

MDA No.: 1544

Title: Water and London's Rivers Part 2

1. Executive Summary

1.1 At the Environment Committee meeting on 13 September 2023 the Committee resolved that:

That authority be delegated to the Chair, in consultation with party Group Lead Members, to any output arising from the discussion.

1.2 Following consultation with party Group Lead Members, the Chair is asked to agree the Committee's report on water and London's rivers, as attached at **Appendix 1**.

2. Decision

2.1 **That the Environment Committee's report on water and London's rivers be agreed, as attached at Appendix 1.**

Assembly Member

I confirm that I do not have any disclosable pecuniary interests in the proposed decision and take the decision in compliance with the Code of Conduct for elected Members of the Authority.

The above request has my approval.

Signature:



Printed Name: Leonie Cooper, Chair of the Environment Committee

Date: 20 March 2024

3. Decision by an Assembly Member under Delegated Authority

Background and proposed next steps:

- 3.1 The exercise of delegated authority agreeing the Committee's report will be formally noted at the Committee's next appropriate meeting.

Confirmation that appropriate delegated authority exists for this decision:

Signature (Committee Services):



Printed Name: Jack Booth, Committee Officer

Date: 20 March 2024

Financial Implications: NOT REQUIRED

Note: Finance comments and signature are required only where there are financial implications arising or the potential for financial implications.

Signature (Finance): Not Required

Legal Implications:

The Chair of the Environment Committee has the power to make the decision set out in this report.

Signature (Legal):



Printed Name: Rory Mckenna, Monitoring Officer

Date: 20 March 2024

Email: rory.mckenna@london.gov.uk

Supporting Detail / List of Consultees:

- Zack Polanski AM, Deputy Chair;
- Tony Devenish AM; and
- Hina Bokhari AM.

4. Public Access to Information

- 4.1 Information in this form (Part 1) is subject to the FoIA, or the EIR and will be made available on the GLA Website, usually within one working day of approval.
- 4.2 If immediate publication risks compromising the implementation of the decision (for example, to complete a procurement process), it can be deferred until a specific date. Deferral periods should be kept to the shortest length strictly necessary.
- 4.3 **Note:** this form (Part 1) will either be published within one working day after it has been approved or on the defer date.

Part 1 - Deferral:

Is the publication of Part 1 of this approval to be deferred? NO

If yes, until what date:

Part 2 – Sensitive Information:

Only the facts or advice that would be exempt from disclosure under FoIA or EIR should be included in the separate Part 2 form, together with the legal rationale for non-publication.

Is there a part 2 form? NO

Lead Officer / Author


Signature: Richard Clarke

Printed Name: Richard Clarke

Job Title: Senior Policy Adviser

Date: 20 March 2024

Countersigned by Executive Director:

Signature: 

Printed Name: Helen Ewen, Executive Director of Assembly Secretariat

Date: 20 March 2024

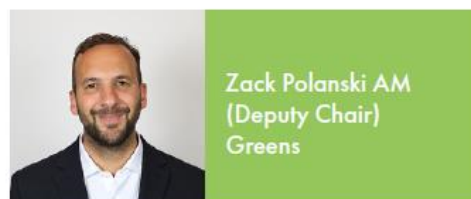
Water and London's Rivers
Environment Committee

LONDONASSEMBLY

Environment Committee



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Foreword



Léonie Cooper AM
Chair of the Environment Committee

London grew up and is built around the Thames, which runs through the heart of the city. Although the main docks have moved down river to Tilbury, the river remains busy - and is tidal, due to its proximity to the sea. Underneath London's streets lie hidden rivers, such as the Fleet, while above ground there are tributaries such as the Lea, the Ravensbourne or the Wandle.

Many of London's rivers, whether above or below ground are part of a network of sewers that are often combined with the street drains. So London faces many challenges in terms of water, particularly as the climate changes. Too much water, previously seen as something to be controlled by the engineering feat that is the Thames Barrier, now includes dealing with the increasingly intense sharp periods of rainfall. This can overwhelm storm drains and storm storage tanks, leading to sewage discharge into the river.

At the same time, short, intense bursts of rain do not refresh aquifers, the rocks that hold ground water, so London's population could face water shortages, if leakage and usage reduction plus reservoir storage and other sources do not receive focused attention and investment over the next few years.

The London Assembly Environment Committee's investigation focused on all the above, as well as looking at emissions from vessels that use the river, plus the potential for using the river to generate renewable energy - still largely untapped. We would like to thank all those that helped us with the investigation.

In our opinion, urgent action is now needed in many areas, and we will be pressing for this action to be taken, sooner rather than later.

Executive Summary

The Committee has investigated London's water and rivers to explore the impacts of climate change, flood risk, sewage pollution, the potential to reduce emissions and how to ensure sufficient water for London in the future.

In the first meeting in July 2023, the Committee heard from Thames Water, River Action, South East Rivers Trust, Thames21 and the Greater London Authority (GLA). In September 2023, the Committee visited the Thames Barrier with the Environment Agency and the Port of London Authority (PLA). The Committee heard from Thames Water, the Environment Agency, the PLA, the GLA, Zoological Society London (ZSL) and Tideway in the second Committee meeting, also held in September 2023. In October 2023, the Committee visited Mogden sewage treatment works in west London with Thames Water. The Committee also held a private briefing in December 2023 with the then joint acting Chief Executive Officer of Thames Water, Cathryn Ross.

This report follows on from the Committee's previous report in February 2023, *London Under Water* which included five recommendations. These outlined actions the Mayor could take to reduce the risk of flooding and increase Londoners' preparedness in light of the increasing threat of climate change.¹

In December 2018, the Mayor of London declared a climate emergency.² London urgently needs to adapt its infrastructure and prepare for a changing climate, as well as doing everything it can to reduce carbon emissions. Nationally, we have made progress in this area, becoming the first G7 country to halve its carbon emissions.³ However, there is a long way to go with data from the Climate Action Tracker showing not a single G20 country, including the UK, is on track to meet pledges made in the Paris Agreement.⁴

The consequences of climate change and more extreme weather events will exacerbate the risks of flooding, whether through surface water, rivers, or tides, so action must be taken. In addition, London faces the threat of seasonal water shortages if more is not done to conserve water and find new ways of ensuring there is sufficient supply in times of drought.

Currently, London's rivers are polluted, often from sewage released during times of heavy rainfall, with none scoring 'Good' in the latest Environment Agency assessments. A rising population and London's Victorian sewage infrastructure, combined with increasingly heavy rainfall, have resulted in year-on-year increases in discharges into the Thames and other rivers. New investment in the Thames

¹ London Assembly Environment Committee, [London Under Water](#), 1 February 2023

² The Guardian, [London mayor unveils plan to tackle 'climate emergency'](#), 11 December 2018

³ Department for Energy Security and Net Zero, [UK first major economy to halve emissions - GOV.UK](#), 6 February 2024

⁴ Climate Action Tracker, [No change to warming as fossil fuel endgame brings focus onto false solutions](#), 5 December 2023

Tideway Super Sewer will make a significant difference to the amount of sewage discharged into the river during extreme weather events in central London. Ongoing issues around misconnections and outflows not covered by the tunnel, such as further upstream and in some of London's other rivers, remain and must continue to be a focus of action.

To address surface water flooding, we need to massively reduce the area of land that is paved or hardstanding – both by private landowners and local councils. Transport for London (TfL) has a role to play in introducing sustainable drainage systems (SuDS), and the Mayor has an important convening role in bringing together stakeholders to address the challenges of flooding, as river catchments cross multiple Borough boundaries. For river flooding, investment in new infrastructure, such as higher walls, and spaces to store the water away from areas where people live and work is needed. For tidal flooding, it is imperative to replace the Thames Barrier – and to ensure appropriate sites are properly safeguarded for this.

In terms of securing the supply of water, Thames Water must reduce levels of water wasted through leaks, and find sustainable ways to increase supply, such as the new Abingdon reservoir in Oxfordshire. Thames Water needs to ensure money goes where it is needed – on investment in infrastructure, rather than to shareholders. If Thames Water chooses to increase bills to pay for investment, it should be the highest users who pay more, particularly businesses who use vast amounts of water on a commercial scale. There must also be new social tariffs to support households and charities, protecting those on low incomes. Water is essential for health. The Committee has concerns around the Teddington direct river abstraction scheme, particularly around the consultation. If leaks could be reduced and more money and effort put behind this, then the need for expensive and controversial infrastructure projects might not be necessary.

A greater emphasis on saving water is also required. London is way above the per person level of daily water use that the Environment Agency advises – 110 litres per day is the recommended level,⁵ while Londoners use 146 litres.⁶ But reducing water use will not negate the need for new water sources nor leakage reduction – all three are required.

Finally, there is a need to make the most of rivers to generate clean renewable energy - and ensure that boats running on the river do not contribute to air pollution, and instead operate with low- or zero-emission fuels. A river clean air zone should be considered to ensure that action to clean up air pollution and reduce CO2 emissions associated with vehicles on London's roads is matched by action to reduce emissions from vessels using the river.

⁵ Environment Agency, Natural Resources Wales & Office for Water Services, [Water resources planning guideline](#), April 2023

⁶ Thames Water, [Annual report 2022-2023](#), p.3

The Committee has the following recommendations:

Recommendations

Drinking water and water scarcity

Recommendation 1

Thames Water and Ofwat should set a more ambitious leakage reduction target in future, aiming for zero leakage by 2050, and be more proactive in monitoring and addressing leaks.

Recommendation 2

Thames Water and the Mayor should work together on information campaigns to promote reductions in water usage across London in 2024 and beyond.

Recommendation 3

Thames Water should also continue to expand smart metering to inform people of their water use, particularly targeting those that use the most water.

Recommendation 4

Thames Water should coordinate with Ofwat to open a consultation on new water tariff options for the 2025-2030 price control period. This should include options to link the charging structure to water use, as well as social tariffs to ensure water remains affordable to all.

Recommendation 5

Thames Water should work proactively with local communities to adequately respond to their concerns around new infrastructure to secure future water resources and should learn lessons on effective community engagement for future consultations.

Recommendation 6

Given the environmental impacts of the proposed Direct River Abstraction scheme at Teddington on water temperatures and a Site of Importance for Nature Conservation, the Mayor should encourage Thames Water to explore alternatives.

Wastewater and pollution

Recommendation 7

Thames Water should accelerate investment in its wider sewer infrastructure in areas of London not covered by the Thames Tideway tunnel, to ensure that it has the capacity to deal with intense rainfall events. The Committee considers that the distribution of costs to cover necessary infrastructure must not adversely impact the affordability of water for customers.

Recommendation 8

All overflow points should have Event Duration Monitors fitted and real-time data about outflows should be published on the website, along with three monthly summaries, as is already the case where Monitors are installed.

Recommendation 9

The Mayor should encourage his environmental team to prioritise work to bring together groups and engage communities on the health of their local rivers in 2024-25. This should include supporting 'Outfall Safaris' and providing guidance to communities in London about how to work with government, local authorities, charities, water companies and the Environment Agency to help reduce pollution.

Recommendation 10

The Government should further increase funding to the Environment Agency for enforcement activity, in order to enable the Agency to effectively monitor river health and enforce environmental protections in London.

Flooding

Recommendation 11

The Mayor should continue to support the London Surface Water Strategic Group to encourage a joined-up approach across London.

Recommendation 12

The Mayor should significantly scale up funding and installation of sustainable drainage systems (SuDS), and scale up the resources available for local boroughs and other landowners to increase their own SuDS installation.

Recommendation 13

The Mayor should double the target in his Transport Strategy to 100,000 square meters a year of roads draining into sustainable drainage systems (SuDS) per year. Transport for London (TfL) should also double its targets for SuDS installation to deliver 10,000 square metres of roads draining into SuDS per year.

Recommendation 14

Defra should work with the London Surface Water Strategic Group to establish a need-based fund to enable boroughs to access simple and long-term funding for sustainable drainage systems (SuDS), while significantly increasing funding available for SuDS installation.

Recommendation 15

As recommended by the London Climate Resilience Review, the Mayor should conduct an audit of land the GLA owns or is responsible for on the riverbank and develop an action plan by 2025, including ways to raise flood defences and create natural areas where flooding can be allowed to occur without harm.

Recommendation 16

The Mayor should also consider how to use his wider planning powers to ensure councils develop riverside strategies and landowners take appropriate action to construct and manage higher walls.

Maximising opportunities

Recommendation 17

The Mayor should work with the Port of London Authority (PLA) to carry out and publish a status report on existing river-based energy projects by the end of 2024. This should include an assessment of potential barriers and opportunities for further renewable energy generation projects on the Thames.

Recommendation 18

The Mayor and the Port of London Authority (PLA) should work together to create a prospectus for investors of river-based energy projects, and actively market the opportunities identified to ensure more renewable energy generation projects on the Thames are installed.

Recommendation 19

The Mayor and the Port of London Authority (PLA) should set out clear and ambitious targets for expanding the proportion of craft using zero emission and renewable fuel sources on the section of the river from the O2 to Teddington, with targets for 2030, 2035 and 2040.

Recommendation 20

The Port of London Authority (PLA) should publish the findings from its feasibility assessment for a River Ultra Low Emission Zone (RULEZ). In response to this, the Mayor should set out his position on such a scheme, and any plans for its implementation.

Recommendation 21

In response to this report, the Mayor should set out the major environmental achievements of the Thames and London Waterways Forum over the last five years, and his key priorities for the forum in 2024-25. The GLA should also swiftly publish meeting notes of the Thames and London Waterways Forum since 2018, as well as a schedule of its future meetings.

Chapter one: Drinking water and water scarcity

Water in London is supplied by four water companies: Thames Water, Sutton and East Surrey Water, Affinity Water and Essex and Suffolk Water (covering Barking and other areas in the east of London). The first three are part of the South East England region, while the last is part of the Water Resources East area.⁷ Thames Water supplies nearly 80 per cent of households in London.⁸

The current level of water usage in London is unsustainable. This is placing significant strain on London's water supply. London and the Thames Valley currently use more than 2.6 billion litres of water every day, and this is forecast to increase by a further one billion litres of water per day by 2075 due to rising population.⁹ If no action is taken by 2050, there will be a shortfall of four billion litres of water per day across England.¹⁰

As well as population growth, climate change is also affecting water resources. In 2023, London experienced temperatures exceeding 40 degrees and had a 50 per cent increase in water consumption, leading to the lowest reservoir levels in 30 years.¹¹ London is already an area of serious water stress according to the Government.¹²

London's water supply currently relies on removing water from rivers and aquifers, known as groundwater abstraction. This involves taking water from chalk aquifers which lowers the water flow in chalk streams.¹³ Current levels of water abstraction are unsustainable and damage sensitive river habitats, particularly when rivers and streams dry up due to a lack of rainfall.

James Wallace, Chief Executive Officer at River Action, told the Committee that London faces "a fresh water emergency [and] we will face water shortages in this capital city very soon if we do not work together."¹⁴

The risk of water shortages is also a significant economic risk, with Thames Water stating that "not having enough water to go around would cost London's economy alone £500 million each day."¹⁵

⁷ Environment Agency, [National Framework for water resources summary](#), 2020, p. 13

⁸ Mayor of London, [MQT](#), 15 September 2022

⁹ Thames Water, [Summary of Draft WRMP 2024](#), p. 3

¹⁰ Environment Agency, [A summary of England's draft regional and water resources management plans](#), October 2023

¹¹ Thames Water, c.f. [London Climate Resilience Review Interim Report](#), January 2024, p. 11

¹² Environment Agency and Department for Environment, Food & Rural Affairs, [Water stressed areas – 2021 classification](#), July 2021, p. 6

¹³ John Lawson, [Review of Abstraction as a % of Recharge in Chalk Streams](#), December 2021

¹⁴ London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, p. 2

¹⁵ Thames Water, [Water is essential – Thames Water Resources Management Plan](#)

Ways to address London's water supply challenges

Fixing leaking pipes

Currently, far too much water is lost before it reaches people's taps in the Thames Water area. Cathryn Ross told the Committee that "Our latest statistics on leakage from the last year shows leakage has gone up to 602 million litres [per day]."¹⁶ This is roughly equivalent of 238 Olympic-sized swimming pools of water lost every day.¹⁷

Thames Water attributes the leaks to a combination of hot weather and wet weather causing soil movement, as well as the rapid freezing and thawing of pipes during winter.¹⁸ Since the Environment Committee met with Cathryn Ross, Thames Water's 2023-24 Interim report for September to December 2023 indicates that there has been a reduction in leakage to 557 million litres per day.¹⁹ Thames Water's current leakage reduction target is 20.5 per cent for the period 2024-2025.²⁰

Thames Water has set a target in its revised Water Resources Management Plan (WRMP24) for a 50 per cent reduction for leakage by 2050.²¹ The Committee considers that this should be more ambitious.

Recommendation 1: Thames Water and Ofwat should set a more ambitious leakage reduction target in future, aiming for zero leakage by 2050, and be more proactive in monitoring and addressing leaks.

Reducing water usage

But fixing pipes and reducing leakage is not the only way in which water use in London needs addressing. Reducing water use is a key part of reducing the environmental impacts of water abstraction, and ensuring there is enough water to go round, particularly in times of drought, which is far more likely as the climate changes.

National guidelines updated in March 2023 require water companies to reduce household water use to 110 litres per person per day by 2050.²² In London, 146 litres of water per person per day were used in 2021-22.²³ Thames Water's revised Water Resources Management Plan 2024 sets out how it will support progression towards the target of 110 litres per person per day by 2050.²⁴ Cathryn Ross, then Acting Joint Chief Executive Officer, Thames Water, told the Committee that 80 per cent of

¹⁶ London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, p. 2

¹⁷ Thames Water, [Our leakage performance](#)

¹⁸ The Guardian, [Thames Water pipe leaks at highest level in five years, Fol reveals](#), June 2023

¹⁹ [Thames Water Interim Report 2023/24](#), December 2023, p. 4

²⁰ Thames Water, [Response to online representations](#), August 2023

²¹ Thames Water, [Section 8 - Demand reduction options - Revised Draft WRMP 2024 - Section 8](#), August 2023, p. 12

²² Environment Agency, Natural Resources Wales & Office for Water Services, [Water resources planning guideline](#), April 2023

²³ Thames Water, [Annual report 2022-2023](#), p. 3

²⁴ Thames Water, [Revised Draft WRMP 2024 - Section 1](#), August 2023

Thames Water's 15 million customers are currently using less than 110 litres per day. However, she added that:

"it is the other 20 per cent that are using a lot. One of the biggest single usages of water is people watering gardens. If you put a hosepipe on for ten minutes and if you have a reasonably high pressure on your hose, that could easily use a typical [daily] consumption in ten minutes."²⁵

There are ways for households to reduce consumption. A bath uses roughly 80 litres of water, whereas a shower uses between 5 to 13 litres per minute, depending on the type installed.²⁶ However, during our investigation we heard that the public are often not aware of the impacts of their water usage, which is hampering efforts to change behaviours and achieve the targets for reductions in household water use.

Thames Water told the Committee that it has started rolling out smart water meters, which provide customers with information about their water usage, and expects to install one million of these by 2025.²⁷ Cathryn Ross described this as "the single most important thing we can do", and set out how on average customers use 13 per cent less water after having one installed, "just because they are conscious that it is now being monitored."²⁸

Dr Bella Davies outlined that households should take steps to lower their own water consumption:

"Everyone can play their part and each household should have measures on their property that should be contributing to water saving. That retrofit is really important and something that perhaps needs to be pushed up the agenda."²⁹

The Committee also heard that commercial water users contribute "a very substantial proportion of demand" in London.³⁰ For example, a data centre uses around 1.7 million litres of water per day.³¹ Cathryn Ross also commented on the principle of fairness in relation to customer water usage and bills. She told the Committee:

"At the moment, it is very much a one-size-fits-all approach to paying for water and everybody pays the same price. There is a certain amount of fairness in that, but the reality is it is deeply regressive and if we are going to see water bills rise then we do have to care about the impact of those bills on the population. If we could find a way to move towards some sort of more progressive charging for water, that might unlock the ability for us to put up water bills for those people who can pay, whilst not putting them up quite so much for people who cannot."³²

²⁵ London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, p. 15

²⁶ Consumer Council for Water (CCW), [How much water do you use? - CCW](#)

²⁷ London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, p. 14

²⁸ *Ibid*, p. 14

²⁹ *Ibid*, p. 9

³⁰ *Ibid*, p. 16

³¹ Savills, [European Data Centres](#), 4 April 2023

³² London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, p. 4

James Wallace stated that there is a need to “completely and utterly overhaul the water industry, bottom-up, top-down, left to right.” He added that it would be very hard for water companies to tell people that their water bills would go up without taking action themselves.³³

Ofwat published research in May 2023 indicating that the majority of people struggling with their water bills are not receiving financial support for water.³⁴ With the rollout of smart water meters, the Committee was told there is space to look at tariff innovation.³⁵ A social tariff would offer the potential to ensure that households and organisations least able to pay are provided water at lower rates.

Recommendation 2: Thames Water and the Mayor should work together on information campaigns to promote reductions in water usage across London in 2024 and beyond.

Recommendation 3: Thames Water should also continue to expand smart metering to inform people of their water use, particularly targeting those that use the most water.

Increasing supply of water

In order to increase the supply of water to London, water companies must either increase the abstraction of identified sources, find new sources from which to abstract water, and/or reduce waste through leakage and excessive consumption. As stated above, reducing excessive consumption and leaks should be a priority, as well as seeking additional supplies of water.

Research suggests that unsustainable abstraction is already occurring at higher levels in London than other regions,³⁶ and groundwater levels in parts of London are falling as a result.³⁷

Cathryn Ross told the Committee that chalk streams are particularly affected by drought conditions, saying:

“when we looked at how ground water and river levels were recovering across our patch following the drought last year, it was the chalk aquifers and the chalk streams that recovered slowest. They had a significant environmental impact because they are very sensitive habitats, and they took longest to recover.”³⁸

³³ Ibid, p. 17

³⁴ Ofwat, [Cost of Living - Wave 3 report](#), May 2023.

³⁵ London Assembly Environment Committee meeting,, [Minutes, 11 July 2023, p. 15.](#)

³⁶ John Lawson, [Review of Abstraction as a % of Recharge in Chalk Streams](#), 2021, p. 27

³⁷ Environment Agency, [Management of the London Basin Chalk Aquifer - Status Report](#), August 2018, p. 5

³⁸ London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, p. 19

James Wallace, Chief Executive of River Action, told the Committee that one of the recommendations he had given in a recent meeting with the Rivers Minister relating to chalk streams was “to speed up and be more ambitious... but also to abstract further downstream, so taking the pressure away from groundwater and headwaters.”³⁹

Thames Water in its Water Resources Management Plan (WRMP24) has proposed a number of schemes to increase water supply, including new abstraction on the River Thames near Teddington, a new reservoir in Abingdon, Oxfordshire and water transfer from the River Severn.⁴⁰

Abingdon reservoir

The Abingdon reservoir scheme in Oxfordshire would extract water during periods of high river flow. When river levels drop or demand for water increases, water would be released back into the River Thames for re-abstraction downstream.⁴¹

The Committee wrote to the Secretary of State for the Department for Environment, Food and Rural Affairs on 16 February 2024 setting out the need for the Government to take extra measures to prioritise the Abingdon reservoir through national planning policy.⁴²

However local groups as well as Oxfordshire County Council have objected to the proposals, citing the local impact and that demand reduction should be a higher priority.⁴³

River Severn

Cathryn Ross told the Committee that plans to transfer water from the River Severn to the River Thames would help manage the supply and demand for water:

“If we can do that and take water from where it is more plentiful and bring it into where it is more scarce, that provides us with alternative sources so that we have to rely less on things like sensitive habitats of chalk aquifers and chalk streams.”⁴⁴

However, these plans are also controversial, with concerns that the original source of water in the scheme would be reservoirs in North Wales,⁴⁵ which could potentially impact water availability in that region.

Teddington abstraction

³⁹ Ibid, p. 19

⁴⁰ Thames Water, [Revised Draft WRMP 2024 - Section 1](#), August 2023, p. 40

⁴¹ Thames Water, [Reservoir Option - Thames Water Resources Management Plan](#)

⁴² London Assembly Environment Committee, [Environment Letter to DEFRA](#), 16 February 2024

⁴³ Oxfordshire County Council, <https://news.oxfordshire.gov.uk/proposal-for-giant-reservoir-faces-continued-opposition/>, January 2023

⁴⁴ London Assembly Environment Committee meeting,, [Minutes](#), 11 July 2023, p. 19

⁴⁵ The Guardian, [‘Very sensitive subject’: plan to take Welsh water for London stirs painful memories](#), March 2023

The Teddington Direct River Abstraction (DRA) Scheme proposes that water from the Thames near Teddington in West London would be transferred to the Lee Valley reservoirs. Treated wastewater would be moved from Mogden sewage treatment works to compensate for the additional water taken from the river, upstream of Teddington weir. Planning consent for construction, which include new underground pipes to transfer the water between Teddington and Isleworth, where Mogden is located, would be needed by 2026-27 for the project to be operational by 2033.⁴⁶ The technical report into the Teddington DRA Scheme identified four potential constraints to the project, including potential increases to the river water temperature, the availability of source water, the availability of land at Mogden sewage treatment works, and the availability of land for conveyance or tunnel shafts.⁴⁷

Cathryn Ross told the Committee that the Environment Agency still has some remaining areas of concern in relation to the proposals to remove and replace water from the river at Teddington:

“It [the Environment Agency] is still concerned about the patterns of discharge and abstraction and its main issue is around making sure that there is sufficient flow in the river. Whatever we end up doing in terms of abstracting from the river at Teddington, we will have to comply with whatever regulations the EA puts in place [...] It is an ongoing conversation, but the EA is happy that Teddington is included in the WRMP at this stage.”⁴⁸

She also told the Committee that due to the Teddington DRA Scheme's late inclusion within Thames Water's draft Water Resources Management Plan (WRMP24), prior engagement with local communities did not occur early enough in the process:

“People are very keen to engage with us and we are hopefully engaging well with the local community on the Teddington scheme. I think one reason for that is that it was a relatively late inclusion in the WRMP. Originally, we had been looking at a different scheme further east and then the Teddington scheme was the one that was selected for best value, so we did not have that included for as long as some of the other schemes in the WRMP process.”⁴⁹

After our meetings, Thames Water consulted on information and options on locations for pipelines and shafts, with likely impacts on the areas affected.⁵⁰ Thames Water is currently processing these responses and has listed a number of site options for specific aspects the Teddington DRA scheme.⁵¹

⁴⁶ Thames Water, [Teddington Direct River Abstraction](#)

⁴⁷ Thames Water, [Teddington DRA Scheme Conceptual Design Report](#), October 2022

⁴⁸ London Assembly Environment Committee meeting,, [Minutes](#), 11 July 2023, p. 13

⁴⁹ Ibid, p. 11

⁵⁰ Thames Water, [Teddington DRA Scheme Report October - December 2023](#)

⁵¹ Thames Water, [Teddington Direct River Abstraction - A vital drought resilience project for London - Thames Water Resources Management Plan](#)

At the time of writing this report, over 30,000 people have signed a petition opposing the scheme.⁵² Objections include the potential impact on river life, and the impacts of construction on the surrounding environment, including 'Eight large shafts, each requiring a construction site half the size of a football pitch' including on the Ham Lands Metropolitan Site of Importance for Nature Conservation (SINC).⁵³ Campaigners have also stated that the temperature of the river will increase as a result of the treated wastewater moving through it, which could negatively impact river life and biodiversity.⁵⁴

A major concern of local campaigners is the potential damage to the Ham Lands SINC which falls within the planned Teddington DRA Scheme proposals. SINC's are "afforded a high level of protection within the planning system. Development that negatively impacts on a SINC can only be permitted in exceptional circumstances and where mitigation can be proven from the beginning."⁵⁵ An environmental assessment of the Scheme in November 2022 identified that just under two hectares of habitat will be permanently lost as a result of new infrastructure being built, which would require an area the size of 3.65 hectares away from the site to mitigate this impact.⁵⁶

Campaigners have put forward some alternatives to the scheme, including transferring water to the River Lee through the Beckton Desalination Plant, and discharging recycled water through an Advanced Water Recycling Plant located near Kempton Water treatment works.⁵⁷

Prior to this consultation in July 2023, Cathryn Ross told the Committee that:

"We completely recognise and hear the concerns of people in the local area. People are very keen to engage with us and we are hopefully engaging well with the local community on the Teddington scheme. [...]. If people feel that [they are not being listened to] I can only apologise. We do need to engage with people, we need to be open, we need to be transparent, and we need to listen to concerns and explain also what we are planning on doing."⁵⁸

The Committee have concerns around the environmental impacts of the Teddington scheme, both in terms of impacts on the impacts on river temperature and river health, but also the impacts on local green spaces around the related construction of pipes.

Recommendation 4: Thames Water should coordinate with Ofwat to open a consultation on new water tariff options for the 2025-2030 price control period. This should include options to link the charging structure to water use, as well as social tariffs to ensure water remains affordable to all.

⁵² Change.org, [Petition · Stop the Abstraction Plant at Teddington Weir and Releasing Treated Sewage into the River](#), 27 January 2023

⁵³ Ibid

⁵⁴ Save our Lands and River, [Why Do We Object? - Save Our Lands & River from Thames Water](#)

⁵⁵ Old Oak and Park Royal Development Corporation, [Sites of Importance for Nature Conservation Statement](#), 2017, p. 3

⁵⁶ Thames Water, [Final-G2-report--LWR.pdf \(thameswater.co.uk\)](#), November 2022, p. 26

⁵⁷ Save Ham Lands and River, [What are the alternatives for Thames Water in Ham](#)

⁵⁸ London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, pp. 11-12

Recommendation 5: Thames Water should work proactively with local communities to adequately respond to their concerns around new infrastructure to secure future water resources and should learn lessons on effective community engagement for future consultations.

Recommendation 6: Given the environmental impacts of the proposed Direct River Abstraction scheme at Teddington on water temperatures and a Site of Importance for Nature Conservation, the Mayor should encourage Thames Water to explore alternatives.

Chapter two: Wastewater and river pollution

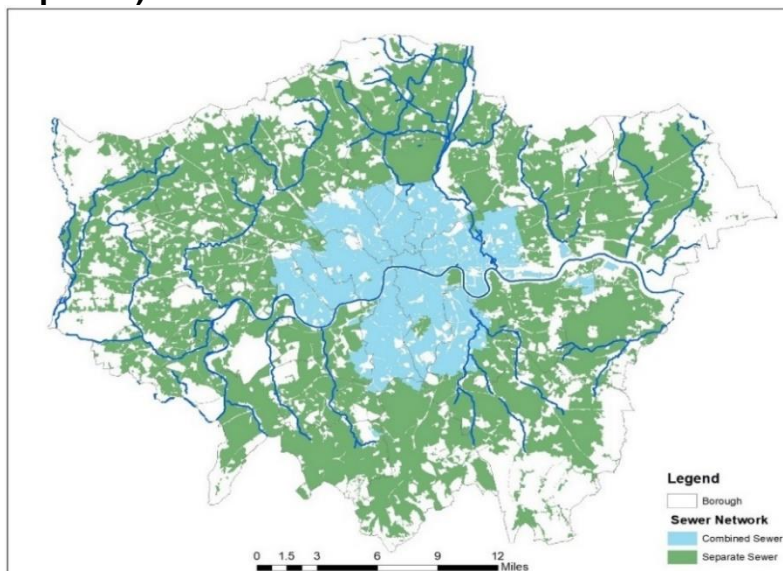
The Environment Agency rated Thames Water two stars out of four for its environmental performance in 2022, including 17 serious pollution incidents - the most of any water company in England.⁵⁹ Although one-off events are the cause of some pollution, much of the raw sewage that gets into London's rivers is a consequence of the way that the system was designed, or due to incorrect or badly maintained infrastructure.

London's sewerage system

London's sewerage system was originally developed in the 19th century to deal with a population of around 2 million people.⁶⁰ This system is now significantly strained, as the population of London today just under 9 million⁶¹ and is expected to grow to over 10 million by 2040.⁶²

The combined sewer system that is in use in much of central and inner London means that both wastewater and rainwater runoff from roads and roofs are combined into the same pipes. During periods of heavy rain there is insufficient capacity in these pipes to contain all the rainwater and sewage, and to prevent it from 'backing up' into people homes, it is released through storm overflows.

Figure 1: Distribution of sewer networks across London (combined and separate)⁶³



⁵⁹ Environment Agency, [Thames Water EPA data report 2022](#), 12 July 2023

⁶⁰ Historic England, [The Story of London's Sewer System](#), March 2019

⁶¹ London Datastore, [Demography](#)

⁶² London Datastore, [New population projections for London – building on the results of the 2021 Census](#), 7 February 2023

⁶³ Thames 21, [Spatial Quantification of Road Runoff Pollution in Greater London](#), 20 July 2019

Pollution from storm overflows:

Storm overflows are intended to act as relief valves when the sewerage system is at risk of being overwhelmed, such as during heavy downpours when rainwater drainage exceeds sewer capacity.⁶⁴ Defra has outlined that storm overflows “can contain high levels of harmful pathogens, such as viruses and bacteria” which “pose health risks to people who use our water bodies for recreation.”⁶⁵

40 million tonnes of raw, untreated sewage is currently discharged into the Thames every year during storm events.⁶⁶ As a result, the Thames is significantly polluted: Volunteers of Thames21 measured water quality in the Thames between 2014 and 2018. Results showed 92 per cent of samples contained a significant presence of coliform bacteria,⁶⁷ which can lead to serious illnesses such as gastroenteritis and diarrhoea, occurring through polluted water from untreated sewage.⁶⁸

Case study: Mogden sewage treatment works' storm tanks

Storm tanks at Mogden Sewage Treatment Works temporarily hold excess sewage when there are surges in the flow of wastewater into the wastewater treatment works, caused by surface water run-off, and can be used to prevent this kind of discharge. Thames Water explained to the Committee during its visit to the Mogden sewage works that the design of these storm tanks helps remove the worst elements of the sewage as it passes through the tanks to reduce contamination in the river.

But in 2020 Mogden sewage treatment works in West London released a mix of untreated sewage and rainwater equivalent to 2,768 Olympic-sized pools (6.9 billion litres) into the Thames.⁶⁹ This includes more than 2 billion litres of raw sewage, which were discharged in just over two days.⁷⁰

However, Sarah Bentley, then Chief Executive Officer of Thames Water, told the House of Commons Environmental Audit Committee in October 2021 that in order to manage the volume of water that fell in October 2020. Thames Water “would have needed 150 more storm tanks”,⁷¹ in addition to the six that it has on its site.

During our investigation, we were told about a lack of comprehensive data on pollution from storm overflows. Joe Pecorelli from ZSL told the Committee:

⁶⁴ Ofwat, [Storm Overflows Explainer](#)

⁶⁵ Department for Environment, Food & Rural Affairs, [Storm Overflows Discharge Reduction Plan](#), August 2022, p. 8

⁶⁶ Tideway, [Tideway | Londoners LOVE the River Thames, data shows, but HATE its pollution problem](#), 1 December 2022

⁶⁷ Thames 21, [Water Quality Results](#)

⁶⁸ Seo, Lee & Kim, [Relationship between Coliform Bacteria and Water Quality Factors at Weir Stations in the Nakdong River, South Korea](#), 4 June 2019

⁶⁹ Peter Hammond, [Effective regulation of untreated sewage discharges needs volumetric and catchment-based monitoring](#), May 2023, p. 4.

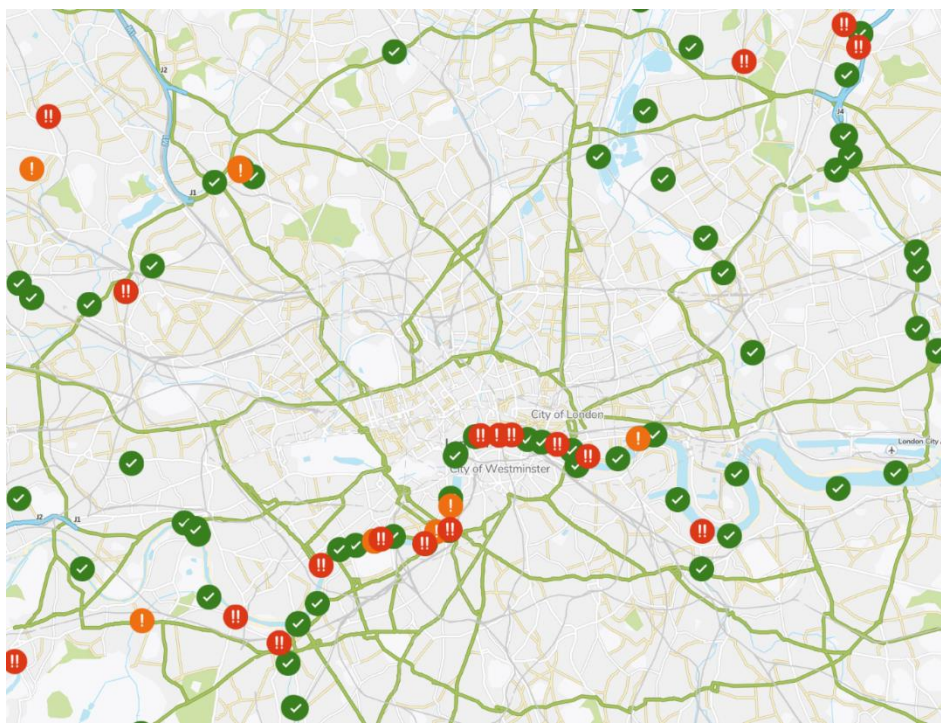
⁷⁰ BBC News, [River Thames: More than 2bn litres of raw sewage discharged over two days](#), c.f. [House of Commons, Environmental Audit Committee oral evidence: water quality in rivers, HC 902](#), April 2021

⁷¹ House of Commons, [Environmental Audit Committee oral evidence: water quality in rivers, HC 74](#), October 2021, p. 19

“There are 306 [combined storm overflows in the Thames Water’s drainage area] that have event-duration monitors (EDMs) and 196 that are known about that are yet to have EDMs on.”⁷²

EDMs use sensors to monitor the level of flow in a tank or sewer, and trigger alerts in the event of a storm discharge.⁷³ They measure the start and end of a flow, but not the volume of a flow itself.⁷⁴ Thames Water has subsequently stated that “127 new locations were added to the map in December 2023. The new EDMs are operational and are recording data, which means that 100 per cent of our storm overflows are now being monitored.”⁷⁵

Fig 2: Snapshot of storm overflow discharges across London, 22 February 2024⁷⁶



Key: Green = Not discharging, Orange = Discharging in the last 48 hours, Red= Discharging now

Thames Water states in its 2025-30 Business Plan that it is allocating £885 million in order to reduce storm overflows.⁷⁷

⁷² London Assembly Environment Committee meeting, [Minutes](#), 13 September 2023, p. 3

⁷³ Thames Water, [Storm discharge and event duration monitoring](#)

⁷⁴ Ibid

⁷⁵ Thames Water, [Information about monitors](#)

⁷⁶ Thames Water, [EDM Map | Storm discharge data](#)

⁷⁷ Thames Water, [TMS01 PR24 Business plan](#), p. 2

Wet wipes

At our meeting in September, Cathryn Ross highlighted how wet wipes are a significant cause of pollution incidents:

“Blockages [are] a really huge driver of pollutions [sic]. We have something like 75,000 blockages every single year. We know that something like 40 per cent of our pollution incidents are caused by blockages that related to fats and wet wipes, so all of that has a massive [...] impact.”⁷⁸

Wet wipes are not biodegradable and can stay for up to 100 years in the environment, where they can fragment into microplastics.⁷⁹ They are a potential source of synthetic white microplastic fibres.⁸⁰ These fibres can also form nano-plastics after being exposed to environment and weathering.⁸¹ Organisms may ingest them, transferring harmful contaminants.⁸² A study in Ireland discovered that 50 per cent of wipes that were labelled as ‘flushable’ also contained microplastics.⁸³

Thames21's Big Wet Wipe Count in March 2019 found almost 8,000 wet wipe products between Hammersmith Bridge and St Paul's School slipway, with between 50 and 200 wet wipes found per square metre.⁸⁴ Data from testing by ZSL showed that the Thames has higher densities of microplastics than five other international comparator rivers.⁸⁵ The Committee also published a report on “unflushable” items in August 2018, which found that – despite being convenient, cost-effective and popular to use – “unflushable” items are harmful to the environment, and contribute to air pollution, if incinerated.⁸⁶ This followed an investigation into the topic and a site visit to Beckton Sewage Treatment works.⁸⁷

Defra launched a consultation on single-use plastics in November 2021.⁸⁸ The summary, published in January 2023, concluded that “In total, 96 per cent of

⁷⁸ London Assembly Environment Committee meeting, [Minutes](#), 13 September 2023, p. 14

⁷⁹ Muonz, Baez, McKinney & Garelick, [Characterisation of “flushable” and “non-flushable” commercial wet wipes using microRaman, FTIR spectroscopy and fluorescence microscopy: to flush or not to flush](#), 8 June 2018

⁸⁰ Lee, Jeong & Chae, [Discharge of microplastics fibres from wet wipes in aquatic and solid environments under different release conditions](#), 25 August 2021

⁸¹ Shruti, Pérez-Guevara & Kutralam-Muniasamy, [Wet wipes contribution to microfiber contamination under COVID-19 era: An important but overlooked problem](#), December 2021

⁸² Kutralam-Muniasamy, Pérez-Guevara, Elizalde-Martínez & Shruti, [An overview of recent advances in micro/nano beads and microfibers research](#), 20 October 2020

⁸³ National University of Ireland Galway, [Wet wipes and sanitary products found to be microplastic pollutants in Irish waters](#), 23 June 2020

⁸⁴ Thames 21, [Plastic Pollution in the River Thames - Results from Citizen Science Surveys January 2015 - December 2019](#), June 2020, p. 18

⁸⁵ Zoological Society of London (ZSL), [The State of the Thames 2021](#), p. 40

⁸⁶ London Assembly, [Single-use plastic: unflushables](#), August 2018

⁸⁷ Ibid

⁸⁸ Department for Environment, Food & Rural Affairs, [Summary of responses and government response](#), January 2023

respondents stated they would support a ban on wet wipes containing plastic.”⁸⁹ In October 2023, Defra launched a new consultation to seek views on the manufacture, supply and sale of plastic-containing wet wipes across the UK.⁹⁰

Thames Water's plan

Thames Water is responsible for drainage and wastewater across London and the surrounding area.⁹¹ It has set a target of reducing the number of pollution incidents by 30 per cent by 2025.⁹² A more long-term target is contained in Thames Water's 2025-30 Business Plan, which aims for a “reduction in storm overflows from 23.8 10,000 sewer connections to 17.2 10,000 sewer connections – a 28 per cent reduction compared to the previous five years.”⁹³

In May 2023, Thames Water published its first 25-year Wastewater Management Plan, following a 12-week consultation in 2022. It will update the shared Plan every five years.⁹⁴ As part of the Plan, Thames Water states that it plans to upgrade over 250 sewers and sewage treatment sites across London and the Thames Valley.⁹⁵ The Plan includes spending £1.6 billion on its sewage treatment works and sewer networks over the next two years, with the aim of reducing the total duration of discharges by 50 per cent by 2030 compared with 2020.⁹⁶

We note in the context of investment that between 2019 and 2023, 28 per cent on average of Thames Water's revenue from bills was spent paying interest or fees on debt. That arguably leaves less money for investment in infrastructure.⁹⁷ In this context, the Committee considers that it is important that customers do not foot the bill for investment in necessary infrastructure.

The Thames Tideway Tunnel

The Thames Tideway Tunnel is a 25km Super Sewer under the Thames that intercepts, stores and transfers sewage waste away from the river.⁹⁸ Work on the project began in 2015 and is expected to be completed in 2025.⁹⁹ According to Tideway, the company delivering the project, the tunnel will cost £4.5 billion to complete and is being paid for by Thames Water's 15 million wastewater customers through their bills, which will rise by “no more than £25 per year.”¹⁰⁰

⁸⁹ Department for Environment, Food & Rural Affairs, [Summary of responses and government response](#), January 2023

⁹⁰ Defra Press Office, [Coverage of consultation launched to ban wet wipes containing plastic](#), 16 October 2023

⁹¹ Thames Water, [Drainage and Wastewater Management Plan \(DWMP\)](#)

⁹² Thames Water, [Pollution incident reduction](#)

⁹³ Thames Water, [TMS01 PR24 Business Plan](#), p. 81

⁹⁴ Thames Water, [Drainage and Wastewater Management Plan](#)

⁹⁵ Thames Water, [Investment plans for storm discharge sites](#)

⁹⁶ Thames Water, [Thames Water pledges record investment to reduce pollution](#), 1 March 2023

⁹⁷ Financial Times, [Thames Water lobbies for higher bills, dividend payouts and lower fines](#), February 2024

⁹⁸ [Tideway | The Tunnel](#)

⁹⁹ *Ibid*

¹⁰⁰ [Tideway | About Tideway](#)

The Tunnel is anticipated to be able to intercept at least 94 per cent of sewage overflowing into the tidal Thames every year, as well as reducing sewage spills from over 50 a year to around five.¹⁰¹ In the areas it covers, it is expected to capture all of the 'first flush' from sewers following heavy rain downpours – which accounts for the most damaging sediment built up during drier weather periods.¹⁰²

Roger Bailey, Chief Technical Officer at Tideway, told the Committee at the July meeting:

"We are 90 per cent of the way through our construction, [...] we are starting commissioning in the spring of next year. [...] we will be cleaning up the River [Thames] and then we will be completely providing the full environmental benefits by 2025. That will mean that 95 per cent of the volume of sewage that is going through the system currently will be taken off into our tunnel and treated through the Beckton Sewage Treatment Works."¹⁰³

Recommendation 7: Thames Water should accelerate investment in its wider sewer infrastructure in areas of London not covered by the Thames Tideway tunnel, to ensure that it has the capacity to deal with intense rainfall events. The Committee considers that the distribution of costs to cover necessary infrastructure must not adversely impact the affordability of water for customers.

Recommendation 8: All overflow points should have Event Duration Monitors fitted and real-time data about outflows should be published on the website, along with three monthly summaries, as is already the case where Monitors are installed.

¹⁰¹ Thames Water, [Thames Tideway Tunnel](#)

¹⁰² Ibid

¹⁰³ London Assembly Environment Committee meeting, [Minutes](#), 13 September 2023, p. 10

The water quality of the Thames' tributaries

The Committee also heard from guests that the water quality of London's rivers that feed into the Thames is not good.

Fig 3: A map of some of the River Thames' tributaries in London ¹⁰⁴



Dr Bella Davies of South East Rivers Trust told the Committee that “Our tributaries are hit massively [by sewage pollution], even if they do not have sewage works or Combined Sewer Overflows on them, they can have these other impacts from sewage from misconnections.”¹⁰⁵ Of London's 41 rivers, two are classified by the Environment Agency as ‘Bad’, three are ‘Poor’ and 36 are ‘Moderate’. No rivers in London are classified as Good.¹⁰⁶

Joe Pecorelli from ZSL added that:

“By the latest Water Framework Directive (WFD) categories, all those 11 management catchments and 47 water bodies [of the Thames] are all classed as failing [in terms of water quality].”¹⁰⁷

¹⁰⁴ Thames21, [The River Thames and its tributaries](#), 25 October 2023

¹⁰⁵ London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, p.21

¹⁰⁶ Environment Agency, [Additional Correspondence London Area Director](#), 20 October 2023

Misconnections

The Committee heard that misconnections are a major source of pollution in areas where there are separate sewer and drainage systems. Thames Water estimates that 1.8 Olympic-sized swimming pools of wastewater enters rivers and streams every day due to misconnected appliances.¹⁰⁸ Thames21 stated the most common sources of misconnection are washing machines (35 per cent), sinks (10-15 per cent), dishwashers (10-15 per cent), toilets (5 per cent), and whole houses (5 per cent).¹⁰⁹

The Chartered Institute of Water and Environmental Management states:

“A significant number of other problems are due to infrastructure such as dual manholes. Dual manholes allow shared access to both foul and surface water sewers that are sometimes in open channels. As such they can allow cross contamination of foul to surface or surface to foul to occur.”¹¹⁰

Misconnections can be addressed via upgrades to infrastructure and plumbing, to ensure that wastewater flows into sewerage pipes that flow to sewage treatment works, rather than drains that flow into local rivers. Joe Pecorelli from ZSL told the Committee that there “are gross problems with connectivity to the foul sewers.”¹¹¹ Cathryn Ross told the Committee that:

“Misconnections are a huge issue for us. [...] Our stats are that it might even be one in ten in London that might be misconnected. It is a huge number. Since 2020 we have dealt with more than 12,000 misconnections.”¹¹²

ZSL and the water charity Thames 21 run ‘Outfall Safaris’,¹¹³ which are citizen science schemes that survey the length of a river to locate polluting outfalls, pipes that flow into a river or stream.¹¹⁴ If they are releasing anything other than water into the watercourse, there is an indication of a misconnection. The information gathered is then reported to the relevant local water company to resolve and the Environment Agency for tracking. In 2021, there were 49 reported polluting outflows in the Hogsmill river, and previously 63 in 2016.¹¹⁵

Misconnections can be addressed via upgrades to infrastructure and plumbing. Thames Water states that alongside ZSL and local volunteers, it has prevented 4,243 misconnected appliances from polluting watercourses across London and the Southeast between 2020 and 2023.¹¹⁶

¹⁰⁸ Thames Water, [Tackling misconnected pipes](#), 31 March 2023

¹⁰⁹ Thames21, [A threat to our rivers: plumbing misconnections](#)

¹¹⁰ Chartered Institute of Water and Environmental Management, [Policy position statement – Misconnections](#)

¹¹¹ London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, p. 3

¹¹² London Assembly Environment Committee meeting, 13 September 2023, [Panel 2](#), p. 6

¹¹³ Greater London Authority, [River health](#)

¹¹⁴ South East Rivers Trust, [Outfall Safaris](#)

¹¹⁵ Ibid

¹¹⁶ Thames Water, [Tackling misconnected pipes](#), 31 March 2023

Recommendation 9: The Mayor should encourage his environmental team to prioritise work to bring together groups and engage communities on the health of their local rivers in 2024-25. This should include supporting 'Outfall Safaris' and providing guidance to communities in London about how to work with government, local authorities, charities, water companies and the Environment Agency to help reduce pollution.

Enforcement

The Environment Agency is responsible for enforcing laws that protect the environment in England. It has a 'Sanctions and Enforcement Policy' to address illegal activity, which includes several areas for possible action against companies, including for offences related to waste, environmental damage and water quality.¹¹⁷

In September 2023, the Government announced an expanded Plan for Water, which will result in an estimated increase in capital investment in the water system of £60 billion to tackle storm overflows, up from the £56 billion announced in 2022.¹¹⁸

The water regulator Ofwat announced in November 2021 it was investigating all major water companies in the UK. In November 2022, it announced that Thames Water would have to pay back more than £50 million to customers because of missed targets on water treatment works compliance, pollution incidents and internal sewer flooding across 2021-22.¹¹⁹ Following an Environment Agency investigation, Thames Water was fined £3.3 million on 4 July 2023 for pollution that occurred in October 2017 in two rivers near Gatwick Airport, where investigators discovered 1,400 dead fish.¹²⁰

James Wallace, referring to the fine for the incident near Gatwick, told the Committee that the enforcement powers that the Environment Agency has, and the fines it could impose on water companies, are inadequate:

"The fine that was announced just a few days ago to Thames Water for a fish kill of over 1,000 fish, the incident happened in 2017. It took six years for that to be acknowledged. [...] if we have a regulatory body, and that includes not just the EA but Ofwat as well that have been de-fanged, they cannot enforce. [...] These fines are a pittance, a couple of million quid to Thames Water or United Utilities or Southern Water [...] it is not even figuring on the balance sheet. We need to treat this with a greater degree of urgency, but also make sure that those fines are very significant, and they can be levied very quickly and then used to invest in [...] fixing leaks and upgrading networks."¹²¹

¹¹⁷ Environment Agency, [Enforcement and sanctions policy](#)

¹¹⁸ Department for Environment, Food and Rural Affairs, [All storm overflows now covered by plan to clean up waterways](#) 25 September 2023

¹¹⁹ Ofwat, [Thames Water and Southern Water to return almost £80m to customers for under performance](#), 15 November 2022

¹²⁰ Environment Agency, [Rivers polluted by "reckless" Thames Water](#), 4 July 2023

¹²¹ London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, pp. 21-22

Deputy Mayor Shirley Rodrigues told the Committee that:

“It is clear that it [Environment Agency] has been underfunded for many years [...] it could be doing more and should be much tougher on the areas that they regulate [...] Whether it is strong enough as a regulator itself is another matter.”¹²²

In December 2023, the Government announced increased powers for the Environment Agency, which is now able to levy unlimited fines on water companies.¹²³ This removed the previous £250,000 cap on Variable Monetary Penalties (VMPs) and also expanded the range of offences that it covers.¹²⁴ Penalties from water companies will also be re-invested into a new Water Restoration Fund, which aims to improve water quality.¹²⁵

Defra has also increased the level of funding to the Environment Agency for environmental protection, rising from £83 million in 2018-19¹²⁶ to £193 million in 2022-23, which is a 133 per cent increase.¹²⁷ However, environmental protection funding remains a fraction of the amount allocated for other areas such as flood defence (£928 million in 2022-23).¹²⁸

The Committee welcomes the potential for the Environment Agency to enforce environmental protection more rigorously, with the ability to deploy greater financial sanctions. Enforcement activity needs to increase significantly in London to address its pollution challenges.

Recommendation 10: The Government should further increase funding to the Environment Agency for enforcement activity, in order to enable the Agency to effectively monitor river health and enforce environmental protections in London.

¹²² London Assembly Environment Committee meeting, 13 September 2023, [Panel 1](#), p.13

¹²³ Department for Environment, Food and Rural Affairs, [Unlimited penalties introduced for those who pollute environment](#), 11 December 2023

¹²⁴ Ibid

¹²⁵ Ibid

¹²⁶ Environment Agency, [Annual report and accounts - 2019-2020](#), 15 December 2020, p. 110

¹²⁷ Environment Agency, [Annual report and accounts - 2022-2023](#), 26 October 2023, p. 195

¹²⁸ Ibid, p. 195

Chapter three: Flooding

Flooding presents a severe challenge to London's climate resilience and economic health, with 200,000 commercial and residential properties at risk of flooding from heavy rain.¹²⁹ The average cost of flood damage to a home is £30,000 and £82,000 to a business.¹³⁰ Analysis by the insurer Zurich UK indicates that flooding from torrential rain threatens 42 per cent' of the capital's 301,000 commercial buildings.¹³¹

The Met Office states that, as the climate continues to warm, intense rainfall events are expected to become more common.¹³²

Surface Water Flooding

In July 2021, two intense rainstorm events overwhelmed London's drainage systems, and more than 1,000 properties in 24 boroughs were flooded.¹³³ Surface water flooding was found to be a contributing factor to the cause of flooding in 12 of 15 London boroughs.¹³⁴ In response, the London Surface Water Strategic Group (LSWSG) was established in 2021 to coordinate key stakeholders across London to help develop London's first Surface Water Strategy.¹³⁵ It comprises senior-level representatives from Risk Management Authorities, including London's Lead Local Flood Authorities, the Environment Agency and Thames Water, as well as other organisations with a flood risk management or strategic governance role, such as the Greater London Authority and Thames Regional Flood and Coastal Committee.¹³⁶

The scope for London's first Surface Water Strategy is due to be published in Spring 2024.¹³⁷ The full Strategy is scheduled to be released in Summer 2024.¹³⁸ To support the development and delivery of the strategy, the Group states that it is working to deliver a communications and engagement plan, a funding plan and an annual monitoring framework to evaluate progress on reviews carried out since 2021.¹³⁹

¹²⁹ Mayor of London, [London Environment Strategy: Second Progress Report \(2019-21\)](#), September 2021, p. 18

¹³⁰ Greater London Authority, [London Flood Awareness Week 2021](#)

¹³¹ Zurich, [42per cent of London firms at risk of climate-fuelled flash floods](#), 25 February 2022

¹³² Met Office, [UK and Global extreme events – Heavy rainfall and floods](#)

¹³³ London Councils, [Surface Water Flood Risk Management in London](#), 2 March 2022

¹³⁴ Thames Water states that in this analysis, "If a Borough is missing it is either because the extents of flooding overlapped with another Borough with the same flooding mechanism, and are, therefore, covered by the same hotspot, or it was outside of the current study area covered by the Beckton and Crossness catchment models". See Thames Water, [London Flood Review - Summary for policy makers - Stage 4 report](#), July 2022

¹³⁵ See Appendix for full composition of the LSWSG

¹³⁶ London Surface Water Strategic Group, [Annual Monitoring Report](#), July 2023, p. 1

¹³⁷ Greater London Authority, [London's Surface Water Strategy](#)

¹³⁸ London Surface Water Strategic Group, [Annual Monitoring Report](#), July 2023, p. 5

¹³⁹ Environment Agency, [Additional Correspondence London Area Director](#), 20 October 2023

Cllr Deirdre Costigan, Vice Chair of the Transport and Environment Committee at London Councils (and also a sitting member of the LSWSG), set out the priorities of the LSWSG at the January 2024 Committee meeting on greening grey infrastructure:

“The focus [of the LSWSG’s work] is on getting together a strategy that we can implement on a London-wide basis because very much each London borough had its own approach, and we did not have a joined-up approach across London.[...]”¹⁴⁰

Sustainable drainage systems (SuDS)

Installing SuDS is important to effectively tackle the issue of surface water. SuDS are “drainage solutions that provide an alternative to the direct channelling of surface water, through networks of pipes and sewers to nearby watercourses.”¹⁴¹ Thames Water has a target of draining 7,598 hectares of impermeable land to SuDS by 2050 – equivalent to 50 Hyde Parks or 10,000 football pitches.¹⁴² In December 2016, the Mayor launched the Sustainable Drainage Action Plan for London (LSDAP).¹⁴³

A significant amount of impermeable surfaces in central London is linked to the road network. To help address the threat of flooding, Transport for London (TfL) has a 5,000 square metre SuDS installation target per annum,¹⁴⁴ which it states it is currently exceeding. Sam Longman, Head of Corporate Environment at TfL, told the Committee in its January 2024 meeting on greening grey infrastructure that:

“To date we have delivered over 6,000 square metres of sustainable drainage but, in our adaptation plan, we committed to increase our delivery rate, which was around 500 metres a year, to 5,000, [...] which is a tenfold increase. But this year we will be delivering close to 8,000 square metres and in the pipeline we have about 20,000 square metres over the next couple of years. We fully expect to break through that 5,000 square metre minimum target.”¹⁴⁵

During our investigation however, the Committee heard that the scale and speed of installing SuDS is not yet in line with the challenge and need. Deb Leach from South East Rivers Trust raised concerns with the Committee around the timeline for achieving Thames Water’s 2050 target for SuDS:

“What we are really concerned about is the length of time it is going to take; we are talking nearly 20 years before this work [removal of hardstanding] even commences and that is really not acceptable.”¹⁴⁶

¹⁴⁰ London Assembly Environment Committee meeting, [Minutes](#), 11 January 2024, p. 24

¹⁴¹ British Geographical Survey, [SuDS](#)

¹⁴² Thames Water, [Drainage and Wastewater Management Plan 2025-2050 - Delivery of SuDS and nature based solutions](#), p. 6

¹⁴³ Mayor of London, [MD2339 Drain London & the London Sustainable Drainage Action Plan](#), 28 August 2018

¹⁴⁴ Transport for London, [Climate Change Adaptation Plan 2023](#)

¹⁴⁵ London Assembly Environment Committee meeting, [Minutes](#), 11 January 2024, p. 26

¹⁴⁶ London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, p. 8

Alice Roberts, Head of Green Space Campaigns at CPRE London, outlined the scale of SuDS installation necessary to meet this in the January 2024 Committee meeting on greening 'grey' infrastructure:

“That [over 7,000 hectares] is a huge amount [...] In that context, 8,000 or 80,000 [square metres] is not very much. We have to deliver a gigantic quantity [of SuDS].”¹⁴⁷

Councillor Deirdre Costigan told the Committee that the LSWSG is “putting together a map of strategic opportunities for SuDS interventions, big SuDS projects that can make a significant impact across the whole of London.”¹⁴⁸

In September, Dan Bicknell from the GLA highlighted that progress on SuDS installation is being set back by other areas being paved over, which only adds to this challenge. He told the Committee:

“For every SuDS that we install, there are probably an equal number of areas being converted into astroturf front gardens and paving over driveways to park cars and so on. It is definitely a problem.”¹⁴⁹

The Mayor has a key role in delivering the installation of SuDS, which is included in the 2018 Mayor's Transport Strategy (MTS), with a target of capturing an additional effective surface area of 50,000 square metres.¹⁵⁰ Sustainable drainage is also referenced in the 2018 London Environment Strategy¹⁵¹ and is included as a specific policy in the 2021 London Plan.¹⁵²

The Mayor has invested in SuDS as part of funding for a number of programmes, including through the £3 million Green and Resilient Spaces Fund designed to tackle climate emergencies,¹⁵³ the Grow Back Greener Fund, which allocated £2 million to enable a more environmentally sustainable recovery from the Covid-19 pandemic,¹⁵⁴ and through Climate Resilient Schools Programme, which funded £1.7 million of changes to ensure schools are more resilient to the impacts of climate change.¹⁵⁵

The GLA has published sector-specific sustainable drainage guidance for six sectors (schools, social housing, parks and greenspaces, hospitals, offices, and retail).¹⁵⁶ The Mayor has also developed bespoke training on sustainable drainage for highways officers to tackle surface water flooding through their projects.¹⁵⁷

¹⁴⁷ London Assembly Environment Committee meeting, [Minutes](#), 11 January 2024, p. 28

¹⁴⁸ Ibid, p. 25

¹⁴⁹ London Assembly Environment Committee meeting, 13 September 2023, [Panel 1](#), p. 16

¹⁵⁰ Mayor of London, [Mayor's Transport Strategy](#), p. 123

¹⁵¹ Mayor of London, [London Environment Strategy](#), May 2018

¹⁵² Mayor of London, [The London Plan](#), March 2021, pp. 385-387

¹⁵³ Greater London Authority, [Green and Resilient Spaces Fund - Round Two](#)

¹⁵⁴ Greater London Authority, [Grow Back Greener Fund 2022](#)

¹⁵⁵ Mayor of London, [MD3053 Additional funds for Climate Resilient Schools programme](#), 5 January 2023

¹⁵⁶ Greater London Authority, [SuDS Sector Guidance](#)

¹⁵⁷ Mayor of London, [London Environment Strategy: Second Progress Report \(2019-21\)](#), September 2021, p.19

London boroughs have also initiated projects to install SuDS, including Camden, Islington, Royal Borough of Kensington and Chelsea (RBKC), and Westminster.¹⁵⁸ However, London Councils, which represents all 32 boroughs, has identified that “funding for reviewing SuDS applications in particular is challenging.”¹⁵⁹ Support is also needed to help promote SuDS and flood risk as a career, and to create a qualification to upskill existing engineers so they can install SuDS.¹⁶⁰ London Councils highlighted that communication with Londoners is essential, as:

“Engagement needs to target residents to let them know of their responsibilities and also to protect their own homes or do things to reduce surface water flooding e.g. installation of water butts, and keeping green spaces. Enhanced political engagement could support communication within and between boroughs.”¹⁶¹

Dan Bicknell outlined an overview of further issues with SuDS delivery in London:

“One of the issues is there is a capacity issue still, if we are going to deliver the SuDS that are needed over the long term, and it is going to be a long-term programme of delivery, there is a skills shortage around delivering sustainable drainage and there is a capacity issue at borough level as well. Boroughs lead local flood authorities are underfunded and under-resourced to deliver SuDS at the moment. We are looking at all sorts of other mechanisms to try and help enable that, so looking at [...] how you work with utilities so that when they dig up the streets, you can retrofit SuDS as part of that process.”¹⁶²

Recommendation 11: The Mayor should continue to support the London Surface Water Strategic Group to encourage a joined-up approach across London, including by developing a strategy for accelerating the delivery of sustainable drainage systems (SuDS) by all partners.

Recommendation 12: The Mayor should significantly scale up funding and installation of sustainable drainage systems (SuDS), and scale up the resources available for local boroughs and other landowners to increase their own SuDS installation.

Recommendation 13: The Mayor should double the target in his Transport Strategy to 100,000 square meters a year of roads draining into sustainable drainage systems (SuDS) per year. Transport for London (TfL) should also double its targets for SuDS installation to deliver 10,000 square metres of roads draining into SuDS per year.

Recommendation 14: Defra should work with the London Surface Water Strategic Group to establish a need-based fund to enable boroughs to access

¹⁵⁸ London Councils, [Transport and Environment Committee meeting](#), 7 December 2023, p. 11

¹⁵⁹ Ibid, p. 3

¹⁶⁰ Ibid, p. 3

¹⁶¹ Ibid, p. 3

¹⁶² London Assembly Environment Committee meeting, [Minutes](#), 11 July 2023, p. 27

simple and long-term funding for sustainable drainage systems (SuDS), while significantly increasing funding available for SuDS installation.

Tidal flooding

The Thames Barrier is the primary defence mechanism to deal with tidal flooding in London.¹⁶³ It became operational in 1982 and consists of ten steel gates which are closed in storm surge conditions. It currently protects over 1.4 million people and 586,000 residential properties worth over £321 billion,¹⁶⁴ as well as 55,640 commercial properties, 4,000 listed buildings and 27 square kilometres of open green space from flooding.¹⁶⁵

The Environment Agency is responsible for the Thames Barrier and closes it when water levels in the Thames would exceed walls or embankments, which happens either when a high tide is predicted to be particularly high, or if a storm is expected.¹⁶⁶ The Barrier does not protect areas downstream from the barrier where the walls and embankments are higher.¹⁶⁷

The Barrier has been closed 215 times since it became operational in 1982.¹⁶⁸ Of these closures 119 were to protect against tidal flooding, and 96 were to protect against combined tidal and fluvial (river)¹⁶⁹ flooding.¹⁷⁰ However, sea level rises due to climate change mean that the barrier “will be closed more and more often for daily high tides.”¹⁷¹

The Thames Estuary 2100 plan

The Thames Estuary 2100 Plan sets out how flood risk will be managed in the Thames estuary to the end of the century and beyond.¹⁷² It also recommends what actions the Environment Agency and others will need to take in the short term (next 25 years), the medium term (the following 15 years) and the long term (to the end of the century).¹⁷³ The Plan is based on current guidance on climate change but is adaptable to changes in predictions for sea level rise and climate change over the century. The Met Office predicts that sea level rises in London could rise to by 1.15 metres by 2100 (from 1990 levels).¹⁷⁴

¹⁶³ Environment Agency, [Additional Correspondence London Area Director](#), 20 October 2023

¹⁶⁴ Ibid

¹⁶⁵ Department for Environment, Food and Rural Affairs [Thames Estuary 2100: 10-year monitoring review \(2021\)](#), 1 February 2021

¹⁶⁶ Ibid

¹⁶⁷ Ibid

¹⁶⁸ Department for Environment, Food and Rural Affairs, [The Thames Barrier](#), Correct as of 14 February 2024

¹⁶⁹ Fluvial flooding is when rivers overflow their banks into surrounding areas following periods of intense rainfall

¹⁷⁰ Department for Environment, Food and Rural Affairs, [The Thames Barrier](#), Correct as of 14 February 2024

¹⁷¹ Department for Environment, Food and Rural Affairs, [Managing future flood risk and Thames Barrier: Thames Estuary 2100](#), 19 April 2023

¹⁷² Department for Environment, Food and Rural Affairs [Thames Estuary 2100 \(TE2100\)](#), 19 April 2023

¹⁷³ Department for Environment, Food and Rural Affairs [Thames Estuary 2100 \(TE2100\)](#), 19 April 2023

¹⁷⁴ Met Office, [Most detailed picture yet of UK's future climate](#), 26 November 2023

The Environment Agency published updates to the Plan in April 2023 following its first full review and stated that it has brought forward the deadline for deciding on an “end of century” option (which needs to be in place by 2070) from 2050 to 2040.¹⁷⁵ There are currently seven options being considered, which include upgrading the existing barrier, creating new flood storage areas, and a new barrier in either Long Reach or Gravesend Reach, consisting of one or two sets of gates and locks.¹⁷⁶

Dan Bicknell from the GLA highlighted in the September 2023 Committee meeting that replacing the Thames Barrier is in itself not sufficient to reduce flood risk, as

“It is the showpiece in a larger system of integrated defences that include thousands of smaller defences. The key thing here is that you need to raise them all in unison at the right time, in order to continue to protect London.”¹⁷⁷

The Environment Agency is developing an investment plan to fund the estimated £16.2 billion cost of the Thames Estuary 2100 plan.¹⁷⁸ It will formulate the Investment Plan in two parts – the first to be completed by 2024 which will set out the approach to funding for the next 15 years, and the second to be completed by 2025 which will establish the approach to funding the Thames Estuary 2100 Plan for the remainder of the century.¹⁷⁹ To support this, the Environment Agency has established a Flood Infrastructure Taskforce, which brings together private businesses and public organisations.¹⁸⁰

The Environment Agency told the Committee in October 2023 that it is only responsible for maintaining 12 per cent of Thames Estuary's flood defences, whereas responsibility for the other 88 per cent lies with other organisations and landowners.¹⁸¹ Where a flood defence wall or embankment is deemed to be in very poor condition, the Environment Agency are able to take action and recover the cost from the landowners.¹⁸² The Environment Agency is developing a Flood Defence Raising Strategy, which will “identify the relevant riparian owners and how we can work with them to upgrade the defences over the coming decades.”¹⁸³

The Interim report of the 2024 London Climate Resilience Review found that “Of the total 330 kilometres of flood defences in the Thames Estuary there are 126 kilometres upstream (west) of the Barrier and just nine kilometres of these (seven per cent) are sufficiently high to last beyond 2050.”¹⁸⁴ It recommends the GLA and

¹⁷⁵ Department for Environment, Food and Rural Affairs [Major updates to Thames Estuary 2100 from 2012 to 2023](#), 19 April 2023

¹⁷⁶ Department for Environment, Food and Rural Affairs, [Managing future flood risk and Thames Barrier: Thames Estuary 2100](#), 19 April 2023

¹⁷⁷ London Assembly Environment Committee meeting, 13 September 2023, [Panel 2](#), p.1

¹⁷⁸ Department for Environment, Food and Rural Affairs, [Funding Thames Estuary 2100: costs and investment](#), 19 April 2023

¹⁷⁹ Environment Agency, [Additional Correspondence London Area Director](#) 20 October 2023

¹⁸⁰ Ibid

¹⁸¹ Ibid

¹⁸² Department for Environment, Food and Rural Affairs, [Funding Thames Estuary 2100: costs and investment](#), 19 April 2023

¹⁸³ Environment Agency, [Additional Correspondence London Area Director](#) 20 October 2023

¹⁸⁴ London Climate Resilience Review, [Interim Report](#), January 2024, p. 11

those who own land bordering the Thames west of the Thames Barrier “conduct an audit of land they own on the riverbank and [...] develop an action plan by 2025 setting out financing and delivery options for raising defences, creating nature-based solutions and sacrificial zones, before 2050.”¹⁸⁵

River flooding

In order to extend the life of the Thames Barrier, a decision has been made to no longer use it to manage fluvial (river) flooding. Dan Bicknell explained how:

“It [the Thames Barrier] is being used more than it was intended to be used. It is being used [...] for fluvial river flooding in west London because it protects the number of homes or an area of west London by holding back the tide. [...] The idea is that the barrier should not close more than 50 times per year. With climate change and an increasing number of predicted storm surges, that is likely to need to increase and therefore it is not sustainable to keep closing for smaller-order flood events in west London.”¹⁸⁶

The Environment Agency has set a deadline for 2030 for councils or other organisations to produce riverside strategies, which involve reshaping riversides in response to rising sea levels. It states that “throughout much of the estuary, flood walls and embankments will need to be a metre or so higher by 2100”.¹⁸⁷ The first of these strategies was published in 2021 by the City of London.¹⁸⁸

Recommendation 15: As recommended by the London Climate Resilience Review, the Mayor should conduct an audit of land the GLA owns or is responsible for on the riverbank and develop an action plan by 2025 including ways to raise flood defences and create natural areas where flooding can be allowed to occur without harm.

Recommendation 16: The Mayor should also consider how to use his wider planning powers to ensure councils develop riverside strategies and landowners take appropriate action to construct and manage higher walls.

¹⁸⁵ Ibid, p. 26

¹⁸⁶ London Assembly Environment Committee meeting, September 2023, [Panel 1](#), p. 1

¹⁸⁷ Department for Environment, Food and Rural Affairs, [Creating benefits and riverside strategies: Thames Estuary 2100](#), 19 April 2023

¹⁸⁸ City of London, [City of London Riverside Strategy](#), 16 August 2021

Chapter four: Maximising opportunities

There are opportunities to use rivers to generate renewable energy, as part of wider net zero efforts, such as the Mayor's 2030 Net Zero target.¹⁸⁹ Shifting away from fossil fuels to help lower emissions can also contribute to better air quality.¹⁹⁰ Generating electricity by using water-source heat pumps, tidal energy and solar energy can help in achieving the Mayor's target. However, without strategic co-ordination for London's waterways, these will not be fully realised.

Generating renewable energy

London's rivers have the potential to be a valuable source of renewable energy. The Thames and other tributaries were collectively identified by government in 2015 to have the "highest potential for water-source heat pump deployment in areas of high heat demand" across England.¹⁹¹ In 2020, a trial estimated that tidal energy in the Thames could power 35,000 homes from hundreds of turbines.¹⁹²

Heat energy from rivers can potentially be used for water-source heat pumps, which could contribute towards the 2.2 million operational heat pumps required by 2030 that the Mayor's preferred pathway to net zero will require.¹⁹³ The PLA states that "there are a number of systems in place on the Thames for heating or cooling." It highlights that "the challenge applicants have faced previously appears to be keeping the underwater structures like intakes clear while meeting the requirements of the eel regulations, without creating a hazard to navigation."¹⁹⁴

Examples of water-source heat pumps in London include the Newington Estate in Southwark, which opened in 2022, using groundwater source heat pumps that use water from underground aquifers, to keep 2,000 flats warm.¹⁹⁵ There are also examples of schemes that undertook feasibility assessments, but did not go ahead, including a feasibility study by SSE Enterprises in 2015 into the use of the Thames as a renewable heat source to power Battersea Power Station.¹⁹⁶

Thames Water generates renewable energy at its sewage sites, using anaerobic digestors to treat sludge and create biogas to generate 23 per cent of its electricity needs.¹⁹⁷ Cathryn Ross from Thames Water outlined to the Committee the opportunities identified for renewable energy generation from sewage:

¹⁸⁹ Greater London Authority, [Pathways to Net Zero Carbon by 2030](#)

¹⁹⁰ Centre for London, [Chapter 1: The case for change](#), 2 November 2021

¹⁹¹ Department of Energy and Climate Change, [National heat map: Water source heat map layer](#), March 2015

¹⁹² Energy Digital Magazine, [London's Thames to See Tidal Energy](#), 17 May 2020

¹⁹³ Mayor of London, [London Net Zero 2030: An Updated Pathway](#), January 2022, p. 9

¹⁹⁴ Port of London Authority, [Heat Source](#)

¹⁹⁵ Southwark Council, [Southwark is first in London to fit new, eco-friendly heating](#), 17 November 2022

¹⁹⁶ SSE Enterprises, [Feasibility study at Battersea Power Station](#), 31 March 2015

¹⁹⁷ Thames Water, [The sewage treatment process](#)

“One [opportunity] is about the potential for gas-to-grid, which is converting our current combined heat and power generation into gas that we can then put back into the grid. [...] We think that the gas there has the potential to heat up to something like 21,000 homes. Exciting opportunity number two we think is for floating solar. [...] We see the potential there to have up to 1 gigawatt of floating solar generation within the M25. Then finally [...] is the potential to generate heat from effluent. We think that the effluent that we currently have within London alone could generate ten terawatt hours of wastewater heat, which [...] is the equivalent of 40 per cent of Hinkley [Point] C [nuclear power station].”¹⁹⁸

The PLA states that “the Thames could provide local tidal energy opportunities, though it is unlikely to be via traditional larger turbine technology.”¹⁹⁹ Considerations for potential locations of tidal energy include proximity to residents, effect on migrating fish, noise and pressure impacts, and the effects on other structures.²⁰⁰ The PLA is encouraging the use of microgeneration in suitable areas, and in 2021 established a trial at Thamesmead. The PLA has stated that “The site is not necessarily a high potential site for [energy] generation, but permits the PLA, the developer and other regulators to gather an understanding of the technology in the Thames and its further deployment.”²⁰¹

As a key stakeholder in consenting renewable energy projects on the tidal Thames from a navigational and environmental perspective in London, in collaboration with other agencies, the PLA states that it “is supportive of alternative energy solutions on the river in line with sustainable development, national policy and relevant consents.”²⁰² Renewable energy, encompassing wind, solar heat source and tidal power, is one of four areas included under the PLA’s definition of green technologies.²⁰³ However, the PLA also states that it has “a duty of care to make sure all proposals have minimal impacts on the use of the port, navigational safety, the environment and the river regime.”²⁰⁴

Grace Rawnsley from the PLA set out at the September 2023 Committee meeting that:

“One of our challenges is that it is a busy river, and these sorts of energy generation projects cannot impede (on) the navigational channel. [...] Our learning so far has been that there are again environmental challenges to bringing tidal energy in. Turbines cause problems for fish and eels often [...] Therefore any tidal generator project that we are involved in, there is a requirement for them to monitor the impact it is having on fish and other parts of the ecosystem.”²⁰⁵

¹⁹⁸ London Assembly Environment Committee meeting, 13 September 2023, [Panel 1](#), p .5

¹⁹⁹ Port of London Authority, [Tidal Energy on the Thames](#)

²⁰⁰ Ibid

²⁰¹ Ibid

²⁰² Port of London Authority, [Heat Source](#)

²⁰³ Port of London Authority, [Green Technologies on River Thames Structures](#)

²⁰⁴ Port of London Authority, [Heat Source](#)

²⁰⁵ London Assembly Environment Committee meeting, 13 September 2023, [Panel 1](#), p. 7

Recommendation 17: The Mayor should work with the Port of London Authority (PLA) to carry out and publish a status report on existing river-based energy projects by the end of 2024. This should include an assessment of potential barriers and opportunities for further renewable energy generation projects on the Thames.

Recommendation 18: The Mayor and the Port of London Authority (PLA) should work together to create a prospectus for investors of river-based energy projects, and actively market the opportunities identified to ensure more renewable energy generation projects on the Thames are installed.

Recommendation 19: The Mayor and the Port of London Authority (PLA) should set out clear and ambitious targets for expanding the proportion of craft using zero emission and renewable fuel sources on the section of the river from the O2 to Teddington, with targets for 2030, 2035 and 2040.

Reducing emissions from river vessels

Vessels on the River Thames are estimated to contribute around one per cent of total London emissions,²⁰⁶ although the majority of shipping emissions in the port occur east of Greater London beyond the QE2 Crossing.²⁰⁷

The PLA announced its first 25-year Air Quality Plan in 2018 after consultation with stakeholders, including the GLA.²⁰⁸ This Plan included targets for reducing Nitrogen oxides (NOx) and particulate matter (PM) emissions by 20 per cent by 2026, 40 per cent by 2031 and 50 per cent by 2041, and 20 actions for reducing emissions, as part of a Five-Year Action Plan.²⁰⁹

In 2020, the PLA and operators of the tidal Thames produced a road map for inland shipping, which indicates a series of steps for reducing emissions.²¹⁰ This concluded that existing vessels could transition to ultra-low emission status by “retrofitting vessels with advanced exhaust clean-up and through the use of low carbon fuel for existing or modified internal combustion engines (ICE).”²¹¹ It highlighted that battery electricity or hydrogen fuel technologies are the main candidates for new zero emission vessels.²¹² Grace Rawnsley stated during the September Committee meeting that:

“Our own fleet has been entirely transitioned to a lower carbon fuel, alternative fuel, HVO [Hydrotreated Vegetable Oil]. One of the reasons was that the PLA

²⁰⁶ Port of London Authority, [Air Quality Strategy for the Tidal Thames](#), June 2018, p. 6

²⁰⁷ Ibid, p. 18

²⁰⁸ Ibid

²⁰⁹ Ibid, p. 23

²¹⁰ Port of London Authority, [Emission Reduction Roadmap for Inland Shipping on the Tidal Thames](#), 2019

²¹¹ Port of London Authority, [Emission Reduction Roadmap for Inland Shipping on the Tidal Thames](#), 2019

²¹² Ibid

felt it was absolutely the right thing to do, to transition to a lower-carbon fuel."²¹³

The PLA published its 2040 Net Zero River Plan on 15 February 2024, which stated that the PLA is “committed to pushing for faster decarbonisation of river-based emission sources – primarily from vessel movements.”²¹⁴ This included actions for supporting this transition by producing feasibility studies for adopting domestic and international green corridors on the Thames, providing access to the Maritime Emission Portal data to operators on the Thames, and reviewing the approval process for the use of green technology use in river vessels.²¹⁵

An example of a large-scale decarbonisation project for river craft is Clean Air Thames, which was announced as a £500,000, three-year project that ran from 2019-2022, funded by the Mayor's Air Quality Fund.²¹⁶ This aimed to retrofit 11 river vessels, including tugs and passenger transport, cutting their emissions (including particulate matter, nitrogen oxides and sulphur oxides) by up to 90 per cent.²¹⁷ It involved the Cross River Partnership (CRP), the GLA and the City of London Corporation. This shows the potential for multiple river stakeholders to prioritise the transition to net zero on vessels. However, at the end of the project, only two vessels had been retrofitted, and almost £355,000 was not used from the original £500,000 allocation.²¹⁸ This amount was instead redirected to the Mayor's Air Quality Fund to “fund other sustainable transport and air pollution initiatives.”²¹⁹

Thames Clippers have also launched a consultation for a proposed cross-river electric ferry service that would run from Rotherhithe to Canary Wharf,²²⁰ partially funded by the Department for Transport's Green Maritime Fund.²²¹ ²²²Subject to approval, it would be expected to be operational in February 2025.²²³ It is designed to increase the capacity of each ferry to 150 passengers and 100 bikes, up from existing levels of 100 passengers and five bikes.²²⁴

A River Ultra Low Emissions Zone (RULEZ)

The PLA's 2020 update to its Air Quality Strategy included plans for a “river-based Ultra Low Emission Zone (RULEZ) [which] will be established in partnership with GLA and TfL to better control emissions from inland vessels.” This is identified as a ‘Medium term’ priority (2023-2030).²²⁵

²¹³ London Assembly Environment Committee meeting, September 2023, [Panel 1](#), p. 10

²¹⁴ Port of London Authority, [The Net Zero River Plan](#), February 2024, p.4

²¹⁵ Ibid

²¹⁶ Cross River Partnership, [Clean Air Thames](#)

²¹⁷ Ibid

²¹⁸ London Assembly Environment Committee meeting, December 2023, [Agenda Document](#), p. 63

²¹⁹ Ibid, p.63

²²⁰ [New cross river ferry | Uber Boat by Thames Clippers](#)

²²¹ Ibid

²²² Department for Transport, [£33 million boost to turn green ports and ships into a reality](#), 26 January 2024

²²³ BBC News, [Plans for London's first fully electric ferry service submitted](#), 12 December 2023

²²⁴ Ibid

²²⁵ Port of London Authority, [Air Quality Strategy for the Tidal Thames](#), June 2020

Grace Rawnsley informed the Committee in September 2023 that the PLA had done an initial scoping exercise into the RULEZ and was doing a feasibility assessment which would likely be published early in 2024. She said this aimed to look at:

“what the economic implications would be, as well as is the technology ready for something like that, and what the appetite is with various different agencies and partners that we would need to work with in order to develop that.”²²⁶

The Committee support the consideration of a river clean air zone, subject to an assessment demonstrating that such a zone would have the desired effect on emissions from vessels.

Recommendation 20: The Port of London Authority (PLA) should publish the findings from its feasibility assessment for a River Ultra Low Emission Zone (RULEZ). In response to this, the Mayor should set out his position on such a scheme, and any plans for its implementation.

Thames and London Waterways Forum

The Thames and London Waterways Forum (TLWF) was set up by the Mayor in 2017, replacing two previous bodies, with the objective to “advise on and address strategic river and waterway issues in London.”²²⁷ It is a joint body that is shared between the GLA, TfL and the PLA, and reports to the Deputy Mayor for Transport.²²⁸ The Terms of Reference of its Steering Group includes “driving forward waterways priorities set out in the London Environment Strategy.”²²⁹ It could therefore be leading on issues such as reducing river emissions to further London’s decarbonisation efforts to mitigate the impacts of climate change.

The bodies replaced by the Forum include the London Waterways Commission, which was established in 2006 to advise the Mayor on waterways issues and share good practice.²³⁰ It also advised the Mayor on implementing policies for the Blue Ribbon Network of waterways in London (rivers, canals and other bodies of water).²³¹ The Mayor also subsequently established the River Concordat in 2009, which was designed to unlock the potential of the Thames for passenger transport.²³²

Shirley Rodrigues outlined the rationale behind the TLWF and its work:

“The point of replacing those forums was to ramp up activity on the TLWF. This is an area that involves many partners [...] There are lots of partners,

²²⁶ London Assembly Environment Committee meeting, September 2023, [Panel 1](#), p. 9

²²⁷ Thames and London Waterways Forum Steering Group, [Terms of Reference](#), p.1

²²⁸ London Assembly Environment Committee meeting, December 2023, [Agenda Document](#), p. 63

²²⁹ Thames and London Waterways Forum Steering Group, [Terms of Reference](#), p. 1

²³⁰ Mayor of London, [MD2116 The Thames and London Waterways Forum](#), 9 May 2017

²³¹ Ibid

²³² Ibid

including the riparian boroughs as well, that we have to take into account, people who use the river as well as those who operate on it. We have been doing a lot of work on freight, on piers, there is the Piers Strategy, you have heard from the PLA about some of the air pollution work and water quality work."²³³

The Committee heard that the Steering Group meets quarterly.²³⁴ The Forum held its annual event in December 2023 which focused on opportunities and challenges for organisations looking to use the river for freight and environmentally sustainable solutions to this,²³⁵ including the Cross River Partnership's London Light River Freight Trial held between February and March 2023.²³⁶ However, meeting details for the Steering Group and working groups have not been updated on the GLA's website since 2018.²³⁷

Recommendation 21: In response to this report, the Mayor should set out the major environmental achievements of the Thames and London Waterways Forum over the last five years, and his key priorities for the forum in 2024-25. The GLA should also swiftly publish meeting notes of the Thames and London Waterways Forum since 2018, as well as a schedule of its future meetings.

²³³ London Assembly Environment Committee meeting, September 2023, [Panel 2](#), pp. 11-12

²³⁴ London Assembly Environment Committee meeting, December 2023, [Agenda Document](#), p. 63

²³⁵ Cross River Partnership, [Focussing on Freight at the Thames & London Waterways Forum](#), 12 December 2023

²³⁶ Cross River Partnership, [CALL Deep Dive: London Light Freight River Trial](#), May 2023

²³⁷ Greater London Authority, [Thames and London Waterways Forum](#)

Committee Activity

The Environment Committee conducted a two-part investigation into water and London's rivers. The Committee held its first meeting on 7 July 2023 with the following guests in attendance:

- Dan Bicknell - Adaptation Manager, Greater London Authority (GLA)
- Bella Davies - Chief Executive, South East Rivers Trust
- Pete Daw - Head of Climate Change, GLA
- Debbie Leach - Chief Executive, Thames21
- Cathryn Ross – Joint Acting Chief Executive Officer, Thames Water
- James Wallace - Chief Executive, River Action

The Committee held its second meeting on 13 September 2023, with the following guests in attendance:

- Roger Bailey - Chief Technical Officer, Tideway
- Joe Pecorelli - Conservation Programme Manager, Zoological Society London (ZSL)
- Grace Rawnsley - Director for Sustainability and Net Zero Transition PLA
- Shirley Rodrigues - Deputy Mayor for Environment and Energy
- Cathryn Ross - Joint Acting Chief Executive Officer, Thames Water
- Charlotte Wood - London Area Director, Environment Agency

The Committee also attended two site visits – the first to the site of the current Thames Barrier on 22 September 2023, with the following guests in attendance:

- **London Assembly Environment Committee Members:** Leonie Cooper AM (Environment Committee Chair), Hina Bokhari AM, Elly Baker AM, Joanne McCartney AM, Onkar Sahota AM, Unmesh Desai AM
- **Environment Agency:** Charlie Wood – London Area Director, Darsha Gill - Hertfordshire & North London Area Director, Sally Harvey - Kent, South London and East Sussex Area Director, Laura Littleton - London Area Flood and Coastal Risk Manager for Thames Estuary 2100, Ben Llewellyn - Environment Planning and Engagement Manager for London
- **Port of London Authority:** James Trimmer - Director of Planning and Development, Grace Rawnsley - Director of Sustainability, Siân Foster- Director of Corporate Affairs, Raj Kehal - Head of Stakeholder Engagement
- **Greater London Authority:** Daniel Bicknell - Climate Adaptation Manager, Pete Daw - Head of Climate Change, Victoria Boorman - Principal Policy and Programme Officer

The second site visit was to Mogden Sewage Treatment Works on 25 October 2023, with the following guests in attendance:

- **London Assembly Environment Committee Members:** Leonie Cooper AM (Environment Committee Chair)
- **Thames Water:** Esther Sharples - Operations Director for London, Anna Boyles - Head of Catchment, Josh Callaway - Area Treatment Manager, Thomas Rhys Dunn - Senior Public Affairs Advisor

There was a separate site visit on 16 November 2023 for the London Assembly Transport Committee with Uber Boat by Thames Clippers, which covered information on electric ferry and riverboat developments related to the Environment Committee's investigation, which the Chair of the Committee attended:

- **Uber Boat by Thames Clippers:** Sean Collins – Chief Executive Officer, Michael Threlfall - Head of Business Development, Rosa D'Alessandro - Business Support

The Committee also held two private briefings with Thames Water.

Appendix

The London Surface Water Strategic Group (LSWSG) is comprised of:

- **London boroughs** – maximum total of six representatives drawn from Chair and Vice-chairs of London Councils' Transport and Environment Committee (TEC) and/or Thames Regional Flood and Coastal Committee (RFCC) Strategic Partnership Leads
- **Mayor of London** – the Deputy Mayor for Environment and Energy
- **Environment Agency** – the London Area Director
- **Transport For London (TfL)** – the Chief Health, Safety and Environment Officer
- **Thames Water** – the Strategic Resource and London Operations Director
- **London Fire Brigade (LFB)** – the Assistant Commissioner
- **Thames Regional Flood and Coastal Committee (RFCC)** – An independent Member.

Other formats and languages

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Chinese

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Vietnamese

Nếu ông (bà) muốn nội dung văn bản này được dịch sang tiếng Việt, xin vui lòng liên hệ với chúng tôi bằng điện thoại, thư hoặc thư điện tử theo địa chỉ ở trên.

Greek

Εάν επιθυμείτε περίληψη αυτού του κειμένου στην γλώσσα σας, παρακαλώ καλέστε τον αριθμό ή επικοινωνήστε μαζί μας στην ανωτέρω ταχυδρομική ή την ηλεκτρονική διεύθυνση.

Turkish

Bu belgenin kendi dilinize çevrilmiş bir özetini okumak isterseniz, lütfen yukarıdaki telefon numarasını arayın, veya posta ya da e-posta adresi aracılığıyla bizimle temasa geçin.

Punjabi

ਜੇ ਤੁਸੀਂ ਇਸ ਦਸਤਾਵੇਜ਼ ਦਾ ਸੰਖੇਪ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਲੈਣਾ ਚਾਹੋ, ਤਾਂ ਕਿਰਪਾ ਕਰਕੇ ਇਸ ਨੰਬਰ 'ਤੇ ਫੋਨ ਕਰੋ ਜਾਂ ਉਪਰ ਦਿੱਤੇ ਡਾਕ ਜਾਂ ਈਮੇਲ ਪਤੇ 'ਤੇ ਸਾਨੂੰ ਸੰਪਰਕ ਕਰੋ।

Hindi

यदि आपको इस दस्तावेज का सारांश अपनी भाषा में चाहिए तो उपर दिये हुए नंबर पर फोन करें या उपर दिये गये डाक पते या ई मेल पते पर हम से संपर्क करें।

Bengali

আপনি যদি এই দলিলের একটা সারাংশ নিজের ভাষায় পেতে চান, তাহলে দয়া করে ফো করবেন অথবা উল্লেখিত ডাক ঠিকানায় বা ই-মেইল ঠিকানায় আমাদের সাথে যোগাযোগ করবেন।

Urdu

اگر آپ کو اس دستاویز کا خلاصہ اپنی زبان میں درکار ہو تو، براہ کرم نمبر پر فون کریں یا منکورہ بالا ڈاک کے پتے یا ای میل پتے پر ہم سے رابطہ کریں۔

Arabic

الحصول على ملخص لهذا المستند بلغتك،
فارجاء الاتصال برقم الهاتف أو الاتصال على
العنوان البريدي العادي أو عنوان البريدي
الإلكتروني أعلاه.

Gujarati

જો તમારે આ દસ્તાવેજનો સાર તમારી ભાષામાં જોઈતો હોય તો ઉપર આપેલ નંબર પર ફોન કરો અથવા ઉપર આપેલ ટપાલ અથવા ઇ-મેઇલ સરનામા પર અમારો સંપર્ક કરો.

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