Our Drainage and Wastewater Management Plan 2030-2055

Delivering for customers, communities and the environment

Performance Indicator Methodology - Emergency Overflow Performance (England)

March 2026

Thames Water

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This methodology document is a working draft based on the requirements of the published DWMP guidance and informed by agreements made through the Water Industry Task and Finish Groups for each Performance Indicator (PI). As the DWMP stages for each PI progress, this methodology will be refined to reflect the practicalities of deployment and feedback from stakeholders. A final published methodology document will describe the detailed approach followed.

1. Introduction

1.1. This document provides a detailed description of the **Emergency Overflow Performance Indicator** and its purpose and contribution to forming our Drainage and Wastewater Management Plan (DWMP).

Purpose of this document

1.2. The purpose of this document is to outline the methodology that will be used to establish the base year and future baseline forecasts for the **Emergency Overflow Performance Indicator**, as part of our DWMP for the 2030-2055 planning period. The base year is 2030[1] and it is our best estimate of expected performance for this indicator at the end of the current investment period (2025-2030). We then forecast what is expected to happen to the indicator at baseline points in the future, if no change in investment is made, beyond that planned in the investment 2025-30 period. These future points are set in the short term (2035), the medium term (2045) and the long term (2055).

1.3. In addition, the document sets out threshold values that will be used to summarise the level of risk and guide the development of options for the 2030-2055 planning period.

1.4. The requirements for Performance Indicators are set out in Government guidance for DWMPs[2] and subsequent clarifications by the Environment Agency (EA)[3]. To understand the general approach to our DWMP please also refer to our Strategic Context document on our website[4].

1.5. Assessment of the base year (2030) and future risks for each of our Performance Indicators is an important step in the development of our DWMP. It informs our understanding of how the drainage and wastewater system is able to meet legal obligations and meet the needs of customers and the environment. The DWMP approach requires completion of a risk assessment for the following Performance Indicators for each future planning horizon at the wastewater catchment scale:

- Internal flooding
- External (curtilage) flooding
- Storm overflow performance (England)[$]
- Treatment works compliance (numeric)[$]
- Treatment works compliance (descriptive at numeric sites)[$]
- Treatment works compliance (Dry Weather Flow (DWF))

[1] 2030 refers to either the regulatory year 1 April 2029 to 31 March 2030 or the calendar year 2029, depending on the specific guidelines for individual Performance Indicators
[2] Guidelines for Statutory Drainage and Wastewater Management Plans (DWMPs) - GOV.UK
[3] EA letters to water companies with feedback on performance indicators (02/10/2025), (23/03/2026) and reporting thresholds (17/10/2025).
[4] DWMP28 | Drainage and wastewater | Thames Water

- Treatment works compliance (Flow to Full Treatment (FFT))
- Good Ecological and/or Chemical Status: Public sewerage
- Pollution incidents: serious[$]
- Pollution incidents: total
- Bathing water quality
- Shellfish water quality
- Surface water flooding (Shared responsibility)[β]
- Good Ecological and/or Chemical Status: Urban and transport (Shared responsibility)[β]
- **Emergency overflow performance[$β]**
- Treatment Works Compliance (descriptive)[β]
- Groundwater pollution[β]
- Groundwater infiltration[β]

1.6. Performance Indicators marked $ will use a nationally consistent suite of thresholds to describe the general level of risk[2,3]. Performance Indicators marked β are considered more experimental in nature and are recognised as inherently difficult to forecast and will hence be trialled in DWMP28 as emerging Performance Indicators and then possibly refined for subsequent DWMPs[2].

Key definitions

1.7. The DWMP guidance provides the following definition for this Performance Indicator:

Table 1. Extract from Table 2 of Defra guidance

Category	Metric	Details
Water environment	Emergency overflow performance (England)	Number of emergency overflows that operate once or more per year.

1.8. **Permit compliance:** Emergency Overflows (EOs) are permitted to operate in the event of equipment failure such as power outages. This metric will also consider the risk that increased demand (growth) and / or climate change, through erosion of system headroom, could lead to a situation now or in the future that Emergency Overflows start to operate for reasons other than permitted reasons (this could include operation due to rainfall or snow melt).

1.9. At the time of writing Thames Water has 19 Emergency Only EOs and 79 EOs that have a joint emergency and storm permit.

2. Key assumptions

2.1. This section contains a description of the assumptions we will make in reporting the Performance Indicator and provides a commentary on alignment with the DWMP guidelines.

Assumptions

2.2. **Spill counting:** the basis of spill counting is the standard 12/24 methodology commonly applied across England and Wales:

- Spill counting starts when the first discharge occurs. A discharge occurs when the sewer level exceeds the threshold level e.g. weir level.
- Any discharge (s) in the first 12-hour block is counted as 1 spill.
- Any discharge (s) in the next and subsequent 24-hour blocks are each counted as 1 additional spill per block.
- This counting continues until there is a 24-hour block with no discharge.

2.3. **Emergency Overflows:** the number of Emergency Overflows assessed for DWMP28 will be the published list as of 1st April 2025 and as submitted as part of our annual Event Duration Monitoring (EDM) return dataset (2024)[5]. For clarity this included sites listed that have a current permit as well as sites that are in progress of having a permit agreed/updated. Please note 2.5 below, Emergency Overflows, where permitted as of 1st April 2025, but without EDMs installed are also included.

2.4. **Dual function overflows:** some overflows are designated both as 'emergency' and 'storm'[7], for clarification this metric only considers the emergency element of the permit / performance.

2.5. **Event Duration Monitoring (EDM):** Not all Emergency Overflows have an EDM[6&7], to date the focus has been on installing EDMs on Storm Overflows, hence some Emergency Overflows will not have EDM data available. There is a regulatory requirement to have EDMs on all Emergency Overflows by the end of AMP8 (2029).

2.6. **Performance**: The DWMP Framework refers to no greater than one spill per annum for the performance of the Emergency Overflow element of the asset, where overflows have dual function (see 2.4), then this metric only looks at the asset reliability element of the overflow performance. Any spill occurring from an Emergency Overflow should be in accordance with the conditions set out in the permit to be a compliant spill. For example, if overflows with an Emergency Only permit spill, due to rainfall or snowmelt, this is categorised as a

[5] Downloadable here https://environment.data.gov.uk/defra/21e15f12-0df8-4bfc-b763-45226c16a8ac/files There are 79 Thames Water Emergency overflows listed
[6] Currently there are 19 only Emergency only Overflows that do not have EDMs.
[7] Some overflows have dual purpose i.e. are permitted to be both storm and emergency function.

non-compliant spill. For this measure performance will therefore be assessed using two approaches:

- Measurement of permitted spills to date e.g. due to equipment failure. Historic data over the period 2020-24 will be reviewed to assess how many permitted spills annually have occurred to date.
- In addition, hydraulic performance will be reviewed to account for the influence of growth and/or climate change impacting system headroom leading to the risk of non-compliant spills (i.e. Emergency Overflow acting as a Storm Overflow).

2.7. **Baseline performance (hydraulic performance):** for assessing hydraulic risk to Emergency Overflows our baseline will be based on a 10-year time series rainfall sequence (2015-2024). This 10-year dataset is deemed to recognise future pressures, using geographically appropriate time series rainfall, adhering to section 7.2 of the DWMP Guidance[2] 'Develop your rainfall model'.

2.8. **AMP8 improvements:** we assume that all planned AMP8 asset health improvements will be completed and their effect included in the 2030 base year assessment.

2.9. **Hydraulic modelling:** with few exceptions, all Thames Water's Emergency Overflows will be assessed through hydraulic modelling. We will report on the models' accuracy in representing current and recent spills performance. Where models do not exist, a desktop assessment will be completed.

2.10. **Current observed overflow performance:** this will be reported alongside base year assessments with no adjustment for monitor down-time, if installed.

2.11. **Groundwater infiltration:** whilst system models can account for the influence of groundwater infiltration on spills, the assessment of changes in duration of spills and risk of prolonged / dry day spills is deemed not to be sufficiently robust in planning type models. This element of the analysis will be undertaken using the methodology for the emerging Performance Indicator relating to groundwater infiltration.

2.12. **Tide levels:** average tide levels will be applied for tidally influenced outfalls.

2.13. **Manually controlled assets:** where overflows are manually operated such as pumping stations, Real Time Control scripts will be developed to replicate operator Standard Operating Manual approach. Similarly, with storage tanks with manual drain down operation, the same approach will be adopted.

3. Data sources

3.1. This section includes a brief description of the key datasets required to generate forecasts and report on this Performance Indicator. We also outline the process of assuring the accuracy of these sources used to calculate the Performance Indicator.

3.2. There is no related backward looking performance measure for this Performance Indicator.

Table 2. Data sources.

Source	Application	Assurance	Comments
EDM return data (where available)	Defines the number of sites considered under the DWMP and forms a record of actual spill counts over previous years.	Thames Water assured as part of Annual Return.	Confirms details and historic performance of Storm overflows as a reference point, including overflows with dual permits.
Operational data e.g. SCADA, Pump replacement, NIRS pollutions.	Each Emergency Overflow site will be reviewed for operational data to investigate incidences of equipment failure / outage.	Data generated will be subject to a bespoke independent assurance process to be defined as part of our DWMP.	Data will be extracted from a number of different systems and collated at a site level basis.
Rainfall (Time Series)	Applied to level 3 hydraulic system models (where available) to forecast the number of spills at each EO. The time series for climate change will use UKWIR's Redup4 tool.	Rainfall data series are acquired from specialist providers and assured at source.	Generation of rainfall time series will be developed in accordance with section 7.2 of the DWMP Guidelines - 'develop your rainfall model'
System models	DWMP Level 3 systems models are used (where available) to forecast the number of spills at each Emergency Overflow. The models are updated to reflect system state in 2030 (base year) and for subsequent base years.	Thames Water is ISO9001[8] accredited, which is independently assured. Industry expert appointed specifically to DWMP system modelling to assure on alignment with the framework.	Scope covers hydraulic (ICM) system models, process models, river models and groundwater models as applied to DWMP.

[8] International Organisation for Standardisation quality management standard

Continued

Source	Application	Assurance	Comments
Permit data	Provides data to ensure assets are appropriately accounted for in analysis e.g. sizing of storm tanks.	Assured by permitting team, held on national database jointly managed with environmental regulator.	Required to ensure correctness of data utilised in analysis of overflows. Provides details of Storm and/or Emergency Overflow application.
Asset data	Corporate Geographic Information System (GIS) system provides details of location of overflows as well as some key data such as overflow physical spill threshold. (Deemed to include asset data such as pumping details).	Maintained and assured by Technical Records	Data used to inform models.
Water Industry National Environment Programme (WINEP)	New or improved data sets to support understanding of overflow structures.	WINEP delivery team	Provides current view of state of overflows such as condition of screens, weirs, flow control devices etc.

4. Reporting thresholds and outputs

4.1. For this Performance Indicator we characterise the performance of Emergency Overflows individually, identifying assets functioning at low, medium and high risk. Through the approaches described in this methodology we identify the number of spills annually and categorise the risk at each Emergency Overflow based on the annual maximum number of spills.

- Band 0 (Green) = 0 spills (no spills occurring)
- Band 1 (Amber) = 1 spill
- Band 2 (Red) = 2 or more spills per annum

4.2. Where appropriate, to normalise the spatial scale, the average number of Emergency Overflow spills per overflow will be reported. This average is calculated by dividing total number of Emergency Overflow spills by the number of Emergency Overflow assets.

4.3. Spatial scales - The average number of Emergency Overflow spills will be reported at the following spatial scales:

- Level 1 (L1) Company level
- Level 2 (L2) River catchment or Local authority level
- Level 3 (L3) Sewerage catchment(s) level
- Level 4 local level (London catchments only)

Reporting outputs

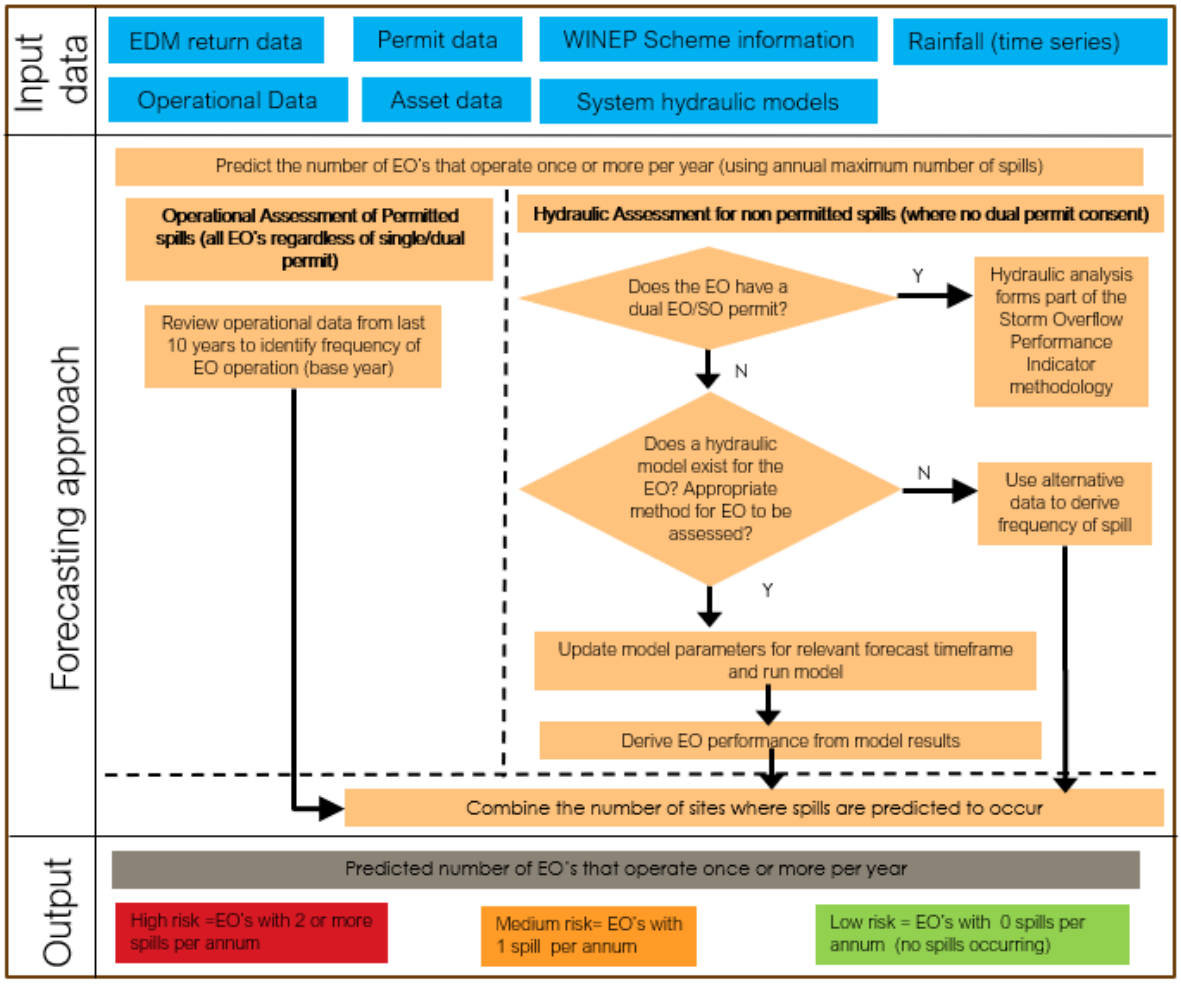
4.4. Tables - To be produced for L1, L2, L3 and L4 (London only) and report the average number of Emergency Overflows spills.

4.5. A schedule of each Emergency Overflow and its risk banding will also be captured.

5. Performance Indicator methodology

5.1. The following methodology will be applied to assess current and forecast future Emergency Overflow performance. The approach is illustrated in Figure 1.

Figure 1. Performance Indicator methodology



Baseline and projected performance

5.2. Where available, Event Duration Monitoring (EDM) data, historic operational performance data (2015–2024), and network and hydraulic system models (the latter using time series rainfall) will be used to produce Emergency Overflow (EO) performance for the following base year and baseline performance scenarios:

Base year performance – 2030

5.3. The reported DWMP spill count will be a combination of 'permitted' and 'non-permitted' spill performance. **Note, where an overflow has dual consent for storm and emergency purposes, the hydraulic (non-EO related permitted spills below) stage will be omitted and the spill count will only relate to EO related permitted spills.** Overflow locations with dual

consents will be assessed for their hydraulic risk in relation to their storm permit as part of the Storm Overflow Performance Indicator methodology.

5.4. **Permitted spills:** operational data from 2015 to 2024, where available, will be reviewed to identify the number of occasions on which Emergency Overflows are deemed to have spilled in accordance with permit conditions. This ten-year dataset will then be used to derive an average annual performance. It is assumed that there is no material change in asset health between 2025 and 2030 that would alter performance relative to the 2015–2024 period. The resulting average will therefore be taken as the permitted performance for the 2030 base year. Where historic EDM data is available (i.e. those overflows with a dual consent) this will be analysed to understand whether any spills relate to equipment failure.

5.5. **Non permitted performance:** hydraulic models of each wastewater catchment will be used in most circumstances. Where no system model exists, or inadequately represents system performance, then the number of spills expected in future years can be derived from recent observations (historical EDM data or wet well[9] level measurement data) projected into future following statistical trends identified in similar catchments with hydraulic models.

5.6. The hydraulic models will be updated to reflect the anticipated population and associated flows for the planning period (2030). Any recent or planned system changes designed to reduce overflow spills will be accounted for. Increases in populations (growth) and assumptions about water consumption, infiltration and trade flows will be generated consistently with related Performance Indicators (e.g. for Dry Weather Flow (DWF) permitting and flooding).

5.7. No climate change adjustment will be made to time series rainfall input data. An appropriate time series rainfall data set will be applied from a collection of 30[10] covering the whole Thames Water region.

5.8. Hydraulic models will be simulated for a 10-year period and the spills from each Emergency Overflow counted using the 12/24 method. The annual maximum value will be used from this 10 year data set for reporting purposes.

5.9. To support assessments a current system simulation will also be made, allowing comparisons between model outputs and recent EDM measurements to be made.

[9] A wet well is a below-ground chamber that receives and temporarily stores incoming wastewater before it is pumped onward.
[10] The 30 locations used relate to localised descriptors for rainfall that account for such factors as elevation influence on rainfall. They are derived from the Flood Estimation Handbook, used to generate synthetic rainfall.

Future baseline performance – 2035-2055

5.10. As with the base year, the spill count will be a combination of 'permitted' and 'non-permitted' spills. **Note, where an overflow has dual consent for storm and emergency purposes, the hydraulic (non-EO related permitted spills below) stage will be omitted and the spill count will only relate to EO related permitted spills.** Overflow locations with dual consents will be assessed for their hydraulic risk in relation to their storm permit as part of the Storm Overflow Performance Indictor methodology.

5.11. **Permitted spills:** the performance determined in the base year analysis will be assumed to follow the same trend as evident from the 2015-2024 historic data set[11] over the baseline since current levels of base investment will be sufficient to maintain performance and renewal rates of assets are such that there is no deterioration in performance.

5.12. **Non-permitted spills:** a similar approach will be taken for making future baseline assessments but with the addition of allowances for changes in population, water consumption and climate change perturbations appropriate for each planning period as indicated in Table 3.

Table 3. System model simulation scenarios

Scenario	Rainfall series	Rainfall perturbation for climate change[12]	Modelled changes
Current system	2015 to 2024	None	
Base Year (2030)	2015 to 2024	Yes – 2040	AMP8 and ongoing operational enhancements. New population and DWF
Short term (5 years)	2015 to 2024	Yes – 2040	New population and DWF
Medium term (15 years)	2015 to 2024	Yes – 2050	New population and DWF
Long term (25 years)	2015 to 2024	Yes – 2060	New population and DWF

5.13. Where there is a range of data, due to uncertainty in the forecastable future input data for the Performance Indicator. Then a scenario planning approach will be adopted in this Performance Indicator and throughout the DWMP. This is to inform our understanding of the sensitivity of our forecasts to uncertainty in input parameters and ultimately support the development of an adaptive pathway to dealing with the risk.

[11] An average companywide trend will be interrogated and applied as appropriate to the baseline performance.
[12] Perturbation is the method we employ to adjust annual rainfall patterns to account for climate change influence e.g. it is generally viewed that in the future winters will become drier and wetter (more drizzle type rain) and in the summer mean time between rainfall events may increase with the resultant increase in short intense summer convective rainfall events. Perturbation is how we account for these weather changes in the modelling.

5.14. For 2030, 2035 and 2045 a central estimate for our input parameters is adopted as being the most likely future condition (scenarios A and B in Table 4. Scenario planning approach). For 2055 a more conservative estimate is made (scenario C) so that the 'worst case' outcome can be forecast.

Table 4. Scenario planning approach

Scenario	Description	Likely occurrence within	Low estimate	Central estimate (most plausible)	High estimate (conservative)
A	5-year medium – most plausible for short-term planning	Approximately 5 years (2030 Planning Year)	Not Applicable	✓	Not Applicable
B	core scenario – high likelihood for long-term planning.	10 to 20 years (2035, 2045 Planning Year)	Not Applicable	✓	Not Applicable
C	25-year high – conservative for long-term planning	Greater than 25 years (2055 Planning Year)	Not Applicable	✓	✓

Assessment

5.15. Modelling results will be processed to compute the annual predicted spill count at each Emergency Overflow, and this will be compared to the standard (0 spills). Each overflow will be attributed to a risk band (low, medium, high) in accordance with thresholds for each planning period.

5.16. In parallel to reporting for the DWMP data tables, the number of Emergency Overflows for each catchment, sub-regional and the whole of Thames Water will be summed, tabulated and mapped for each planning period.

5.17. Spatial (mapping) Scales

- Level 1 (L1) Company level
- Level 2 (L2) River catchment or Local authority level
- Level 3 (L3) Sewerage catchment(s) level
- Level 4 local level (London catchments only)

5.18. Alongside publication of this Performance Indicator methodology, there is a requirement to value performance outcomes using our Value Framework. This step will be completed during the Options Development and Appraisal (ODA) stage, once the framework has been fully defined and agreed following consultation with stakeholders.

6. Next steps

Receipt and adoption of any changes/adjustments as required by Ofwat

6.1. Data will be collected / generated in support of this Performance Indicator. The data will be processed and reviewed to determine the most suitable threshold bands as indicated in this document and in line with the DWMP stages and overall timeline.

We welcome your views on this technical methodology. Please share them with us by emailing DWMP@thameswater.co.uk.

Our Drainage and Wastewater Management Plan 2030–2055 will include a number of technical methodologies, like this one. They will all provide detailed information on specific topics featured in our draft Plan such as climate change and sustainable approaches to drainage. You will be able to access all of the technical methodologies on our DWMP webpage.

For more DWMP28 information please visit our DWMP webpage and portals on our website.

Thames Water