



By 2040, there will be a shortfall of **414 million** litres per day if there is no new source of supply

London's Successful Growth Water

London faces several challenges over the coming years. Two of the most prominent are London's growing population and climate change.

Population: The London Infrastructure Plan 2050, published by the GLA in 2014, predicts the Capital's population will hit 10 million by the 2030s and 11 million by 2050. This increase poses a considerable challenge, particularly in the management of land and resources.¹

Climate Change: Climate change makes weather patterns increasingly more volatile. The danger of droughts, heatwaves and flooding is increased and the ability to predict future weather patterns becomes more difficult.

In this Briefing Note we examine what effect these two challenges have on the water industry and what London needs to do to overcome them.

How prone are we to drought?

London and the South East is classified as "seriously water stressed" increasing the likelihood of drought.

Demand for water is expected to exceed supply by 10 per cent in 2025 and by 21 per cent in 2040.² Water resources require long term planning (20 -25 years) so we should be putting plans in place to deal with this shortfall with the next few years.

Thames Water is working on the current Water Resource Management Plan which is published every 5 years and next due for publication in 2019. This will set out their plans for managing water supply from 2020 to 2045. As part of this plan, Thames Water are reviewing current and future water resource options including:

- A pipeline or canal from the River Severn to "top up" London's water supply;
- A reservoir in Abingdon;
- A wastewater reuse site at Deephams or Beckton Sewage Treatment works.

All three options have their own benefits and challenges and more than one option may be required if we are to meet future demand for the long term.

Can't we just reduce how much we use?

There are some things we can do to reduce use, including behavioural change, smart metering and design.

Behavioural change: The South East on average uses 164 litres per capita consumption daily (PCC), the highest of any UK region and considerably more than the UK average of 148 litres PCC. Promoting a change in how we view water is crucial if Londoners are to reduce the amount we consume, requiring the coordinated energies of local and central government, agencies and water companies alike.³

Smart Metering: Smart metering roll out can help lower water usage by accurately recording how much water each household is using. By doing so, the water company can identify leakages in the water network, and encourage behavioural change.

By Design: Enhanced standards to incorporate effective water saving and reuse technology in new property developments and refurbishment of existing property where practicable can minimise PCC particularly with fast growing housing needs.

However, it is unlikely that demand management measures alone will be enough to meet the growing need for water in London.

Average South East Litres Per Capita Consumption (PCC)



UK Average Litres Per Capita Consumption (PCC)



What about flooding?

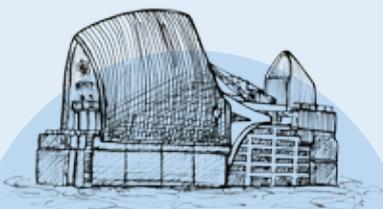
Flooding does pose a threat to London's continued success and growth. There are several types of flooding which London is affected by:

Surface water flooding: This occurs when rainwater does not soak into the ground or overloads the drainage system. Surface water flooding has become a larger problem over recent years due to the paving over of front gardens and construction on green, permeable spaces.

River flooding: Heavy rainfall can lead to rivers overflowing. Crucially, this not just concerns the Thames, but also the many small rivers that run into it.

Tidal surges: Tidal surges happen when the effects of low atmospheric pressure storms out at sea coincide with high spring tides to force large volumes of water up the Thames Estuary.

Rising groundwater and sewerage flooding: In some areas, the water table is rising. This poses a flooding risk to deep basements, the underground, building foundations and any other sub-surface infrastructure. Sewerage flooding can also occur due to the Victorian combined sewerage system and London's 'lost rivers' many of which have been diverted.



The Thames Barrier protects around 1.25 million people, 16 hospitals and £200 billion worth of property from flooding.⁴

*Sewage refers to the waste matter, sewerage refers to the physical facilities used to treat sewage.

So how is London protected?

Stopping surface water flooding:

To reduce surface water flooding, London will need to invest in more green infrastructure and sustainable drainage systems (SuDS). The Sustainable Drainage Action Plan was developed by the GLA in 2015 and provides guidance on the use of SuDS in different sectors and for different land uses.

Stopping river flooding: Many of London's rivers are now in artificial channels which are prone to overflowing. By restoring rivers, London can reduce the risk of flooding. The London Rivers Action Plan helped to restore 15km of river around London in 2015.

Protecting against tidal surges:

London is protected against tidal surges by the Thames Barrier.

The Barrier protects around 1.25 million people, 16 hospitals and £200 billion worth of property from flooding.

The Thames Estuary 2100 Plan sets out the necessary upgrades required to protect London against flooding up until the end of the century. It includes all of the viable options that could reduce flooding such as a new barrier in 2070, routine maintenance of existing defences, improved defences, managed realignment and flooding of marshes downstream of the barrier.

Protecting against rising groundwater and sewerage flooding:

Groundwater can be removed through abstraction. In 1998, the General Aquifer Research Development and Investigation Team (GARDIT) launched a five point strategy to increase groundwater abstraction. The strategy was largely seen as a success. Preventing sewerage flooding requires continuing maintenance works to the sewerage network.

And what about wastewater?

London's sewerage system is currently going through a large transformation with the construction of the Thames Tideway Tunnel.

Currently, London's sewerage system uses Combined Sewer Overflows (CSOs) which were built to discharge sewage into the river during heavy storms. However, nowadays these CSO discharges happen almost every week, pouring an average of 20 million tonnes each year of untreated sewage into the Tidal River Thames. The Tunnel, when complete, will be 25 kilometres long and will redirect this sewage to the Lee Tunnel and then onto Beckton Sewage Treatment Works.

Design and behavioural changes that reduce our consumption of clean water also impact on how heavily we use the sewerage system.

Who's in charge of what?

Different organisations have different responsibilities for water resources, flood protection and wastewater management in London:

- **Strategic overview & main rivers:** Environment Agency
- **Water supply:** Thames Water, Affinity Water, Sutton and East Surrey Water, Essex Water and Suffolk Water
- **Sewerage and sewage*:** Thames Water
- **Local flooding:** GLA (Drain London), and local authorities



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Meet the experts

This Briefing was prepared by the ICE London and South East Water Panel.

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1 Central estimated population prediction from the London Infrastructure Plan 2050, GLA, July 2014

2 Ibid

3 London Plan, GLA Website london.gov.uk

4 The Thames Barrier works alongside the associated gates, walls and embankments. For more information see the Thames Barrier Website www.gov.uk/the-thames-barrier