

# Catchment Strategic Plan

Part of our Drainage and Wastewater Management Plan (DWMP)

Co-creating resilient wastewater catchments

A long-term Strategic Plan for the **Deephams** System



# Contents

Preface	3
Catchment strategic plan glossary	6
Introduction	7
Our co-creators	9
Partners' policies	10
Issues today	12
Our predictions for the future	13
Sustainable solutions	14
Partnership working – case studies	15
Our shared plan	16
Developing our preferred plan for Deephams	17
Our preferred plan for Deephams	18
Our preferred 25 year plan for Deephams	19
Next steps	20
Our shared plan at catchment level	21
Risk zone summary table	23
Navigation index	24
Work with us	25

# Foreword



Thames Water has been making considerable progress to bring to fruition their drainage and wastewater management plan (DWMP). The DWMP vision is to co-create a 25-year plan

for drainage and wastewater that benefits communities and the natural environment in London and the Thames Valley. We can all agree that planning to adapt to the growing critical pressures facing the water industry, such as climate change, a growing population and urbanisation, is of paramount importance and it has been very good to see that these challenges have been faced head on in the development of this plan.

Thames Water's commitment to achieve the DWMP vision through a collaborative process is one of the most important and admirable themes of this plan. Working alongside stakeholders and customers, including the Thames Regional Flood and Coastal Committee, ensures that the plan is reflective of our combined views and optimises overall efficacy and acceptability.

I have thoroughly enjoyed being part of this process and have been impressed by the extent of engagement that Thames Water has managed to undertake despite the challenging conditions of the coronavirus pandemic. As a result, I believe that the DWMP offers a significant step forward in planning for drainage and wastewater in our region.

Of course, the real changes will only happen once the plan is implemented on the ground, but the joined-up work and co-creation of the DWMP plan so far promises significant improvements for customers, communities and the natural environment across London and the Thames Valley. Continued focus on maintaining a tight relationship with all stakeholders is essential in moving forward to ensure Thames Water reaches their ambitious goals.

**Professor Robert Van de Noort**  
Chair, Thames Regional Flood  
and Coastal Committee



# Preface

## Our DWMP progress and enhancements since our draft plan

We're proud of our first DWMP, and encouraged by the level of positive feedback we've received. By engaging and working collaboratively with around 2,000 of our customers and stakeholders, we've been able to deepen our shared understanding as well as develop new ways to approach drainage and wastewater management across our region.

We'd like to say a big thank you to everyone who got involved and collaborated with us in the development of our shared plan. We're really happy it's having a positive impact already, and encouraged by the shared benefits we can deliver in the future as we continue to move forward together.

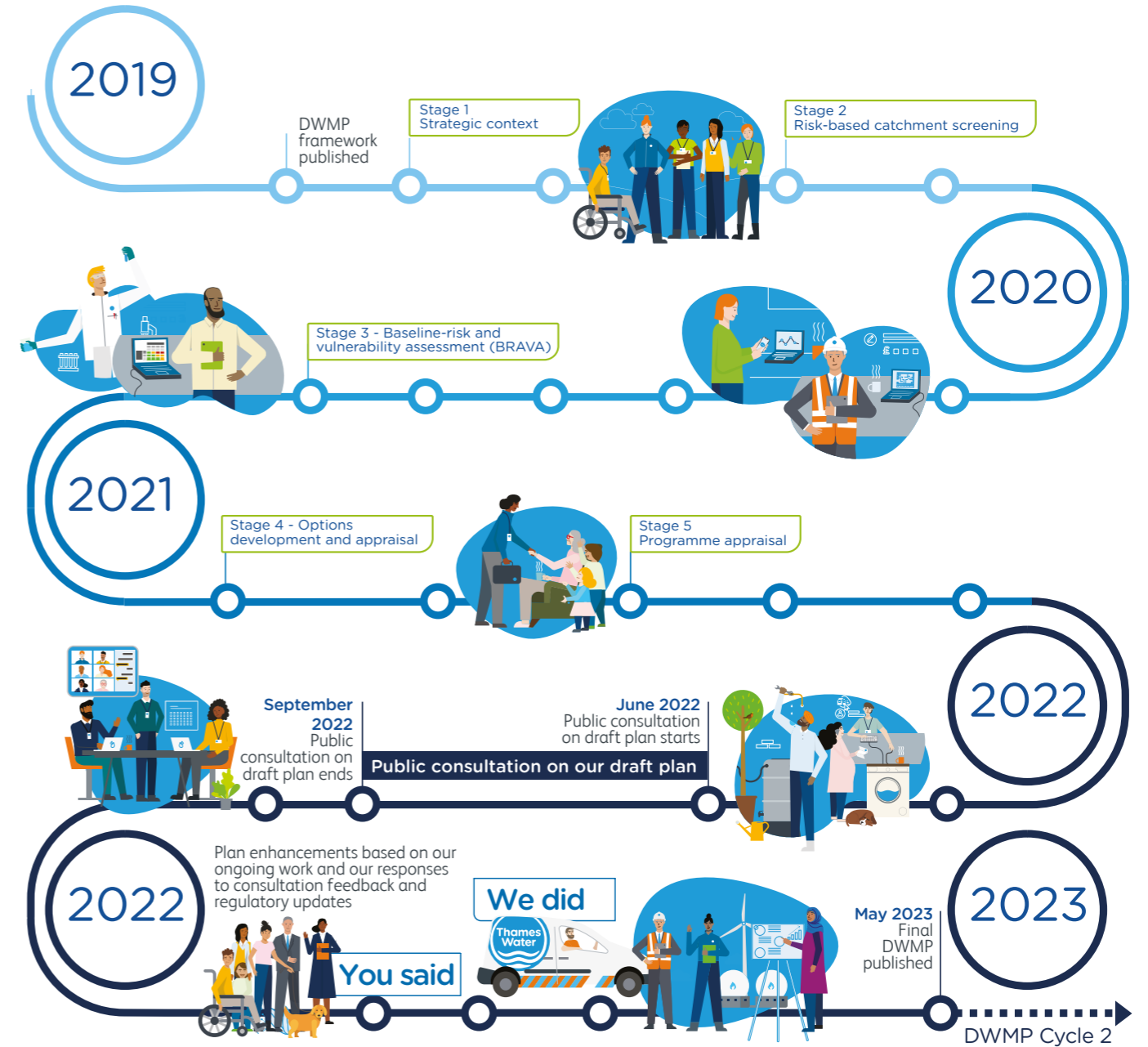
Our plan aligns with wider industry strategic plans and delivery programmes, such as the Water Industry National Environment Programme (WINEP) and the Long-Term Delivery Strategy (LTDS), and we'll make sure it continues to do so as we tackle current pressures and future challenges.

Over the past four years, we've developed, tested and enhanced our DWMP by engaging with customers and stakeholders and working with their valuable input and feedback to create a final plan we can all support. It's been almost a year since we first published our draft DWMP, and we've made some great progress since then. As customer and stakeholder requirements have evolved over time, our plan has evolved too.

We've enhanced our adaptive planning to increase the resilience of our final DWMP. We've also been testing its sensitivity against a range of alternative plans, risks and uncertainties to make sure our final plan is flexible to different potential futures. This approach will help us to make more proactive, adaptable and informed choices over time. It will also make sure that our interventions are set up for the future and can add the best value while providing ongoing opportunities for us to develop innovative solutions and ways of working.

The rest of this document summarises our final plan for this specific Catchment Strategic Plan (CSP) area, including the progress we've made from draft to final. We look forward to building on this progress and our collaborative approach as we implement our shared plan and evolve into DWMP Cycle 2.

### DWMP Cycle 1



# Preface

## What you told us about the draft DWMP for our region

We published our draft DWMP for public consultation in June 2022, and asked our customers and stakeholders for their feedback on it. We received around 1,400 responses from a wide range of local, regional and national stakeholder groups, including responses from every CSP area across our region.

We received lots of positive comments on the quality and ambition of our draft plan as well as useful ideas for making our final DWMP even stronger.

The consultation feedback had six main themes, as outlined below. We've listened carefully and responded wherever possible within our final plan\*.

This valuable feedback has further enhanced our DWMP and will help our customers, communities and the natural environment in our region to thrive now and in the future.

### You said

#### You supported

- Our preferred plan with the majority of our customers and stakeholders agreeing with this choice
- Our proposed solution types from nature-based solutions to using the latest technologies to increase capacity in our sewer system
- Our partnership-working approach with our 200+ local authorities, organisations, action groups, catchment partnerships and national stakeholders

#### You challenged

- Our targets – you wanted amendments or some new ones to be added
- Our programme – you wanted quicker delivery in certain areas and were concerned about such an ambitious SuDS plan
- The cost – you were worried about the impact on customer bills

#### You offered ideas for

- New or amended solutions that we could consider including in our preferred plan
- Maximising the benefits of our preferred plan's positive outcomes
- Enhancements to our stakeholder engagement approach and ongoing activities

#### You wanted more details on

- The resilience of our assets to flooding and power outage
- How our plan will be funded - by business-as-usual activities (base funding) or enhancement funds
- Adaptive planning scenarios to evidence how our plan could adapt to future influencing factors such as climate change

#### Feedback themes



#### Protecting the environment

Level of ambition and pace of delivery



#### Evidencing best value

Affordability and bill impact



#### Delivering the plan

Solutions and deliverability of the plan



#### Enhancing the plan

Technical clarifications and ease of navigation



#### Working together

Collaboration to achieve multiple benefits



#### Valuing your input

Stakeholder engagement

### We did

We've used as much of your feedback as we could, together with the progress from our ongoing DWMP work and our responses to regulatory updates, to enhance our final plan including in the following ways:



**More** ambitious storm overflow target delivery to help protect the environment



**Increased** evidencing around best value and justification for our preferred plan



**Increased** alignment of DWMP to other strategies and delivery plans



**Increased** number of proposed solutions



**Rewritten** and restructured parts of the documents to be clearer and more accessible



**More** detailed content throughout, especially on strengthening partnership working and stakeholder engagement



**Additional** future scenario testing



**Increased** balancing of risk, ambition and deliverability



**Earlier** planned implementations



**New** dedicated technical appendices

\* Some 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.



This document focuses on the progress and updates we've made in our final DWMP for this specific CSP area.



Find out more about how we've addressed the wider consultation feedback in our [You said, We did](#) Technical appendix.

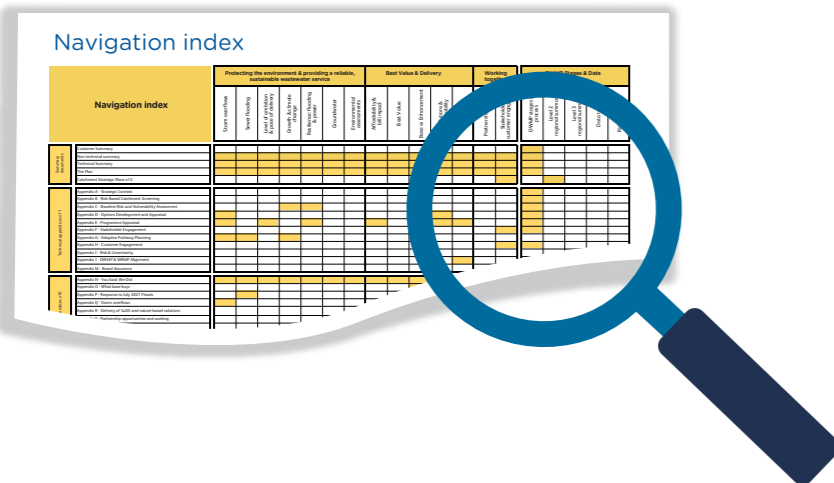
# Preface

## Navigating the final DWMP for our region

We've enhanced our final DWMP since we published it as a draft for public consultation in June 2022, and we want to make it easy for you to see what's changed.

You can spot all the places we've updated our draft plan with our 'progress signposts', which we've used across all our final DWMP documents. Here's where they'll be:

- Preface summaries - We've put a summary table in each document's preface, excluding Summary documents and the Catchment Strategic Plans (CSPs)
- Relevant chapters - We've placed the appropriate signposts next to each relevant chapter, including Summary documents and the CSPs

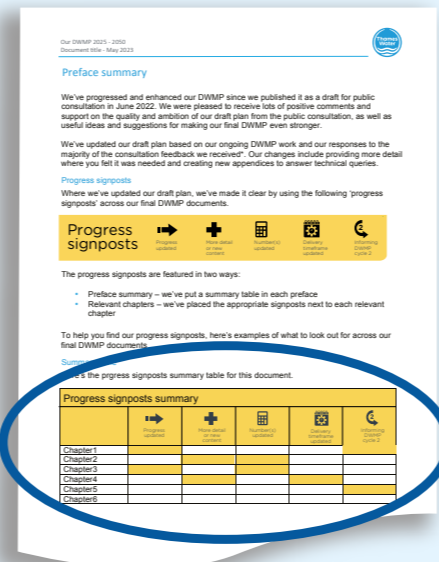


**Progress signposts**

- Progress updated
- More detail or new content
- Number(s) updated
- Delivery timeframe updated
- Informing DWMP cycle 2

To help you find our progress signposts, across our final DWMP documents, here are examples of what to look out for:

### Preface summaries



### Relevant chapters



If you need help navigating our final DWMP and locating key content, you can find a Navigation index at the back of this document.

# Catchment strategic plan glossary

Term	Definition
<b>1 in 30-year storm</b>	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.
<b>1 in 50-year storm</b>	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.
<b>Baseline Risk And Vulnerability Assessment (BRAVA)</b>	Following Risk Based Catchment Screening (RBCS) detailed risk assessments on those catchments where we believed there was an adverse risk to performance over time, we modelled their performance for future epochs (2020, 2035 and 2050).
<b>Combined Sewer</b>	A combined sewer is a sewer designed to carry both wastewater and surface water from domestic and/or industrial sources to a treatment works in a single pipe.
<b>Dry Weather Flow (DWF)</b>	Dry Weather Flow (DWF) is the average daily flow to a Sewage Treatment Works (STW) during a period without rain.
<b>EA Pollution Categories 1 to 3</b>	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 guidance available <a href="#">here</a> .
<b>Event Duration Monitoring (EDM)</b>	Event Duration Monitoring measures the frequency and duration of storm discharges to the environment from storm overflows.
<b>Foul Sewer</b>	A foul sewer is designed to carry domestic or commercial wastewater to a sewage works for treatment. Typically, it takes from sources including toilets, baths, showers, kitchen sinks, washing machines and dishwashers from residential and commercial premises.
<b>Hydraulic Overload</b>	When a sewer or system is unable to cope with a high flow.
<b>L2 Area (Strategic Planning Area)</b>	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.

Term	Definition
<b>L3 Catchment (Tactical Planning Unit)</b>	Geographical area in which a wastewater network drains to a single sewage treatment works. 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 watercourse.
<b>Lead Local Flood Authorities (LLFAs)</b>	LLFAs are Risk Management Authorities as defined by the Flood and Water Management Act. They have statutory duties with respect to flood risk management, investigating flooding and the compilation of surface water management plans.
<b>Risk Based Catchment Screening (RBCS)</b>	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.
<b>Sewage Treatment Works (STW)</b>	A Sewage Treatment Works is a site where wastewater is received and treated to a standard legally agreed with the Environment Agency before it is released back into the environment.
<b>Storm Overflow Discharges</b>	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 waterbody, land area or alternative drainage system.
<b>Surface Water Sewer</b>	A surface water sewer collects rainwater from domestic and commercial roofs, driveways, patios, etc to a local watercourse or suitable surface water drainage system.
<b>Sustainable Drainage Systems (SuDS)</b>	Drainage solutions for surface runoff that mimic natural drainage regimes and provide an alternative to a network of pipes and sewers.
<b>Thames Regional Flood and Coastal Committee (TRFCC) Area</b>	Thames Regional Flood and Coastal Committee (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 <a href="#">here</a> on our DWMP portal.

# Introduction

Since 2019, we've been working with you, our stakeholders, to develop our first long-term strategy for wastewater and drainage issues within the Deephams system that covers the boroughs of Barnet, Haringey, Enfield, western parts of Waltham Forest and parts of the counties of Hertfordshire and Essex.

We're developing a strategy for the next 25 years to meet future challenges such as climate change, population growth and urban creep which could impact the sewerage and drainage systems in our region.

We want to make sure we increase the resilience of our sewerage and drainage assets and network so that we can protect our customers, communities, and the environment from the impacts of these challenges. This long-term strategic plan outlines our shared vision for the future and details how, through working together, we can improve and enhance our wastewater and surface water services in this TRFCC area to achieve the following ambitious goals:

In this document we'll explain:

- How we've worked in partnership to develop our strategic plan
- Our predictions of the future challenges we face in this region
- How this plan is expected to address these challenges and who else needs to be involved
- Our shared strategy for maintaining the safe and reliable delivery of wastewater and surface water services in the long-term

In this document we summarise our long-term plan for this catchment and also provide links to allow readers to investigate further into various risk zones. If you want to contact us or want to find out more about our DWMP and the set of documents it comprises, please use the following links:

[DWMP@thameswater.co.uk](mailto:DWMP@thameswater.co.uk)  
[Drainage and wastewater management plan](#)

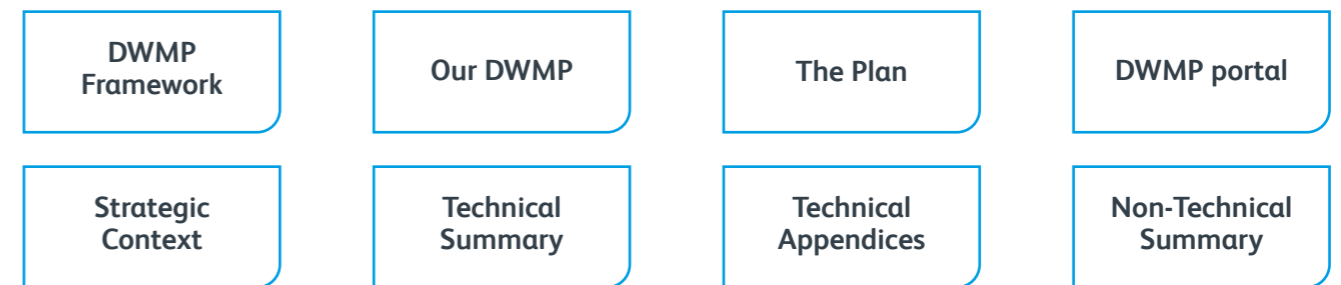
## Our Goals

95% of properties not at risk of flooding in a 1 in 50-year storm by 2050

Eliminate harm from storm overflows - no more than an average of 10 discharges per annum by 2045 at overflow locations

Enhancing resilience at Deephams sewage treatment works to ensure 100% permit compliance and protect river water quality

## Our DWMP components



Theme		How we will measure performance			
	<b>Environment</b>	<b>Sewage treatment works quality compliance</b> The ability of Sewage Treatment Works (STW) to treat and release treated sewage in line with the consented discharge permit quality conditions.	<b>Sewage treatment works DWF compliance</b> The ability of STWs to treat and discharge treated sewage in compliance with the flow discharge permit Dry Weather Flow (DWF) conditions.	<b>Risk of pollution incidents</b> The risk of polluting the environment through uncontrolled escape of sewage (classified as Category 1 to 3 by the Environment Agency) arising from either network or treatment sites.	<b>Storm overflow performance</b> The number of storm overflow discharges to the environment, both in the network and at the STWs.
	<b>Property hydraulic sewer flooding</b>	<b>Internal hydraulic sewer flooding risk in a 1 in 30-year storm</b> The risk of properties flooding internally as a result of hydraulic sewer overload.	<b>External hydraulic sewer flooding risk in a 1 in 30-year storm</b> The risk of sewer flooding to gardens and other land within the property curtilage as a result of hydraulic sewer overload.	<b>Risk of hydraulic sewer flooding in a 1 in 50-year storm (resilience sewer flooding)</b> The risk of residential properties experiencing sewer flooding as a result of hydraulic sewer overload based on a modelled assessment of the performance of our sewers in a storm that statistically occurs once every 50 years on average.	
	<b>Asset health</b>	<b>Sewer collapses</b> The risk of sewers collapsing or rising mains bursting that leads to a loss of / interruption to continued service.			

## The Deephams system

The Deephams system covers a large part of North London and also parts of Hertfordshire and Essex. It is predominantly residential and suburban, spanning from Tottenham in the south to Cheshunt in the north and from Finchley and High Barnet in the west to Chingford and Waltham Abbey in the east.

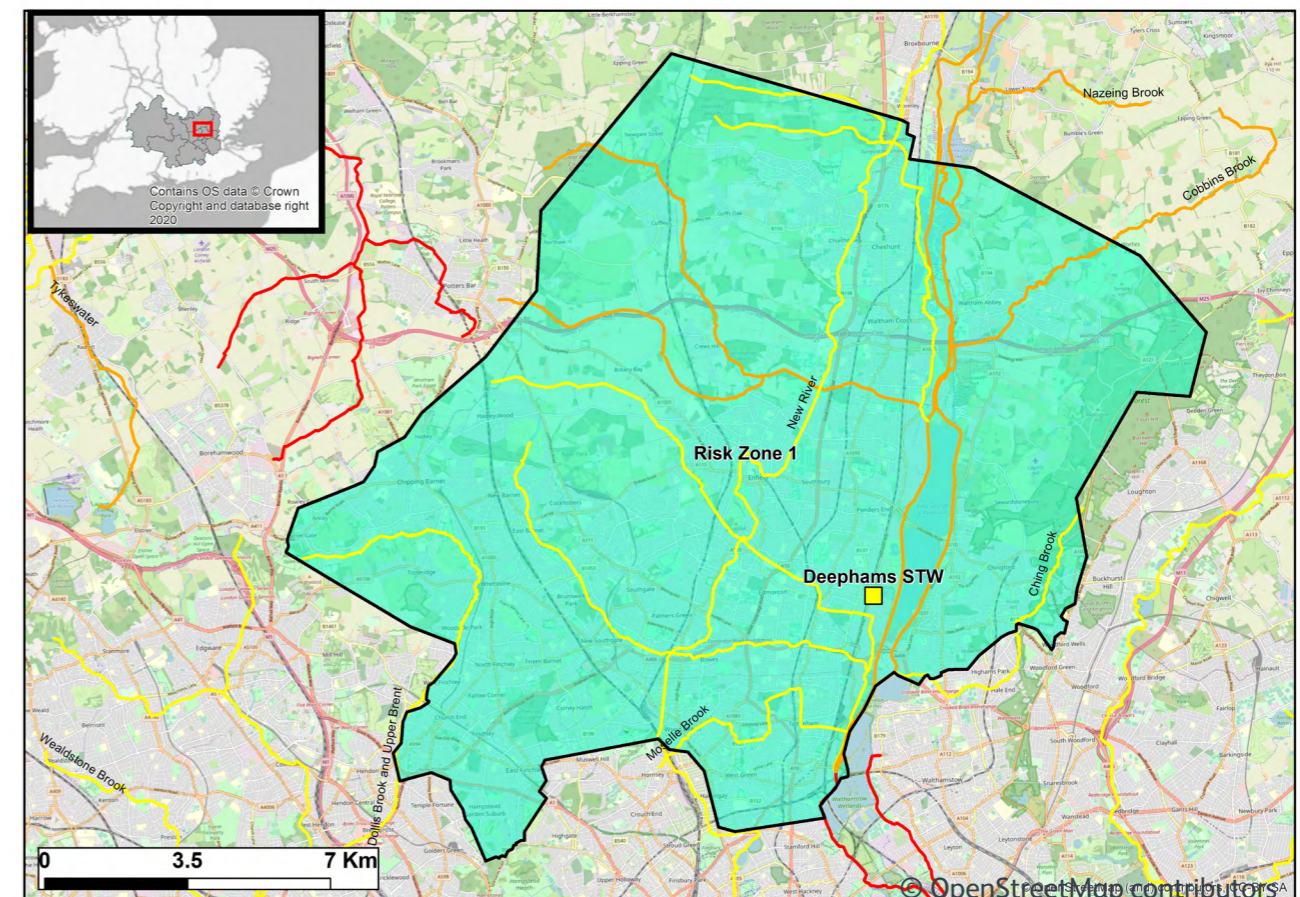
Deephams is the 4<sup>th</sup> largest STW wastewater system Thames Water operates in terms of the number of customers with approximately 989,000 customers in North and North East London.

The catchment has approximately 6,700 km of sewer network and 79 pumping stations. The system is fairly complex and has a wide range of assets to maintain and operate.

The STW can trace its history back to the late 1800s and is located in Edmonton just north of Tottenham. The effluent discharges via the Salmons Brook to the River Lee. The site underwent a large upgrade in 2013 to comply with more stringent Environment Agency standards.

This is a conventional gravity system with a trunk sewer network and many assets over 100 years old. Deephams STW is a strategic sludge centre in North London; in addition to treating its own sludge, the works was upgraded so that it can accept imported sludge from neighbouring sludge centres if they require support.

The region overview map below highlights the watercourses in this catchment that are typically heavily modified with water status ranging from poor to moderate. The map also shows the Deephams risk zone, this catchment has not been segregated into separate risk zones.



L2 TRFCC Strategic Planning Area  
 Environment Agency WFD River Water Quality Status 2019  
 High Good Moderate Poor Bad





# Our co-creators

## Who our stakeholders are

It's not possible for all the benefits identified in the DWMPs to be developed by water companies alone. They are led by water companies but created collaboratively with other organisations and groups that, with Thames Water have a shared responsibility and/or interest in drainage, flooding and environmental protection. Active engagement with these stakeholders is vital for the consultation, planning and refinement of our DWMP.

Since 2019, we've been working with a wide variety of stakeholders from across this region to understand the local issues and opportunities so that we could create a long-term plan that provides the best outcome for everyone.

In this region we've engaged and worked with stakeholders from the following organisations and groups:

Environment Agency, Natural England, National Highways, Department for Environment, Food and Rural Affairs (Defra), Consumer Council for Water, Thames Water Customer Challenge Group (CCG), Thames21, Thames Rivers Trust, Haringey Council, Barnet Council, Enfield Council, London Borough of Waltham Forest, London Lea Catchment Partnership, Greater London Authority and Transport for London.



**GREATERLONDONAUTHORITY**



## The stakeholder feedback we've received

To ensure our stakeholders' views have been considered and are a fundamental part of our final DWMP, we've carried out a variety of stakeholder engagement activities.

During 2020 to 2022 much of the interaction was online due to coronavirus restrictions, but over the years they've included workshops, drop-in sessions, 1-2-1 calls, recorded webinar updates, newsletters, surveys, feedback forms as well as online discussions. From our engagement throughout each of the DWMP framework stages we know that our stakeholders want our strategic plan to deliver the following things in this region (see quotes on the right).

We've spoken to our stakeholders to identify their strategic management plans and policies that could interact with our DWMP. The strategic themes are displayed below and the following table records all of the plans and policies and how they align with the DWMP.

“ Proposed measures (SuDS, Bilton Way etc.) seem appropriate. ”

“ It's great that Thames Water have involved so many different stakeholders in developing the plans, we'd like more certainty regarding future funding potential. ”



# Partners' policies

Management Plan (Hyperlink)	Key aspects that align with the DWMP
<b>Sustainability, Strategy and Planning</b>	
<a href="#"><u>Barnet Sustainability Strategy and Action Plan</u></a>	<ul style="list-style-type: none"> <li>Barnet Council to be net zero by 2030</li> <li>Barnet borough to be net zero as soon as possible and by 2050 at the latest</li> </ul>
<a href="#"><u>The London Plan</u></a>	<ul style="list-style-type: none"> <li>" This plan is an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years."</li> </ul>
<b>Green/Blue Infrastructure Plans</b>	
<a href="#"><u>Green &amp; Blue Infrastructure, Waltham Forest Infrastructure Delivery Plan</u></a>	<ul style="list-style-type: none"> <li>The plan seeks to establish green corridors that provide more walking and cycling routes.</li> </ul>
<a href="#"><u>Enfield's Blue and Green Strategy</u></a>	<ul style="list-style-type: none"> <li>Sets out the ten-year strategy to protect, maintain and enhance the borough's network of blue and green assets in response to the challenges ahead</li> </ul>
<a href="#"><u>Haringey's Greenest Borough Strategy</u></a>	<ul style="list-style-type: none"> <li>The vision statement of this strategy is to work together to tackle climate change and secure a clean, safe and environmentally sustainable future for everyone living, working, visiting or studying in Haringey.</li> </ul>
<a href="#"><u>Epping Forest District Council, Green Infrastructure Strategy</u></a>	<ul style="list-style-type: none"> <li>The purpose of this strategy is to ensure that a strategic and holistic approach is taken to protect, maintain and enhance the ecology, landscape and heritage in the district.</li> </ul>
<a href="#"><u>Essex Green Infrastructure Strategy</u></a>	<ul style="list-style-type: none"> <li>This strategy is to take a positive approach to enhance, protect and create an inclusive and integrated network of high-quality green infrastructure in Greater Essex, to create a county-wide understanding of green infrastructure - its functions and values, and to identify opportunities for delivering green infrastructure.</li> </ul>

Management Plan (Hyperlink)	Key aspects that align with the DWMP
<b>Local Flood Risk Management Strategies</b>	
<a href="#"><u>London Borough of Waltham Forest, Local Flood Risk Management Strategy</u></a>	<ul style="list-style-type: none"> <li>Provides an overview of flood risk management work being undertaken and planned throughout the borough</li> <li>Outlines how we are working with partners to reduce flood risk</li> <li>Sets out which organisations are responsible for different types of flooding in the borough</li> <li>Is in accordance with the National Flood and Coastal Erosion Management Strategy</li> </ul>
<a href="#"><u>Haringey London, Local Flood Risk Management Strategy</u></a>	<ul style="list-style-type: none"> <li>The scale of any flooding problems</li> <li>What the Council are doing about it</li> <li>What residents can do to help</li> <li>General aspects such as riparian owner responsibilities</li> </ul>
<a href="#"><u>London Borough of Enfield, Local Flood Risk Management Strategy</u></a>	<ul style="list-style-type: none"> <li>Specifies the roles of the different authorities that have responsibilities for managing flood risk in Enfield</li> <li>Describes how Enfield is working with partners to reduce flood risk</li> <li>Provides an overall assessment of local flood risk</li> <li>Sets out the objectives for managing local flood risk</li> <li>Outlines what actions are to be taken to meet those objectives</li> </ul>
<a href="#"><u>London Borough of Barnet, Local Flood Risk Management Strategy</u></a>	<ul style="list-style-type: none"> <li>Prevent risks of flooding in new developments</li> <li>Promote flood resistance and resilience</li> <li>Evaluate maintenance and update the flood risk asset register</li> <li>Prepare emergency plans for flood warnings and alerts, efficient response to flood incidents and emergency recovery following a flood incident</li> <li>Establish and maintain long-term partnership working, both internally within Barnet Council departments and externally with other Risk Management Authorities</li> <li>Update and review hydraulic modelling of Critical Drainage Areas</li> <li>Modelling of Barnet catchment sewerage network</li> <li>Develop, maintain, apply and monitor a strategy for local flood risk management of the area</li> <li>Prepare flood hazard maps and flood risk maps</li> <li>Prepare flood risk management plans</li> </ul>

Management Plan ( <a href="#">Hyperlink</a> )	Key aspects that align with the DWMP
<a href="#">Hertfordshire County Council, LFRMS 2</a>	<ul style="list-style-type: none"> <li>The strategy provides information on local flood risk and the significant points that this has raised for managing flood risk in the county.</li> </ul>
<a href="#">Essex County Council, Local Flood Risk Management Strategy</a>	<ul style="list-style-type: none"> <li>This strategy sets out the aims and actions to reduce the impact of local flooding to the community.</li> </ul>
<a href="#">Community Water Management for a Liveable London (CAMELLIA) - Test area 'Meridian Water' Development</a>	<ul style="list-style-type: none"> <li>Focusing on London, CAMELLIA, will bring together environmental, engineering, urban planning and socio-economic experts with governmental and planning authorities, industries, developers and citizens to provide solutions that will enable required housing growth in London whilst sustainably managing water and environment in the city.</li> </ul>
River Catchment Partnership Plans	
<a href="#">London Lea Catchment Management Plan</a>	<ul style="list-style-type: none"> <li>Increase surface water management at source</li> <li>Improve knowledge and understanding of the catchment</li> <li>Increase public engagement and participation</li> </ul>
<a href="#">Lower Lea Catchment Management Plan</a>	<ul style="list-style-type: none"> <li>Application of a collaborative, bottom-up Catchment Based Approach to improve rivers and meet WFD targets</li> </ul>
<a href="#">Brent Catchment Partnership and Action Plan</a>	<ul style="list-style-type: none"> <li>The vision statement of this plan is to promote awareness and understanding of the potential of the River Brent corridor to contribute to the social, environmental, and economic wellbeing of local people.</li> </ul>

Management Plan ( <a href="#">Hyperlink</a> )	Key aspects that align with the DWMP
Surface Water Management Plans	
<a href="#">Surface Water Management Plan for the London Boroughs of: Waltham Forest Haringey Barnet</a>	<ul style="list-style-type: none"> <li>These plans were prepared as part of the Drain London Project and identify the most cost - effective way of managing surface water flood risk in the long-term.</li> </ul>
<a href="#">Essex County Council, Surface Water Management Plans</a>	<ul style="list-style-type: none"> <li>Surface Water Management Plans (SWMPs) outline the preferred surface water management strategy and establish a more detailed long-term action plan to influence, planning, investments, maintenance, and engagement.</li> <li>The SWMP studies in Essex are undertaken in consultation with key local partners who are responsible for surface water management and drainage in their area. Partners work together to understand the causes and effects of surface water flooding and agree the most cost-effective way of managing surface water flood risk for the long-term.</li> </ul>
<a href="#">Broxbourne Borough Surface Water Management Plan</a>	<ul style="list-style-type: none"> <li>These reports outline the preferred surface water management strategy for the Broxbourne Borough and East Hertfordshire District. In this context, surface water flooding describes flooding from sewers, drains, groundwater, and runoff from land, small watercourses and ditches that occurs as a result of heavy rainfall.</li> </ul>
<a href="#">East Hertfordshire District Surface Water Management Plan</a>	

# Issues today

The initial [risk-based catchment screening](#) (RBCS) in this region, published in 2019, assessed system performance against a range of 17 indicators, using information from company reporting systems or from relevant stakeholders, to identify systems that are vulnerable to the risks of growth and climate change. We identified that this system warranted long-term planning with 7 of the 17 indicators being breached.

As part of optioneering we have then assessed the catchment against a series of planning metrics as shown in the table below.

This identified the highest risk for each metric that then progressed through optioneering and into the appraisal phases. The table identifies the risk areas and metrics that have passed through for solution development.

The DWMP process is iterative and will be repeated every 5 years, with the next version due in 2028. This will capture any changes in demands for this catchment and will look for opportunities to utilise future technologies and engineering solutions.

Risk Zone	Risk						
	Storm Overflow Performance	Internal Sewer Flooding	External Sewer Flooding	Resilience (1 in 50 - year storm)	Surcharging	STW Quality Compliance	STW DWF Compliance
STW	Yes	N/A	N/A	N/A	N/A	No	No
1	No	Yes	Yes	No	No	N/A	N/A

'N/A' indicates that a particular risk is not applicable/cannot be quantified either to/for the STW or risk zones



# Our predictions for the future

We've modelled the entire system against future challenges, assessed targets and carried out discussions with local stakeholders and forecast that, if we do nothing and do not implement the DWMP, over the next 25 years there will be an increased risk of flooding and pollution from our sewer systems.

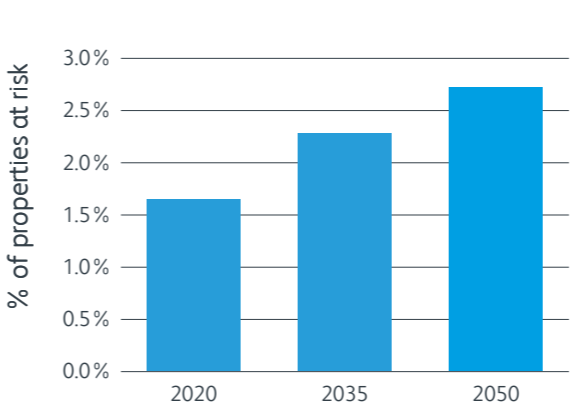
We modelled the impact of climate change, population growth and urban creep on flood risk, pipe capacity, treatment works compliance and storm overflow compliance from a 2020 baseline.

Our forecast network performance metrics are summarised opposite. By 2050 we forecast that, across the region, 9% of properties will be at risk of hydraulic sewer flooding, in a 1 in 50-year storm.

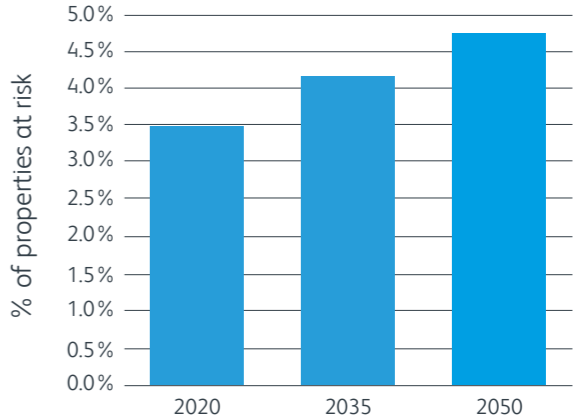
Based on our findings from the modelling and carrying out discussions with local stakeholders we forecast that, if we do nothing, over the next 25 years there will be an increased risk of hydraulic sewer flooding and pollution from our sewer systems in this region.

## Change in risk if we do nothing and do not implement the DWMP

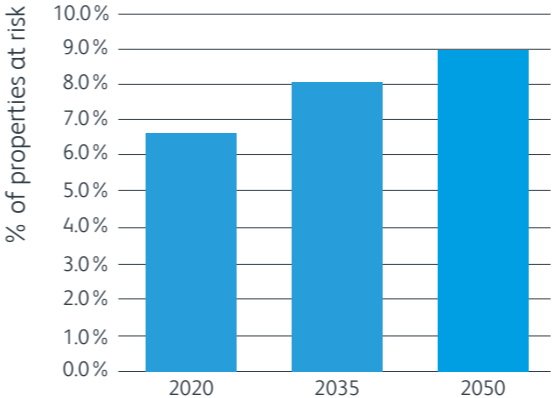
**Internal hydraulic sewer flooding (1 in 30-yr storm)**  
- i.e. >3.3% chance of happening each year



**External hydraulic sewer flooding (1 in 30-yr storm)**  
- i.e. >3.3% chance of happening each year



**Hydraulic sewer flooding (1 in 50-yr storm)**  
- i.e. >2% chance of happening each year



## Deephams STW water quality compliance

	2020	2025	2030	2035	2040	2045	2050
<b>Water Quality (SS* &amp; BOD*)</b>	80%	93%	95%	98%	100%	104%	107%
<b>Water Quality (AmmN*)</b>	80%	93%	95%	98%	100%	104%	107%

\* Suspended Solids (SS)  
\* Biochemical Oxygen Demand (BOD)

\* Ammoniacal Nitrogen (AmmN)

The ability of STW to treat and dispose of sewage in line with current water quality discharge permit conditions was assessed. The results above indicate that the water quality compliance will worsen over time. There is an evident need for long-term planning and the implementation of the DWMP, to protect this region and support its future growth.

If you are a DWMP practitioner, further details can be found on our Practitioner portal.

[DWMP Practitioner portal](#)

# Sustainable solutions

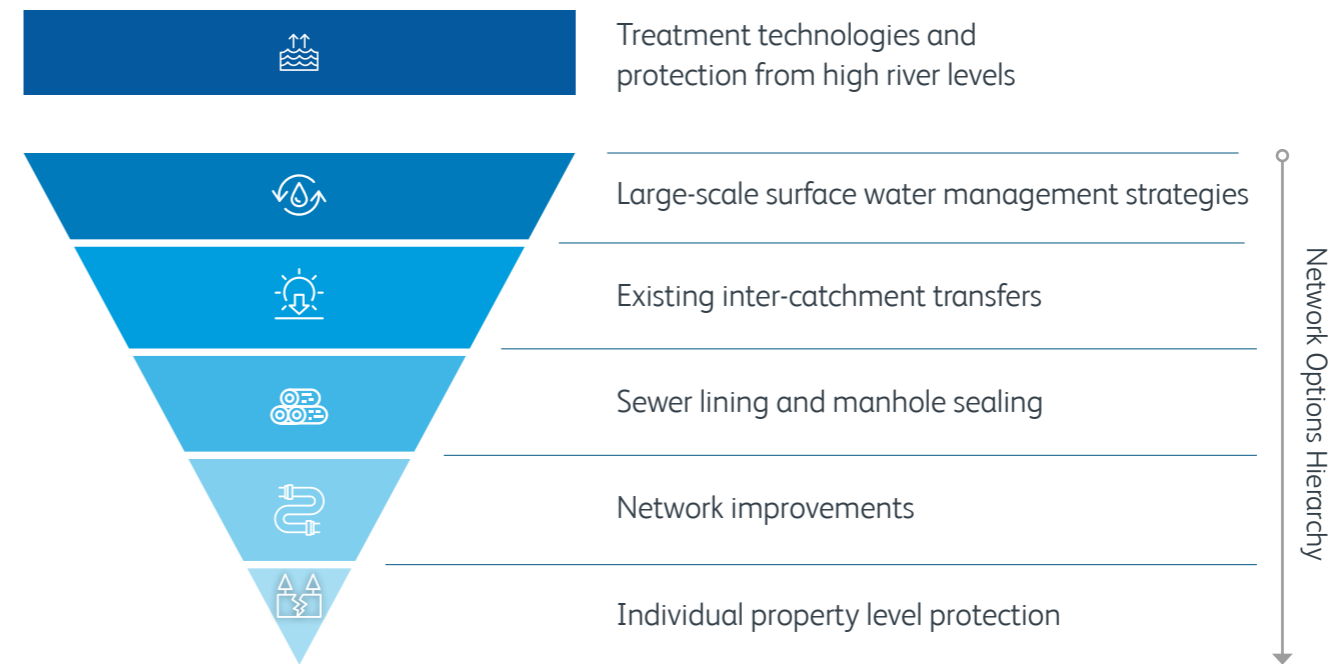
We've combined our knowledge of the catchments with the stakeholder feedback we've received to help us identify the solutions required to meet the future needs of this region. We've used a structured approach that started with over 40 generic solutions, to ensure broad thinking, and identified and assessed the feasibility of a wide range of potential interventions and the extent to which they resolve the area's future needs.

Our approach has followed the same method that has been developed and implemented successfully over many years for our Water Resources Management Plans (WRMP).

Our stakeholders, like us, want this DWMP to work in balance with the natural environment and make the best use of available land.

Our hierarchy of options follows this principle - it focuses first on maximising the efficient use of existing assets, then prioritising natural surface water management solutions over network improvements.

The common sustainable solution options we've considered for this catchment are outlined below. Further information on Options Development and Appraisal stage is available on our [DWMP portal](#).



## Solution options considered in optioneering

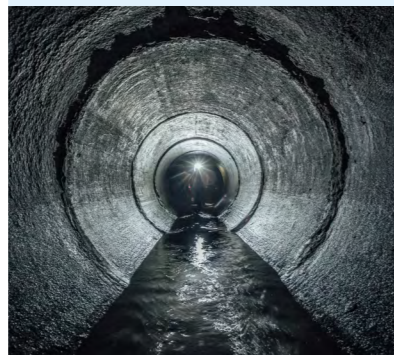
### Surface water management

Surface water separation and the installation of features to collect, store and/or infiltrate surface water from buildings and impermeable areas, such as driveways and car parks as part of enhancing our surface water sewerage system. This option also looks to reinforce the fundamental basis of our sewerage systems being separate by addressing property misconnections of surface water into the foul sewer system or foul to surface water.



### Existing inter-catchment transfers

Optimise existing connections between catchments and STWs to transfer surplus flows to catchments with short-term capacity.



### Sewer lining and manhole sealing

Undertaking a programme of sewer lining and manhole sealing, we will target as a priority the areas of high infiltration and with a high potential to reduce unwanted flows into our sewer system that currently take up much of its capacity.



### Network improvements

Managing the impact of surface water on the sewerage system through the identification of network improvements to address deficiencies in the sewerage network capacity, specifically in areas with deliverability constraints and a high risk of sewer flooding now or in the future. This includes the construction of large attenuation sewers, new surface water and foul water sewers.



### Individual property level protection

Providing vulnerable homes with active and passive flood protection measures such as flood proof doors, self-sealing bath/shower systems (non-return valves) and installation of household pumping stations.



### Treatment process technologies and protection from high river levels

Implementation of a range of different technologies identified to enhance the performance of the STW, through either retrofitting or new-build options. This will include the use of more intensive wastewater treatment processes which have the capacity to meet future demands and the construction of flood bunds to protect our assets from high river levels.



# Partnership working – case studies

Working in partnership with our stakeholders is a fundamental component of our plan. It can provide significant potential to support delivery of mutually beneficial outcomes, address multiple drivers and deliver multiple benefits. In this section we present a few examples of partnership working opportunities in this region.

## Enfield SuDS

Enfield Council was a partner in the London Strategic SuDS Pilot Study to help reduce residential flooding across Greater London. Other partners included London boroughs of Hillingdon and Camden, the London Drainage Engineers Group (LoDEG), Greater London Authority, Thames Water, Transport for London, Environment Agency, Thames Flood Advisors and Arcadis. The scheme was recognised at the Environment Agency’s Flood and Coastal Excellence Awards where it won the Surface Water Management category.

There is a requirement for a long-term strategy for SuDS across London to integrate SuDS and Blue Green Infrastructure features to benefit the local communities and maximise partnership working and funding over the 25-year period. All partners demonstrated effective partnership working which potentially will lead the way in further similar schemes being delivered.



## Chestnuts Park Rainscape Masterplan

Chestnuts Park in Haringey has a range of facilities including a main park area, a willow garden, an orchard and playing fields. Large parts of the park become waterlogged during wet weather and cannot be used.

By collaborating with other partners, including Friends of Chestnuts Park, Environment Agency and Thames21, Haringey Council put forward opportunities to enhance the park and create opportunities for habitat and biodiversity through opening the culverted Stonebridge Brook, which runs beneath the park, developing new wetlands and swales. This will help with drainage issues and tackle flooding downstream.

## Hoddesdon Transfer

This option is a case study of how adaptive and resilient planning can benefit both flood risk and water resources security. The Hoddesdon Transfer is designed to be used during drought conditions to deliver 25 Ml/d of sewage from the Deephams STW catchment via an 18km rising main to the Rye Meads STW.

The additional treated effluent flows from Rye Meads STW is to be discharged into the River Lee and abstracted further downstream into the Lee Valley reservoirs.

BRAVA workshop discussions identified the ability to reduce flow between Dundee Way Sewage Pumping Station and Deephams STW by permanently diverting flow to Rye Meads using the Hoddlestone Transfer.

Opportunity	Partners
Enfield SuDs	Enfield Council
Bilton Way Surface Water Pumping Station	Enfield Council
Chestnuts Park Rainscape Masterplan	Haringey Council
Hoddesdon Transfer	Essex County Council
Friary Park SuDS	Barnet Council

These opportunities have been identified following a detailed screening and prioritisation exercise with our partners. This approach is explained in the [Appendix S Partnership Opportunities and Working](#) report.

# Our shared plan

Our shared long-term plan for the Deephams system has been formulated based on a balance of how deliverable and sustainable the proposed interventions are, and also how cost-efficiently they can deliver multiple benefits across our stakeholder groups.

The challenges this region has presented to us in delivering that balance include:

- Population growth uncertainties
- Incomplete mapping of surface water systems e.g. sewer, highway or land drainage and the extent of our hydraulic surface water sewerage network model coverage

- Location of property level misconnections
- Pipe materials e.g. pitch fibre sewers impacting asset health
- Ownership and maintenance of SuDS

We propose an asset strategy that fundamentally addresses the inputs to our system i.e. unwanted flow removal and bringing foul systems back to their original intent of taking foul flows only.

By 2050 our foul sewerage systems in the Deephams catchment will no longer be reliant on storm overflows to manage the risk of flooding. The catchments we serve with positive surface water systems will function as greenfield systems.

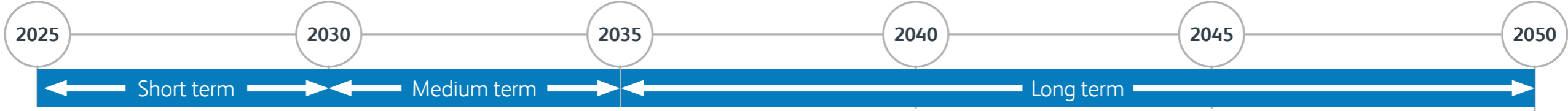
We will achieve this through an adaptive approach whereby we will aggressively target unwanted flows to restore capacity in our foul only network incrementally at system level over the next 25 years. This will include relining sewers and sealing manholes to reduce groundwater infiltration, and replumbing surface water misconnections.

Our approach is to address systems holistically, to provide wide-ranging benefit to the catchments we service in the most resilient and sustainable way for foul, combined and surface water systems.

We will work in partnership, where possible, to evolve surface water systems, championing green infrastructure.

We will focus on our smaller catchments in the short to medium term to deliver the maximum benefit of reducing sewage escapes to the environment in the shortest time possible for our customers. Those assets linked to the most sensitive watercourses will be prioritised.

The diagram below outlines the sequencing of our proposed interventions for this area:



## Restore

- **Managing surface water drainage** - Reducing surface water misconnections to foul will ensure capacity is available for future growth
- **Continue addressing unwanted flow in our network**

## Enhance

- **Informed surface water plans** - Mapping and modelling surface water systems will increase confidence in our plans for surface water management solutions
- **Reduced risk of flooding and pollution** - Implementing surface water management solutions will reduce the risk of flooding and pollution
- **Positive environmental and community impacts** - Creating a positive impact on environment and community wellbeing in key locations through partnership work

## Maintain

- **Ensure our Deephams STW can manage the increases created by future growth in the area and are 100% compliant**
- **Investigate potential future upgrades for Deephams STW**



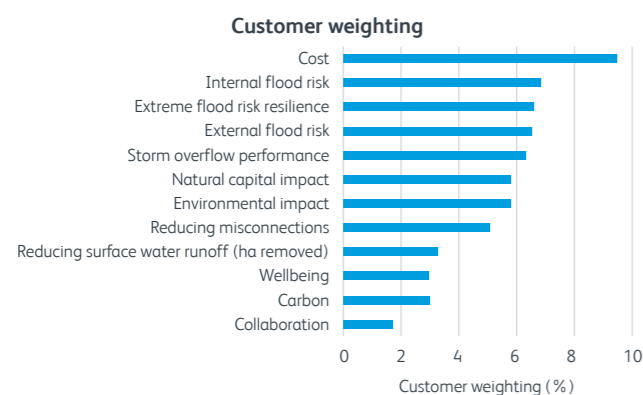
# Developing our preferred plan for Deepphams

## Defining a best value framework

A best value framework is one that considers broader criteria than just economic cost. So our DWMP maximises outcomes for the communities it serves. Our criteria are based on the 12 planning objectives of the DWMP with additional criteria to capture broader environmental impact.

## Defining what our customers and stakeholders value

We have used quantitative customer research to determine the relative priorities of the different criteria.



## Agreeing scenarios with stakeholders

For our London catchments our approach has focused on a programme of storm discharge and flooding reduction that meets targets in each of the thirty-five risk zones. We identified and agreed scenarios to cover the range of our ambitions through discussion with our regional stakeholders.

Alternative plans and outcomes
<b>Maintain flooding resilience</b> - delivers the statutory storm discharge reduction requirements and maintains property flooding at 2025 levels
<b>Maximum community benefit</b> - meets our DWMP sewer flooding objectives and delivers our storm discharge reduction plan for high priority sites by 2035 and all sites by 2045 whilst also creating the most benefit to communities and the environment
<b>Resilient - constrained</b> - meets our sewer flooding planning objectives and delivers our storm discharge reduction plan for high priority sites by 2035 and all sites by 2045. Delivers a feasible level of surface water management within the first 10 years of the plan
<b>Accelerated / deliver sooner</b> - accelerates investment to deliver our performance outcome targets sooner, including our storm discharge reduction at all sites by 2035, reflecting views expressed by stakeholders in the public consultation

To avoid customer bill volatility, we also explored alternative investment profiles that define how quickly options are implemented. We also considered a better information plan that includes factors such as improvements in overflow and river monitoring data and improved accuracy in our hydraulic modelling to predict flood risk.

## Scoring our options against our planning objectives

Scores have been generated for every option for each of our planning objectives and weighted based on our customer priorities. For example, DWMP with additional criteria to capture broader environmental impact.

**Natural capital (NC) impact**  
 We used data from Natural England on the existing NC in the catchment and assessed whether the option would improve or reduce this baseline based on additional green space generated. Surface water management schemes scored highly whilst new sewers and tanks scored lower.

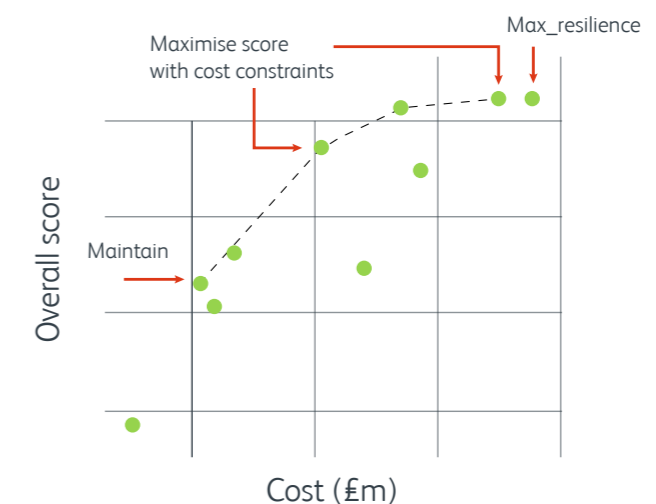
**Wellbeing impact**  
 We used data on environmental factors in the catchment that influence population and human health, including improved access to recreation and the environment, and assessed whether the option would improve or reduce this baseline.

**Reducing misconnections**  
 We assessed the area to be disconnected from our foul and connected into our surface water systems as part of our options.

## Assessing different scenarios

We used a decision support tool to optimise our plan based on our 'value criteria'. We tested multiple alternative plans to allow us to assess different scenarios and compare their outcomes.

### Illustrative score vs cost



## Determining our preferred plan

Our preferred plan has been developed by considering a range of factors including:

- affordability
- deliverability
- performance outcomes
- strategic environmental appraisal
- stakeholder feedback

This has allowed us to develop an adaptive plan that recognises areas of risk and uncertainty, where improved understanding will be used to prioritise interventions at key decision points over those that can be deferred.

Our preferred plan balances our ambitions, our stakeholder and customer desires, our planning objectives and affordability.

# Our preferred plan for Deephams

From the first iteration of our preferred plan for Deephams we estimate that to tackle growth and climate change we need to invest an additional £1.5bn over the period 2025 to 2050, on top of our day-to-day maintenance activities. We aim to reduce this cost requirement in subsequent iterations of our DWMP through partnership benefits, innovation and better targeting with enhanced surface water system knowledge.

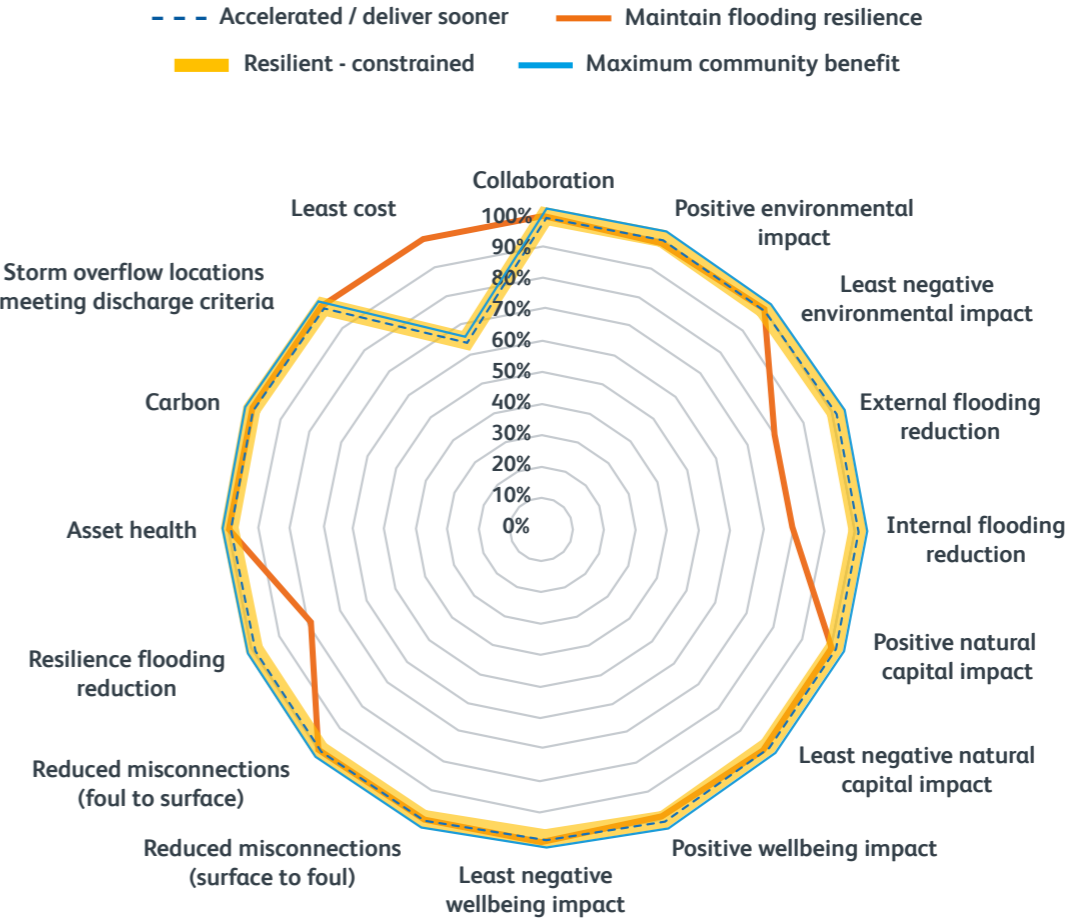
Our asset strategy for our systems in London is to deliver a storm discharge and flooding reduction programme that will meet our targets in each of the 35 risk zones by 2050 allowing for climate change and growth.

Our preferred plan comprises options that have been developed to meet medium term (2035) and long term (2050) performance targets. Our hierarchy of solution types commences with, and seeks to maximise the implementation of and benefit from sustainable urban drainage solutions.

- £760m on managing the impact of surface water on the sewerage system including construction of new sewers, sewer upsizing and attenuation storage to provide additional capacity
- £756m on improvements to surface water management, with a particular focus on removing surface water from impacting on the networks
- £0.5m upgrading the Deephams STW

Our preferred plan (resilient - constrained) has been optimised to offer the best value solution to reduce sewer flooding, protect the environment, and enhance natural capital as shown in the relative performance of our preferred plan figure.

Relative performance of our preferred plan



**Storm overflow performance**

Reduce the number of average annual storm discharges by 147. By 2050, none of the 37 storm discharge locations in this catchment will overflow more than ten times per annum on average



**Property flooding**

Protect 4,154 properties from internal sewer flooding up to a 1 in 30-year storm event  
 Protect 6,678 properties from external sewer flooding up to a 1 in 30-year storm event  
 Protect 12,225 properties from sewer flooding up to a 1 in 50-year storm event  
 If we don't invest, over 8.2% of properties would be at risk in a storm up to 1 in 50-year storm in 2050. As a result of implementing our plan, this would decrease to 5.3%

Still supporting an overall goal of 95% of properties not at risk across London



**Treatment capacity enhancements and/or protection from high river levels at the STW**

Investigate potential future upgrades for Deephams STW



**Reduce misconnections / Reduce surface water runoff**

613 ha (equivalent to 40,900 properties) to be disconnected from our sewers and reconnected to a surface water sewer with attenuation or to a soakway

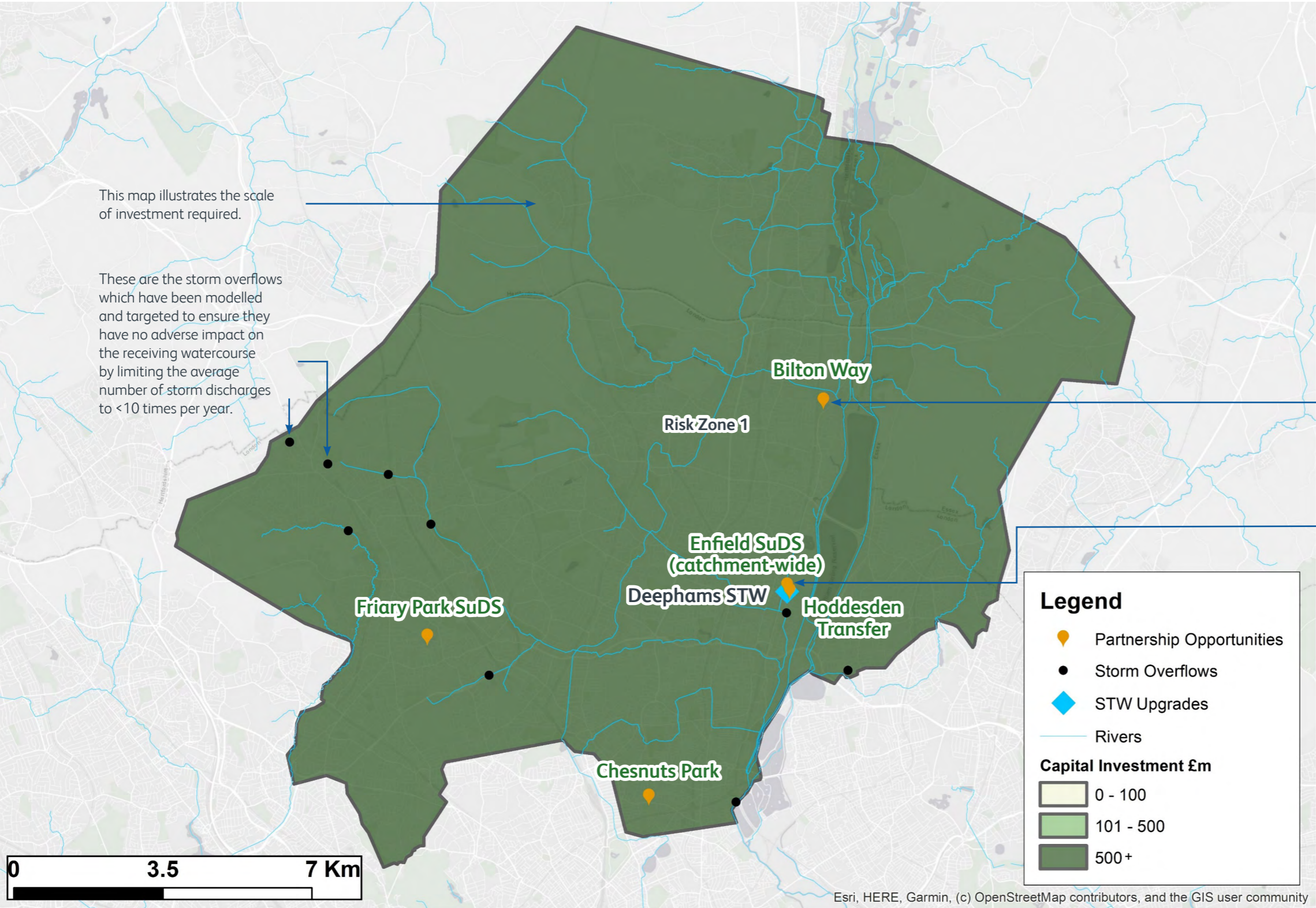


**Carbon**

210,778 tonnes of carbon embodied in delivering the plan, with 3,560 tonnes of carbon sequestered in delivering the plan



# Our preferred 25 year plan for Deepphams



We've mapped a selection of the partnership opportunities in this region where we could work together with our stakeholders. If you are a DWMP practitioner, further details can be found on our [Practitioner portal](#).

Upgrades to the STW will be required over the next 25 years to ensure treatment capacity keeps pace with growth.

# Next steps

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## Final version of the plan

We've progressed and enhanced our DWMP since we published it for public consultation in June 2022. We've updated our draft plan based on our ongoing DWMP work and our responses to regulatory updates and the majority of the feedback received during the 12-week consultation period.

Our preferred plan balances our ambitions, our stakeholder and customer desires, our planning objectives and affordability.

## Further stakeholder input

This is our first DWMP and it will be the launch pad for future DWMP cycles that will occur every five years where growth, risks and system performance will be re-assessed and reviewed and the DWMP process repeated. We hope that we will receive a similar level of engagement and co-creation from our stakeholders in the next iteration as it has been a valuable contribution to this first iteration.

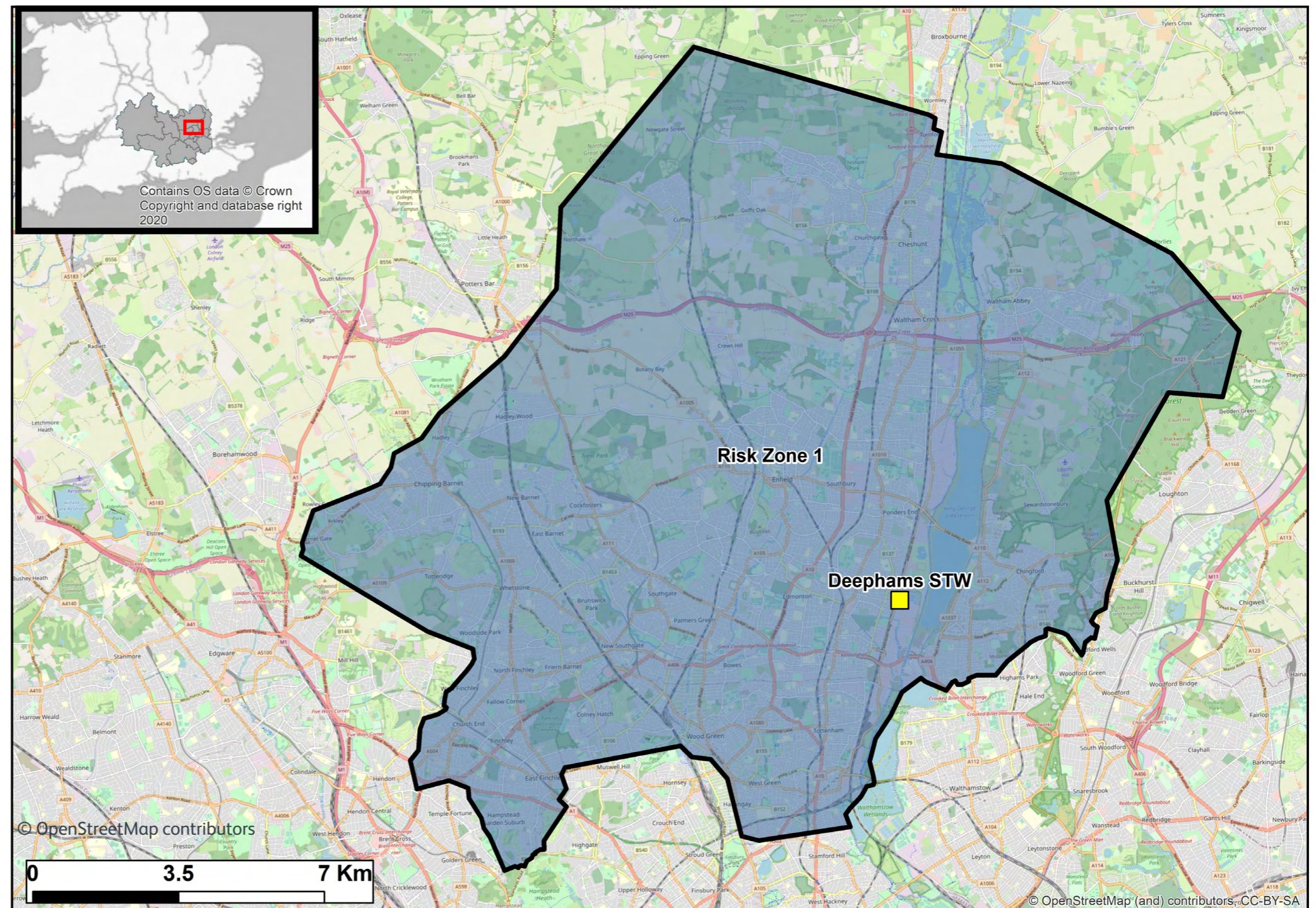
## Funding and delivery

This DWMP is a 25-year rolling strategic plan. The first 5-years of the plan will be assessed through the price review process to confirm the funding to deliver the initial phase between 2025 and 2030.

Future iterations on the plan will address elements that can't be progressed due to funding restrictions, as well as changes in customer priority or technical issues.

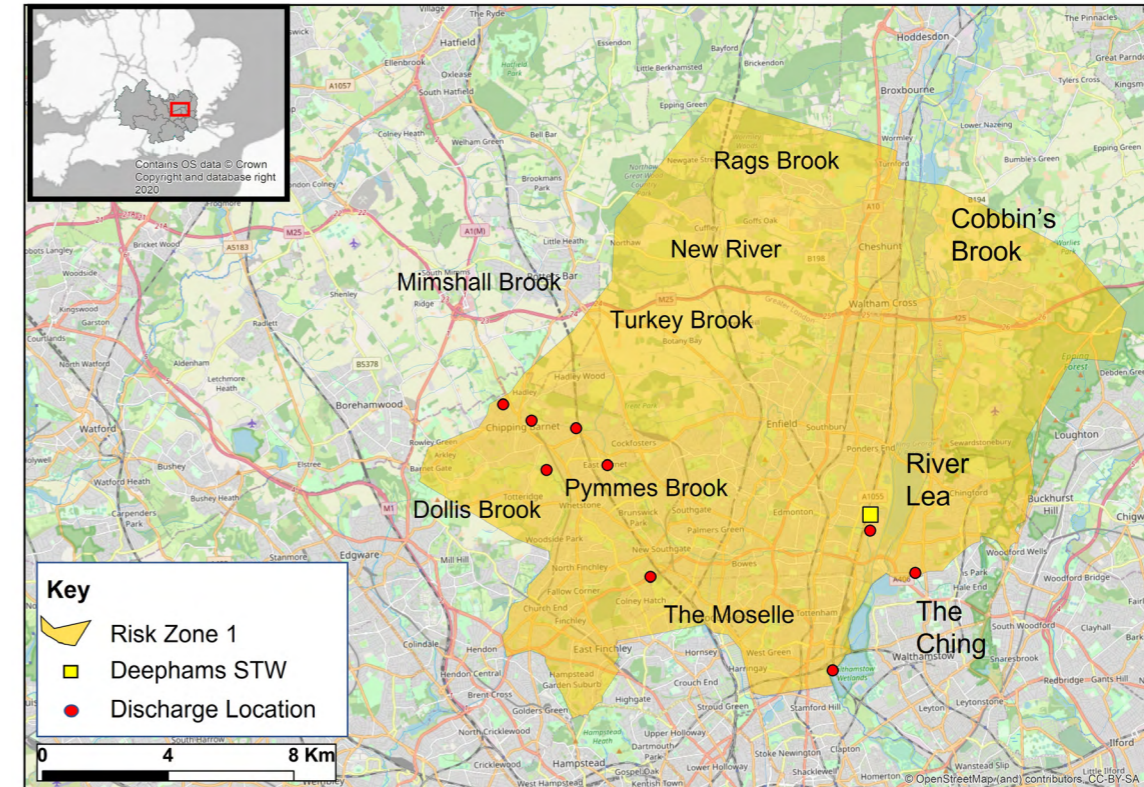
# Our shared plan at catchment level

To find out more about our plans for this region, please use this interactive map by clicking on the blue box.



## Risk Zone 1 - Deephams

What are the challenges?	<ul style="list-style-type: none"> <li>Increased internal hydraulic sewer flooding - from 1.3% to 2.2% of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 1.3% of properties (5698) at risk up to a 1 in 30-year storm in 2025 to 2.2% of properties (9430) at risk by 2050</li> <li>Increased external hydraulic sewer flooding - from 3.2% to 4.2% of properties: Calculated as increased modelled risk of external hydraulic sewer flooding from 3.2% of properties (13567) at risk up to a 1 in 30-year storm in 2025 to 4.2% of properties (17987) at risk by 2050</li> <li>Increased hydraulic sewer flooding - from 6.0% to 8.2% of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 6.0% of properties (25298) at risk up to a 1 in 50-year storm in 2025 to 8.2% of properties (34787) at risk by 2050</li> <li>The eight overflows in this area discharged 79 times in 2021</li> </ul>
Which of our solutions are best suited?	<ul style="list-style-type: none"> <li>Large-scale surface water management</li> <li>Network improvements</li> <li>Construct deep tanks and tunnels</li> </ul>



	2025	2030	2035	2050
<b>Timescale</b>	← Short term →		← Medium Term →	
What targets are we seeking?	<p><b>To:</b></p> <ul style="list-style-type: none"> <li>Reduce property hydraulic sewer flooding to 1.5% (internal) and 3% (external) for rainfall up to a 1 in 30-year storm event in any given year</li> <li>Reduce storm discharges (where overflows are present) to &lt;10 in an average year by 2050</li> <li>Maintain 100% STW permit compliance</li> </ul>			
How will we achieve the targets?	<p><b>We will:</b></p> <ul style="list-style-type: none"> <li>Increase the confidence in our plans for long-term investment to reduce the risk of internal and external hydraulic sewer flooding and enable catchment-level planning of surface water management solutions</li> <li>Provide sewer network improvements by installing larger sewers to increase network capacity</li> <li>Investigate potential future upgrades to Deephams STW</li> </ul>	<p><b>We will:</b></p> <ul style="list-style-type: none"> <li>Further develop our catchment-level planning and implement large-scale surface water management strategies to reduce the risk of hydraulic sewer flooding by removing rainfall runoff that is entering our foul sewer system and enhance our surface water sewerage systems</li> <li>Continue to provide sewer network improvements by installing larger sewers to increase network capacity</li> <li>Construct deep tanks and tunnels to store combined sewage</li> </ul>	<p><b>We will:</b></p> <ul style="list-style-type: none"> <li>Continue to reduce the risk of hydraulic sewer flooding by removing surface water from our foul sewer systems through the implementation of large-scale surface water management strategies</li> <li>Continue to construct deep tanks and tunnels to store combined sewage</li> </ul>	

# Risk zone summary table

Risk Zone	2025 modelled baseline					2050 Performance without DWMP					2050 Performance with DWMP				Preferred solutions			
	(no.& % of properties)					(no.& % of properties)					(no.& % of properties)							
	Internal flooding (2025)	External flooding (2025)	Resilience flooding (2025)	Number of monitored storm overflows (2021)	Recorded (EDM) storm overflow discharges in 2021	Internal flooding (2050)	External flooding (2050)	Resilience flooding (2050)	Number of modelled storm overflows (2050)	Modelled average annual storm discharges (2050)	Internal flooding (2050) DWMP	External flooding (2050) DWMP	Resilience flooding (2050) DWMP	Modelled average annual storm discharges (2050 DWMP)	2025-2030	2030-2035	2035-2050	Investment Band (£)
<b>Deephams RZ1</b>	5698 (1.3%)	13567 (3.2%)	25298 (6%)	8	79	9430 (2.2%)	17987 (4.2%)	34787 (8.2%)	37	505	5276 (1.2%)	11309 (2.7%)	22562 (5.3%)	<=10	CP, NI	CP, DT, LSSWM, NI	DT, LSSWM	High
<b>Deephams STW</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CP	CP, STW		Low

Note: We will achieve our London-wide flood reduction targets. However, there are a number of risk zones where this is not possible that are offset by other risk zones where the risks are reduced below the target

**CP** = Catchment-level planning including mapping and modelling

**LSSWM** = Large-scale surface water management

**NI** = Network improvements


**DT** = Deep tanks and tunnels

**STW** = Treatment process technologies and protection from high river levels

# Navigation index

We've developed a comprehensive document suite to share our final DWMP. This includes five summary documents, that contain increasing levels of detail, as well as Catchment Strategic Plans. To help you to navigate around our document suite and to find key DWMP content, we provide a navigation index below.

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																			

 Find all the documents in our DWMP suite on [our website](#).





## Work with us

We want to continue to draw on your expertise and local knowledge and invite you to work further with us to meet the future needs of drainage and wastewater services in our region.

Please get in touch with us or provide feedback on this document by emailing our DWMP team at [DWMP@thameswater.co.uk](mailto:DWMP@thameswater.co.uk)

For more information on our DWMP work or to share your views, please visit the DWMP portal on our website [here](#).