Our final plan

Our Drainage and Wastewater Management Plan 2025-2050

Technical Appendices
Appendix Q – Storm Overflows

May 2023

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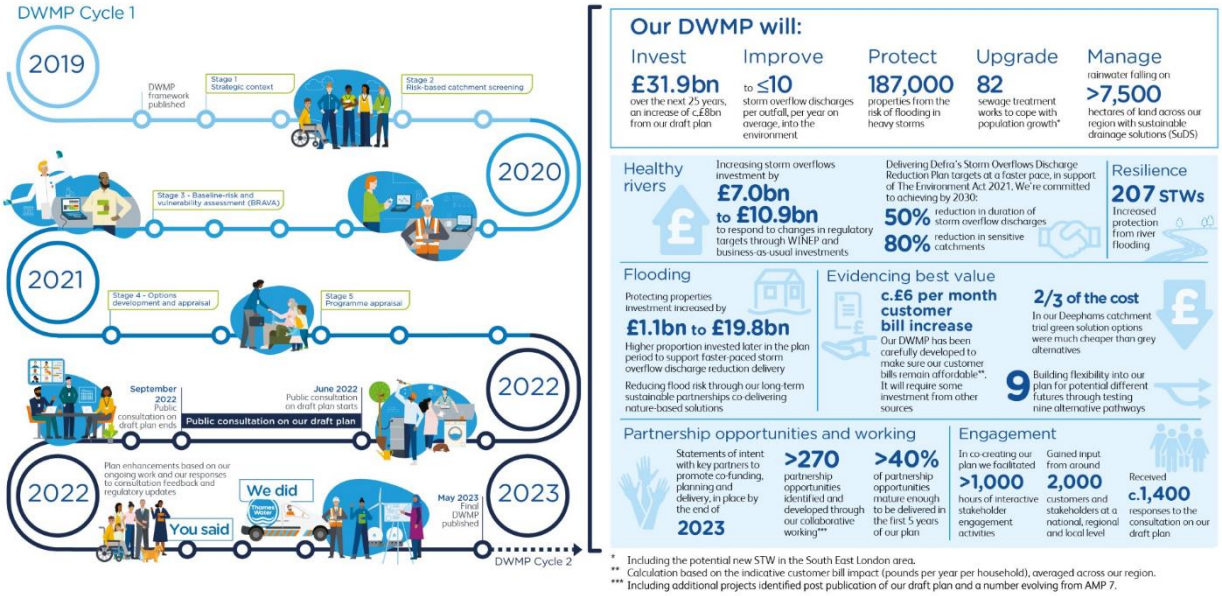
Preface

We are proud to present our first Drainage and Wastewater Management Plan (DWMP) and encouraged by the level of positive feedback we have received. Over the last four years, we have engaged and worked collaboratively with around 2,000 of our customers and stakeholders, to deepen our shared understanding and develop new ways to manage drainage and wastewater across our region. We illustrate our DWMP Cycle 1 and its headlines below.



We have progressed and enhanced our DWMP since we published it for public consultation in June 2022. We were pleased to receive lots of positive comments and support on the quality and ambition of our draft plan as well as useful ideas for making our final DWMP even stronger.

We have updated our draft plan based on our ongoing DWMP work, regulatory updates and our responses to the consultation feedback wherever possible*. Our updates include providing more detail where you felt it was needed and creating new appendices to answer technical queries. For more details on how we have progressed our final plan and responded to the consultation feedback, please see our Non-technical summary and You said, We did Technical appendix.

* Some public consultation feedback didn't require further action or wasn't relevant to the DWMP process. Other feedback was relevant to future DWMP planning cycles and will be used to inform this work.

Progress signposts

We want to make it easy for you to see what's changed. You can spot all the places we have updated our draft plan with our 'progress signposts' which we have used across our final DWMP documents.

For documents newly created for the fDWMP, we have provided a progress summary table upfront, to demonstrate what type of information the document provides.

Progress summary table

The progress signposts summary table for the chapters in this document is outlined below. We have used orange cells to indicate where our draft plan has been updated with progress.

Progress signposts summary: Appendix Q – Storm Overflows	Progress updated	More detail or new content	Number(s) updated	Delivery timeframe updated	Informing DWMP cycle 2
1 Introduction					
2 What our stakeholders want					
3 Our plan for storm overflows					
4 Adaptive planning for storm overflows					
5 Next steps					
6 Conclusion					

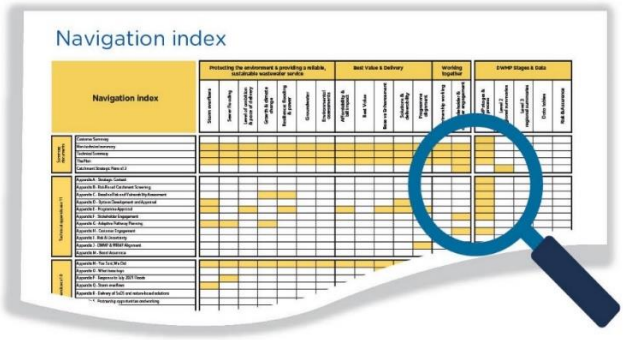
Key DWMP content

This document specifically includes the following key DWMP content:

- Protecting the environment and providing a reliable, sustainable wastewater service:
  - Storm overflows
  - Level of ambition & pace of delivery
  - Growth & climate change
- Best Value and Delivery:
  - Solutions & deliverability
  - Programme alignment
- Working together:
  - Stakeholder & customer engagement

Navigating our documents

To help you navigate around our final DWMP document suite and find where key DWMP content features, we have placed a Navigation index at the back of this document.



Executive Summary

Discharging untreated sewage into the environment is unacceptable to us at Thames Water, our customers and stakeholders. Following the publication of our draft Drainage and Wastewater Management Plan (DWMP) for consultation in June 2022, we received significant customer and stakeholder feedback relating to storm overflow discharges. At the same time, new industry regulatory guidelines and requirements were published, including Defra's Storm Overflows Discharge Reduction Plan (SODRP). As an organisation we are committed to stopping storm overflow discharges impacting on the environment. We have made a public commitment to accelerate delivery of the regulatory requirements, to move us closer to achieving our corporate ambition.

Storm overflow discharges act as a 'relief valve' and are a mechanism used across the water industry. While our infrastructure is designed to use storm overflow discharges, when necessary, we closely monitor the number and frequency of discharges, as we know our performance isn't where it needs to be. We have got a lot to do, and we have listened carefully to the customer and stakeholder feedback we received throughout the development of our DWMP. We have found that the feedback aligns with our priorities and has now been incorporated into our plan, along with the new regulatory requirements. This has resulted in some significant changes to our DWMP, and to better understand these changes we have produced this new technical appendix. This is in direct response to customer and stakeholder consultation feedback requesting more insight into our existing and planned storm overflow reduction work. A more detailed overview of our most recent stakeholder consultation feedback, and our responses to it, can be found in this document and our You Said, We Did technical appendix.[1]

We have outlined a summary of the main points that were made during this phase of our stakeholder consultation in Figure 0-1 below.

Figure 0-1 Main points from stakeholder feedback

[1] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-n-you-said-we-did.pdf

We have fundamentally increased the scale and pace of our storm overflow discharge reduction plan, which is an integral part of our DWMP and wider strategic and delivery programmes. We have set ambitious targets in our delivery programme to ensure our storm overflow discharges do no environmental harm. The most sensitive areas have been prioritised as our initial focus, so we can turn around our performance as quickly as we can.

Our storm overflow discharge reduction plan builds on the projects we currently have in progress. The plan has been designed to address the requirements to tackle storm discharge events and to protect the environment and our customers from their impact.

Our regulators have made recommendations and set important targets that we have incorporated into our storm overflow discharge reduction plan. They are outlined in this document. We have brought forward investment, committing to reduce the duration of discharges by 50% by 2030; and by 80% at sensitive sites. Additionally, we have committed to continuously monitor the delivery of these targets and make improvements to our plan as it progresses.

Figure 0-2 illustrates, at a high level, the main stakeholder and regulatory expectations regarding around our storm overflow discharge reduction plan to deliver no more than 10 storm overflow events, its' main components and their delivery timeframe.

Figure 0-2 Main stakeholder and regulator expectations on our SODRP

Our plan for reducing storm overflow discharges involves spending £10.9bn across 25 years, to ultimately prevent over 13,000 storm overflow discharges per average rainfall year, as can be seen in the table 0-1 below.

fDWMP	Unit	2025 - 2030	2030 - 2035	2035 – 2040	2040 - 2045	2045 - 2050	Total
Capex (20/21 Price base)	£m	682	2,254	3,494	2,982	1,485	10,897
Defra Storm Overflow Discharge Reduction Plan target	%	14	28	52	76	100	n/a
% Storm overflow locations resolved (Company)	%	20	51	89	99	100	n/a

Table 0-1 Planned spend to 2050 for the prevention of storm overflow discharges

We have aligned our DWMP 2025-2030 (AMP8) programme with our Water Industry National Environment Programme (WINEP) Storm overflow discharge reduction drivers as submitted to the Environment Agency in January 2023. This is subject to change as we work with the Environment Agency and Ofwat to refine the programme.

The increased pace of delivery required by our regulators has had an impact on the technology that we will be using to deliver our plan. Our project programmes will be delivering a combination of nature-based solutions and "end of pipeline" solutions such as expanding storm tanks and increasing hydraulic capacity of sewage treatment works. We will still have the opportunity to review these solutions as the plan develops and progresses, and consider the potential for using new technology, where possible, within the confines of the regulatory recommendations.

As we deliver our programme of works during 2025-2030 (AMP8) we will have more and new data and requirements to include. We will use this information to revise and refine our plan for the future.

We anticipate that partnership working with the communities we serve will make a big difference. The constructive feedback we received about our draft plan and the positive outcomes we have already achieved mean we will continue to deliver our projects to align with our core value of 'reach higher, be better'. We look forward to continuing to work with our all our stakeholders and keep refining our plan to make sure it serves their needs and achieves our corporate ambition of zero harm from storm overflows to the environment.

1 Introduction

1.1 Storm overflows act as a 'relief valve' in our sewerage system. Our network, pumping stations, and sewage treatment works are designed to operate up to a certain maximum capacity. Once the system is full, usually following heavy rain or snow melt, storm overflows prevent sewage from backing up and flooding into homes and businesses by discharging diluted and partially treated sewage into the environment. The resulting action from storm overflows are known as discharges. These discharges are also commonly referred to as 'spills'.

1.2 We want all our rivers to be wonderful, natural places, full of wildlife and able to provide peace and tranquillity in an increasingly hectic and uncertain world. Unfortunately, that is too often not what we see today.

1.3 Considering all the stretches of river in our area, only 6% of our region meets 'good' ecological status, as defined by the Environment Agency. As the single biggest contributor to poor river water quality in the Thames River basin, it is incumbent upon us to take a leading role in addressing the problems, and not just those for which we are directly responsible. Our regions also include chalk streams which are both incredibly rare and a hugely important part of our environmental heritage.

1.4 We have been working for several years with local action groups striving to protect key watercourses, via supporting applications for inland bathing water status. We continue to collaborate with local authorities and interest groups who are investigating new areas for bathing water status.

1.5 In our 2050 Vision we state for rivers that we will:

- Keep all untreated sewage out of our rivers
- Play a leading role in improving the region's water environments, helping our rivers become some of the healthiest in the UK

1.6 We regard any discharge of untreated sewage as unacceptable, even when it is legally permitted, and we are committed to tackling this problem. We have committed to achieving at least a 50% reduction in the total annual duration of untreated discharges by 2030, and within that an 80% reduction in sensitive catchments, against a 2020 baseline.

1.7 Our plan currently includes 749 storm overflow locations, and as of January 2023 we identified that 44% of them may fall into the definition of a high priority site. This aligns with our AMP8 Water Industry National Environment Programme (WINEP) Storm Overflows Reduction Plan which we submitted to the Environment Agency in January 2023. As we gain a better understanding of our storm overflows latest performance we will refine this programme, and update it in future cycles of the DWMP, and future iterations of the WINEP programme.

DWMP and Storm Overflow Discharge Reduction Plan (SODRP)

1.8 The storm overflows discharge reduction plan was published by Defra in August 2022.[2] It sets stringent new targets to protect people and the environment, requiring water companies to deliver the largest infrastructure programme in water company history.

1.9 The 4 key headline targets for Water Companies are shown in Figure 1-1.

1. Water companies will only be permitted to discharge from a storm overflow where they can demonstrate that there is no local adverse ecological impact.
    - The headline target must be achieved for at least 75% of storm overflows discharging in or close to high priority sites by 2035.
    - It must be achieved for 100% of storm overflows discharging in or close to high priority sites by 2045.
    - Water companies must achieve this target for all remaining storm overflows sites by 2050.
2. Water companies must significantly reduce harmful pathogens from storm overflows discharging into and near designated bathing waters.
3. Storm overflows will not be permitted to discharge above an average of 10 rainfall events per year by 2050.
4. Water companies will be required to ensure all storm overflows have screening controls.

Figure 1-1 Defra Storm Overflow Discharge Reduction Plan: four key headline targets for water companies

1.10 Table 1-1 below aligns the SODRP targets and how they have been incorporated into the development of our DWMP. We have used ≤10 discharges in a typical year as a proxy for assuming no ecological harm.

Discharge targets	Storm Overflows Discharge Reduction Plan	Final DWMP
No ecological harm	No ecological harm by 2050	≤10 discharges in a typical year by 2045
Discharges to sensitive waterbodies	No ecological harm by 2045	≤10 discharges in a typical year by 2035
Discharges to designated bathing waters	≤ 3 discharges by 2035	≤ 3 discharges in a typical year by 2030

[2] https://assets.publishing.service.gov.uk/government/uploads/system/upStorm Overflows Discharge Reduction Plan

Discharge targets	Storm Overflows Discharge Reduction Plan	Final DWMP
Storm overflow discharge frequency (all overflows)	≤10 discharges in a typical year by 2050	≤10 discharges in a typical year by 2045
Screening controls	All overflows to have screening control	100% coverage of screens by 2045

Table 1-1 Storm Overflow discharge reduction targets

1.11 Our storm overflow discharge reduction plan requires an ambitious scale of delivery; as the Thames River Basin has a significant proportion of high-priority sensitive sites to be resolved by 2035. This has resulted in a front-loaded programme and has meant that a large part of our DWMP investment in AMP8 and AMP9 is devoted to the reduction of discharges. In table 1-1 below we show the profile of improvement required by our regulators in the Defra Storm Overflow Discharge Reduction Plan:

Year	2030	2035	2040	2045	2050
% of high priority site storm overflows improved	20	51	89	99	100
% of total storm overflows improved	14	28	52	76	100

Table 1-2 Defra Storm overflow discharge reduction plan targets

1.12 Meeting the SODRP targets forms part of our DWMP and is part of the positive steps we are taking to increase the scale and pace of delivering our projects.

1.13 Our DWMP recognises that our sewerage system is experiencing increasing pressure from climate change and population growth. We are making positive steps to address the challenges we face by creating an ambitious, fast-tracked investment programme that will reduce the impact on the environment by delivering the projects needed at each site to significantly reduce the frequency of storm overflow discharges.

1.14 In order to reduce the number of storm overflow discharges that occur, our DWMP recognises we need to reduce the volume of flow that is coming into the system. We will do this by implementing sustainable, nature-based solutions or by upgrading our assets so that they can accommodate a higher volume. As part of our DWMP we are considering all possible solution options. More detail on our approach to solutions can be found in Appendix F – Options Development and Appraisal.[3]

DWMP and WINEP

1.15 The WINEP is a wide-ranging collection of actions to meet new and existing environmental legislation, including the Environment Act 2021.[4]

1.16 The WINEP is designed to enable companies to meet new legal obligations and regulatory expectations in relation to the environment. Actions required under the WINEP, as cascaded through from priorities and expectations in the Water Industry Strategic

[3] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-d-options-development-and-appraisal.pdf
[4] https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted

Environmental Requirements (WISER)[5], are designed to ensure compliance with UK environmental legislation, including any target delivery dates.

1.17 We have set ourselves an ambitious target to go above and beyond the minimum statutory requirements defined in the storm overflow driver guidance to meet the Environment Act milestones in AMP8. We have publicly committed to halving the duration of all our storm overflow spills from a 2020 baseline by 2030, with an 80% reduction in the most sensitive locations. Improvements include a range of actions, including increased treatment capacity at sewage works, providing storage for high flows, reducing flows entering the system and provision of treatment for storm overflows separate from the main treatment route.

1.18 We have ensured that our DWMP plans for storm overflows in AMP8 align to WINEP storm overflow plan as submitted to the Environment Agency in January 2023.

What have we done so far?

1.19 This recent government direction aligns with the work we have already delivered to reduce storm overflows to the environment. Reducing the use of storm overflows forms a key part of our "Speak up, Open up, Clean up" approach to improving River Health in our region, and through this work, especially from 2020 onwards, we have improved the health of approximately 113km of our rivers6.

1.20 In 2016, we invested £700m to build the 6.4km long Lee Tunnel to prevent storm sewage from being discharged into the Channelsea river in East London. The tunnel runs from Abbey Mills Pumping Station (near the Olympic Park) to Beckton sewage treatment works. We are pleased that since its completion we have not had a single discharge of storm sewage from Abbey Mills Pumping Station. This has resulted in reports of significantly improved river quality. A recent fish survey carried out by environmental consultancy Ricardo PLC and ourselves, to understand the existing ecology in the Channelsea River, found that the river is healthy and supports a wide variety of fish and other wildlife. In total, 714 fish from 12 different species were captured and measured, before being released back into the river.

1.21 In 2016 we also started construction on the Thames Tideway Tunnel, an ambitious £4.6bn project which aims to build a 25km long 'super-sewer' in central London to intercept storm sewage from existing overflow points and transport it to Beckton sewage treatment works to be treated. We are about to begin the testing and commissioning phase and expect that once the tunnel goes fully live in 2025, it will prevent 1700 storm overflow events per year.

1.22 Good data is key to understanding our impact on the environment, and between 2016-2020 we installed Event Duration Monitors (EDMs) at many of our storm overflow sites. We have been regularly reporting this data to the Environment Agency since 2018.

1.23 Between 2020-2025 we are delivering improvements via the AMP7 WINEP which will help us understand our performance better and reduce our storm overflow discharges. This

[5] https://www.gov.uk/government/publications/developing-the-environmental-resilience-and-flood-risk-actions-for-the-price-review-2024/water-industry-strategic-environmental-requirements-wiser-technical-document
[6] Thames Water River Health Plan

includes 61 projects that will increase the flow capacity of our STWs and increase the size of our storm tanks, and 498 schemes to scope out or install additional monitoring around our inlets and storm tanks.

1.24 We are committed to being fully open and transparent around storm overflow performance. A big milestone in achieving this journey was reached in January 2023 when we launched our near-real time alerts on our website, by overlaying our Event Duration Monitoring data onto a map of our area. The map can be found at this link: https://www.thameswater.co.uk/edm-map. We have also included the data in our DWMP Practitioners Portal for stakeholders to be able to view this data alongside our DWMP results.

1.25 More information about what we are doing to improve river health can be found on our website:https://www.thameswater.co.uk/about-us/performance/river-health.

2 What our stakeholders want

Stakeholder engagement response

2.1 It is fundamental to our plan to understand the issues that are important to our stakeholders in relation to storm overflow discharges. We had more than 130 comments in our responses that related to storm overflows, which gives us a clear indication of what we needed to incorporate into our plan. Working in partnership is important to us and will enable us to co-create a 25-year plan for drainage and wastewater that sustainably benefits communities and the natural environment in our region. Figure 2-1 below summarises the main themes that were common across the stakeholder engagement feedback.

Figure 2-1 Common themes across stakeholder engagement feedback

You Said, We Did

2.2 Our stakeholder engagement programme was an extensive exercise that consulted with all our stakeholder partners. We have considered all the feedback that was gathered following the publication of our draft DWMP and the requirements and recommendations from our regulators. We have summarised the feedback of our response in our Technical Appendix – You Said, We Did[7] and detailed in Table 2-1.

[7] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-n-you-said-we-did.pdf

Sub-Theme	You Said	We Did	Documentation updated
Amendment of targets a) storm overflows	You told us that a 2050 target of 10 spills per storm overflow per annum is not ambitious enough.	Since our dDWMP, storm overflow reduction requirements have become better defined. Defra's Storm Overflows Reduction Plan[3] and the Environment Act 2022 set out the statutory obligations on us and aim to ensure sites are given appropriate priority over the period to 2050. Specifically, this requires us to deliver improvements to sites discharging to sensitive watercourses by 2035, and a target of three spills per bathing season for sites discharging to designated bathing waters. Other receiving waters have a target of 'no ecological harm', or a maximum 10 spills per overflow per annum. Our fDWMP follows the principles of the dDWMP storm overflow performance targets and exceeds the minimum requirements of the Storm Overflows Reduction Plan by delivering the statutory obligations earlier. The sensitivity of our plan to more ambitious storm overflow targets, including no untreated discharge to watercourses and a target of zero spills, has also been considered. We have undertaken additional scenario testing within our programme appraisal activities to understand the impact of a plan which explores the priorities as agreed, and how implementing solutions earlier in the planning period, and delivering more challenging targets (e.g., flooding and resilience), impact on our plan. The targets have been reassessed as a result of the additional scenario testing, which has led to a change in the detail of the programme. This, and sensitive catchment prioritisation have been further described in a new Storm Overflows technical appendix.	The Plan Appendix E - Programme Appraisal Appendix G – Adaptive Pathways Storm Overflows - new technical appendix
	Our customers told us they did not universally support the reduction of storm overflows; their support reduced if the reduction would lead to an increase in cost or would be achieved at the expense of other investments. Customers told us that reducing flooding and protecting the river environment over the longer term, from day-to-day discharges from treatment works, ranked higher than reducing storm overflows. Customers wanted a balanced plan that makes progress across a number of areas like flooding, resilience, sewage treatment works upgrades and storm overflows. Customers did not support focusing our plans on one specific challenge, particularly if that was to the detriment of addressing other needs which have been identified in the course of developing the DWMP.		
	You said storm overflows which impact the most sensitive catchments and/or overflows that discharge the greatest	We have added a new technical appendix on storm overflows, that identifies sensitive storm overflow	The Plan

Sub-Theme	You Said	We Did	Documentation updated
	volumes and caused the most pollution, should be identified, prioritised and targeted early in the programme.	locations. It is important to note that phasing in 2025-2030 has more certainty than post 2030, due to better data (from EDMs) and future WINEP studies. We have also made changes in our fDWMP around our storm overflow targets. These changes include: Developing a constrained profile which shows milestones and prioritisation, to evidence the costs for storm overflow schemes. Developing a new scenario in programme appraisal to assess the benefits of investment in interventions that will provide better information, and reduce uncertainties in our plan; e.g., undertaking modelling and monitoring of surface water inflows, sewer overflows, etc.	Appendix E- Programme Appraisal Appendix D Options Development Appraisal (ODA) Storm Overflows - new technical appendix
	You told us that the dDWMP would be improved by including a constrained profile which shows milestones and prioritisation, to provide evidence on the cost for these storm overflow schemes	Please also see above response. Our DWMP scenarios reflect the storm overflow priorities set out in the WINEP. The evidence behind prioritisation is in the WINEP and is outlined in our Storm Overflows Technical Appendix. We are not reproducing the storm overflow only scenario with the changes required for WINEP, yet it will be clearly visible from the Appendix and the DWMP Data Tables (for costs).	Storm Overflows - new technical appendix
Regulator comment 2) Programme Alignment (to Water Industry National Environmental Programme (WINEP), PR24, etc)	Our regulators raised concerns that the dDWMP had insufficient and unconvincing evidence for Thames Water's PR24 investment cases. We were advised to reflect on regulator comments when finalising our DWMP so that plans can be used as an evidence base for PR24.	Our regulator highlighted that our ambitious goals will require significant changes to the way flood risk is managed and the mechanisms behind how projects are funded today. They would like to see a high-level road map for how to ensure future Price Reviews / AMP / WINEP cycles create the right funding environment to ensure the right projects receive funding and maximise opportunities for collaboration between partner organisations.	The Plan Appendix E Programme Appraisal

Sub-Theme	You Said	We Did	Documentation updated
	Our regulator said there was no sign of joined-up thinking with Thames Water's clean-water business in respect to the groundwater environment or WINEP investigations and catchment schemes.	Groundwater requirements are not specified in the framework. We have provided enhanced data on Groundwater through the dedicated technical appendix.	New technical appendix on Groundwater
Increase in data sharing	You said we should provide information on duration and volume of discharge available on as near to a real-time basis as possible, so that users of rivers can make informed decisions as their short-term usage of the rivers.	Changes we have made to our fDWMP in response to your comments on data sharing include: Where it is available and can be shared publicly, we have added additional data to our DWMP portal and to our practitioners' portal. We are continually striving to ensure our data is up to date, reflecting the latest status of our assets on the ground. Several datasets on our portal have been updated between the draft and fDWMP. We have also incorporated some of the suggestions we have received about data sharing into an updated Stakeholder Engagement Plan which we will put into practice in cycle 2. This includes consideration of how we can share real time information more widely and what GIS asset data we can share. Near real time data is available for storm overflows from January 2023 on our website.	The Plan Cycle 2

Table 2-1 Storm Overflows You Said We Did 2023

3 Our plan for storm overflows

3.1 In 2022 we reported a total of nearly 8,000 storm overflow discharge events, however that was in the context of a year of low rainfall. The Baseline Risk and Vulnerability (BRAVA) modelling demonstrates that the effect of climate change and population growth has the potential to increase storm overflow discharges to over 19,000 in an average rainfall year by 2050. We have a clear target outlined in the Defra Storm Overflows Reduction Plan to reduce overflows to no more than 10 events per year (average) per overflow by 2050, to meet this target we will need to address over 13,000 discharges.

Region Wide

3.2 We have increased proposed expenditure from the draft DWMP for 2025 to 2030 in the final plan. This was done to meet our regulatory targets and to comply with the Defra Storm Overflow Discharge Reduction Plan. We forecast expenditure of £10.9 billion between 2025 and 2050, as detailed in Table 3-1.

fDWMP	Unit	2025 - 2030	2030 - 2035	2035 – 2040	2040 - 2045	2045 - 2050	Total
Capex (20/21 Price base)	£m	682	2,254	3,494	2,982	1,485	10,897
%Total storm overflows improved (Defra Storm Overflow Discharge Reduction Plan target)	%	14	28	52	76	100	n/a
%Total storm overflows improved (Company)	%	20	51	89	99	100	n/a

Table 3-1 Storm Overflow Cost/Benefit profile/source

Meeting our targets

3.3 By working in collaboration with our regulators, our plan now achieves the headline targets as set out in the Defra Storm Overflow Discharge Reduction Plan. Supplementary guidance was issued by the Environment Agency as part of the WINEP which refined these targets, and we have included below how we will meet the requirements of both the WINEP and SODRP.

Water companies will only be permitted to discharge from a storm overflow where they can demonstrate that there is no local adverse ecological impact.

3.4 The SODRP's first headline target prioritises investment based on preventing environmental harm. High priority sites include:

- Sites of Special Scientific Interest (SSSIs)
- Special Areas of Conservation (SAC)
- Urban Wastewater Treatment Regulations sensitive areas
- Chalk streams, and
- Waters currently failing Defra ecological standards due to storm overflows[8]

[8] Defra Storm Overflow Discharge Reduction Plan

3.5 When identifying potential High Priority sites, we aligned with the WINEP Storm Overflow driver guidance issued by the Environment Agency, and used a combination of:

- GIS[9] analysis
- Information provided by the Environment Agency
- Event Duration Monitoring (EDM) data, and
    - The outcome of previous investigations performed under the Storm Overflows Assessment Framework (SOAF)

3.6 The SODRP defines 'no local adverse ecological impact' as achieving the Urban Pollution Management (UPM) Fundamental Intermittent Standards (FIS) or 99 percentile standards for ammonia and dissolved oxygen downstream of the discharge point.

3.7 When forecasting our improved performance, we have used less than 10 storm overflow discharge events per year as a proxy for assuming no adverse ecological impact.

3.8 Table 3-2 summarises the Environment Agency WINEP driver guidance criteria for assessing potential High Priority sites, and the impact on our plan. Note that some sites fall into multiple categories; and some may have been assessed but won't be included as High priority in the DWMP as they discharge less than 10 times per year.

Category type	Description	Impact on Plan
Reason for Not Achieving Good Status (RNAGS)	Where sewage intermittent discharges are identified by the Environment Agency as either confirmed or probable RNAGS	From the information provided by the Environment Agency, we have identified 50 sites that meet these criteria
Storm Overflow Assessment Framework (SOAF) Sites	Where sites have been identified to have an environmental impact following the SOAF investigations, as defined by the Environment Agency PR24 WINEP Driver Guidance definition of harm	37 storm overflow sites have been identified in the Stage 2 SOAF investigations as having an environmental impact
Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA) or Ramsar	Where the storm overflow discharges into or within 50m of an SSSI, SAC, SPA or Ramsar water feature, as defined by the Environment Agency PR24 WINEP Driver Guidance definition of harm	We have identified 28 sites that discharge into or within 50m
Eutrophic Sensitive Area	Where the storm overflow discharges into or within 50m of a Eutrophic Sensitive Area as defined by the	We have identified 81 sites that discharge into or within 50m

[9] GIS is Geographical Information Systems

Category type	Description	Impact on Plan
	Environment Agency PR24 WINEP Driver Guidance definition of harm	
Chalk Rivers	Where the storm overflow discharges into or within 50m of a chalk river	We have identified 141 sites that discharge into or within 50m
Shellfish Water	Where the storm overflow discharges into or less than 1km upstream of a designated shellfish water	There are no designated shellfish waters within the Thames Water region
Coastal Bathing Waters	Where the storm overflow discharges into or less than 1km upstream of a designated coastal bathing water	There are no designated coastal bathing waters within the Thames Water region
Inland Bathing Waters	Where the storm overflow discharges into or less than 5km upstream of a designated inland bathing water	We have identified 2 sites that discharge into or near inland bathing waters

Table 3-2 Different categories for assessing High Priority sites and impact on DWMP

3.9 As we gain a better understanding of our ecological impact via investigation and monitoring, we will refine our plan to ensure we fulfil the requirements to demonstrate there is no adverse impact.

Water companies must significantly reduce harmful pathogens from storm overflows discharging into and near designated bathing waters by 2035.

3.10 We have a number of designated bathing waters in our region, two of which we have identified as having our assets discharging into them. They are Port Meadow in Oxfordshire and Frensham Ponds in Surrey. As of January 2023, we have identified two storm overflow locations discharging into or near these bathing waters, one each for Port Meadow and Frensham Ponds. These need investment to reduce our storm overflow discharge events to less than three per overflow location per year. Both these will be addressed by 2035.

3.11 We are committed to working with our stakeholders to support applications for designated bathing water status at other locations in our region. In the future we will adjust our Storm Overflow Discharge Reduction Plan to ensure we take account of any storm overflows that discharge into new designated bathing waters.

Storm overflows will not be permitted to discharge above an average of 10 rainfall events per year by 2050.

3.12 In order to determine which storm overflows will need investment, we have used a combination of EDM data and the outputs from the DWMP BRAVA modelling of storm overflows. See our Baseline Risk and Vulnerability Assessment[10] technical appendix for more details. We identified 669 overflows either found to be discharging more than 10 times a year, or modelled to be discharging more than 10 times a year by 2050. This includes the sites that have been identified as potential High Priority sites. 80 overflows were modelled to not be discharging more than 10 times a year by 2050 and therefore do not require investment.

3.13 Figure 3-1 shows our DWMP plotted alongside the Storm Overflow Discharge Reduction Plan. The plan for AMP8 aligns with our January 2023 WINEP submission to the Environment Agency, and the figure shows that our proposed delivery profile delivers above the regulatory requirement.

Figure 3-1 Defra Storm Overflow Discharge Reduction Plan and our plan

Water companies will be required to ensure all storm overflows have screening controls.

3.14 Screening controls have an important part to play to reduce the amount of inorganic and solid material being discharged from a storm overflow.

3.15 Following the WINEP Storm overflow driver guidance issued by the Environment Agency, we have identified 346 storm overflow discharge locations that potentially require screening

[10] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-c-baseline-risk-and-vulnerability-assessment-and-problem-characterisation.pdf

controls. If we are unsure that our asset has a screen on it or not, we have assumed that one is required. We plan to deliver these by 2040.

Where we are investing

3.16 Figure 3-2 shows a map of our region with storm overflows and our target AMP for implementing a resolution for achieving the SODRP objective. To address the impacts of population growth and climate change, some sites will be addressed in the short term, and then revisited in the 25-year period, to ensure long term compliance with the SODRP targets.

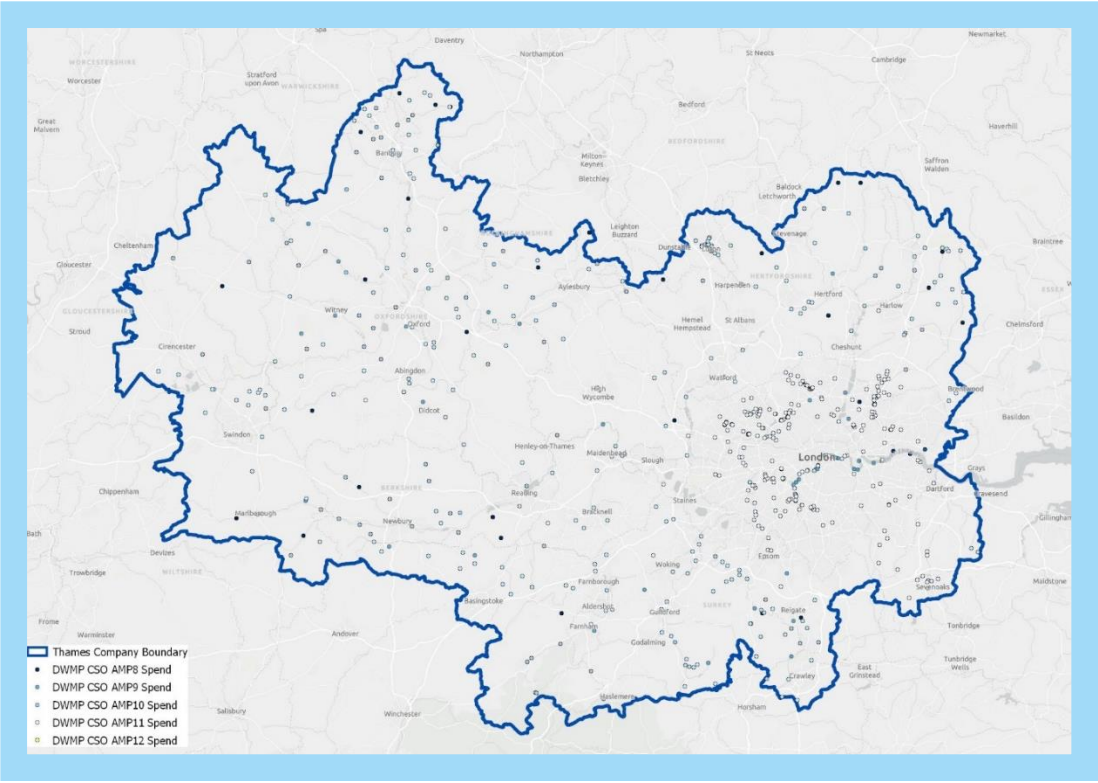


Figure 3-2 Map of Storm Overflows

How we are addressing storm overflow discharges

3.17 Aligning our plan with regulatory requirements has meant implementing an increased pace of delivery and investment. This also has an impact on the technology that we will be using to deliver our plan. Our project programmes will be delivering an increased number of 'end of pipeline' solutions such as expanding storm tanks and increasing hydraulic capacity of sewage treatment works. The benefit of this is that we will be implementing proven solutions which will enable us to meet the challenging targets set out in the WINEP guidance. We will still have the opportunity to review these solutions as the plan develops and progresses and look at the potential for using new technology where possible within the confines of the regulatory recommendations.

Our plan for London

3.18 London benefits from the legacy and foresight of the Victorian architects of the capitals' sewer system. Built to serve a population of four million, at a time when the capital was home to two and a half million people, it still forms the backbone of the system today. But

London's wastewater services now face 21st century challenges. We know that population growth and climate change could put pressure on our wastewater assets because of changes in sewer flows, water quality, ground conditions, the sensitivity of receiving water courses and the demand for sludge recycling.

3.19 Our plan for London needs to address some unique challenges over the long-term:

- Major population and economic growth in an already densely populated city with little or no room to expand existing assets
- Large and complex assets including three of the largest networks and treatment works in the UK
- Working around our industrial heritage sites such as Abbey Mills pumping station, the Grade II listed "Cathedral of Sewage" designed by Joseph Bazalgette as part of the original city sewer system
- Large highly centralised, interconnected, systems that will take a long time to improve and require complex strategic-scale solutions
- High expectations of our customers and stakeholders on river water quality and storm overflow performance
- There is a need for us to play our part in contributing to the improved wellbeing of London's communities and a responsibility to seek opportunities to create more green space in a heavily urbanised city
- Interaction with the Thames River Barrier and long-term proposals by the Environment Agency to protect the capital from rising sea levels

3.20 We are already taking innovation inspiration from our Victorian predecessors by constructing our £4.6bn Thames Tideway Tunnel and hope to continue seeking innovative approaches to solving storm overflow discharges.

3.21 Our plan for London has taken account of 337 storm overflows, 45% of the total across our region. By 2050, to bring overflow events down to ≤10 per overflow location, we expect to have prevented over 1,800 storm overflow events per typical year.

3.22 This will build upon the work that is already being delivered by the Thames Tideway Tunnel, which will prevent an additional 1,700 storm overflow events per typical year.

3.23 Our plans for Mogden and Riverside sewage treatment works are particularly ambitious, spread across multiple regulatory periods to effectively deliver the upgrades needed on works serving a combined population of 2.6 million people.

3.24 The SODRP targets require us to initially prioritise storm overflow investment outside of London in AMP8, due to the concentration of high priority sites in Thames Valley, however we have designed an ambitious delivery profile to ensure we can still confidently meet our targets in London, and we still expect to have resolved nearly 10% of London's storm overflows down to ≤10 storm overflow discharge events per average year by the end of 2030. This is in line with our AMP8 WINEP submission to the Environment Agency as of January 2023.

3.25 Currently the plan for London in AMP8 has been costed based on solutions initially targeting storm overflows in our network. Our network infrastructure in London is particularly

complex, involving multiple internal overflow points, and so we have grouped some CSOs together that are closely linked.

3.26 We have applied the learning from previous urban pollution monitoring (UPM) studies in London, in the Dollis, Pymmes, Wandle and Hogsmill catchments to understand how best to target solutions such as storage tanks in the network and increasing the capacity of network pipes.

3.27 We have identified that nearly 50% of the storm overflows in London AMP8 may require screening solutions to meet the SODRP requirements, so we have provisioned for these.

3.28 The profile of our plan for resolving storm overflows in London can be seen in Figure 3-3 and Table 3-3.

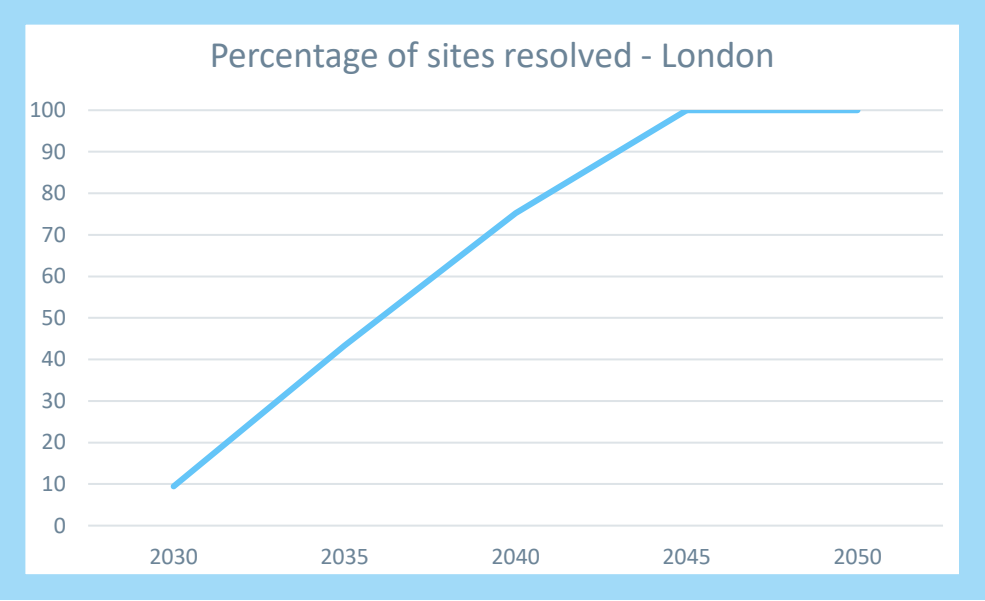


Figure 3-3 Profile of resolving storm overflows in London

fDWMP	Unit	2025 - 2030	2030 - 2035	2035 – 2040	2040 - 2045	2045 - 2050	Total
London Capex (20/21 Price base)	£m	110	1,876	3,032	2,318	1,485	8,819
% London Storm overflow locations resolved	%	10	43	75	100	100	n/a

Table 3-3 Investment in storm overflows in London

3.29 Storm overflows in London are spread out across five Level 3 catchments. More detail about what we are doing in these areas, including how we are working with local communities, can be found in our specific Catchment Strategic Plans, found on our website.[11]

[11] https://www.thameswater.co.uk/about-us/regulation/drainage-and-wastewater-management

Our plan for Thames Valley

3.30 Unlike London, the Thames Valley has a de-centralised asset base comprising over 350 catchments, the majority of which are small and dispersed. 80% of them serve less than 10,000 population equivalent and 200 of the smallest systems serving less than 1% of the total Thames Water population. Small does not mean of less importance. Watercourses and rivers are generally of high amenity value and treasured by communities, and stakeholders would like to see us reduce the ecological impact of storm overflows to preserve these diverse habitats. This area contains the most Areas of Outstanding Natural Beauty (AONB) and Sites of Special Scientific Interest (SSSI) in our region, including globally rare chalk stream habitats. Our drainage and wastewater service needs to protect this unique area and support the population growth ambitions of its communities.

3.31 The key challenges to overcome in Thames Valley over the long-term are:

- Groundwater infiltration, Chalk geology means a highly active water table with groundwater infiltration present in 20% of systems
- Climate change will increase discharges from storm overflows
- High expectations of our customers and stakeholders regarding river water quality and storm overflow performance, with a strong desire to improve the amenity and environmental benefits of our rivers
- Very high sensitivity rivers with global ecological importance
- Campaigns by community groups to establish more designated bathing waters, which will lead to an increased level of investment to reduce storm overflows in these areas

3.32 Our plan for the Thames Valley area has taken into account 412 storm overflows, 55% of the total across our region. To bring overflow events down to no more than 10 per overflow location, we expect to have prevented over 11,000 storm overflow events per typical year.

3.33 The rural/urban mix in this area aligns to balancing green and grey engineering solutions. We will work hard in future cycles to create innovative solutions which allow us to meet the targets of the SODRP via the WINEP.

3.34 Nearly 80% of the sites in our current plan for AMP8 in Thames Valley are at storm overflows on our sewage treatment works.

3.35 Solution selection has included a range of options including increasing treatment capacity at works and constructing additional storm storage. We also propose to stop the flow from entering our network entirely in certain areas using solutions such as sewer relining and installing sustainable drainage systems.

3.36 We have identified that 40% of the storm overflows in Thames Valley in AMP8 may require screens to meet the SODRP. We have made provision for this.

3.37 The profile of our plan for resolving storm overflows in Thames Valley and Home Counties can be seen in Figure 3-4 and Table 3-4.

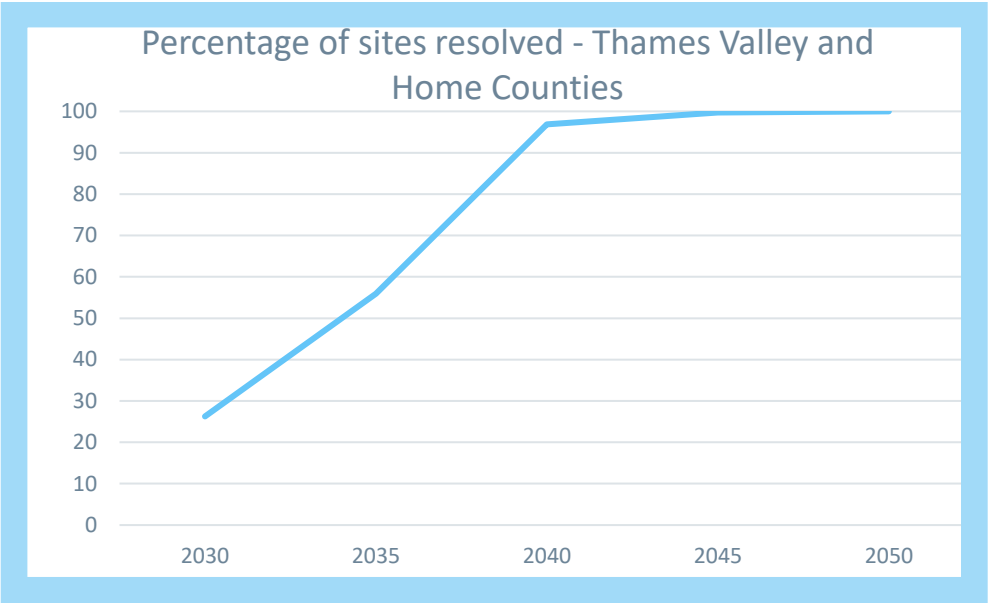


Figure 3-4 Profile of resolving storm overflows in the Thames Valley

fDWMP	Unit	2025 - 2030	2030 - 2035	2035 – 2040	2040 - 2045	2045 - 2050	Total
Thames Valley Capex (20/21 Price base)	£m	572	379	463	664	0	2,078
% Thames Valley Storm overflow locations resolved	%	26	56	97	100	100	n/a

Table 3-4 Investment in storm overflows in the Thames Valley

3.38 Storm overflows the Thames Valley are spread out across seven Level 2 catchments. More detail about what we are doing in these areas, including how we are working with local communities, can be found in our specific Catchment Strategic Plans, found on our website.[12]

[12] https://www.thameswater.co.uk/about-us/regulation/drainage-and-wastewater-management

4 Adaptive planning for storm overflows

4.1 We estimate £10.9bn investment is required to reduce the impact of storm overflows on the environment over the next 25 years. This section assesses whether this plan is future proofed. We have specifically considered what could result in a change in the scale, pace and type of solution and is the plan flexible enough to accommodate this change. This is known as adaptive planning.

4.2 Adaptive planning provides a framework for exploring how sensitive a plan may be and identifies where thresholds and trigger points for alternative adaptative pathways exist. This provides the basis for monitoring and review of the strategy and interventions, mitigating the risk that short-term decision making might reduce or jeopardise choices in the future.

4.3 We developed our adaptive planning methodology following Ofwat's guidance for Long Term Delivery Strategies (LTDS).[13] A detailed account of how we applied an adaptive planning framework for our DWMP, and the insights on the adaptability of our plan, are provided in our Adaptive Pathway Planning technical appendix.[14] Here we give an overview of the main findings focused on our storm overflow reduction plan.

Understanding the impact of different scenarios

4.4 Following Ofwat's framework, we tested our storm overflow plan against different scenarios driven by three drivers of uncertainty: climate change, growth and technology.

4.5 Our preferred plan tracks at a benign position for climate change; slightly adverse for population growth; and adverse for technology (slower than expected technological improvements). For more details refer to Section 4 of our Technical Appendix on Adaptive Planning.[14]

4.6 Figure 4-1 and Table 4-1 show the sensitivity of our storm overflows investment to different future scenarios.

4.7 Climate change has by far the most substantial impact on our programme. High climate change scenarios may lead to storms of a far greater intensity, with consequent need for our networks and treatment works to handle much higher flows of surface water. Leading to higher storm overflow discharge volumes and more discharge events. A high global emissions climate change scenario may require up to 29% more investment in the longer-term (up to 2050), compared to our preferred plan. This is a cost increase from £11.8bn to over £14bn.[15]

[13] PR24 and beyond: Final guidance on long-term deliver strategies https://www.ofwat.gov.uk/wp-content/uploads/2022/04/PR24-and-beyond-Final-guidance-on-long-term-delivery-strategies_Pr24.pdf
[14] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-g-adaptive-pathway-planning.pdf
[15] The LTDS guidance requires costs to be represented in Totex, which is Capex plus Opex.

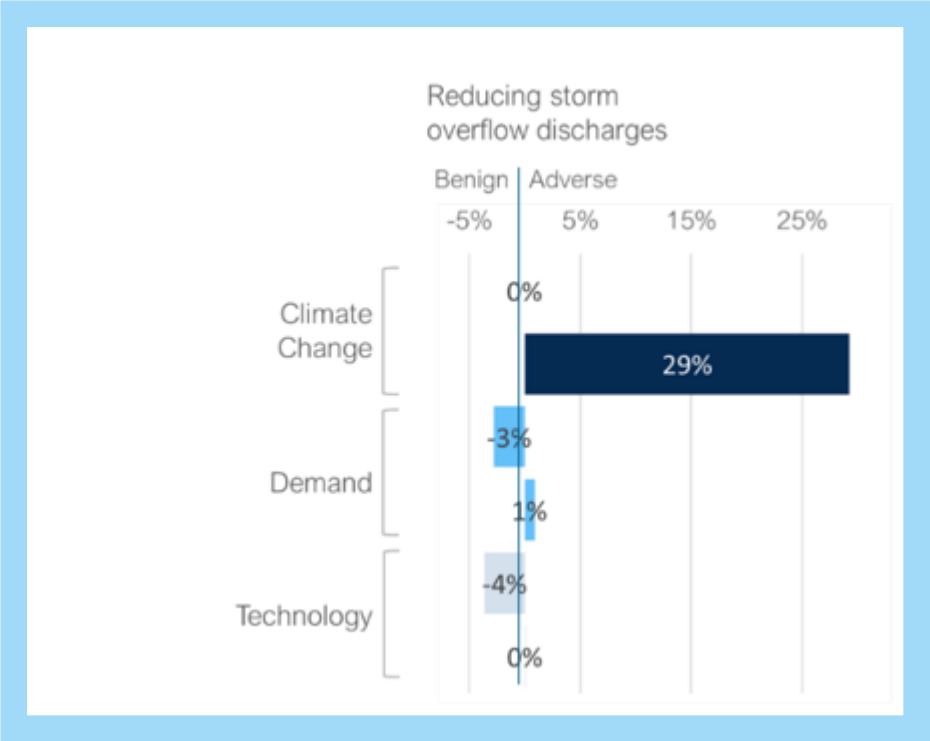


Figure 4-1 Comparing our preferred storm overflow plan to the scenarios we tested

	Key factors driving future uncertainty	Preferred plan (£bn)	Potential range of impact (£bn)	
			Low	High
Reducing storm overflow discharges	Climate change	11.8	11.4	14.8

Notes
1. Our adaptive plan pathways include both Capex and Opex costs. he preferred plan consists of £10.8bn Capex and £1bn Opex. 2. Adverse climate change driver of uncertainty: UKCP18 probabilistic projections, RCP8.5, 50th percentile probability level. 3. Benign climate change driver of uncertainty: UKCP18 probabilistic projections, RCP2.6, 50th percentile probability level

Table 4-1 Comparing our preferred storm overflow plan to the scenarios we tested

Comparing our preferred plan against a range of plausible futures

4.8 Following Ofwat's LTDS guidance we combined climate change, population growth and technology scenarios to generate plausible futures that drive different plans or pathways. We then compared our preferred plan to the subsequent "core" and "adverse" pathways. Figure 4-2 shows the result of this work. See our Adaptive Planning Pathway technical appendix[16] for further details how we did this and a full definition of tested scenarios.

[16] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-g-adaptive-pathway-planning.pdf

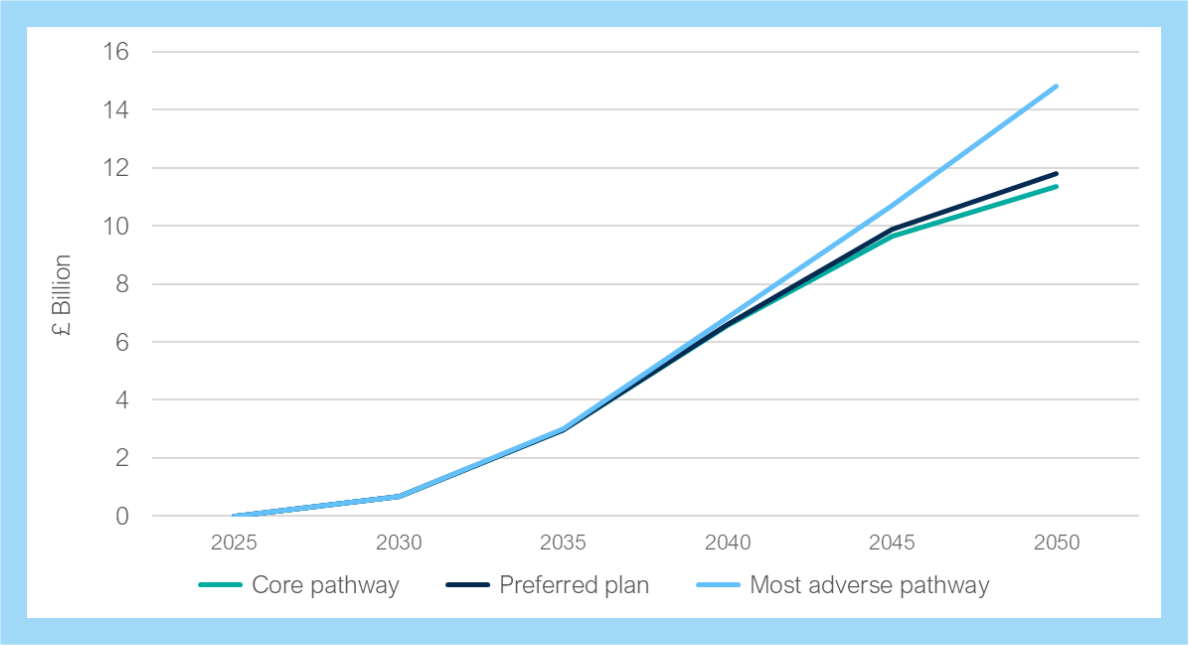


Figure 4-2 Preferred plan cumulative cost compared to the core and most adverse pathways (reducing storm overflow discharges)

4.9 In the medium term, different combined forecasts (climate change, population growth and technology) don't have a significant impact on driving different plans as uncertainty forecasts in both population growth and climate change track close to the preferred plan in the medium term. As a result, our preferred plan is aligned to a no- and low-regret (core) pathway up to 2040 in terms of overall investment.

4.10 Beyond 2040, divergent climate change forecasts drive different pathways. Our preferred storm overflow plan tracks a position between the core and adverse pathways, close to the core. The cost of our preferred plan is 4% greater than the core pathway cost, and over 29% less that the most adverse pathway cost. The positioning of the preferred plan closer to the core, enables us to more easily accelerate or de-accelerate the pace of the plan, retaining flexibility.

4.11 We considered the adaptability of our solutions used to achieve the storm overflow discharge reduction plan. Table 4-2 shows how we would need to adjust our plan under different pathways.

4.12 In ODA we selected a priority order for solution type to be implemented with surface water management being the preferred (and first) technology to be considered. We also maximized the use of surface water management. For this reason, we were unable to increase the amount of surface water management the preferred plan has already selected the perceived maximum. Furthermore, it would be the last technology chosen to be reduced as the grey engineering had a lower priority in the solution hierarchy. For further details on this solution preference refer to Section 9 of our Technical Appendix on ODA.[17]

4.13 As expected, we see most of the change in the long-term post 2035 when, in particular, divergent climate change forecasts will drive different amounts of activity. This impacts in

[17] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-d-options-development-and-appraisal.pdf

particular, on the volume of storage required at treatment works and the amount of grey engineering (network storage tanks) required.

Preferred solution type	Unit	Planning horizon	Preferred plan	Needed in all scenarios	Needed in most scenarios	Needed to keep future options open	Needed in the short term	Core pathway	Most adverse pathway
Reducing storm overflow discharges									
Surface Water Management	Hectares managed	2025-2030	80	Yes			Yes	80	80
		2030-2035	20	Yes				20	20
		2035-2040	360	Yes				360	360
		2040-2045	190	Yes				190	190
		2045-2050	470	Yes				470	470
Network Improvements (storage)	000's of m3	2025-2030	5	Yes			Yes	5	5
		2030-2035	1,448		Yes			1,445	1,451
		2035-2040	1,574		Yes			1,545	1,704
		2040-2045	1,391		Yes			1,332	1,578
		2045-2050	311		Yes			222	1,422
Network Improvements (new sewers)	Km	2035-2040	4	Yes				4	4
		2045-2050	10		Yes			7	46
Storage at STWs	000's of m3	2025-2030	22	Yes			Yes	22	22
		2030-2035	289		Yes			289	289
		2035-2040	481		Yes			473	518
		2040-2045	621		Yes			570	779
		2045-2050	15		Yes			11	70
Sewer Lining	Km	All	661	Yes			Yes	661	661
Total cost	**£bn**		**11.8**					**11.4**	**14.8**

Key

The scope (and cost) of solutions are the same or more than the preferred plan
The scope (and cost) of solutions are less than the preferred plan

Table 4-2 Comparing our preferred storm overflow plan solutions to the core and most adverse pathways

4.14 We have chosen not to adjust the sewer lining due to groundwater infiltration risk and the development of both our Infiltration reduction Plans (IRP's) and Groundwater Impacted Management System Plans.[18]

4.15 Because the solution types are small, dispersed or modular it is easier to adjust if our plans have to accelerate or de-accelerate in a changing world. If our plan was dominated by single point, long lead time, large infrastructure solution then this would not be possible.

Understanding if and when we need to change our plan

4.16 Knowing when we have to change pace is a key element of adaptive planning. We currently forecast trigger points towards because that is when current UK forecasts a change in the climate sufficient to require an adjustment in our planning response. These trigger points may need to change their timing as national climate change forecasting is updated.

[18] https://www.thameswater.co.uk/about-us/regulation/drainage-plans

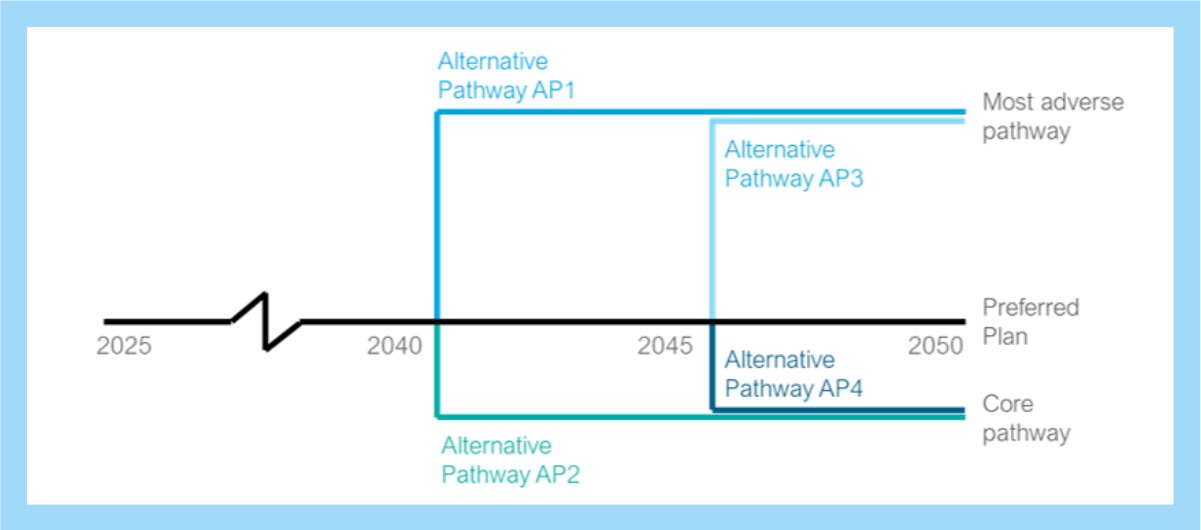


Figure 4-3 Alternative pathways diagram

4.17 Figure 4-3 is a schematic showing the overall framework in which our preferred plan may need to flex to accommodate different futures. We have devised alternative pathways to ensure that our ambition can be met across the range of plausible futures. Our ability to switch pathways is due to the nature of the solutions selected and means we avoid the risk of undertaking investments in the short to medium-term.

4.18 In summary, adaptive planning for our investment to reduce storm overflow discharges will largely be driven by climate change science and this may have most impact in the last decade of the planning period. In response, we may have to programme in more or less storage at treatment works and more grey engineering (storage tanks) in the network to accommodate the additional flow. Our increasing network of intelligent monitoring points such as EDMs will allow us to identify catchment wide trigger points for investment. The trigger points will relate to the reduction of system capacity relative to our performance objective target. For example, when the peak water levels exceed a risk-based threshold then an investment decision will be required.

4.19 For more details on adaptive planning refer to Technical Appendix G.[19]

[19] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-g-adaptive-pathway-planning.pdf

5 Next Steps

Aligning the programme with the PR24 WINEP

5.1 Our initial proposal for reducing storm overflows in AMP8 was submitted to the Environment Agency in January 2023. The EA are currently reviewing the proposal and we are in the process of responding to queries arising from the original submission.

5.2 We anticipate that the final programme for AMP8 will be different than the original proposal, although our strategic ambition remains and we expect that the scale of the programme will not change. We will realign the DWMP with our planned PR24 submission to Ofwat and as necessary, update the DWMP data tables in October 2023. It is important to note that at that stage the overall plan is still subject to agreement with Ofwat and may change again. Future cycles of the DWMP will always align with the latest relevant delivery plan.

Delivering the programme

5.3 The Environment Agency's WINEP guidance[20] requires water companies to investigate our storm overflow locations and determine the level of impact they are having on the environment. Investigations will follow the relevant technical guidance and will consist of data modelling, environmental assessments, and detailed solution scoping. The outputs will help us better understand the environmental impact of storm overflow discharges. This will enable us to refine our investment plans and better prioritise our sites so that we can build a more informed and robust plan. This will likely result in a change to our storm overflow discharge reduction programme as we can improve the profiling of delivery and the types of solutions according to the results of our investigations.

5.4 Under the Environment Act 2021[21] Section 82 we are also required to continuously monitor the water quality of the receiving water upstream and downstream of assets. Defra have consulted on technical guidance relating to this. The consultation closed on 23 May 2023. Further information can be found in the Defra document 'Continuous water quality monitoring programme: Provisional technical guidance for sewerage undertakers on implementing s.82 of the Environment Act 2021'.[22] Along with the Event Duration Monitoring data this will give us better information about the performance of our assets and the impact on the environment, meaning we can better target improvement efforts. All this work will allow for an improved delivery schedule that will be reflected in future DWMP cycles.

[20] PR24 WINEP driver guidance – Storm overflow reductions Version 0.3.
[21] https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted)
[22] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1149923/CWQM_programme_provisional_technical_guidance_for_sewerage_undertakers_April_2023.1.pdf#:~:text=The%20act%20requires%20sewerage%20undertakers%20to%20monitor%20for,and%20can%20be%20every%20hour%20at%20other%20times.

6 Conclusion

6.1 Protecting the health of our rivers is important to our customers and stakeholders, and we must take a leading role by reducing our environmental impact. Addressing storm overflows impact on the environment is a key part of our "Speak up, Open up, Clean up" approach to river health. Our DWMP has developed a £10.9bn plan over the next 25 years on storm overflows. We forecast this scale of investment is required to meet our ambitious goals for 2050. This plan is subject to change particularly as we finalise the AMP8 plan with regulators and also due to evolving climate change science and resulting forecast updates.

Glossary

Term	Description
1 in 30-year storm	A storm that has a 1 in 30 chance (3.33% probability) of being equalled or exceeded in any given year. This does not mean that a 30-year flood will happen regularly every 30 years, or only once in 30 years.
1 in 50-year storm	A storm that has a 1 in 50 chance (2% probability) of being equalled or exceeded in any given year. This does not mean that a 50-year flood will happen regularly every 50 years, or only once in 50 years.
Asset Management Plan (AMP)	A five-year planning cycle used by English and Welsh water industry regulators to set allowable price increases for privately owned water companies and for the assessment of performance indicators such as water quality and customer service.
Baseline Risk And Vulnerability Assessment (BRAVA)	Following Risk Based Catchment Screening (RBCS), more detailed risk assessments on those catchments where we believed there was an adverse risk to performance over time. We modelled their performance to 2020 (baseline), 2030, 2035 and 2050.
Business Plan	Business Plans are produced by water companies every 5 years. They set out their investment programme to ensure delivery of water and wastewater services to customers. These plans are drawn up through consultation with the regulators, stakeholders and customers and submitted to Ofwat for detailed scrutiny and review.
Catchment Strategic Plans (CSPs)	Summary reports to promote system thinking across large wastewater catchments. These provide early sight of our final plans enabling co-authoring opportunities for our stakeholders. Each document outlines the challenges that the catchment will face in the future and the long-term plans to address these issues.
Combined sewer	A sewer designed to receive both wastewater and surface water from domestic and industrial sources to a treatment works in a single pipe.
Customer Challenge Group (CCG)	An independent body that challenges both our current performance and our engagement with customers on building our future plans.
Cycle 1 and Cycle 2 DWMP	Our current DWMP is referred to as Cycle 1, it covers a planning period of 2025-2050. Our next plan will be published in five years' time and is referred to as our Cycle 2 DWMP, it will cover a planning period of 2030-2055.
Department for Environment, Food and Rural Affairs (Defra)	UK government department responsible for safeguarding the natural environment, food and farming industry, and the rural economy.
Drainage and Wastewater Management Plan (DWMP)	A Drainage and Wastewater Management Plan (DWMP) is '*a long-term strategic plan that sets out how wastewater systems, and the drainage networks that impact them, are to be extended, improved and maintained to ensure they are robust and resilient to future pressures*'. The planning period is 25 years, from 2025 to 2050. DWMP is iterated every five years; the first known as 'Cycle 1', published as a final plan in May 2023.
dDWMP	The draft version of the Drainage and Wastewater Management Plan, published in June 2022.
fDWMP	The final version of the Drainage and Wastewater Management Plan, to be published in May 2023.
Dry Weather Flow (DWF)	Dry Weather Flow is the average daily flow to a Sewage Treatment Works (STW) during a period without rain.

Environment Agency (EA)	UK government agency whose principal aim is to protect and enhance the environment in England and Wales.
EA Pollution Categories 1 to 3	Category 1 incidents have a serious, extensive or persistent impact on the environment, people or property. Category 2 incidents have a lesser, yet significant, impact. Category 3 incidents have a minor or minimal impact on the environment, people or property with only a limited or localised effect on water quality. Further Ofwat guidance available here: WatCoPerfEPAmethodology v3-Nov-2017-Final.pdf (ofwat.gov.uk)
Event Duration Monitoring (EDM)	Event duration monitoring (EDM) measures the frequency and duration of storm discharges to the environment from storm overflows.
External hydraulic sewer flooding	External flooding occurs within the curtilage of a property due to hydraulic sewer overload. Further Ofwat guidance available here: Reporting-guidance-sewer-flooding.pdf (ofwat.gov.uk)
Foul sewer	A foul sewer is designed to carry domestic or commercial wastewater to a sewage works for treatment. Typically, it takes wastewater from sources including toilets, baths, showers, kitchen sinks, washing machines and dishwashers from residential and commercial premises.
Grey infrastructure	New sewers, sewer upsizing and attenuation storage to provide additional capacity in the wastewater networks. Also covers new pumping stations, rising mains and/or civil structures at STWs.
Green infrastructure	Sustainable surface water management solutions, including sustainable drainage systems (SuDS), that are designed to mimic naturally draining surfaces. Typically applied to surface water or combined sewerage systems, but can also be applied to land, highway or other forms of surface drainage.
Historic England (HE)	A non-departmental public body of the government whose aim is to protect the historical environment of England by preserving and listing historic buildings, ancient monuments.
Hydraulic overload	Hydraulic overload occurs when a sewer or sewerage system is unable to cope with the receiving flow.
Internal hydraulic sewer flooding	Flooding which enters a building or passes below a suspended floor caused by flow from a sewer. Further Ofwat guidance available here: Reporting-guidance-sewer-flooding.pdf (ofwat.gov.uk)
L2 Area (Strategic Planning Area)	An aggregation of level 3 catchments (tactical planning units) into larger level 2 strategic planning areas. The level 2 strategic planning areas allow us to describe strategic drivers for change (relevant at the level 2 strategic planning area scale) as well as facilitating a more strategic level of planning above the detailed catchment assessments.
L3 Catchment (Tactical Planning Unit)	Geographical area in which a wastewater network drains to a single STW. Stakeholders may be specifically associated with this area. Includes for surface water sewerage that may exist which serves the wastewater geographical area but drains to a water course.
Lead Local Flood Authorities (LLFAs)	LLFAs are Risk Management Authorities as defined by the Flood and Water Management Act 2010. They have statutory duties with respect to flood risk management, investigating flooding and the compilation of surface water management plans.

Long-Term Delivery Strategy (LTDS)	A requirement by Ofwat on water companies, to ensure that short term expenditure meets long term objectives for customers, communities, and the environment. These will be submitted as part of the Price Review.
Misconnections	Misconnections are where either surface water drainage or foul water is connected to the wrong system e.g., surface water to foul only or foul to surface water systems.
Natural capital accounting	The process of calculating the total stocks and flows of natural resources in a given system, either in terms of monetary value or in physical terms.
Natural England (NE)	A non-departmental public body sponsored by the Department for Environment, Food and Rural Affairs to protect the natural environment in England, helping to protect England's nature and landscapes.
Non-governmental organisation (NGO)	An organisation that operates independently of any government, typically one whose purpose is to address a social or political issue.
Options Development and Appraisal (ODA)	A method to focus the level of planning effort, i.e., proportionate to the risks identified, with a view to providing a measure of consistency across the industry.
Ofwat	The regulatory body responsible for economic regulation of the privatised water and wastewater industry in England and Wales.
PR24	Every five years, water companies set out their plans for what they'll deliver and how much they'll charge customers[23]. Their plans over the next five years should include how they will: • Provide a safe and clean water supply • Provide efficient sewerage pumping and treatment services • Control leaks • Install meters • Maintain pipes and sewers • Maintain and improve environmental standards This process is known as the price review, and the next one will be in 2024, when Ofwat will make its final decisions. We call this PR24.
Risk-Based Catchments Screening (RBCS)	A first-pass screening exercise of catchment vulnerability against 17 different risk indicators. To understand which catchments are low risk catchments and those that are likely to be at risk in the future if not supported by our long-term plan.
Risk Management Authorities (RMAs)	Authorities responsible for Flood Risk as defined in the Flood and Water Management At 2010. These include, Lead Local Flood Authorities, Highway Authorities, Local Planning Authorities, Natural England and the Environment Agency.
Sewage Treatment Works (STW)	A sewage treatment works receives and treats wastewater to a standard legally agreed with the Environment Agency, before it is released back into the environment.
Specific, Measurable, Achievable, Relevant, and Time-Bound (SMART)	A framework for setting effective targets.
Storm overflow discharges	Storm overflows are used to manage excess flows, which typically occur as a result of heavy rainfall. Excess flow that may otherwise have caused flooding is released through a designated outfall to a water course, land area or alternative drainage system.

[23] https://www.ccwater.org.uk/priorities/price-review/

Strategic Environmental Assessment (SEA)	A systematic decision support process to ensure that environmental and other sustainability aspects are considered effectively in policy, plan and programme making.
Surface water sewer	A surface water sewer collects rainwater from domestic and commercial roofs, driveways, patios etc to a local watercourse or suitable surface water drainage system.
Sustainable Drainage systems (SuDS)	Drainage solutions that provide an alternative to the direct channelling of surface water through networks of pipes and sewers to nearby watercourses. SuDS aim to reduce surface water flooding, improve water quality, and enhance the amenity and biodiversity value of the environment. SuDS achieve this by lowering flow rates, increasing water storage capacity and reducing the transport of pollution to the water environment.
Thames Regional Flood and Coastal Committee (TRFCC) area	The TRFCC area was established by the Environment Agency under the Flood and Water Management Act 2010 that brings together members representing the Constituent Authority. Featured TRFCCs are listed here on our DWMP portal: Drainage and Wastewater Management Plan (arcgis.com)
Water Industry National Environmental Programme (WINEP)	The framework under which Defra and the EA require environmental improvements to be delivered by water companies. Guidance is released by regulators, which water companies interpret for their geographical area, and resubmit the outputs back to regulators for endorsement.

Navigating our DWMP

We have developed a comprehensive document suite to share our final DWMP. This includes five summary documents that contain increasing levels of detail. To help you to navigate around our document suite and to find key DWMP content, we provide a Navigation index below and on our DWMP webpage. The orange cells refer to where key DWMP content can be found across our final document suite.

Navigation index		Protecting the environment and providing a reliable, sustainable wastewater service							Best value and delivery					Working together		DWMP stages and data				
		Storm overflows	Sewer flooding	Level of ambition & pace of delivery	Growth & climate change	Resilience: flooding & power	Groundwater	Environmental assessments	Affordability & bill impact	Best Value	Base vs Enhancement	Solutions & deliverability	Programme alignment	Partnership working	Stakeholder & customer engagement	DWMP stages & process	Level 2 regional summaries	Level 3 regional summaries	Data tables	Risk & Assurance
Summary documents	Customer summary	■	■											■	■	■				
	Non-technical summary	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	Technical summary	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	The Plan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	Catchment Strategic Plans x13	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■		
Technical appendices x11	Appendix A - Strategic context												■			■				
	Appendix B - Risk-Based catchment screening															■				
	Appendix C - Baseline risk and Vulnerability assessment				■	■										■				
	Appendix D - Options development and appraisal	■										■				■				
	Appendix E - Programme appraisal	■		■		■			■	■	■	■	■			■				
	Appendix F - Stakeholder engagement														■	■				
	Appendix G - Adaptive pathway planning	■	■		■															
	Appendix H – Customer engagement Part A – Draft DWMP														■	■				
	Appendix I - Risk and uncertainty											■								■
	Appendix J - DWMP and WRMP alignment												■							
	Appendix M - Assurance																			■
New technical appendices x9	Appendix N - You Said, We Did (YSWD)	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
	Appendix O - What base buys										■									
	Appendix P - Response to July 2021 Floods		■	■	■	■			■			■	■	■	■					
	Appendix Q - Storm overflows	■		■	■				■			■	■							
	Appendix R - Delivery of SuDS and nature-based solutions	■	■	■	■	■			■	■		■	■	■	■					
	Appendix S - Partnership opportunities and working			■								■		■	■					
	Appendix T - Groundwater quality						■													
	Appendix U - Resilience		■		■	■							■	■	■					
	Appendix V – Customer engagement Part B – Consultation Survey Report														■					
Environmental assessments	Appendix K - Strategic environmental assessment (SEA)							■												
	Appendix L - Habitats regulations assessment (HRA)							■												
Portals and data	Customer portal	■	■							■		■		■	■	■	■	■		
	Practitioner portal	■	■											■	■		■	■		
	Data tables			■							■								■	
	Data tables commentary																		■	

We welcome your views on our DWMP. Please share them with us by emailing: DWMP@thameswater.co.uk.

This document reflects our DWMP 2025-2050 as published in May 2023.