Uisce Éireann Technical Standard

Storm Water Overflows

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1.0	Approved WTEF	MG/DMcM/KK/RK	WTEF	09/10/17
2.0	General Updates	LK/TQ	WTEF	28/11/24
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1 INTRODUCTION

Uisce Eireann is committed to the delivery of high-quality water services in a safe and environmentally responsible manner to our customers. We are committed to meeting all statutory and regulatory requirements, as well as the expectations of our customers and stakeholders.

This document outlines the methodology for assessing existing Storm Water Overflows (SWOs), the Engineering Specification for the upgrade and construction of new SWOs, and defines the minimum standard required in the design of new/upgraded SWOs.

This Revision 2.0 update of the Technical Standard is an interim update pending development of a new national storm water overflow policy aligned to the recast Urban Wastewater Treatment Directive.

During rainfall events, Storm Water Overflows (SWOs) act as relief valves within the system, allowing excess surface water to be released from the wastewater network to the storm water network, or directly to receiving waters (including rivers, lakes, estuarine or coastal waters). This helps protect properties from flooding and prevents wastewater backing up into streets and homes during heavy storm events. This important function must be balanced with protection of the environment while considering financial constraints.

2 PURPOSE

The purpose of this Technical Standard is to produce a formal document that ensures the delivery of consistent new Storm Water Overflows that meet the regulatory obligations. The Technical Standard will also be used in both the assessment of existing Storm Water Overflows and design of new and/or upgrade of Storm Water Overflows (SWOs).

The licencing of SWO's under the Waste Water Discharge (Authorisation) Regulations, SI No. 684 of 2007 requires that Storm Water Overflows are assessed and designed in accordance with "Procedures and Criteria in relation to Storm Water Overflows" (PCRSWOs) by the DoEHLG, (1995). The 2024 Urban Wastewater Treatment Directive (recast) sets requirements for Integrated Urban Wastewater Management Plans for agglomerations ≥100,000PE and for agglomerations ≥10,000PE based on risk. These plans are required to set objective limits for pollution load from storm water overflows and will necessitate adequate monitoring, sampling and modelling to verify compliance.

Water Action Plan: Ireland's River Basin Management Plan 2022 – 2027 is Ireland's roadmap to protect and restore our rivers, lakes, estuaries, coastal waters and groundwaters. That Plan includes the development of a new national storm water overflow policy to replace the PCRSWOs. Upon completion of that new national policy, this SWO Technical Standard will be updated.

The purpose of this technical standard is to provide guidance and interim interpretation of the 1995 DoEHLG document and 2024 rUWWTD. This includes the assessment, compliance, and design of Storm Water Overflows. This Technical Standard also covers SWO Screening, Monitoring and Sampling requirements.

Under the current Wastewater Discharge (Authorisation) Regulations 2007, Uisce Éireann has the responsibility to provide the required level of wastewater collection and treatment prior to discharge to the environment. The Regulations, through an agglomeration Wastewater Discharge Authorisation (WWDA) Licence (>500 PE) or Certificate (≤500 PE), prescribe the quality standards to be applied, the relevant supervision required and the enforcement procedures in relation to the discharges.

This Technical Standard provides a guide the designer and / or contractor in establishing engineered solutions that deliver robust, reliable, and repeatable performance that meets Uisce Éireann's objectives for Storm Water Overflows.

This Technical Standard describes requirements for Storm Water Overflows. While the Technical Standard is provided to convey Uisce Éireann's specific baseline requirements with regard to Storm Water Overflows, the appointed designer or contractor will retain the role of detailed system designer and each design will be carried out on a site-specific basis, accounting for all constraints and restrictions therein.

Where appropriate, this Technical Standard makes reference to the relevant Water Industry Mechanical and Electrical Specifications (WIMES) which have been adopted by Uisce Éireann in a bid to ensure a baseline quality standard of system design and installation across all categories of Storm Water Overflows. For this Technical Standard, the user should make reference to the WIMES documents and associated Uisce Éireann amendments (see Reference section).

The aforementioned WIMES documents shall form the basis of equipment selection, installation and testing for all Storm Water Overflow installations and, in tandem with this document, should be used as a reference point by the designer / contractor to ensure compliance with Uisce Éireann requirements. Where additional information is required, the designer may also refer to the following Uisce Éireann documents:

- General M&E Specification TEC-200-01
- General M&E Specification Notes for Guidance TEC-200-02

For civil engineering works the specification requirements of CESWI with Uisce Éireann Supplementary Clauses shall apply as listed below.

- General Civil Engineering Specification TEC-300-01
- General Civil Engineering Specification Notes for Guidance TEC-300-02

Where conflicts between these documents occur, the Uisce Éireann Standards shall take precedence.

3 SCOPE

This Technical Standard sets out Uisce Éireann's interim (until 2028) requirements for all new Storm Water Overflows design, for the assessment of existing overflows and for the refurbishment and upgrading of existing Storm Water Overflows (including Storm Water Overflows at WWTP's).

For Technical Standards relating to Wastewater Gravity Sewers, Wastewater Pumping Stations & Rising Mains and Storm Water Tanks on Wastewater Networks refer to the following Technical Standards:

- Uisce Éireann Technical Standard for Wastewater Gravity Sewers TEC-800-01
- Uisce Éireann Technical Standard for Wastewater Pumping Stations & Rising Mains TEC-800-02
- Uisce Éireann Technical Standard for Storm Water Tanks on Wastewater Networks TEC-800-04

3.1 Derogations from the Standard/Specification

Whilst the minimum requirements of this standard / specification shall be met (where applicable) this document is not intended to stifle innovation by the Contractor, or delay progress. Should the Contractor wish to apply for a derogation from any aspect of the document, they shall submit a derogation application to the Employer's Representative in accordance with AD-EDS-SOP-005, in advance of any proposed departure from the requirements of the specification (the required form for the derogation application will be provided to the Contractor by the Employer's Representative). Submission of the derogation application does not confer permission to proceed, and the application should be submitted allowing sufficient time for the Employer and the Employer's Representative to evaluate. Works can only proceed on the basis of the derogation, after the Contractor has received written confirmation from the Employer's Representative. The written confirmation of the derogation shall be treated as a change order/variation under the contract and its consequences shall be decided pursuant to the change/order variation mechanism of the contract.

The submission of a derogation application shall not impact on the programme of works for the specified project and shall be made at the risk and expense of the Contractor. Uisce Éireann or the Employer's Representative shall retain the right to reject the derogation application in favour of compliance with this document.

For the avoidance of doubt, the derogation, where approved, shall only pertain to the specific circumstance for which the derogation is approved. An approved derogation shall not carry any precedent to another project/contract and shall not be used or applied on other similar projects/contracts or circumstances thereafter. The subject of a derogation can only be applied on another contract/project if it has been directly incorporated into the standards/specifications for the relevant contract/project.

3.2 Energy Efficiency Design

Uisce Éireann is committed to designing, building and operating assets to ensure energy efficiency and embedding the principles and practice of Energy Efficient Design (Uisce Éireann Energy Policy, AMT-POL-007). Energy Efficient Design is a fundamental requirement of Uisce Éireann, and it is Uisce Éireann objective that plant, equipment, buildings, systems and directly associated activities are designed, equipped, maintained and operated in such a manner to ensure a high level of energy performance and that energy is used effectively and efficiently. In referencing this standard the user should be aware that designs and subsequently specified equipment will be required to be accompanied by an EED review, in compliance with the requirements of Uisce Éireann Energy Efficient Design Standard (TEC-600-04) before being considered for deployment in our asset base.

4 DEFINITIONS

See UÉ Glossary of Abbreviation and Terms SRR-RR-PR-01-FM-03

Terms & Acronyms	Definition
ATEX	Appareils destinés à être utilisés en ATmosphères EXplosibles.
CEWSI	Civil Engineering Specification for the Water Industry
CSO	Combined Sewer Overflow = Storm Water Overflow (SWO)
DWF	Dry Weather Flow
EDM	Event Duration Monitor
EO	Emergency Overflow
EQS	Environmental Quality Standard
FFT	Flow to Full Treatment
LCC	Life Cycle Costs
PCRSWOs	“Procedures and Criteria in Relation to Storm Water Overflows” by the DoEHLG, (1995).
PE	Population Equivalent
PFF	Pass Forward Flow
RAM	Remote Asset Management

Terms & Acronyms	Definition
SWO	Storm Water Overflow
SuDs	Sustainable Drainage Systems
TSR	Time Series Rainfall
UWWTD	Urban Wastewater Treatment Directive 1991
rUWWTD	Recast Urban Wastewater Treatment Directive 2024
WLC	Whole Life Costs
WIMES	Water Industry Mechanical and Electrical Specifications
WWDA	Waste Water Discharge (Authorisation)
WWPS	Wastewater Pumping Station
WWTP	Wastewater Treatment Plant

5 ROLES AND RESPONSIBILITES

The responsibility for ensuring compliance with the Uisce Éireann Standards and Specifications shall lie with Project Team, Designers and Contractors/Designers. Uisce Éireann reserve the right to inspect all assets at any time to ensure compliance with the Standards and Specifications is being achieved.

The design guidance outlined in this Technical Standard is Uisce Éireann's required practice and shall be followed unless there is a valid reason for deviating from it. Any deviation shall be notified in writing to Uisce Éireann and shall not be put in place without the written approval of Uisce Éireann.

This document is one of a group of standards and specifications which forms Uisce Éireann Technical Standards System. The requirements of this document are mandatory for those engaged in the design and construction of Uisce Éireann assets.

If a Supplier considers that adhering to any part of this document will result in an asset which is not fit for purpose for a particular project or situation, or a Supplier has any other issue with this document, they are obliged to seek permission to modify the requirements of this document from Uisce Éireann through the derogations process.

6 STANDARD

6.1 Storm Water Overflows

The Wastewater Discharge (Authorisation) Regulations, SI No. 684 of 2007, defines a Storm Water Overflow (SWO) as follows:

"Storm Water Overflow" means a structure or device on a sewerage system designed and constructed for the purpose of relieving the system of excess flows that arise as a result of rainwater or melting snow in the sewered catchment, the excess flow being discharged to receiving waters.

An overflow that can spill in storm conditions but is constructed on a separate or partially separate foul sewer is classed as a SWO – the presence of inflow due to misconnections (storm to foul) means that the foul sewer is effectively combined. However, these SWOs are subject to different performance criteria to SWOs constructed on combined systems. A combined sewer network cannot operate as a 'closed' system and thus needs to include a stormwater release mechanism to relieve the network of excess flows during storm events exceeding design return period to reduce the potential for upstream and downstream flooding.

A single outfall point into receiving water may receive flows from more than one SWO. Conversely, an overflow pipe from a SWO may diverge to more than one outfall point.

SWOs should not be confused with a bifurcation, which is a structure where wastewater can be diverted into a different part of the sewer system. Flows that are diverted at a bifurcation still reach the wastewater treatment works whereas flows that are diverted at a SWO do not.

It should also be noted that the term Storm Water Overflow (SWO) is defined under EU Directives and Irish legislation whereas the more familiar term Combined Sewer Overflow (CSO) is not. However, for the purpose of this document both terms have the same meaning and can be used interchangeably.

6.1.1 Types of Storm Water Overflows

Although sharing many of the same characteristics, Storm Water Overflows can be split into three main categories based on location:

- WWTP Overflows
- WWPS Overflows
- Network Overflows

WWTP storm water overflows are located within the boundary of the treatment works site, and may be located on gravity pipework/chambers, at Inlet works pumping station or another process element. There can be a number of SWOs within a WWTP.

WWPS storm water overflows are located at/near pumps stations outside a WWTP site boundary. For pumping station overflows, the pass forward flow is limited by the foul pump rate. WWPS SWOs may be located at the wet well, storm tank or in a separate chamber upstream.

Network storm water overflows are located in chambers on gravity sewers outside a WWTP site boundary, and the pass forward flow is generally determined by the overflow setting, e.g. weir height of pass forward pipe capacity. In some cases, the arrangement may be complicated for example an overflow on branch sewer which overflows due to the trunk sewer surcharging.

SWOs may spill to receiving waters by gravity or rely on storm pumps to reach the receiving waters.

Typical layouts for storm water overflows are contained in Appendix B.

6.2 Legislation

The currently legislated 1991 Urban Waste Water Treatment Directive (UWWTD), Article 3 contains specific requirements with regard to collection systems. Annex 1(A) of the Directive outlines the approach and states that “The design, construction and maintenance of collection

systems shall be undertaken in accordance with best technical knowledge not entailing excessive costs, notably regarding:

- Volume and characteristic of urban waste water
- Prevention of leaks
- The limitation of pollution of receiving waters due to storm water overflows"

The 2024 rUWWTD notes that overflows are expected to increase due to the combined effects of urbanisation and the progressive change of the rain regime linked with climate change. It contains further specific objectives with regard to collection systems which must be adopted by Uisce Éireann. This includes requirements for Integrated Urban Wastewater Management Plans for agglomerations ≥100,000PE and for agglomerations ≥10,000PE based on risk. These plans are required to include indicative non-binding objectives *"that storm water overflow represents a small percentage that cannot be more than 2% of the annual collected urban wastewater load calculated in dry weather conditions*".

Apart from the specific requirements of the rUWWTD, certain quality standards or objectives for the aquatic environment need to be considered in relation to the provision of upgraded or new SWOs. The objectives that have been given legal effect in Ireland by means of the Directives and National Regulations.

6.3 Emergency Overflows

An Emergency Overflow (EO), typically provided at a Pumping Station or WWTP, is designed to operate only in the event of operational failure (e.g. power, mechanical, electrical or control failure), rising main failure or blockage in the downstream sewer. The overflow may occur at the pumping station itself or at a chamber upstream on the incoming sewer.

EOs are not designed to operate in response to rainfall. They may be present on separate sewerage systems as well as combined sewerage systems. An overflow device which operates only in storm events greater than a 1-in-30-year return period rainfall event is classified as an EO.

All WWPS and WWTP storm water overflows that can operate in the circumstance of dry weather due to mechanical failure, e.g. pump failure, are classified as Dual Function Overflows within discharge authorisations.

Pumping stations on a combined sewer often have both a SWO and an EO at different levels or settings. It is important to distinguish between these two types of overflows, since they have different conditions applying to them even though they may discharge to the environment through the same outfall pipe.

Uisce Éireann's requirements with regard to EO's are provided in Uisce Éireann Technical Standard for Wastewater Pumping Stations & Rising Mains TEC-800-02.

6.4 Principle Performance Criteria of Storm Water Overflows

The operational requirements of an effective SWO structure are directly compatible with the overall objectives of a sewerage system. An effective SWO should:

- Provide adequate hydraulic relief of the sewerage system to meet the target for flood control.
- Control the pass forward (continuation) flow (PFF) to protect the downstream sewerage system and wastewater treatment works from overloading.
- Control the pass forward flow (PFF) to maximise the amount of polluting material that is passed forward to treatment.
- Control the spill flow to meet the regulatory requirements for intermittent discharge to the receiving water.
- Operate automatically and minimise any operational requirements for maintenance and not expose operatives to unnecessary health and safety risk.
- Minimise whole life cost (WLC).
- Have the ability to operate during high receiving watercourse conditions.

6.4.1 Assessment Criteria for existing Storm Water Overflows

Waste Water Discharge Licences state that *"All storm water overflows shall be in compliance with the criteria for storm water overflows as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995 (PCRSWO)".*

The PCRSWO states; *in assessing the operation of an existing SWO, one shall determine if it:*

1. causes significant visual or aesthetic impact and public complaints.
2. causes deterioration in water quality in the receiving water.
3. gives rise to failure in meeting the requirements of national Regulations on foot of EU Directives (Bathing Water, etc).
4. operates in dry weather.

Uisce Éireann assesses the performance of each SWO against these DEHLG criteria, and report this within the Annual Environmental Reports prepared for each agglomeration.

6.5 Design Standard for New & Upgraded Storm Water Overflows

The design standards for upgraded/new SWOs as set out in the 1995 PCRSWO are dependent on the following factors:

- Receiving Water Type (Freshwater or Coastal/Transitional)
- Receiving Water Body Designation or Use (Bathing, Recreational, Sensitive, etc…)
- SWO Significance (refer further to Section 6.6)
    - Receiving Water (Low Flow Dilution, Designation)
    - SWO Dilution
    - PE of catchment upstream of SWO

Subsequent legislation and the need to reduce pollution from SWOs necessitates the consideration of design standards greater than those set out in the PCRSWO. The best achievable SWO performance at reasonable cost should be identified when designing new and upgraded SWOs, with low annual spill frequency/volumes targeted.

The 2024 rUWWTD sets an objective for Integrated Urban Wastewater Management Plans, to include that storm water overflows represents a small percentage that cannot be more than 2% of the annual collected urban wastewater **Load** calculated in dry weather conditions across an agglomeration. In the absence of spill sampling to determine typical SWO spill concentrations in Ireland, this is assumed equivalent to an annual spill **Volume** limit of 4% DWF. **This assumption is an interim approach to spill Volume limit until such time as the new national storm water overflow policy is developed**.

A structured approach to selecting and evaluating potential improvements to the SWO should be taken. In evaluating improvements, they should typically include any upgrading likely to be required for:

- Eliminating unwanted throttles in the sewer system.
- The rationalisation of SWOs, e.g. to eliminate unwanted, obsolete, or redundant overflows.
- Meeting flooding or structural upgrading requirements.
- Outfall hydraulic restrictions such as high river levels.
- Other planned allowances, e.g. for new development.

When evaluating future system performance, it is important that any possible future changes are considered, particularly in relation to the following:

- Population growth or decline.
- Industrial/commercial growth or decline.
- Reduction in inflow and/or infiltration.
- Climate change.
- Urban Creep.
- Misconnection Allowance.

For guidance on population/industrial/commercial growth or decline, reference should be made to Uisce Éireann's Wastewater Network Risk Assessment and Needs Identification Standard Drainage Area Plan Stage 3 (TEC-800-12).

For guidance on climate change, reference should be made to Uisce Éireann Guidance Note on the Application of Rainfall Data in Wastewater Network Modelling (TEC-800-13).

For guidance on urban creep and misconnection allowance, reference should be made to Uisce Éireann's Guidance for the Application of Urban Creep and Misconnection Allowances in Wastewater Network Future Modelling Scenarios (TEC-800-14).

6.5.1 Method of Analysis

6.5.1.1.1 Calculation of Surface Water Flows – Rivers

When calculating SWO Significance, a robust method for the assessment of receiving water flows shall be used when determining dilution (95%ile river flow: Foul DWF) available.

In the first instance, hydrometric data from a local gauging station with a record duration of greater than 10 years should be used to support estimation of 95%ile (Q95) low flows. Where this is not possible, donor gauges may be used to transpose data to the SWO location where catchments are hydrologically similar. Where this is not possible the EPA Hydrotool may be used where appropriate.

Similarly for hydrological inputs to water quality models (simple or complex), hydrometric data from a local gauging station with a record duration of greater than 10 years should be used to drive the assessments.

Where this is not possible, donor gauges may be used to calibrate simple hydrological run-off models which can be applied to the SWO catchment where catchments are hydrologically similar.

Other methods of synthesising flow records may be considered by Uisce Éireann on a case-by-case basis.

6.5.1.1.2 Emission Controls

Uisce Éireann adopts a tiered, risk-based approach to the assessment and management of storm water overflows. In the first instance, for Low Significance SWOs with small loadings and no network model, a minimum pass forward flow with storage requirements is used to limit spills.

6.5.1.1.3 Hydraulic Modelling

Where necessary, hydraulic modelling of SWO performance is used to assess annual spill frequency and volumes. Model detail should be commensurate with the complexity of the sewer network, SWO Significance and the scale of likely scheme cost.

Where a fully calibrated and verified sewer network model is required, this should be developed using an audited hydraulic model built and verified in accordance with the latest version of Uisce Éireann's *Wastewater Network Hydraulic Model Build and Verification Standard TEC-800-06* or, if deemed acceptable by Uisce Éireann in the case of older models, in accordance with the *WaPUG Code of Practice for the Hydraulic Modelling of Sewer Systems, 2002*. In particular, the hydraulic model used in the design process should exhibit high verified confidence in its predicted performance (flow and depth) for a range of rainfall scenarios in the area of the proposed SWO.

When upgrades are being considered for wastewater networks and SWOs, long term monitoring (through the use of both temporary flow monitors, permanent flow monitors, EDMs etc.) shall be required in certain networks as agreed with Uisce Eireann to ensure all variable conditions of the network (such as variations in ground infiltration) are considered.

6.5.1.1.4 Design Rainfall and Time Series Rainfall

The design rainfall storm used in the modelling process for developing the SWO design shall be in accordance with Uisce Éireann's Guidance Note on the Application of Rainfall Data in Wastewater Network Modelling (TEC-800-13) addresses the following items:

- Design Rainfall
- Time Series Rainfall
- Areal Reduction Factor

- Wetness Parameter (New PR Runoff Model)
- Climate Change

6.5.2 Spill Frequency

Where applicable, significant (>50m^3) spill frequency requirements for new and upgraded SWOs based on the type, use and designation of receiving waters are set out in Section 8.

Uisce Éireann work to the following definition of a spill, which is in line with UK Stormwater Overflow Assessment Framework:

- one or more discharge overflow events within a period of-12 hours or less is considered to be one spill, one or more discharge overflow events extending over a period of greater than 12 hours up to 36 hours is considered to be 2 spills.
- Each subsequent 24-hour duration counts as 1 additional spill and the whole of the 24-hour block is included. Where more than one storm overflow discharges to a designated waterbody, then spills should be aggregated.

Detailed analysis using a calibrated and verified network model in conjunction with an appropriate Time Series Rainfall (TSR) dataset may be used to estimate the frequency and volume of discharge of receiving waters. Many SWOs are monitored with event duration and/or spill volumes being recorded. All available SWO monitoring should be reviewed and cleansed where necessary to inform current wastewater network performance and loading compared with model predictions. Spill sampling should also be undertaken, to allow designer to calculate percentage DWF Load discharged via overflows.

Where the design standard for a SWO is based on a certain spill frequency, average predicted performance is to be determined by running a minimum of a 10-year Times Series Rainfall (TSR) through an appropriate verified model of the sewer system.

Boundary conditions such as the rise and fall of river/tide levels shall also be considered as part of the TSR analysis to reflect actual conditions and any potential hydraulically restricted outflows. Information on river and tide levels is available from the OPW at waterlevel.ie.

6.5.3 Receiving Water Quality Modelling

Where water quality modelling is required to assess impact on receiving water, a tiered approach to assessment should be adopted. The approach should be commensurate with the designation/use of the receiving water, SWO Significance and the scale of potential construction costs.

Network and water quality modelling is required to assess SWO impact on receiving water for all Medium and High SWOs and/or SWOs discharging to freshwater with dilution <8:1.

For Medium significance and low dilution SWOs, simple mass balance-based calculations are normally used to demonstrate that a proposed scheme will be compliant with 99 Percentile standards.

For High Significance SWOs more detailed river, estuary and/or marine models may be required to demonstrate compliance with relevant standards.

For guidance on Marine Modelling, reference should be made to Uisce Éireann's Marine Modelling Standard (TEC-100-015). UPM methods and metrics are used to determine existing and proposed impacts of SWO discharges to freshwater. See Appendix A.

6.6 SWO Performance Settings

6.6.1 SWO Significance

The PCRSWOs identifies methods that may be used to establish appropriate SWO spill settings and frequency/volume based on SWO Significance, which is dependent on a combined assessment of the size of the contributing catchment, the available dilution and the designation of the receiving water. SWOs are Low Significance unless multiple criteria occur.

SWO Significance	Criteria				Criteria Application	Discharge Settings Assessment
	Dilution	Discharge Interactions	Population Equivalent	Fisheries		
Low	>8:1	None	-	-	-	Emission controls
Medium	<8:1	Limited	>2,000	Cyprinid	Only if all four Criteria apply	Simple models, e.g. SDD, QUALSOC, CARP + sewer hydraulic model
High	<2:1	Significant	>10,000	Cyprinid or salmonid	Only if all four Criteria apply	Complex models, e.g. sewer and river quality models

Table 6-1: Significance of SWOs on freshwaters and Discharge Settings Assessment

Significance	Criteria			Criterion Application	Discharge Settings Assessment
	Population equivalent	Bathing Waters	Shellfish Waters		
Low	-	-	-	-	Emission control, e.g. Formula A
Medium	0 – 10,000	Affects Identified	Affects Identified	Applies if at least two of the three criteria are met	Complex models, e.g. sewer and water quality models
High	>10,000	Affects Identified	Affects Identified	Applies if at least two of the three criteria are met	

Table 6-2: Significance of SWOs to Coastal Waters and Estuaries and Discharge Settings Assessment

The majority of SWOs nationally are Low Significance, and water quality models often do not exist to inform a discharge setting assessment. Therefore, emission controls are to be applied initially in the design of all upgraded and new SWOs, as set out in Section 8.4, and confirmed through modelling.

6.6.2 Receiving Water: Surface Waters – Rivers & Lakes

Within the PCRSWOs the dilution relating to a SWO is defined as the ratio between the foul DWF in the sewer (per SWO) and the 95%ile flow in the receiving water.

SWO significance is on a SWO-by-SWO basis. Therefore, different SWO Significance may exist within a single agglomeration. Where there is interaction with any other urban wastewater discharges (including other SWOs) to surface waters, the SWO significance shall be determined using the cumulative dilution. The determined significance shall apply to all interacting SWOs.

It is noted that freshwater may also have a bathing water designation / water contact usage and therefore the appropriate bathing design standard should be applied in conjunction with freshwater standards.

6.6.3 Receiving Water: Contact/Recreational

Contact/recreational waters are waters where bathing and /or contact sports (immersion) is regularly practiced (e.g. windsurfing, canoeing).

Where a discharge impacts on contact/recreational waters, SWOs should be designed so that the maximum number of significant (>50m^3) spills discharged via the storm water overflow shall, on average, not exceed 7 per bathing season. The bathing season in Ireland runs from 1 June to 15 September.

6.6.4 Receiving Water: Bathing

Identified bathing waters are bathing waters (sea, river, or lake surface waters) which local authorities consider to be widely used by the public for bathing. Identified bathing waters are monitored, managed, and assessed under the requirements of the 2008 Bathing Water Quality Regulations.

Where a discharge impacts on a European Union Bathing Water Directive designated bathing water, SWOs should be designed so that the maximum number of significant (>50m3) spills

discharged via the storm water overflow shall, on average, not exceed 3 per bathing season.

Water quality modelling may be considered to demonstrate that spills in excess of this design standard can be permitted in the case where compliance with the relevant bathing water standard can be demonstrated.

The bathing season in Ireland runs from 1 June to 15 September. All bathing water monitoring results are available from Splash (EPA Website http://splash.epa.ie/#) Beaches Ireland[1] and posted on notice boards at the beaches throughout the season.

6.6.5 Receiving Water: Shellfish

The areas designated as Shellfish Waters are listed under Schedule 3 of the European Communities (Quality of Shellfish Waters) Regulations 2006 (S.I. No. 268 of 2006).

There is no current national policy on the assessment and design of intermittent discharges which discharge near / into designated shellfish waters. As an interim approach, the methodology used in Urban Pollution Management Manual 3rd Edition (UPM3)[1] is to be adopted, with SWOs to be designed so that the maximum number of significant (>50m3) spills discharged via a SWO shall, on average (over 10+ years), not exceed 10 per annum where such discharges are directly or in close proximity (<1km) to the designated shellfish water.

6.6.6 Receiving Water: Fresh Water Pearl Mussel

Similar to shellfish, there is no current national policy on the assessment and design of intermittent discharges which discharge near / into designated FWPM waters. As an interim approach, the methodology used in Urban Pollution Management Manual 3rd Edition (UPM3)[1] is to be adopted, with SWOs to be designed so that the maximum number of significant (>50m3) spills discharged via a SWO shall, on average (over 10+ years), not exceed 10 per annum where such discharges are directly or in close proximity (<1km) to the designated FWPM water.

[1] EPA Website: www.epa.ie/our-services/monitoring--assessment/bathing-water/

6.6.7 Receiving Water: Nutrient Sensitive Waters

The PCRSWOs specifies the volume of overflows directly or in close proximity to nutrient sensitive water as a percentage of rainfall run-off volume to the foul sewer should be a maximum of 20%, i.e. 80% of annual rainfall run-off volume entering the wastewater network should be retained and treated at the WWTP.

This is to be assessed using a 10-year TSR assessment of SWO discharges to Sensitive Waters. The methodology to calculate the annual run-off volume requires two sets of TSR runs to be completed:

- TSR Run No.1: The Full 10-year TSR model run
- TSR Run No.2: Full 10-year TSR model run with rainfall removed

The results from the two datasets should then be assessed with the following formula for each time step as follows:

TSR Run No.1 – TSR Run No.2 = Annual Rainfall Run-off Volume

Individual and aggregated SWO performance within a particular agglomeration shall be considered by the designer.

6.7 Performance Requirements and Design Appraisals

6.7.1 Design Appraisals

The design of a new SWO or upgrade of an existing SWO shall involve a rigorous appraisal of all potential options in order to identify the optimum solution at reasonable cost. The optioneering associated with the SWO should be undertaken as early as possible in the design process. The scale of the optioneering undertaken should be appropriate and commensurate with the scale of the project. The 2024 rUWWTD states measures that must be considered, including preventative measures and optimised use of existing infrastructrure.

Upgrades of SWOs can comprise, but is not limited to, one or more of the following elements and should also be considered:

1. Preventing reverse flow (inflows) from receiving water (non-return valves, relocated outfall)
2. Source Control.

3. Structural Renovation including upgrades to SWO chamber structure and geometry.
4. Operational Maintenance such as sewer cleaning, screen cleaning etc.
5. Inflow and Infiltration reduction.
6. Real time control of sewers to utilise more in sewer storage capacity.
7. Raising overflow levels or controlling flows through chamber to reduce spills.
8. Re-direction of upstream flows.
9. Separation from combined system of sewers and drains carrying surface water flows through SUDs and/or traditionally grey infrastructure solutions.
10. Reducing overflow outlet throttles.
11. Increased sewer capacity downstream (gravity sewer or pumped sewer).
12. Aesthetic controls (screens, baffles, scum boards etc.).
13. Additional storm storage near the overflow (on-line/off-line storage, upsized sewers etc).
14. Relocating point of discharge to more suitable location.

Option selection should pay due regard to sustainability and in particular to WLC implications and should be developed with the following hierarchy in mind:

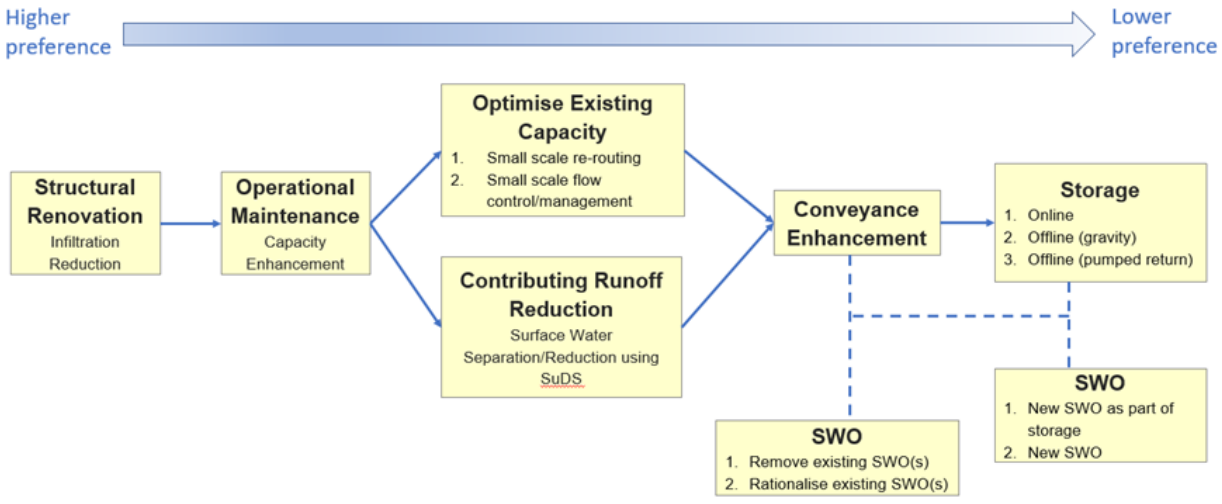

Figure 1: Option Development Hierarchy

Schemes solutions and the drainage system as a whole should be designed, constructed, and maintained in accordance with the best technical knowledge not entailing excessive costs.

Before design and upgrade of a SWO, consideration shall be given to preventive measures aiming at avoiding the entry of unpolluted rain waters into sewage collecting systems, including measures promoting natural water retention or rainwater harvesting, and measures increasing blue-green infrastructure solutions such as Nature Based SuDs. SuDs shall be designed to manage and reduce the amount of surface water in the combined system to reduce storm water flows. SuDs shall be utilised with the aim to eliminate the requirement for an SWO, or to reduce the frequency and volume of spills into the receiving waterbody.

Where possible at reasonable cost, existing SWOs should be removed and/or multiple SWOs in close proximity rationalised. A SWO at/near stormwater storage should not operate before available storage is fully utilised, and SWO spill flow path should be via any available storm storage to avail of settlement and minimise pollution.

6.7.2 Performance Requirements of New and Upgraded Storm Water Overflows

The following two tables detail Uisce Éireann interim performance requirements of new and upgraded storm water overflows, which shall be confirmed as appropriate for each particular SWO and across an agglomeration through water quality modelling where necessary.

These performance requirements are interim pending development of new national storm water overflow policy aligned to the recast Urban Wastewater Treatment Directive.

Overflow Type	Hydraulic Model Available	Pass Forward Flow Requirement	Storage Requirement	Climate Change Allowance
Network & WWPS	**Yes**	Formula A	To achieve ≤4% annual DWF spill volume	TSR adjusted for Climate Change where available, otherwise, an additional 20% allowance in the storage volumes to be provided at all SWOs.
	No	Formula A	(Formula A – PFF for 2 hours + 120 L/PE.)	
WWTP	**Yes**	Flow to Full Treatment	To achieve ≤4% annual DWF spill volume	
	No	Flow to Full Treatment	(Formula A – FFT for 2 hours + 120 L/PE)	

Table 6-3: Performance Requirements for all New and Upgraded Storm Water Overflow discharging to Surface Waters

The 2% DWF Load / 4% DWF Volume spill limit applies on a whole agglomeration aggregated basis.

COASTAL/TRANSITIONAL WATERS Discharge into / or close proximity to:						
Type of Overflow	**Water Designation**	**Recreational Waters**	**Bathing Waters**	**Shellfish Waters & FWPM**	**Nutrient Sensitive**	**No designation**
Network & WWPS	**Pass Forward Flow Requirement**	Formula A Minimum	Formula A Minimum	Formula A Minimum	Formula A Minimum	Formula A Minimum
	Max No. of spills	7 per bathing season	3 per bathing season	10 per year	≤20% annual storm spill volume and ≤4% annual DWF spill volume	≤4% annual DWF spill volume
	Climate Change Allowance	TSR adjusted for Climate Change where available, otherwise, an additional 20% allowance in the storage volumes to be provided at all SWOs.				
	Hydraulic Modelling	Verified Hydraulic Model				
WWTP	**Pass Forward Flow Requirement**	Flow to Full Treatment Minimum	Flow to Full Treatment Minimum	Flow to Full Treatment Minimum	Flow to Full Treatment Minimum	Flow to Full Treatment Minimum
	Max No. of spills	7 per bathing season	3 per bathing season	10 per year	≤20% annual storm spill volume and ≤4% annual DWF spill volume	≤4% annual DWF spill volume
	Climate Change Allowance	TSR adjusted for Climate Change where available, otherwise, an additional 20% allowance in the storage volumes to be provided at all SWOs				
	Hydraulic Modelling	Verified Network Hydraulic Model				

Table 6-4: Performance Requirements of New and Upgraded Storm Water Overflow discharging to Coastal/Transitional Waters

Storage may be provided at WWPSs where pass forward flow is less than Formula A. Spill volumes impacting sensitive waters (fresh water and coastal waters) shall be ≤20% of storm run-off received, assessed on an individual SWO sub-catchment and whole agglomeration aggregated basis.

6.8 Formula A Flows

In the absence of storage, the minimum pass forward flow setting for upgraded and new SWOs is Formula A. This shall be in agreement with Uisce Eireann. This is based on the 1970 report titled *Technical Committee on Storm Overflow and the Disposal of Storm Sewage*. Formula A is calculated as follows:-

Fully Separate Systems

As per paragraph 348 of the 1970 report, for a separate foul system the minimum pass forward flow for the Storm Water Overflow shall be calculated using the following equation:

Minimum Pass Forward Flow 3*PG + I + 3*E (m^3/d)

*Multiple may be increased / reduced based on catchment size served but shall not be less than values contained in Uisce Éireann Technical Standard for Wastewater Gravity Sewers (TEC-800-01).

Partially Combined Systems

Where there is a significant proportion of the catchment drained on a separate system (where less than 20% of the network is combined), the pass forward flow for the Storm Water Overflow should be calculated as follows:

Formula A $= DWF + 1.36P_{\mathbf{comb}} + 2P_{\mathbf{sep}}G + 2E_{trade}$ (m^3/d)

DWF $= P_{total}\,G + I_{total} + E_{total}$ (m^3/d)

$P_{\mathbf{comb}}$	= population served by **combined** sewer	(Pop.)
$P_{\mathbf{sep}}$	= population served by **separate** foul sewer	(Pop.)
$E_{Industrial}$	= industrial flows from the total area	(m^3/d)
P_{total}	= Total Population	(Pop.)
G	= wastewater discharge / head /day	(m^3/PE/d)
I_{total}	= Total Infiltration	(m^3/d)
E_{total}	= Industrial Total	(m^3/d)

Combined Systems

Where all or most (≥80%) of the catchment is drained on a combined foul system, Formula A is simply calculated as follows:-

Formula A		= DWF + 1.36P + 2E	(m^3/d)
Dry Weather Flow (DWF)		= PG + I + E	(m^3/d)
P	=	Population	(Pop.)
G	=	wastewater discharge / head /day	(m^3/PE/d)
E	=	Industrial Flow	(m^3/d)
I	=	Infiltration	(m^3/d)

Existing infiltration should be determined through long-term flow monitoring or surveys to ensure existing DWF correctly identified. DWF should take account of peak seasonal baseflow, slow response and tidal infiltration sources.

6.9 SWO Chamber Design

New or upgraded network SWO Chambers shall be designed in accordance with WaPUG Guide 'The Design of CSO Chambers to Incorporate Screens, 2006'. SWOs shall be fitted with flow control and weir(s), screening to reduce solids discharge, flow monitoring, telemetry connection and stormwater retention/attenuation storage where possible. The chamber shall minimise the risk of sedimentation, and for a given site the size shall be dependent upon the ancillaries to be used at the site. New Overflows chamber design shall also be designed to allow for monitoring and sampling to be undertaken as detailed in Section 6.15.

The WaPUG guide provides the minimum dimensions that shall be used for all installations. Consideration shall be given to ensure that the flow patterns are compatible with effective screen operation. The dimension of the chamber shall be appropriate to the hydraulic performance of the screen.

All SWO chambers shall be located to allow for unrestricted access for maintenance and emergency scenarios where possible, and consideration given to relocation of the chamber if necessary. Where feasible they shall be located off road. The storm water overflow shall be designed in such a way as to minimise the creation and/or reduce the creation of confined spaces. Where entry by maintenance staff is more regularly required. Areas where confined

space classification cannot be avoided shall be designed in such a way that health and safety is in line with the HSA's Code of Practice for Confined Space Locations.

SWO chambers shall be designed to be self-cleansing. The longitudinal slope of the chamber floor shall give a velocity of at least 0.75 m/s and preferably 1 m/s at 2DWF. During spill conditions general guidance recommends that the velocity is <2 m/s. Benching in the main flow channel shall have a 1:6 slope and shall be benched to a level equal to the soffit of the pass-forward pipe.

The weir height shall be >0.6 D where D is the inlet pipe diameter. If this cannot be satisfied, then the Designer shall agree the design with Asset Planning. The weir shall be wide enough to accommodate any fixings and loads applied to it (e.g., by screens fitted to it).

6.9.1 Control of Overflow Flows

The setting of the overflow is normally based on the continuation flow when spills start.
The outflow should be controlled so that variation with depth is limited as much as possible.
Suitable methods of control include:

- Fixed orifice plate
- Adjustable penstock
- Vortex flow regulator
- Throttle pipe

Orifices and throttle pipes should be a minimum of 200mm to prevent blockages. The length, diameter and hydraulic gradient shall be taken in account in the design to ensure appropriate application.

6.9.2 SWO Cleaning and Maintenance

The SWO and associated chambers shall have their access designed to facilitate proactive cleaning and maintenance and minimise the need for reactive intervention.

The width of the incoming flow channel shall be sufficient to allow suitable access to the channel for cleaning and maintenance purposes. The clearance required for proper hydraulic operation of a scum board (if required) shall also be considered when determining the total

channel width. An appropriate working clearance (e.g. 900mm) shall be provided around the screen wherever access is required to carry out maintenance operations.

Any installed screens shall comply with the cleaning and maintenance requirements set out in Section 6.10.2.

SWO chambers shall be visited periodically to inspect for issues that may result in the SWO and/or screen to not operate as designed or result in damage if the fault remains undetected.

At each visit the following checks shall be made:

- Routine maintenance and cleaning of all ancillaries within the chamber
- Inspect any fasteners for damage and ensure none have come loose
- Built-up sediment removed from the chamber where safe to do so
- Check that the covers remain in good operational condition and do not pose a fall risk to operators or the public
- Inspect any telemetry and monitoring equipment (as per the EDM Specification) and sampling equipment.

6.10 SWO Screening and Treatment

SWOs shall be designed to minimise the visual impact caused by the discharge. Potential impacts include gross sewage solids, paper, plastic, and sewage fungus being visible within the receiving water, or stranded on the banks of rivers, or on beaches.

Aesthetic control of some sort will be required for all new and for existing non- compliant SWOs. This can be achieved by a number of means, for example the design of the overflow structure or the provision of screens.

The degree of control required is dependent on the amenity of the location impacted by the overflow and the frequency of discharges from the overflow.

6.10.1 SWO Screening

6.10.1.1.1 Aesthetic Requirements for New SWOs

The provision and size of screens for new SWOs shall be in accordance with the table below:

Amenity Category	Amenity Type Description	Aesthetic Control Requirements for Network & Pumping Station SWOs	Aesthetic Control Requirements for WWTW SWOs
High	- Area where bathing and water contact sport immersion is regularly practised. - Sensitive Areas. - Designated Shellfish Waters - Waters designated under Birds and Habitats Directives	Discharge flows to be screened to at least 2D 10mm; where the frequency of storm water discharge is more than once per year, 80% of the volume shall be screened to 2D 6mm. Debris with size greater than the aperture of the screen shall not be observed in the storm water discharged to the watercourse.	
Moderate	- Boating on receiving water. - Popular footpath adjacent to watercourse. - Watercourse passes through housing or frequented town centre area (pedestrian area, bridge, shopping area). - Recreation and contact sport (non-immersion area)	2D 10mm screening is required for all new/upgraded overflows.	As per High Amenity Category above.
Low	- Basic amenity use only. - Casual limited riverside access on a limited infrequent (bridge in rural area, footpath adjacent to river).	2D 10mm screening is required for all new/upgraded overflows.	As per High Amenity Category above.
Non-Amenity	- Seldom or never used for amenity purposes. - Remote or inaccessible access.	2D 10mm screening is required for all new/upgraded overflows.	As per High Amenity Category above.

Table 6-5: Amenity Categories and associated Aesthetic Control Requirements

6.10.1.1.2 Aesthetic Requirements for Existing SWOs

The provision of and size of screens for existing SWOs shall be in accordance with the table below:

Amenity Category	Performance	Aesthetic Control Requirements
All	Satisfactory	No action.
All	Unsatisfactory: Verified complaints and incidents have been attributed to the activation of the SWO in terms of visual impact.	Apply measures as per New SWO. Requirements in previous section[2]

Table 6-6: Aesthetic Requires for Existing SWOs

6.10.1.1.3 Site Considerations

The following are the site-specific considerations with respect screen selection and design:

- The amenity value of the receiving water
- The predicted maximum number of storm spill events per annum
- The availability of (or the possibility of providing) a suitable power supply
- The nature and characteristics of the upstream catchment as this will influence the temporal distribution of the flow and the aesthetics loadings that enter the screened SWO chamber
- The location of the overflow in relation to the location of other overflows in the catchment
- If upstream overflows are screened the quantities of aesthetic solids may increase towards the downstream end of the system
- Catchments which have historic operational information available with regard to the following problematic issues
    - High levels of fats, oils, or greases
    - High levels of grit
    - A reverse in the flow direction to the screen

[2] Subject to a hydraulic assessment to ensure no detriment post installation.

6.10.1.1.4 Screen Design

This section shall be read in conjunction with the latest issue of WIMES for the plant specified, including any Uisce Éireann amendments and generic data sheets.

In addition to the information provided in Section 9, this section shall be read in conjunction with the latest issue of WIMES for the plant specified, including the Uisce Eireann amendments and generic data sheets.

The following WIMES documents apply to Screening:

- WIMES 5.02 Coarse (1D) Screens for Sewage Treatment
- WIMES 5.03 Fine (2D) Screens for Sewage Treatment
- WIMES 5.04 Overflow Screens for Sewerage Systems and Sewage Treatment Works

Electrical installation shall be in accordance with WIMES 300 series, and associated Uisce Éireann amendments and in particular:

- WIMES 3.03 Low-voltage ac electrical motors for use in the Water Industry
- WIMES 3.04 Low-voltage electrical specification for package plant for use in the Water Industry

Corrosion protection shall be in accordance with WIMES 4.01 – Paints/polymeric coatings for corrosion.

All screenings at Network and WWPS SWOs should be captured within the pass forward flow. All screening wash water shall be returned to the pass forward flow for full treatment. All fixings shall be manufactured from stainless steel[3] with appropriate isolation kits where necessary to prevent galvanic corrosion.

[3] The selection of steel grade shall be made on the basis the degree of corrosion resistance required. This shall be a function of the aggressiveness of the environment, particularly with respect to the presence of chlorides, and the frequency and duration of immersion.

6.10.1.1.5 Screen Types

This Technical Standard applies the following type of overflow screens:

- Static screens
- Self-cleaning screens
- Powered screens

The above screens are designed for installation at an overflow weir(s). If WWTP inlet screens are required for an overflow screen application, refer to UÉ Technical Standard TEC-700-99-02 Inlet Works (wastewater).

6.10.1.1.6 Screen Selection

Criteria that influence screen selection include:

- Screen choice shall be integral with the design of chamber.
- Screen performance should be effective and be compliant with standards and licence requirements.
- Screens should be appropriately maintained. Static screens shall only be selected where infrequent use is expected due to general requirement to inspect screen after each spill occurrence or to check if screen blinding has occurred. The static screen should be suitable for visual inspection from ground level, and it should be capable of being washed from ground level with a jet wash. These requirements shall be considered in the WLC Assessment process. For guidance purposes only, when the predicted spills are less than 10 per annum then particular consideration should be given to static screens; this will have the additional benefit of avoiding the cost for controls and power supplies and potentially planning permissions for the housing of ancillary above ground equipment.
- The requirement for automatic screening will be determined on a site-by-site basis dependant on a number of factors including the frequency of operation.

6.10.2 Screen Performance Requirements

6.10.2.1.1 General

The screen shall effectively remove debris (screenings) from wastewater flows and shall be capable of operation for long periods without attention under all weather conditions and be robust and reliable in operation.

The screens shall separate from the effluent a significant quantity of persistent material and faecal/organic solids greater than the specified size in 2 dimensions.

The screen shall operate automatically and unless otherwise specified shall also be cleaned automatically, with all screenings directed to the pass forward flow.

6.10.3 Design basis

The basis for design should be as follows:

- To prevent upstream network flooding, storm screening shall include an overtop / by-pass facility. Screens shall be designed to cater for flows between 1-in-5 year return periods and 1-in-30 year return periods without overtopping screening channels
- Static or mechanically raked / screens can be used. Static screens shall account for blinding via increased screen size
- Telemetry / dial out alarms shall be required to notify operator in case of mechanical screen failure
- Screens and chambers shall be designed to not increase upstream flood risk. Extra consideration shall be given when retrofitting screens to existing works

Every effort shall be made to automatically route the screenings to the non-storm flow (continuation flow) passed to full treatment. The requirement for manual screenings handling and transport shall only be permitted where it has been agreed with Uisce Éireann that there are no practical alternative solutions.

Storm screens shall be sized to account for a blinding factor of 50%.

6.10.3.1.1 Design Life

The screen asset life shall be as follows (for all non- wearing/non-consumable components):

- Minimum 20 years for screens

For screen components where applicable:

- Minimum 3 years for non-metallic wearing components (i.e. brushes, seals, strips, etc.)
- Minimum 5 years for metallic wearing components (i.e. chains, rollers, guides, etc.)

6.10.3.1.2 Design Flow Rate

The values for the design flow rate per square metre of clean submerged screen at the maximum design flow shall be as follows:

Screen Type	Design Flow Rate, l/s/m^2
Static Screens	50
Power Screens	380

Table 6-7 - Screen Design Flow Rate

6.10.3.1.1 Blinding Factor

The hydraulic design shall be based on the fine screen(s) being blinded by a factor of 50%.

6.10.3.1.1 Maximum Velocity

The velocity through the screen aperture should be restricted to a maximum of 1.2 m/s.

6.10.3.1.1 Screens Loading Factor

If a screens loading value is not available for the given sub-catchment, the typical value of 0.03m^3/1000PE/day shall be used.

6.10.3.1.1 Screenings Retention Value (SRV)

The term Screenings Retention Value (SRV) refers to the benefit provided to the total solids retention efficiency of a CSO (SWO) chamber as a result of the inclusion of a screen, taking due regard of the solids separation performance of the chamber. In other words, the 'added value' which represents the extra efficiency added to the combined CSO(SWO)/Screen arrangement by the addition of the screen.

The principles behind the SRV value are provided in UKWIR Report Ref. No. 06/WW/08/14 National CSO Test Facility, Wigan WwTW, CSO Screen Efficiency 1997 – 2005. The SRV is defined by equation below:

$$SRV = \frac{[TSREWITH - TSREWITHOUT]}{[100 - TSREWITHOUT]} \times 100\%$$

Where:

TSREWITH	= Total Solids Retention Efficiency of the chamber and Screen
TSREWITHOUT	= Total Solids Retention Efficiency of the chamber without the Screen

The minimum average SRV % value that is acceptable for the types of screens is provided below. The actual SRV% value shall be provided based on measured value during type-testing and performed as 'type-test" at the UKWIR CSO Test Facility.

Screen Type	Minimum Average SRV (%)
Band Screens/Belt Screens	50%
Static Screens	44%
Spiral Screens/Brush Screens	30%
Bar/Disk Screens	30%

Table 6-8 - Minimum SRV% Values

6.10.3.1.1 Peaking Factor

The Peaking Factor Assessment Protocol (P-FAP) developed by Thompson RPM, will be used to determine the peaking factor (PF) and shall be calculated in accordance with UÉ Technical Standard TEC-700-99-02 Inlet Works & Stormwater Treatment (wastewater).
For further details refer to technical note TRPM-TN004 *Sewage and Catchment Characterisation* (a copy of this document is available as part of the UÉ document suite).
For Uisce Éireann assets the peaking factor shall be a minimum of 50 in all cases (covering fine and coarse screens).

Note – the peaking factor relates only to the screenings loading volume / rate, it is not applicable to the flow rate to the screen.

6.10.3.1.1 Peak Flow Rate

The screen shall be designed as a minimum requirement that it has sufficient hydraulic capacity to cope with events up to and including the 1-in-5 year rainfall event without becoming blinded and bypassed. The required size of a screen shall be based on screening up to the simulated peak flow for a 5-year return period storm over a range of storm durations including the critical storm duration.

6.10.3.1.1 Head Loss

The maximum allowable head loss across the screen shall be based on meeting hydraulic performance requirements and appropriate service levels and shall be based on outputs from a verified model.

The actual head loss at the screen shall be based on the maximum flow rate to be screened and the blinding factor. The screen unit shall be designed to withstand the maximum possible head differential without incurring any structural damage or excessive distortion. The screen shall be capable of effective operation after this head differential has reduced to normal operational levels.

The maximum head differential shall be that which would occur with the upstream network filled with sewage to its maximum level and the overflow channel empty.

6.10.3.1.2 Maintenance Of Assets

All assets shall, at a minimum, meet the following maintenance requirements:

- All regular inspection and cleaning maintenance should be achievable without requiring access below ground
- No elements that require greasing shall be below the water line
- Minimum clearance should be provided such that parts can be removed in a safe & reliable way, without interference to operation
- Wearable brushes (where used) should be replaceable by a single operator
- All flanges shall be PN16
- Screens should be maintainable from the dry channel

Where static screens are installed, they shall be cleaned no less than once every 3 months. Refer to individual sections for more specific requirements.

6.11 Reed Beds

Where reed beds are being utilised to treat storm overflows, the following is required to be considered:

6.11.1 Performance requirements

Reed bed shall be provided to achieve the following:

- To achieve the required level of treatment as outlined in the site WWD license / certificate.

6.11.2 Design Basis

The reed beds should be designed on the following criteria:

- For reedbeds treating storm overflows only should be sized with at least 0.5 m^2/pe and a maximum of 0.8 m^2/pe
- For tertiary polishing reed beds and combined storm / tertiary reed beds a minimum of 1.0 m^2/pe should be provided
- Where tertiary reed beds treating secondary storm overflows together with the main flows are used, these should be designed in accordance with the relevant Uisce Éireann standard (not yet available)

6.11.3 Specific Requirements

Where storm water is treated in reed beds the opportunity to re-combine flows shall be done after the secondary effluent sampling point.

Reed beds shall be protected after septic tanks with appropriate screen arrangements where no upstream screening is provided. The following design parameters shall be met:

- Planted length – minimum 12.5m
- Aspect ratio (length: width) – from 4:1 to 6:1
- Minimum reed planting density – 4 plants per m^2
- Inlet – even flow distribution across width of reed bed shall be provided
- Riser pipes shall not be used on storm beds
- Outlet – outlet arrangement shall be provided that can be adjusted from 100mm above bed surface to 100mm below floor level
- Facilities to periodically flush inlet and outlet pipework and rodding points shall be provided
- Raised 0.5m freeboard bund to retain surface flow

6.11.4 Process Control and Operating Regime

Operational procedures shall ensure that the reed bed receives sufficient water to sustain plant life.

Flooding of reed beds may be required where flow is intermittent with long periods of low flow. Lower the outlet if surface flow is excessive and return it to normal setting after a few days. Flood reeds for April and May during first 2 years of operation to inhibit weed germination.

6.12 SWO/EO Outfalls

Whether an outfall from a SWO/EO is to a watercourse or stormwater system, the arrangement detail should be determined in consultation with the relevant authorities (e.g. local authorities, EPA, Inland Fisheries Ireland, National Parks & Wildlife Service, MARA) and also in consultation with flood data from the OPW.

The outfall shall be in accordance with the Uisce Éireann Standard Details for Wastewater Infrastructure. Where an overflow discharges via an outfall the following is to be provided:

- A cage or safety grill shall be fitted if the diameter of the outfall pipe is 350mm diameter or larger. The cage/grill shall be removable or hinged to facilitate cleaning from the outside.
- A flap or duckbill valve shall be fitted on all outfalls below 1 in 100-year river and/or coastal levels. The location of the outfall shall be taken into account when deciding whether it is necessary to fit both a cage and a flap or duckbill valve.
- An inline flap or duckbill valve shall be fitted on all discharge points to storm water sewers to ensure no backflow of separated storm water flows enter the foul network.

Outfalls shall be designed to limit the risk of the following:

- Erosion/Scour
- Trapping (accumulation) of sediment
- Entrapment of fish
- Direct loss of bank side / riparian habitat

All outfalls shall be assessed using outfall boundary conditions.

For Coastal waters, the 10% AEP coastal levels should be used to assess network requirements to ensure no adverse impacts. For rivers, the 10% AEP river levels should be used to assess network requirements to ensure no adverse impacts.

6.13 Coastal Outfalls

Outfalls for all new SWO discharges into coastal waters should be located below the Mean Low Water Springs Level (MLWS). Where there are particular local extenuating circumstances which either prevent or render it impractical to locate the outfall below MLWS the design will require the number of spills that are made through these outfalls to be limited. For outfalls that are above the Mean High-Water Springs (MHWS) level the spill frequency could be limited to 1 in every 5 years.

Marine outfalls to coastal or transitional may require a Foreshore License. The Maritime Area Regulatory Authority (MARA), under the aegis of the Department of Housing, Local Government and Heritage, administer applications for consent under the Foreshore Act for developments which fall within the statutory responsibility of the Department of Housing, Local Government and Heritage.

An application for Foreshore License consent is made on the application form provided by MARA. An application must be accompanied by the materials necessary to support the application and to allow a full assessment of the proposal, such as an environmental impact statement and/or Natura impact statement where required, maps, plans, or any other information which MARA may require to fully assess the application.

6.14 River Outfalls

River outfalls require the following consents:

- Local Authority consent to place an outfall in a watercourse in accordance with the Water Pollution Act.
- Planning Permission from the relevant Planning Authority
- Easement and right to discharge from affected land owners
- Consent from Inland Fisheries Ireland and/or Waterways Ireland, if relevant,

6.15 SWO Event/Flow Monitoring

Event logging and flow monitoring shall be carried out as per figure 6.2 for new overflows below and as per figure 6.3 for existing overflows.

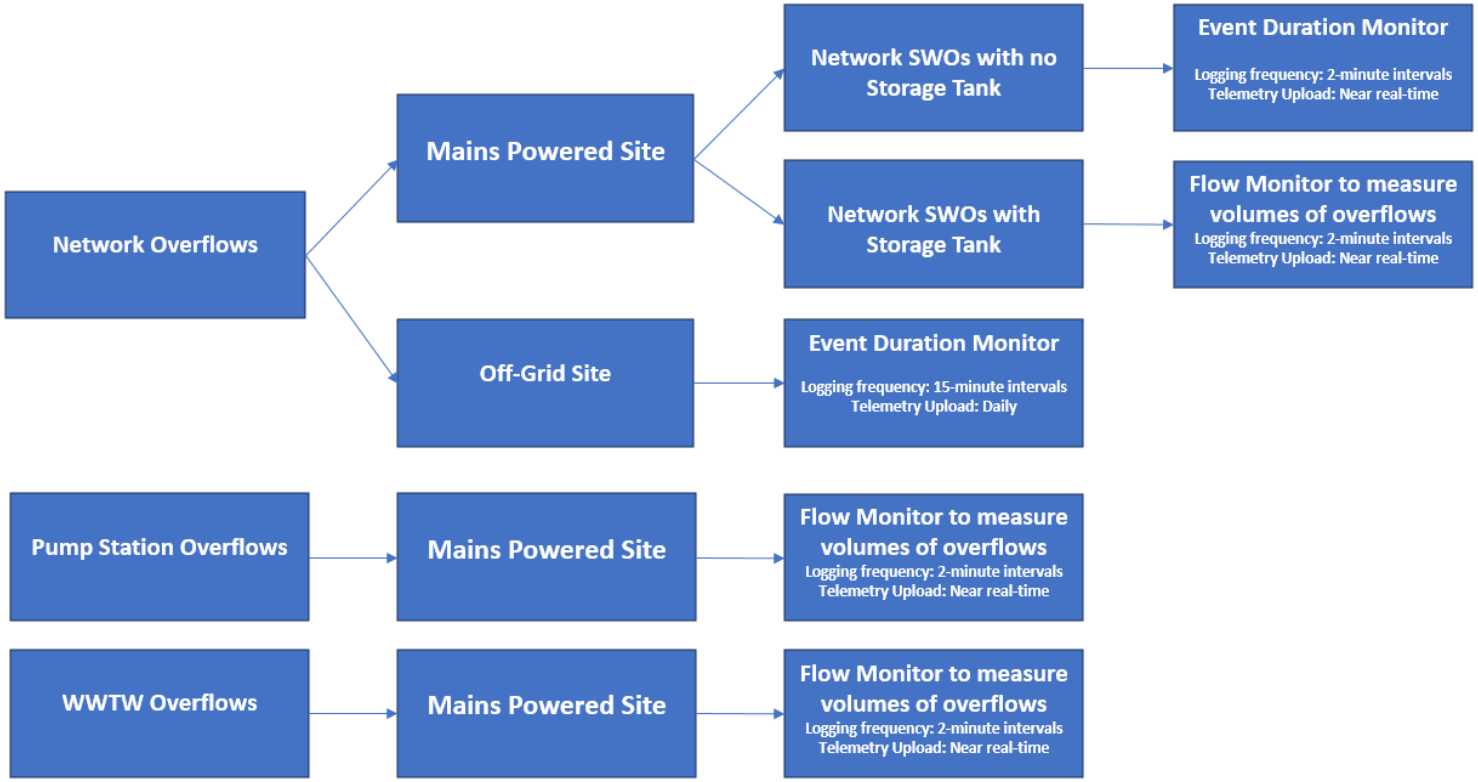

Figure 6-2: Storm Overflow Monitoring Requirements Flow Chart for new overflows.

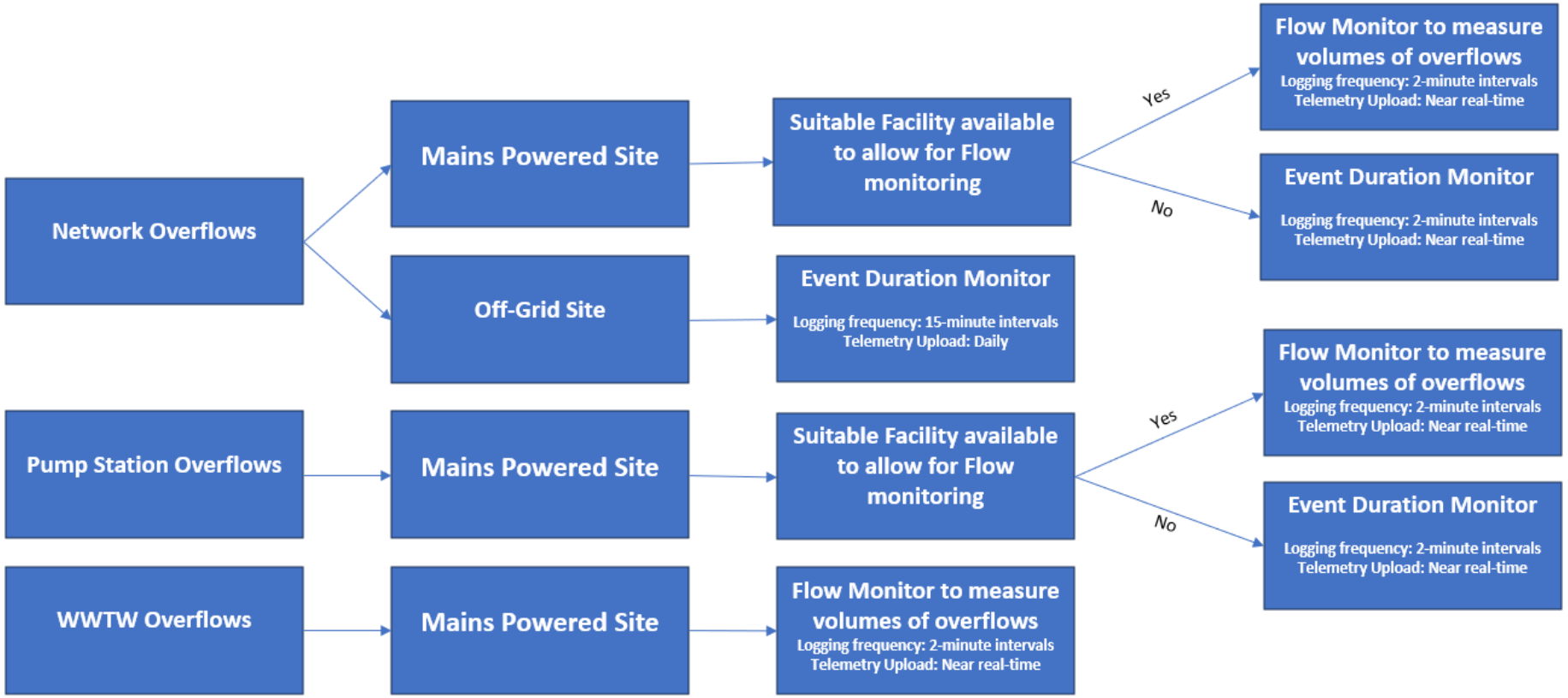

Figure 6-3: Storm Overflow Monitoring Requirements Flow Chart for existing overflows.

As per Level 2 – Wastewater Data Logger Policy (COO-AO-POL-00X) all new storm water overflows shall be fitted with an Event Duration Monitor (EDM) in accordance with (UE EDM Specification). All EDMs are to be linked to the National Telemetry System (NTS) and SCADA and are required to record the date, start time, and end time of overflow events. Where installed all EDMs shall report data to telemetry and SCADA at the upload period outlined in Figure 6-2.

Flow monitoring is required to record date, times, and volume of overflows.

Alarms shall be provided to indicate failure of the following:

- Power failure
- Screen malfunction
- Screen overload
- Screen overtopping

The Remote Asset Management (RAM) Policy for Waste Water Network Combined Sewer Overflow (CSO), Document Number: RAM-SPEC-5030-003 defines the business requirements for telemetry information for Storm Water Overflows.

6.16 SWO Sampling

The 2024 rUWWTD targets spill limits in terms of Load. Therefore, SWO spill monitoring is required to assess performance against this target. Sampling facilities for “grab” sampling shall be provided at all new and upgraded SWOs. Flow proportional composite sampling (based on flow rate measured at outlet) shall also be provided for all SWOs where flow monitoring is provided and deemed necessary by Uisce Éireann, such as storm tanks at WWTPs and large WWPSs. The specific requirements for sampling should be confirmed with Uisce Éireann for each SWO.

Each sampling point shall be located where good mixing is likely to occur to avoid settlement impacting the sample representativeness, and where backflow/ingress is not possible (e.g. river or final effluent back up into sample location).

6.17 Application of this Standard

The Designer / Contractor shall demonstrate that the screening plant provided satisfies the following requirements:

- Low whole life cost (WLC)
- Low energy usage
- High reliability
- Robustness and operational flexibility
- Low maintenance and low frequency of operator's visits
- Meets Health & Safety Requirements (e.g. minimise operator handling)
- Good operability and maintenance (e.g. accessibility, ease of process control)
- Low environmental impact (e.g. odour, vehicular movements)

Whole Life Cost (WLC) shall include all costs incurred throughout the service life of the Storm Water Overflow such as design and capital costs, operating costs, depreciation, and disposal costs. It shall also include environmental impact and social costs.

Life Cycle Cost (LCC) refers to the total costs incurred throughout the service life of a screen system including capital, installation and commissioning, energy, operating, maintenance, unplanned downtime, environmental and decommissioning costs.

The design process parameters given in the following sections are minimum requirements based on current good practice. A detailed process design shall be undertaken for each proposed works to suit the site- specific flow and loading characteristics of the upstream network and the requirements outlined in the WWDA.

The design and layout of all plant and ancillary equipment shall consider health & safety requirements, along with maintenance requirements.

Considerations shall be given to all screening equipment and how this equipment will be serviced during breakdowns.

All overflow screens should be designed to reduce manual handing and/or biological risk associated with their cleaning.

The overall design and layout of a SWO Screen shall minimise adverse environmental impacts. As part of the design process, the operation and maintenance strategy need to be considered, such that accurate whole life cost decisions can be made.

This Technical Standard is part of a suite of standards that includes higher level general requirements, including requirements for compliance with the ATEX Directive 1999/92/EC as incorporated into Part 8 of the 2007 Safety Health and Welfare at Work (General Application) Regulations and Safety and Welfare at Work (Confined Spaces) Regulations 2001 (S.I. No. 218 of 2001).

All new and refurbished storm water overflow works shall be designed and assessed in accordance with the Uisce Eireann standard TEC-600-08 using the risk assessment tool TEC-600-08 FM-01. The risk assessment tool evaluates catchment risk in determining the zoning requirements at SWOs.

Where there is any perceived conflict in requirements, clarity should be sought through agreement with UE Asset Management. Waiver / change request arrangements should be sought through agreement with UE Asset Management. The National and European standards in Section 8 shall be read in conjunction with this Technical Standard where appropriate.

7 DETAILED DESIGNS, DRAWINGS & SPECIFICATIONS

All details shall be in accordance with Uisce Éireann Standard Drawings, unless agreed otherwise with Uisce Éireann.

- Uisce Éireann Standard Details for Wastewater Networks
- Uisce Éireann As-Constructed CAD Standards TEC-100-001

The specification requirements of CESWI with Uisce Éireann Supplementary Clauses shall apply.

- General Civil Engineering Specification TEC-300-01
- General Civil Engineering Specification Notes for Guidance TEC-300-02
- General M&E Specification TEC-200-01
- General M&E Specification Notes for Guidance TEC-200-02

Where conflicts between these documents occur, the Uisce Éireann Technical Standards shall take precedence.

Where hydraulic models have been used to assist in the design of SWOs, as-constructed models and hydraulic designs shall be provided to Uisce Eireann following the completion of the works.

8 REFERENCED DOCUMENTS

Document Name	Document Number	Location
General Mechanical & Electrical Engineering Specification	*TEC-200-01*	link
General Mechanical & Electrical Engineering Specification – Guidance Notes	*TEC-200-02*	link
General Civil Engineering Specification	*TEC-300-01*	link
General Civil Engineering Specification Notes for Guidance	*TEC-300-02*	link
Wastewater Gravity Sewers	*TEC-800-01*	link
Wastewater Pumping Stations & Rising Mains	*TEC-800-02*	link
Storm Water Tanks on Wastewater Networks	*TEC-800-04*	link
Wastewater Network Hydraulic Model Build and Verification Standard	*TEC-800-06*	link
Wastewater Network Risk Assessment and Needs Identification Standard - Drainage Area Planning Stage 3	*TEC-800-12*	link
Guidance Note on the Application of Rainfall Data in Wastewater Network Modelling	*TEC-800-13*	link
Guidance for the Application of Urban Creep and Misconnection Allowances in Wastewater Network Future Modelling Scenarios	*TEC-800-14*	link
Uisce Éireann Energy Efficient Design Standard	*TEC-600-04*	link
Design Standard for Explosive Atmosphere Compliance	*TEC-600-08*	link

Document Name	Document Number	Location
Hazardous Area Risk Assessment Tool	*TEC-600-08-FM01*	link
As-Constructed CAD Standard	*TEC-100-001*	link
Remote Asset Management (RAM) Policy for Wastewater Network Combined Sewer Overflow (CSO)	*RAM-SPEC-5030-003*	link
Inlet works & Stormwater Treatment (wastewater)	TEC-700-99-02	link
WIMES Series 300 Electrical (3.01 to 3.12 inclusive)	-	link
WIMES 3.03 Low-voltage ac electrical motors for use in the Water Industry	-	link
WIMES 3.04 Low-voltage electrical specification for package plant for use in the Water Industry	-	link
WIMES 4.01 - Paints & Polymeric Coatings for Corrosion Protection	-	link
WIMES 5.02 – Coarse (1D) Screens for Sewage Treatment	-	link
WIMES 5.03 – Fine (2D) Screens for Sewage Treatment	-	link
WIMES 5.04 - Overflow Screens for Sewerage Systems and Sewage WWTW	-	link
WIMES 8.03 Mechanical Installations	-	link
WaPUG Guide - The Design of CSO Chambers to Incorporate Screens, 2006.	-	link
WaPUG Guide to the Quality Modelling of Sewer Systems	-	link
Water Action Plan: Ireland's River Basin Management Plan 2022 – 2027	-	link
Recast Urban Wastewater Treatment Directive (EU -2024)	-	link

Document Name	Document Number	Location
Marine Modelling Technical Standard	*TEC-100-015*	link
Technical Committee on Storm Overflows and the Disposal of Storm Sewage (1970)	-	link
DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995 (PCRSWO)".	-	link
UKWIR Report Ref. No. 06/WW/08/14 National CSO Test Facility, Wigan WwTW, CSO Screen Efficiency 1997 – 2005	-	link

9 GENERATED DOCUMENTS

Document Name	Document Number	Location
Storm Water Overflows	*TEC-800-03*	link

APPENDIX A: WATER QUALITY MODEL TYPES

9.1 Simple River Water Quality Modelling

Use of sewer model and river flow data/models as inputs to a simple mass-balance assessment of the receiving water(s). This process may be Stochastic (Monte-Carlo method) or Deterministic (based on 10 years-time series data).

Following this process, an assessment of compliance with EQS for BOD, COD, SS, TN, TP, Total Ammonia, MRP) and 99 percentile standards (BOD, Un-ionized Ammonia) can be made.

The following assumptions are permitted for Simple River Water Quality Modelling exercises:

- Where a calibrated and verified (to Uisce Éireann Standards) model is not available, existing models should be considered for use. In the absence of any sewer modelling tools, a validated network model should be constructed to estimate flows and loads from sewer network to receiving waterbody. With respect to model complexity, this may be WaPUG Type 1, with suitable calibration and validation using EDM and limited flow/rainfall survey data. Flow survey should capture SWO events in order to demonstrate the model represents SWO operation
- In the absence of a validated sewer quality model, Event-mean concentrations may be applied to inflows to rivers from SWOs
- Depending on the size, and complexity of the agglomeration and proximity to a hydrometric gauge, mass balance assessment may be carried out using gauged flows and ambient concentrations from WFD monitoring
- In the absence of data relating to the oxygenation/chemistry conditions in the river, ambient concentration values for pollutants may be inferred from the biology status of the river by assuming a pollutant concentration of the mid-point of the status band based on the current biological status band
- In the absence of local gauged data, river flows may be generated using a long-term record from an analogue gauging station from a hydrologically similar catchment and adjusted for area
- Where no suitable river flow data exists, simple catchment/river models and rainfall data may be used to synthesise flows from rainfall records

- Proposed Methodologies to be agreed with Uisce Éireann Environmental Strategy Team

9.2 Detailed River Water Quality Modelling

Use of a detailed hydraulic sewer and river water quality model as inputs to carry out a detailed deterministic, 10- year time-series assessment of the receiving water driven by a targeted monitoring campaign.

Following this process, an assessment of compliance with EQS (DO, BOD, COD, SS, TN, TP, Total Ammonia, MRP) and 99 percentile standards (BOD, Un-ionized Ammonia) can be made.

The following assumptions are permitted for Detailed River Water Quality Modelling exercises:

- Calibrated and Verified Network model to UE Standard shall be used to develop inputs to river model
- River model may be dynamically linked to network model, but a decoupled approach may be suitable where it can be demonstrated that there is no scope for exchange of water from rivers to networks
- Long term flow record, (gauge data or modelled) should be used in conjunction with flow/load relationship to provide ambient concentrations in river. Flow/Load relationship should be informed by campaign of WQ monitoring. This monitoring should be carried out upstream, midstream, and downstream of the agglomeration
- River model shall include oxygenation processes and pollutant decay
- Where an approach other than 1D is proposed to model the river, proposed simulations periods/events shall be agreed on a case- by -case basis
- Event-mean concentrations or direct inputs from inputs from SQM may be used to simulate SWO loads
- Proposed methodologies to be agreed with Uisce Éireann Environmental Strategy Team

APPENDIX B: TYPICAL STORMWATER OVERFLOW LAYOUTS

9.2.1 Typical Wastewater Treatment Plant SWOs

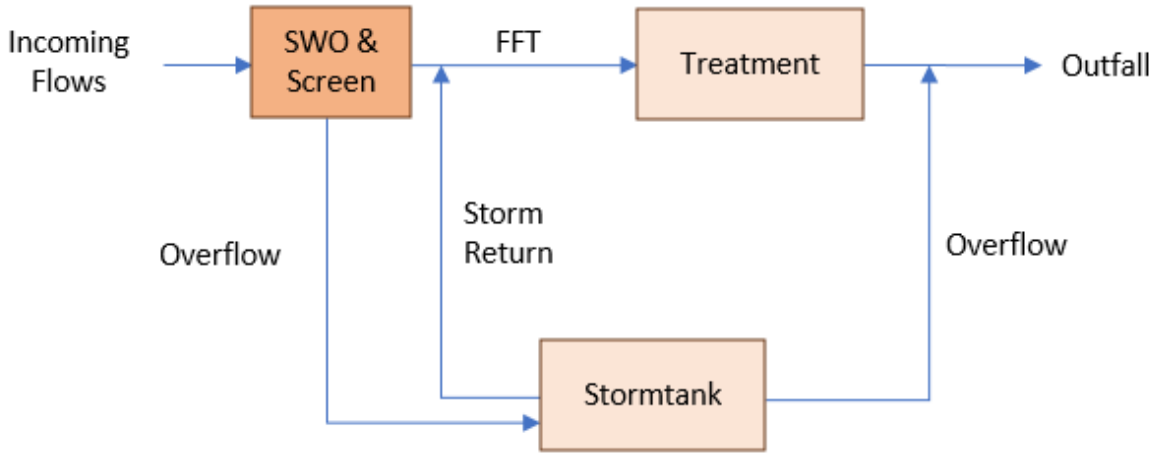

Figure 0-1: SWO at WWTP Inlet with Storm Tank overflow

9.2.2 Typical Wastewater Pumping Station SWOs

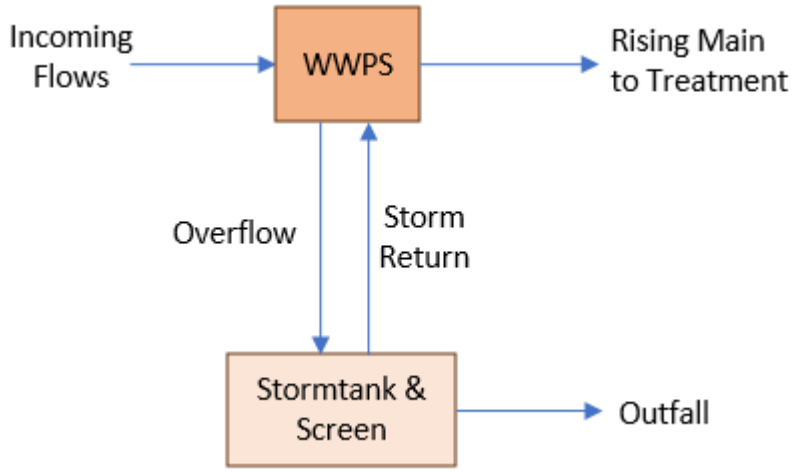

Figure 0-2: SWO at WWPS with Storm Tank and screened overflow

9.2.3 Typical Network SWOs

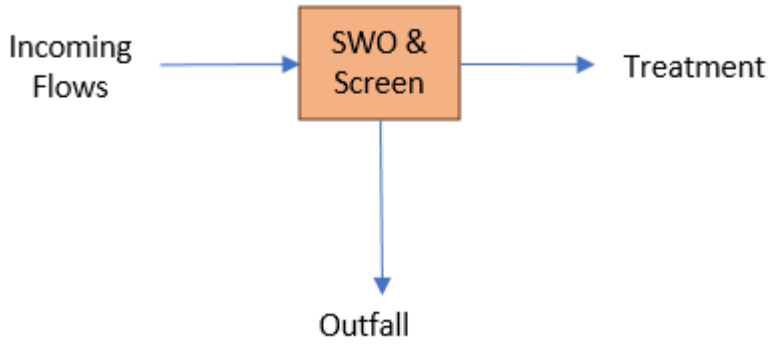

Figure 0-3: Typical Network SWO