water-stressed South East of England is not good. On average 121 litres are lost per property per day through leakage¹¹⁷ in England, higher than our proposed target of 100 Lpppd, which makes that a difficult ask. Many developers brought up leakage unprompted with the inquiry, and spoke in negative terms of the water industry’s efforts to reduce it.

“We need to change our attitudes to water use. It is the most fundamental thing needed to ensure a healthy environment but we are taking too much of it and have to work together to manage this precious resource.” – Emma Howard Boyd, Environment Agency, May 2018

110 Making space for water, DEFRA 2005

111 Long term initiatives for flood risk environments, BRE

112 Aquitecture: Buildings and cities designed to live and work with water, Barker and Coutts, Jan 2016

113 A Home For All Seasons, Ed Barsley, The Environmental Design Studio, 2016

114 The long term potential for deep reductions in household water demand, Artesia Consulting, April 2018

115 McGinley, October 2015

116 2016/17, Water, water everywhere?, Consumer Council for Water, December 2017

117 2016/17, Discover Water, Water UK, 2018

Water companies must work with the regulator on improving their performance on reducing leakage. A reasonable and costed target would be to reduce leakage by half by 2050¹¹⁸. The companies and the regulator need to look again at their SELL (sustainable economic levels of leakage) calculations.

“It’s more a target [household water efficiency guidelines] really to encourage individual households to think about their water, to encourage the use of, for instance, flushing systems on toilets that are more economical in the way they use water, and basically get the types of innovation that we need within households over a period of time, so that we are using water more carefully.” – Environment Minister Rt Hon. George Eustice MP, May 2018

Traditional water efficiency measures (low flow showers and toilets etc.) provide many of the low cost and easy interventions on saving water. Rainwater harvesting is where rainwater is harvested from roofs and other hard surfaces and stored for future use. Greywater recycling is reusing lightly used water (e.g. from sinks) for washing the car, flushing the WC etc. Rainwater and greywater reuse can improve people’s autonomy by reducing their reliance on central water infrastructure, particularly valuable during droughts and ‘hosepipe bans’ when there would still be water available for watering gardens or washing cars. Rainwater reuse can lower flood risk by storing rainwater on the property, reducing the amount flowing downstream and causing flooding downstream in the catchment, and reduce abstraction from the environment increasing resilience to dry weather.

However, there are some technical concerns about adopting greywater reuse at the household level, and there are some concerns over public acceptability (the ‘yuck’ factor). There remain questions among respondents around the value for money, health and safety, and carbon usage of greywater reuse systems which need to be more thoroughly investigated. Other countries have found that a significant reduction in the volume of water through sewers can result in higher organic odour: this should be monitored.

‘We are reluctant to install grey water systems into homes for a number of reasons. As dual plumbing systems are required this, as well as increasing cost, also greatly increases the risk of leaks. The need to provide filters within the system means that home owners are given added responsibility to maintain the system. Health risks are also associated to grey water particularly in the warmer months, which when coupled with the maintenance requirements, may put potential purchasers off from buying the house.’ – Redrow, 2018

Looking to the future many respondents see scope to adopt new water saving innovations at neighbourhood scale. **The government should continue over time to tighten building regulations to take account of the benefits of water reuse technologies, especially at the neighbourhood scale.**

Efficiency in new build homes is easier and cheaper than retrofit. Better information to consumers would help: it is difficult for even consciously water-saving customers to identify efficient products. Experience with energy labelling for white goods has shown that this helps consumer choice and can relatively quickly rid the market of the least efficient products. **A**

118 Preparing for a drier future – England’s water infrastructure needs, National Infrastructure Commission, April 2018

mandatory water efficiency labelling scheme for household appliances, similar to the EU energy label, could go some way to helping consumers understand their options to save water. The WaterSense label in the US or WELS in Australia provide examples of good practice.

‘Not all flooding can be prevented. Properties at risk should be more resilient, and better equipped to prevent water coming in and to deal with it more quickly if it does. Effective measures include flood barriers, non-return valves on wastewater pipes, airbrick covers, and flood-resistant coatings on walls.’ – 25 Year Environment Plan, DEFRA, January 2018

‘After serious flooding events, complacency creeps in after a couple of years and people forget. Using the terminology ‘1-100 year event’ to describe a flood is completely meaningless to people. We need to raise the awareness of flood risk in the public, without causing complacency or panic.’ – Sue Illman, landscape architect, Illman Young

According to many respondents to this inquiry, the public’s knowledge of their own flood risk is surprisingly poor, even when seemingly obvious, such as buying a low lying house near a river. Less than half of people were found to be aware of flood risk at purchase in a 2009 study¹¹⁹. Even though flood risk features in the searches done before buying a property, people either don’t read it or ignore it.

‘People have short memories – the floods of 2014 will be a distant memory in five years’ time, and the lure of a riverside property will be as strong as ever.’ – James Wyatt, Barton Wyatt, February 2014

Resilient homes are much less disruptive to the householder, the resident does not have to be evacuated, and the community can be back to normal in a matter days after the flood waters recede. The costs of clean-up are significantly lower, as well as knock on expenses such as opportunistic burglaries. However, for existing homes it is difficult for householders to prioritise spend on resilience measures.

Many respondents also spoke of a feeling amongst the public that it wasn’t their responsibility, that it was the government’s responsibility to prevent them from being flooded. Even after a flooding event, respondents remarked that the homeowner tends not to move away from the area, and it takes two or three such events for ‘the penny to drop’ for them to take action. The Government’s own paper showed that consumers lacked confidence in resilience measures¹²⁰. This inquiry has heard anecdotal evidence of resilience measures being removed by the homeowner either for aesthetic reasons, or concerns that by highlighting flood risk to a potential buyer they will hurt the property price. Though this is a sound assumption, it is actually flooding events, not flood risk, that dampen house prices, and even these rebound within three years of an event¹²¹.

119 Flooding and Property Values, RICS, June 2009

120 The Property Flood Resilience Action Plan, DEFRA, September 2016

121 Flooding and property values, Royal Institution of Chartered Surveyors, June 2009

“The three things that the public want to know is: How much am I at risk of flooding? What are you [the government] going to do about it? What can I do? This conversation should be used to more widely engage the public in flood risk management and to increase the uptake of property flood protection measures.” – Dr. David Balmforth, March 2018

One solution to solve this at the householder level would be to follow the example of the Energy Performance Certificate (EPC), which has been very successful in raising the awareness of energy performance among buyers, and driving action for example through the recent requirement for landlords to take action to improve the energy efficiency of rental homes.

We propose builders and householders should be required in law to provide a ‘Property Resilience Certificate’ (PRC) before they can sell or rent the property.

“The public needs to have a clearer idea of the quality and risks associated with the home that they are about to buy. A new national rating such as the Property Resilience Certificate will help inform the public, and this would drive the market for higher rated homes. A PRC would also help the insurance sector understand the impact of natural disasters like flooding, which could also benefit the premium holder.” – roundtable, Graham Brogden, Chair of DEFRA ‘Property Flood Resilience roundtable, May 2018

If the EPC and the PRC were brought together ‘thermal comfort’ could also be rated, which would cover energy efficiency and overheating issues of the house to the potential buyer. The PRC could update and make mandatory BRE’s Home Quality Mark where houses are rated out of 5 stars for running costs, environmental footprint, and health and wellbeing. Many developer respondents to this inquiry made the point that flooding primarily affects old homes, and that newly built homes do not get flooded. This shows the importance of the PRC applying to all homes, to incentivise retrofit of property resilience measures for flooding.

Green infrastructure not concrete

‘Well-designed SuDS can be built affordably and without delay in nearly all kinds of development as well as retrofitted in established development.’ – A place for SuDS, CIWEM & WWT, February 2017

The lack of a clear statutory definition of sustainable drainage was a cause of confusion among many respondents. Whilst approximately 80% of developments incorporate ‘some form of attenuation’, some respondents were concerned that the drainage provided has minimal additional benefits, sometimes ‘resembling a neglected bomb crater’. There is a lack of a clear delineation between ‘underground grey’ attenuation, and ‘over-ground green’ SuDS. While technically classified as SuDS at the moment, respondents questioned whether the underground concrete attenuation systems can be considered ‘sustainable’. Respondents to this inquiry considered ‘high quality SuDS’ to be predominantly above ground green features, which offer the multiple benefits of amenity, biodiversity, groundwater recharge and recreation.

‘Surface water flooding poses a significant and increasing risk, which can lead to sewer flooding and environmental pollution... Sustainable drainage systems (SuDS), such as

permeable surfaces, storage tanks and ponds, reduce the risk of surface water flooding.'
–25-year Environment Plan, DEFRA, January 2018

All respondents considered that Sustainable Drainage Systems (SuDS) have real benefits and most considered there were only very few circumstances in which SuDS could not be adopted in new build as a planning baseline. Some housebuilders recognised the place-making benefits of SuDS, designing green attractive places that people want to live which can achieve a 10% price premium¹²².

'SuDS are a cost-effective, environmentally friendly way of reducing pressure on combined sewer networks.' – Water & Wastewater Treatment, March 2015

Respondents expressed frustration that the inclusion of high-quality SuDS in new developments still remains uncommon, with 'harder' solutions tending to prevail¹²³. Only 8% of professionals in the sector believe the current non-statutory SuDS framework is delivering high quality and effective SuDS in England¹²⁴. Exact figures are difficult to obtain as there is no national register of SuDS features, but anecdotal evidence of over-ground 'green SuDS' says that coverage remains low. A Committee on Climate Change survey of planning applications in flood risk areas found that less than 15% had SuDS features included¹²⁵. Another survey of LLFAs found that only 9% were automatically involved in major planning applications, and only 50% of councils have some form of SuDS policy or strategy in place¹²⁶. The requisite detail in applications for drainage considerations was often reported as lacking.

'SuDS can be incorporated into any terrain as they do not necessarily depend upon infiltration into porous sub-strata. SuDS can equally well be incorporated into the surface landscaping of impervious ground such as clay similar to Lamb Drove' – Lamb Drove case study, SusDrain 2006

Respondents considered there was adequate guidance on SuDS and more on the way. For example Anglian Water has had a successful SuDS adoption policy since 2009, the water companies have been working on how they can adopt SuDS features through the work on updating the guidance Sewers For Adoption¹²⁷, where SuDS features can be effectively reclassified as sewers, and Water UK has also been looking to create a 'SuDS for Adoption' set of standards. The real problem is that greater adoption requires consistent application of the guidance. A number recommended mandatory build standards for SuDS. Some developer respondents had concerns over having a mandatory requirement for sustainable drainage as they viewed it not always appropriate for every site, particularly if the site is small, contaminated or have a clay-based soil which drains slowly, where the water table is high, or in Groundwater Source Protection Zones.

There was also some concern over the land take of above ground SuDS, and how this might negatively affect housing density and therefore housing affordability. This may be truer for the

122 Whole life costing for sustainable drainage, HR Wallingford, March 2004

123 Melville-Shreeve et al, Water and Environment Journal, CIWEM 2017

124 A Place for SuDS?, CIWEM 2017

125 Progress in preparing for climate change, Climate Change Committee, June 2015

126 Survey of LLFAs, CIC and Illman Young, March 2018

127 Sewers for Adoption, Water UK 2013

volume housebuilders than the higher end developers who sell at a higher unit price and for whom ‘greening the development’ may actually boost profitability. The new draft NPPF¹²⁸ says that: ‘Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate.’ Whilst this is a step in the right direction, concerns remain about the scope for developers to use the viability test to remove SuDS, and what is defined as a ‘major development’. **These issues should be addressed in the new ‘Bricks and Water’ Sustainability Code aimed at tougher but simpler planning regulations and the draft NPPF should be firmed up to mandate green infrastructure as the norm.**

A particular barrier that should be addressed as a matter of urgency is around ownership for managing SuDS systems. Green SuDS require more active and frequent maintenance than concrete and pipe solutions, and depending on site specifics can be mowing, vegetation management, silt removal, and erosion repair¹²⁹. Responsibility for the care of communal green spaces and overflow areas needs to be assigned as a matter of course during the planning application. For example, at a site in Stratford, London, this will be taken on by a management company independent of the architects and developers.

Some respondents argue that the green infrastructure needs to be managed spatially with the surrounding ‘hard infrastructure’ such as roads, i.e. by the relevant local authority level. This is perhaps unlikely given that this would require funding through the council tax, which is politically controversial. Housebuilders had concerns over who was going to take over the long-term adoption of the maintenance of SuDS features. Whilst the draft NPPF mentions that there should be ‘maintenance arrangement in place’¹³⁰ for SuDS, it is unclear on who should take on the important role of adoption—who pays and who is responsible being the key issues for respondents.

House builders generally consider that management to control surface water runoff is still too fragmented¹³¹, and many respondents considered that the local water and/or sewerage company would be best placed take on the management of SuDS in their area alongside sewer management, not least as the company reaps the benefits of lower demand on combined sewers and water quality and extraction. All of the mechanisms for the design, delivery, adoption and charging for SuDs are in place, the Government must now ensure that developers, local authorities and water companies are working together to make SuDS the rule rather than the exception. The Government has already committed to review the guidance in the NPPF and Building Regulations on the construction and maintenance of SuDS¹³² and this should **make it a planning requirement that a single body is made responsible for SuDS management as part of the planning application process.**

No national data is available on the coverage of SuDS in England and this gap needs to be filled to understand how much SuDS there is in any one area and nationally. **The new body should use the Catchment Partnerships to keep a record of all significant green infrastructure in their area.**

128 National Planning Policy Framework (draft), MHCLG, March 2018

129 Maintenance of SuDS guidance, SusDrain, CIRIA 2018

130 National Planning Policy Framework (draft), MHCLG, March 2018

131 Written evidence (FFP 90) to EFRA Select Committee, Home Builders Federation, March 2016

132 A Green Future: Our 25 Year Plan to Improve the Environment, DEFRA, January 2018

Post-CAP incentives for the public good

Land managers and farmers have a role to play in upstream measures to improve water quality and reduce flooding risk. This should be incentivised in the post-CAP arrangements. The Government has set out its ambition to pursue public money for public good in its ‘Health and Harmony’ public consultation on reforming CAP after Brexit¹³³. This proposes a reduction over time in the level of direct income payments (Pillar 1) so as to “free up money to help the industry prepare for the future and to pilot new environmental land management schemes”. As farmers’ manage 70% of the land in England, they have a significant role to play in the health of the water environment¹³⁴. Government needs to clarify the post-CAP funding mechanisms to deliver public goods, defining the parameters to the right level so as to have challenging targets but not restrict private investment¹²¹. New post-CAP money could be combined with contributions from water companies and developers, to offset the effects of housing development on the catchment and have a net-positive effect.

While the Defra consultation does include water quality as one of a range of proposed public goods, **we recommend water quality and flood prevention measures be put high up the list of priorities for post-CAP public subsidy**, given the challenges that need to be addressed now in order to protect future generations. Improving water quality requires measures that also drive other environmental benefits such as soil quality (reducing run-off from fields) and tree planting.

Some water companies already run payment schemes for upstream water management, which reduce water treatment costs and have environmental benefits, for example South West Water’s ‘Upstream Thinking’ project in Exmoor and ‘Moors for the Future’ project to restore the Peak District, funded by United Utilities, Yorkshire Water and Severn Trent Water. Many respondents to this inquiry suggested that further progress on restoring the natural functions of catchments features should be a priority of the new body, facilitated through their Catchment Partnerships, and this should be considered as part of the development of the post-CAP framework.

Other issues – planning, skills and funding

During the course of this inquiry other issues, especially around planning, skills and funding, have been raised with us. We set some of these out here for follow-on consideration:

- Local Planning Authorities were given permission to increase their planning fees by up to 20% across England from 17th January 2018¹³⁵. Further increases in fees should be allowed subject to their being reinvested in improving capacity and skills in the planning service. This would help address flaws in the local planning system identified by the TCPA¹³⁶ around the lack of technical support to LPAs on issues such as future flood risk scenarios, surface water flooding risk, and climate change adaptation. It could also

133 Health and Harmony: the future for food, farming and the environment in a Green Brexit, DEFRA, February 2018

134 Water company catchment management and agriculture policy post-Brexit, Indepen, May 2018

135 Statutory Instrument 2017 no.1314

136 Planning for the Climate Challenge? Understanding the performance of English Local Plans, Town and Country Planning Association, November 2016

provide capacity for planning staff to engage with the new body at the catchment level in the Catchment Partnerships.

- The Peace Review¹³⁷ found that there was a lack of certainty for developers and local authorities alike, resulting from the complex mechanisms of contributions. The government is currently consulting on reform of this system in response, and is likely to require local authorities to set Infrastructure Funding Statements, where the authority will outline how it anticipates using funding from developer contributions¹³⁸. The government should ensure that the review of developer contributions prioritises environmental sustainability and resilience as a long term priority.
- Approximately 80% of the applications reviewed by LPAs are small scale domestic improvements. An option that the Government has already pursued is to extend permitted development rights to the householder with prior approval, to largely remove the need to submit a planning application. Carrying out additional deregulation would go a little way to freeing up planners to engage in forward planning.
- Local Authorities can apply for funding for housing infrastructure from the competitive Housing Infrastructure Fund, the first beneficiaries of which were announced in March 2018. Applications to the Fund can include ‘blue and green infrastructure’, however most of the successful projects are transport infrastructure, particularly roads. Successful bids were decided on value for money, and although ‘non-monetised impacts’ (such as well-being and amenity) are included, it is up to the user how these are applied¹³⁹. The Department should adopt clear criteria on making communities more resilient and green, when evaluating applications to the Housing Infrastructure Fund.
- The ‘water neutrality’ concept needs to be further investigated: water demand for ultra-efficient new developments should be offset by water efficiency retrofit of existing development.
- Retrofitting water efficiency and sustainable drainage remains a huge issue given that most housing stock already exists; new homes are a relatively small proportion of the problem. Approximately 80% of the homes that will be standing in 2050 have already been built. Rainwater and greywater reuse technologies are prohibitively expensive for installation in single homes at the moment, but may benefit from economies of scale if they are introduced at a development scale. HR Wallingford and others stated that they are likely to be cost effective when centralised within an existing community. Some respondents suggested that a high priority for water efficiency is social housing via the social housing landlords, given that water usage in social housing has been found to be high.
- Rebate schemes for water efficiency devices linked to a strong water efficiency label could be trialled by the government, and have been implemented in the USA and Australia. These could help water efficiency retrofit in existing homes, for which water efficiency devices are much easier to install than rainwater harvesting or greywater reuse. There are also strong links between water and energy efficiency, which should be addressed through more integrated programmes.

137 Peace Review – A new approach to developer contributions, CIL, October 2016

138 Supporting housing delivery through developer contributions, MHCLG, March 2018

139 An introduction to the Housing Infrastructure Fund, DCLG, July 2017

- Rebate schemes for retrofitted greywater reuse systems could be trialled in city regions learning from rainwater and greywater harvesting rebate schemes currently being trialled in several cities in Canada (Guelph¹⁴⁰ Kitchener, Waterloo, Mississauga, Bathurst), in Tucson USA and in Joondalup, Western Australia. Grants to retrofit communities with greywater reuse and rainwater harvesting could be funded by matched contributions from water customers and water companies, who are the beneficiaries of the reduced water usage of these systems. The value for money to the taxpayer of such schemes needs to be carefully evaluated.
- Issues around skills in the construction sector were also raised. Respondents were not convinced engineers are properly trained in their design and implementation of green roofs and subbase replacement technologies. Construction methods and a skilled workforce need to be regularly updated. Some housebuilders listed the supply chain skill base as one of the concerns with sustainable drainage installation. For property-level resilience measures, CIWEM, ICE and RICS are currently developing a code of practice for built environment professionals and local authority planners to harness new technologies like off-site build, but this needs to be underpinned by mandatory building codes/regulations.

The WSBF

About the Westminster Sustainable Business Forum

The Westminster Sustainable Business Forum (WSBF) is a high level coalition of leading businesses, parliamentarians and public sector organisations working to promote effective sustainability policy in the UK.

The WSBF brings together leading businesses who share a belief in the need to operate in an environmentally, socially and economically sustainable way, and who understand that these concerns need to be incorporated into core business practices in order for companies to prosper in the long-term. The WSBF is independent, cross-party and not-for-profit.

Policy Connect is a cross-party think tank improving people's lives by influencing policy. We collaborate with Government and Parliament, through our APPGs, and across the public, private and third sectors to develop our policy ideas. We work in health; education & skills; industry, technology & innovation, and sustainability policy.

We consulted

Methodology and Steering Group

Scoping for Bricks and Water began in December 2016. The first scoping session was called 'Water and Infrastructure – a multi sector approach' and chaired by the Earl of Selborne. The second scoping session was held in April 2017 and chaired by Policy Connect CEO Jonathan Shaw.

The WSBF has a cross-party and cross-departmental Steering Group to strengthen robustness and advise on the research process required to produce the report. The Board is made up of membership from Parliamentarians, sponsors, WSBF members, Civil Servants, and independent experts. The Steering Group was consulted on the format and content of this report, but full editorial control was maintained by WSBF, and final sign-off was approved by the parliamentary co-chairs.

This report is informed by the evidence collected, but none of the contributing parties necessarily agree with all the findings and recommendations of this report. The Westminster Sustainable Business Forum would like to thank our sponsors Anglian Water, Affinity Water Thames Water, Yorkshire Water and the Wildfowl and Wetlands Trust without whom this report would not have been possible. We would also like to give special thanks to:

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The Steering Group included a range of members for industry and academia:

Angela Smith MP	House of Commons
Baroness McIntosh	House of Lords
Jim Clark	WSBF
Naomi Pratt	WSBF
Oona Muirhead CBE	Policy Connect
Martin Ballard	Willmott Dixon
Prof. Ian Barker	Water Policy International, Exeter University
Richard Benwell	Wildfowl and Wetlands Trust
Dr Jerry Bryan	Albion Water
Claire Curtis-Thomas	The British Board of Agrément
Nick Fenton	The Kent Developers Group
Meyrick Gough	Southern Water
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James Harris	Royal Town Planning Institute
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Alan Turner	Kent County Council
Angela Wallis	The Environment Agency
Lord Whitty	House of Lords
Dr Wei Yang	Wei Yang & Partners

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Housebuilding and Construction

- BRE (Building Research Establishment)
- Construction Industry Research and Information Association
- Willmott Dixon
- Countryside Properties
- Southern Housing Group
- NHF (National Housing Federation)
- HBF (Home Builders Federation)
- Peabody
- Taylor Wimpey
- Berkeley Developments
- Redrow

Water

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- Affinity Water
- Yorkshire Water
- Thames Water
- Consumer Council for Water
- CaBA (the Catchment Based Approach)
- Hydraulics Research (HR) Wallingford
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- FlushRain
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- Floodline
- Water UK
- South Staffs Water
- South West Water
- Polypipe
- Pyterra
- Southern Water
- United Utilities

Planning

- TCPA (Town and Country Planning Association)
- RTPI (Royal Town Planning Institute)
- Cambridge City Council
- Ashford Borough Council
- Kent County Council
- Lincolnshire County Council
- Hackney Council

Engineering

- AECOM
- Arup
- MWH Global
- Institute of Civil Engineers
- Royal HaskoningDHV
- WSP

NGO/Environmental

- The Rivers Trust
- The Canal & Rivers Trust
- CIWEM (the Chartered Institution of Water and Environmental Management)
- Business in the Community
- 100 Resilient Cities
- WWT (the Wildfowl and Wetlands Trust)

Insurance

- ABI (Association of British Insurers)
- AVIVA
- BIBA (British Insurance Brokers Association)
- Protek

Government

- DEFRA (Department for Environment, Food and Rural Affairs)
- MHCLG (Ministry of Housing, Communities and Local Government)
- Environment Agency
- Met Office
- Ofwat
- CCW (Consumer Council for Water)
- Committee on Climate Change, and Adaptation sub-committee
- Embassy of Holland
- Embassy of Australia
- Embassy of the United States of America
- Local Government Association
- Local Government Association Coastal Special Interest Group

Academic

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- University of East Anglia
- Anglian Centre for Water Studies
- NERC (Natural Environment Research Council)
- University of Oxford
- Sheffield Water Centre
- University of Sheffield
- Imperial College London
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Architecture

- TEDS (The Environmental Design Studio)
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- Baca Architects
- RICS (Royal Institution of Chartered Surveyors)
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