# How to classify storm overflow performance

Guidance note

**Reference number:** GN066

**Document Owner:** Head of Business, Regulation and Permitting

## What is this document about?

This guidance outlines the criteria, process and methodology Water and Sewerage Companies should use to classify the performance of permitted and unpermitted storm overflows. The classification will be used to plan and prioritise improvements to bring all storm overflows up to satisfactory status.

There is additional guidance for unpermitted storm overflows in GN021 Unpermitted storm overflows.

## Who is this document for?

Water and Sewerage Companies

## Contact for queries and feedback

Water Quality Policy team: waterqualitypolicyteam@cyfoethnaturiolcymru.gov.uk

## Version History

| Document version | Date published | Summary of changes |
|---|---|---|
| 1.0 | 26 October 2023 | Document published |
| | | |

Review Date: October 2024

To report issues or problems with this guidance contact: guidance.development@cyfoethnaturiolcymru.gov.uk

## Contents

## Tables

## Figures

# 1. Introduction

This guidance sets out the definitions (Section 2), classification criteria (Section 3), assessment methodology (summary in Section 4 and detail in Annex 1) and data collection and submission requirements (Annex 2). Water and Sewerage Companies (WaSCs) must use it to classify storm overflows (SOs) as either:

- Satisfactory
- Substandard
- Unsatisfactory

The guidance is applicable to all SOs, unpermitted and permitted. It should be used for SOs that discharge to rivers and Transitional and Coastal (TraC) waters. For unpermitted SOs, WaSCs should also use GN021 Pre-application requirements for unpermitted storm overflows.

This guidance replaces the relevant sections in 7.01 How to comply with your environmental permit. Methodologies and scoring set out in User Guide for Assessing the Impact of Combined Sewer Overflows FR 0466 (Foundation for Water Research, 1994) and the Storm Overflow Assessment Framework (SOAF) (Environment Agency, 2018) should no longer be used.

## 1.1. Requirements

This guidance is underpinned by the Urban Wastewater Treatment Regulations (UWWTR) 1994. We expect WaSCs to design, construct and maintain sewerage systems to limit pollution of the environment and provide long term sustainability.

SOs should not discharge on a dry day. When a discharge from an SO on a dry day has been identified, it should be self-reported as soon as is reasonably practicable, not at the end of the classification process.

We will consider the appropriate regulatory response for SOs that are substandard or unsatisfactory. We may take enforcement action and or vary permits to add improvement conditions or amend existing conditions as appropriate.

We require WaSCs to assess and understand how their sewerage system is operating. WaSCs should notify us where there is potential or actual pollution from a SO. This guidance does not alter the existing requirement for WaSCs to self-report pollution incidents to us. WaSCs should also self-report when an unpermitted overflow is identified.

We expect WaSCs to ensure that SO classifications are kept up to date to reflect current performance if new evidence shows a change in performance. WaSCs should submit an updated assessment as soon as reasonably practicable.

The classification assessment should be focused on identifying and assessing hydraulic and engineering design issues that will need investment and scheme planning/design to resolve. If the SO has maintenance issues (for example blockages, siltation, worn pump impellors) you should notify us as soon as is reasonably practicable and ensure the issues are rectified as soon as possible. We would expect these types of issues to be resolved within 12 months from the date they are identified.

Data affected by the issue should be excluded from the assessment. For example, the relevant Event Duration Monitoring (EDM) annual dataset where high spills were caused by a partial blockage can be excluded from Stage 1 of the assessment, but this should be made clear in your assessment submission and evidence should be available on request (AOR).

## 1.2. Good practice

WaSCs must use Urban Pollution Manual (UPM) version 3.1 (Foundation for Water Research, 2018): http://www.fwr.org/UPM3/

WaSCs should follow all relevant good practice guides and codes, including those produced by CIWEM: https://www.ciwem.org/special-interest-groups/urban-drainage-group

# 2. Definitions

## 2.1 Flow passed forward (FPF)

FPF is defined as the rate of flow (litres per second) of the wastewater arriving at the overflow from its upstream collection system and passed forward to the continuation flow. FPF must be maintained for the duration of the spill event, or the hydraulic capacity of the downstream sewer shall be deemed to have been exceeded (as per the individual permit condition of the SO).

For Wastewater Treatment Works (WwTW) and Last In Line (LIL) Sewage Pumping Stations (SPS), FPF does not include any flows drawn from a continuation flow that has already been passed forward by the overflow and reintroduced to the incoming flow upstream of that SO.

Achievement of FPF rate can be demonstrated using monitoring certificate scheme (MCERTS) accredited flow monitors or pumping station rates, using the permitting conditions as standard. In the absence of these data sources within the sewer network, DWMP (Drainage and Wastewater Management Plan) network models should be used. FPF rates for the duration of spills can be assessed to ensure that the permitted rate is being achieved.

## 2.2 Continuation flow

As defined in Urban Pollution Management (UPM) manual version 3.1 (Foundation for Water Research, 2018), the continuation flow is the rate at which flow is passed forward for treatment from the structure or device. It is expressed as a proportion of the design peak inflow rate for the structure or device.

## 2.3 Formula A

Formula A is the flow passed forward to a network or terminal SO.

A minimum retained flow in the sewer of Formula A is the normal minimum requirement for SOs on the sewer network and for Last in Line (LIL) unsettled SOs at the inlet to a WwTW.

It is calculated as:

- Formula A (litre/day) = DWF + 1360P + 2E

Where:

- DWF = total dry weather flow (litre/day) calculated from PG + I + E
- P = catchment population (number)
- G = per capita domestic flow (litre/head/day)
- I = infiltration (litre/day)
- E = trade effluent flow (litre/day)

Where Formula A equivalent storage is provided at an SO and in very large sewerage systems where significant smoothing of flows occur, this can be considered in defining the performance equivalent to Formula A, subject to agreement with us.

Where there are significant areas within the catchment that were designed, and remain, separately drained, an allowance for separately drained areas may be made. You will need to provide evidence that the storm response in these sewers is minimal (less than or equal to 3DWF). Consequently, the minimum FPF required from those populations served by separately drained areas is:

- 3PsG + Is + 3Es

Where:

- Ps = population in areas served by a separate system
- G = per capita domestic flow (litre/head/day)
- Is = infiltration flow from separately drained areas (litre/day)
- Es = trade flow from separately drained areas (litre/day)

Formula A becomes:

- Formula A (litre/day) = DWF + 2PsG + 1360 Pc + 2Et

and:

- DWF (litre/day) = PtG + It + Et

Where:

- Pc = population in areas served by combined and partially separate sewers
- Pt = total population
- It = total infiltration (litre/day)
- Et = total trade flow (litre/day)

## 2.4 Flow to full treatment (FFT)

The WwTW must be designed to treat peak dry weather flow (DWF) and additional flows from light rainfall.

The normal minimum FPF is set as:

- Flow to full treatment (FFT) = 3PG + Imax + 3E

Where:

- P = catchment population (number)
- G = per capita domestic flow (litre/head/day)
- E = trade effluent flow (litre/day)

This FFT setting is also known as 3DWF.

Imax is the maximum infiltration rate over the whole year. In certain circumstances you will need to consider the infiltration for summer and winter separately.

To find the maximum infiltration (Imax), calculate infiltration for every dry day as:

- Idry day = measured TDV − PG – E

The value of I within this calculation includes all flow above PG and E, thereby encompasses, groundwater infiltration, water entering a sewer, drain, or manhole chamber due to leaking joints, cracks, or faults or via purpose formed routes such as land drains and illegal connections. Where Imax exceeds 40% (typical rate as set out in Future Impacts on Sewer Systems in England and Wales, report prepared for Ofwat by Mott MacDonald, June 2011) of domestic flow an infiltration study needs to be undertaken to understand how to reduce this flow. A reduction plan which includes justification for not reducing infiltration, should be provided. This will include a definition of the extent of infiltration, identifying any point source discharges, along with a plan detailing the solutions and timescales for implementation.

## 2.5 Dry weather flow (DWF)

Dry weather flow (DWF) is the average daily flow to a WwTW during a period without rain.

The flow in a combined sewerage system will increase when it rains. This flow may vary seasonally due to changing levels of sewer infiltration and population numbers. You need to design your WwTW with enough capacity to treat the flows from the sewerage collection systems it serves.

It is calculated as the total daily flow value that is exceeded by 80% of the total daily flow values in any period of twelve months.

## 2.6 Dry day and dry day discharges

A “dry day” is a day (midnight-midnight) with total rainfall accumulation not exceeding 0.25 millimetres.

“One dry day” is one whole calendar day (midnight-midnight) after cessation of rainfall.

A “dry day discharge” is any discharge that occurs or continues on a “dry day”, allowing “one dry day” after rainfall ends. This provides allowance for network drain-down for the first dry day after rainfall or snowmelt.

For example, if rainfall ceases at 5pm on 10 December, a dry day discharge is where an overflow discharges any time after midnight on 12 December.

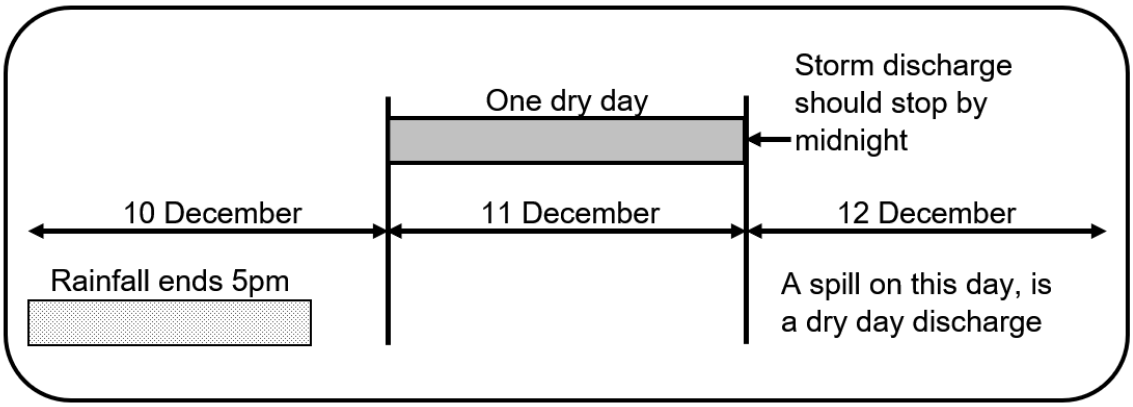


**Figure 1. Diagram showing a dry day and a dry day discharge**

| Scenario | 24-48 hours prior to spill | 0-24 hours prior to spill | Spill | If spill occurs on dry day 0-24 hours after spill, classify spill as: | If spill occurs on dry day 24-48 hours after spill, classify spill as: |
|---|---|---|---|---|---|
| 1 | Dry day | Dry day | Yes | Unsatisfactory | Unsatisfactory |
| 2 | Dry day | Not dry day or heavy rain (>0.25 mm/day but less than 4 mm during any 1 hour) | Yes | Substandard | Unsatisfactory |
| 3 | Dry day | Heavy rain during any 1 hour | Yes | Satisfactory | Unsatisfactory |

**Table 1: Storm overflow spill rainfall assessment**

## 2.7 Heavy rainfall

The Met Office classify rainfall above 4 millimetres per hour, as “heavy rainfall”. Where a rainfall event totalling 4 mm or more in any one-hour period has been recorded (at a representative rain gauge or triangulated rain gauge in the previous 24 hours), then the spill can be considered as “due to heavy rainfall”. Radar data may be used in the absence of representative rain gauge data where the approach is agreed with us.

## 2.8 Drain down time

SOs may operate, or continue to operate, after rainfall or snowmelt has ceased. This is due to the time it takes for water to enter the sewer system and the time it takes to travel

along the sewers to the relevant SO. We expect the allowable drain down time, in even the largest sewerage catchments, from directly and or positively drained areas (roofs, roads, pavements, drives, patios, yards), is highly unlikely to exceed 24 hours.

24 hours drain-down time is the minimum allowance for any given event when applying the one calendar day criterion, so the actual allowance may be higher depending on when the rainfall ceased.

Drain down times more than 24 hours are likely to be due to one or more of the following:

- run-off from indirectly drained (remote) areas
- land drains
- excessive infiltration

These are all unacceptable causes for a storm overflow to operate. They should be reduced, or the excess flow accommodated with the sewer system and WwTW treatment capacity.

## 2.9 Mixing zone

The mixing zone is defined as the location downstream from a discharge point where the discharge is adequately mixed with the waterbody. Typically, a distance equivalent to seven river widths can be used, but local conditions may mean it is less or more than this.

# 3. Criteria to classify a storm overflow

## 3.1 Satisfactory

There are specific criteria which must be met for a SO to be classified as satisfactory. The SO must:

- meet all minimum design standards
- be compliant with permit conditions
- have no environmental impact (includes aesthetic, biological, water quality, protected sites and groundwater).

## 3.2 Substandard

If the SO is compliant with the permit and does not have an environmental impact, but at least one of the following minimum design standards are not achieved, the SO will be classified as substandard, if it does not:

- discharge on a dry day
- contain flows up to heavy rainfall
- screen to 6 mm
- have adequate settled storm storage (storm tank only)
- have a FPF equal to FFT (storm tank only)
- pass forward Formula A (SO or SPS (Sewage Pumping Station) only).

## 3.3 Unsatisfactory

If any of the tests confirm unsatisfactory performance, the asset will be classified as unsatisfactory overall. The tests include:

- discharging on a dry day
- causing at least a low environmental impact (includes aesthetic, biological, water quality, protected sites and groundwater) as defined in Annex 1
- non-compliance with permit conditions.

# 4. Classification methodology summary

## 4.1 Overview

There are four stages in the Storm Overflow Classification Methodology, as summarised below. Detail on how to carry out the tests, score the assessment results and determine if any results confirm substandard or unsatisfactory status, are provided in Annex 1 – Classification methodology.

The methodology has been developed from the User Guide for Assessing the Impact of Combined Sewer Overflows FR 0466 (Foundation for Water Research, 1994) and Storm Overflow Assessment Framework (SOAF) (Environment Agency, 2018) methodologies. This Guidance Note methodology replaces these documents. They should no longer be used or referenced.

If an SO has already been through the SOAF assessment, the WaSC can reuse the assessment results if they are still representative of the SOs current performance. However, the scoring and classification set out in this guidance must be used.

### Stage 1: Minimum design standards

This stage has six tests:

1. Dry day discharges
2. Heavy rainfall spills
3. 6 mm screening
4. Settled storm storage (storm tank only)
5. FPF equal to FFT (storm tank only)
6. Passing forward Formula A (SO or SPS only)

### Stage 2: Permit compliance

This stage has four tests to check if the SO is compliant with permit conditions related to:

1. FPF rate
2. Screen requirements
3. Storage requirements
4. Discharging only due to rainfall/snowmelt

### Stage 3: Environmental impact assessment

This stage has three tests:

1. Stage 3a: Aesthetics, comprising of 6 elements:

- Pollution incidents
- Substantiated public complaints
- Sewage litter (separate methodology for rivers and TraC waters)
- Sewage fungus on outfall (separate methodology for rivers and TraC waters)
- Sewage fungus on substrate (separate methodology for rivers and TraC waters)
- Amenity value

2. Stage 3b: Invertebrate (biological) (separate methodology for rivers and TraC waters)

3. Stage 3c: Water quality (WQ) modelling (separate methodology for rivers and TraC waters)

### Stage 4: Other evidence

The WaSC should consider any other available sources of known information. If a SO causes an environmental impact which has not been evidenced in any other stage of the classification assessment, the information should be summarised in the submission to us.

## 4.2 The stages required

To ensure there is a robust assessment of SO performance that can be used for planning and prioritisation, for:

- permitted SOs you must complete stages 1, 2, 3a, 3b and 4. If 3b is not possible you must do 3c
- unpermitted SOs you must complete stages 1, 3a, 3b and 4. If 3b is not possible you must do 3c.

## 4.3 How to determine the overall classification

An unsatisfactory classification can be determined during any of the four stages.

A substandard classification can only be determined in Stage 1 (minimum design standards). But if any of the other tests are unsatisfactory, the final classification will be unsatisfactory.

A satisfactory classification can only be given if all four stages are passed.

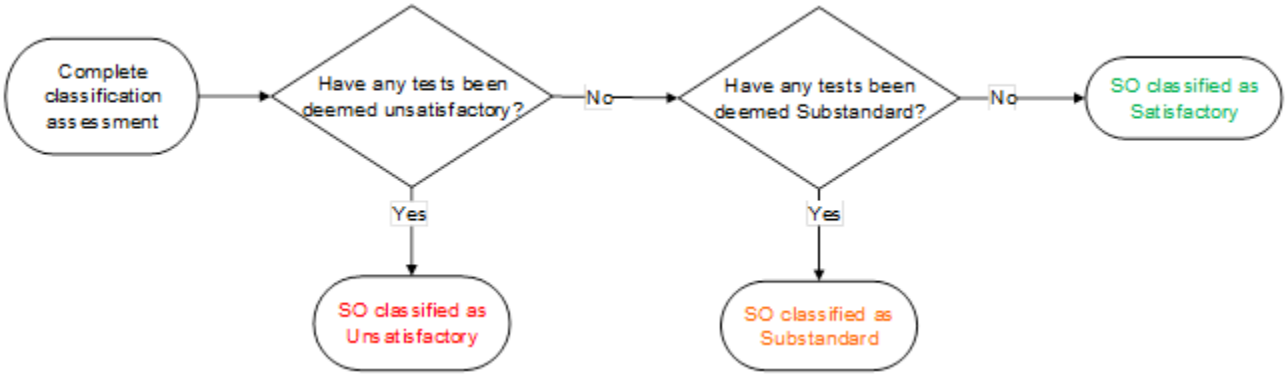


**Figure 2: Flow chart for determining overall asset classification**

## 4.4 Submission and confirmation of classification

Once the WaSC has completed the assessment, they should submit the assessment findings (specified in Annex 2) and evidence to us with a proposed classification. We will review the submission and once any queries or requests for further information have been resolved, we will confirm the classification.

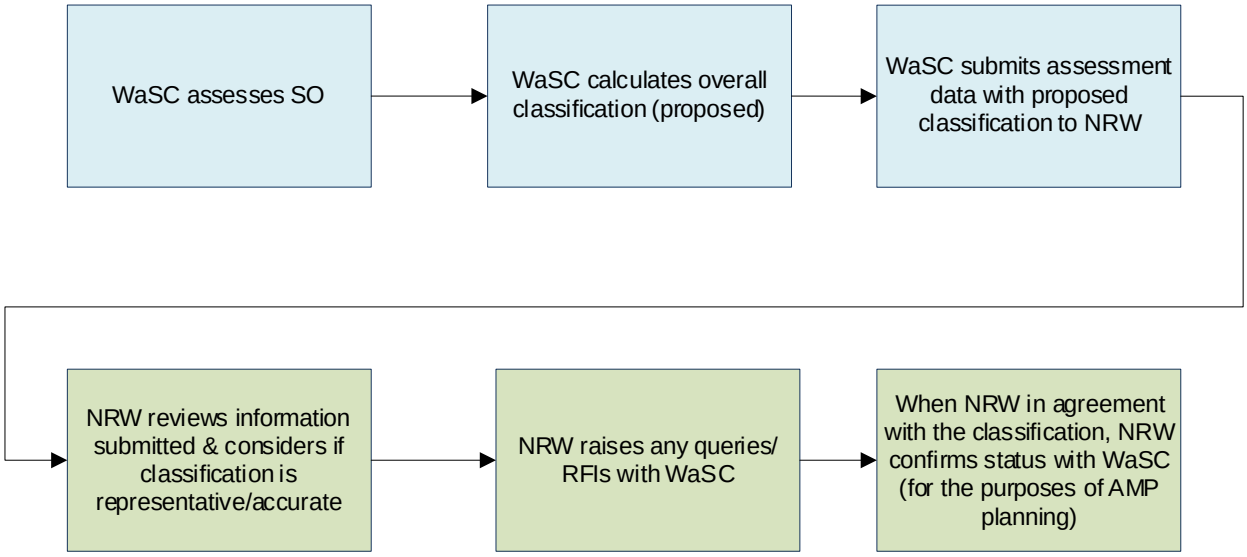


**Figure 3: Flow chart showing how classification is confirmed**

# Annex 1 – Classification methodology

## Stage 1 – Minimum Design Standards

### Test 1: Dry day discharges

WaSCs should use EDM recorded spills and rainfall data to assess:

| |
|---|
| "Does the SO have any dry day discharges in the last 3 years (minimum) that are due to hydraulic reasons?"<br><br>Yes = Unsatisfactory; No = Indicates satisfactory; N/A = EDM data not available |

EDM recorded spills can be compared to rainfall records. For SOs where you have less than 3 years EDM data, provide what is available. Where maintenance issues, such as blockages, lead to dry day discharges, these can be excluded from the assessment if the WaSC can demonstrate that these have been fully investigated and rectified. The WaSC should make this clear in the assessment submission and provide evidence on request.

Where a dry day discharge is due to hydraulic reasons the SO will be classified as unsatisfactory.

Use rain gauge data that is the most representative for the SO. Where there is no nearby rain gauge, the three closest gauges can be triangulated. Radar data can be used where the approach is agreed with us.

Additional factors, as reported by the Met Office, will be considered as evidence for snow melt. Factors include the extent of snow cover and how quickly it thaws across the catchment served by the SO.

### Test 2: Heavy rainfall spills

| |
|---|
| "In the last 3 years (minimum) is the SO only spilling due to heavy rainfall?"<br><br>Yes = Indicates satisfactory; No = Substandard; N/A = EDM data not available |

This assessment can be carried out using EDM recorded spills and comparing with the preceding rainfall. The assessment will need to be carried out against all spills. For SOs where you have less than 3 years EDM data, provide what is available.

Where discharges occur that are not because of heavy rainfall, the SO should be investigated to determine the cause of the discharge(s). The outcome of the investigation should be provided to us with the assessment submission.

### Test 3: 6 mm screening requirements

| |
|---|
| "Are the minimum 6mm screening requirements (described below) achieved?"<br><br>Yes = indicates satisfactory; No = substandard |

All SOs should meet the following screening criteria and provide 6 mm solids separation. This should provide separation from the effluent, of a significant quantity of persistent material and faecal and organic solids, greater than 6 mm in any 2 dimensions. The discharge shall not be comminuted or macerated. All screenings shall be removed from the discharge.

The screen shall be adequately maintained and included within regular maintenance works. Where a mechanically cleaned screen is provided, a telemetry alarm system shall be installed and maintained, to give the operator immediate notification of a failure of the screen cleaning mechanism, unless otherwise agreed in writing by us. The operator must return the screen cleaning mechanism to normal operation as soon as reasonably practicable.

Flows up to and including the 1 in 5-year storm return period must be screened as a minimum. You must provide a bypass weir to prevent flooding due to flows greater than the 5-year screen design flow, or if the screen becomes fully blinded. Screens and chambers must not increase flood risk. The 5-year return period design should consider forecast development and make a suitable allowance for partial screen blinding during spills.

Where 6 mm solids separation is not already in place but the SOs are otherwise performing satisfactorily the SO can be upgraded at end of screen life or whenever other upgrade works are carried out. Where there is currently no screening in place the SO will need to upgrade within a timescale agreed with us.

## Test 4: Settled storm storage (storm tank only)

"Is the storm overflow dealing with either:

- 3DWF is allowed in combination with storm storage which must settle out solids and have a minimum capacity of 68 litre per head served, or
- a storage equivalent of 2 hours at the maximum flow rate to the storm tanks?"

Yes = indicates satisfactory; No = substandard

The capacity and availability of storage needs to be assessed and compared with the requirements. This assessment should be based on the total population that could be served within the existing WwTW design horizons, so that the storm storage provision is in line with the DWF permitted volume.

## Test 5: FPF equal to FFT (storm tank at a WwTW only)

"Is FPF equal to FFT?"

Yes = indicates satisfactory; No = substandard

This test will assess whether the WwTW is passing forward the correct amount of flow to treatment.

### Test 6: Passing forward Formula A (SPS and SOs only)

| |
|---|
| "Is the SO passing forward Formula A?"<br><br>Yes = indicates satisfactory; No = substandard |

## Stage 2 – Permit Compliance

Where non-compliances are readily addressed through maintenance or quick wins and compliance restored then they are unlikely to contribute to a classification of unsatisfactory. If a maintenance issue is identified, we would expect these to be resolved within 12 months from the date they are identified.

### Test 1: Flow Passed Forward (FPF) permitted rate

| |
|---|
| "Is the SO meeting permitted FPF?"<br><br>Yes = indicates satisfactory; No = unsatisfactory; N/A = not specified in permit |

### Test 2: Screen requirements

Assess all relevant screening permit conditions.

| |
|---|
| "Is the SO compliant with its permitted screen requirements?"<br><br>Yes = indicates satisfactory; No = unsatisfactory; N/A = not specified in permit |

### Test 3: Storage requirements

| |
|---|
| "Is the SO compliant with its permitted storage requirements?"<br><br>Yes = indicates satisfactory; No = unsatisfactory; N/A = not specified in permit |

The volume of storage specified in the permit must be available. Effluent returned from the storm tank to the continuation flow must be adequately managed to prevent loss of volume (for example by sediment build up or debris). Ensure efficient emptying of the storm tank. Storage capacity should not be unduly compromised from a failure to adequately empty the tank from a previous storm event.

### Test 4: Rainfall/snowmelt condition

| |
|---|
| "Is the SO compliant with the rainfall/snowmelt condition?"<br><br>The discharge shall only occur when, and only for as long as, the flow passed forward is equal to or greater than the overflow setting indicated due to rainfall and/or snowmelt<br><br>Yes = indicates satisfactory; No = unsatisfactory; N/A = not specified in permit |

To comply with this permit condition:

- a discharge shall only occur when the FPF is equal to or greater than the overflow setting due to rainfall or snowmelt, and
- all offline storage (storm tanks):
    - must be fully utilised before a discharge can occur, and
    - should only fill when the FPF is equal to or greater than the overflow setting indicated due to rainfall and/or snow melt, and
    - should be emptied and its contents returned to the continuation flow as soon as reasonably practicable.

To ensure clarity on how we will regulate this permit condition, we will use the following principles:

- Using our definition of drain down time of a sewer catchment, we will consider any overflow operating after "one dry day" as non-compliant with this permit condition.
- For the purposes of UWWTR, we consider rainfall or snowmelt to be that which has fallen on hardstanding in the urban catchment (for example including roofs, pavements, roads, yards, drives). Run-off from indirectly drained areas such as fields and hills, and inflow from field drains, rivers and streams is not included.
- Significant infiltration of groundwater is excluded for the purposes of assessing the rainfall and/or snowmelt condition. UWWTR requires that infiltration through ground and soil shall be minimised in accordance with best technology knowledge not entailing excessive cost (BTKNEEC). Groundwater is ultimately due to rain or snow melt that has percolated through the soil, but the precipitation event may have occurred many days, weeks or even years previously. It is not appropriate to drain significant groundwater flows via a foul sewer and for this flow to be included in achieving the permitted FPF rate if the infiltration rate exceeds the infiltration rate used in the calculation of the permitted FPF.
- Infiltration encompasses groundwater, water entering a sewer, drain, or manhole chamber due to leaking joints, cracks, or faults or via purpose formed routes such as land drains and illegal connections.

# Stage 3 – environmental impact assessment

# Stage 3a – aesthetic impact assessment

There are two different methodologies to use to assess aesthetic impact: one for discharges to rivers and one for discharges to TraC waters.

## Discharges to rivers

Two site surveys and an assessment of incident and complaint records are required to complete an aesthetics impact assessment. This is due to the potential effects of bankside vegetation on access, visibility, and the potential for litter to collect. You should separate the two site surveys with a reasonable time span, by at least three months and ensure that one of the visits is when bankside vegetation is minimal (late autumn-spring). You should submit the data for both surveys, but the worst score from the two surveys must be used as the element score.

The assessment is split into six aesthetic elements, which are scored separately and then a combined score is used to categorise the aesthetic impact as per Table 2 below:

| Total score of 6 elements | Aesthetic impact | Aesthetic impact classification |
|---|---|---|
| 0 | No impact | Indicates satisfactory |
| 1 – 10 | Very low | Indicates satisfactory |
| 11 – 25 | Low | Unsatisfactory |
| 26 – 50 | Moderate | Unsatisfactory |
| 51 – 75 | High | Unsatisfactory |
| Greater than 75 | Severe | Unsatisfactory |

**Table 2: Aesthetic impact and classification**

## Element 1: Pollution incidents

"Has the SO had any substantiated pollution incidents (category 1-3) that are attributed to hydraulic causes in the last 3 years (minimum)?"

Take the highest category and score this element as follows:

- If highest category of incident/s is Category 1, score 100
- If highest category of incident/s is Category 2, score 60
- If highest category of incident/s is Category 3, score 20

You should request information from us as part of this check. Pollution incidents with an environmental impact of category of 1, 2 or 3 are considered to have an adverse impact on the receiving water environment, so the SO would be classed as unsatisfactory.

Where an incident has been investigated and the root cause resolved these can be excluded from the assessment, but they should be made clear in the data submission as detailed in Annex 2. These could include maintenance issues such as blockages and tree roots that have since been resolved.

## Element 2: Substantiated complaints

"How many substantiated public complaints (to the WaSC, local authority or NRW) has the SO had, in the last 3 years (minimum), which have been attributed to hydraulic causes?"

Calculate a score for this element as follows:

- 0 complaints, score 0
- 1-4, score 10
- 5-9, score 20
- 10-14, score 30
- >=15, score 40

## Element 3: Sewage litter

Sewage derived litter includes hygiene products, contraceptives, toilet paper, faeces, wet wipes, and earbuds.

At each SO, estimates should be made of the number of identifiable items of sewage derived litter at three locations (see Figure 4: Diagram showing three locations to count sewage litter):

1. In the immediate vicinity of each SO
2. Along a stretch of river extending 50 m upstream of each SO or SO group
3. Along a stretch of river extending 50 m downstream of each SO or groups of SO.

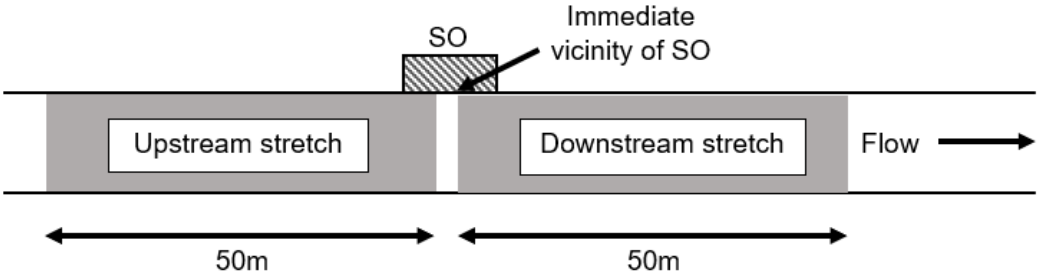


**Figure 4: Diagram showing three locations to count sewage litter**

When estimating items in the immediate vicinity of the SO, include any on the external structure (screen, flap valve, apron etc) and, for SOs set back from the water's edge, on the bank immediately in front of the SO. Do not include items in the river immediately in front of the SO as these will be counted in the downstream assessment.

For the upstream and downstream stretches select, where possible, a 50 m stretch starting at the SO. These should be as similar as possible. If, for example, there is a bridge adjacent to the SO, choose a stretch starting beyond the bridge. If the nature of the banks or watercourse changes such that a relatively uniform 50 m stretch cannot be found, then shorter but equal length stretches should be selected. For example, if the river enters a canalised section 30 m downstream, then stretches extending 0-30 m downstream and 0-30 m upstream of the SO should be selected (see Figure 5).

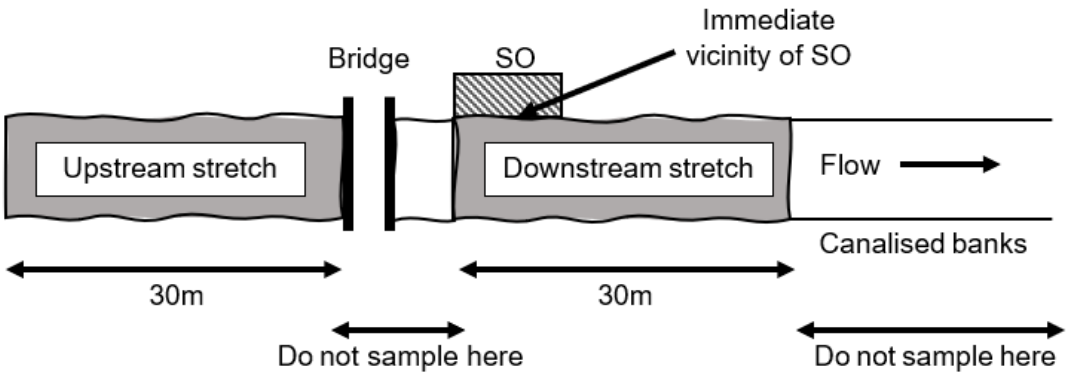


**Figure 5: Diagram showing how to select upstream and downstream sewage litter sampling stretches to avoid non-uniform river sections**

If it is not possible to identify similar upstream and downstream stretches, then this part of the assessment should be abandoned.

To assess the number of sewage-derived litter items, walk the length of each stretch once, counting visible items. Wherever possible, assess the stretch by wading in the water (ensuring that safety regulations/guidelines are met). Include items in the water, on the bank or beach and on overhanging vegetation. When a large amount of sewage litter is present, the number of items can be estimated to save time.

Where it is foreseeable that litter may be stranded and visible in areas downstream of the notional 50 m survey area, the survey should be extended to include this area. This will be important where the amenity class increases downstream of the immediate 50 m reach. For example, where there is a park alongside the watercourse 300 m downstream of the outfall, then this would be included in the aesthetics assessment.

Where the upstream-downstream assessment of sewage derived litter has been made, the number of items of sewage derived litter attributed to the SO should be calculated by subtracting the upstream count from the downstream count. Compare this count with the immediate vicinity count and the higher of the two to determine the score as described below.

Where multiple SOs discharge into a stretch of river, sewage litter should be assessed upstream and downstream if the group of SOs and the highest ‘immediate vicinity’ count should then be compared with the difference between the upstream and downstream count and the highest of the count used to determine the score as described below.

Separately score the immediate vicinity count and the difference between the upstream and downstream count as follows:

- 0 items, score 0
- 1-10, score 5
- 11 – 25, score 10
- 26 – 50, score 15
- >50, score 20

Use the highest score for the element score.

## Element 4: Sewage fungus on outfall

"Is sewage fungus present on the outfall?"

Present = score 5, absent = score 0

## Element 5: Sewage fungus on substrate

"Is sewage fungus present on substrate downstream of mixing zone?"

Yes = score 25, No = calculate the mean % cover within mixing zone and score as follows:

- 0% mean cover, score 0
- >0% but <2%, score 5
- 2-10%, score 10
- 11-25, score 15
- 26-50, score 20
- >50, score 25

Where possible, assess the percentage cover of sewage fungus on the substrate (riverbed) at three locations, explained below and illustrated in Figure 6: Diagram showing where to sample stones to assess sewage fungus.

At each site, pick up ten cobble-sized stones (usually defined as >64 millimetre – <256 millimetre) and estimate the percentage cover of sewage fungus over the whole stone, including top and bottom to the nearest 10%. Ensure that the stones are taken from locations at each site that are similar in terms of flow, depth, and riverbed composition. Record the value for each stone separately.

**Three sites**:

1. A suitable site within about 50 m upstream of the SO.

   The percentage cover of sewage fungus upstream of the SO is not used for scoring purposes, but if present, the site should be investigated further to ascertain the cause.

2. Within the mixing zone, immediately downstream of the SO and adjacent to the bank on which the SO is situated.

3. After the mixing zone downstream of the SO.

   If sewage fungus is present assign a score of 25.

If it is not present downstream, then average the percentage cover for the ten stones assessed within the immediate mixing zone.

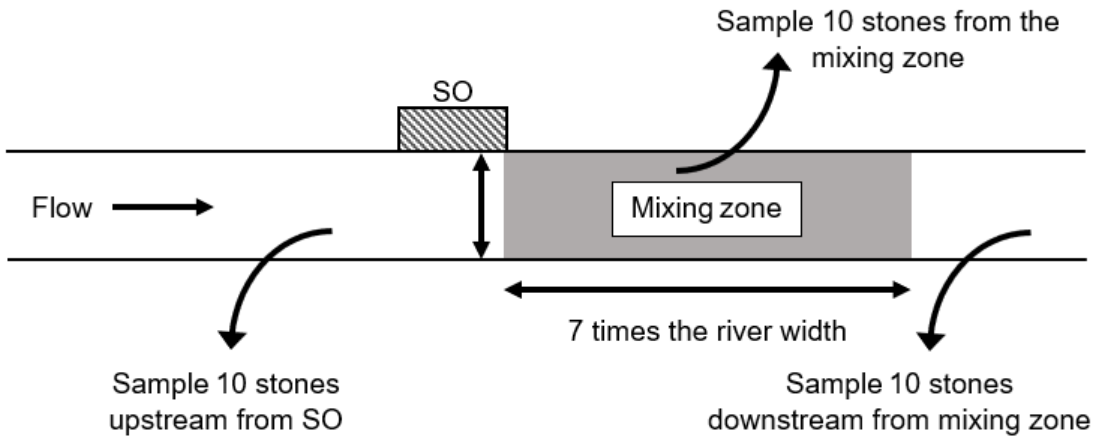


**Figure 6: Diagram showing where to sample stones to assess sewage fungus**

## Element 6: Amenity value

| |
|---|
| "What is the highest amenity value within 1 km downstream of the overflow?" Use judgement as appropriate.<br><br>Determine the amenity value and score using Table 3 below. |

Moderate and high amenity sites will always trigger, as a minimum, a 'very low impact' aesthetic impact category (as per Table 3) even where there is no evidence of debris, public complaint, or pollution incidents. This is because two seasonal aesthetics surveys may not be sufficient to identify a problem. The SO will always pose a risk of aesthetic impact and complaint in areas of moderate to high amenity.

| Amenity value | Examples | Score |
|---|---|---|
| High | • Influences an area where bathing and water contact sport (immersion) is regularly practised (for example wind surfing, sports canoeing)<br>• Receiving watercourse passes through formal public park<br>• Formal picnic site<br>• Designated shellfish waters<br>• Designated bathing waters<br>• Waters designated under the Conservation of Habitats and Species Regulations 2017 that are Sensitive Areas | 10 |
| Moderate | • Boating on the receiving water<br>• Popular footpath/coastal path adjacent to waterbody<br>• Recreation and contact sport (non-immersion) areas<br>• A watercourse that passes through a housing development or frequently used town centre area (for example bridge, pedestrian area, shopping area)<br>• It is linked, through substantiated “reasons for failure”, to an element of the Water Framework Directive classification being less than Good | 5 |
| Low | • Basic amenity use only<br>• Casual riverside access on a limited or infrequent basis, such as a road bridge in a rural area, footpath adjacent to watercourse | 0 |
| None | • Seldom or never used for amenity purposes<br>• Remote or inaccessible area | 0 |

**Table 3: Amenity value example criteria**

## Discharges to Transitional and Coastal (TraC) Waters

The methodology for assessing impact on aesthetics from discharges to TraC waters is in development – this guidance will be reissued as soon as its available.

# Stage 3b – invertebrate (biological) impact assessment

## Discharges to rivers

### Introduction

Where it is possible to collect representative benthic invertebrate samples immediately upstream and downstream of the overflow, impact will be assessed using abundance weighted Whalley Hawkes Paisley Trigg (WHPT) indices with the River Invertebrate Classification Tool (RICT). This is the method used for WFD assessments (River Assessment Method Benthic Invertebrate Fauna: Invertebrates (General Degradation) UKTAG, 2014). The method is designed to detect impacts due to organic pollution and is also sensitive to toxic pollutants. The RICT was developed by the three UK environmental agencies to classify the ecological quality of rivers.

Invertebrate sampling is only appropriate in simple scenarios where there is a single storm overflow discharging to that reach of the river. You should not carry out an invertebrate assessment (instead go to Stage 3c and model the water quality impact) if any of the following apply:

- multiple outfalls in close proximity
- there are other sources of pollution which could account for differences in invertebrate quality between sampling sites upstream and downstream of the outfall
- if the SO discharges into a degraded urban watercourse where background / upstream invertebrate quality has a WFD status of Poor or Bad then this method should also not be used
- there are physical constraints that prevent sampling.

If none of the above apply you must carry out an invertebrate impact assessment.

A minimum of two separate seasonal samples are required – one taken in the spring (March – May), and one taken in the autumn (September – November). These should be consecutive but could either be the spring and autumn of the same calendar year or autumn and the following spring. You should also visit in the summer to record the environmental variables (habitat information), but if this is not possible, then you may be able to use ‘Model 44’ in RICT which allows you to input the NGR grid reference and it will use GIS to assign site base data for you.

### Methodology

#### 1. Record observed NTAXA and calculate ASPT scores

The number of abundance weighted WHPT scoring families found during sampling (WHPT NTAXA), and their individual abundance weighted scores for sensitivity to organic pollution are recorded. An average score per taxon (ASPT) for the sample is then calculated.

#### 2. Predict scores if site undisturbed (or reference scores) using RICT

The observed abundance weighted WHPT NTAXA and ASPT values are compared to the values that might be expected under undisturbed or reference conditions for that site.

These undisturbed or reference scores are predicted by statistical models in the RICT software.

### 3. Calculate Environmental Quality Ratio using the observed and predicted scores

The observed values of WHPT ASPT and WHPT NTAXA are compared to the predicted values to generate an Environmental Quality Ratio (EQR). EQRs close to 1.0 indicate that invertebrate communities are close to their natural state. Use Table 4: EQR ratios for different WFD invertebrate status classes to assign an invertebrate status class.

| EQR values for WHPT NTAXA | EQR values for WHPT ASPT | Invertebrate status class |
|---|---|---|
| >=0.8 | >=0.97 | High |
| >=0.68 | >=0.86 | Good |
| >=0.56 | >=0.72 | Moderate |
| >=0.47 | >=0.53 | Poor |
| <0.47 | <0.53 | Bad |

**Table 4: EQR ratios for different WFD invertebrate status classes**

### 4. Calculate a mean EQR for the two seasons (spring and autumn)

A mean EQR is then calculated for the two seasons.

### 5. Estimate confidence of status class difference using RICT Compare Module

The RICT uses Monte Carlo processes to simulate uncertainty in observed and expected EQRs due to factors such as sampling variation, error in measuring environmental variables, and laboratory processing errors (bias). The software typically uses 10,000 ‘shots’ to build up a distribution of potential EQRs to estimate confidence of status class.

Use the RICT Compare Module’s ‘Compare – At a Glance’ report to compare the quality of the upstream and downstream sampling sites. The report shows the percentage number of simulations where the downstream sample is in a different status class to the upstream sample for both WHPT NTAXA and ASPT. Use the scoring system in Table 5 and Table 6 below for both indices (WHPT NTAXA & ASPT):

| Percentage of simulations the downstream sample is one or more classes worse than upstream (%) | Score | Multiply score by no. of classes the downstream sample is worse than upstream |
|---|---|---|
| 1-4 | 1 | Yes |
| 5-9 | 2 | Yes |
| 10-29 | 4 | Yes |
| 30-49 | 6 | Yes |
| 50-70 | 8 | Yes |
| 71-90 | 10 | Yes |
| >90 | 12 | Yes |

**Table 5: Invertebrate impact scoring for WHPT NTAXA & ASPT**

| Total score | Invertebrate impact | Overall SO classification |
|---|---|---|
| 1 | No impact | Indicates satisfactory |
| 2 – 3 | Very low | Indicates satisfactory |
| 4 – 5 | Low | Unsatisfactory |
| 6 – 7 | Moderate | Unsatisfactory |
| 8 – 9 | High | Unsatisfactory |
| 10 – 11 | Very high | Unsatisfactory |
| 12 – 15 | Severe | Unsatisfactory |
| 16 – 19 | Very severe | Unsatisfactory |
| 20 or more | Extremely severe | Unsatisfactory |

**Table 6: Invertebrate impact for WHPT NTAXA & ASPT**

## 6. Calculate overall classification

As shown in Table 6, if there is evidence of at least a ‘Low impact’ on invertebrates, the SO will be classified as unsatisfactory.

Overall classification is based on the worst status class assigned for the multi – season mean WHPT NTAXA and WHPT ASPT.

The worst score for WHPT NTAXA and ASPT should be used to assign impact. The scoring process will be repeated for each of the individual spring and autumn samples, and the overall mean of the seasons to produce a short-term and long-term impact assessment (Table 7).

| Type | Description | Impact |
|---|---|---|
| Short-term | Worst single season impact result for WHPT NTAXA and ASPT | No impact – extremely severe |
| Long-term | Worst of WHPT NTAXA and ASPT for the overall multi season (spring & autumn impact) | No impact – extremely severe |

**Table 7: Short-term and long-term impact assessment**

### 7. Check existing data

Where available, existing biological monitoring data for fish and invertebrates used for WFD classification may be used to provide additional evidence that the overflow is not causing an environmental impact. For example, where representative sampling points are present downstream of the overflow, in close proximity, or in locations likely to be sensitive to discharges from the overflow, and these consistently record good or high status, then this may be used as evidence to support no impact classifications.

## Discharges to Transitional and Coastal Waters (TraC)

The methodology for assessing impact on invertebrates (biology) from TraC discharges is in development – this guidance will be reissued as soon as its available.

# Stage 3c – Water quality (WQ) impact assessment

## Introduction

You do not need to complete a WQ impact assessment if you have carried out an invertebrate impact assessment as specified in Stage 3b.

If you wish to carry out a WQ impact assessment you can submit this with the classification assessment evidence, but the invertebrate impact assessment will take precedence.

If it was not possible to carry out an invertebrate impact assessment for one of the reasons specified in Stage 3b, you must carry out the water quality impact assessment methodology as detailed below.

This stage assesses whether the SO is likely to cause an environmental impact using WQ modelling.

You should explain the risk-based approach to the level of modelling you have used to determine the impact.

## Discharges to rivers

### Carry out initial screening

Determine if the overflow is likely to cause water quality issues and jeopardise water quality standards, by checking the following:

"Does the SO meet all three dilution criteria below?

- the SO must pass forward a retained flow of Formula A over the full duration of spills
- the dilution in the receiving water must be >8:1 (Q95 river flow: sewer DWF)
- there is no potential for interaction with other discharges"

Yes = assign a water quality classification of 'very low' and no need to use a water quality model

No = water quality modelling is required to assess the impact of the overflow

### WQ assessment overview

The assessment should quantify the impact of the storm overflow on either:

- the duration of 99 percentile exceedance, or
- 99 percentile quality for total ammonia and BOD, and the number of exceedances of the fundamental intermittent standards (FIS) for dissolved oxygen and un-ionised ammonia.

This should be undertaken as a relative assessment by comparing the impact of the urban drainage system on downstream river quality with and without the discharge from the SO.

New models are not required in all cases. Where they are 'fit for purpose', existing sewer and river impact models from recent drainage planning or UPM studies should be used.

## Model complexity levels

Although a verified sewer model is required to assess impact, it is not expected that complex sewer quality and dynamic river quality modelling is carried out in all cases. The Urban Pollution Management (UPM) manual version 3.1 (Foundation for Water Research, 2018) provides guidance on modelling the impact of storm discharges.

The level of complexity involved depends on the complexity of the problem and the potential cost of any solutions. A complex problem, for example where many storm overflows discharge into a river channel which contains structures such as weirs or sluices likely to affect quality, will need more detailed models and data collection. In contrast, simplified impact approaches will be sufficient for simple scenarios, for example where a single or very small number of overflows discharge into a simple river reach and dilution levels are relatively high.

There are four levels of complexity:

1. Level 1 is the simplest form of impact assessment. Time series outputs from the verified sewer model are mixed with random picks of upstream river flow and quality selected from statistical distributions. Default or sampled values for storm sewage BOD and total ammonia concentrations can be used and applied as an event mean concentration. The river reach is simplified to a trapezoidal channel. Hydraulic equations are used to estimate the depth and velocity of the mixed flow of river and storm sewage. A simplified water quality model usually representing the main oxygen demand processes (BOD decay and nitrification) and re-aeration is used to predict levels of dissolved oxygen and un-ionised ammonia at the end of the reach. Checks against 99 percentile standards and initial un-ionised ammonia can be made at the point of mixing.

2. Level 2 is similar to level 1. However, instead of a stochastic approach to representing upstream river flow, a river flow time series is used. This allows the flow, and therefore dilution available in the river at the time of a spill, to be better represented. As in level 1, simplified river hydraulics and water quality are still used to predict the time of travel for pollutants along the reach, and the depth and velocity of flow used to predict re-aeration rates.

3. Level 3 studies use calibrated flow routing models to predict time of travel along longer and more complex water bodies more accurately. This allows better representation of advective pollutant transport. More complex water quality simulation can be used with the model calibrated for the key parameters – BOD, ammonia, and dissolved oxygen – using observed event sampling and water quality sonde data. Storm sewage quality is represented using observed sampling data or calibrated sewer quality models.

4. Level 4 is the most complex form of impact model. Calibrated hydrodynamic river models used to simulate the varying depth and velocity of flow within the watercourse. Advection and dispersion is calibrated against observed data (e.g., dye tracing). Various levels of water quality simulation are possible with calibration and verification against event sampling and water quality sonde data.

For all levels, a long (minimum 10 year) historic or synthetic rainfall time series representative of the catchment is required.

Further on potential modelling approaches and levels of complexity is provided below.

## Potential modelling approaches and the four levels of complexity

### Urban drainage inputs

- SO flow:
  - Levels 1-4: verified sewer model
- Storm sewage quality:
  - Levels 1 & 2: Event mean concentrations using default values (e.g., Dempsey, 2005) or sampled values
  - Levels 3 & 4: Sampled values or calibrated sewer quality model
- WwTW flow:
  - Level 1: Statistical distribution from MCertified data
  - Levels 2-4: Predicted flow time series from verified sewer model
- WwTW quality:
  - Levels 1-4: Statistical distribution from sampled effluent quality

### Boundary river conditions

- Upstream river flow
  - Level 1: Statistical distribution from gauged data or ungauged estimate
  - Levels 2-4: 10-year historic flow time series from EA gauging station or calibrated rainfall runoff model
- Upstream river quality
  - Levels 1-4: Statistical distribution from EA routine samples

### River model

- Hydraulic
  - Levels 1&2: Simplified channel, steady & uniform
  - Level 3: Calibrated flow routing model
  - Level 4: Calibrated hydro-dynamic model
- Water quality
  - Levels 1&2: Simplified WQ processes & re- aeration using default values for rate coefficients
  - Level 3: Advective pollutant transport, WQ simulation calibrated from event sampling & sonde data
  - Level 4: Calibrated advection – dispersion model, WQ simulation calibrated from event sampling & sonde data

### Rainfall series

- Levels 1-4: 10-year representative historic or synthetic time series.

## Impact scoring

The worst water quality score from the two types of assessment (99 percentile quality and FIS) should be used as follows:

### (1) 99 percentile quality

Two approaches are available depending on the type of modelling tool used:

i. **Estimate of 99 percentile**

Select the relevant 99 percentile BOD and total ammonia standards for the receiving water according to WFD water body typology. These standards can be obtained from the Urban Pollution Management (UPM) manual version 3.1 (Foundation for Water Research, 2018). As an example, Table 8 below shows the 99 percentile classes for water body types 3, 5 and 7. Where there is a drop in 99 percentile status class between the modelled upstream and downstream assessment points assign a score of 45.

| WFD status for water body types 3, 5 and 7 | 99 percentile for biological oxygen demand (BOD) (mg/l) | 99 percentile for total ammonia (mg/l) |
|---|---|---|
| High | 9.0 | 0.7 |
| Good | 11.0 | 1.5 |
| Moderate | 14.0 | 2.6 |
| Poor | 19.0 | 6.0 |

**Table 8: 99 percentile standards for WFD water body types 3, 5 and 7**

Where the overflow does not cause a drop in status class but causes a degree of within class deterioration, assign a score according to the percentage within class deterioration as shown in Table 9 below. Use the worst score returned for the BOD and total ammonia assessments.

| Percentage within class deterioration | Score |
|---|---|
| 1 – 10 | 5 |
| 11 – 25 | 15 |
| 26 – 50 | 25 |
| 51 – 75 | 35 |
| >75 | 45 |

**Table 9: 99th percentile within class deterioration scores**

### ii. Duration of exceedance

Where modelling tools are used which do not calculate a 99th percentile, but instead estimate the duration for which a 99th percentile standard is exceeded, then use the scoring system in Table 10 below in conjunction with the 99th percentile BOD and total ammonia standards for good status. The impact duration with the worst score should be used.

| Impact duration | Allowable exceedances (number/year) | Score |
|---|---|---|
| 1 hour | 87.6 | + 0.5 points for every 1.0/year increase in exceedances |
| 6 hours | 14.6 | + 3.0 points for every 1.0/year increase in exceedances |
| 24 hours | 3.65 | + 12.0 points for every 1.0/year increase in exceedances |

**Table 10: Scoring system for duration / number of 99th percentile exceedances**

### (2) Fundamental intermittent standards (FIS)

Select the relevant fundamental intermittent standards for the receiving water according to fishery type (sustainable cyprinid, sustainable salmonid, and salmonid spawning). The FIS for dissolved oxygen and un-ionised ammonia are available in the Urban Pollution Management (UPM) manual version 3.1 (Foundation for Water Research, 2018). Compare the frequency of FIS exceedances in the receiving water with and without the storm discharge. For example, the FIS for dissolved oxygen in sustainable cyprinid waters (correction factors are also required) are shown in Table 11 below.

| Frequency (return period) | DO concentration (mg/l) 1 hour | DO concentration (mg/l) 6 hours | DO concentration (mg/l) 24 hours |
|---|---|---|---|
| 1 month | 4.0 | 5.0 | 5.5 |
| 3 months | 3.5 | 4.5 | 5.0 |
| 1 year | 3.0 | 4.0 | 4.5 |

**Table 11: Fundamental intermittent dissolved oxygen (DO) standards for sustainable cyprinid waters**

Use the scoring system in Table 12 where the discharge causes a deterioration (increase) in the frequency of allowable exceedances:

| Frequency (return period) | Allowable exceedances (number/year) | Score |
|---|---|---|
| 1 month | 12 | + 1.5 points for every 0.5/yr increase in exceedances |
| 3 months | 4 | + 4 points for every 0.5/yr increase in exceedances |
| 1 year | 1 | + 6 points for every 0.2/yr increase in exceedances |

**Table 12: Scoring system for increases in FIS exceedances for un-ionised ammonia and dissolved oxygen**

### Determine SO classification for WQ impact

The worst score obtained from the FIS and 99 percentile assessments should be used for the water quality impact classification set out in Table 13: Water quality impact and classification below.

| Water quality score | Water quality impact | Overall SO classification |
|---|---|---|
| 0 – 5 | No impact | Indicates satisfactory |
| 6 – 9 | Very low | Indicates satisfactory |
| 10 – 19 | Low | Unsatisfactory |
| 20 – 29 | Moderate | Unsatisfactory |
| 30 – 39 | High | Unsatisfactory |
| 40 or more | Severe | Unsatisfactory |

**Table 13: Water quality impact and classification**

A score of ‘Low impact’ or worse results in the SO being classified as unsatisfactory.

## Discharges to Transitional and Coastal Waters

The methodology for assessing the impact on water quality from discharges to TraC waters is in development – this guidance will be reissued as soon as its available.

## Stage 4 – Other evidence

The WaSC should consider any other available sources of known information. If a SO causes an environmental impact which has not been evidenced in any other stage of the classification assessment, the information should be summarised in the submission to us.

"Is there any other evidence that demonstrates that the SO is having an environmental impact, alone or in combination with other discharges, on the following protected sites (but not limited to):

- a deterioration in biological or chemical status of the receiving water (Water Framework Directive) or a water body downstream
- a failure in bathing quality standards for a designated bathing water
- a failure in shellfish quality standards for designated shellfish water
- unfavourable conservation status of protected site features (including a Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site, or Site of Special Scientific Interest (SSSI))
- an impact to an UWWTR sensitive area designation
- an impact to a drinking water protected area
- groundwater Source Protection Zones (SPZ)"?

Yes = provide a summary in your submission; No = confirm no other evidence known in submission

"Is any other information available for the SO (that has not already been used in Stages 1-3) that evidences environmental impact?"

Yes = provide a summary in your submission; No = confirm no other evidence known in submission

Other information could include, but is not limited to:

- Historic surveys of the SO or receiving water
- Sewer network model results that are likely to have been generated during the production of Drainage and Wastewater Management Plans (DWMPs) or other programmes that could be utilised to assist in the classification of SOs
- Other data that may have been gathered and assessed during the DWMP or other programmes, including but not limited to as-built drawings and/or surveys
- Any known intermittent issues impacting on chemical or biological water quality.

# Annex 2 – data collection and submission requirements

## General information on SO

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 1 | Permit reference (or unique identifier if unpermitted) | No EPR or NPS prefix, no variation number suffix | Must match permit reference on public register | Submit |
| 2 | Site name | | If permitted, must match public register | Submit |
| 3 | WaSC asset ID | | | Submit |
| 4 | Sewerage catchment | | | Submit |
| 5 | Storm discharge asset type | SO on sewer network / Storm discharge at pumping station / Inlet SO at WwTW / Discharge from storm tank at WwTW / Other storm discharge asset type (specify) | Same as used on EDM returns | Submit |
| 6 | NGR of SO location | Use 12 figure grid ref, for example SN5110064321 | | Submit |
| 7 | NGR of discharge point | Use 12 figure grid ref, for example SN5110064321 | | Submit |
| 8 | Receiving water category | River / TraC / Other (specify) | | Submit |
| 9 | Permitted BW / SFW trigger no. | BW## / SFW## / N/A | e.g., BW5, SFW14 | Submit |
| 10 | Has SO had a SOAF assessment | Yes / No | | Submit |
| 11 | Any confirmed NEP schemes for this SO | Provide planned start and end dates with a short description of the scheme | | |
| 12 | Representative rain gauge/s identification | | Include station name and number | Submit |
| 13 | Approx river width (m) | | | Submit |
| 14 | Photos of SO, outfall and sampling locations | Must be date and time stamped | | AOR |
| 15 | Outfall type | Bankside / Short sea outfall / Long sea outfall | Also state if permanently submerged | Submit |
| 16 | Outfall condition | Good / Damaged / Overgrown / Other (specify) | | Submit |

| | | | | |
|---|---|---|---|---|
| 17 | Does SO discharge directly or indirectly into a SAC catchment? | Yes / No | | Submit |
| 18 | Name of receiving WFD waterbody | | | Submit |
| 19 | Waterbody ID of receiving waterbody | | | Submit |

## Event Duration Monitoring (EDM) data

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 20 | EDM annual datasets used for assessment | State years | | Submit |
| 21 | Excluded annual EDM datasets | State years | If any in last 3 years have been excluded due to maintenance issues that causes high spills | Submit |
| 22 | Reason for dataset exclusion | Free text | | Submit |
| 23 | Any known issues with EDM data accuracy or operability | Yes / No | At least 90% monitor operability expected | Submit |

## Stage 1: Minimum design standards

### Test 1: Dry day discharges

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 24 | Does the SO have any dry day discharges in the last 3 years (minimum) that are due to hydraulic reasons? | Yes / No / N/A | Submit |
| 25 | Analysis report | Demonstrate how the dry day definitions have been applied to the rainfall and EDM data, including deviations from overarching methodologies that you may refer to. Include description of assessment method and data sources. Provide a summary representation of outputs, using graphs as appropriate | Submit |
| 26 | Classification | Unsatisfactory / Indicates satisfactory | Submit |

## Test 2: Heavy rainfall spills

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 27 | In the last 3 years (minimum) is the SO only spilling due to heavy rainfall? | Yes / No / N/A | Submit |
| 28 | Analysis report | Demonstrate how the heavy rainfall definition have been applied to the rainfall and EDM data, including deviations from overarching methodologies that you may refer to. Include description of assessment method and data sources. Provide a summary representation of outputs, using graphs as appropriate | Submit |
| 29 | Classification | Substandard / Indicates satisfactory | Submit |

## Test 3: 6 mm screening requirements

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 30 | Are the minimum 6mm screening requirements achieved? | Yes / No | Submit |
| 31 | Type of screen present | 4 mm 1D, 4 mm 2D, 6 mm 1D, 6 mm 2D, 10 mm 1D, 10 mm 2D, other, none | Submit |
| 32 | Classification | Substandard / Indicates satisfactory | Submit |

## Test 4: Settled storm storage (storm tank only)

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 33 | What can the settled storm storage deal with? | At least 3DWF / At least 2hrs equivalent storage / Neither | Submit |
| 34 | Classification | Substandard / Indicates satisfactory | Submit |

## Test 5: FPF equal to FFT (storm tank at a WwTW only)

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 35 | Is FPF equal to FFT? | Yes / No | Submit |
| 36 | Classification | Substandard / Indicates satisfactory | Submit |

## Test 6: Passing forward Formula A (SPS and SOs only)

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 37 | Is the SO passing forward Formula A? | Yes / No | Submit |

| | | | |
|---|---|---|---|
| 38 | Formula A (l/s) | | Submit |
| 39 | Classification | Substandard / Indicates satisfactory | Submit |

# Stage 2: Permit compliance

## Test 1: Flow Passed Forward (FPF) permitted rate

| No. | Data field | Data/information validation | Submit/ AOR? |
|---|---|---|---|
| 40 | Is the SO meeting permitted FPF? | Yes / No / N/A | |
| 41 | Permitted FPF (l/s) | Value or N/A | Submit |
| 42 | Actual FPF (l/s) | | Submit |
| 43 | How is actual measured | Observed / Modelled | Submit |
| 44 | Classification | Unsatisfactory / Indicates satisfactory | Submit |

## Test 2: Is the SO compliant with its permitted screen requirements?

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 45 | Is the SO compliant with its permitted screen requirements? | Yes / No / N/A | | |
| 46 | Permitted screen requirement | 4 mm 1D, 4 mm 2D, 6 mm 1D, 6 mm 2D, 10 mm 1D, 10 mm 2D, other, N/A | | Submit |
| 47 | Screen present | 4 mm 1D, 4 mm 2D, 6 mm 1D, 6 mm 2D, 10 mm 1D, 10 mm 2D, other, none | | Submit |
| 48 | Screen replacement date | End of Life (EOL) / Upgrade required | Upgrade date needs to be agreed with us | Submit |
| 49 | Classification | Unsatisfactory / Indicates satisfactory | | Submit |

## Test 3: Storage requirements

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 50 | Permitted storage requirement ($m^3$) | $m^3$ or N/A | Submit |
| 51 | Storage available ($m^3$) | $m^3$ | Submit |
| 52 | Following cessation of rainfall how is storm tank contents returned to FFT? | Auto / Manual / None | Submit |
| 53 | Classification | Unsatisfactory / Indicates satisfactory | Submit |

## Test 4: Rainfall/snowmelt condition

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 54 | Is the SO compliant with the rainfall/ snowmelt condition? | Yes / No / N/A | Submit |
| 55 | If no, give reason | Free text | Submit |
| 56 | Classification | Unsatisfactory / Indicates satisfactory | Submit |

# Stage 3a: Aesthetics assessment

## Site visit information

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 57 | Date of Spring assessment | DDMMYY | Submit |
| 58 | Date of Autumn/Winter assessment | DDMMYY | Submit |
| 59 | Discharging at time of visit? | Yes / No | AOR |
| 60 | Discharge colour/quality | Clear / Grey / Other (specify) | AOR |
| 61 | Weather at time of visit | Free text | AOR |
| 62 | Weather in last 24 hours | Free text | AOR |
| 63 | Are any of the following present: oil sheen, silt or sediment at outfall or downstream substrate, odour? | Free text | AOR |
| 64 | Is there a visible plume? | Yes / No | Submit |

## Element 1: Pollution incidents (hydraulic related)

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 65 | WIRS reference number/s | | Submit |
| 66 | WIRS reference number/s excluded as due to maintenance issues | | AOR |
| 67 | Highest environmental impact category of hydraulic WIRS | Cat 1 / 2 / 3 / 4 / None | Submit |
| 68 | Element score | 100 / 60 / 20 / 0 | Submit |

## Element 2: Substantiated complaints

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 69 | No. received by WaSC | | Include dates, details, references | AOR |
| 70 | No. received by Local Authority | | Include dates, details, references | AOR |
| 71 | No. received by NRW | | Include dates, details, references | AOR |
| 72 | Total no. of complaints | | | Submit |
| 73 | Element score | 0 / 10 / 20 / 30 / 40 | | Submit |

## Element 3: Sewage litter

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 74 | If assessment is for a group of SOs, provide all permit/unpermitted unique refs | Permit refs or N/A-single asset assessed | | Submit |
| 75 | Stretch starts how many metres u/s of outfall (m) | | | AOR |
| 76 | Length of stretch (m) | | | AOR |
| 77 | No. of items of sewage litter upstream | | | Submit |
| 78 | Stretch starts how many metres d/s of outfall (m) | | | AOR |
| 79 | Length of stretch (m) | | | AOR |
| 80 | No. of items of sewage litter downstream | | | Submit |
| 81 | Difference between u/s and d/s count | | | Submit |
| 82 | Score for u/s d/s difference | 0 / 5 / 10 / 15 / 20 | | Submit |
| 83 | No. of items of sewage litter in immediate vicinity & on structure | | | Submit |
| 84 | Score for immediate vicinity | 0 / 5 / 10 / 15 / 20 | | Submit |
| 85 | Element score | 0 / 5 / 10 / 15 / 20 | Use worst score between u/s d/s difference & immediate vicinity | Submit |

## Element 4: Sewage fungus on outfall

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 86 | Is there fungus on outfall | Present / Absent | | Submit |
| 87 | Element score | 0/5 | 0 for absent, 5 for present | Submit |

## Element 5: Sewage fungus on substrate

### Upstream of SO

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 88 | % Coverage on 10 stones u/s of SO | % | Not used for scoring, but should investigate cause | AOR |
| 89 | Average % coverage on u/s substrate | % | | Submit |

### Within mixing zone 0-50 m downstream of SO

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 90 | % Coverage on 10 stones d/s of SO | % | To nearest 10% | AOR |
| 91 | Average % coverage on d/s substrate | % | | Submit |
| 92 | Score | 0 / 5 / 10 / 15 / 20 / 25 | | Submit |

### Beyond mixing zone

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 93 | % Coverage on 10 stones d/s of SO | % | To nearest 10% | AOR |
| 94 | Average % coverage on d/s substrate | % | | Submit |
| 95 | Score | 0 / 25 | 0 = absent, 25 = present | Submit |
| 96 | Element score | 0 / 5 / 10 / 15 / 20 / 25 | Use highest of two scores (92 and 95) | Submit |

## Element 6: Amenity value

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 97 | Amenity category | High / Medium / Low / None | Submit |
| 98 | Reason for category | Free text | Submit |
| 99 | Element score | 0 / 5 / 10 | Submit |

## Total aesthetics impact

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 100 | Total of 6 element scores | | Submit |
| 101 | Aesthetic impact | None / Very low / Low / Moderate / High / Severe | Submit |
| 102 | Classification | Satisfactory / Unsatisfactory | Submit |

# Stage 3b: Invertebrate (biological) assessment

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 103 | Assessment data and outputs | | Includes WHPT indices, EQR, Sims | AOR |
| 104 | Worst short-term invertebrate impact (spring) | No impact / Very low / Low / Moderate / High / Very high / Severe / Very severe / Extremely severe | | Submit |

| | | | | |
|---|---|---|---|---|
| 105 | Worst short-term invertebrate impact (autumn) | No impact / Very low / Low / Moderate / High / Very high / Severe / Very severe / Extremely severe | | Submit |
| 106 | Worst long-term invertebrate impact (spring and autumn) | No impact / Very low / Low / Moderate / High / Very high / Severe / Very severe / Extremely severe | | Submit |
| 107 | Overall invertebrate classification | Unsatisfactory / Indicates satisfactory | Use worst out of three above | Submit |

## Stage 3c: WQ impact assessment

| No. | Data field | Data/information validation | Additional guidance | Submit / AOR? |
|---|---|---|---|---|
| 108 | Does the SO meet all three dilution criteria? | Yes / No | Yes = Very low impact | Submit |
| 109 | If no, provide a summary report of WQ modelling undertaken and conclusions | | | Submit |
| 110 | Which parameters have failed | | | Submit |
| 111 | Overall WQ impact | No impact / Very low / Low / Moderate / High / Severe | | Submit |
| 112 | Classification | Unsatisfactory / Indicates satisfactory | | Submit |

## Stage 4: Other evidence

| No. | Data field | Data/information validation | Submit / AOR? |
|---|---|---|---|
| 113 | Is there any other evidence that demonstrates that the SO is having an environmental impact, alone or in combination with other discharges, on any protected sites? | Yes / No | Submit |
| 114 | If yes, provide a summary report | Free text | Submit |
| 115 | Is any other information available for the SO (that has not already been used in Stages 1-3) that evidences environmental impact? | Yes / No | Submit |
| 116 | If yes, provide a summary report | Free text | Submit |
| 117 | Classification | Unsatisfactory / Indicates satisfactory | Submit |

## Overall proposed classification

| No. | Data field | Data/information validation | Submit/AOR? |
|---|---|---|---|
| 118 | Overall proposed classification | Unsatisfactory / Substandard / Satisfactory | Submit |
| 119 | Submission date | Date submitted | Submit |

# Abbreviations

| | |
|---|---|
| AOR | Available on request |
| DWMP | Drainage and wastewater management plans |
| EDM | Event duration monitoring |
| EOL | End of life |
| FFT | Flow to full treatment |
| FPF | Flow passed forward |
| HRA | Habitat Regulations Assessment |
| LIL | Last in line |
| MCERTS | Monitoring certificate scheme |
| RFI | Request for information |
| SAC | Special Areas of Conservation |
| SO | Storm overflow |
| SOAF | Storm overflow assessment framework |
| SPA | Special Protection Areas |
| SPS | Sewage pumping station |
| SSSI | Site of Special Scientific Interest |
| TraC | Transitional and coastal waters |
| TSR | Timeseries rainfall |
| UPM | Urban Pollution Manual |
| UWWTR | Urban Wastewater Treatment Regulations |
| WaSC | Water and sewerage company |
| WFD | Water Framework Directive |
| WIRS | Wales Incident Recording System |
| WWTW | Wastewater treatment works |