

# Drainage and Wastewater Management Plan

March 2019

**DRAFT**

## Drainage and Wastewater Management Plan

### Contents

1. Introduction
2. Future pressures
3. Approach – planning for the future
4. Our planning tools
5. Defining our planning boundaries
6. Risk-based catchment screening
7. Stakeholder Consultation
8. Conclusion and next steps

### Appendices

- A. Strategic Planning Areas
- B. Tactical Planning Units
- C. Catchment Plans

## 1.0 Introduction

### We are developing our first Drainage and Wastewater Management Plan

Every year we treat over 4,700 mega litres of wastewater from our customer’s properties before returning the cleaned water back to the environment.

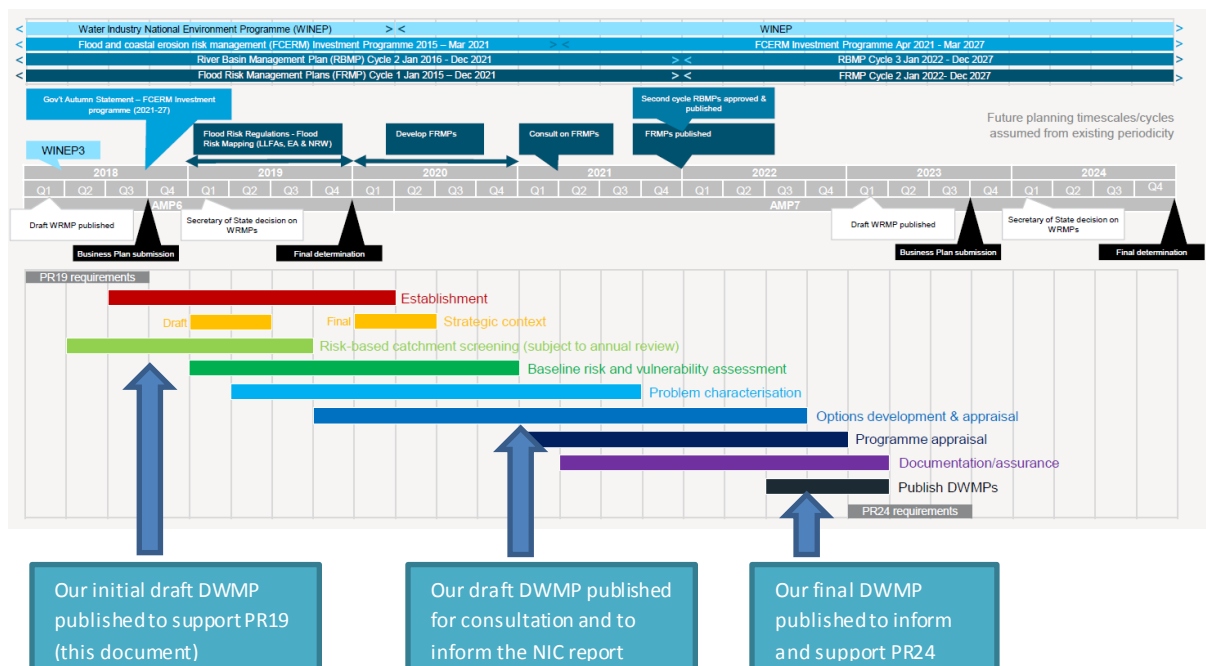
Our wastewater system consists of over 500km of sewers and drains, 90 pumping stations and 50 treatment works. This system has to continue to operate effectively day in day out but also needs to be able to cope with future pressures and this is where our Drainage and Wastewater Management Plan comes in.

Our Drainage and Wastewater Management Plan will cover the investments we plan to make over the next 5 year period, 2020 to 2025, as well setting out a long term (25 year) strategy for how we are going to deliver a reliable and sustainable wastewater service. We will consult stakeholders during its development.

The first full publication of Drainage and Wastewater Management Plans (DWMPs) is not scheduled until 2022/23. We have chosen to provide a draft of our initial findings to:

- support the strategic investments we are proposing for AMP7;
- demonstrate our commitment to long term, sustainable, wastewater planning; and,
- provide an early benchmark to support and encourage the sector in development of DWMPs - in keeping with our position as a sector leader and innovator.

We intend to produce another update on our DWMP in 2020/21 to aid early customer and stakeholder consultation and inform the next ‘State of the Nation’ report by the National Infrastructure Commission (NIC). Consultation phases will be added to the timeline below, once we have coordinated with our stakeholders. We will then further refine our plans with latest data and with further consultation before producing a full DWMP in 2022/23 to inform our PR24 business plan submission.



## 2.0 Future pressures

### The wastewater system will need to be resilient in the face of future pressures

Our 5 year plan and 25 year strategy takes account of some of the key pressures that our going to impact our wastewater system. These pressures are summarised below:

**Climate change:** There is no denying that extreme events are becoming more frequent and more intense. Our sewer systems will need to adapt to cope with this. A recent study into the impact of climate change on sewer design has concluded that we will need to accommodate an increase of 20% on peak flows just to maintain current levels of performance.

**Population Growth:** We are expecting increased development in our region in the next 5 years based on the predictions from the recently adopted Powys Local Development Plan. We will have to accommodate the extra waste water these additional properties produce as well as dealing with the surface water run-off from the new infrastructure created to serve them (for example, roads, schools, shopping centres etc).

**Water Quality:** The Water Framework Directive sets ambitious targets for the standard of water quality our rivers need to achieve. This will mean that we need to allow less wastewater to be discharged through our Combined Sewer Overflows and treat wastewater to a higher standard. It is not just our discharges that impact water quality, solving this problem will require a catchment approach.

**Operational Performance:** Our customers and stakeholders continue to expect improvement in the level of service we are able to provide. For our wastewater system this is predominantly measured through the number of incidents of flooding that affects people's homes and gardens, the number of times we pollute a watercourse and percentage of time our treatment works are compliant with the standards set by the Natural Resources Wales. Our sewerage systems currently perform reliably with minor issues already being addressed or investigated. We want to build on this great performance and continue to improve but this becomes gradually more and more challenging as the issues we are trying to fix get more complicated and more isolated.

## 3.0 Approach - planning for the future

Our approach to planning for the future builds on the best practice guidance set out in the Drainage Strategy Framework (Environment Agency and Ofwat 2013). The Drainage Strategy Framework sets out six guiding principles for drainage planning. Our approach aligns with these guiding principles and seeks to set a new best practice standard through innovative planning tools and techniques:

Guiding principle	Our approach to planning for the future
Partnership	<ul style="list-style-type: none"><li>• We are taking a lead on integrating drainage planning and have developed tools to aid sharing of information between different organisations.</li><li>• We are facilitating catchment-based partnerships that can deliver multiple outcomes (e.g. flood risk, environmental, economic growth)</li><li>• Consulting stakeholders</li></ul>

---

<b>Uncertainty</b>	<ul style="list-style-type: none"> <li>• All of our modelled outputs use multiple scenarios to test the sensitivity to uncertainty.</li> <li>• Our models are assessed against a confidence grading standard based on the level of verification achieved.</li> </ul>
<b>Risk Based</b>	<ul style="list-style-type: none"> <li>• We have developed 'driver trees' (a hierarchy of sub-measures) for all our key performance metrics that ensures we focus on the leading measures of performance, as well as the traditional lag measures, to help us prioritise our highest risk catchments.</li> <li>• All of our risks are visualised on catchment plans to make it easy to compare risks and identify 'hotspot' areas.</li> </ul>
<b>Whole life costs and benefits</b>	<ul style="list-style-type: none"> <li>• As well as considering whole life costs and benefits of specific schemes in isolation we are also assessing the costs and benefits of catchment level options and identifying opportunities for efficiency through co-delivery of work (e.g. refurbishing sewers and water mains at the same time or aligning sewer reinforcement work with highway re-surfacing).</li> <li>• We are directly incentivising ourselves to consider the benefits associated with Natural and Social Capital through our Green Communities Performance Commitment.</li> </ul>
<b>Live process</b>	<ul style="list-style-type: none"> <li>• We already maintain all of our models in a 'live' state which means that any changes in the catchment are immediately incorporated into the models and the risk assessments are reviewed.</li> <li>• We are installing 'live' monitoring into our sewers, pumping stations and treatment works to give us a much more granular view of operation and provide advance warning of indicators of failure.</li> </ul>
<b>Innovative and sustainable</b>	<ul style="list-style-type: none"> <li>• Our 'Open Innovation' approach is helping us stay at the forefront of emerging technology. We have an implementation process that helps us roll out the best innovations quickly into business as usual.</li> <li>• Sustainability has been incorporated into our decision making and our performance commitments. We have pre-assessed opportunities for surface water removal and SuDS to support prioritisation of interventions.</li> </ul>

## 4.0 Our planning tools

We have a range of comprehensive planning tools that we use to help us develop a detailed understanding of system risk. We are using the very latest software and modelling techniques to test multiple future scenarios and identify optimal and timely interventions.

It is the level of detail and the coverage of our planning tools that sets us apart from the rest of the sector. For example all companies will have hydraulic models of their sewer network, but few have 100% coverage with all models maintained in a 'live' state. Similarly, all companies will have some form of asset deterioration model to predict failures and inform operational investment. Few however will have factored in input characteristics such as local population demographics and proximity to food outlets - and even less will considered true consequence by mapping the path and depth of flood water.

Our suite of planning tools give us a much clearer view of risk and therefore allows us to prioritise really effectively where we intervene, which in turn makes us more efficient. An example is the difference in that we made on sewer flooding by introducing a new risk register approach.

We can also use the models to identify where there are synergies between programmes of work that can be exploited to make sure that when we do invest at a site, we resolve all potential drivers at the same time or build in a modular way that allows for future expansion. Aligning drivers of investment at a site or catchment level delivers significant efficiency over a non-aligned investment programme.

We have summarised our key planning tools and the function that they serve:

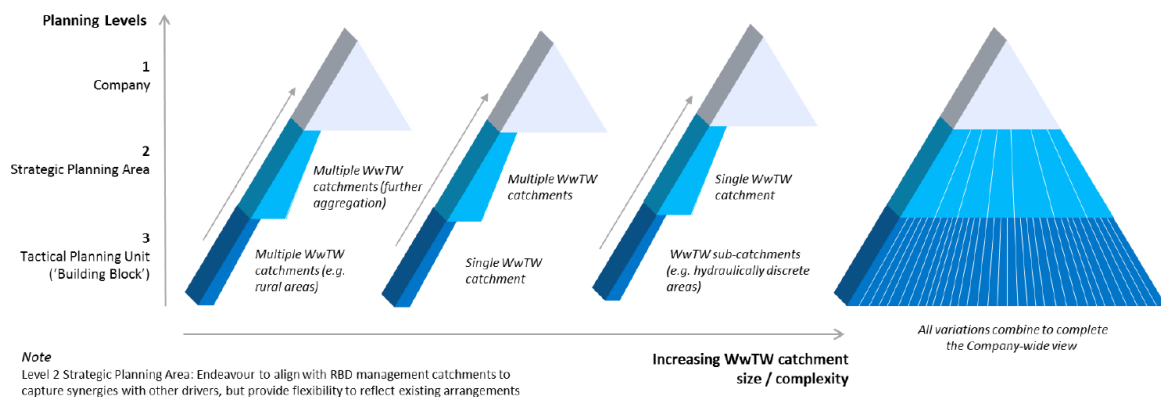
Tool	Planning function
<b>Sewerage Management Plan Models (using Integrated Catchment Modelling (ICM))</b>	<ul style="list-style-type: none"> <li>• Our Sewerage Management Plan (SMP) models deliver all of our understanding on how our system operates hydraulically.</li> <li>• The models are developed using the latest version of the Integrated Catchment Management (ICM) software from Innovyse.</li> <li>• By 2020 we will have full coverage of our system and all models will be maintained in a 'live' state (regularly updated for any catchment changes and re-verified)</li> </ul>
<b>Sewer Consequence Model (using Infonet)</b>	<ul style="list-style-type: none"> <li>• We have developed bespoke Sewer Consequence Models using the software Infonet. These models simulate a failure of every one of our pipes and assess the likely consequence using a range of datasets such as LiDAR, GIS mapping and 2D Flood Modelling.</li> <li>• Knowing the likely consequence (flooding or pollution) of a failure and being able to predict its severity (i.e. would it have affected a property internally or polluted a sensitive watercourse) enables better prioritisation.</li> </ul>
<b>2D Flood Routing (using Flood Risk Mapper and PondSIM)</b>	<ul style="list-style-type: none"> <li>• As an input to our SMP and Sewer Consequence Models we use 2D flood routing/mapping software to consider the risk from hydraulic overload, blockage or collapse of the sewer.</li> </ul>
<b>Hydraulic Flooding Risk Register</b>	<ul style="list-style-type: none"> <li>• In preparation for AMP6 we introduced our own hydraulic flooding risk register to replace the DG5 methodology. Our risk register calculates true risk by calculating a likelihood, based on an annual probability of flooding, and a consequence, based on area impacted by flooding and the depth.</li> <li>• This risk calculation has allowed us to convert all potential flooding schemes into a common denominator (known as the Equivalent Flooding Index) and therefore rank schemes based on the true risk.</li> </ul>
<b>Water Quality Models (inc. SIMPOL, SIMCAT and SAGIS)</b>	<ul style="list-style-type: none"> <li>• Our water quality models assess the impact of our discharges (both continuous and intermittent) on river and estuarine water quality.</li> <li>• We use these models to calculate the standards our treatment works or CSO discharges need to achieve to meet the objectives of the Water Framework Directive. We can also use these models to take a catchment based approach to improving water quality or consider options for alternatives to treatment enhancement (e.g. diffuse pollution management).</li> </ul>
<b>Flow and Load Tool</b>	<ul style="list-style-type: none"> <li>• We have a 'ready reckoner' tool for considering the impact of additional flows or loads on our Wastewater Treatment Works (WwTW) performance.</li> <li>• The Flow and Load Tool uses current performance versus design flow and load to calculate available headroom in WwTW capacity. When a risk threshold is breached this will trigger on site investigation and potential investment.</li> </ul>
<b>Sewer Infrastructure Model</b>	<ul style="list-style-type: none"> <li>• The Sewer Infrastructure Model (SiM) is our asset deterioration and operational whole life costs and benefits optimiser. It uses sewer condition assessments, asset data and performance data to calculate a rate of deterioration and the levels of investment needed to offset this deterioration or meet a defined set of targets.</li> <li>• The model is built in the Enterprise Decision Analytics software supplied by SEAMS Ltd and represents over 10 years of ongoing model development.</li> </ul>

<b>Non-Infrastructure Model</b>	<ul style="list-style-type: none"> <li>The Non-Infrastructure model works in a similar way to SiM but considers the deterioration of above ground assets including both civil structures and mechanical and electrical equipment.</li> </ul>
<b>Portfolio Optimiser</b>	<ul style="list-style-type: none"> <li>The Portfolio Optimiser is another tool from the Enterprise Decision Analytics package. We enter all the costs and benefits (using both willingness to pay and private costs of failure) of our schemes into the Portfolio Optimiser and it supports us in choosing the optimum overall balance of investment.</li> </ul>

## 5.0 Defining our planning boundaries

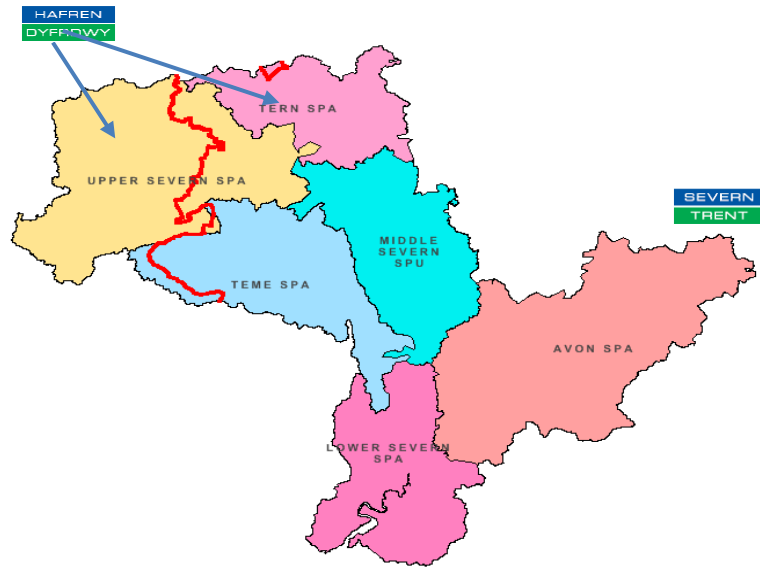
In line with the DWMP Framework we will be developing our DWMP at three different planning levels.

- Level 1 - Company:** This section brings together planning at level 2 and 3 to provide a high level overview to summarise the overarching DWMP to provide a strategic, long-term plan for drainage and wastewater resilience and associated investment over the plan period.
- Level 2 - Strategic Planning Areas (SPA):** These areas provide an aggregation of Level 3 units into larger level 2 strategic planning areas (SPAs). The Level 2 SPAs are proposed to describe the local drivers for change as well as facilitating a more strategic and collaborative level of planning above the detailed catchment assessments.
- Level 3 – Local Tactical Planning Unit (TPU):** These local planning areas are based on wastewater treatment works (WwTW) catchments. For small catchments these may be aggregated together but for our larger treatment works, or discrete sub-catchments for larger wastewater treatment works (WwTW) catchments).



Our Strategic Planning Areas are primarily based on the River Basin District boundaries as this offers the good alignment with other drivers (such as water quality and flood risk) and enables us to make use of the existing catchment based partnerships that are running in these areas. In some cases we have had to amend the boundaries slightly to ensure that the entirety of a sewage treatment catchment boundary falls within a single Strategic Planning Area. By doing this we maintain line of sight from Tactical Planning Unit through into Strategic planning Area.

In total we have 3 Strategic Planning Areas in the Hafren Dyfrdwy region; Upper Severn (Hafren) SPA, Tern SPA and Teme SPA.



For the purposes of our initial risk-based catchment screening assessment we have defined our Tactical Planning Units as the Wastewater Treatment Works catchment boundary. We have 50 WwTW catchments. Going forwards we may refine this to group some small rural catchments together into a single Tactical Planning Unit and break out our very large catchments into a number of smaller sub catchments.

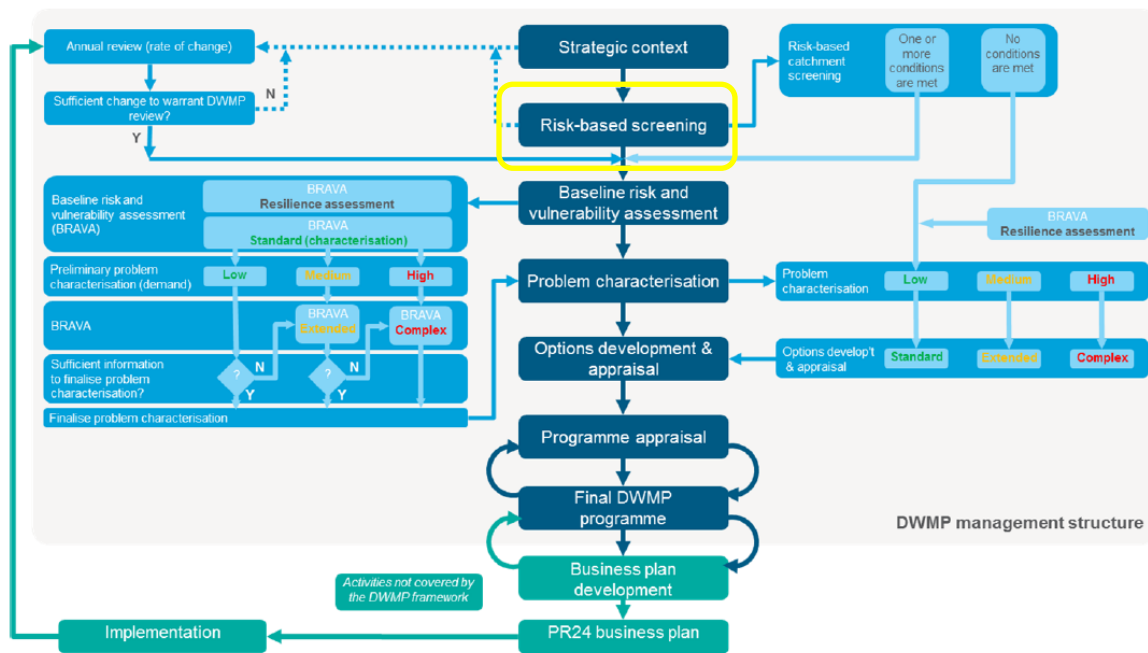
**Read more:** We've shown how our proposed Strategic Planning Area boundaries align to other administrative boundaries in Appendix C – Catchment Plans

## 6.0 Risk-based catchment screening

The first assessment stage of a DWMP is to complete a risk-based catchment screening. The screening exercise is intended to identify those catchments that require further, more detailed, investigation.

In order to complete the risk-based catchment screening we have measured each of our 50 Level 3 Tactical Planning Units against the 16 screening metrics (a combination of both performance measures and risk assessment measures) set out in the DWMP Framework.





**Read more:** We've included an overview description of each of our Strategic Planning Areas and the detailed outputs of our risk-based catchment screening in Appendix A.

## 7.0 Stakeholder Consultation

This section is in development as we work with stakeholders to align activities and agree how best to align consultations with other relevant work, such as the development of area statements in Wales.

## 8.0 Conclusion and next steps

We have all the necessary data, tools and techniques to progress quickly with the development of our first Drainage and Wastewater Management Plan (DWMP). Throughout the development of the Framework for DWMPs we have supported the sector by testing out the proposed methodologies and the metrics and provided critical feedback that has helped shape the end output.

We have shown through this document and its appendices that we understand both the current and future risks across our planning areas and we are ready to move to the next stage of the process to consider the baseline risk and vulnerability position and start engaging with customers and stakeholders on option development and appraisal.

The key strategic investments that we are planning to make in AMP7 are supported by the findings of our risk-based catchment screening exercise. They include many examples of how we are applying best practice, such as:

- co-creating and co-delivering solutions with developers and local authorities to align designs and reduce overall cost;
- taking a holistic, catchment based approach to deliver multiple benefits through a single investment; and,

- ensuring that we consider long term sustainability within our solutions and look for opportunities to phase investments where appropriate to manage uncertainty and/or bill impact for customers.

This document is just starting point and we recognise that we have a long journey ahead to develop our final DWMP – but it’s a journey we are fully committed to making. There are some near term next steps that we are going to be taking in advance of AMP7 so we can continue to lead and inform the rest of the sector:

Next step	What we are going to do
<b>Setting up Strategic Planning Groups (SPGs)</b>	<ul style="list-style-type: none"> <li>• The SPGs will have a key role to play in informing and shaping our DWMP and therefore setting these up is going to be one of the first things we do following publication of the framework.</li> <li>• In late 2018 we intend to hold some stakeholder workshops to help us set and co-create the terms of reference for our SPGs and raise awareness of the DWMP process.</li> <li>• We understand the pressures that both we and many of our stakeholders have around resourcing the SPGs and therefore we are going to look at ways in which we can integrate DWMPs into existing forums such as RFCCs and CaBA groups to reduce the burden and make the most of everyone’s time.</li> </ul>
<b>Formalising our Strategic Catchment Planning Team</b>	<ul style="list-style-type: none"> <li>• We have insourced some of the work that used to be completed by our specialist hydraulic modelling consultants. This has allowed us to appoint a new Strategic Catchment Planner role. It will be the responsibility of this Catchment Planner to be the expert on everything that is happening within their catchment and to liaise closely with stakeholders such as developers, local authorities and Natural Resources Wales to ensure that we take advantage of potential opportunities for collaboration.</li> <li>• We have appointed an employee into this role earlier this year and with the publication of the DWMP framework we will be formalising their role within the process.</li> </ul>
<b>Updating our assessments to take account of UKCIP18 data</b>	<ul style="list-style-type: none"> <li>• In November 2018 the latest UK climate change impact predictions are set to be published by UKCIP.</li> <li>• Climate change is one of the largest areas of uncertainty in our future predictions and therefore we will need to assimilate the latest information published by UKCIP and update our climate change factors where required.</li> </ul>
<b>Undertaking the BRAVA stage of DWMP</b>	<ul style="list-style-type: none"> <li>• The next stage of producing our DWMP is to undertake the baseline risk and vulnerability assessment (BRAVA) which will help us refine the outputs of our risk based catchment screening into a much more granular level of detail to dictate which catchments (or parts of catchments) should move forward to problem characterisation and options development and appraisal.</li> <li>• We intend to complete this assessment in 2019, a year ahead of the sector timeline.</li> </ul>

# Acronyms

<b>21CDP</b>	21st Century Drainage Programme
<b>AMP</b>	Asset Management Period or Plan
<b>CaBA</b>	Catchment Based Approach Groups
<b>CAF</b>	Capacity Assessment Framework
<b>DAP</b>	Drainage Area Plan
<b>DEFRA</b>	Department for Environment, Food and Rural Affairs
<b>DSF</b>	Drainage Strategy Framework
<b>DWMP</b>	Drainage and Wastewater Management Plan
<b>LA</b>	Local Authority
<b>LDP</b>	Local Development Plan
<b>LLFA</b>	Lead Local Flood Authority
<b>LPA</b>	Local Planning Authority
<b>WINEP</b>	Water Industry National Environment Programme
<b>Ofwat</b>	Water Services Regulation Authority
<b>PR</b>	Periodic/Price Review
<b>PSG</b>	Project Steering Group
<b>RBD</b>	River Basin District
<b>RBMP</b>	River Basin Management Plan
<b>RFCC</b>	Regional Flood and Coastal Committee
<b>RMA</b>	Risk Management Authorities
<b>SOAF</b>	Storm Overflow Assessment Framework
<b>SuDS</b>	Sustainable Drainage System
<b>UKCIP09</b>	UK Climate Projections 2009
<b>UKCIP18</b>	UK Climate Projections 2018
<b>UKWIR</b>	UK Water Industry Research Ltd
<b>WRMP</b>	Water Resources Management Plan
<b>WFD</b>	Water Framework Directive
<b>WwTW</b>	Wastewater Treatment Works