

Drainage and Wastewater Management Plans

Summary of the methodology for the Baseline Risk and Vulnerability Assessment (BRAVA) on:

Bathing Waters

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from
**Southern
Water** 

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1. Introduction

1.1. Purpose

The purpose of this document is to provide a summary of the method for undertaking the Baseline Risk and Vulnerability Assessment (BRAVA) for the planning objective to **improve Bathing Water quality**.

The BRAVA is an important step in the development of Drainage and Wastewater Management Plans (DWMPs). It is an assessment of current and future risks for each of the planning objectives and is undertaken for the wastewater catchments that were flagged during the Risk Based Catchment Screening (RBCS).

All Water and Sewerage Companies (WaSCs) were required to complete a BRAVA and report to Water UK on the following six common planning objectives:

1. Risk of sewer flooding in a 1 in 50 year storm
2. Storm overflow performance
3. Risk of WTW compliance failure
4. Internal sewer flooding risk
5. Pollution risk
6. Sewer collapse risk

We developed methodologies for conducting these six BRAVAs in accordance with the Water UK guidance and completed the BRAVAs in December 2020. The methodologies and outputs are published on our website at: <https://www.southernwater.co.uk/dwmp/baseline-risk-and-vulnerability-assessment>

We identified that two additional ‘bespoke’ objectives would complement the six common national objectives and have included these in our DWMP:

7. Annualised Flood Risk - which is the flood risk arising from sewers as a result of different severities of rainfall event; and
8. Wastewater Treatment Works (WTW) Dry Weather Flow (DWF) Compliance – to assess our compliance with the Environment Agency (EA) permit relating to the DWF arriving at a wastewater treatment works.

We are working collaboratively with partner organisations in the development of our DWMP. Through this collaboration we identified six additional planning objectives that will help us to achieve the wider environmental outcomes that our customers expect and we want to achieve.

They are:

1. Secure nutrient neutrality
2. Achieve Good Ecological Status / Potential
3. Reduce groundwater pollution
4. Improve bathing waters quality
5. Protect shellfish water quality
6. Improve surface water management

Further information on planning objectives for DWMPs can be found on our website: <https://www.southernwater.co.uk/dwmp/planning-objectives>.

1.2. Objective

Our region includes 700 miles of coastline with 83 designated bathing waters. Maintaining the water quality for bathing waters is a priority for our customers and stakeholders. Our long term aim is to ensure all the bathing waters in our region achieve an 'excellent' rating so they can be enjoyed by our customers, communities and visitors to our region, and support local economies. We are committed to protecting these coastal waters to ensure they are of the highest quality and have invested millions of pounds over recent years to improve and maintain the standard of the bathing waters in our region.

Bathing waters can be impacted by pollution from various sources, including discharges from combined sewer outfalls, houses with misconnected drains, leaking septic tanks, road runoff, run-off from slurry or manure from livestock, and animal (mostly dog) and bird faeces on beaches or from litter left behind by visitors.

In our AMP7 Business Plan covering the period 2020 - 2025, we made 43 performance commitments, which included the following three for bathing waters:

1. Maintain the number of bathing waters with an excellent water quality classification as defined under the revised Bathing Water Directive. Following the improvement of seven bathing waters to excellent in AMP6, we committed to maintaining a minimum of 57 bathing waters at this standard, including all seven of those improved in AMP6 (2015 – 2020).
2. Improve the number of bathing waters to at least good and bring at least five named bathing waters to the good water quality classification by 2025; and
3. Improve the number of bathing waters at excellent quality by bringing at least two from four named bathing waters to the excellent water quality classification.

This means by 2025 we will improve bathing water quality at seven locations to achieve 97% of our bathing waters at a good status or better. However, our longer term target is more challenging. By 2040 we aim to bring all 83 bathing waters up to 'excellent' standard by working collaboratively with partner organisations and with continuing customer support. To ensure we are investing to achieve this target we have created this planning objective and the associated BRAVA assessment to track our progress in achieving this target and identify the future investment needed to secure this outcome.

1.3. Definitions

A bathing water is a coastal or inland water that attracts a large number of bathers in relation to any infrastructure or facilities that are provided, or other measures that are taken to promote bathing at the site.

The Environment Agency (EA) takes up to twenty water samples at each designated bathing water in our area during the bathing water season between 15 May and 30 September each year. A classification for each bathing water is calculated annually based on samples from the previous four years. These classifications are, from best to worst:

- excellent – the highest quality, cleanest seas

- good – generally good water quality
- sufficient – the water meets minimum standards
- poor – the water has not met the new minimum standards.

These classifications are based on a statistical analysis of the samples taken over a four year period. The EA samples tell us the quality of the water at that specific time, but water can change even over the course of one day. In each sample, the EA tests for bacteria that indicate whether there is faecal matter in the water. The bacteria tested for are:

- Escherichia coli or E. coli (EC)
- Intestinal enterococci (IE)

The more of these bacteria present in a bathing water means there are greater risks to bathers' health. The standards used are specified in the Bathing Water Directive and are based on World Health Organisation research which recorded the incidence of gastrointestinal disease (stomach upsets) in people bathing in waters of differing bacterial concentrations.

There are no 'pass' or 'fail' standards. Statistical analysis groups bathing waters into classifications based on the probability that most of the time concentrations of Escherichia coli (EC) or Intestinal enterococci (IE) will be below classification thresholds. All the samples are combined and the classification is based on a statistical measure, known as the 'percentile' which measures the probability of high results occurring. The classification uses either the 95% or 90% percentile depending on the classification (see table 1).

Table 1: Coastal Bathing Water Classification Thresholds

Classification	Thresholds	Confidence level
Excellent	EC: ≤250 cfu/100ml ; IE: ≤100 cfu/100ml	95th percentile
Good	EC: ≤500 cfu/100ml ; IE: ≤200 cfu/100ml	95th percentile
Sufficient	EC: ≤500 cfu/100ml ; IE: ≤185 cfu/100ml	90th percentile
Poor	Means that the values are worse than the sufficient	

1.4. Scope

The scope of this BRAVA assessment is to undertake a risk assessment for all of our wastewater catchments / systems to identify those that may be contributing to bathing waters that are not achieving, or at risk of failing to achieve, the "excellent" bathing water classification. The purpose of the risk assessment is to enable us to target investment in those catchments to improve our systems and enable the bathing water to achieve an excellent classification.

The assessment is a desktop exercise using readily available data from the EA as well as the data we hold. Further in depth analysis may be needed to identify if the cause of a bathing water not achieving the excellent classification is due to our assets or to other sources such as dog fouling on the beach, highway storm run-off, and/or householder misconnections.

1.5. Reporting Requirements

We are not required to report the BRAVA outcomes for our bespoke and additional planning objectives to Water UK. However, we will publish the results on our website for consideration by our customers and partner organisations.

2. Data Sources

The following is a short description of the data that has been used and where it has been obtained from.

2.1. Water Quality data

The EA's bathing water quality data and analysis as published on the UK Government website provides the classification for each of the bathing waters in our area. This has been used in this risk assessment as the primary source of data.

3. Method of Assessment

The following methodology has been developed to assess the risks from our wastewater networks affecting the quality of a bathing water and contributing to it not achieving or at risk of failing to achieve the 'excellent' classification.

3.1. Process

We have undertaken investigations to assess the potential sources of contamination. Identifying the geographical relationship between our assets and a bathing water has helped us to establish the root causes of why the bathing water may be negatively affected and allow us to develop an appropriate solution. For example, the reasons may include:

- Agricultural – where a bathing water is close to a river mouth and analysis of the sample data shows that high concentrations of faecal matter occur during tidal changes so that the root cause can be attributed to agricultural activities.
- Misconnections – where samples with high levels of faecal matter do not necessarily correlate with spill data from our assets, the root cause may be attributed to foul sewage misconnected to our surface water sewer network.
- Private sewers serving holiday parks and marinas close to the bathing waters can impact bathing water quality.
- Sewer integrity – Poor structural sewers in the vicinity of a bathing water can leak foul water which could lead to high level of faecal matter.

- Overflows from wastewater systems – discharges from storm overflows in our wastewater systems in proximity of a bathing water can have an impact on the bathing water quality.

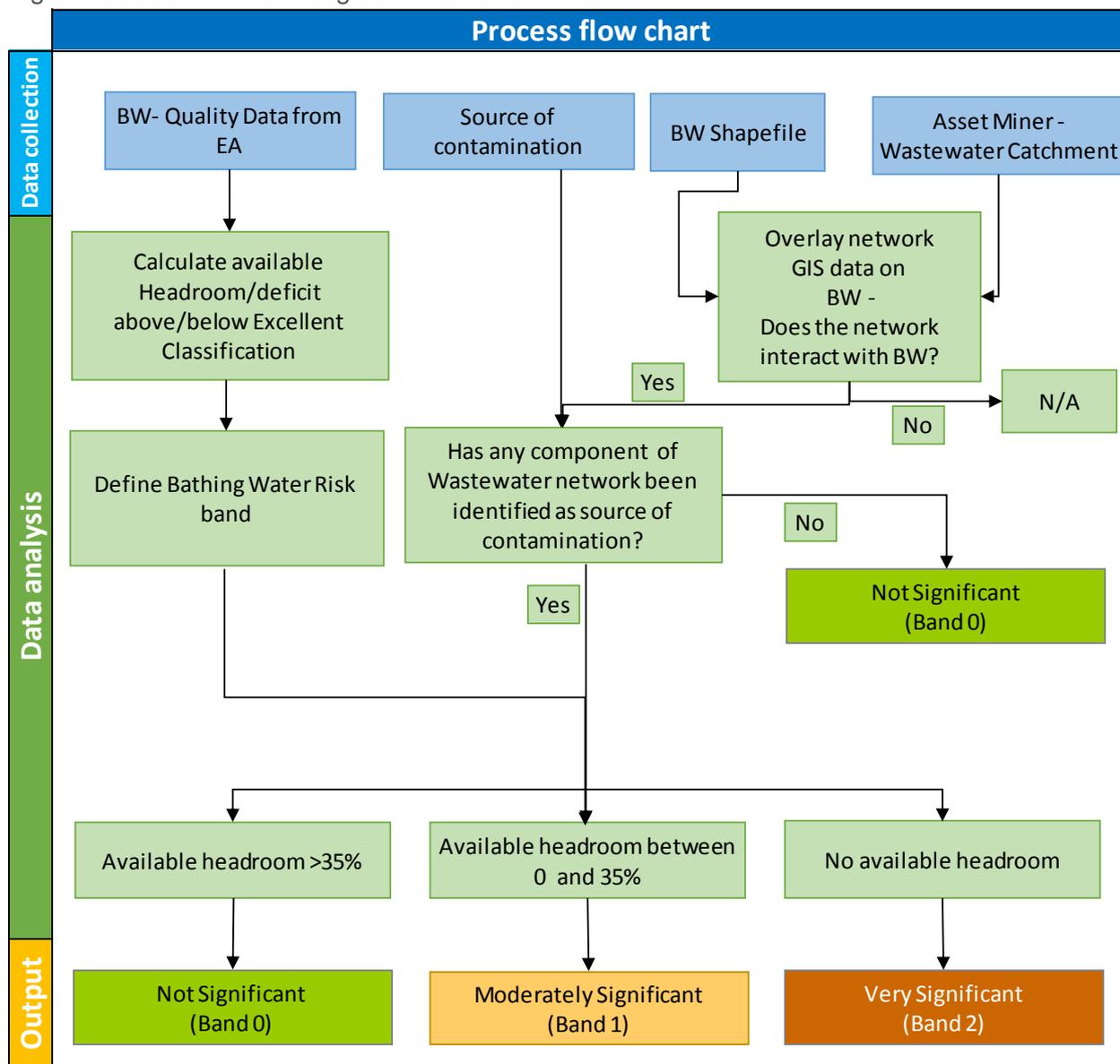
We have assessed concentrations at bathing waters using the EA's sample data. For each bathing water the calculated 95th percentile is compared to the excellent threshold concentration and expressed as a percentage of that threshold concentration. For example, 'good' classification is expressed as 200% of 'excellent'. Therefore, a percentage greater than 100% indicates that the bathing water status is not achieving 'excellent' classification.

We aspire to achieve 'excellent' status. Therefore the process developed for this assessment considers the available headroom above the 'excellent' class at each bathing water.

For the purpose of this assessment we assigned bathing waters to one of three bands (risk categories as defined by Water UK) according to the available headroom in the results. These are shown in table 2. The risk band of the bathing water is assigned to the wastewater systems that are contributing to the water quality for the bathing water.

The process for the bathing water risk assessment is shown in the flow chart below (see Figure 1).

Figure 1: Process for Bathing Water Risk Assessment



3.2 Outputs from the BRAVA

The outputs from the BRAVA on bathing waters will provide a risk score for each bathing water and also for each sewer catchment. The score is determined based on the headroom available in each bathing water, detailed in table 2.

Table 2: Bathing Water banding thresholds

Criteria	Bands	
35% available headroom above the minimum standard required to achieve 'Excellent' class	0	<i>Not Significant</i>
0- 35% available headroom above the minimum standard required to achieve 'Excellent' class	1	<i>Moderately Significant</i>
No available headroom (Site currently below 'Excellent' class or with risk to drop to low status)	2	<i>Very Significant</i>

The risk score for each wastewater system (catchment) corresponds to the bathing water score. Where the wastewater system has an impact on more than one bathing water, the worst of the bathing water scores is used for the wastewater system score and risk band.

Where a wastewater catchment is not linked to a bathing water, the “not applicable” classification is applied to the wastewater catchment.

The scores for each sewer catchment are collated for reporting at the river basin catchment scale. The river basin catchment score is taken as the maximum risk band for any wastewater system in the river basin district catchment.

Southern Water
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