

# Department of the Environment



## Regulation of Water Service Discharges

*Report for the Year 2001*



An Agency within the Department of the  
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# Contents

List of Tables:

List of Figures:

<b>Summary</b>	<b>1</b>
<b>Section 1</b> Introduction	<b>6</b>
<b>Section 2</b> Regulatory System	<b>7</b>
<b>Section 3</b> Registered Standards	<b>8</b>
<b>Section 4</b> Waste Water Treatment Works (WWTWs) Performance	<b>14</b>
<b>Section 5</b> Compliance with the Urban Waste Water Treatment (UWWT) Regulations in 2001	<b>25</b>
<b>Section 6</b> Sewerage System Assessment	<b>30</b>
<b>Section 7</b> Water Treatment Works (WTW) Performance	<b>32</b>

<b>Section 8</b>	
<b>Water Service Regulation Audits</b>	<b>34</b>
<b>Section 9</b>	
<b>Pollution Incident Investigation</b>	<b>36</b>
<b>Section 10</b>	
<b>Comparisons</b>	<b>38</b>
<b>Appendix A</b>	<b>40</b>
<b>Status of Individual Waste Water and Water Treatment Works     at June 2003</b>	<b>40</b>
<b>Appendix B</b>	<b>48</b>
<b>Registered Standards for Waste Water Treatment Works above a 250 PE</b>	<b>48</b>
<b>Glossary</b>	<b>54</b>
<b>References</b>	<b>56</b>

## List of Figures

<b>Figure 1:</b>	<b>Percentage WWTW Compliance for the United Kingdom (UK) 1997-2001</b>	<b>3</b>
<b>Figure 2:</b>	<b>Locations of WWTWs Serving a PE greater than 250</b>	<b>15</b>
<b>Figure 3:</b>	<b>Summary of WWTW Compliance</b>	<b>16</b>
<b>Figure 4:</b>	<b>Locations of WWTWs that were Required to Comply with the UWWT Regulations in 2001</b>	<b>25</b>
<b>Figure 5:</b>	<b>WTW Compliance 1998-2001</b>	<b>32</b>
<b>Figure 6:</b>	<b>Distribution of Sources of Pollution Incidents 2001</b>	<b>36</b>
<b>Figure 7:</b>	<b>Distribution of Sources Pollution Arising from Water Service Activities in 2001</b>	<b>37</b>
<b>Figure 8:</b>	<b>Percentage WWTW Compliance for the United Kingdom (UK) 1997-2001</b>	<b>38</b>

## List of Tables:

Table 1:	Summary of Compliance with WWTW Registered Discharge Standards	1
Table 2:	Summary of Compliance for WWTWs Discharging to Sensitive Areas	2
Table 3:	Summary of Compliance for all UWWT Directive WWTWs	2
Table 4:	WTW Compliance	3
Table 5:	Standards Applying to WWTWs PE>10,000 Discharging to Sensitive (Eutrophic) Areas	12
Table 6:	Compliance of WWTWs with Registered Standards in 2001	14
Table 7:	WWTW Registered Discharge Standard Compliance	16
Table 8:	WWTWs Placed on the Public Register from 1 January 2002	16
Table 9:	WWTWs that were Non-compliant with their Registered Standard in 2001	17
Table 10:	Dangerous Substance Compliance	19
Table 11:	WWTWs Placed on the Public Register from 1 January 2001 that were Non-compliant in 2001	20
Table 12:	WWTWs Adversely Affected by the Foot and Mouth Outbreak	20
Table 13:	UWWT Regulation Works that Require Upgrade and the Estimated Costs of that Upgrade	21
Table 14:	Non-UWWT Regulation Works that Require Upgrade and the Estimated Costs of that Upgrade	23
Table 15:	WWTWS that do not Provide the Level of Treatment Required by the UWWT Regulations	27
Table 16:	WWTWs that were Non-compliant with the Requirements of the UWWT Regulations in 2001 by parameter	28
Table 17:	WWTWs with Insufficient Sample Results in 2001	28
Table 18:	Percentage Compliance for WWTWs Discharging to Sensitive (Eutrophic) Areas	29
Table 19:	Status of Drainage Area Plans -30 April 2003	31
Table 20:	WTW Compliance 1998-2001	32
Table 21:	Compliant Water Treatment Works Discharges 1998-2001	33
Table 22:	Non-compliant Water Treatment Works Discharges 1998-2001	33
Table 23:	Substantiated Pollution Incidents 1996-2001	36

## Summary

This is the first report on the performance of effluent discharges made by Water Service, an agency of the Department for Regional Development. It provides a summary of the compliance of Water Service discharges with Registered Standards set by Environment and Heritage Service (EHS), an agency of the Department of the Environment, to control the quality of such discharges. Discharges included are the effluents from 268 Waste Water Treatment Works (WWTW) serving a population equivalent (PE) greater than 250 and the effluents from 25 Water Treatment Works (WTW). Details of compliance with the requirements of the EU Urban Waste Water Treatment (UWWT) Regulations (Northern Ireland) 1995 are also presented for the 37 WWTWs that currently qualify for inclusion under the conditions of the Regulations.

It should be noted that the details of the capital works upgrades and the financial arrangements to support this investment, given in this 2001 Report, have been updated to reflect the situation at mid 2003.

## Compliance of Waste Water Treatment Works (WWTW) with EHS Standards

The results of compliance with the Registered Standards set by EHS and entered into the public register from 1997 onwards are presented in **Table 1**.

These results show an improved performance from 73 % in 1997 to 87% in 1999. However, this drops to 81% in 2000, and drops more sharply in 2001 to 58%. This decline in 2001 is strongly influenced by:

- tighter standards introduced in 2001 for coastal discharges and some inland WWTWs, to bring them into line with the UWWT Directive standards which came into force at the end of 2000;
- the addition of 107 further works to the Register to bring the threshold size of works registered down to 250 PE.

**Table 1: Summary of Compliance with WWTW Registered Discharge Standards**

	1997	1998	1999	2000	2001
Number of WWTWs on Register	133	134	159	160	268
Percentage of WWTWs complying with numeric discharge standards	68%	80%	85%	77%	54%
Percentage of WWTWs complying with descriptive discharge standards	100%	95%	97%	100%	100%
<b>Overall compliance with standards</b>	<b>73%</b>	<b>83%</b>	<b>87%</b>	<b>81%</b>	<b>58%</b>

## Compliance with UWWT Regulations

The Compliance of WWTW effluent discharges with the UWWT Regulations is reported for 1999, 2000 and 2001. The first reporting year under the Regulations for the 15 WWTW serving a PE greater than 10,000 discharging into areas identified as 'sensitive' under the UWWT Directive (91/271/EEC) was 1999. A summary of compliance for these works is shown in **Table 2**.

**Table 2: Summary of Compliance for WWTWs Discharging to Sensitive Areas**

Percentage Compliance		
1999	2000	2001
53%	53%	60%

In 2001 the number of discharges qualifying under the Regulations was increased to 37 due to the inclusion of works serving a PE greater than 15,000. As can be seen in **Table 3**, compliance in 1999 and 2000 was determined as 53 % and in 2001 it dropped to 35% due to a number of coastal discharges and some inland WWTWs

being included, that did not have the required level of treatment under the Regulations. Indications are that compliance for 2002 will be close to 45%.

**Table 3: Summary of Compliance for all UWWT Regulated WWTWs**

Percentage Compliance		
1999 <sup>+</sup>	2000 <sup>+</sup>	2001 <sup>*</sup>
53%	53%	35%

<sup>+</sup>15 WWTWs assessed in 1999 and 2000

<sup>\*</sup>37 WWTWs assessed in 2001

An assessment of the condition of the sewerage systems (termed "collection systems" in the Regulations) serving the major towns in Northern Ireland is also presented in **Section 6** of this report.

## Compliance of Water Treatment Works (WTW) with EHS Standards

The compliance of WTW effluents with their Registered Standards is presented for the years 1998 to 2001 (**Table 4**). Compliance has increased from 18% in 1998 to 48% in 2001.



Newtownbreda WWTW

**Table 4: WTW Compliance**

	1998	1999	2000	2001
Number of WTW discharges monitored	22	26	24	27
Number of WTW discharges complying with registered standards	4	8	11	13
<b>Percentage of discharges complying with registered standards</b>	<b>18%</b>	<b>31%</b>	<b>46%</b>	<b>48%</b>

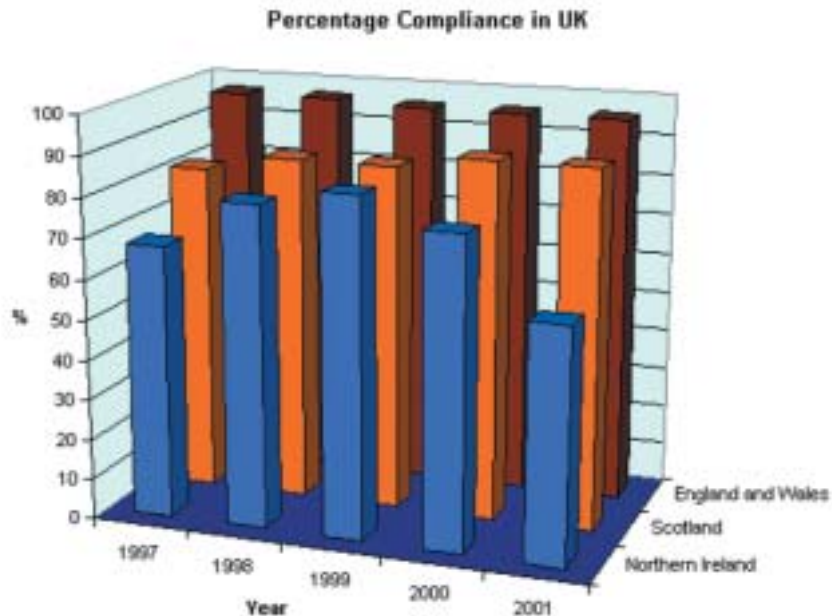
**Summary of Action taken at WWTWs and WTWs**

A summary of the action taken to improve the performance of the WWTW and WTW discharges, the difficulties experienced and improvements proposed is also presented in this report. The costs of upgrading individual WWTWs that were non-compliant in 2001 are included in **Tables 13** and **14**. The total cost amounts to an estimated investment of £203 million, not including the additional investment that will take place as part of a number of proposed Public Private Partnerships (PPP).

**Comparison of WWTW Compliance in Northern Ireland with that in the Rest of the UK**

**Figure 1** shows the trends in percentage compliance for WWTW in England and Wales, Scotland and Northern Ireland. It demonstrates that compliance in Northern Ireland is significantly lower than in other parts of the UK.

**Figure 1: Percentage WWTW Compliance for the United Kingdom (UK) 1997-2001**



	1997	1998	1999	2000	2001
■ Northern Ireland	68	80	84	77	58
■ Scotland	82	86	86	89	89
■ England and Wales	97	97	96	96	96

## Future WWTW Compliance

The UWWT Regulations require that all WWTWs in Northern Ireland provide levels of treatment that will adequately protect the waterway to which they discharge by the end of 2005. EHS is developing environmental needs standards to do this and to meet the requirements of other EU Directives and domestic water quality objectives. EHS aims to issue environmental needs standards for all works by 2005 and to place these standards on the public register. It is estimated that there are still over 600 works with PEs less than 250 in Northern Ireland that require registered standards to be formulated. This work is currently underway.

Meeting the requirements of the UWWT Regulations will require additional investment in Water Service capital assets. Without the financial investment outlined in **Section 3** (Tables 13 and 14), Water Service is extremely unlikely to reach the levels of compliance currently achieved in the rest of the UK, nor can it continue to serve the needs of present and future development in a sustainable manner.

Lack of funding, and hence investment, to date has resulted in an inability to meet the requirements of the UWWT Directive. The investment set out in **Table 13** of this report is the minimum that will be required to ensure compliance with this Directive.

## Sewerage Systems

Water Service is actively seeking to agree proposals for sewerage system upgrades that result from Urban Pollution Management (UPM) studies.

The high proportion of pollution incidents related to the operation of Combined Sewer Overflows (CSOs) demonstrates the importance of this investment, which is also needed to meet the requirements of the UWWT Regulations.

The cost of upgrading the sewerage systems to the standards set out in the Guidance Note to the UWWT Regulations is likely to be similar to that for upgrading the treatment works.

## Future WTW Compliance

Water Service is currently in the process of upgrading all WTWs to meet the requirements of the EC Drinking Water Directive. As a result of this investment, treatment of effluent discharges from these works is also being upgraded, with effluent quality being systematically brought into compliance with the standards set by EHS.

## Future Investment Planning

The significant improvements in both sewage treatment and maintenance of the sewerage network, necessary for the environmental and regulatory reasons outlined in this report, will require large amounts of ongoing investment. All other parts of the UK have faced similar requirements for greatly increased investment in sewerage systems and sewage treatment.

Capital investment funding in Northern Ireland particularly in recent years has been well behind levels in England and Wales. Water Service considered they also had to target a large proportion of its available capital programme at upgrading water treatment facilities ahead of waste water improvements.

In looking forward, this report acknowledges that the need to accelerate investment has been recognised and is now being urgently addressed. Water and sewerage infrastructure upgrading has been explicitly raised to top priority for resource allocation within the Department for Regional Development.

The prioritisation has resulted in significantly increased direct funding allocations being made available under the Budget 2002, brought to a conclusion December 2002. Over the next three years Water Service, with assistance from the Strategic Investment Programme, proposes to invest almost £500 million to upgrade water and waste water infrastructure. This level of investment, made possible by an increase of £180 million above previously programmed resources, should support significant acceleration of waste water infrastructure improvement. In addition, EHS understands that Water Service is working closely with the Strategic Investment Board, to develop a programme of Public Private Partnership (PPP) projects to complement its

water and waste water investment programme. It is understood a PPP programme totalling £260 million is also planned, in addition to current levels of direct funding. PPP construction work is envisaged to start from 2005 onwards. Furthermore, the introduction of self-financing arrangements from 2006 should provide Water Service with a secure and sustainable source of annual funding.

Water Service has advised EHS that during the next 3 years direct investment devoted to improving waste water infrastructure will total around £290 million, £210 million to upgrade Waste Water Treatment Works and £80 million on sewage collection networks. Additional PPP investment valued at around £120 million is also being considered for a number of major WWTW projects including the North Down/Ards, Craigavon and Newtownabbey areas. Increased direct funding will not only support large WWTW projects such as Ballymena, Omagh, Culmore, North Coast (Portrush/Portstewart), Cookstown, Larne and Ballyclare, but will also target improvements at many smaller locations to meet compliance requirements and to support local development.

EHS has been informed by Water Service that the progressive delivery of over 100 new or upgraded WWTWs over the next 3 years has been programmed to improve compliance at the fastest rate practical following the years of under investment.

## Introduction

In 1997 Environment and Heritage Service (EHS) agreed proposals with Water Service for the regulation of Water Service discharges. This role as Regulator of Water Service discharges, assumed by EHS, reflects the situation applying to other dischargers that come under the provisions of the Water Order (Northern Ireland) 1999. It is consistent with the rest of the UK where an independent Regulator regulates the sewerage undertaker, but it does not provide for the legal powers that the other UK regulators operate under. The regulatory role of EHS also fulfils the terms of Article 12 of the EC Urban Waste Water Treatment Directive (91/271/EEC) which requires that a competent authority ensures that the disposal of waste water from urban waste water treatment works (WWTW) is subject to prior regulations and /or specific authorisation. The regulation proposals were summarised in a policy document on Regulating Water Service Discharges (RPD 1E/00) issued in June 2000.

This report, prepared by the Water Management Unit of EHS, summarises the assessment of the performance of Water Service discharges during the year 2001. This includes compliance with the discharge requirements set by EHS in accordance with its policy to conserve and protect surface waters under the Water Order and compliance

with the requirements of the Urban Waste Water Treatment (UWWT) Regulations (Northern Ireland) 1995.

## Format of Report

**Section 2** of the report describes the agreed regulatory system for the Regulation of Water Service discharges by EHS. **Section 3** describes the types of standards set by EHS and how compliance with these standards is assessed. The results of the assessment of compliance with EHS standards are presented in **Section 4** and a separate assessment of compliance with the requirements of the UWWT Regulations, is provided in **Section 5**. An overview of the performance of the sewerage systems operated by Water Service is presented in **Section 6**. The performance of the effluent discharges from Water Service WTWs that currently have Registered Standards is set out in **Section 7**. **Section 8** reviews the audit checks carried out by EHS on the information received from Water Service. A summary of the contribution of Water Service activities to pollution incidents in 2001 in **Section 9** and there is a comparison of WWTWs compliance with that in the rest of the UK set out in **Section 10**.



Drumavalley WWTW Outfall

## Regulatory System

EHS as the regulator, and Water Service as the provider, of water and sewerage services, have separate and distinct roles in protecting the environment and, since 1999, have operated within different government Departments. The regulatory procedures agreed between the two agencies in 1997 are summarised below.

Water Service discharges are not subject to control under the Water Order (Northern Ireland) 1999 and do not require a Water Order “consent”. However, it is the policy of the Department of the Environment that Water Service discharges should comply with requirements similar to those under the Water Order. To this end, Water Service discharges are regulated by means of standards and conditions set out in what are termed “registered standards” that are placed on a public register.

The Department of the Environment is also the competent authority to implement the regulatory requirements of the UWWT Directive as set out in the Urban Waste Water Treatment Regulations (Northern Ireland) 1995 (referred to as the Regulations). The requirements of these Regulations are taken into account in drawing up EHS registered standards.

The requirements of other EC Directives, such as the Freshwater Fish Directive (78/659/EEC), the Bathing Water Directive (76/160/EEC), the Shellfish Water Directive (79/923/EEC) the Dangerous Substances Directive (76/464/EEC) and the Birds and the Habitats Directives

(79/409/EEC and 92/43/EEC respectively) are also taken into account in formulating registered standards.

A public register has been established to allow public access to information on performance against the standards and to allow for public accountability. The register contains information on:

- the discharge conditions set by EHS to meet local environmental needs

and

- separate discharge conditions to meet the requirements of the Regulations. The main objective of the Regulations is to ensure that all significant discharges receive a minimum level of treatment prior to discharge. (This level of treatment is not always sufficient to adequately protect the local environment and hence the need for additional discharge conditions tailored to meet local environmental needs).

A system to monitor and report compliance with the standards has been established, employing advisory letters that formally identify unsatisfactory performance and request improvements. The advisory letters notify Water Service of non-compliance with a standard and/or present evidence that a discharge is causing an adverse environmental impact, and also request that action be taken to correct the situation. The advisory letters are placed on the public register.



EHS Water Quality Inspector sampling at Castlederg WWTW

## Registered Standards

### Types of Registered Standard

There are three main types of registered standard depending upon the nature of the discharge and the conditions that are considered appropriate:

- (a) numeric,
- (b) non-numeric, and
- (c) descriptive.

### Numeric Registered Standards

A numeric registered standard specifies numeric limits to control individual parameters and enables a quantitative assessment of compliance to be formulated. For EHS standards the parameters that are controlled are biochemical oxygen demand (BOD), suspended solids (SS) and ammonia (NH<sub>4</sub>). In some cases, nutrient limits are included to control the discharge of phosphorus and/or nitrogen.

Numeric registered standards for WWTWs employ 95-percentile and upper tier standards for BOD, suspended solids and ammonia. Compliance with a 95-percentile limit standard requires 95% certainty that the works complies with the standard 95% of the time. In practice this is assessed for each parameter using the “look-up” table set out in the Regulations. Because of the high degree of certainty built into the assessment, more samples are allowed to be non-compliant with the standard than would be otherwise expected with a simple 95-percentile compliance. The overall compliance for the WWTW defaults to that of the parameter recording the worst compliance. In cases where the UWWT Regulations apply or where there is limited dilution, an upper tier standard may be applied. An upper-tier limit is an absolute standard which a parameter must not exceed at any time. A single exceedence of an upper tier standard at any time during the year results in the works being non-compliant for the whole of that year.

Numeric standards are established for all new or substantially modified WWTWs at the design stage to determine the level of treatment needed and the quality required of the effluent. In determining the appropriate standard for rivers

and streams, account is taken of the flow in the receiving water and the discharge flow. This is usually based on the dry weather flow (DWF) at the inlet of the works, (i.e. the flow received by the works during prolonged dry weather conditions), and the low flow in the river, (i.e. the flow that is exceeded 95 percent of the time). This information is input to a simple statistical model to derive standards for a range of possibilities, and the most suitable standard that provides the required level of protection for the receiving water is selected. The standard derived from this procedure takes into account not only the water quality targets set by EHS for the receiving waterway but also the requirements of any relevant EC Directives. For coastal discharges, some form of dispersion modelling is often required to determine a suitable standard. The standard in both cases represents the ‘environmental needs standard’, which is the standard that EHS considers necessary to protect the receiving waterway from adverse effects from the discharge. The standards formulated are then forwarded to the Fisheries Conservancy Board, the Loughs Agency and EHS’s Natural Heritage Directorate, where appropriate, for consultation before being issued to Water Service.

Industrial effluent components of waste water such as toxic metals and certain organic chemicals (like those detailed in the EC Dangerous Substances Directive (76/464/EEC)), are subject to absolute concentration and/or load limits. These substances should also be subject to regulation before being accepted to the sewer by Water Service through trade discharge authorisations under the Water and Sewerage Service (Northern Ireland) Order 1973 Part V. EHS is progressively reviewing standards for dangerous substances in Water Service discharges as information on their presence in effluent discharges is made available.

The effluent discharges from Water Treatment Works supplying potable water, which may be continuous or intermittent, are considered as process effluents like those from industry. Such discharges are required to comply with a 99-percentile standard for parameters such as

suspended solids, aluminium, iron and chlorine. This 99-percentile standard is for practical purposes taken to mean one allowed exceedence of the registered standard in 12 samples taken over a 12-month period. A second exceedence of any parameter results in the discharge failing to comply with the registered standard.

Interim, relaxed, numeric registered standards may be applied as a temporary measure where major capital works are being carried out at an existing works and there may be a risk of non-compliance with the existing standard for a period of time. Such interim, relaxed, registered standards are time banded and their conditions are agreed in writing before work commences. Applications for interim standards are considered on a case by case basis. As a rule, the conditions in the interim relaxed standard are the minimum necessary for Water Service (or the contractor) to carry out the work. Normally an interim relaxed numeric registered standard will be issued in preference to an interim descriptive registered standard, but descriptive conditions will be used where considered appropriate. Where an interim relaxed standard could lead to failure of a relevant water quality objective or EC Directive the request is likely to be refused.

### Urban Waste Water Treatment Directive Standards

The UWWT Directive sets out minimum standards for the discharge of treated effluent from WWTWs. The Directive was transposed into legislation in Northern Ireland in March 1995 by the Urban Waste Water Treatment Regulations (NI) 1995, which are implemented and regulated by EHS as the competent authority. The Regulations have already led to the cessation of the disposal of sewage sludge to sea.

The Regulations require that all significant discharges of sewage be treated whether the discharge is to inland surface waters, groundwater, estuaries or coastal waters. Significant discharges are defined as those to freshwaters or to estuaries from WWTWs serving communities with a population equivalent (PE) of more than 2,000 and those to coastal waters from WWTWs serving communities of more than 10,000. The standards to be met depend on the

size of population served and on whether the receiving waters are defined as “normal” within the terms of the Directive or classified as, “sensitive” or “less sensitive”. In most cases the treatment considered appropriate for discharges to freshwaters, estuaries and coastal waters is secondary as specified in the Directive for ‘normal’ waters.

Discharges from WWTWs with PE greater than 15,000 to “normal” waters must have secondary treatment by 31 December 2000. Discharges to inland and estuarial waters from WWTWs serving between 2,000 and 15,000 PE and to coastal waters from WWTWs serving between 10,000 and 15,000 PE must receive secondary treatment by 31 December 2005. All other discharges should have “appropriate” treatment as defined by individual Member States.

The UWWT Directive sets 95-percentile standards and upper-tier standards for BOD and COD (chemical oxygen demand), and these are set out in the Regulations. The 95-percentile standard applied may be a numerical limit (i.e. 25 mg/l O<sub>2</sub> BOD) or a minimum percentage reduction figure (i.e. the BOD of the effluent must be at least 70% less than the BOD of the influent). The minimum percentage reduction to be achieved for BOD and COD are laid down in Part I of Schedule 3 of the Regulations (see **Table 5** of this report) and are to be met 95 per cent of the time as judged by the look-up table. Where a discharge does not comply with the percentage reduction criteria, it will be assessed using the appropriate 95 percentile limit values.

WWTWs of more than 10,000 PE discharging into waters which are identified under Schedule 1 Part I of the Regulations as “sensitive” to eutrophication by nitrogen or phosphorus, are subject to appropriate nutrient reduction and are required to comply with a standard which is either a minimum percentage reduction or a maximum annual mean. As in the case of assessment with the 95-percentile standards, compliance is assessed on percentage reduction in the first instance. Where the average percentage reduction requirement is not met, compliance is assessed against the annual mean.

Coastal discharges to “less sensitive” areas identified under Schedule 1 Part II of the Regulations, referred to as “high natural dispersion areas” (HNDAs), may employ primary treatment if it is demonstrated by a comprehensive study that such discharges will not adversely affect the environment. The comprehensive study is carried out by Water Service or its agents in accordance with the guidelines issued by the UWWT Directive Implementation Group. The study report is assessed by EHS, and, after examination and audit, EHS will issue a statement in writing accepting or otherwise that the study demonstrates that the primary treatment proposed will have no adverse environmental effect. In 2001 the two HNDAs previously identified for Northern Ireland were withdrawn by the Department, and Water Service will introduce more advanced treatment at these locations.

### **Non-numeric Registered Standards**

As well as standards for treatment works discharges, the UWWTD also covers collection systems, more commonly known as sewerage systems. The Directive requires that collection systems for WWTWs be provided by the same compliance dates as the WWTWs and that they be designed, constructed and maintained in accordance with best technical knowledge not entailing excessive costs. Guidance on the requirements of the Directive and compliance with them are set out in the Guidance Note to the UWWT Regulations published by EHS in August 1999.

Most collection systems are ‘combined’ in that they deal with rainwater run-off as well as domestic and industrial wastewater. Such systems are fitted with combined sewer overflows (CSOs) that allow storm sewage to discharge directly to waterways during storm events that would normally overwhelm the system and risk damage to the sewer itself and any ancillary equipment. Such discharges are intermittent and, when subject to good engineering design and providing they discharge into waters with adequate dilution, do not normally cause adverse environmental effects.

### **Combined Sewer Overflows and Emergency Overflows**

Intermittent sewage discharges from CSOs or pumping station emergency overflows (EOs) on sewerage systems will be granted a non-numeric registered standard. Such a standard will set out the design settings or operating conditions that determine when a discharge is allowed to take place and the controls to be applied to it, such as screening, storage, stand-by generators and hard standing for tankers. Where such discharges have a significant impact on water quality (e.g. a bathing water), a limit to the number of spills per year may be required. In the case of EOs, EHS requires telemetry to be installed at all new pumping stations and at existing pumping stations where environmental problems have been identified.

The determination of registered standards for CSOs and EOs takes account of the requirements of the Guidance Notes to the Regulations and the recommendations of the Urban Pollution Management (UPM) Manual. This manual sets out an agreed approach to the control of wet weather discharges developed jointly by the United Kingdom environmental regulators and the water industry. Both Water Service and EHS have agreed to employ the assessment procedures set out in the UPM manual in examining the environmental impact and design of sewer systems containing CSOs.

### **Descriptive Registered Standards for WWTW**

A descriptive registered standard may apply to small WWTWs, (i.e. less than 250 PE for inland waters, and, where appropriate, less than 10,000 PE for works discharging to coastal waters) where the environmental impact is limited and there is no significant amount of trade effluent received at the works. The registered standard sets out operational and maintenance requirements for the works in accordance with good practice.

A descriptive registered standard may also be applied as an interim measure where major capital works are being carried out at an existing works. Such interim registered standards are time banded and their conditions agreed in writing before work commences.

## Monitoring and Assessment of Compliance

### Numeric Registered Standards

Compliance with numeric registered standards is assessed using “spot” samples taken by Water Service according to an agreed sampling programme issued in advance of the compliance year. Water Service is required to forward the results of these samples to EHS for assessment within 3 weeks of the end of the month in which compliance is to be assessed. EHS also carries out ‘spot’ audit sampling on an ad hoc basis, as it considers appropriate to check Water Service procedures and analysis.

Water Service is informed at regular intervals of non-compliance by the issue of advisory letters. An advisory letter is issued when a parameter has reached or exceeded the maximum number of exceedences allowed for the 95-percentile standard and/or where there has been an extreme exceedence of the standard. The advisory letter sets out the significance of the exceedence(s), the works compliance, and/or whether there was an extreme exceedence. When a works does not comply with a standard, an explanation is sought and Water Service is required to take action to avoid future non-compliance. It is also asked to inform EHS in writing of the measures taken. All correspondence in relation to these regulatory functions is placed on the public register. Where the remedial action requires significant modifications or capital works, it may take some time to be carried out. In other cases, interim measures may be employed until the long-term solution is provided.

To assess compliance each parameter is considered separately and the parameter with the worst compliance is used to record the overall 12-month performance at the end of the year. In assessing compliance, the application of the Normal Operating Conditions (NOC) clause is taken into consideration. This clause allows programmed samples to be discounted from the compliance assessment on the grounds that they are not representative of the performance of the works, due to the works not operating normally at the time of sampling as a result of unforeseen circumstances, such as extreme weather conditions or a power failure.

## Urban Waste Water Treatment Directive Standards

The Regulations require that 24-hour composite samples be taken to monitor compliance with the UWWT Directive requirements. A composite sample is the combination of a series of equal volume individual effluent samples of the discharge, taken at hourly intervals over a 24-hour period into one sample. This is normally carried out by means of an automatic sampler that preserves and retains the integrity of any samples collected. Composite sampling is required at each WWTW as the Regulations come into effect and; for the purposes of this report, that was either at the end of 1998 or the end of 2000. Where Water Service wishes to use the percentage reduction standard for assessing compliance, a composite sample of the sewage entering the works, as well as one of the effluent, is required.

The UWWT Directive as previously described sets down 95-percentile and upper-tier standards for BOD and COD as set out in **Table 5**. In determining compliance with the UWWT Regulations, 95-percentile compliance with the percentage reduction criteria is assessed in the first instance. Only when the sample results show that the required percentage reduction has not been achieved or it is not possible to determine the degree of reduction due to a lack of influent data, is compliance assessed with the 95-percentile limit value and the upper-tier standard.

Compliance with the 95-percentile standard is assessed in a similar way to that with the normal registered standard except that a composite sample result is used. In assessing compliance, each parameter is assessed separately, and the overall compliance is based on the parameter with the worst performance.

For works that have a PE greater than 10,000 and discharge into waterways that are identified as Sensitive to eutrophication, nutrient reduction is required. This may be a reduction in the level discharged of total phosphorus or total nitrogen, or both, depending on the nutrient that needs to be controlled (usually phosphorus in freshwaters and nitrogen in saline waters). Compliance with the relevant standards in **Table 5** is also assessed on 24-hour composite sample results. As these standards are annual averages, it is often not

**Table 5: Standards Applying to WWTWs PE>10,000 Discharging to Sensitive (Eutrophic)Areas**

Parameter	95-Percentile Limit	Average Limit	Upper-Tier Limit	Percentage Reduction
Biochemical Oxygen Demand (BOD)	25 mg/l O <sub>2</sub>		50 mg/l O <sub>2</sub>	70-90%
Chemical Oxygen Demand (COD)	125 mg/l O <sub>2</sub>		250 mg/l O <sub>2</sub>	75%
Total Phosphorus		2 mg/l P#		80%
Total Nitrogen		10-15mg/l N\$		70-80%

# 1mg/l limit applies to works with PEs greater than 100,000.

\$ 10mg/l limit applies to works with PEs greater than 100,000.

possible to demonstrate non-compliance until the year is complete.

For a works to be non-compliant the UWWT Directive standards it must:

- Fail to comply with the upper tier standard and the percentage reduction standard in the same sample for BOD or COD at least once in the year.  
  
(If percentage reduction cannot be assessed, non-compliance is by exceedence of the upper tier standard alone.)
- Exceed the 95-percentile limit standard and the percentage reduction standard in the same sample for BOD or COD on more than the permitted number occasions in the year. (That is more than twice for 12 samples and more than three times for 24 samples)
- Be non-compliant with the annual average total phosphorus and / or total nitrogen standard and the annual average percentage reduction (where nutrient standards are applicable).
- Not have met the sampling requirements of the Regulations in relation to the number of samples for the size of the works or the provision of composite samples.

Failure of just one of the above bullet point situations constitutes an overall failure of the WWTW.

### Non-Numeric Registered Standards for Intermittent Discharges

These do not normally require monitoring, unless the discharge is to an environmentally sensitive area or it is demonstrated that the discharge is causing a water quality problem. Where required by the registered standard, Water Service shall keep records of the frequency and volume of spills from CSOs or emergency overflows (EOs) for a period of at least 10 years. These records are to be provided to EHS on request. Water Service may also be requested to provide information on the design settings and the performance of overflows to assist in identifying satisfactory and unsatisfactory overflows.

In certain situations Water Service may be required to provide waste water flow data upstream and downstream of a CSO to demonstrate that it is operating at the correct overflow setting. The performance of sewerage systems are reviewed following the procedures set out in Annex 8 of the Guidance Notes to the Regulations. In addition, EHS may carry out detailed studies of the impact of intermittent discharges on receiving waters using biological and chemical monitoring, combined with a visual examination of the operation of CSOs under dry weather as well as storm conditions. The performance of any screening arrangements should also be checked in the case of overflows at WWTWs where the storm tanks operate in combination with a CSO at the inlet to the works. Currently, only a small number of non-numeric standards have been issued for CSOs.

In the case of pumping stations with EOs, records of the maintenance carried out are required to be retained. This includes information on the operation of the pumps, the telemetry system and, where appropriate, the standby generator.

Compliance with a non-numeric registered standard will be assessed with regard to the flow settings, the frequency of spills and/or the requirements for the retention of solids. In addition, a discharge may be considered unsatisfactory using the criteria set out in the Guidance Notes to the Regulations.

An advisory letter may be issued where a discharge with a non-numeric registered standard does not comply with the conditions laid down, or where the effect of the discharge on the receiving water is considered to categorise the overflow as unsatisfactory.

### **Descriptive Registered Standards for WWTWs**

Monitoring of descriptive registered standards at WWTWs involves inspection of the works to check for satisfactory operation as well as examination of maintenance records received from Water Service. Where a discharge is considered to be polluting, EHS may implement a sampling programme to verify, and to determine the extent of, the impact. The data obtained and any other relevant environmental information are used to seek action to improve the discharge or to assess the need for a numeric registered standard.

### **Flow Regulation**

#### **WWTW Flows**

The flows received and discharged by a WWTW are regulated by the registered standard, using the registered dry weather flow (DWF) and the maximum flow to full treatment for the works (the “pass forward flow”). Other flow settings may also be checked on occasions, i.e. the flow at which storm water is diverted to storm tanks. If the total volume of effluent discharged in any one day exceeds the registered “pass forward flow”, it would result in non-compliance of the discharge. Also, if the daily average flow measured under dry weather flow conditions exceeded the registered DWF, the works would be considered as non-compliant.

For future reports compliance with the flow requirements will be assessed using the flow records supplied by Water Service. These records may be verified on occasions by flow measuring exercises carried out by EHS.

#### **WTW Flows**

At WTWs, the registered maximum flow rate and the maximum volume discharged per day are regulated. Registered standards also set out the requirements for flow measuring and the maintenance of flow measuring equipment.

The flow records are to be held by Water Service for at least 24 months and made available to EHS on request. Flow records from WTW are assessed against the maximum daily volume to be discharged and the maximum rate of flow. Any exceedence of these registered flow limits would be considered to constitute non-compliance.

#### **CSOs at WWTWs**

At WWTWs it is necessary to confirm the flow at which a CSO begins to operate, as required by the registered standard. Normally this is carried out through spot checks during inspection visits to confirm flow compliance with the registered standard. At larger works (>5000 PE), or where the overflow is likely to have a significant impact on receiving waters, it may be necessary to check using continuous flow recording data.

## Waste Water Treatment Works (WWTW) Performance

### Compliance 2001

#### Introduction

Water Service discharges are not subject to control under the Water (Northern Ireland) Order 1999 and therefore do not require a consent under this legislation. However, by administrative agreement, Water Service is regulated by similar conditions to those that would apply under the Order in relation to waste water treatment works discharges. To this end, these discharges are regulated by means of standards and conditions set out in Registered Standards, as described in **Section 3**.

The public register of discharge standards has been in operation since April 1997 and compliance information is available from January 1997. This Section summarises the compliance for the year 2001 for those waste water treatment works currently on the register. It does not include compliance with UWWT Regulations which is covered by **Section 5**.

From 1 January 2001, an additional 107 works were added to the public register following completion of the review of works with a PE between 250 and 1000. **Figure 2** shows the locations of all works with a PE greater than 250 in Northern Ireland.

Although this section does not include compliance with the UWWT Regulations, it should be noted that for a number of works the application of these Regulations resulted in an automatic review and tightening of their registered standards to the standards required by the UWWT Regulations. Specific details on non-compliant works are included in **Appendix A**.

#### Compliance with the Registered Standards

The results of the compliance assessment for the year 2001 are summarised in **Table 6** and are compared graphically with compliance in previous years in **Figure 3**.

**Table 6 :Compliance of WWTWs with Registered Standards in 2001**

Water Service Final Statistics 2001	Numeric	Descriptive	All
Total Number of Registered Standards	247	21	268
Total Number WWTW Compliant	134	21	155
Percentage WWTW Compliant	54%	100%	58%

Figure 2: Locations of WWTWs Serving a PE greater than 250

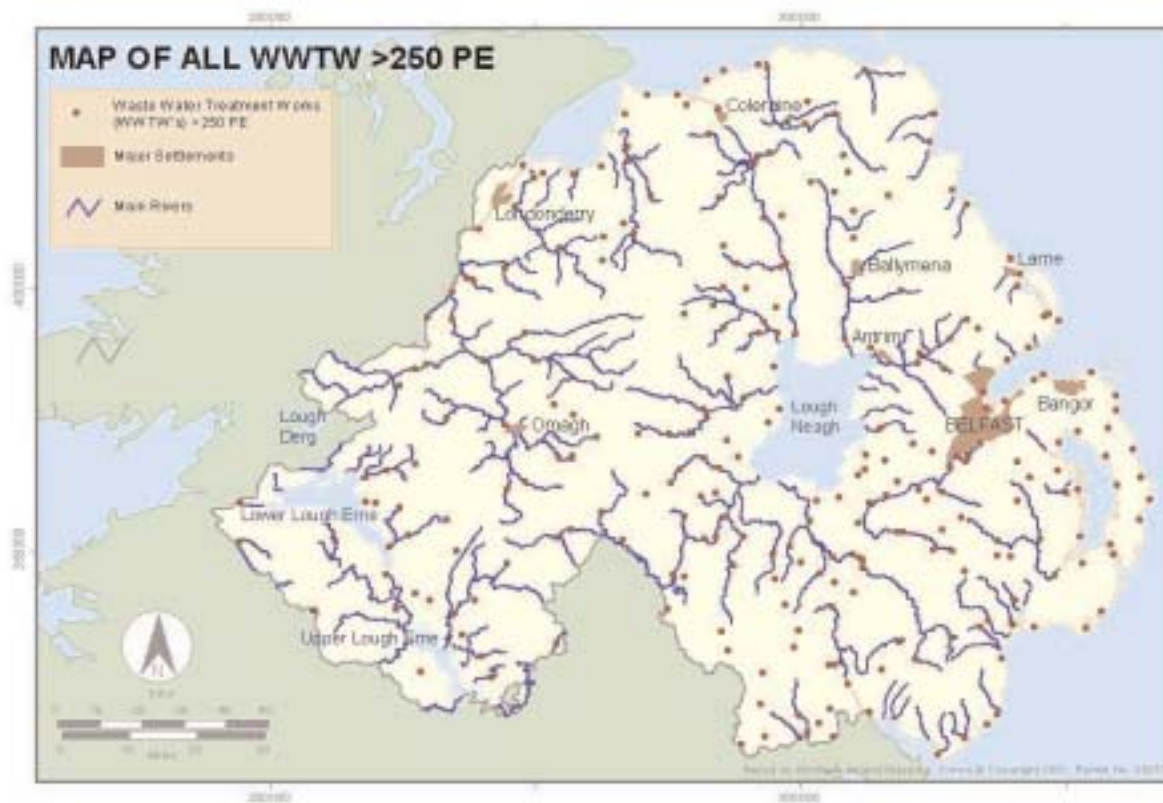


Figure 3: Summary of WWTW Compliance

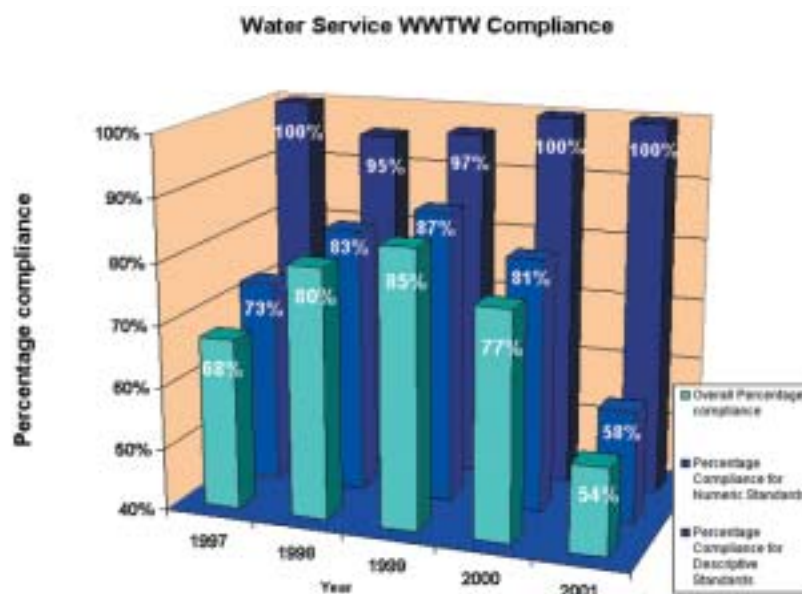


Table 7: WWTW Registered Discharge Standard Compliance

	1997	1998	1999	2000	2001
Number of WWTW on Register	133	134	159	160	268
Number of WWTW with numeric discharge standards	111	112	130	133	247
Number of WWTW complying with numeric discharge standards	75	90	110	102	134
Percentage of WWTW complying with numeric discharge standards	68%	80%	85%	77%	54%
Number of WWTW with descriptive discharge standards	22	22	29	27	21
Number of WWTW complying with descriptive discharge standards	22	21	28	27	21
Percentage of WWTW complying with descriptive discharge standards	100%	95%	97%	100%	100%
<b>Overall Compliance with standards</b>	<b>73%</b>	<b>83%</b>	<b>87%</b>	<b>81%</b>	<b>58%</b>

### New Registered Standards Placed on the Public Register

From the 1 January 2002, the works listed in **Table 8** with a population equivalent between 250 and 1000 were added to the register.

Table 8: WWTWs Placed on the Public Register from 1 January 2002


Name of Works	PE	Biochemical Oxygen Demand 95%-ile (mg/l) Standard	Suspended Solids 95%-ile (mg/l) Standard	Ammonia 95%-ile (mg/l) Standard	Receiving Water
Ballymagorry	583	50	60		Glenmorran River
Maghery	275	50	90		Blackwater
Annaghmore	265	30	40		Tributary of the Torrent River
Lurganare	275	10	20	15	Jerrettespass River

As EHS becomes aware of further works with population equivalents greater than 250, they will be placed on the register.

## Summary of WWTWs that did not meet their Registered Standard in 2001

**Table 9** summarises the WWTWs with numeric registered standards that were non-compliant with their standards during 2001.

### Key:

<b>X</b>	Non-compliance with standard
	No standard applies for this parameter
<b>95%</b>	95-percentile standard
<b>U/T</b>	Upper tier standard
<b>% Red</b>	Percentage reduction standard
<b>An Avg</b>	Annual average standard

**Table 9: WWTWs that were Non-compliant with their Registered Standard in 2001**

Name of Works	Standard Compliance								
	Biochemical Oxygen Demand mg/l			Suspended Solids mg/l			Ammonia mg/l		Total Phosphorus mg/l
	95%	U/T	% Red	95%	U/T	% Red	95%	U/T	An Avg
Ardglass			X			X			
Ballinadolly	X			X					
Ballynahinch		X		X	X			X	
Ballyrickard New	X			X					
Ballyrickard Old	X	X		X					
Briggs Rock	X	X		X					
Carrickfergus	X	X		X					
Carrowdore	X			X					
Clough	X						X		
Crossgar Filter	X			X					
Donaghadee	X	X		X					
Drumlough	X			X					
Dundrum				X					
Edenderry	X			X					
Hillsborough	X			X					
Kilkeel	X	X		X					
Kircubbin	X								
Lisbarnet							X		
Loughries	X								
Moneyreagh	X			X					
Mullanaghglass 1	X			X			X		
Raholp	X			X					
Seaforde	X								
Spa	X			X			X		
Stoneyford				X			X		
Whitehouse (N'abbey)	X	X		X					

## Section 4

Name of Works	Standard Compliance								
	Biochemical Oxygen Demand mg/l			Suspended Solids mg/l			Ammonia mg/l		Total Phosphorus mg/l
	95%	U/T	% Red	95%	U/T	% Red	95%	U/T	An Avg
Articlave	X								
Ballyclare									X
Ballymena Filtration	X			X					
Castledawson	X								
Clady (Northern	X			X					
Clogh	X			X			X		
Coleraine	X	X		X					
Cookstown	X			X					X
Corkey	X			X			X		
Creagh				X					
Desertmartin							X		
Dunloy	X						X		
Glenone	X			X					
Glenstall	X	X		X					
Gulladuff	X			X			X		
Loughguile	X			X			X		
Macosquin							X		
Magherafelt	X			X			X		
Milltown (Antrim)							X		
Parkgate	X			X					
Portballintrae SO	X	X		X					
Portglenone	X								
Portrush SO	X	X		X					
Sandybay SO		X		X					
Stewartstown	X								
Straid							X		
Swatragh	X						X		
Tullaghgarley	X	X		X			X		
Tullywiggan	X								
Armagh							X		
Banbridge	X	X							
Benburb	X			X					
Bessbrook	X								
Castlewellan	X								
Cullaville	X			X					
Cullyhanna	X			X					
Damolly	X								
Forkhill	X								
Glenavey	X								
Hamiltonsbawn	X			X					
Hilltown				X					
Kilcoo	X			X			X		
Killeen Dungannon	X			X					
Killylea	X			X					
Kinallen	X								
Loughbrickland	X						X		
Maghaberry	X								
Moira	X			X					
Mullaghbawn	X			X					
Newry	X	X		X	X				

Name of Works	Standard Compliance								
	Biochemical Oxygen Demand mg/l			Suspended Solids mg/l			Ammonia mg/l		Total Phosphorus mg/1
	95%	U/T	% Red	95%	U/T	% Red	95%	U/T	An Avg
Poyntzpass				X					
Rathfriland	X	X		X	X		X	X	
Seagoe	X								
Tandragee	X	X		X					X
Upper Ballinderry	X			X					
Whitecross	X			X					
Aghanloo	X								
Artigarvan New	X								
Augher	X								
Ballymonie	X			X					
Brookeborough	X								
Campsie	X			X					
Castleberg	X			X					
Clady	X			X					
Claudy	X								
Culmore	X	X		X					
Derrylin							X		
Donneybrewer	X								
Drumsum	X			X					
Ederney	X			X					
Fivemiletown	X			X					
Lack	X								
Lisnarrick	X			X					
Magheramason	X								
Mountfield				X					
Omagh/Coneywarren	X	X		X					
Sixmilecross	X			X			X		
Strabane	X	X		X					
Trillick (New)	X	X		X					

## Dangerous Substances and Other Standards

Aghanloo is the only works that must currently comply with dangerous substance parameters, although work is under way to apply these standards to other works with significant trade inputs. **Table 10** summarises compliance with these standards in 2001.

**Table 10: Dangerous Substance Compliance**

Name of works	Standard Compliance				
	Soluble Chromium mg/l	Soluble Copper mg/l	Soluble Lead mg/l	Soluble Nickel mg/l	Soluble Zinc mg/l
	*	*	*	*	*
Aghanloo 2		X	X		

\*Indicates a standard where compliance is absolute, ie must be met for all samples.

**X** Non-compliance with Standard

**Works added to the Register from 1 January 2001**

During 1999 and 2000, monitoring data from all WWTWs with PEs between 250 and 1000 were examined. Based on the quality of the effluent discharged, a performance level was determined and this was tightened to bring the registered standard closer to that required to ensure that the receiving water is adequately protected. Some of these works are scheduled to be upgraded and so are included in **Table 14**. The works listed in **Table 11** did not comply in 2001 and may require more rigorous maintenance and treatment optimisation than currently provided, in order to meet their recently reviewed standards. Therefore, while many have been non-compliant in their first year, compliance could improve from 2002 onwards.

**Table 11: WWTWs Placed on the Public Register from 1 January 2001 that were Non-compliant in January 2001**

Name of WWTW	
Drumlough	Parkgate
Edenderry	Swatragh
Mullaghglass	Benburb
Raholp	Cullyhanna
Spa	Forkhill
Stoneyford	Poyntzpass
Clady (Co L'derry)	Augher
Clogh	Campsie
Corkey	Mountfield
Desertmartin	Sixmilecross
Glenone	Trillick
Gulladuff	Claudy

**The Foot and Mouth Crisis in 2001**

The Foot and Mouth crisis made it difficult for Water Service to obtain access to works in affected areas. Water Service was unable to carry out routine maintenance at a number of these works, and difficulties persisted at some works after the outbreak had ended as many farmers remained reluctant to permit access. EHS was prepared to discount non-compliant samples during the period of the outbreak, because of access restrictions but this could not be extended

once the risk of infection had diminished. Thirty works had samples discounted because of the restrictions imposed during the Foot and Mouth crisis, but these were mainly small works with PEs less than 1,000. Eleven of the thirty works granted discounted samples did not meet their registered standard conditions in 2001. **Table 12** lists these works.

**Table 12: WWTWs Adversely Affected by the Foot and Mouth Crisis**

Name of WWTW
Augher
Castleberg
Claudy
Creagh
Cullaville
Dunloy
Forthill
Glenone
Mageramason
Mullaghbawn
Swatragh

**Capital Works Proposals for WWTWs that were Non-compliant in 2001**

**Tables 13** and **14** give details of WWTWs that did not meet their registered standards in 2001 and are unlikely to do so until capital works are carried out to upgrade the treatment. This includes the 15 works with a PE greater than 15,000 that were required to provide secondary treatment under the UWWT Regulations after 31 December 2001 but are not capable of doing so at present. It also includes works with PEs between 250 and 1000 recently added to the Register as part of the ongoing review of standards. Many of these smaller works are required to move towards meeting their environmental needs standard and this has highlighted the need for upgrade. In identifying those works where improvements are considered necessary to meet the required standards, EHS has asked Water Service to provide estimates of the cost of the upgrades proposed to achieve compliance. This enables an estimate of the capital expenditure necessary to achieve compliance with both the EHS and the UWWT Regulations standards over the time period indicated.

## Section 4

**Table 13: UWWT Regulation Works that Require Upgrade and the Estimated Costs of that Upgrade**

Name of WWTW (with PE)		Pre 31 December 2000 Standard			Post 31 December 2000 Standard			Environmental Needs Standard	Comments	Upgrade Completion Date	Cost of Upgrade £K *
		BOD	SS	NH4	BOD	SS	NH4	Y/N			
Antrim PE 34791	F	30	50	15	30	50	15	Y	The works does not nitrify and requires upgrade to comply with the standard. There are no plans to install additional treatment..	No scheme proposed	
Ballyclare PE 13000	F	35	45	10	35	45	10	N	The works is overloaded and does not provide phosphorus reduction. Upgrade is currently time-tabled to commence October 2003. A total phosphorus standard of 1mg/l will apply to the new works. (Currently the 2mg/l total phosphorus UWWTD standard applies).	October 2005	6700
Ballymena PE 27000	F	30	50		30	50		N	The works is overloaded and it is planned that it will be decommissioned once Phase 2 of the Tullagharley scheme is complete. The Tullagharley discharge is to the River Maine.	August 2004	See Tullagharley Scheme
Ballyrickard PE 45300	M	60	90		30	50		N	This works provides full secondary treatment but not of sufficient efficiency to guarantee compliance with the reviewed standard. Until treatment is upgraded compliance is likely to be variable. Upgrade to meet the reviewed standard will not be sufficient to meet the likely environmental needs standard for this works as it discharges to a small stream with very little dilution.	PPP	PPP
Banbridge PE 29618	F	25	50		25	50		N	Construction of a new works was completed in 2003.	April 2003	7600
Bangor (Briggs Rocks) PE 92414	M	DES	DES		30	50		Y	Screened sewage is discharged at this works. The incoming sewage will be diverted to the new North Down WWTW once it becomes operational.	PPP	PPP
Carrickfergus PE 34500	M	200	150		30	50		Y	Only primary treatment is provided for this discharge. Upgrade is scheduled to commence in 2003.	PPP	PPP
Coleraine/North Coast Scheme PE 32000	E	90	80		30	50		Y	At this works 70 percent of incoming sewage receives full secondary treatment while the remainder is primary treated. The incoming sewage will be diverted to the North Coast works.	June 2006	41000
Cookstown PE 12750	F	30	50		30	50		N	The present works is overloaded and struggles to meet its current standard and also does not provide phosphorus reduction. The replacement works will be required to meet the environmental needs standard of 15mg/l BOD, 25mg/l SS, 4mg/l NH4 and 1mg/l total phosphorus. Upgrade should commence June 2003.	June 2005	9000
Culmore PE 110584	E	250	250		30	50		Y	Upgrade from primary to secondary treatment is scheduled to commence in January 2006.	November 2005	17000
Donaghadee PE 33600	M	DES	DES		30	50		Y	Untreated sewage is discharged below the low water mark via a sea outfall. The discharge will be diverted to a new North Down works, construction of which is programmed to commence January 2006 subject to planning permission.	PPP	PPP
Glenstall PE 26555	F	110	150		30	50		Y	While this works provides secondary treatment it is of an insufficient level to meet the reviewed standard. Upgrade is scheduled to commence August 2003. The scheme will result in the closure of Ballymoney WWTW and the treatment of that waste water at the upgraded Glenstall WWTW.	May 2005	2100
Kilkeel PE 12301	M	250	250		30	50		Y	A new works providing secondary treatment became fully operational at the end of September 2002.	October 2002	4232
Larne (Sandy Bay) PE 15050	M	DES	DES		30	50		Y	Sewage is discharged via a short sea outfall. Construction of a works to provide secondary treatment is scheduled to commence March 2003.	September 2005	14500
Magherafelt PE 11500	F	25	45	5	25	45	5	N	This works performs well but discharges to a small stream and the lack of dilution results in a tight NH4 standard that the works struggles to meet. Diversion of the discharge to the Moyola will allow a more relaxed NH4 standard and the works should be compliant. A total phosphorus standard of 1mg/l will apply to the diverted discharge	December 2005	565
Newry PE 40828	E	265	250		30	50		Y	Secondary treatment was commissioned early 2003.	January 2003	6893
Newtownabbey (Whitehouse) PE 75161	M	150	150		30	50		Y	This works provides partial secondary treatment. An upgraded works to provide full secondary treatment is programmed to commence in October 2003.	PPP	PPP
Omagh PE 35237	F	40	80	80	30	50		N	The existing works is overloaded and struggled to meet the old standard. The works storm facility operates almost continuously thus not all influent receives secondary treatment. Interim action commenced in March to deal with storm discharges. The estimated cost of the interim action at the inlet works is £3313K.	April 2006	10000
Portballintrae PE 15050	M	DES	DES		30	50		Y	Water Service have reduced the strength of the trade input and thus removed from the requirement to meet the reviewed standard. However the reviewed standard is still likely to apply from 31 December 2005.	No capital works scheme proposed.	

## Section 4

Name of WWTW (with PE)		Pre 31 December 2000 Standard			Post 31 December 2000 Standard			Environmental Needs Standard	Comments	Upgrade Completion Date	Cost of Upgrade £K *
		BOD	SS	NH4	BOD	SS	NH4	Y/N			
Portrush PE 16391	M	DES	DES		30	50		Y	Portrush sea outfall will close once the new North Coast works is commissioned.	June 2006	See Coleraine/ North Coast Scheme
Strabane PE 22891	E	250	250		30	50		Y	Upgrade from primary to secondary treatment commenced in January 2002.	January 2004	6458
Tandragee PE 10500	F	30	30		30	50		N	Tandragee is heavily overloaded due largely to trade inputs. Upgrade is programmed to commence November 2003.	November 2004	1628
Tullagherley PE 75000	F	20	30	5	20	30	5	Y	By the time construction of this works was complete it was already overloaded and it struggles it struggles to meet its standards regularly. Phase 2 will meet requirements for Ballymena to 2027. Upgrade commenced in April 2002.	September 2004	14000

Standard does not apply

F - Indicates a discharge to freshwater.

E - Indicates a discharge to an estuarine waters.

M - Indicates a discharge to the marine waters.

\* - Based on the best available information at June 2003. Dates are subject to obtaining the necessary planning approvals etc..

PPP- Public Private Partnership proposals (details to be agreed by ministers).



Construction of the new Kilkeel WWTW

## Section 4

**Table 14: Non UWWT Regulation Works that Require Upgrade and the Estimated Costs of that Upgrade**

Name of WWTW (with PE)		Pre 31 December 2000 Standard			Post 31 December 2000 Standard			Environmental Needs Standard	Comments	Upgrade Completion Date	Cost of Upgrade *
		BOD	SS	NH4	BOD	SS	NH4	Y/N			
Ardglass PE 3500	M	20% red	50% red		20% red	50% red		N	The current works does not provide consistent primary treatment. An upgraded works is planned and this will have to provide secondary treatment. Construction is due to commence September 2003.	February 2005	3798
Articlave PE 1000	F	30	50		30	50		See North Coast (Coleraine) Scheme	Non-compliance in 2001 results from operational difficulties. The flows will be diverted to the North Coast works once construction is complete.	June 2009	See Table 14 North Coast (Coleraine) scheme
Artigarvan PE 570	F				40	60		Y	Non-compliance in 2001 results from operational difficulties. The works is currently being upgraded.	Spring 2002	Will be funded from general Western division programme**
Ballykelly PE 3760	F	50	80		50	80		N	Upgrade of this works is scheduled to commence by end 2003.	June 2006	660
Ballymonie PE 470	F				40	60		N	The works is adversely affected by excessive infiltration. Remedial action is currently being undertaken.		310
Ballynadolly PE 760	F				25	40		N	Work is ongoing to upgrade treatment at this works.	November 2003	980
Bessbrook PE 10619	F	70	50		70	50		See Newry Scheme	The works will be decommissioned and flows diverted to Newry once the new works there is operational.	January 2003	See Table 14 Newry Scheme
Brookeborough PE 762	F				60	70		N	Upgrade of this works has been completed	April 2002	540
Carrowdore PE 1225	F				20	30		See North Down (Bangor) Scheme	Carrowdore is heavily overloaded and is having a detrimental effect on the quality of the stream that it discharges to. It is likely that this works will be closed and the sewage treated at the new North Down works.	PPP	PPP
Castlederg PE 3865	F	70	70		70	70		N	High infiltration rates on this sewerage system causes problems with works operation. Upgrade is scheduled to commence in June 2003. Remedial action in the form of a reed bed will be completed by May 2002.	June 2005	1600
Clough PE 456	F				40	60	15	N	Upgrade in the form of new inlet screens is scheduled for the 2002/2003 financial year.		238
Creagh PE 294	F				50	90		See Toome Scheme	This works will be decommissioned and influent diverted to Toome WWTW.		See Toome scheme
Crossgar PE 2963	F	30	60		30	60		Diverted to Killyleagh	The works is overloaded. It is planned that the works will be decommissioned and flows diverted to Killyleagh. Diversion is scheduled to take place spring 2002.	November 2003	871
Cullaville PE 322	F				70	70		N	Refurbishment works was carried late 2001 to improve effluent quality.	2002	201
Derrylin PE 600	F				30	50	7.5	N	Upgrade was completed in June 2002.	June 2002	258
Dunloy PE 884	F				15	25	5	N	The works will be replaced and the discharge from the new works will be to the River Maine.	December 2005	350
Ederney PE 405	F				70	70		N	Upgrade was completed in May 2002.	May 2002	
Feeney PE 543	F				15	40	7.5	N	Upgrade should commence within the next 1-2 years.	June 2005	310
Fivemiletown PE 2109	F	45	45		45	45		N	Upgrade of the works will commence October 2003 and in the interim a reed bed system is being installed to improve effluent quality.	January 2005	358
Glenavy PE 1318	F				65	75		N	Construction of a replacement works will commence August 2003	August 2004	2000
Hamiltonsbawn PE 917	F				20	30	10	N	Upgrade is scheduled for completion late 2005.	August 2005	450
Hilltown PE 1150	F	40	60		40	60		Y	The works is to be upgraded with completion scheduled for May 2004.	November 2005	550
Kilcoo PE 279	F				10	15	5	May be diverted to Castlewellan of Hilltown	The works discharge is to be addressed by April 2004.	October 2004	900
Killeen (Dungannon) PE 550	F				60	80		N	A replacement works has been commissioned.	Early 2002	766

## Section 4

Name of WWTW (with PE)		Pre 31 December 2000 Standard			Post 31 December 2000 Standard			Environmental Needs Standard	Comments	Upgrade Completion Date	Cost of Upgrade £K *
		BOD	SS	NH4	BOD	SS	NH4	Y/N			
Killylea PE 421	F				75	75		N	Remedial action to deal with operational difficulties is currently taking place. An upgraded works is scheduled to be commissioned by October 2005.	October 2005	295
Kinallen PE 736	F				40	60		N	The existing works is currently being refurbished and a replacement works should be completed by September 2004.	January 2005	650
Kircubbin PE 2135	M	150	150		150	150		N	This works currently provides poor primary treatment and is overloaded. Construction of a secondary treatment works to meet its environmental needs standard commenced in April 2002.	July 2003	Total cost Greyabbey/ Kircubbin scheme 4320
Lack PE 280	F				40	60	10	N	The upgraded works was completed during 2002.	2002	Is included in Scheme to upgrade WWTWs in Fermanagh ***
Lisbarnet PE 265	F				20	30	5	N	The works is overloaded and it is likely that it will be upgraded within the next few years.	January 2005	600
Lisnarick PE 282	F				70	100		N	The works is scheduled for upgrading.	April 2007	198
Loughbrickland PE 1064	F				40	60	15	N	The works will be decommissioned and pumped to Banbridge. Construction of the pumping station is scheduled for 2003	August 2004	515
Loughguile PE 331	F				10	20	7.5	N	The current works is overloaded. An upgraded works is scheduled to commence August 2004.	July 2005	260
Loughries PE 250	F				20	30		N	Loughries is overloaded and is having a detrimental effect on the quality of the small stream that it discharges to. It is likely that this works will be closed and the sewage diverted for treatment.	PPP	PPP
Magheramason PE 482	F				40	60		N	Upgrade is scheduled to commence in April 2004. Discharges to a stream with very little dilution within a few hundred yards of the River Foyle.	April 2005	300
Moneyreagh PE 1210	F	30	45		30	45		N	The works is grossly overloaded and additional treatment in the form of a membrane plant has recently been installed. However, this will only treat current flows and the works still requires upgrade to allow for further development in the area.	December 2005	1100
Portglenone PE 1416	F	60	120		60	120		N	The works is overloaded and construction of a new works started April 2002.	April 2004	1920
Rathfriland PE 2953	F	10	15	5	10	15	5	Y	This works was upgraded in 1997 but has yet to meet its standard. Work is to commence at the end of 2002 to remove infiltration to the system to improve compliance.	July 2005	1050
Stewartstown PE 1076		50	70		50	70		N	The works is overloaded and requires upgrade to meet its standard.	December 2005	538
Straid PE 261					40	60	10	See Ballyclare Scheme	Straid is overloaded. It is currently planned to decommission the works and divert flows to the new Ballyclare works.	December 2005	See Table 14 Ballyclare Scheme
Toome PE 737					70	70		N	Upgrade is planned although no timescale has been forwarded.	August 2005	1000
Tullywiggan PE 410					50	80		See Cookstown Scheme	Difficulties in dealing with low flow to the works result in non-compliance of this works. It is proposed to decommission the works and pump flows to the new Cookstown works.	January 2005	See Table 14 Cookstown Scheme
Upper Ballinderry PE 319					40	60		N	A replacement works was commissioned early 2002	Early 2002	399
Whitecross PE 324					50	70		N	Replacement of the current treatment system is scheduled for 2005	October 2005	203

Standard does not apply

Works not on public register prior to 31 December 2000

F - Indicates a discharge to freshwater.

E - Indicates a discharge to an estuarine waters.

M - Indicates a discharge to the marine waters.

\* - Based on the best available information available at June 2003. Dates are subject to obtaining the necessary planning approvals etc.

\*\* - A general Western Division WWTW Improvement Scheme will cost £765,000.

\*\*\* - A general scheme to upgrade WWTW in Fermanagh will cost £2,486,000.

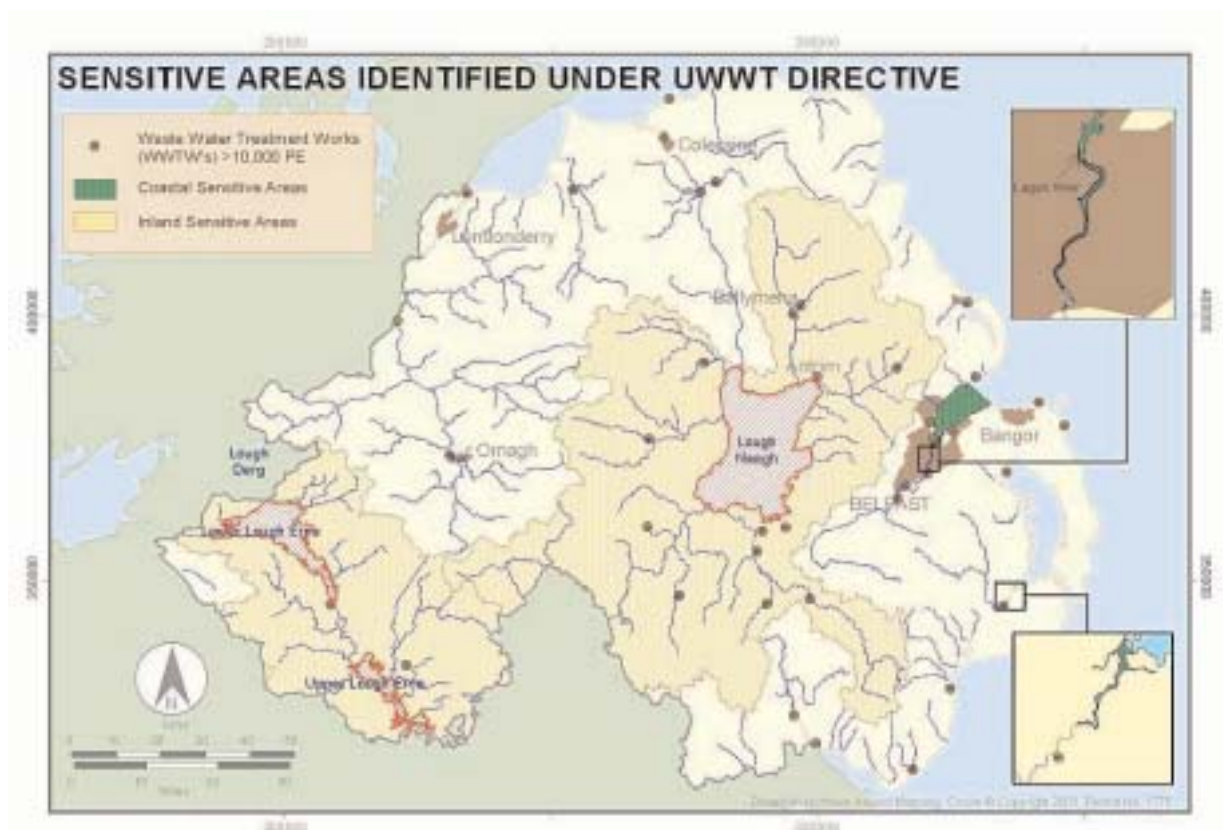
PPP Public Private Partnership proposals (details to be agreed by ministers).

## Compliance with the Urban Waste Water Treatment Regulations in 2001

From the 31 December 2000, 37 works were required to comply with the UWWT Regulations. Fifteen of these, with a PE greater than 10,000, discharging into the waters of the Lough Neagh and Lough Erne catchments, have been required to comply from 31 December 1998. The remaining

22 works have PEs greater than 15,000 and discharge into areas in the default, "normal" category. These 22 works had to comply with the Regulations during 2001.

**Figure 4: Locations of WWTWs that were Required to Comply with the UWWT Regulations in 2001**



**NB** The tidal Lagan, Inner Belfast Lough and the Quoile Pondage were identified in 2001 and WWTWs discharging to these areas will be requested to comply in 2008.

## Performance Results for 2001

Based on data received from Water Service from 1 January 2001 to 31 December 2001, the following 13 works below have complied with the UWWT Regulations for 2001 (this equates to 35% compliance).

Antrim (Milltown)  
 Armagh  
 Ballymoney (Ballybrakes)  
 Ballynacor  
 Banbridge  
 Bullays Hill  
 \* Coleraine  
 Limavady  
 \*\* Lisnaskea  
 Magherafelt  
 Moygashel  
 \* Newcastle  
 Tullagherley

\*Although Coleraine and Newcastle WWTWs have met the monitoring requirements of the Regulations, it is unclear from the flow data whether the required volume of influent waste water received full secondary treatment as outlined in the Guidance Note to the UWWT Regulations.

\*\*Lisnaskea is accepted as having a PE less than 10,000 following the closure of local industry. As a result, this works will not be assessed again under the UWWT Regulations until the end of 2005.

The remaining 24 WWTW did not comply with the requirements of the Regulations for a variety of reasons, and these are set out in the following sections. Specific details on the performance of these works are included in **Appendix A**.

## Reasons for Non-compliance

Ballyclare and Cookstown did not provide tertiary treatment by 31 December 1998 and so do not comply with the nutrient reduction requirement for discharge to a Sensitive (Eutrophic) Area. Eleven works were non-compliant with the requirements of the Directive because secondary treatment was not in place by the 31 December 2000. All of the WWTWs are the subject of capital schemes to provide the required treatment. These are either under way or have planned start dates within the current Water Service capital works programme. Previous lack of investment has resulted in Water Service being unable to fully comply with the implementation programme for upgrade of these works. Additionally, in some cases, planning difficulties have also resulted in lengthy delays in proceeding with the necessary capital works. A summary of the position for each works is set out in **Table 15**.



The filter beds at Ballymena WWTW

**Table 15: WWTWs that do not Provide the Level of Treatment Required by the UWWT Regulations**

Name of WWTW	Current Treatment	Required Treatment	Date Required	Time-scale for Upgrade/Replacement
Bangor (Briggs Rocks)	Preliminary	Secondary	31.12.2000	Upgrade is due to commence January 2006 for completion December 2008 as part of the North Down Scheme.
Ballyclare	Secondary	Tertiary	31.12.1998	Construction of a new works including provision for phosphorus reduction is scheduled to commence June 2003.
Carrickfergus	Primary	Secondary	31.12.2000	Upgrade due to commence March 2005 for completion March 2006.
Cookstown	Secondary	Tertiary	31.12.1998	Construction of a new works including provision for phosphorus reduction was scheduled to commence December 2001 but has been delayed until design flows determined by the Urban Pollution Management Study are available. Construction will now commence June 2003 for completion January 2005.
Culmore	Primary	Secondary	31.12.2000	Upgrade due to commence December 2003 for completion November 2005.
Donaghadee	None	Secondary	31.12.2000	Upgrade due to commence January 2006 for completion December 2008 as part of the North Down Scheme.
Kilkeel	Primary	Secondary	31.12.2000	Completed late 2002.
Larne (Sandy Bay)	None	Secondary	31.12.2000	Upgrade due to commence September 2003 for completion September 2005.
Newry	Primary	Secondary	31.12.2000	Upgrade of secondary treatment was complete late 2002. Additional work on the inlet will be completed in 2003.
Newtownabbey	Partial Secondary	Secondary	31.12.2000	Upgrade scheduled to commence January 2006 for completion December 2008.
Portballintrae	None	Secondary	31.12.2000	Have reduced PE to below 15,000, therefore not subject to the Regulations until 2005.
Portrush	None	Secondary	31.12.2000	Upgrade as part of the North Coast Scheme due to commence January 2006 and be completed December 2008.
Strabane	Primary	Secondary	31.12.2000	Upgrade January 2002 for completion January 2004.

NB Dates are subject to obtaining the necessary planning approvals etc.

Strabane and Culmore, have full analytical data available, while for Bangor data from limited spot sampling have been received. In July 2001, EHS requested that all the above WWTWs be sampled using spot sampling techniques to ensure that any change in performance can be demonstrated.

The works in **Table 16** did not meet the requirements of the UWWT Regulations in 2001 for the reasons given.

**Table 16: WWTWs that were Non-compliant with the Requirements of the UWWT Regulations in 2001 by Parameter.**

Name of WWTW	Standard Compliance				
	Biochemical Oxygen Demand 95%ile Limit (25mg/l)	Biochemical Oxygen Demand Upper Tier (50mg/l)	Chemical Oxygen Demand 95%ile Limit (125mg/l)	Chemical Oxygen Demand Upper Tier (250mg/l)	Total Phosphorus Annual Average
Ballyclare					x
Ballymena					x
Ballymoney (Glenstall)				x	
Ballyrickard			x		
Cookstown			x		x
Enniskillen		x		x	
Omagh		x			
Seagoe		x			
Tandragee				x	x

x Indicates non-compliance with the appropriate standard

 Standard does not apply

The works in **Table 17** are capable of providing the required level of treatment but did not meet the monitoring requirements of the Directive because insufficient sample results were provided.

**Table 17: WWTWs with Insufficient Sample Results in 2001.**

Name of Works	Number of Sample results required	Number of Biochemical Oxygen Demand results received	Number of Chemical Oxygen Demand results received
Ballyrickard	24	22	20
Belfast	24	22	22
Dunmurry	12	11	11
New Holland	24	22	19
Newtownbreda	12	12	11

**Summary and Conclusions**

The percentage of WWTWs complying with the requirements of the UWWT Regulations during 2001 (35%) is substantially lower than in previous years. This is due to the 22 additional works that came under the control of the Regulations at the end of 2000, a large number of which do not have the required level of treatment. Indications are that compliance for 2002 will be closer to 45%. Compliance over the period 1999 to 2001 for the 15 works required to comply by 31 December 1998 (**Table 18**) shows a slight improvement in 2001.

**Table 18: Percentage Compliance for WWTWs Discharging to Sensitive (Eutrophic) Areas**

Percentage Compliance		
1999	2000	2001
53%	53%	60%

For the additional 22 works that were required to comply with the Regulations by the end of 2000, 18% compliance was achieved. This poor performance reflects the fact that 10 works do not have the required level of treatment and, in the case of a further 5 works, Water Service did not have sufficient resources to carry out the necessary sampling.



**Construction of the new WWTW at Derrygonnelly**

## Sewerage System Assessment

### Collection Systems

In Northern Ireland, many of the collection systems (more commonly known as sewer systems) date back to the 1800s. They have suffered from a lack of investment, and this has resulted in an accumulation of unsatisfactory CSOs. Currently EHS and Water Service are working together in a number of project working groups not only to identify and rectify unsatisfactory CSOs but to rationalise sewer systems and reduce the total number of CSOs. These groups examine any proposals Water Service make to extend or upgrade their collection systems to determine whether they will meet the requirements of EHS and the UWWT Directive after 2005. In common with the rest of the environmental regulators and water industry in the UK, EHS and Water Service have agreed to adopt the Foundation for Water Research Urban Pollution Management (UPM) Manual methodology in assessing the performance of collection systems and any proposed upgrade solutions.

CSOs will be considered unsatisfactory if they:

- discharge in dry weather,
- cause a deterioration in the classification of a water-body
- cause failure of environmental standards
- cause visible pollution and have a history of public complaint.

These unsatisfactory CSOs need to be dealt with by upgrading the sewer systems to ensure that they operate effectively, and EHS is working closely with Water Service to this end.

As part of the process, Water Service produces Drainage Area Plans (DAPs) that quantify the volumes carried forward for treatment and the volumes spilt under rainfall events expected in a year. EHS assesses the effect that discharges from the collection systems are having on the water quality objectives to be met by the relevant receiving waters. From the information provided

by these assessments, the level and sophistication of the UPM study is agreed between EHS and Water Service. **Table 19** sets out the progress on DAPs, as of April 2003.

For the towns listed 10 UPM studies have been largely accepted by EHS and are awaiting completion of scoping studies or the beginning of construction work. Twenty-one studies are part of the ongoing process of consultation between Water Service and EHS. EHS is currently awaiting DAPs for 29 systems and has carried out preliminary fieldwork and data gathering for these but further work will depend on the information obtained from the DAPs. **(See Table 19)**

**Belfast's urban streams are often impacted by intermittent discharges**



Table 19: Status of Drainage Area Plans - April 2003

Agreement Reached in Principle	Ongoing	Due in Future
West Belfast	Armagh	Ballymoney
Limavady	Carrickfergus	Bushmills
Strabane	Greencastle	Dungannon
Bangor	Greenisland	Gilford
Bessbrook	Lisburn	Markethill
Moirá	Lurgan	Tandragee
Enniskillen	Newtownabbey	Downpatrick
Dunmurry	Antrim/Crumlin/Templepatrick	Millisle
Seahill/Helen's Bay	Ballyclare	Maghera
Greyabbey	Ballymena	Draperstown
	Coleraine	Moneymore
	Cookstown	Newtownbreda
	Randalstown	Magheralin
	Craigavon	Waringstown
	Portadown	Annahilt
	Rathfriland	Ballynahinch
	Richhill	Crossgar
	Londonderry	Killyleagh
	Omagh	Fintona
	East Belfast	Fivemiletown
	Warrenpoint	Irvinestown
		Lisnaskea
		Upper Falls
		Ballykelly
		Dungiven
		Eglington
		Greysteel
		Crossmaglen
		Keady

## Water Treatment Works (WTW) Performance

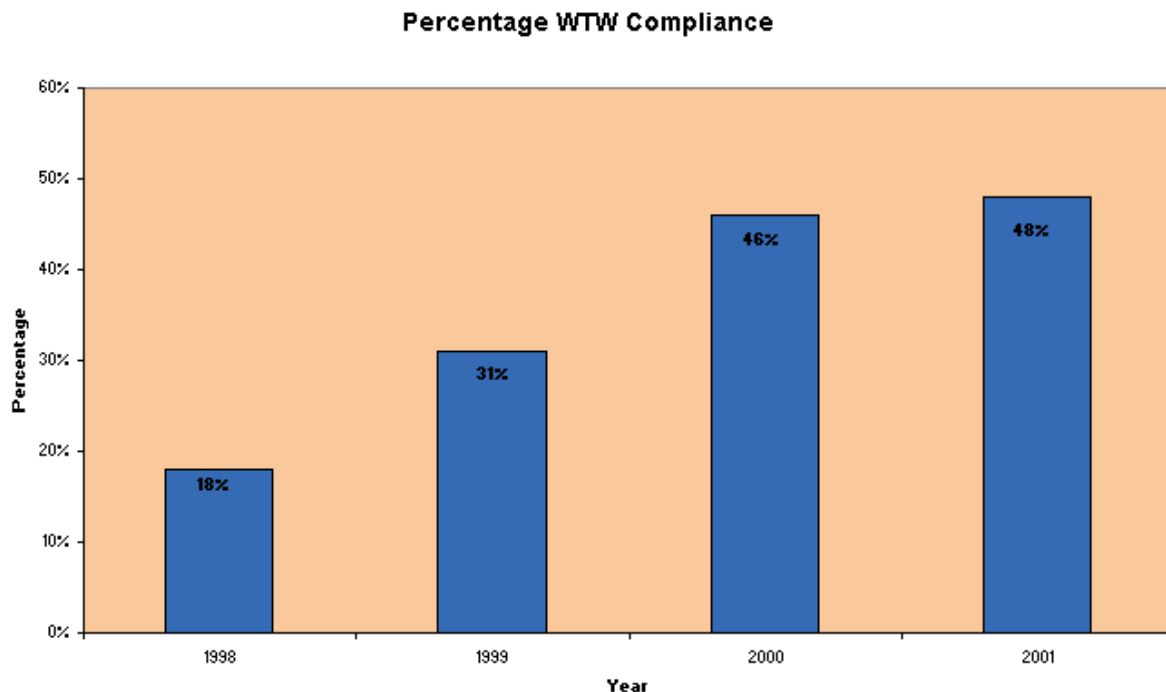
The treatment of water for public supply generates waste water which needs to be disposed of. This waste water is often discharged to a nearby waterway and requires discharge standards set by EHS to protect the quality of the receiving water. Discharge standards for 20 WTWs were placed on the public register on 1 April 1998. A further 5 were entered in 1999.

Compliance for the four years 1998 to 2001 - based on the monitoring data provided by Water Service is presented in **Table 20 & Figure 5**. The data show an improvement in compliance up to 2001. Specific details for all WTWs are included in **Appendix A**.

**Table 20: WTW Compliance 1998 - 2001**

	1998	1999	2000	2001
Number of discharges monitored	22	26	24	27
Number of discharges complying	4	8	11	13
Percentage of discharges complying	18%	31%	46%	48%

**Figure 5: WTW Compliance 1998 - 2001**



The following WTW discharges complied with their discharge standards during the years shown.

**Table 21: Compliant Water Treatment Works Discharges 1998 - 2001**

1998	1999	2000	2001
Belleek	Belleek	Belleek	Belleek
Carnmoney	Carnmoney	Carnmoney	Carnmoney
Glenhordial	Glenhordial	Glenhordial	Dungonnell
Killea	Killea	Killea	Killea
	Caugh Hill	Caugh Hill	Caugh Hill
	Creightons Green	Creightons Green	Creightons Green
	Killyhevlin	Killyhevlin	Killyhevlin
	Dunore settlement tanks	Dunore settlement tanks	Killylane
		Killylane	Seagahan
		Seagahan	Altmore
		Silent Valley	Castor Bay Sandwasher
			Castor Bay Lagoon
			Clay Lake

The following WTW discharges did not meet their discharge standards for the years shown.

**Table 22: Non-compliant Water Treatment Works Discharges 1998 - 2001**

1998	1999	2000	2001
Altmore	Altmore	Altmore	
Ballinrees	Ballinrees	Ballinrees	Ballinrees
	Ballintemple	Ballintemple	Ballintemple
Ballysallagh Upper	Ballysallagh Upper	Ballysallagh Upper	Ballysallagh Upper
Ballysallagh Lower	Ballysallagh Lower		Ballysallagh Lower
	Carran Hill	Carran Hill	Carran Hill
Castor Bay lagoon	Castor Bay lagoon	Castor Bay lagoon	
Castor Bay sandwasher	Castor Bay sandwasher	Castor Bay sandwasher	
Clay Lake	Clay Lake	Clay Lake	
Dorisland	Dorisland	Dorisland	Dorisland
Dungonnell	Dungonnell	Dungonnell	
Dunore sludge beds	Dunore sludge beds	Dunore sludge beds	Dunore sludge beds
Dunore settlement tanks			Dunore settlement tanks
			Forked Bridge RGF
Forked Bridge sandwasher	Forked Bridge sandwasher	Forked Bridge sandwasher	Forked Bridge sandwasher
Killyhevlin			Glenhordial
Killylane	Killylane		
Lough Cowey	Lough Cowey	Lough Cowey	Lough Cowey
Lough Fea*			Lough Fea
Lough Money	Lough Money		
Seagahan	Seagahan		
	Silent Valley		Silent Valley

NB At the beginning of 1999, the discharge of effluent from Lough Fea WTW was temporarily stopped; during 2000, it was directed back to Lough Fea and new standards were agreed which came into effect on 1 January 2001. Ballysallagh Lower was out of service during 2000, and Lough Money was decommissioned during the summer of 1999.

## Water Service Regulation Audits

### Quality Audits

#### Introduction

As part of the Regulation process established in 1997, it was agreed that Water Service would carry out the monitoring of effluent discharges for the purposes of compliance assessment. This self-monitoring regime is the first in the UK and is consistent with the “polluter pays principle”, and with the monitoring carried out for the UWWT Directive across the whole of the UK. In agreeing to self-monitoring by the Water Service, EHS established a series of audit checks and procedures to ensure that the samples taken are representative of the effluent quality both in the way they are obtained and in the accuracy of analytical data produced. Additionally, the UWWT Regulations state that the Regulator must ensure that the monitoring is carried out by a competent authority using internationally accepted laboratory practices.

#### Laboratory Audits

All Water Service Laboratories have obtained United Kingdom Accreditation Service (UKAS) accreditation for analysis of all the parameters as stipulated by EHS when self-monitoring was agreed.

During 2001, two of Water Service’s laboratories were examined. The first audit took place on 10 May 2001 in the Western Division Laboratory. The second was carried out on 26 June 2001 at Northern Division’s Academy House laboratory.

The remit of the audits was to ensure:

1. sample integrity and traceability throughout the system from collection to final data reporting;
2. appropriate analytical quality and confidence in the results reported; and
3. accurate reporting and adequate follow-up procedures for all relevant results.

Both laboratories audited are well organised and managed and their quality systems are well established. The audits have shown that EHS can

be confident that the data forwarded for compliance assessment are accurate and representative of the samples taken.

Three recommendations arose from the two audits carried out.

1. All automatic samplers used for UWWT Directive sampling need to be checked to ensure that they maintain a temperature not exceeding 5°C during the whole of the 24-hour sampling period. This is a requirement of the Guidance Note to Urban Waste Water Treatment (NI) Regulations 1995 (Appendix 10, 4.5.7). Water Service is currently examining the likely cost of upgrading its sampling equipment to meet these requirements.
2. Analysis for BOD should commence within 24 hours of receipt by the laboratory. In addition, the COD and Total Phosphorus analysis should commence within 36 hours of receipt. Compliance with this recommendation will require changes to the work patterns within the laboratories as weekend analysis does not routinely take place.
3. Samples taken for registered standard compliance should be lifted randomly at the weekends as well as on weekdays and the above analytical timescales also apply to these samples. Again, changes in work patterns are required to ensure compliance.

Additionally, during 2001, 22 WWTW were added to the sampling programme for the UWWT Regulations. As it was the first time that these works were sampled by automatic composite samplers, difficulty was experienced in complying with the pre-set sampling programme, in some areas. The variation in sampling also affected the distribution of samples through the year and in some cases there was a lack of samples in the first half of the year. In other cases, as described in **Section 5**, insufficient samples were taken. Water Service has taken action to address the situation.

### Site Inspections

As part of the audit checks on discharges made by Water Service qualified EHS staff regularly inspect WWTWs and WTWs to check the operation and maintenance on site. To cater for such inspections, access to the works is allowed at all reasonable times by arrangement with Water Service Divisional staff, in order to take account of Health and Safety requirements.



Aeration tanks at Newtownbreda WWTW

### Model Audits

#### Marine Dispersion Models

The development of discharge standards for coastal discharges usually involves the use of a marine dispersion model to assess the effect of the proposed discharge on the surrounding waters. The predictions of such models depend on the design of the model, the data incorporated and how they are employed. Before EHS accepts the results of these modelling studies from Water Service an independent audit is required to determine whether the model is 'fit for purpose' and whether the modelling work has been carried out in an appropriate professional and technical manner.

#### Sewer System Models

The design of sewer systems in accordance with the best technology available as required under the UWWT Regulations will often involve the development of hydraulic sewer models. Here again, Water Service similarly needs to demonstrate that the model provided is 'fit for purpose' and the modelling work has been carried out in a professional and technically competent manner. EHS has set out its audit requirements for such models in a draft policy guidance note.

## Pollution Incident Investigation

### General

The Incident Response Section of EHS is responsible for investigating and monitoring pollution incidents in Northern Ireland resulting from unauthorised discharges.

The Water Service, because of the nature of its work, has a significant impact on the aquatic environment. **Table 23** (taken from Water Pollution Incident and Prosecution Statistics Reports 1996-2001) shows the breakdown of pollution incidents from 1996 to 2001. Over this

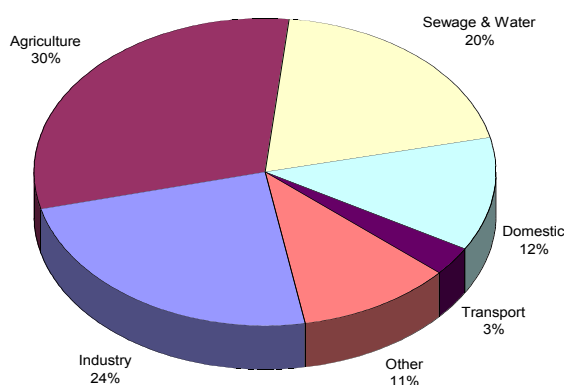
period, Water Service activities have consistently resulted in approximately 20% of the total pollution incidents each year. **Figure 6** shows the percentage distribution of pollution incidents in 2001. Of the Water Service related pollution incidents 2% were of high severity, 24% of medium severity and 74% of low severity. In 2000 11% of pollution incidents in England and Wales resulted from the activities of the Water Companies while in Scotland 26% of incidents were attributed to the water industry.

In 2001, there were approximately 305 confirmed pollution incidents attributed to Water Service.

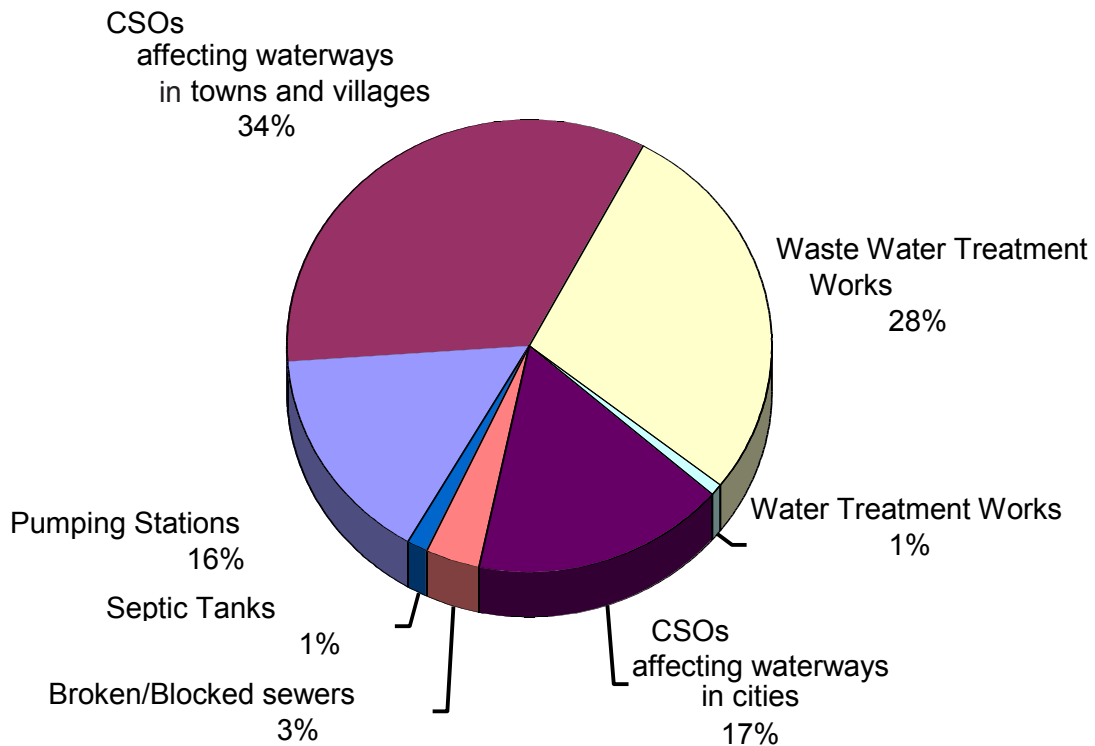
**Table 23: Substantiated Pollution Incidents 1996-2001**

Source	1996		1997		1998		1999		2000		2001	
	No	%	No	%	No	%	No	%	No	%	No	%
Industry	537	26	365	20	435	27	348	23	451	26	364	24
Agriculture	509	24	550	30	467	28	438	29	525	31	477	30
Sewage & Water	377	18	353	19	278	17	347	23	322	19	305	20
Domestic	189	9	205	11	228	14	155	10	191	11	187	12
Transport	40	2	53	3	64	4	53	4	64	4	41	3
Other	435	21	300	17	172	10	166	11	152	9	172	11
<b>TOTAL</b>	<b>2087</b>		<b>1826</b>		<b>1644</b>		<b>1507</b>		<b>1705</b>		<b>1546</b>	

**Figure 6: Distribution of Sources of Pollution Incidents 2001**



**Figure 7: Distribution of Sources of Pollution Arising from Water Service Activities in 2001**



**Figure 7** above shows the distribution of the activities undertaken by Water Service which resulted in the pollution incidents in 2001.

The chart illustrates that the vast majority of pollution problems attributed to Water Service are a result of discharges from CSOs (these are located predominantly in urban areas). The predominance of pollution incidents from this source demonstrates the importance of implementing the solutions that emerge from the UPM studies. As Water Service proceeds to upgrade its sewer systems, these incidents should

decrease. Many incidents at WWTWs result from overloading works and, with investment in new works to improve compliance with registered standards, the number of such incidents should decrease. Additionally, more attention to good management practice at WWTWs has the potential to reduce the risks of pollution incidents.

## Comparisons

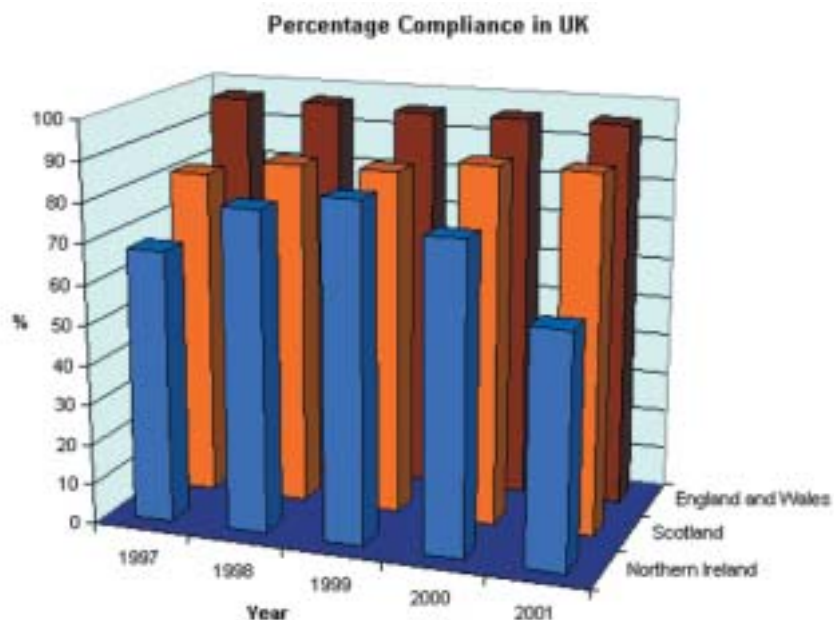
### Comparison with the Rest of the UK.

**Figure 8** shows the trends in percentage compliance of WWTWs with their discharge standards in England and Wales, Scotland and Northern Ireland for the period 1997 to 2001. It demonstrates that compliance in Northern Ireland is significantly lower than in other parts of the UK.

Since the public register of WWTWs discharge standards was established in Northern Ireland in

1997, compliance with the registered standards steadily improved until 1999. Following the addition of 107 works to the register in 2001 and the review of standards for 22 works to meet the requirement of the UWWT Regulations, the compliance has decreased significantly. The drop in compliance reflects the lack of investment needed to comply with the requirements of the UWWT Directive, and to meet the environmental needs standards issued by EHS, within the required time scale.

**Figure 8: Percentage WWTW Compliance for the United Kingdom (UK) 1997 - 2001**



	1997	1998	1999	2000	2001
■ Northern Ireland	68	80	84	77	58
■ Scotland	82	90	86	89	89
■ England and Wales	97	97	96	96	96

In considering the compliance data, account should be taken of the fact that, in England and Wales, there was a substantial capital investment after the Water Companies were created in 1989 and that this investment has been maintained by water charges that are linked to investment requirements. In addition, there had already been significant investment in England, Wales and Scotland to meet the requirements of the Control of Pollution Act 1974.

### Future WWTW Compliance

The UWWT Regulations require all WWTWs in Northern Ireland to provide levels of treatment that will adequately protect the waterway to which they discharge (referred to as an environmental needs standard) by the end of 2005. To meet this legislative requirement, EHS aims to issue environmental needs standards for all works by 2005 and to place these standards on the public register. It is estimated that there are still over 600 WWTWs (with PEs less than 250) in Northern Ireland that require registered standards to be formulated.

Only with the financial investment outlined in **Section 4 (Tables 14 and 15)** will Water Service reach the levels of compliance currently achieved in the rest of the UK and continue to serve the needs of present and future development in a sustainable manner.

A more robust funding system needs to be established to provide the necessary investment within a reasonable time to ensure the maximum level of compliance possible before 2006. This is being actively addressed by the Department for Regional Development, through the Water Reform programme. Ministers have decided that water and sewerage services will become progressively self-financing from 1 April 2006 onwards, and that these services will no longer be delivered by Central Government. A public consultation on the options for the determination of mechanisms, and the new business model for water and sewerage delivery took place between March and June 2003. The self-financing arrangement should provide the secure and sustainable funding required to facilitate long term capital planning and investment in Northern Ireland's water and sewerage services.

Lack of adequate funding, and hence investment, to date has prevented Water Service from meeting the requirements of the UWWT Directive. **Table 14** sets out the minimum investment that would be necessary to achieve compliance with this Directive.

### Sewerage Systems

Water Service is actively seeking to agree proposals for sewer system upgrades that emerge from UPM studies.

Assessment of compliance for WWTWs is relatively straightforward compared with assessment of the performance of sewer systems. The high proportion of pollution incidents related to the operation of unsatisfactory CSOs demonstrates the importance of this investment, which is also needed to meet the requirements of the UWWT Directive. It is also important that future investment in sewerage infrastructure incorporates the appropriate use of Sustainable Drainage Systems (SuDs) in order to contribute to the reduction of diffuse pollution in urban areas and to sustain urban growth without compromising water quality.

The cost of upgrading the sewer systems to the standards set out in the Guidance Note to the UWWT Regulations is likely to be of a similar magnitude to that of upgrading the treatment works.

### Future WTW Compliance

Water Service is currently upgrading water treatment works to meet the requirements of the EC Drinking Water Directive. As a result of this investment, treatment of effluent discharges from these works is also being upgraded, and the quality of effluent is being systematically brought into compliance with the standards set by EHS.

### Status of Individual Waste Water and Water Treatment Works at June 2003

#### WWTWs that were non-compliant with both the UWWT Regulations and their EHS Registered Standard in 2001

##### Ballyclare

The works is overloaded. It has been required to comply with the requirements of the UWWT Directive since 1 January 1999, as it discharges to the Lough Neagh catchment which is identified as being sensitive to eutrophication. The works is required to have phosphorus reduction installed to comply with the phosphorous standard under the Directive. Water Service has delayed installing the required phosphorus reduction facilities at the works pending consideration of the options for finally dealing with the waste water from Ballyclare. In the interim period, the works does not meet the phosphorus standard of the Directive. Water Service proposes to commence a scheme in 2003 to deal with the Ballyclare situation.

##### Ballymena

All the waste water from Ballymena town is received at the Ballymena (Spencestown) works where preliminary treatment takes place. The flows are then split between Ballymena and Tullaghgarley to receive secondary treatment. The works at Spencestown is unable to treat to the required standard because of the load received. At EHS's request interim measures have been introduced to increase the treatment capacity at Tullaghgarley works. A more frequent routine maintenance programme has been introduced to improve compliance. EHS has also expressed concerns over the flow regime at the inlet to the works and the flow to full treatment. Ballymena WWTW will be decommissioned once the planned upgrade of Tullaghgarley is completed in 2004.

##### Ballymoney (Glenstall)

This works does not have secondary treatment of sufficient capacity to meet UWWT Directive requirements or its reviewed Registered Standard. Water Service intends to commence an upgrade to meet the UWWT Regulations in 2003 for completion in May 2005.

##### Ballyrickard

The present treatment processes are not capable of consistently meeting the UWWT Regulation requirements. EHS has requested that Water Service take action to optimise current treatment to ensure that the best possible effluent quality is maintained.

## Banbridge

The works was overloaded and, although Water Service introduced more rigorous maintenance measures to improve the level of performance, these were not sufficient to comply with the BOD standard in 2001. A new works is currently under construction and due for completion in 2003.

## Cookstown

The works receives significant quantities of trade waste and is overloaded. Proposals for a new treatment works were agreed in 1994 but this has not progressed due to planning difficulties. Like Ballyclare, Cookstown was required to comply with the requirements of the UWWT Directive from 1 January 1999 as it discharges to the Lough Neagh catchment, and is required to have phosphorus reduction. Due to the delay in the provision of the new works, phosphorus reduction has not been installed but will be incorporated in the new works. Water Service is proposing to begin construction of the new works by Autumn 2003 subject to the necessary permissions.

## Kilkeel

The works is required to provide secondary treatment under the UWWT Directive, and the upgrade to provide the required treatment was completed at the end of September 2002.

## Omagh

The works is overloaded and, in 1993, EHS requested that a capital works scheme be instigated at this works as a priority. Due to difficulties with obtaining a suitable site, this has not happened and a scheme is currently programmed to commence in October 2003. Water Service has proposed interim measures to improve performance, and work on these is due to commence by early 2003 for completion within a year. EHS will continue to monitor the situation and press for the full capital works scheme to be implemented as soon as is feasible.

## Strabane

The works currently provides primary treatment only . The capital works scheme to upgrade the treatment works in line with the UWWT Regulations commenced in late 2001 with a scheduled completion date of January 2004.

## Tandragee

This works is very heavily overloaded by trade discharges, and an upgrade to address the overloading is planned to commence in 2003. The discharge is having a detrimental effect on the quality of the River Cushier. Action by Water Service to improve works performance has resulted in little improvement. EHS has repeatedly requested that the trade effluent discharge standards be reviewed to reduce the load to the works but this has yet to take place.

### WWTWs that were non-compliant with their EHS Registered Standard in 2001

#### Aghanloo

There are two distinct works at Aghanloo. Incoming domestic sewage effluent is treated and discharged separately from incoming industrial effluent.

#### Antrim (Milltown)

The total ammonia load discharged from this works has increased, with increased flows, since the standard was first registered in 1997. At EHS' request, treatment optimisation has been carried out to reduce the ammonia levels discharged. However, because of the plant design, this has not been sufficient to ensure compliance with the 95-percentile standard. The works easily meets all other standards.

#### Ardglass

The works is heavily overloaded by trade discharges. Better control over trade discharges is required until the treatment works is upgraded. Water Service has carried out remedial works to improve performance in the interim but this has not been enough to enable the discharge to comply on a consistent basis. The current start date for upgrade is September 2004 with completion by February 2005.

#### Armagh

Armagh WWTW was not designed to nitrify and so fails to meet its ammonia standard. Upgrade of the works is scheduled to commence June 2003. Water Service has improved the operating conditions at this works.

#### Articlave

This works has been adversely affected by dry weather as insufficient flows prevent full utilisation of the biological treatment stage. It is planned that the works will close once the new North Coast works is commissioned.

#### Ballynahinch

Water Service has indicated that the failures at this works are as a result of the poor performance of the tertiary filters. Action has been taken to refurbish these and is due for completion in late autumn 2002.

#### Bessbrook

The works has difficulty meeting its discharge standard and Water Service has indicated that unauthorised discharges to the sewer system have inhibited the treatment processes at the works. At EHS's request, Water Service has introduced additional treatment to improve works performance.

This works was originally to be decommissioned in 1996 and diverted to Newry, but construction of the Newry WWTW was delayed. Commissioning of the new Newry works is due to be completed in 2003 and closure of Bessbrook WWTW is scheduled to be completed by 2004.

## Castledawson

This works has been adversely affected by dry weather as insufficient flows prevent full utilisation of the biological treatment stage. Water Service intends to divert flows to Magherafelt once its upgrade has been completed.

## Castleberg

Maintenance at the works has been adversely affected by the Foot and Mouth crisis. However, these difficulties have merely exacerbated the existing problems with high infiltration to this works.

## Castlewellan

Excessive storm flows received at the works have caused operational difficulties. Remedial action has been taken to address these problems.

## Crossgar

The works is overloaded due largely to trade effluent discharges and Water Service has taken action to address this. In future the waste water currently treated at this works will be pumped to Killyleagh WWTW which has excess capacity. It is proposed that the diversion should take place in the near future as most of the required infrastructure is now in place.

## Damolly

Ageing infrastructure has led to operational difficulties at this works. Remedial action has been carried out and the works will be decommissioned once the Newry works is commissioned.

## Fivemiletown

The works is overloaded and scheduled for upgrade. As an interim measure, reed beds are being installed to improve effluent quality.

## Kircubbin

This works provides primary treatment. Construction of a new works to provide secondary treatment commenced in 2002.

## Macosquin

Operational difficulties resulted in a reduction in the treatment capacity over a short period of 2001.

## Magherafelt

The works discharges to a waterway with limited dilution and has a restrictive ammonia standard that the treatment plant has difficulty meeting. A scheme is in place to relocate the discharge to the Moyola River, which will allow greater dilution and therefore a less restrictive standard. The relocation of this discharge to the Moyola is programmed for completion in December 2003.

## **Maghaberry**

Problems with the operation of this works have been attributed by Water Service to large volumes of surface water entering the works and affecting the operation of the treatment process. Investigations are being carried out by Water Service to determine the source of the excess surface water, and EHS awaits the results of these investigations.

## **Moneyreagh**

The works was heavily overloaded and was having a severe detrimental impact on the receiving water. Additional treatment, to address overloading and improve the quality of the discharge, has been installed and operated since spring 2002.

## **Moira**

This is a newly constructed works that has difficulty complying with the suspended solids standard. Water Service has attributed problems to high storm flows received at the works and inadequate flow splitting. Action was taken by Water Service during 2000 to optimise works performance, but this has not resulted in the required level of improvement.

## **Mullaghabawn**

There have been compliance problems with this works because of mechanical breakdowns. Water Service has recently installed telemetry at the works. This should enable prompt action to be taken in the event of future breakdowns and will increase the likelihood of compliance in the future.

## **Rathfriland**

This works was upgraded in 1997 but Water Service has indicated that it is now overloaded. It is also adversely affected by excessive infiltration, which Water Service is seeking to address. A scheme to remove infiltration from the system was programmed to commence at the end 2002.

## **Portglenone**

The current works is overloaded and construction of a replacement works is due to commence in the next few months.

## **Stewartstown**

EHS considers that the works is overloaded and needs a major upgrade to treat the effluent to an acceptable level. A capital improvement scheme is planned for 2005.

## **Seagoe, Donneybrewer, Dundrum and Hillsborough**

It is unlikely that the operational difficulties which resulted in the failure of these works in 2001 will be repeated in 2002.

### **Strangford**

The works is adversely affected by the intrusion of sea water which causes septicity.

### **Tullaghagarley**

All the waste water is received at the Ballymena works where preliminary treatment takes place. The flows are then split between Ballymena and Tullaghagarley to receive secondary treatment. Since 1995, when the works was commissioned, Tullaghagarley regularly failed to meet the required ammonia standard and work has commenced to upgrade the works to provide additional capacity. A Vitox system has been installed to increase the treatment capacity of the aeration tanks. This has improved compliance.

## **WWTWs that were Non-compliant with the Urban Waste Water Treatment Regulations in 2001**

### **Belfast, Dunmurry, New Holland and Newtownbreda**

The analytical data received show that treatment at these works meets the requirements of the Regulations but insufficient sample results were provided to allow compliance to be assessed according to the requirements of the Regulations. The works are, therefore, considered to be non-compliant. Water Service has taken action to ensure that the agreed sample programmes are adhered to.

### **Enniskillen**

The works exceeded the upper-tier standard for BOD and COD on a number of occasions in 2001 as a result of a series of operational problems that Water Service has attempted to address. EHS is content with the action taken to ensure compliance in future.

### **Seagoe**

The works failed the upper-tier standard for BOD in 2001. The first year that Seagoe was non-compliant was 2001 as the works normally complies with UWWT Regulations, and the investigation requested by EHS did not highlight any particular causes. EHS is satisfied that Water Service has taken suitable action to ensure compliance in the future.

## Summary of Water Treatment Works Effluent Compliance in 2001

### Altmore

This is an old WTW, that is due for replacement in the near future. The nature of the raw water and treatment processes result in difficulties with controlling the pH of the effluent. In 2001 the effluent quality from the works was compliant.

### Ballinrees

The works struggles to meet its registered standard conditions. In Autumn 2001 Water Service changed coagulant type but due to financial consideration returned to the original coagulant.

### Ballintemple and Carran Hill

Both these works struggle to meet their total chlorine registered standard. In both cases, high chlorine concentrations in the waste water has resulted in non-compliance. Water Service is currently investigating an alternative means of disposal of this water to ensure that the effluents comply in future.

### Ballysallagh Upper and Ballysallagh Lower

Production processes at both works involve the use of chlorinated water to backwash the filter beds. This wash water then forms part of the effluent discharged. Water Service installed a dechlorination plant in 2000 to address the high chlorine concentrations in the effluent but have had difficulties with the operation of that equipment. The dechlorinator will be replaced in the near future.

### Castor Bay

There are two effluent discharges from this WTW, the first from the sandwashers and the second from the lagoon. In 2000, Water Service installed a new sandwashing plant and relocated the lagoon sample point at the outlet of the lagoon. For 2001, the quality of both effluents complied with the registered standard.

### Clay Lake

From 1998 to 2000 the works failed its total chlorine standard. In 2001, Water Service installed new on-line chlorine monitoring equipment and so were able to return any waste water to the head of the works. Therefore effluent quality from the works was compliant in 2001.

## **Dorisland**

Prior to 2001, chlorinated water was used to backwash the sand filters. This water was then discharged as part of the works effluent, which caused difficulty in meeting the total chlorine standards. In 2001, a new works was commissioned, and operational difficulties during the commissioning period resulted in non-compliance. The new works is now fully operational.

## **Dunore Point**

There are two discharges from this WTW, one from the sludge drying beds and the other from settlement tanks. These discharges have been subject to various operational problems. Water Service is currently investigating relocation of the discharges from the Dunore River to Lough Neagh, allowing greater dilution and therefore a less restrictive standard.

## **Forked Bridge**

There are two effluent discharges from this works, one from the sandwasher and one from settlement tanks. There are ongoing operational difficulties at this works, and Water Service is seeking to address these.

## **Lough Cowey**

Lough Cowey is an old works that has experienced operational difficulties associated with backwash discharges from the rapid gravity filters and also with the sludge treatment plant. The works is scheduled for upgrade, and, in the interim, Water Service is seeking to bring forward an upgrade of the sludge and effluent treatment plant to improve effluent compliance.

## **Lough Fea**

The works commenced discharging effluent in late 2000 and did not comply in 2001 as the requisite number of samples had not been taken.

## **Seagahan**

Compliance with the suspended solids parameter of the registered standard at this works has been variable as a result of operational difficulties. In 2001, effluent quality complied with the registered standard.

## **Silent Valley**

No effluent treatment is currently provided for the process effluent from this works.

## Registered Standards for Waste Water Treatment Works above a PE of 250

Name of Works	Biochemical Oxygen Demand		Suspended Solids		Ammonia		Total Phosphorus
	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	Upper Tier STD
Aghanloo	40		60				
Aghanloo 2	40	80	60	150	10	20	
Annahilt	20		30		10		
Annalong	<b>DES</b>		<b>DES</b>				
Annesborough	40		60				
Ardglass	20% Red		50% Red				
Armagh ★	15	50	25	70	12	40	2
Armoy	40		60		10		
Articlave	30		50				
Artigarvan New	40		60				
Augher	65		60				
Aughnacloy	60		60				
Ballinadolly	25		40				
Ballinamallard	40		60		12		
Ballycarry	30		45				
Ballycassidy	40		60				
Ballycastle	<b>DES</b>		<b>DES</b>				
Ballyclare ★	30	65	45	110	10	37	2
Ballygawley	40		60				
Ballygowan	15		30				
Ballyhalbert R/T	<b>DES</b>		<b>DES</b>				
Ballykelly	50		80				
Ballykinler	60		90				
Ballymartin	<b>DES</b>		<b>DES</b>				
Ballymena ★	30	65	50	125			2
Ballymoney \$	30		50		10		
Ballymonie	40		60		20		
Ballynacor ★	30	65	50		20	37	1
Ballynahinch	10	30	15	40	2.5	10	
Ballynure New	30		40		5		
Ballyrickard new \$	30	65	50	125			
Ballyrickard old \$	30	65	50	125			
Ballyronan	40		60		7.5		
Ballystrudder	150		150				
Ballywalter R/T	<b>DES</b>		<b>DES</b>				
Balnamore	40		60				
Banbridge ★	25	65	50	125			2
Belcoo	40		60				
Belfast \$	30		50				
Bellaghy	50		70				
Bellanaleck	40		60				
Belleek Western	40		60				
Benburb	40		60				

## Appendix B

Name of Works	Biochemical Oxygen Demand		Suspended Solids		Ammonia		Total Phosphorus
	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	Upper Tier STD
Benone	85		65				
Beragh	40		70				
Bessbrook	70		50				
Blackarch SO	<b>DES</b>		<b>DES</b>				
Blackwatertown	40		60				
Bangor/Briggs Rock \$	30	65	50				
Brookborough	60		70				
Bullays Hill ★	30	65	50	125			2
Bushmills	35		50		10		
Cabragh Dungannon	30		50		15		
Caledon	40		60				
Campsie	30		40				
Cargan	20		30		7.5		
Carnlough SO	<b>DES</b>		<b>DES</b>				
Carrickfergus \$	30	65	50				
Carrickmore	35		50				
Carrowdore	20		30				
Castle Archdale	40		60				
Castlecaulfield	40		60				
Castledawson	40		60				
Castlederg	70		70				
Castlerock SO	<b>DES</b>		<b>DES</b>				
Castlewellan	50		50				
Clady	60		80				
Clady (Northern)	40		60				
Claudy	40		60				
Clogh	40		60		15		
Clogher	40		60				
Clough	40		60		15		
Cloughmills	40		70				
Cloughy R/T	<b>DES</b>		<b>DES</b>				
Cluntorichardson	150		100				
Coagh	60		75				
Coalisland	35		50		10		
Coleraine \$	30	65	50				
Cookstown ★	30	65	50	125			2
Corkey	20		40		5		
Cranfield	<b>DES</b>		<b>DES</b>				
Creagh	50		90				
Crossgar Aeration	30		60				
Crossgar filter	30		60				
Crossmaglen	35		40				
Cullaville	70		70				
Cullyhanna	30		40		15		
Culmore \$	30	65	50	95	42		
Cushendall SO	<b>DES</b>		<b>DES</b>				
Cushendun SO	<b>DES</b>		<b>DES</b>				
Damolly	250		150				
Darkley	30		50		15		

## Appendix B

Name of Works	Biochemical Oxygen Demand		Suspended Solids		Ammonia		Total Phosphorus
	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	Upper Tier STD
Derrygonnelly	30		50				
Derryhale	40		60				
Derrylin	30		50		7.5		
Dervock	60		70				
Desertmartin	40		60		10		
Donagh	50		60				
Donaghadee \$	30	65	50				
Donaghmore	20		30		10		
Donemana	45		65				
Donneybrewer	40		90				
Downpatrick Aeration	20		60		5		
Drains Bay	<b>DES</b>		<b>DES</b>				
Draperstown	40		60				
Dromara	20		30		10		
Dromore	25		35				
Dromore Tyrone	40		70				
Drumahoe	30		60		10		
Drumaness	40		60				
Drumbeg	30		50				
Drumintee	5		15		5		
Drumlough	25		40				
Drumquin	40		60				
Drumsum	20		30		7.5		
Drumvalley	250		150				
Dundrum	45		55				
Dungiven	50		60				
Dunloy	15		25		5		
Dunmurry \$	10		25		2.5		
Edenderry	40		60				
Ederney	100		75				
Eglisk Dungannon	70		70				
Enniskillen/Silverhill ★	30	65	50				2
Feeney	15		40		7.5		
Fintona	40		50				
Fivemiletown	45		45				
Forkhill	70		80				
Garrison	40		60				
Garvagh	30		50		5		
Gilford	35		50		10		
Glenarm SO	<b>DES</b>		<b>DES</b>				
Glenavy	65		75				
Glenone	40		60				
Glenstall \$	30	65	50	125			
Glynn	160		110				
Gortin	60		65				
Gortnaghey	40		60		10		
Gravel Hill	40		60		10		
Greenisland/Greenlane	60		90				
Greyabbey	60		90				

## Appendix B

Name of Works	Biochemical Oxygen Demand		Suspended Solids		Ammonia		Total Phosphorus
	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	Upper Tier STD
Greysteel (large)	80		120				
Gulladuff	30		50		10		
Hamiltonsbawn	20		30		10		
Helens Bay	<b>DES</b>		<b>DES</b>				
Hillsborough	25		35				
Hilltown	40		60				
Irvinestown	20		30				
Jonesborough	40		60		7.5		
Keady	35		40				
Kesh	45		50				
Kilclief	<b>DES</b>		<b>DES</b>				
Kilcoo	10		15		5		
Kilkeel \$	30	65	50				
Killeen Dungannon	60		80				
Killen	40		60		15		
Killinchy	40		60				
Killough	250		250				
Killylea	75		75				
Killyleagh	30		100				
Killyman	30		50				
Kilrea	40		60				
Kinallen	40		60				
Kircubbin	150		150				
Lack	40		60				
Larne/Sandybay \$	30	65	50				
Laurelvale	50		50				
Lawrencetown	40		60				
Lenaderg	50		60				
Limavady \$	30		50		12		
Lisbarnet	20		30		5		
Lisbellaw	45		60				
Lisnarrick	70		100				
Lisnaskea ★	30	50	50	87.5	10	20	1
Loughbrickland	40		60		15		
Loughgall	40		60				
Loughguile	10		20		7.5		
Loughmacrory	10		15				
Loughries	20		30				
Lower Ballinderry	40		60		10		
Macosquin	15		25		7		
Maghaberry	40		50		10		
Maghera	25		45				
Magherafelt \$	25	65	45	110	5	20	1
Magheralin	60		50		15		
Magheramason	40		60				
Maguiresbridge	45		75				
Markethill	50		50				
Mayobridge	40		60		10		
Meigh	55		70				

## Appendix B

Name of Works	Biochemical Oxygen Demand		Suspended Solids		Ammonia		Total Phosphorus
	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	Upper Tier STD
Middletown	40		60				
Millisle R/T	<b>DES</b>		<b>DES</b>				
Antrim/Milltown ★	30	65	50		15	45	1
Moira	10		15		5		
Moneymore	25		40				
Moneyreagh	30		45				
Moorfields	40		60				
Mosside	40		60				
Mountfield	10		15		10		
Mountnorris	50		60				
Moy	40		60				
Moygashel ★	20	55	30	75	5	20	1
Mullaghbawn	40		60				
Mullaghglass 1	15		30		7.5		
Mullaghglass 2	15		30		7.5		
Mullinahoe	60		80				
New Holland \$	10	50	15	40	2.5	10	
New Mills	40		40				
Newcastle \$	30		50				
Newry \$	30	65	50	125			
Newtownbreda \$	15	50	30	75	5	20	
Newtownbutler	75		90				
Newtownhamilton	25		35		5		
Newtownstewart	55		60				
Omagh/Coneywarren \$	30	65	50	125			
Parkgate	40		60				
Plumbridge	70		70				
Pomeroy	30		40		7.5		
Portaferry	<b>DES</b>		<b>DES</b>				
Portavogie R/T	<b>DES</b>		<b>DES</b>				
Portballintrae SO \$	30	65	50				
Portglenone	60		120				
Portrush SO \$	30	65	50				
Portstewart SO	<b>DES</b>		<b>DES</b>				
Poyntzpass	15		30		7.5		
Raholp	20		30				
Randalstown	30		50				
Rasharkin	30		45				
Rathfriland	10	20	15	37.5	5	10	
Ravernette	55		70				
Richhill	30		40				
Rock	55		80				
Rosslea	80		90				
Roughfort	25		35		7.5		
Saintfield	25		45				
Sandholes	100		100				
Scarva	25		30		15		
Seaforde	30		50				
Seagoe ★	30	65	50				2

Name of Works	Biochemical Oxygen Demand		Suspended Solids		Ammonia		Total Phosphorus
	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	95%-ile STD	Upper Tier STD	Upper Tier STD
Seahill	150		150				
Seapatrick	40		60				
Seskinore	40		60				
Sion Mills	50		70				
Sixmilecross	40		60		20		
Spa	10		20		5		
Spamount	25		35		15		
Stewartstown	50		70				
Stoneyford	20		30		5		
Strabane \$	30	65	50				
Straid	40		60		10		
Strangford 1 and 2	40		60				
Stranocum	40		60				
Swatragh	35		55		10		
Tamlaght	40		60				
Tandragee ★	30	65	50	125			2
Templepatrick	70		90				
Tempo	70		95				
Tobermore	15		20				
Toome	70		70				
Trillick (new)	40	80	60	150			
Tullagharley \$	20	55	30	75	5	20	1
Tullywiggan	50		80				
Upper Ballinderry	40		60				
Upperlands (New)	40		60		20		
Waringstown	60		65				
Warrenpoint	50		70				
Whitecross	50		70				
Whitehouse \$	30	65	50				
Whitehead	<b>DES</b>		<b>DES</b>				
Whiterock	40		120				

★ Works that were required to comply with UWWT Regulations by 31 December 1998.

\$ Works that were required to comply with UWWT Regulations by 31 December 2000.

**DES** Descriptive Standards.

SO Sea Outfall

% Red Percentage reduction between influent quality and effluent quality

## Glossary:

Ammonia (NH <sub>4</sub> )	A chemical found in water often as a result of pollution by sewage effluents. High levels can adversely affect fish.
Biochemical Oxygen Demand (BOD)	A measure of polluting potential - BOD is a measure of the amount of oxygen required by bacteria or algae to break down the organic biodegradable material in sewage or effluent.
Chemical Oxygen Demand (COD)	A measure of all inorganic compounds that will remove oxygen from the receiving water.
Combined Sewer Overflow (CSO)	Channels which act as sewers during normal flow conditions. Under high flow conditions, such as during or after storms, these channels can either direct increased flows to storm-water storage tanks to prevent sewage treatment works being overloaded or to allow storm waste water to flow into surface waters.
Composite sample (24-hour)	A sample of effluent/influent waste water that represents the quality of that waste water passing the sampling point over a period of 24 hours. Equal volume, individual, hourly portions (or for flow proportional measuring, volumes proportional to the flow) are combined to form the sample.
Discharge Standard	A standard issued by EHS when permitting the discharge of effluent to a water-body. The standard lays down limits in order to minimise adverse effects on the receiving water. Registered standards specify the location of the discharge and the total volume of effluent permitted together with the appropriate discharge standards for the effluent. Discharge standards can impose limits on BOD and suspended solids, and, ammonia, nutrients, metals or other polluting substances.
Dry Weather Flow (DWF)	The minimum average daily flow that the sewerage system is likely to carry in dry weather. The DWF can be determined by the calculation: $DWF = PG + I + E$ where: P = population served G = water consumption per head per day I = Infiltration E = trade effluent flow to sewer
Effluent	Discharge from a sewage or water treatment works.
Emergency overflow (EO)	Outlet to permit discharge of sewage from a pumping station only in the event of a mechanical or electrical breakdown. Protects against out of sewer flooding including spillage into houses.
Eutrophication	Enrichment of waters by nutrients, especially nitrogen and/or phosphorus compounds, causing accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned.
Industrial Waste Water	Waste water from an industrial source.
Influent	Waste water flowing into a treatment works.
Look-up table	Table listing the maximum number of allowed exceedences per annum of a 95-percentile standard for various numbers of samples taken in a year.
mg/l	milligrams per litre - a measure of the concentration of a substance in liquid.
NOC	Normal Operating Condition. A clause in a registered discharge standard that allows for sample results to be discounted due to the works not operating normally. A works is considered not to be under normal operating conditions if it has been affected by adverse weather conditions, vandalism, or other uncontrollable major disruption.

Outfall	The structure or pipe that conveys the effluent to the point where it is discharged to the receiving water .
Percentile Limit	A numeric limit that must be achieved or bettered for at least some stated percentage of the time over a specified assessment period. A 95 percentile limit must be met for at least 95 per cent of a 12-month period (see Look-up table).
Population equivalent (PE)	A measure of the organic biodegradable load received at a waste water treatment works where one population equivalent (1PE) is equal to a biochemical oxygen demand of 60g of oxygen per day.
Preliminary treatment	The most basic treatment that waste water can receive, employing screens to remove visible solids and normally includes grit removal.
Primary treatment	Treatment of waste water by a physical and/or chemical process involving the settlement of suspended solids, or other processes in which the biochemical oxygen demand of the incoming sewage is reduced by at least 20% before discharge, and total suspended solids of the incoming waste water is reduced by at least 50%.
Public Register	Record of discharge standards and analysis of effluents and waters that are available for inspection by any member of the public. The Register can be viewed at Calvert House, Belfast.
Receiving Water	Body of water receiving a discharge.
Secondary Treatment	A higher level of treatment (than provided by primary treatment) of waste water generally involving a biological process followed by clarification or other process, in which the UWWT Directive's treatment standards for biochemical oxygen demand, chemical oxygen demand and suspended solids are respected. Secondary treatment is the normal standard for treatment of discharges under the Regulations.
Sewage (or urban waste water)	Generally a mixture of domestic waste water (from toilets, baths, sinks, and washing machines) with industrial waste water and surface run-off.
Sewerage collection system	A system of pipes and ducting which collects and transports waste water.
Spot sample	A sample of effluent/influent representing the quality of the effluent/influent at the instant that the sample is obtained.
Suspended Solids (SS)	Solid matter, including food waste, faeces, condoms and sanitary items found in sewage that can be removed by settlement.
Tertiary or "more stringent" treatment	A higher level of treatment than secondary, involving the removal of specific polluting matter such as: nutrients (nitrogen and/or phosphorus), micro-organisms or toxic substances.
Total Nitrogen (Total N)	Is a measure of all compounds that contain nitrogen which, if present, can result in eutrophication in marine waters.
Total Phosphorus (Total P)	Is a measure of all compounds containing phosphorus which, if present, can result in eutrophication in freshwaters.
Treatment levels	Waste water is treated to various levels: they are: preliminary, primary, secondary and tertiary. Each level of treatment following preliminary treatment builds on the previous treatment level.
UKAS	United Kingdom Accreditation Service. An accreditation body which ensures that quality standards are met for both analysis and measurement.
Upper Tier Standard	An absolute limit, generally a multiple of the 95 percentile limit, that may be included with the 95-percentile in the discharge standard for sewage treatment works.
Water Treatment Works (WTW)	Plant where a natural water source is treated to provide drinking water for domestic consumption before discharge to the environment
Waste Water Treatment Works (WWTW)	Plant where sewage/waste water is received for treatment before discharge to the environment.

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*Our aim is to protect and conserve the natural and built environment and to promote its appreciation for the benefit of present and future generations.*

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