

BRAVA planning objectives for the first cycle of DWMPs

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Context

This technical note is intended primarily for practitioners from water companies and other participants in the Drainage and Wastewater Management Plan (DWMP) process, to provide clarity on the details of the Planning Objectives to be used at a national level for outputs from the BRAVA process for the first cycle of DWMPs. A non-technical overview of DWMPs can be found [here](#), and full details of the DWMP framework can be found [here](#).

Background

The Baseline Risk and Vulnerability Assessment (BRAVA) is one of the stages within the Drainage and Wastewater Management Plan (DWMP) framework. BRAVA follows the risk-based catchment screening (RBCS) stage, which aims to filter out low risk level 3 tactical planning units (TPUs). The objective of BRAVA is to assess the baseline risk for level 3 TPUs which have not already been filtered out by the RBCS stage. This includes how current drainage and wastewater systems perform, how the risks will change in the long term, and the identification of the principal drivers for those changes in risk.

Much like the supply demand balance concept of Water Resource Management Plans, the outputs of BRAVA will provide a strategic view of the level of risk facing drainage and wastewater services now and for the long term. These outputs will help inform decisions on whether interventions are required to ensure a robust and resilient service can be provided. If interventions are required, these will be developed through the Options Development Appraisal and Programme Appraisal stages and incorporated in final DWMPs.

In considering the appropriate approach to BRAVA for the first cycle of DWMPs, companies have been mindful of the need to appropriately prioritise resources, in particular for resource intensive activities such as modelling – in line with the strategic purpose of DWMPs and that “it is not the intention of the DWMP framework to develop a cottage industry around modelling”¹.

The approach companies will take for the first cycle is to make baseline assessments for all planning objectives, and then make assessments where applicable for 2050 to understand the potential situation at the end of the 25-year planning period.

¹ DWMP Framework Appendix C, page 4

Where a catchment is not found to be at significant risk in either the baseline or at the end of the planning period, there would be little benefit in also modelling the situation at the intermediate 5-year and 10-year time horizons which are also referred to in the DWMP Framework; not modelling these intermediate periods for BRAVA enables resources to be focussed on assessing higher risk catchments in more detail in the Options Development Appraisal (ODA) stage of DWMPs.

The reporting to stakeholders of the BRAVA stage in December 2020 will help provide stakeholders with a strategic view of the level of risk facing drainage and wastewater services across the country and enable companies and stakeholders to progress towards final DWMPs, including identifying opportunities for collaboration within other strategies and plans.

Qualification for BRAVA

Baseline risk assessments are carried out for those level 3 TPUs that meet one or more of the risk-based catchment screening criteria. As set out in section C.2.2 of the framework, where level 3 TPUs have been captured within the risk-based screening process based on a single indicator, companies will take a view on the extent of the assessment undertaken. The comments sections of the reporting tables allow companies to provide commentary for these circumstances. As defined in section B.2.2 of the framework, if only the sewer collapses and/or blockages indicators are found to be exceeded through the risk-based catchment screening, then this is to be treated as if no indicators are exceeded.

Planning objectives

Companies have established planning objectives against which catchment constraints are to be assessed and interventions developed, some of which reflect performance commitments that are relevant to drainage and wastewater services.

The DWMP is focused on long term planning at both national and local levels, and as a result companies have classified planning objectives as either:

- Common planning objectives (applied to all companies and reported at a national level) or
- Bespoke planning objectives (applied by individual companies and reported at a local level).

Common planning objectives

All companies will use six common planning objectives for national level outputs for the first iteration of DWMPs which will be published in draft in summer 2022.

Three of the common planning objectives will have baseline assessments (2020) and long-term (2050) forecasts of performance. These common planning objectives are:

- risk of sewer flooding in a 1 in 50-year storm;
- storm overflow performance; and
- risk of wastewater treatment works quality compliance failure.

The remaining three of the common planning objectives will only currently be assessed for the baseline year. This is because a method for forecasting future events in such a large asset stock, which are typically caused by random or unpredictable incidents, is not presently available. These common planning objectives are:

- internal sewer flooding risk;
- pollution risk; and
- sewer collapses risk

The six common planning objectives are intended to provide stakeholders with an informed overview of current baseline performance, and the long-term risk for three of the planning objectives, under a 'do nothing' scenario, considering future challenges including climate change, urban creep and growth.

Methodologies have been developed for each of the common planning objectives and how they are used in the BRAVA process; these are included in the Annex to this document.

All six common planning objectives will be reported at level 1 (company regional area), level 2 (strategic planning areas) and level 3 (tactical planning units) and in the formats (tables and/or maps) set out in the Annex.

Bespoke planning objectives

Bespoke planning objectives are specific to each individual company's priorities and developed with local stakeholder consultation as described in each company's strategic context to their DWMP. These bespoke planning objectives will complement the common planning objectives and as they are specific to individual companies, they will be reported on by each individual company.

It is anticipated that for the second cycle of DWMPs there may be opportunities for some bespoke planning objectives to be used more widely across the industry, and possibly even become common planning objectives, where it has been demonstrated through cycle 1 that a more standardised approach would be beneficial for cycle 2.

Exceedance / thresholds

As outlined in the framework (section 4.2.2), companies will develop, in consultation with stakeholders, an understanding of what levels of risk are acceptable at the different time horizons, which will be used to determine appropriate thresholds for planning objectives for each company.

For the first cycle of DWMPs, these will be company specific, but the approach to thresholds will be reviewed as a part of the review from cycle 1 to cycle 2 to identify where there may be opportunities for greater standardisation of approaches.

Annex Common planning objectives for the first cycle of DWMPs

1. Risk of sewer flooding in a 1 in 50-year storm

<u>Objective/Definition</u>	<u>Definition clarifications</u>
<ul style="list-style-type: none"> • To be applied to all catchments that have triggered a BRAVA assessment through the RBCS process. • This approach will provide a sewer flood risk input to complement the National Infrastructure Assessment of properties at risk from river/sea & surface water flooding. • It will be consistent with, but will not reflect exactly, the annual reporting for the Ofwat common resilience performance commitment, as set out below under ‘baseline assessment’. • Approach to be undertaken in accordance with the guidance set out by Ofwat, apart from as below: <p>https://www.ofwat.gov.uk/wp-content/uploads/2019/04/Reporting-guidance-Risk-of-sewer-flooding-in-a-storm_final_290319.pdf</p> <ul style="list-style-type: none"> • As per the Ofwat methodology it includes ‘internal’ hydraulic sewer flooding only but, unlike the Ofwat methodology, will not exclude catchments under 2,000 PE or apply vulnerability grades/functional areas. 	<p>Results to be presented at Baseline (2020) and 2050-time horizons.</p> <p><u>Thresholds</u></p> <ul style="list-style-type: none"> • Bands of 0, 1 & 2 to be applied; with 0 as ‘Not Significant’, 1 as ‘Moderately Significant’ and 2 as ‘Very Significant’. Where a catchment does not trigger BRAVA, these will be flagged as ‘Not Applicable’. • Thresholds for bands to be developed by each company appropriate to their needs and to ensure outputs are meaningful to inform stakeholder engagement. <p><u>Maps</u></p> <ul style="list-style-type: none"> • To be produced for an L2 based on bands 0, 1 & 2. <p><u>Tables</u></p> <ul style="list-style-type: none"> • To be produced for L1, L2 & L3 and include only 0, 1 & 2 banding. • Subject to a review of compliance with data protection regulations, additional detail at an L3 could be included, for example % population at risk. • L1 & L2 to additionally include numbers of properties at risk of sewer flooding in a 1 in 50-year storm.

<u>Baseline Assessment</u>	<u>2050 Assessment</u>
<ul style="list-style-type: none">• Baseline position (2020) to be produced in accordance with the guidance set out by Ofwat for the PR19 performance commitment, except where a hydraulic model is not available for a catchment, then an informed assessment of risk will be undertaken by the company to identify properties likely to be at internal flood risk.• This will provide a more representative assessment of current risk for planning purposes, rather than assuming all properties are at risk in a non-modelled catchment as per the Ofwat methodology which is intended to incentivise companies to expand their hydraulic models to more catchments over time.• Each company will determine the thresholds it will use to ensure the results appropriately reflect their risk and provide an overview of their calculations.	<ul style="list-style-type: none">• Same methodology as Baseline Assessment, with:<ul style="list-style-type: none">○ Rainfall uplifted to include forecast climate change impacts up to 2050 epoch.○ Growth and creep to be added in line with best available central estimate / company approach.

2. Storm overflow performance

<u>Objective/Definition</u>	<u>Definition clarifications</u>
<ul style="list-style-type: none"> • The purpose of this Planning Objective is to assess baseline (2020) storm overflow performance and provide an indication of future vulnerability by 2050 under a 'do nothing' scenario due to climate change, new development, and permeable area creep. The objective being to identify those catchments at greater risk to inform Option Development & Appraisal (ODA). • This assessment is to be carried out for all catchments triggering BRAVA through the RBCS process where there are storm overflow(s) in the catchment. • Results will be collated and reported at a L3 TPU catchment level and at a L2 SPA. Asset specific spill performance for each storm overflow will not be reported as part of BRAVA. • In line with Appendix C of the Framework, performance will be categorised as: 0 (Not Significant), 1 (Moderately Significant), 2 (Very Significant) or N/A (Not applicable). • The definition of storm overflow will include both sewer network and WWTW storm tanks. • Annual average spills are to be calculated using the EDM criteria of '12/24 spill counting'. 	<ul style="list-style-type: none"> • Where catchments have no storm overflows/WWTW storm tanks, then catchments should be flagged as 'Not Applicable' • For Cycle 1 of DWMPs the assessment is to exclude receiving water quality, amenity use and dilution. However, where storm overflow performance is highlighted as 'Moderately Significant' or 'Very Significant' the environmental impact should be considered as part of Option Development & Appraisal (ODA). <p data-bbox="928 961 992 993"><u>Maps</u></p> <ul style="list-style-type: none"> • To be produced at for L2 to visually display bands 0, 1 & 2. <p data-bbox="928 1121 1003 1152"><u>Tables</u></p> <ul style="list-style-type: none"> • To be produced for L1, L2 & L3 and include only 0, 1 & 2 banding.

Baseline Assessment	2050 assessment
<ul style="list-style-type: none"> • Assessments should be completed using the most appropriate means of determining storm overflow performance. Where available, fit for purpose hydraulic models should be used where possible. Where a suitable hydraulic model is not available then EDM data can be used with an appropriate adjustment for annual rainfall. Where an overflow did not meet EDM criteria for monitoring (e.g. low spills/low impact), then the default performance should be 'Not Significant' under baseline performance. • Hydraulic modelling assessments should preferably use 10-year TSR to determine average annual spills ('12/24 spill counting'). However, companies may use representative '3-year TSR' (per CAF) or a 'Typical Year' dataset where appropriate. This approach ensures BRAVA does not become an overly extensive modelling exercise whilst acknowledging that full TSR may still be needed as part of ODA to address holistic catchment risks. • Thresholds to be reviewed once results available to ensure meaningful outputs. However proposed thresholds for performance criteria (per CSO) are to be aligned to the CAF methodology, namely: <ul style="list-style-type: none"> ○ < 20 spills = 'Not Significant' (0 points) ○ 21-40 spills = 'Moderately Significant' (1 point) ○ > 40 spills = 'Very Significant' (2 points) <p><u>CSO</u></p> <ul style="list-style-type: none"> ○ < 3 = 'Not Significant' (0 points) ○ 4 – 10 = 'Moderately Significant' (1 point) ○ > 10 = 'Very Significant' (2 points) <p><u>Bathing Waters</u> (events per summer)</p> <ul style="list-style-type: none"> ○ < 3 = 'Not Significant' (0 points) ○ 4 – 10 = 'Moderately Significant' (1 point) ○ > 10 = 'Very Significant' (2 points) <ul style="list-style-type: none"> • Aggregation to an L3 based on Weighted Points Score= (total number of points scored by CSOs *100)/ (total number of CSOs *2), with L2 normalisation based on 'Population Equivalent' (per RBCS). Worked examples will be provided once results are available to ensure the aggregate outputs are meaningful. 	<ul style="list-style-type: none"> • Same methodology as Baseline modelling, with: <ul style="list-style-type: none"> ○ Rainfall time series uplifted to include climate change using 2017 UKWIR Red-Up rainfall perturbation tool for 2050 epoch. ○ Growth and creep to be added in line with best available central estimate • Where no hydraulic model is available, an appropriate adjustment should be applied to baseline EDM spill data. • Climate change uplifts should use central estimate 2050 projections. • Performance and aggregation to use the same baseline methodology to ensure comparability. • The outputs will comprise of data tables at L3, with maps at Level 2.

3. Risk of wastewater treatment works quality compliance failure

<u>Objective/Definition</u>	<u>Definition clarifications</u>
<ul style="list-style-type: none"> • To be applied to all catchments that have triggered a BRAVA assessment through the RBCS process. • This planning objective defines the 'Risk of WwTW quality compliance failure'. • A compliance failure aligns to the current definition as set out in the EPA guidance. • Covers treatment works compliance as set out in Environmental Performance Assessment (EPA) at wastewater assets only. • This measure will exclude water treatment works compliance as these assets are not relevant to Drainage and Wastewater Management plans. • Results to be presented for the Baseline (2020) and Long term (2050). • Companies may choose to cover other elements of WwTW compliance in bespoke assessments. 	<ul style="list-style-type: none"> • Where WwTW have no numeric permit conditions (Descriptive permits), catchments should be flagged as "Not Applicable". • Any issues identified with sites holding a descriptive permit should still be considered for options development. <p><u>Thresholds</u></p> <ul style="list-style-type: none"> • Bands of 0, 1 & 2 to be applied; with 0 as 'Not Significant', 1 as 'Moderately Significant' and 2 as 'Very Significant'. Where a catchment does not trigger BRAVA, or it is not appropriate to conduct an assessment as per the framework they will be flagged as 'Not applicable'. • Thresholds for bands to be developed by each company appropriate to their needs and to ensure outputs are meaningful to inform stakeholder engagement. <p><u>Maps</u></p> <ul style="list-style-type: none"> • To be produced at for L2 to visually display bands 0, 1 & 2. <p><u>Tables</u></p> <ul style="list-style-type: none"> • To be produced for L1, L2 & L3 and include only 0, 1 & 2 banding.

<p><u>Baseline Assessment</u></p> <ul style="list-style-type: none"> • The baseline performance is to be based on an assessment of modelled WwTW treatment capacity. • Where a suitable WwTW model is not available companies will use historic performance data to produce a projection of compliance using the last 3 years of performance data. • This baseline assessment considers compliance with current permit only. • Companies will provide commentary where there is no model to provide transparency. • The L3 results are to be aggregated up to a L2 based on PE served. • Each company will determine the thresholds it will use to ensure the results appropriately reflect their risk and provide an overview of their calculations. 	<p><u>2050 Assessment</u></p> <ul style="list-style-type: none"> • Same methodology as Baseline Assessment, should be used with the following changes to model inputs and parameters: <ul style="list-style-type: none"> ○ Updated population equivalent projections ○ Updated flow and load projections ○ Updated permit conditions where there are committed permit change anticipated in AMP7 e.g. WINEP • Where there is no model, a factor should be applied to the trend analysis to account for growth. <p><u>Assumptions</u></p> <ul style="list-style-type: none"> • WwTW assets and condition remain the same between 2020 and 2050 • Receiving water quality remains the same and does not trigger permit changes unless already confirmed in AMP7. The approach for how climate change will impact this will be developed with stakeholders in advance of cycle 2. • The approach for forecasting UV compliance will be reviewed as companies start to produce meaningful data.
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4. Internal sewer flooding risk

<p><u>Objective/Definition</u></p> <ul style="list-style-type: none"> • To be applied to all catchments that have triggered a BRAVA assessment only through the RBCS process. • This planning objective defines the 'Internal Sewer Flooding Risk' for both hydraulic & Other Causes e.g. blockages. It allows for a comparison to be drawn between the likely scale of all 'Internal sewer flooding' experienced each year compared to the scale of hydraulic only flooding that may be observed during a rare event such as a 1 in 50-year storm. • As per the Ofwat reporting criteria it covers internal sewer flooding due to hydraulic incapacity and other causes (e.g. blockages, collapses & equipment failure). It excludes: Non-sewer related flooding such as privately owned sewerage, Fluvial, Pluvial (except where linked to the incapacity of a sewer), Land Drainage, Highway drainage and private drains. • Results are to be presented at a Baseline (2020) case only. 	<p><u>Definition clarifications</u></p> <p>Results to be presented at Baseline (2020).</p> <p><u>Thresholds</u></p> <ul style="list-style-type: none"> • Bands of 0, 1 & 2 to be applied; with 0 as 'Not Significant', 1 as 'Moderately Significant' and 2 as 'Very Significant'. Where a catchment does not trigger BRAVA, these will be flagged as 'Not applicable'. • Thresholds for bands to be developed by each company appropriate to their needs and to ensure outputs are meaningful to inform stakeholder engagement. <p><u>Maps</u></p> <ul style="list-style-type: none"> • To be produced for L2 to visually display bands 0, 1 & 2. <p><u>Tables</u></p> <ul style="list-style-type: none"> • To be produced for L1, L2 & L3 and include only 0, 1 & 2 banding.
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<u>Baseline Assessment</u>	<u>2050 Assessment</u>
<ul style="list-style-type: none">• The baseline performance is to be based on best available model data.• Where a suitable model is not available, companies will use an average of last 3 years of annual performance.• The results are to be normalised based on connected 'properties' to move between level 3, level 2 and level 1. This is undertaken to ensure comparability of performance is provided across all geographical bases.• Each company will determine the thresholds it will use to ensure the results appropriately reflect their risk and provide an overview of their calculations.	<ul style="list-style-type: none">• Not to be produced for Cycle 1 but the potential for 2050 assessments to be produced for Cycle 2 to be considered in the 'Cycle 1 to Cycle 2 review'.

5. Pollution risk

<p><u>Objective/Definition</u></p> <ul style="list-style-type: none"> • To be applied to all catchments that have triggered a BRAVA assessment through the RBCS process. • This planning objective defines the ‘Pollution risk’. It allows for a comparison to be drawn between the likely scale of pollution risk. • Covers pollution incidents as set out in Environmental Performance Assessment (EPA) relating to wastewater assets only and thus this measure will exclude non-sewer related pollutions such as water treatment/supply assets, third party private assets. • This will include sewerage infrastructure, including pumping stations, WwTW and Sludge/Biosolids incidents. Comprising other causes (i.e. blockages, collapses and equipment failure) and those caused by hydraulic overload (i.e. sewer overflows operating outside permit conditions or due to overland rainfall induced pollution). • It only includes Serious Pollutions (formerly Cat 1 and 2) and Category 3 incidents (aligned to RBCS). All pollutions counted equally for the purposes of this measure. • Results to be presented as Baseline (2020) case only. 	<p><u>Definition clarifications</u></p> <p><u>Thresholds</u></p> <ul style="list-style-type: none"> • Bands of 0, 1 & 2 to be applied; with 0 as ‘Not Significant’, 1 as ‘Moderately Significant’ and 2 as ‘Very Significant’. Where a catchment does not trigger BRAVA, these will be flagged as ‘Not applicable’. • Thresholds for bands to be developed by each company appropriate to their needs and to ensure outputs are meaningful to inform stakeholder engagement. <p><u>Maps</u></p> <ul style="list-style-type: none"> • To be produced at L2 to visually display bands 0, 1 & 2. <p><u>Tables</u></p> <ul style="list-style-type: none"> • To be produced for L1, L2 & L3 and include only 0, 1 & 2 banding.
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<u>Baseline Assessment</u>	<u>2050 Assessment</u>
<ul style="list-style-type: none">• The baseline performance is to be based on best available model data.• Where a suitable model is not available, companies will use an average of last 3 years of annual performance.• The results are to be normalised based on connected sewer length to move between level 3, level 2 and level 1, in line with RBCS/EPA.• Each company will determine the thresholds it will use to ensure the results appropriately reflect their risk and provide an overview of their calculations.	<ul style="list-style-type: none">• Not to be produced for Cycle 1 but the potential for 2050 assessments to be produced for Cycle 2 to be considered in the 'Cycle 1 to Cycle 2 review'.

6. Sewer collapse risk

<p><u>Objective/Definition</u></p> <ul style="list-style-type: none"> • To be applied to all catchments that have triggered a BRAVA assessment through the RBCS process. • This planning objective defines the ‘Sewer Collapse Risk’. • The definition of the measure is in accordance with the Ofwat reporting guidance for sewer collapses. • It includes rising mains, pipe bridges and failures on the infrastructure network, including inlets to WwTW and terminal pumping stations. • Results are to be presented at a Baseline (2020) case only. 	<p><u>Definition clarifications</u></p> <p><u>Thresholds</u></p> <ul style="list-style-type: none"> • Bands of 0, 1 & 2 to be applied; with 0 as ‘Not Significant’, 1 as ‘Moderately Significant’ and 2 as ‘Very Significant’. Where a catchment does not trigger BRAVA, these will be flagged as ‘Not applicable’. • Thresholds for bands to be developed by each company appropriate to their needs and to ensure outputs are meaningful to inform stakeholder engagement. <p><u>Maps</u></p> <ul style="list-style-type: none"> • To be produced for L2 based on bands 0, 1 & 2. <p><u>Tables</u></p> <ul style="list-style-type: none"> • To be produced for L1, L2 & L3 and include only 0, 1 & 2 banding.
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<u>Baseline Assessment</u>	<u>2050 Assessment</u>
<ul style="list-style-type: none">• The baseline performance is to be based on best available model data.• Where a suitable model is not available, companies will use an average of last 3 years of annual performance.• The results are to be normalised based on km of sewer to move between level 3, level 2 and level 1.• Each company will determine the thresholds it will use to ensure the results appropriately reflect their risk and provide an overview of their calculations.	<ul style="list-style-type: none">• Not to be produced for Cycle 1 but the potential for 2050 assessments to be produced for Cycle 2 to be considered in the 'Cycle 1 to Cycle 2 review'.