Environmental Standards Scotland
Ìrean Àrainneachdail na h-Alba

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06 June 2025

Dear [redacted]

Response to information request – full disclosure - Reference ESS.IR.006

I am writing in response to your email of 30 May 2025. The information you requested is as follows:

- In your report into sewage overflows in Scotland, a mention is made of the Urban Waste Water Treatment Regulations Guidance Note (citation no 85 in the report), but it is noted that it is no longer publicly available online, could you please provide a copy of this document.

As the information you have requested is 'environmental information' for the purposes of the Environmental Information (Scotland) Regulations 2004 (EIRs), we are required to deal with your request under those Regulations. We are applying the exemption at section 39(2) of the Freedom of Information (Scotland) Act 2002 (FOISA), so that we do not also have to deal with your request under FOISA. This exemption is subject to the public interest test. Therefore, taking account of all the circumstances of this case, we have considered if the public interest in disclosing the information outweighs the public interest in applying the exemption. We have found that, on balance, the public interest lies in favour of upholding the exemption as there is no public interest in dealing with the same request under two different regimes. This is essentially a technical point and has no material effect on the outcome of your request.

I am pleased to enclose a copy of: 'The Urban Waste Water Treatment (Scotland) Regulations 1994, A Working Document for Dischargers and Regulators, A Guidance Note, 1998.' This is a full disclosure of all the information requested.

Right to seek a review

While we believe we have complied with your information request in full, if you are unhappy with this response to your request under the EIRs, you may ask us to carry out an internal review of the response by writing to:

Chief Executive Officer
Environmental Standards Scotland
Thistle House
91 Haymarket Terrace Edinburgh
EH12 5HD
Email foi@environmentalstandards.scot

Your review request should explain why you are dissatisfied with this response and should be made within 40 working days from the date when you received this letter. We will issue a full response to your request for review within 20 working days of receiving it.

Yours sincerely

[redacted]

[redacted]

Freedom of Information Officer
Environmental Standards Scotland

THE URBAN WASTE WATER TREATMENT (SCOTLAND) REGULATIONS 1994

A WORKING DOCUMENT FOR DISCHARGERS AND REGULATORS

A GUIDANCE NOTE ISSUED BY THE SCOTTISH OFFICE AGRICULTURE, ENVIRONMENT AND FISHERIES DEPARTMENT

February 1998

Instructions for use

- **Headings in blue text are hyperlinks to associated pages**
- **Click on ▲ to return to the Index page**

Erratum Sheet

Guidance, Section 3.5

In the last line, the population equivalent should read 0.06kg BOD/head /day

Appendix H2.1

In the second last box from the bottom on the right hand side ‘Soilids’ should read ‘Solids’.

Appendix H2.2

The title should read “Aesthetic Control Requirements for CSO’s into Inland Waters, Coastal Waters and Estuaries.

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THE URBAN WASTE WATER TREATMENT (SCOTLAND) REGULATIONS 1994

A GUIDANCE NOTE[1] ISSUED BY THE SCOTTISH OFFICE AGRICULTURE, ENVIRONMENT AND FISHERIES DEPARTMENT AS A WORKING DOCUMENT FOR DISCHARGERS AND REGULATORS

1. INTRODUCTION

1.1 The Secretary of State considers that it will be useful, particularly for water authorities and other dischargers and for the Scottish Environment Protection Agency (SEPA) to have available to them some guidance on the implementation and interpretation of the Urban Waste Water Treatment (Scotland) Regulations 1994.

1.2 The European Commission's (EC) draft proposal for a directive concerning municipal waste water treatment (later to be known as the Urban Waste Water Treatment Directive) was published by the EC in late 1989 and adopted by the Council in May 1991. It is this Directive that these Regulations transpose into legislation for Scotland.

1.3 The main objective of the Urban Waste Water Treatment (UWWT) Directive is to ensure that all significant discharges of sewage are treated before they are discharged either to inland surface waters, groundwaters, estuaries or coastal waters. For the purpose of the Directive, significant discharges are those to fresh waters or to estuaries serving agglomerations with population equivalents (sometimes abbreviated as pe) of more than 2,000, or those to coastal waters serving agglomerations with population equivalents of more than 10,000. Sewage will normally be treated to secondary treatment (normally a biological process) standards, but in estuarine and coastal areas with high natural dispersion characteristics primary treatment is acceptable in certain cases. Discharges into areas identified as "sensitive" will require more stringent treatment than the secondary treatment specified in the Directive. Among other things, the Directive requires appropriate treatment to be provided for discharges from smaller agglomerations and also brings to an end to the disposal of sewage sludge at sea.

1.4 The compliance dates given in the Directive range from 1998 to 2005 depending on the size of the agglomeration and location of the discharge. Separate provisions in the Directive refer to a number of industrial sectors, the discharges from which, in terms of Biochemical Oxygen Demand (BOD) and suspended solids (SS), are of a similar nature to domestic sewage.

2. THE REGULATIONS: GENERAL

2.1 The Urban Waste Water Treatment (Scotland) Regulations 1994 (SI 1994 No 2842) transpose into legislation the requirements of the Urban Waste Water Treatment Directive (91/271/EEC). Although their order is different from the Articles of the Directive, the Regulations, for the most part, adopt the wording of the Directive. The Secretary of State considers that some

[1] This Guidance is intended to be a 'living' document, which will need to be updated from time to time to reflect changes in legislation or experience gained in matters of practical implementations.

parts of the Regulations require a degree of interpretation. The purpose of the following guidance is therefore to advise organisations, in particular operators of sewage treatment works, water authorities and the environmental regulator (the Scottish Environment Protection Agency, SEPA), on the implementation of the Regulations. Much of the guidance has been drawn up with the assistance or advice of the River Purification Authorities (RPAs) and SEPA, into which the RPAs were subsumed on 1 April 1996; Government Departments; and the water authorities who are the statutory sewerage authorities. They have all agreed its detail.

Status of Guidance Note

2.2 It must be borne in mind that only the Courts can give authoritative decisions on interpretation of the Regulations. This guidance note has been produced as a working document for distribution to dischargers and regulators. It is, however, available on request from the Agriculture, Environment and Fisheries Department of The Scottish Office. This guidance note does not have statutory force and it may be updated and amended to reflect experience gained in the practical implementation of the Regulations. In addition, an EC Committee with a regulatory role (henceforth referred to as the Regulatory Committee) has also been set up under the terms of the Directive to oversee its implementation. This will continue to provide a forum for discussing interpretation of the Directive's requirements and the exchange of ideas with other Member States. Should the Regulatory Committee propose and adopt amendments to those parts of the Directive with which it is concerned, or reach formal decisions about interpretation of any similar requirement of the Directive, its decisions will be the subject of further guidance as appropriate.

3. REGULATION 2: INTERPRETATION

3.1 **Local Authority**: the Regulations define "local authority" as having the same meaning as in the Sewerage (Scotland) Act 1968 which was amended by Schedule 13 of the Local Government (Scotland) Act 1994. The term "sewerage authority" is therefore used in this guidance note instead of local authority.

3.2 **River Purification Authority**: the Regulations refer to the River Purification Authorities which were subsumed into SEPA on its establishment on 1 April 1996. Transitional provisions in the Environment Act 1995 ensure that all references to the River Purification Authorities in existing legislation should be read as being SEPA.

3.3 **Estuary**: the maps showing the upper and outer limits of estuaries (see Regulation 12(a)) have been drawn up by the Department and are available for public inspection at SEPA offices. The outer limits have been determined, taking into account the advice of SEPA, as either:

3.1.1 - a line between such topographical features as define the outer boundary of the estuary; or

3.1.2 - the place where the waters on a depth averaged basis have a salinity of 95% of the adjacent sea water for 95% of the time.

3.4 **Agglomeration**: the calculation of "agglomeration" populations is critical to the interpretation of Regulation 4(2) covering the sewerage network (and associated storm sewage discharges) and Regulations 5(1), 5(2), 5(5) and 5(7) covering treatment provision for continuous discharges. The definition of "agglomeration" must be consistent across all these regulations. Annex A to this guidance note defined the methodology applied for different types of identified agglomerations. This presents a pragmatic approach and sewerage operators will be required to respect the integrity of the arrangements by avoiding artificial sub-division of discharges to circumvent particular treatment requirements.

3.5 **Population Equivalent**: this is a calculation of the size of a discharge based on organic biodegradable load. It includes trade effluent discharges, and reflects, *inter alia*, the size of the agglomeration population at the time of its highest load - eg the height of the holiday season for coastal resorts - excluding unusual situations such as those due to the effect of heavy rain. The population equivalent is usually quoted as 0.6kg BOD/head/day.

4. REGULATION 3: SENSITIVE AREAS AND HIGH NATURAL DISPERSION AREAS

Identification

4.1 The identification of sensitive areas and areas with high natural dispersion characteristics (HNDA's) was undertaken in accordance with the criteria set out in Schedule 1 of the Regulations. Those criteria have been elaborated as indicated in Annex B to the Department's Consultation Document entitled "Methodology for Identifying Sensitive Areas (Urban Waste Water Treatment Directive) and Designating Vulnerable Zones (Nitrates Directive) in Scotland" published on 2 April 1993. The Directive uses the term "less sensitive areas". However, the criteria for identification of such areas actually relates to their good water exchange, which makes them less vulnerable to any harmful effects from discharges. The term used in the Regulations therefore refers to these high natural dispersion characteristics and the term High Natural Dispersion area has been substituted for less sensitive area in Annex B and elsewhere in this document.

4.2 Regulation 3(1) refers to those areas which the Secretary of State has identified as sensitive areas and areas with high natural dispersion characteristics. The RPAs first proposed candidate areas to the Secretary of State based on the criteria as elaborated. The Secretary of State then formally identified both sensitive areas and high natural dispersion areas having considered the RPAs' expert advice. Maps showing the location and limits of identified areas have been deposited with SEPA by the Secretary of State in accordance with Regulation 3(1).

4.3 The Secretary of State did not consider it necessary to identify any sensitive areas under the Regulations for the purpose of fulfilling other Directives.

Review

4.4 Regulation 3(2) requires that the Secretary of State shall review the identification of sensitive areas and HNDAs at intervals of no more than four years. SEPA will make recommendations to the Secretary of State for any revisions or additions to the existing identified sensitive areas and HNDAs and has carried out the first such review which was due by 31 December 1997.

5. REGULATION 4: DUTY TO PROVIDE AND MAINTAIN COLLECTING SYSTEMS AND TREATMENT PLANTS

Provision and maintenance of collecting systems

5.1 Regulation 4(1) requires the sewerage authorities to ensure that collecting systems are provided by the dates specified and that they satisfy certain standards as to design and other matters. Each date specified reflects the Directive's requirements according to the size of the agglomeration and the nature and sensitivity of the receiving waters.

5.2 The standards for the design, construction, operation and maintenance of collecting systems which are to apply to the systems themselves are set out in Schedule 2 to the Regulations. The provisions mirror the Directive, which sets out minimum standards, and does not prescribe how they might be achieved. Annex B to this guidance document gives some practical and useful elaboration. It lists reference material which together reflects current practice in Scotland and which the Secretary of State considers should be used as guidelines for satisfying the requirements of the Regulations. There will of course be continuing developments in technology and the guidance should not be seen as in any way restricting the sewerage authorities in their use of new or equally adequate advice or technology.

Exceptions to the requirement to provide collecting systems

5.3 Regulation 4(2) provides that where no environmental benefit will accrue or where excessive costs will be incurred, no collecting system need be provided. This is subject to the provision of alternative systems and to certain additional safeguards. Those safeguards require the sewerage authority first to obtain from SEPA or the Secretary of State a certificate confirming that the exceptional circumstances claimed do indeed exist. In practice, the sewerage authority will be expected first to apply to SEPA for a certificate that a collecting system will produce no environmental benefit. If it is refused and a case can be made for an exception on the grounds of cost, then that case may be put to the Secretary of State. The Secretary of State will normally seek SEPA's view before considering applications on the grounds of cost.

Provision of treatment plants

5.4 Regulation 4(3) imposes a duty on sewerage authorities to provide sewage treatment plants as specified in Regulation 5 and to ensure that urban waste water entering them is treated as so specified.

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Standards for treatment plants

5.5 Regulation 4 (3)(a) sets out requirements in relation to the design, construction, operation and maintenance of sewage treatment works. The requirement is that standards should "ensure sufficient performance under all normal local climatic conditions". Sufficient performance means performance which will achieve compliance with the treatment standards set out in the Regulations. Once again, however, the Regulations give no indication of the design standards that will achieve the objective. Therefore, the Secretary of State has provided guidelines at Annex C, along with those relating to collecting systems, and on the same flexible basis. In addition, the definition of unusual weather conditions in Annex L is relevant.

Re-use and disposal of sewage sludge and treated waste water

5.6 Regulation 4(3)(b) imposes a duty on sewerage authorities to ensure that treated waste water and sludge are re-used whenever appropriate. Annex D lists the relevant legislative controls already in existence. In addition it gives details of a Code of Practice for Agricultural Use of Sewage Sludge.

5.7 Regulation 4(3)(c) imposes a further duty on sewerage authorities to ensure that disposal routes for treated waste water and sludge minimise the effects on the environment. The Secretary of State takes this requirement to mean, in relation to sludge, that the overall combination of disposal routes chosen (eg incineration, landfill, agricultural spreading) must minimise the adverse effects on the environment. The new duty is consistent with sewerage authorities' existing general duty under Section 1 of the Sewerage (Scotland) Act 1968 to provide sewerage systems, together with their existing responsibility for disposing of the sludge that they produce and the selection of disposal routes.

5.8 The disposal of treated waste water is normally to inland, marine or ground waters, the discharge into which is regulated and enforced through SEPA's consenting procedures. This procedure is already imbedded in the Control of Pollution Act 1974 and SEPA's Discharge Consents Manual describes it in detail (Appendix J.1).

6. REGULATION 5: REQUIREMENTS AS TO PROVISION OF TREATMENT

6.1 When considering the various requirements for discharge standards, readers should also note the explanation of those standards as set out in Schedule 3, which is given later in this Guidance Note.

Provision of the "normal" level of secondary treatment

6.2 Regulation 5(1) sets out the dates by which sewage discharges of various sizes must be subjected to secondary treatment, as defined in Regulation 2(1), if the receiving waters have not been identified as either sensitive areas or HNDA's. An application may be made for an extension, a maximum of 5 years, of the earlier specified time limit of 31 December 2000 in exceptional cases due to technical problems. Regulation 5(1)(a) additionally ensures that, should the European

Commission agree to an extension of time for compliance, this would not result in a breach of national legislation.

Provision of more stringent treatment than secondary treatment in sensitive areas

6.3 Regulation 5(2) requires that where there is a discharge from an agglomeration greater than 10,000 pe affecting a sensitive area, treatment more stringent than secondary treatment must be provided by 31 December 1998. Where the waters are identified as sensitive by the criterion of eutrophication, the removal of nitrogen or phosphorus or both may be required to meet the standards set out in Schedule 3, Part 1, Table 2, subject to an assessment of whether that would have any affect, in accordance with Schedule 1, Part 1(a)(i) and (ii).

6.4 In the case of areas identified as sensitive on the basis of the nitrate levels in surface waters abstracted for drinking water, "more stringent" treatment might involve some form of nitrogen removal. Action taken simultaneously under measures required by the EC Directive concerning the protection of waters against pollution caused by nitrates from agricultural sources will also contribute to the reduction in nitrate levels. Decisions as to the degree of nitrogen removal required at sewage treatment works serving an agglomeration with a population equivalent greater than 10,000 will be taken by SEPA on a catchment by catchment basis.

Alternative measures in sensitive areas

6.5 Regulation 5(3) allows an alternative approach based on an overall reduction of both the phosphorus and nitrogen content of discharges to a sensitive area. If both the phosphorus and nitrogen content of the combined load entering all sewage treatment works in a sensitive area can be reduced by 75% - ie both the phosphorus and nitrogen content of the combined discharges to the receiving waters is reduced to no more than 25% of that which entered all the works taken together - then the requirement to install more stringent treatment at individual sewage treatment works serving an agglomeration with a population equivalent greater than 10,000 in the sensitive area, need not apply. In practice, this overall reduction in nutrients may be achieved by selecting a number of sewage treatment works, of any size, to receive more stringent treatment. It will be for SEPA to certify its satisfaction that the minimum percentage reduction is achieved.

6.6 Regulation 5(4) provides that, where, following a review, new sensitive areas are identified or HNDAs cease to be so identified, the discharges into the waters concerned must be brought up to the required standards within seven years. (If the seventh anniversary of the change in status falls before the relevant date specified in Regulation 5(1), however, the deadline is the later Regulation 5(1) date. For example if an area into which an agglomeration of 12,000 pe discharges ceases to be a HNDA on 31 December 1997, the seventh anniversary would be 31 December 2004 whereas the Regulation 5(1) date would be 31 December 2005. In this case, secondary treatment or an equivalent treatment would not have to be provided until 31 December 2005.) The length of this period reflects the need to provide new or upgraded sewage treatment facilities, including the time needed to obtain planning permission and to construct and fit out works.

Provision of less stringent treatment than secondary treatment in High Natural Dispersion Areas

6.7 Regulation 5(5) allows discharges to receive less stringent treatment than secondary treatment, but at least primary treatment, where the receiving waters have been identified as having high natural dispersion characteristics. The deadline for the provision of such treatment is that which would otherwise have applied under Regulation 5(1) for the provision of secondary treatment. A definition of primary treatment is given in Regulation 5(8)(b) and expanded in Annex E to this guidance note. The acceptance of this lower level of treatment is dependent on SEPA having certified that it is satisfied that comprehensive studies have indicated that there will be no adverse effect on the environment. The Department has considered, with advice from the Marine Pollution Monitoring and Management Group, proposals concerning the comprehensive studies that must be undertaken and details are given in Annex F. This Group comprises representatives of organisations responsible for monitoring the marine environment. It advises the Secretary of State on related matters. The studies are being carried out according to the format published by the Group. They will be carried out by the dischargers or consultants engaged for the purpose at the dischargers expense.

6.8 When it has been established that an effluent discharges into a HNDA, identified according to the agreed criteria referred to in paragraph 4.1, then comprehensive studies into the effects of the discharge are carried out. Only when SEPA is satisfied that the study shows that the provision of primary treatment will not adversely affect the environment, can it issue a consent for primary treatment only. If SEPA is not satisfied, following analysis of the results of any study, that a primary treated discharge will have no adverse environmental effect, then secondary treatment will be required to be installed for the discharge in question. Annex F also provides an explanation of the relationship between the identification of HNDAs and comprehensive studies into the effects of discharges into those identified areas.

6.9 Where SEPA considers that a comprehensive study indicates that providing secondary treatment for a discharge into coastal waters identified as an HNDA, from an agglomeration with a population equivalent greater than 150,000, will not produce any environmental benefit, primary treatment can be allowed if the European Commission gives its consent. Such applications to provide only primary treatment following a comprehensive study will be made by SEPA to the Secretary of State in the first instance. If he is minded to agree the request, it is he who will make a formal application to the Commission for a minimum of primary treatment to be permitted for the discharge

6.10 Agglomerations with a population equivalent of 2,000 or more are required by Regulation 4(2) to have collecting systems. Smaller agglomerations do not need to have collecting systems, but where collecting systems have nevertheless been provided, Regulation 5(7) requires the provision of appropriate treatment for the associated discharges. The provision of appropriate treatment is also required for coastal discharges of less than 10,000pe.

6.11 The definition of "appropriate treatment" given in Regulation 5(8)(a), however, relies on "relevant quality objectives" for the receiving waters. No quality objectives for receiving waters are laid down in the Urban Waste Water Treatment Directive, but other relevant Directives containing water quality objectives are laid down in Appendix G1. SEPA intend to adhere to its Consent

Conditions Manual as detailed in Appendix J.1 when setting consents for treatment for the small discharges addressed by this Regulation.

7. REGULATION 6: DISCHARGES OF TREATED URBAN WASTE WATER

Treatment standards for discharges from ALL sewage treatment works

7.1 Regulation 6(1) sets out the requirements for treatment standards for all discharges from sewage treatment works. The requirements applicable to discharges into waters of varying sensitivities are indicated in Part I of Schedule 3 which is addressed later in this guidance note. The requirements apply equally whether or not works are operated by the sewerage authorities. In this context, it is relevant to note that establishments which have historically benefited from Crown Exemption will be required to comply fully with the terms of the Regulations. Regulations are currently being drafted to commence Schedule 21 of the Environment Act 1995, removing Crown Exemption and it is expected to come into force in early 1998.

Discharge consents

7.2 Regulation 6(2) places a duty on SEPA to ensure, through their discharge consenting powers, that the relevant treatment standards are met for all discharges from sewage treatment works; that pollution from combined sewer overflows is limited (see Annex H); that sewage sludge is not discharged through pipelines to surface waters after 31 December 1998 and that both the amount of and the harmful contaminants in the sludge are progressively reduced until that date. Because the consenting procedures are already embodied in legislation under the Control of Pollution Act 1974 (COPA), as amended by the Water Resources Act 1989 and the Environment Act 1995, and because those provisions include enforcement powers and provide for significant penalties in respect of any breach of water pollution legislation, those same powers of enforcement and penalties on conviction will apply to breaches of these Regulations. SEPA's Consent Conditions Manual incorporates its' policy and practices in discharging its duties under the Control of Pollution Act 1974 (Appendix J.1).

7.3 Regulation 6(3) and (4) provide that SEPA should review regularly the discharge consents they give to achieve compliance with these Regulations and that, in so doing, the requirements of these Regulations will override existing legislative restrictions on their powers of review. This provision is necessary, eg, to accommodate any changes made to the UWWT Directive standards by the EC's Regulatory Committee. In most circumstances, the Secretary of State does not expect that reviews will be carried out at intervals of less than four years. The existing restrictions on the time allowed for reviewing consents will remain in force in relation to matters unconnected with the requirements of these Regulations.

7.4 The requirements of the Directive will be brought into effect by means of a clause in a discharge consent given under the Control of Pollution Act. The format for a standard condition to be included in consents for this purpose is given in Appendix J.1.

7.5 In relation to matters unconnected with these Regulations, SEPA's consenting and enforcement powers are restricted to "controlled waters". The definition of "controlled waters" contained in Section 30A of the Control of Pollution Act 1974, as amended, excludes lochs and ponds which do not drain into rivers, although SEPA can control discharges into isolated lochs or ponds by the use of Prohibition Notices. The effect of Regulation 6(5) is that a consent will be required for the discharge of sewage effluent from treatment plants to any inland freshwaters.

8. REGULATION 7: DISCHARGES OF INDUSTRIAL WASTE WATER TO COLLECTING SYSTEMS OR TREATMENT PLANTS

Consenting industrial discharges to sewer

8.1 Regulation 7(1) places all those who have power to consent, or review, or make agreements with industrial dischargers, as to matter permitted to be discharged to collecting systems or sewage treatment works, under a duty to ensure that those discharges meet the requirements set out in Schedule 4. In so far as the Secretary of State is bound by this duty, so shall the sewerage authority be bound in exercising relevant functions on the Secretary of State's behalf.

8.2 Annex I to this guidance note explains that the current practice in Scotland fits well with the requirements of this regulation and the objectives of Schedule 4.

8.3 Regulation 7(2) - (6) provides that none of the conditions of consent set out in the Sewerage (Scotland) Act 1968 shall be taken as restricting the conditions that may be imposed to secure compliance with these Regulations; that relevant agreements entered into under that Act will have no force unless their provisions secure compliance with these Regulations; and, to mirror Regulation 6(3) and 6(4), that sewerage authorities should review regularly their consents and authorisations given to achieve compliance with these Regulations and that, in so doing, the requirements of these Regulations will override existing legislative restrictions on their powers of review. In most circumstances, in line with these restrictions, the Secretary of State would not expect reviews to be carried out at intervals of less than two years. Similarly, the existing restrictions on the time within which a review is allowed will remain in force in relation to matters unconnected with the requirements of these Regulations.

9. REGULATION 8: DISCHARGES OF CERTAIN INDUSTRIAL WASTE WATER INTO RECEIVING WATERS

9.1 The EC's Regulatory Committee has considered the existing consenting regimes for industrial discharges direct to receiving waters which are administered by the regulatory authorities in the UK. The UK stressed to the Committee, in particular, the merits of considering applications for consent to discharge trade effluent on a case by case basis, thus ensuring that conditions are always set which are appropriate to the nature of the effluent and to the type and nature of the receiving water. The Commission acknowledged that such arrangements fulfil the requirements of Article 13 of the UWWT Directive (Regulation 8).

9.2 It is therefore proposed that the industrial sectors' discharges covered by Regulation 8 and Schedule 5 should continue to be dealt with under the existing regulatory regime where SEPA considers each consent application on a case by case basis and sets conditions accordingly. SEPA will check existing conditions to ensure that they are consistent with the requirements of the Regulations.

10. REGULATION 9: DUMPING OF SLUDGE FROM SHIPS

10.1 For the purposes of Regulation 9, it is The Scottish Office Agriculture, Environment and Fisheries Department, which is the licensing authority under the Food and Environment Protection Act 1985, which is thereby placed under a duty to ensure that the dumping of sewage sludge at sea ceases by 31 December 1998 and that, in the meantime the load of sewage sludge and, the load of potentially harmful contaminants in the sewage sludge are progressively reduced.

11. REGULATION 10: SAMPLES AND RECORDS

Automatic composite samples

11.1 The effect of Regulation 10 is to allow SEPA to include in discharge consents conditions which will require the use of automatic sampling by apparatus provided by the operator of the sewage treatment works. The Regulations mirror the Directive's requirement for composite samples (Schedule 3 Part II paragraph 2(a) -"Flow-proportional or time-based 24-hour samples") which can only reasonably be taken by automated means.

11.2 Regulation 10(4) links the concept of composite samples, taken mechanically, to the traditional sampling regime which is currently followed by SEPA under the terms of existing pollution control legislation.

12. REGULATION 11: MONITORING

12.1 Regulation 11(1) and (2) place both SEPA and The Scottish Office Agriculture Environment and Fisheries Department (SOAEFD) under a duty to monitor, as set out in Schedule 3, such of the environmental requirements of the Regulations as are relevant to their functions. The Regulation enables SEPA and SOAEFD to "procure monitoring" by using agents to undertake the necessary monitoring and studies. Under the terms of the Regulations those agents must be competent authorities or appropriate bodies. However it will be for SEPA and SOAEFD to judge whether this is so in particular circumstances. Guidelines on monitoring of discharges which are considered appropriate for Scotland are set out in Annex K to this guidance note.

12.2 Monitoring information is required to be made available to the Commission within six months of a request from them. Regulation 11(3) requires that such monitoring information should be retained by SEPA and SOAEFD. This applies whether the information was originally obtained by them or by a competent authority or appropriate body on their behalf. This information is required

to be made available to the Secretary of State on request, for the purpose of complying with this obligation.

13. REGULATION 12: DEPOSIT OF MAPS AND CERTIFICATES

13.1 Regulation 12 requires SEPA to keep and make available to the public, maps showing the limits of estuaries; maps showing the location of sensitive areas and HNDA's; and all certificates issued by them in connection with their functions under the Regulations.

14. REGULATION 13: INFORMATION AND ASSISTANCE REQUIRED IN CONNECTION WITH CONTROL OF POLLUTION

14.1 Member States are required by the Directive to establish a programme for the implementation of the Directive in accordance with Article 17 and to provide information about the programme to the European Commission. The first UK report under Article 17 was submitted to the Commission in November 1994 in the format agreed by the EC Regulatory Committee. The programme is a vehicle whereby the water authorities establish investment priorities for provision of collecting systems and sewage treatment to the Directive's standards and establish timetables for construction and other necessary procedures so that standards are met by the due dates. Additionally, Article 16 of the Directive requires situation reports to be published and to be transmitted to the European Commission. The first such situation report under Article 16 was published in the UK in March 1996.

14.2 It will be necessary to gather information from SEPA and the sewerage authorities in order to fulfil the obligation to update the implementation programme as necessary and to publish situation reports at two yearly intervals. Regulation 13 emphasises the Secretary of State's existing powers to request information for the purposes of carrying out his functions and to put beyond doubt the fact that provision of this information to the Commission is a relevant function in relation to those powers.

15. REGULATION 14: ENFORCEMENT OF DUTIES IMPOSED ON SEWERAGE AUTHORITIES

15.1 Regulation 14 reflects the obligation placed on the Secretary of State to ensure that Scotland's contribution to UK compliance with the Directive is achieved.

16. SCHEDULE 1: CRITERIA FOR IDENTIFICATION OF SENSITIVE AREAS AND HIGH NATURAL DISPERSION AREAS

Sensitive areas

16.1 The criteria and procedures for identifying sensitive areas are set out in Part I of Schedule 1 and were the subject of a consultation paper published by the Secretary of State in the spring of

1992. The consultation was undertaken as an acknowledgement of the fact that the criteria in the Directive were given in only the broadest terms. In particular, it was recognised that eutrophication, being one of those broad criteria, describes a process rather than a state and studies have shown that it is influenced by a number of factors. One of the consultation paper's aims was to seek a measure of agreement on an expanded and more scientific definition of "eutrophic". The criteria agreed following this consultation are set out in Annex B to this guidance.

High natural dispersion areas

16.2 The criteria for identifying HNDAs are set out in Part II of Schedule 1 of the Regulations and were the subject of the same consultation exercise referred to in paragraph 16.1 although they were referred to there as "less sensitive areas" (see paragraph 4.1 above). The format of the comprehensive studies has been referred to in paragraph 6.8 above.

17. SCHEDULE 2: REQUIREMENTS FOR COLLECTING SYSTEMS

Treatment requirements for waste water

17.1 Collecting systems are required, by paragraph 1 of Schedule 2, to take into account waste water treatment requirements.

Design standards, etc

17.2 Paragraph 2 of Schedule 2 sets out broad requirements for the design, construction and maintenance of collecting systems. The design and construction requirements apply only to the construction of new sewers or sewers being refurbished. The requirements as to "best technical knowledge not entailing excessive costs" are taken into account in the list of documents in Annex A setting out current practice in Scotland. In addition, the considerations set out in Annex E to this paper will govern the limitation of pollution from storm water overflows.

18. SCHEDULE 3: REQUIREMENTS FOR DISCHARGES FROM TREATMENT PLANTS AND REFERENCE METHODS FOR MONITORING AND EVALUATION OF RESULTS

Requirements for discharges

18.1 Part I of Schedule 3 sets out requirements for treatment of discharges from all waste water treatment plants. Those set out in paragraphs 1 and 5 are applicable to all discharges, whatever level of treatment is to be provided. The existing discharge consenting procedure already takes account of the location of discharge points.

18.2 The requirements in paragraph 2 relate to discharges which are to receive either the norm of secondary treatment, or treatment more stringent than that because they discharge into sensitive areas. The requirements in paragraph 3 relate specifically to discharges into areas identified as

sensitive by reason of eutrophication. Paragraph 4 applies where more stringent requirements are needed to ensure that the receiving waters satisfy any other relevant Council Directives.

Table 1

18.3 The requirements to meet the standards set out in the Regulations will be included in discharge consents and standard clauses are shown in Annex J.

18.4 Either values for concentration or for percentage reduction may be used as a basis for measurement of compliance with Table 1. There is little operational experience in the UK relating to the use of COD as a control parameter for sewage works. Investigations of the limited data available appear to indicate that the concentration value approach is satisfactory for most sewage treatment works. However, there will be occasions when, although meeting the 25 mg/l BOD limit, it will be difficult for the works to conform to the COD value of 125 mg/l. This will be, for instance, when the discharge has an unusual trade effluent content.

18.5 Table 1 of Annex 1 in the Directive offers suspended solids as an optional parameter. The Secretary of State has decided not to include suspended solids in Table 1 of Schedule 3 in the Regulations. SEPA will continue to include suspended solids in consents where there are good environmental reasons for so doing. In these circumstances, compliance with the consents parameter will not be taken into account for determining compliance with the Directive.

Table 2

18.6 There is sufficient confusion as to the meaning of footnote [(3)] to Table 2 of Annex 1 of the Directive that the Regulatory Committee are continuing to consider a means of clarification. Their advice will be the subject of further guidance in due course. In the meantime, this footnote has been excluded from the Regulations and the revised version will be added by means of an amendment to these Regulations once the Committee has reached agreement.

Reference methods for monitoring and evaluation

Composite and spot samples

18.7 Paragraph 2(a) of Part II of Schedule 3 requires composite samples to be taken. This is a departure from SEPA's current normal practice for COPA purposes which relies on spot samples. Annex J sets out the monitoring and control procedures that will apply.

Normal operating conditions

18.8 Paragraph 4 (b) of Part II of Schedule 3 makes reference to "normal operating conditions" and paragraph 5 refers to "unusual situations such as those due to heavy rain". In addition, Regulation 4(3)(a) requires treatment plants to perform sufficiently "under normal local climatic conditions". Annex L to this guidance note sets out the Secretary of State's views as to what "abnormal conditions", "unusual situations" and "exceptional weather conditions" will be taken to

mean, to aid interpretation of the exceptional circumstances when the norms of the Regulations need not apply.

18.9 Appendix J.1 also records the wording that SEPA have agreed will be introduced into their discharge consent conditions for all sewage treatment works to allow for unusual weather conditions. The consents will thus apply the provisions relating to exceptional weather to all parameters measured, even where they are not required to be measured by the Directive. The registers established under the Control of Pollution (Registers) (Scotland) Regulations 1993 will record if sewerage authorities claim unusual conditions, and whether this claim is accepted or disputed by SEPA.

19. SCHEDULE 4: INDUSTRIAL WASTE WATER

19.1 This Schedule sets out requirements in relation to discharges to sewer of industrial waste water. As explained in paragraph 8.2, the present practice described in Annex I fulfils the requirement of the Regulations.

20. SCHEDULE 5: INDUSTRIAL SECTORS REFERRED TO IN REGULATION 8

20.1 This schedule lists those industrial sectors whose direct discharges to waters are subject to the provision of the Regulations. As explained in Paragraph 9.2, existing consenting procedures will continue to be used with standards set on a case by case basis.

INTERPRETATION OF AGGLOMERATION

DEFINITION OF "AGGLOMERATION" POPULATION

1. The calculation of "agglomeration" populations is critical to the interpretation of the Regulations. There are no provisions which suggest that the interpretations could be different between Regulations 4(2), 5(1), 5(2), 5(5) and 5(7).

2. The three different situations that can be identified in the UK.

(i) The sewerage network already exists and the sewage is treated in a sewage treatment works prior to discharge into the environment; this is likely to be the situation for most inland discharges and some estuarine and coastal discharges in the UK.

(ii) The sewerage network already exists and the sewage is discharged either untreated or with only preliminary treatment (screening); many estuarine and coastal discharges will fall into this category in the UK.

(iii) Agglomerations are not connected to existing sewerage networks and first-time sewerage is required; this will be a relatively uncommon occurrence in the UK.

These 3 situations are considered separately below.

3. Agglomeration definition where the sewerage network already exists and the sewage is treated prior to discharge.

3.1 Agglomeration populations for individual continuous point discharges already subjected to sewage treatment are calculated as the total population connected to the associated sewerage network (Appendix A1, examples A1.1 and A1.2) for the purposes of Regulations 4 and 5 (i.e. Articles 3, 4, 5, 6 and 7). It is not the intention to further subdivide such sewerage catchments for the purposes of defining agglomeration populations even where geographically distinct communities (separate villages or towns) can be identified. However where there is a recognisable political entity (eg a village, town or city) currently served by a number of sewerage networks, each discharging via a separate sewage treatment works, then the agglomeration populations will be determined on the basis of separate population equivalents for each sewerage catchment (Appendix A1, examples A1.3, A1.4, A1.5) and not by the total population of the village, town or city.

4. Agglomeration definition where the sewerage network already exists and the sewage is untreated, or subject only to preliminary treatment, prior to discharge.

4.1 Agglomeration populations for individual continuous point discharges which are either untreated or subject only to preliminary treatment, are calculated as the total population connected to the associated sewerage network (Appendix A2, examples A2.1 and A2.2) for the purposes of Regulations 4 and 5 (i.e. Articles 3, 4, 5, 6 and 7). It is not the intention to further subdivide such sewerage catchments for the purposes of defining agglomeration populations even

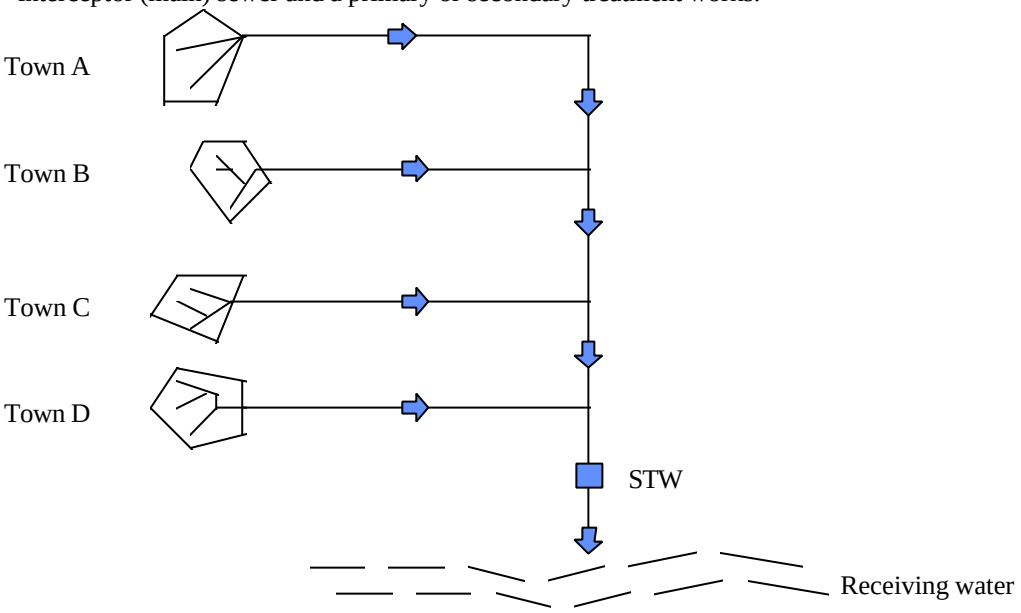
where geographically distinct communities (separate town or villages) can be identified. Where there is a recognisable political entity (eg a village, town or city) currently served by a number of sewerage networks, each separately discharging untreated or preliminary treated effluent, then this will still be calculated as a single agglomeration based on the political boundary (Appendix A2, examples A2.3, A2.4 and A2.5) and not subdivided by sewerage network.

5. Agglomeration definition where sewerage network does not exist.

5.1 Agglomeration populations will be calculated separately for individual communities (villages, hamlets) for the purposes of Regulations 4 and 5 (i.e. Articles 3, 4, 5, 6 and 7) regardless of whether they are subsequently combined and/or linked to other existing sewerage networks (Appendix A7).

DEFINITION OF AGGLOMORATIONS FOR ARTICLES 3,4,5,6 AND 7 FOR EXISTING SEWERAGE NETWORKS ALREADY CONNECTED TO A SEWAGE TREATMENT WORKS

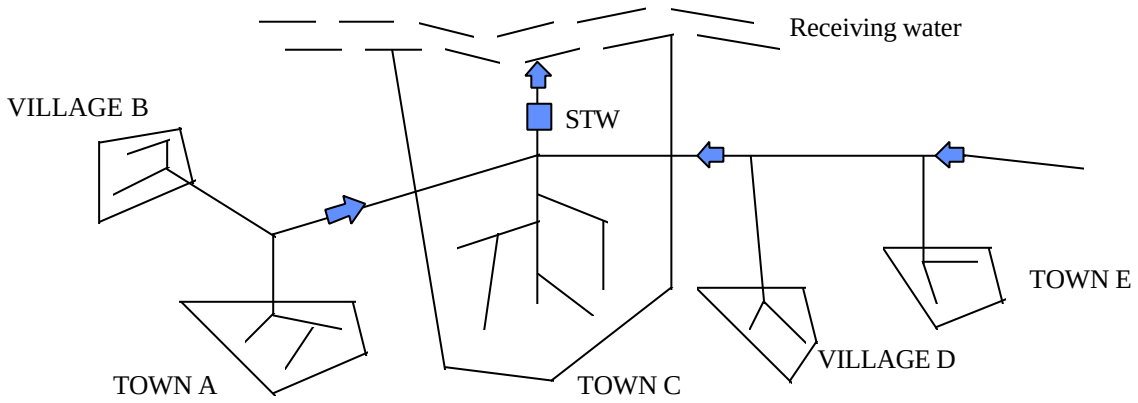
EXAMPLE A1.1 Four separate towns connected to one discharge point via an interceptor (main) sewer and a primary or secondary treatment works.



Size of Agglomeration

Represents 1 single agglomeration (A+B+C+D) for purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 and 7 TREATMENT PROVISIONS

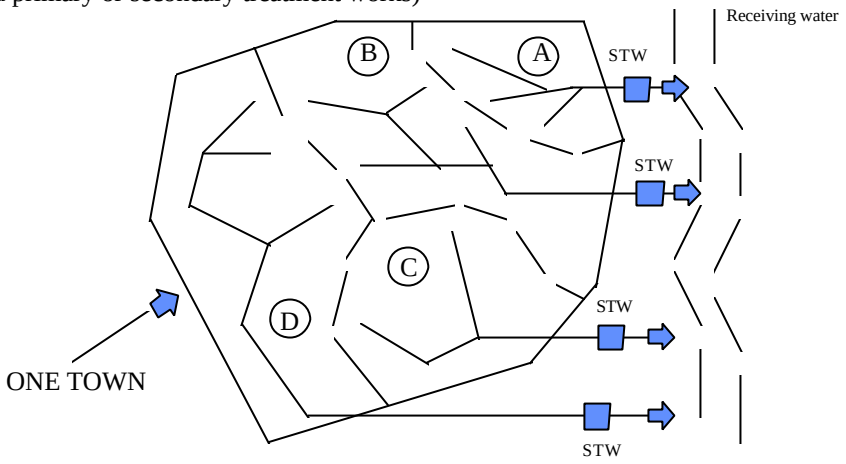
EXAMPLE A1.2 Several small towns and villages connected to one discharge point in large town via interceptor (main) sewers and a primary or secondary treatment works



Size of Agglomeration

Represents 1 single agglomeration (A+B+C+D+E) for purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 and 7 TREATMENT PROVISIONS

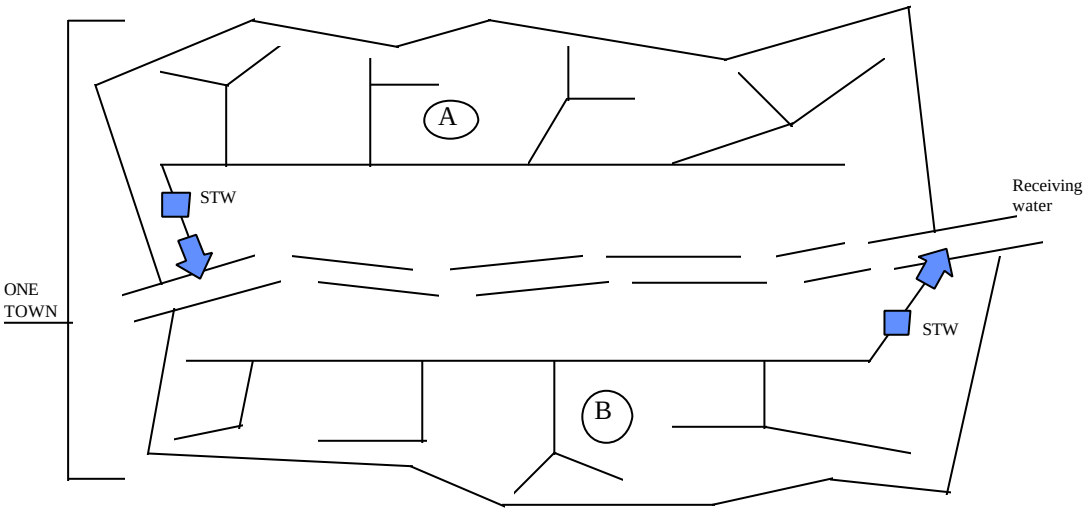
EXAMPLE A1.3 One town with four collecting systems (each connected to a separate discharge point via a primary or secondary treatment works)



Size of Agglomeration

Represents 4 agglomerations (Agg A, Agg B, Agg C, Agg D) for purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 & 7: TREATMENT PROVISIONS

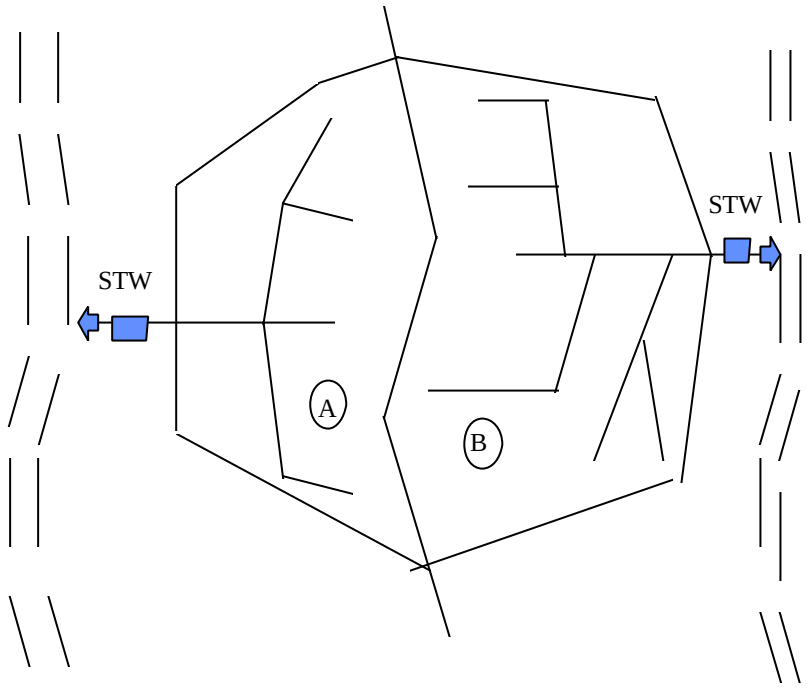
EXAMPLE A1.4 One town divided by a receiving water, each part connected to its own discharge point via a primary or secondary treatment works



Size of Agglomeration

Represents 2 agglomerations (Agg A and Agg B) for purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 & 7: TREATMENT PROVISIONS

EXAMPLE A 1.5 One town draining to two catchments, each connected to different discharge points via primary or secondary treatment works



Receiving water

Receiving water

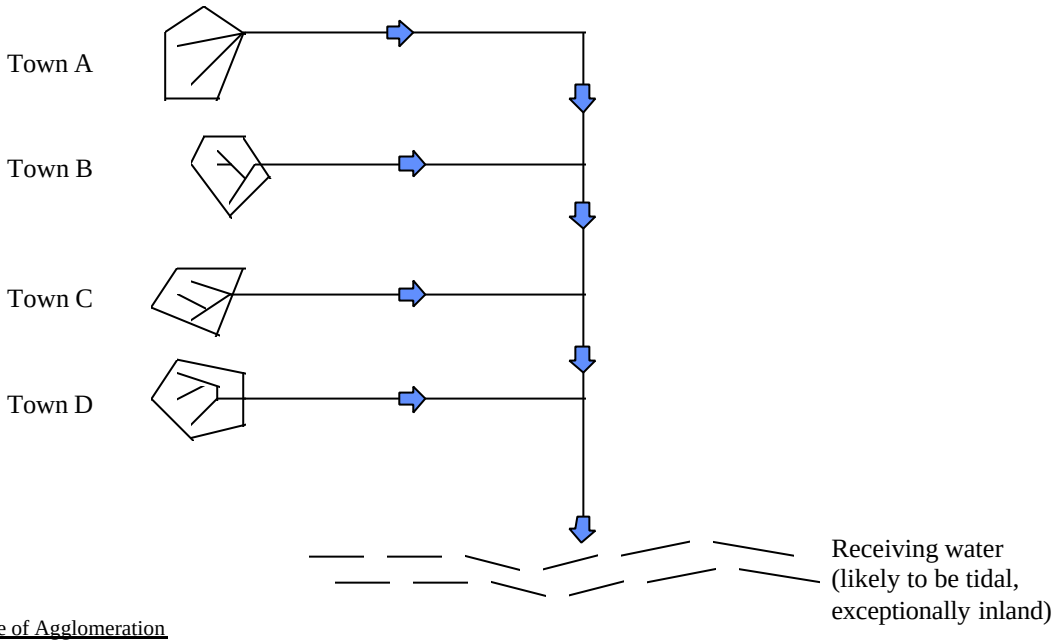
Size of Agglomeration

Represents 2 agglomerations (Agg A and Agg B) for purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 & 7: TREATMENT PROVISIONS

APPENDIX A2

Definition of Agglomorations for Articles 3,4,5,6 and 7 for existing sewerage networks which are not at present connected to primary or secondary treatment works

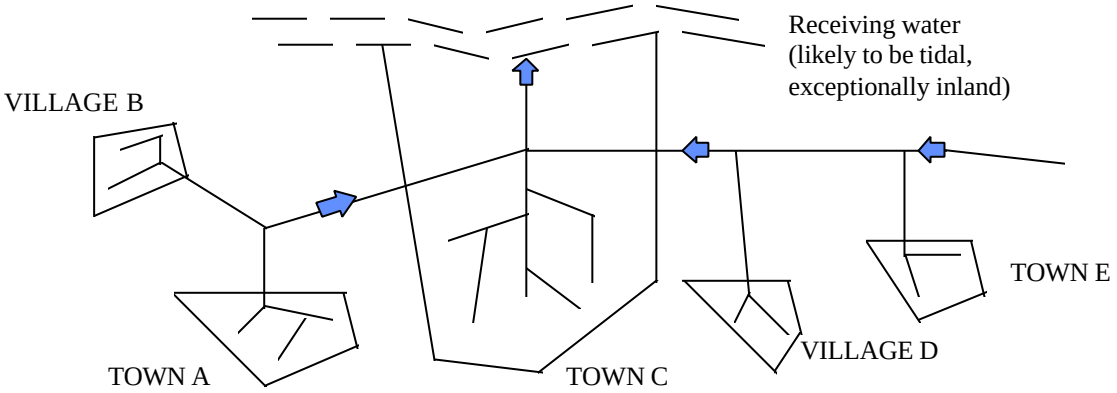
EXAMPLE A2.1 Four separate towns connected to one discharge point via an interceptor (main) sewer with no primary or secondary sewage treatment.



Size of Agglomeration

Represents 1 single agglomeration (A+B+C+D) for purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 and 7: TREATMENT PROVISIONS

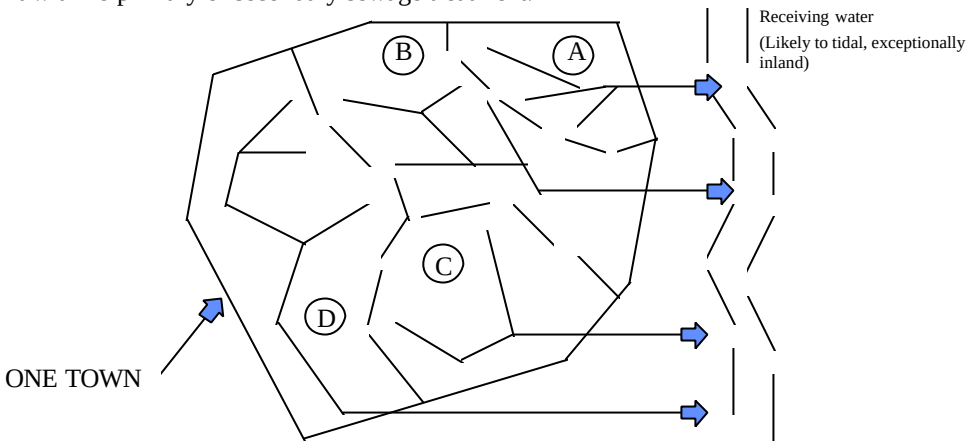
EXAMPLE A2.2 Several small towns and villages connected to one discharge point in large town via interceptor (main) sewers with no primary or secondary sewage treatment.



Size of Agglomeration

Represents 1 single agglomeration (A+B+C+D+E) for purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 and 7: TREATMENT PROVISIONS

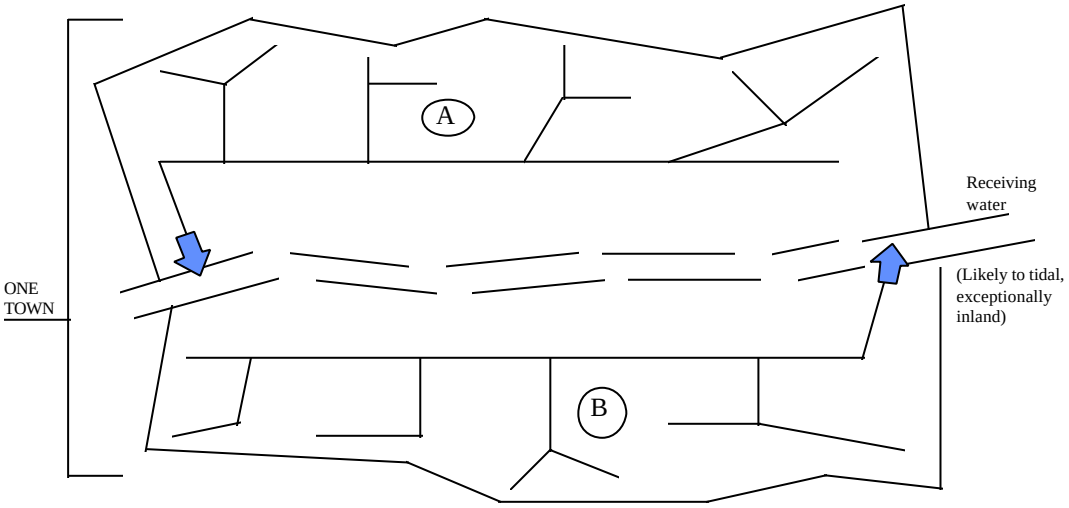
EXAMPLE A2.3 One town with four collecting systems each connected to a separate discharge point with no primary or secondary sewage treatment.



Size of Agglomeration

Represents 1 single agglomeration (A + B + C + D) for purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 & 7: TREATMENT PROVISIONS

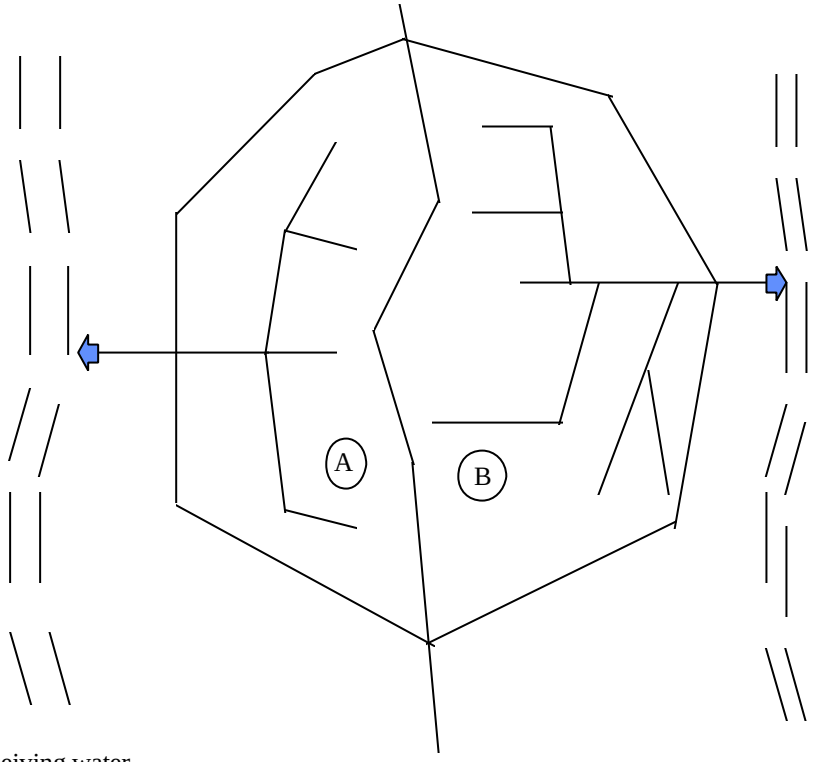
EXAMPLE A2.4 One town divided by a receiving water, each part connected to its own discharge point with noprimary or secondary sewage treatment.



Size of Agglomeration

Represents 1single agglomeration (A + B) for purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 & 7: TREATMENT PROVISIONS

EXAMPLE A2.5 One town draining to two catchments and two discharge points with no primary or secondary sewage treatment



Receiving water

Receiving water

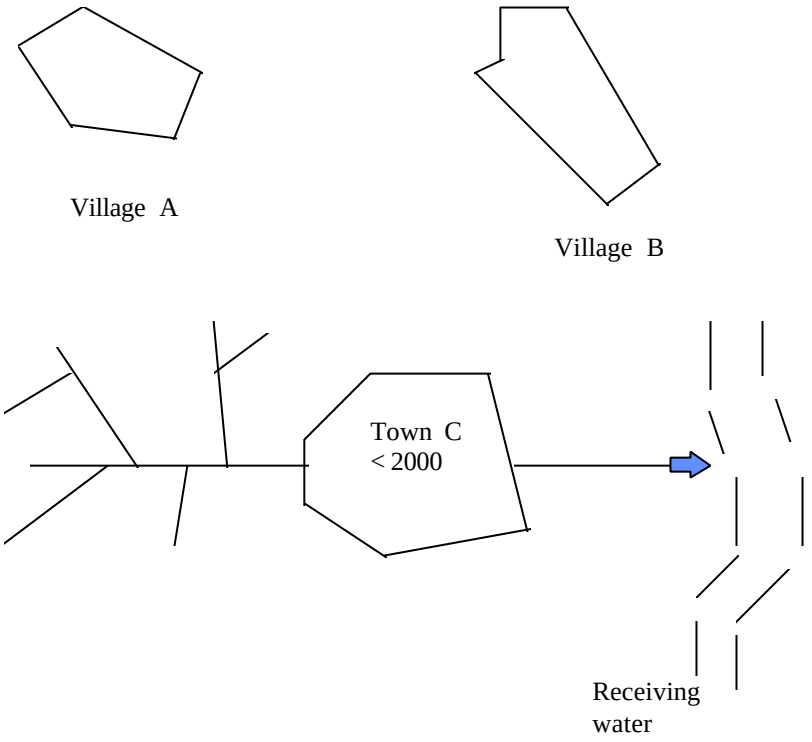
(likely to be tidal & execptionally inland)

Size of Agglomeration

Represents 1 singleagglomeration (A + B) for purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 & 7: TREATMENT PROVISIONS

Agglomeration definition where there is no existing sewerage network

EXAMPLE: Two villages, each less than 2,000 pe but jointly greater than 2,000 pe, currently without collecting systems.



Size of Agglomeration

Villages A and B will be considered separate agglomerations for the purposes of Article 3: COLLECTING SYSTEMS and Articles 4,5,6 & 7: TREATMENT PROVISIONS regardless of whether or not they are subsequently combined into a single discharge or linked to existing town C

AGREED CRITERIA FOR IDENTIFYING SENSITIVE AREAS AND HIGH NATURAL DISPERSION AREAS

1. INTRODUCTION

1.1 Schedule 1 of the Regulations sets out certain criteria for the identification of sensitive areas and high natural dispersion areas.

1.2 In March 1992, The Scottish Office Environment published a consultation paper about the criteria and procedures for identifying sensitive areas and high natural dispersion areas in Scotland. Separate consultation papers were issued in England and Wales and Northern Ireland.

1.3 In all, about 30 responses were received and, following consideration of the points made in them by the Working Group which drew up the original proposals, the criteria were revised as follows. These revised criteria form the basis on which the UK identifies sensitive areas and high natural dispersion areas as required by the Regulations. As this was the first attempt to lay down such criteria they will need to be refined as new methods of monitoring become available.

1.4 The original consultation paper gave something of the background of the Directive. It did not, however, set it into the context of the system of pollution control in the UK in general. It may therefore be helpful to understand something of this relationship. This may help to demonstrate that, if particular waters are identified as high natural dispersion areas in the terms of the Urban Waste Water Treatment Directive, this does not indicate any lack of concern about the condition of those waters in a wider sense.

1.5 Some of the comments received during consultation were outside the scope of the Regulations, in so far as, for example, they sought "sensitive area" status for particular geographic locations which may, perhaps, suffer from some form or degree of pollution, but which may not meet the criteria for identification addressed by the Regulations. It would also be inappropriate to identify as "sensitive" all waters meeting the proposed criteria, regardless of the existence of a qualifying sewage discharge[a], as such an identification could have no practical effect in relation to any other kind of discharge or activity not addressed by the Regulations.

1.6 Some of the concerns addressed in responses related to matters which are themselves the subject of other EC Directives. For example, the protection of designated shellfish waters. In such cases, the UWWT Directive does include a provision to identify a sensitive area if the norm of secondary treatment is unlikely to fulfil the requirements of other Directives. However, the Shellfish Waters Directive will, in general, be the appropriate vehicle for safeguarding the condition of such waters. In respect of Directives such as those concerning the conservation of the habitats of wild flora and fauna and wild birds, where no numeric standards are set in relation to pollutants, it will be necessary to carefully consider whether a sensitive area should be identified in order to protect a habitat.

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[a] A discharge of a particular size that might require additional treatment under the terms of the Directive, depending on the nature of the receiving waters.

1.7 Action taken under the terms of the Directives, to improve the quality of waters which fail their mandatory standards, will be reinforced in the UK by consenting procedures. SEPA sets standards for discharges tailored to individual circumstances, in order to safeguard uses of individual receiving watercourses. In order to protect the high quality of rivers in many parts of the country, consent standards are already set for different types of discharge at levels tighter than those required by specific EC Directives. This will continue to be the case; and consenting procedures will continue to ensure that any discharges from small sewage treatment works which are not subject to specific requirements under the Regulations will continue to require "appropriate treatment".

1.8 In Scotland, the setting of individual consents has for many years been facilitated by a system of quality objectives for rivers, which enables the standards set for discharges to be tailored to the achievement of specific environmental goals.

1.9 One of the aims of the consultation paper about the criteria for identifying sensitive areas was to seek a measure of agreement on an expanded and more scientific definition of "eutrophic". The definition of "eutrophication" given in the Regulations is that taken from the Urban Waste Water Treatment Directive:

> "the enrichment of water by nutrients, especially compounds of nitrogen and/or phosphorus, causing an 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."

1.10 Eutrophication describes a process rather than a state and studies have shown that it is controlled by a number of factors. These include nutrients, flow rate of waters, shading and turbidity, depth, temperature and turbulence. The relationship of many of these factors to eutrophication is not easily quantified. The assessment of whether a stretch of water actually or potentially is eutrophic is not possible simply by reference to numeric chemical criteria. A number of symptoms should be considered in order to come to a judgement as to whether an individual stretch of water is suffering or likely to suffer from eutrophication. The importance of particular symptoms will depend on local circumstances.

1.11 However, implementation of the Regulations requires a judgement to be made as to the point at which this process may be said to have created (or to be likely to create) a eutrophic state in any particular water body. It does not require waters to be identified in relation to every sign of the process of eutrophication. Although the criteria are subjective, they reflect the approach adopted by the Paris Commission (See paragraph 2.2.2 below).

1.12 In recognition of the subjective nature of certain of the criteria a mechanism has been introduced, in the form of a Quality Assurance Panel, to ensure that the Regulators' recommendations as to the need to identify particular sensitive areas are consistent throughout the UK. It is the Government who will make the ultimate decision on the identification of waters, based on the advice of the Regulators.

2. CRITERIA FOR SENSITIVE AREAS

2.1 Criteria for Surface Waters Used As Sources of Drinking Water 75/440/EEC

2.1.1 The Regulations refer to the criterion of whether surface freshwaters fail (or may fail if protective action is not taken) the requirements of the Surface Waters (Abstraction for Drinking Water) (Classification) (Scotland) Regulations 1996 which implement Directive 75/440/EEC in relation to nitrates. Where there is a qualifying discharge, such a failure leads automatically to identification as a sensitive area.

2.1.2 Monitoring of surface waters is undertaken for a period of at least 12 months. The results of the monitoring are evaluated against the relevant provisions of Directive 75/440/EEC. The criteria applied are that, where the surface waters contain more than the concentration of nitrates laid down in accordance with Directive 75/440/EEC, the waters must be identified as a sensitive area, where there is a qualifying discharge.

2.1.3 For waters which could contain more than the concentration of nitrates laid down in accordance with Directive 75/440/EEC if protective action is not taken, historical data will be examined to determine any trends in the surface water concentration. Unlike groundwaters, surface waters react very quickly to the leaching of pollutants. Information from the National Rivers Authority (NRA), now the Environment Agency, during the first round of identifications, suggested that nitrate levels in surface waters have in general remained fairly constant in recent years. The halt in the previous rising trend may be due at least in part to changes in agricultural practices in recent years, for example the replacement of spring by winter cereals, and a significant reduction in autumn nitrogen fertiliser applications. The 1992 monitoring data was used to review the lack of any upward trend.

2.2 Criteria for Estuaries and Coastal Waters Subject to Eutrophication

2.2.1 Nitrogen is usually the nutrient with the most potential for limitation of phytoplankton in coastal and estuarine waters. Their potential for eutrophication is therefore covered in the Regulations.

2.2.2 The question of eutrophication of these waters has already been addressed by both the Paris Commission (PARCOM) and the International Council for the Exploration of the Sea (ICES). PARCOM is an international body, made up of North Western European countries which agrees measures for the protection of marine waters from the effects of discharges from land based sources. ICES is an international organisation which provides scientific advice on marine pollution. In developing criteria for the implementation of these Directives the Working Group followed the PARCOM guidelines as closely as possible. These specify a range of criteria which may be symptomatic of nutrient enrichment against which any water body can be evaluated. ICES has qualified these criteria by emphasising that many of the phenomena mentioned are natural and that nutrient supply ratios are a further important factor. Whilst each symptom itself may not be indicative of undesirable eutrophication effects the scope is comprehensive and allows sound judgement taken overall.

2.2.3 Consideration of any particular sea area must be within the context of past information on nutrient inputs, their ratios and sources, local or transboundary, as well as hydrographic and meteorological data. For example, nutrient loads from shore, currents, light conditions, temperature, wind.

2.2.4 The criteria to be considered in assessing eutrophication in estuarial and coastal waters are as follows:

(a) *Nitrate Concentrations*

Winter (February) nitrate-nitrogen concentrations significantly enhanced relative to a background concentration for a defined geographical area based on salinity. Information on background concentrations is available from a number of sources.

(b) *Occurrence of exceptional algal blooms*

Attention should be given to the occurrence of unusual blooms of phytoplanktonic species or of blooms of unusual scale or blooms with unusual toxicity characteristics.

In considering abundance it can be taken that blooms of algae in coastal waters normally reach densities of at least 5×10^5 [(1)] cells per litre and chlorophyll-a concentrations of around 10 mg/m^3[(1)].

(c) *Duration of Algal Blooms*

It could be considered exceptional if the normal spring bloom algal densities persisted through the summer until the autumn bloom without the typical nutrient-limited decline in the summer.

(d) *Oxygen Deficiency*

Attention should be given to decreased oxygen concentration at the surface, as well as in deeper water layers, including in areas where sedimentation and/or stratification may occur.

Care must be taken under this heading to ensure that consideration is given to oxygen deficiency which is due to the decay of plant material and not caused by organic discharges to the local areas.

(e) *Changes in Fauna*

Substantial increases or decreases in benthic biomass, shifts in species composition and mortality of benthos and fish.

[(1)] Numeric values are given only as indicators of possible current or future problems. They are neither limits above nor below which a state of eutrophication will have been demonstrated to be present or absent.

(f) *Changes in Macrophyte Growth*

These can be relatively minor, such as the disappearance of red algal species, or a reduction in depth of the photic zone, or more significant, for example dense and widespread growth of Enteromorpha spp.

(g) *Occurrence and Magnitude of Paralytic Shellfish Poisoning (PSP)*

The occurrence of PSP-causing species (eg Alexandrium sp) is endemic in areas around the UK coast even where there is no nutrient enrichment and blooms of varying significance occur each year. However, their scale may be enhanced by nutrient enrichment, extending the duration and geographic area of effect of the present chronic phenomenon. Such an extension could indicate eutrophication but could also be due to a variety of natural causes.

(h) *Formation of Algal Scums on Beaches and Offshore*

Dense blooms of colonial or chain-forming species (e.g. Phaeocystis, Chaetoceros) can result in drifts of cells on the sea surface or on the strand-line, or slimy deposits on fish nets or drogues. The significance of these phenomena should be placed in a historical perspective as such phenomena have been regularly recorded in some UK coastal waters for over 100 years.

2.3 Criteria for Freshwaters Subject to Eutrophication

2.3.1 One factor which is an essential precursor to eutrophication is the presence of nutrients in sufficient quantity to support sustained algal and macrophyte growth. The nutrient which controls the production in most freshwaters is phosphorus and it is known as the limiting nutrient. Rooted plants obtain most, or all, of their phosphorus from sediments via the root system, whereas nitrogen may be obtained directly from the water. However, nitrogen in rivers is unlikely to be a limiting factor for macrophyte growth, although it can be limiting in certain circumstances, usually in oligotrophic waters. Specific rules cannot be derived for these exceptional circumstances. The Regulators will need to consider them on a case by case basis.

2.3.2 Depending on the other factors, accelerated growth of algae and macrophytes may take place. The results of the accelerated growth and increase in biomass could give rise to some measurable effects in the water body concerned. These effects include marked diurnal fluctuations in rivers in dissolved oxygen concentrations and pH value, increased overnight carbon dioxide concentrations, increases in discoloration and turbidity, and enrichment of sediments with organic matter.

2.3.3 *Still Freshwaters*

2.3.3.1 The OECD carried out a review of eutrophication problems in standing freshwaters. The results of this review were published in "Eutrophication of Waters: Monitoring, Assessment, and Control", (OECD, Paris, 1982).

2.3.3.2 This report concluded that the eutrophication process could be described using a number of parameters, the most useful of which were:-

(a) Total phosphorus concentration.

(b) Chlorophyll *a* concentration.

(c) Secchi disc depth. (A measure of light penetration).

The report considered that a water body has a greater than 50% probability of being eutrophic where the annual average (geometric mean) total phosphorus concentration is greater than 50µg/l. The corresponding figure for annual average chlorophyll *a* concentration is 9µg/l, for peak chlorophyll *a* concentration 30µg/l, and for Secchi disc transparency at 3 m. (All geometric means).

2.3.3.4 Total phosphorus measures the "pool size" of phosphorus and is also generally the best estimator of bioavailable phosphorus. Furthermore the use of total phosphorus concentrations in still waters is necessary for conformity with the OECD model database. This determinant will be adopted for assessment of the trophic status of lakes.

2.3.3.5 A number of symptoms are also useful in characterising the trophic state of freshwaters, for example increase in colour, changes in abundance and diversity of biota, the formation of exceptional scums and blooms, production of algal toxins, and fish kills due to toxins or low dissolved oxygen.

2.3.4 *Running Freshwaters*

2.3.4.1 The identification of parameters for the assessment of eutrophication in rivers and streams is complex. Most effort has been directed at determining phosphorus concentrations below which nuisance growths will not occur. Total phosphorus concentrations of 30↘g/l (monthly mean)[a], 30↘g/l (annual mean)[b] and 100↘g/l (maximum concentrations)[c] have all been proposed as levels which would prevent any plant `nuisance' arising. Significant plant growth related problems in British rivers have been associated with orthophosphate (PO_4-P) concentrations in excess of 100↘g/l PO_4-P[d]. There are examples of severe effects at levels in excess of 1000↘g/l PO_4-P[d,e,f].

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[a] Clyde River Purification Board (1989), "Eutrophication in flowing waters." Technical Report No 92, Technical Report No 92, Clyde RPB, Rivers House, East Kilbride.
[b] Cartwright N.G and Painter H. (1991). "An Assessment of the environment quality standards for inorganic nutrients necessary to prevent eutrophication". Draft Report No.2397, WRc plc, Medmenham, Buckinghamshire.
[c] Mackenthun, K.M (1973). "Towards a cleaner aquatic environment". U.S Environmental Protection Agency, Washington D.C.
[d] Pitcairn C.E.R and Hawkes H.A (1973). "The role of phosphorus in the growth of Cladophora". Water Research 7pp 159-171.
[e] Fouracre V.A. and Price P.C. (1985). "Factors affecting the growth of Cladophora in Rivers". Final Report to the Department of the Environment in respect of Contract No PECD7/7086-159/82 November 1985.
[f] Forth River Purification Board (1990) "River Almond Modelling Group progress report to March 1990". Forth RPB Report No. FC08/89.

2.3.4.2 The diversity of measurements and proposals illustrates the difficulty of quantifying nutrient enrichment liable to cause adverse effects in flowing waters. Not only are effects mediated by physical factors and innate variability in concentration but algae also have the ability to assimilate and store excess phosphorus further complicating evaluation of causal relationships.

2.3.4.3 The historical database in UK on phosphorus concentrations in rivers is based on orthophosphate analyses (PO_4-P). Furthermore this form is more relevant than "pool" phosphorus in the transient conditions of rivers. For these reasons the assessment of running waters in the United Kingdom will be based upon measurements of orthophosphate in conjunction with the other factors described. Whilst there are relatively few references linking excessive growth of rooted algae and macrophytes with phosphorus concentrations (section 2.2.1) operational observations have indicated that concentrations between 50 and 600 ↘g/l PO_4-P can give rise to problems with Cladophora. Therefore, an indicative orthophosphate level of 100↘g/l P as an annual average concentration is proposed.

2.3.4.4 In rivers affected by planktonic algae, chlorophyll *a* concentrations may be measured as for standing waters. There is no good database to indicate concentrations at which chlorophyll *a* levels in rivers may be assumed to indicate eutrophic conditions.

2.3.4.5 The measurement of chlorophyll *a* concentrations in the water column will not be appropriate for those nutrient enriched rivers where attached algae, particularly Cladophora, are the main problem. The quantification of attached algal biomass in rivers is possible but the techniques are difficult and costly. Estimates of the percentage cover of algae could provide a useful estimate of biomass.

2.3.4.6 Daytime DO levels above 150% saturation are an indication of excess growth occurring and hence of the possibility of eutrophication. Excessive growth of planktonic or attached algae, or rooted macrophytes will usually give rise to exaggerated diurnal dissolved oxygen cycles from normal levels in rivers. Photosynthesis during daylight may produce dissolved oxygen saturations above 150%, whilst respiration may reduce night-time saturations to near zero. This can be the easiest and most reliable measure of eutrophication in flowing waters.

2.3.4.7 All three parameters can be used to indicate whether a river is eutrophic or potentially eutrophic, thus:-

(a) phosphate concentrations will indicate which rivers are susceptible to severe eutrophication

(b) biomass of attached algae and macrophytes will indicate the extent of growth, chlorophyll *a* concentrations will indicate the extent of planktonic algal growth, where relevant

(c) dissolved oxygen diurnal cycles will integrate the combined effects of all algae and macrophytes and describe the severity of eutrophication.

In rivers having a true phytoplankton responsible for producing the adverse effects of eutrophication, a consideration of reproduction rates and retention time within the river system may be important.

2.3.4.8 Even when all these conditions have been satisfied final decisions on the identification of sensitive areas can only be taken by examining local conditions.

2.3.5 *Still Freshwaters*

2.3.5.1 The criteria to be considered in assessing eutrophication in still freshwaters are as follows:

(a) *Phosphorus concentrations*

An annual average (geometric mean) total phosphorus concentration of greater than 50 µg/l [(1)].

(b) *Chlorophyll a concentrations*

Peak chlorophyll *a* concentrations of greater than 30 µg/l[(1)].

(c) *Water clarity*

An annual average (geometric mean) Secchi disc transparency of less than 3m[(1)] , due to algal biomass (water colour predominantly green).

(d) *Dissolved oxygen*

Excessive supersaturation of surface layers and decreased saturation in deeper stratified layers (hypolimnion)

(e) *Effects on fauna*

Adverse changes in diversity and abundance of invertebrates and fish fauna which can be attributed to the effects of nutrient enrichment.

(f) *Effects on macroflora*

Substantial adverse changes in macrophyte abundance and diversity.

(g) *Effects on microflora*

Exceptional increases in plankton, floating or attached algal biomass leading to blooms, scums, or discoloration

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[(1)] Numeric values are given only as indicators of possible current or future problems. They are neither limits above nor below which a state of eutrophication will have been demonstrated to be present or absent.

2.3.6 *Running Freshwaters*

2.3.6.1 The criteria to be considered in assessing eutrophication in running freshwaters are as follows:

(a) *Phosphorus Concentration*

An annual average orthophosphate concentration over 100 ↘g/l P[(1)].

(b) *Algal Biomass*

A high percentage cover of attached algae, especially Cladophora. Planktonic algae producing annual mean concentrations of more than 25 ↘g/l[(1)] chlorophyll *a* or a maximum of 100↘g/l[(1)].

(c) *Water Retention Time*

In rivers affected by planktonic algae, sufficient retention time for algal multiplication (normally over 5 days).

(d) *Dissolved Oxygen*

A strong diurnal cycle of dissolved oxygen saturation, daytime supersaturation levels (over 150%) and reduced night-time saturation levels.

(e) *Effects on Fauna*

Adverse changes in diversity and abundance of invertebrates and fish fauna which can be attributed to the effect of nutrient enrichment.

(f) *Effects on Macroflora*

Substantial adverse changes in macrophyte abundance and/or diversity.

(g) *Effects on Microflora*

Exceptional increases in planktonic, floating, or attached algal biomass leading to blooms, scums or discoloration.

3. CRITERIA FOR HIGH NATURAL DISPERSION AREAS

[(1)] Numeric values are given only as indicators of possible current or future problems. They are neither limits above nor below which a state of eutrophication will have been demonstrated to be present or absent.

3.1 Regulation 5(5) allows less stringent (at least primary) treatment to be applied to discharges to high natural dispersion areas. This provision applies to the following, where there is no need to make application to the European Commission:

(a) discharges of 2,000 to 10,000 population equivalents (pe)[a] to estuaries

(b) discharges of 10,000 to 150,000 pe to coastal waters

and to the following, if the Commission agree, following application:

(c) discharges greater than 150,000 pe to coastal waters.

3.2 The criteria for identifying high natural dispersion areas are set out *in Schedule 1, Part II of the Regulations*. The criteria cover the following:

(a) the discharge does not adversely affect the environment due to morphology, hydrology, or specific hydraulic conditions;

(b) the risk of detrimental effects in adjacent areas, particularly sensitive areas;

and the following elements should be taken into consideration:

degree of water exchange, degree to which waters are subject to, or likely to be subject to eutrophication or oxygen depletion.

3.3 For discharges to high natural dispersion areas the Regulations require:

(a) the application of at least primary treatment;

(b) comprehensive studies to indicate that discharges will not adversely affect environment (see Annex F);

(c) monitoring and studies to verify that discharges are not adversely affecting the environment.

3.4 *Criteria for Estuaries*

3.4.1 It is proposed that high natural dispersion areas will be identified where all the following circumstances obtain in estuaries:

(a) there is a discharge of between 2,000 and 10,000 pe or plans for such a discharge

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[a] 1 pe (population equivalent) means the organic biodegradable load having a five-day biochemical oxygen demand (BOD5) of 60g of oxygen per day.

(b) there is an absence of eutrophication problems in the case of an existing discharge or a predicted absence subsequent to the commencement of the discharge in the case of a new discharge

(c) the median dissolved oxygen value should be maintained above 7mg/l

(d) the discharge does not, or is unlikely to, adversely affect the environment

(e) there are no or unlikely to be significant detrimental effects attributable to the discharge in adjacent areas including areas in other Member States.

3.5 **Criteria for coastal waters**

3.5.1 It is proposed that high natural dispersion areas will be identified where all the following circumstances obtain in coastal waters:

(a) there is a discharge greater than 10,000 pe or plans for such a discharge

(b) there is an absence of eutrophication problems in the case of existing discharges or a predicted absence subsequent to the commencement of the discharge in the case of new discharges

(c) the discharge should not affect or, in the case of new discharges, be predicted to affect adjacent areas, in particular sensitive areas

(d) the discharge does not or, in the case of new discharges, is unlikely to adversely affect the environment

(e) there are no or, in the case of new discharges, unlikely to be significant detrimental effects attributable to the discharge in adjacent areas including areas in other Member States.

DESIGN, CONSTRUCTION AND OPERATION OF COLLECTING SYSTEMS AND TREATMENT PLANT

1. INTRODUCTION

1.1 Regulation 4(1) contains provisions on the design, construction, operation and maintenance of collecting systems and regulation 4(3) contains provisions on the design, construction and maintenance of treatment plants to ensure sufficient performance. The provisions mirror the Directive, which sets out only minimum standards, and does not indicate how they might be achieved.

1.2 Listed below are the relevant appropriate documents which reflect current practice in the UK. The Secretary of State believes that these should be taken as guidelines which meet the requirements of the Regulations. However, many Manuals and Guidelines are regularly updated and changed to take account of new developments and improvements in technology. These guideline lists are therefore to be used in a manner which gives flexibility to achieve objectives without imposing unnecessary constraints which might inhibit initiatives.

2. COLLECTING SYSTEMS

2.1 Schedule 2 requires that Collecting Systems shall take into account waste water treatment requirements.

2.2 The design, construction and maintenance of collecting systems shall be undertaken in accordance with best technical knowledge not entailing excessive costs, notably regarding:

- volume and characteristics of urban waste water.
- prevention of leaks
- limitation of pollution of receiving waters due to storm sewage overflow.

2.3 The principal document which defines current UK practice is BS8005:1987 "Sewerage". This covers all aspects of design, construction, and maintenance. It makes reference to relevant supporting documentation including:

- Civil Engineering Specification for the Water Industry
- Sewers for Adoption (for England and Wales) 3rd Edition 1989
- The Wallingford Procedure
- The Sewerage Rehabilitation Manual
- Storm Sewage Separation and Disposal: Scottish Development Department, HMSO 1977
- The 1970 Ministry of Housing and Local Government Technical Committee's Report Disposal of Storm Sewage" (MHLG 1970)
- Materials Selection Manual for Sewers, Pumping Mains and Manholes

2.4 It also makes reference to further relevant documents which were issued recently.

- A Guide to Sewerage Operational Practices, FWR 1991
- Standard Specification for Water and Sewerage Schemes by the Scottish Association of Directors of Water and Sewerage Services, Third Edition.
- The Urban Pollution Management Manual, November 1994, FR/CL 0002.

2.5 In addition to the above there are a number of guides and documents available dealing with storm overflows and the use of rainfall time series for sewer system modelling.

2.6 In April 1994, the Foundation for Water Research published a method for assessing and updating the environmental impact of 150 discharges on receiving waters - "Development of a Procedure for Assessing the Impact of Combined Sewer Overflows (FR 0465).

2.7 The Urban Pollution Management (UPM) Manual was published in November 1994 (FWR FR/CL 0002). It provides an approach for planning CSO improvements which is particularly suitable for complex sewerage systems and where numerous discharges interact. The Manual has been endorsed by SEPA.

2.8 In November 1994, the Foundation for Water Research (FWR) also published an updated Guide to the Design of Combined Sewer Overflow Structures (FR 0488). The Guide supersedes ER304E 'A Guide to the Design of Storm Sewer Overflow Structures' which has been recognised as providing guidance for "good engineering design" for CSO structures for some years. The Guide builds upon and updates the previous guidance in the light of improved knowledge resulting from recent research and recent changes in regulatory requirements. The updated design procedures should now be regarded as appropriate guidance for "good engineering design". Recently developed software, "Aesthetisizer 97 - UK WIR" now complements FWR 0488

3. TREATMENT WORKS

3.1 There is no equivalent document to BS8005 in the field of treatment works design, construction, operation and maintenance. Principal aspects are dealt with below.

3.2 Design and Construction

3.2.1 Hydraulic Design: significant variations in generally accepted design criteria apply to meet specific consents and requirements of receiving waters but the following principles generally apply:

- Normal treatment capacity should be adequate to treat the diurnal variations in dry weather flow (DWF), for example 3 times dry weather flow for small to medium size works.
- Normal storm tank capacity is typically 2 hours at 3DWF

The following supporting documents are relevant:

- Hydraulics Research "Tables for the Hydraulic Design of Pipes and Sewers".
- BS 3640 Measurement of flows in Open Channel
- MHLG 1970

3.2.2 Process Design: no single document covers all aspects of process design.

Important references are:

- Manuals of British Practice in Water Pollution Control
- Preliminary Treatment for Marine Outfalls, Users Guide. WRc 1989
- Design Guide for Marine Treatment Schemes, WRc 1990
- Technical Report TR11 "Settling of Activated Sludge", WRc 1973
- Design Guide for Activated Sludge Processes, WRc for FWR, FR0090, 1990
- Guide on Nutrient Removal Process Selection WRc, FWR, FR0253, 1992
- Guidelines for Design and Operation of Biological Filtration Plant, WRc Ref: UK2551, July 1995 and UC2551, July 1995
- BS6297: 1983 Design and Installation of Small Sewage Treatment Works and Cesspools
- CIRIA TR119 Screenings and Grit in Sewage
- Enclosed Waste Water Treatment Plants - Health and Safety Considerations, FR/W 0001, November 1993
- Health Hazards at Waste Water Treatment Plants - the Implications of the COSHH Regulations, FR/W 0002, June 1994
- Guidelines for Retrofitting Chemical Phosphorous Removal to Wastewater Treatment Plants WRc Ref: UC 2376
- Technical Report TR93 “The Design of Percolating Filters and Biological Contactors” WRc

3.2.3 Over many years WRc have worked with the water industry to produce a series of guides and documents covering most aspects of process design. These are incorporated to varying degrees in sewerage authorities' design procedures.

3.2.4 There are numerous supporting documents and most sewerage authorities have developed their own "design manuals" which are appropriate to their own needs. These tend to draw on best practice from a wide range of base documents including WRc guidelines.

3.2.5 Structural Design: the principal documents are:

- BS8110 The Use of Reinforced Concrete
- BS8007 Concrete in Water Retaining Structures
- BS5950 Structural Steelwork
- BS6031 Code of Practice for Earthworks
- BS8004 Code of Practice for Foundations

There are numerous others, including British Standards, Ciria Reports, Building Research Establishment Digests, Building Regulations and Fire Regulations.

3.2.6 Mechanical and Electrical Design: electrical aspects are more fully covered than mechanical. The principal documents are:

- BS5750 Part 1/150 9001 - Good Design Practices
- Regulations for Electrical Installations (16th Edition)
- The Electricity at Work Regulations (1989)
- BS5304 Code of Practice for Safety of Machinery
- BS4500 ISO limits and fits
- IEE Guide to Documentation for Real Time Software
- HSE Guidelines on the use of Electronics Systems in Safety Related Applications.

3.3 Operations and Maintenance.

3.1 Again, no comprehensive document exists, but the important references are:

- Manuals of the British Practice in Water Pollution Control
- Occasional Technical Paper No 4 - The Operation and Maintenance of Small Sewage Treatment Works
- BS6423 Maintenance of electrical switch gear.

3.2 Most sewerage authorities have developed and refined their operating and maintenance procedures to reflect:

- local circumstances
- the use of telemetry
- planned maintenance
- consequences of failure
- availability of standby plant.

DISPOSAL OF SEWAGE SLUDGE

1. EXISTING LEGISLATION ON DISPOSAL OF SLUDGE

1.1 The disposal of sludge is in all cases subject to "general rules or regulation or authorisation" in accordance with Article 14.2 of the UWWT Directive. This takes many forms.

1.1.2 **Disposal to controlled waters** is controlled by section 34 of the Control of Pollution Act 1974 (as amended), and requires authorisation by SEPA.

1.1.3 **Disposal to agricultural land** is regulated by the Sludge (Use in Agriculture) Regulations 1989 (as amended)

1.1.4 **Disposal to other land** may require a waste management licence under the Waste Management Licensing Regulations 1994 (as amended) from SEPA, unless it is exempt (exemptions are defined in Schedule 3 to the 1994 Regulations).

1.1.5 **Disposal by incineration** requires an authorisation under Part 1, EPA 1990 from SEPA.

1.1.6 **Disposal at sea by ship** requires a licence from SOAEFD under Part II, Food and Environment Protection Act 1985.

2. CODE OF PRACTICE

2.1 The Code of Practice for Agricultural Use of Sewage Sludge contains relevant advice, although it does not have mandatory status.

PRIMARY TREATMENT STANDARDS

1. DEFINITION OF PRIMARY TREATMENT

1.1 Regulation 5.8(b) defines primary treatment as "treatment of urban waste water by a physical and/or chemical process involving settlement of suspended solids, or other processes in which the BOD of the incoming wastewater is reduced by at least 20% before discharge and the total suspended solids of the incoming wastewater are reduced by at least 50%". Further, Regulation 11 and Parts I and II of Schedule 3 set out a monitoring regime for all types of treatment works.

2. REQUIREMENTS FOR TREATMENT PLANTS

2.1 Treatment plants must be well-designed, installed, and properly run, and standards must be adopted to ensure that pollution caused by incorrect operation of the plant does not occur.

3. MONITORING AND CONTROL

3.1 The proposals set out below incorporate the Regulations' requirements into SEPA's monitoring and control regimes.

3.1.1 Applications for consent: These need to be supported by adequate information about the sewage to be treated and the treatment to be applied, together with information about the HNDA status of the discharge location, and the results of the comprehensive studies undertaken in order to demonstrate that secondary treatment is not needed.

3.1.2 Plant Design: The plant must be designed to remove, under normal circumstances, at least 50% of suspended solids and at least 20% of BOD as measured by 24 hour composite samples of inflow and outflow, and assessed according to Table 3 in Part II of Schedule 3 to the Regulations. These performance standards will be specified in the consent.

3.1.3 Sampling Equipment: This must be installed and operated to produce 24 hour composite samples of inflow and outflow.

3.1.4 Upper Tier: In order to control the discharge of excessively high levels of solids caused by the discharge of sludge or mal-operation of the plant SEPA may apply an absolute upper limit[(1)] to be judged against a spot sample taken at any time.

No upper limit will normally be applied for BOD because this is not regarded as environmentally significant in HNDA's, and settlement processes will remove only that BOD associated with solids. However, it may be that there are discharges which require control where there is soluble BOD from a trade effluent e.g. fish processing.

[(1)] See SEPA Consent Manual (Appendix J1 to Annex J)

HIGH NATURAL DISPERSION AREAS AND COMPREHENSIVE STUDIES

1. DESIGNATION OF HIGH NATURAL DISPERSION AREAS (HNDAs)

1.1 Regulation 5.5 allows certain discharges to receive less stringent treatment than secondary treatment, but at least primary treatment, where the receiving waters are identified as an HNDA and a comprehensive study demonstrates that such discharges will not adversely affect the environment. It is therefore necessary for an HNDA to be identified before consideration can be given to this less stringent treatment.

1.2 High natural dispersion areas (HNDAs) are identified by the Secretary of State according to the criteria set out in Part II of Schedule I of the Regulations. These criteria were expanded, and agreed following public consultation, and published in April 1993 as Annex B to the Department's consultation document "Methodology for Identifying Sensitive Areas (Urban Waste Water Treatment Directive) and Designating Vulnerable Zones (Nitrates Directive) in Scotland". They are set out at Annex B of this guidance. The Secretary of State's identification of HNDAs is informed by recommendations made by SEPA, to whom the task of applying the agreed criteria falls.

1.3 HNDA status must be reviewed at least every four years. This exercise is separate from the comprehensive studies into the affects of discharges. Regulation 3(2) required the first such review to be completed by 31 December 1997. If, taking account of recommendations made by SEPA following such a review, the HNDA status is withdrawn by the Secretary of State, any relevant discharge located within that area would become subject to the requirement to provide secondary treatment. A period of seven years from the date of the removal of HNDA status would be allowed for compliance. However, if the seventh anniversary of the change in status falls before the date originally specified in Regulation 5(1), the later of the two dates applies. For example, if a coastal area into which an agglomeration of 12,000 pe discharges, ceases to be a high natural dispersion area on 31 December 1997, the seventh anniversary would be 31st December 2004 whereas the Regulation 5(1) date would be 31 December 2005. Therefore secondary treatment or its equivalent would not have to be provided until 31st December 2005.

1.4 Following removal of HNDA status, if the deadline for provision of secondary treatment is later than the date that would otherwise have applied under Regulation 5(1), it will still be necessary to provide by that earlier date the primary treatment that would have been permitted in an HNDA.

2. REQUIREMENT FOR COMPREHENSIVE STUDIES

2.1 Consent for a discharge to receive a lower level of treatment than secondary is dependent on comprehensive studies having first indicated that there will be no adverse effect on the environment from a primary treated discharge. Comprehensive studies are designed to indicate whether or not a discharge into an identified high natural dispersion area will cause adverse effects if a minimum of primary treatment is substituted for full secondary treatment (see paragraph 3.2 below for an explanation of the test required by Article 6(2) of the Directive). Once the study has been completed SEPA should certify, if satisfied for the purpose of Regulation 5(5)(b), that the discharge will not adversely affect the environment.

2.2 If comprehensive study supports primary treatment

2.2.1 After comprehensive studies into the effects of discharges are carried out, SEPA, only if it is satisfied as to the outcome in each case, will issue discharge consents requiring primary treatment only. Provision of primary treatment under Regulation 5(5) does not require prior consent from the European Commission except in the exceptional circumstances referred to in paragraph 2.2.2 below. However, information about the comprehensive studies which support any consent for primary treatment must be sent to the European Commission, which may submit a proposal to the Council if it considers that the conditions set out in article 6.2 of the Directive are not met.

2.2.2 Exceptionally, where SEPA considers that a discharge into coastal waters identified as an HNDA, from an agglomeration with a population equivalent greater than 150,000, has had a comprehensive study which shows that more advanced treatment will not produce any environmental benefit (paragraph 3.3 below explains that this test under Article 8.5 of the Directive is different from that applied under Article 6.2), the Secretary of State may make an application to the European Commission to allow consent for a minimum of primary treatment for the discharge.

2.3 If comprehensive study shows secondary treatment necessary

2.3.1 If SEPA is not satisfied, following analysis of the results of any comprehensive study, that a primary treated discharge into an HNDA will have no adverse environmental effect or that more advanced treatment will not produce any environmental benefit, then secondary treatment will be required to be installed.

3. METHODOLOGY FOR COMPREHENSIVE STUDIES

3.1 A methodology for comprehensive studies has been developed by the Comprehensive Studies Task Team (CSTT) of the Marine Pollution Monitoring and Management Group (see paragraph 6.7 of the guidance note) and the second edition was published in January 1997.

3.2 The team's report acknowledges that it will never be possible to demonstrate that a discharge will have no adverse affect on the environment whatsoever if this is taken to mean that the discharge will be completely neutral so far as the environment is concerned. If this was the interpretation to be given to the Directive it would mean that Article 6.2 would have no practical application. The correct interpretation of this Article (and of the corresponding provision in Regulation 5(5)(b)) must be that the effect on the environment of a discharge which has received primary treatment should be no worse than the effect of the discharge if it received secondary treatment. Thus the effect of a discharge which has received secondary treatment provides the base line from which to judge the effect of a discharge which has received primary treatment.

3.3 The UK has established the format set out in the Comprehensive Studies Task Team Report to give a robust scientific basis to an assessment based on this interpretation of the requirement. This is, in fact, the same test that applies to the larger discharges referred to in paragraph 2.2.2 above as set out in Article 8.5 of the Directive. The Article 8.5 test is already expressed as a requirement to demonstrate that more advanced treatment will not produce any environmental benefits. The same comprehensive study format used in relation to Article 6.2 discharges is used in

relation to the larger discharges under Article 8.5, although in the latter case the study results will form the basis of the application to the European Commission referred to in paragraph 2.2.2 above. SEPA will take the CSTT report into account in issuing certificates under Regulation 5(5)(b) in relation to discharges subject to both the Article 6.2 test and the Article 8.5 test.

3.4 The studies entail an initial field environmental assessment involving hydrographic surveys, chemical and biological sampling. The results of the field work are used in predictive modelling studies to determine the probable effects of the discharge options.

3.5 The results of the monitoring and modelling are then assessed against specified numerical criteria defining adverse effect.

4. CONSULTATION

4.1 Under the certification process required by the Regulations, SEPA is charged with determining the level of treatment required following the comprehensive studies. Some regulators and other bodies have a formal role as statutory consultees at the stage when a consent application is submitted for the discharge to which the study relates. It may be expected that such consent applications will be advertised in the normal way to afford all interested parties a chance to submit their views on the proposed discharge.

5. PRIMARY TREATMENT DISCHARGE CONSENTS

5.1 The timing of discharge consents must be tied to completion of comprehensive studies and certification by SEPA that these demonstrate no adverse effect. A discharge consent for primary treatment will come into effect at the end of commissioning of the scheme or at the relevant UWWTD deadline, whichever is the earlier.

6. RELATIONSHIP BETWEEN HNDA STATUS AND THE COMPREHENSIVE STUDY OF EFFECTS OF DISCHARGES

6.1 The identification of an HNDA is based on the likelihood of its being able to tolerate discharges without adverse effect taking account of the criteria set out in Annex B to this guidance.

6.2 The comprehensive study is concerned with the effect of a particular discharge or proposed discharge and is not required by the Regulations to address the more general question of whether the receiving waters meet the criteria for identification as an HNDA.

6.3 Failure by a comprehensive study to demonstrate 'no adverse effect' for a particular discharge cannot automatically invalidate HNDA status. It could be that the particular discharge studied would not have an adverse effect if moved elsewhere within the HNDA eg. where the current discharge is from an unacceptably short outfall. However, each case should be assessed on its merits and the fact that a comprehensive study had failed to demonstrate "no adverse effect" would certainly need to be taken into account in any review of the HNDA.

6.4 Obvious problems with the first preferred discharge location should be identified as early as possible during a comprehensive study by both the relevant sewerage authority and SEPA, with whose Regional Office the authority liaises during their studies. Thereafter, the authority will need to explore alternative discharge arrangements within the HNDA with SEPA, to seek a location where primary treatment is acceptable. It may be feasible (to be determined on a case by case basis) to avoid repeating work already done while considering the first discharge option and to dispense with a full comprehensive study for revised outfall locations. The exercise might consist of a desk study in the first instance, leading in some cases to further field work. If all the alternative points fail these studies then this is likely (but not certain) to mean that HNDA status is not sustainable. HNDA status can be reviewed at any time (but at least every four years) and if a study clearly demonstrates a need for such a review of any HNDA, SEPA would undertake the review on an *ad hoc* basis and make recommendations to the Secretary of State as appropriate. The final decision would rest with the Secretary of State.

6.5 If, following both study and review, HNDA status is revoked, secondary treatment will need to be provided within seven years of the date of revocation, as described in paragraph 1.3 above. If a comprehensive study shows the need for secondary treatment for a discharge located in an HNDA, and HNDA status remains in force, secondary treatment will have to be provided by the relevant deadline set out in Regulation 5(1).

"APPROPRIATE TREATMENT"

1. DEFINITION OF APPROPRIATE TREATMENT

1.1 Regulation 5(7) requires appropriate treatment (as defined in Regulation 5(8)(a)) to be applied to discharges from agglomerations of:-

less than 2,000 pe to freshwater and estuaries;
less than 10,000 pe to coastal waters.

1.2 Regulation 5(8)(a) defines appropriate treatment as

"treatment of urban waste water by any process and/or disposal system which after discharge allows the receiving waters to meet the relevant quality objectives and the relevant provisions of the Directive and other Community Directives"[1]

2. INTERPRETATION OF REQUIREMENTS

2.1 Freshwaters

2.1.1 SEPA considers appropriate treatment for discharges to freshwater (inland waters and groundwaters) to be dependent upon the size of the discharge relative to the receiving watercourse or aquifer. The treatment will typically be one of the following:- septic tank, rotating biological contactor (RBC), trickling filter, activated sludge plant, reed bed or equivalent alternative system.

2.2. Estuarine and Coastal Waters

2.2.1 For the discharges to estuarine and coastal waters given the dilution and dispersive characteristics of such waters, a minimum requirement will normally be screening or equivalent to retain aesthetically objectionable solids. Depending on location of the discharge, primary treatment or the treatment listed for freshwaters may be required to meet water quality standards.

3. DISCHARGE CONSENTS AND MAINTENANCE PROCEDURES

3.1 Where a discharge has the potential to cause environmental problems, numeric standards will apply, otherwise a descriptive consent will be appropriate.

3.2 In some cases, the discharger may be asked to have documented maintenance procedures.

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[1] The other community Directives referred to in Regulation 5(8)(a) are listed in Appendix 1 to this Annex.

OTHER COMMUNITY DIRECTIVES

1. THE OTHER COMMUNITY DIRECTIVES REFERRED TO IN REGULATION 5(8)(A)

1.1 The 'other Community Directives' referred to in Regulation 5(8)(a) are any Community Directive (other than the Urban Waste Water Treatment Directive) which imposes quality objectives or other requirements in respect of the quality of the receiving waters. The following Directives fall within this category.

(a) Council Directive 75/440/EEC concerning the quality required of surface water intended for abstraction of drinking water in the Member States;

(b) Council Directive 76/160/EEC concerning the quality of bathing water;

(c) Council Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community. and the various 'daughter' Directives made under it, namely:

(i) Council Directive 82/176/EEC on limit values and quality objectives for mercury discharges by the chlor-alkali electrolysis industry;

(ii) Council Directive 85/513/EEC on limit values and quality objectives for cadmium discharges;

(iii) Council Directive 85/156/EEC on limit values and quality objectives for mercury discharges by sectors other than the chlor-alkali electrolysis industry;

(iv) Council Directive 84/491/EEC on limit values and quality objectives for discharges of hexachlorocyclohexane;

(v) Council Directive 86/280/EEC on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC, as amended by Council Directives 88/347/EEC and 90/415/EEC;

(d) Council Directive 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life;

(e) Council Directive 79/409/EEC on the conservation of wild birds;

(f) Council Directive 79/923/EEC on the quality required of shellfish waters;

(g) Council Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances;

(h) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.

FRAMEWORK FOR CONSENTING INTERMITTENT DISCHARGES

1. INTRODUCTION

1.1 Regulation 4(1) requires the sewerage authorities to ensure that agglomerations with a population equivalent of 2000 or more are provided with collecting systems. It further requires that the collecting systems satisfy the requirements of Schedule 2. This states that the design, construction and maintenance of collecting systems shall be undertaken in accordance with the best technical knowledge not entailing excessive costs, notably regarding, among other things, the limitation of pollution of receiving waters due to combined sewer overflows.

1.2 The Directive acknowledges the impracticality of constructing collection systems and treatment works such as to treat all waste water during situations such as heavy rainfall. It therefore places responsibility on member states to decide on measures to limit pollution from combined sewer overflows and suggests that these measures could be based on:

- dilution rates; or
- the capacity of the collecting system in relation to dry weather flow; or
- a certain number of overflows per year.

1.3 This annex sets out a framework and is supported by two, more detailed, appendices on consenting intermittent sewage discharges, to freshwaters (Appendix H.1) and to estuaries and coastal waters (Appendix H.2), including:

- combined sewer overflows (CSOs);
- pumping station emergency overflows; and
- storm overflows at sewage treatment works.

1.4 This Annex and its detailed supporting notes at Appendices H2 and H3 set down in general terms, the minimum requirements which are to be met to ensure compliance with the Regulations. **For the purpose of protecting the water environment SEPA may, in certain circumstances, require more stringent standards to be met than those specified in the notes.** In view of the local nature of such circumstances it is not appropriate to cover these in this paper or in the notes. Rather they are for consideration at the local level between SEPA and the sewerage authorities.

1.5 This Annex sets out criteria for consenting those overflows that are unsatisfactory; that is, the factors to be taken into account, and the methodology and the model consent conditions to be adopted. The intention is to ensure that a common approach is used by SEPA and that dischargers, who are mainly sewerage authorities, are treated in a similar manner. The requirements are set out with the objective of trying to adopt as simple an approach as possible consistent with meeting the Regulations' requirements but a more complex approach will be required where particular circumstances warrant it. It is also not intended to be totally prescriptive; there must always be the opportunity for flexibility to take account of cost and environmental benefits and to meet specific local requirements.

1.6 With so many discharges to consider, a fundamental question arises concerning the implementation of the guidelines. However, the framework proposed starts from the assumption that SEPA will not, in the short to medium term, wish to direct resources to reviewing all intermittent discharge consents just because some of the present consents do not conform with one that would be issued according to this guidance. SEPA and the sewerage authorities will need to examine and agree priorities and time scales jointly.

1.7 The subsequent sections set out a framework within which effort will be focused on the discharges that are unsatisfactory and for which the sewerage authorities need to spend money to alleviate these problems over agreed time scales. Over a longer period of time most overflows will be brought within the framework as flows increase or engineering works are required for other purposes. The trigger will be either that an overflow has become unsatisfactory (see below) or is predicted to be close to becoming so because of changes that are known to be taking place. The use of interim measures as a staged improvement would be acceptable.

1.8 Progress on implementation has to meet the requirements of the Regulations. These require that the design, construction and maintenance of collecting systems is undertaken in accordance with best technical knowledge not entailing excessive costs, notably regarding:

- volume and characteristics of urban waste water;
- prevention of leaks; and
- limitation of pollution of receiving waters due to combined sewer overflows.

This guidance contributes to the definition of "best technical knowledge" as mentioned in Schedule 2 of the Regulations, particularly in the context of limitation of pollution.

1.9 All agglomerations with a population equivalent of 2000 or more should have collecting systems unless there are special circumstances. Where there are sensitive areas and a population equivalent of over 10,000, the requisite collecting systems must be in place by 31 December 1998. Requisite collecting systems must be provided for a population equivalent of over 15,000 in areas not identified as sensitive by 31 December 2000. All other implementations are required by 31 December 2005.

1.10 A tighter UK timescale was established for achieving bathing water quality standards as required by the EC Bathing Water Directive. Sewerage and sewage treatment schemes for the 23 currently identified bathing waters in Scotland were programmed to be completed in virtually all cases by 31 December 1995.

2. PUMPING STATION EMERGENCY OVERFLOWS RECOGNISED AS A CONSTITUENT PART OF THE COLLECTING SYSTEM

Sewage pumping stations are recognised as part of the collection system and normally possess emergency overflows which are designed to protect the pumping station or other property from flooding in the event of pumping station failure. The cause is usually mechanical and or electrical failure and if flooding did occur the station could be sufficiently damaged to be taken out of service for days or weeks rather than a few hours. Because these overflows may operate in dry weather

conditions and often discharge into relatively samll watercourses, their environmental impact can be greater than CSO's. The emphasis in pumping station consents is twofold. Firstly, to ensure that there are adequate facilities (telemetry systems) to monitor the operational status of the pumping station, and in particular for operation failures, in order that there can be a quick response to minimise pollution from the emergency overflow. Secondly, facilities should be provided to minimise the potential for an emergeny overflow. The arrangements will depend on local circumstances and the characteristics of of the sewerage system but would normally include standby pump(s) together with one or more of standby generators, storage or access for tankers, as agreed with SEPA. Where the sewerage authority chooses to provide storage within the sewerage system or at the pumping station, for normal situations 1-2 hours storage at 3 dry weather flow (3PG+I+3E) would be acceptable, although the sensitivity of the receiving water course or remoteness of the pumping station may warrant significantly longer storage times. New pumping stations should be constructed in accordance with the above principles. For existing pumping stations causing problems, consents will be reviewed and, where necesssary, enhanced levels of protection or improved backup arrangements will be specified over an agreed timescale.

3. UNSETTLED STORM OVERFLOWS AT SEWAGE TREATMENT WORKS

3.1 These will be considered in the same manner as CSOs. They are usually reviewed when the consent for the treatment works is reviewed and it is not considered necessary to have a general review. Clearly, if one is unsatisfactory according to the criteria in Section 4.1 below it should be treated as any other CSO but this may need to be tied in with a review of the consent for the whole works.

4. DEFINITION OF UNSATISFACTORY COMBINED SEWER OVERFLOWS

4.1 The following criteria are to be used in deciding which CSOs are unsatisfactory and, therefore, subject to consent review to drive improvements.

(i) causes significant visual or aesthetic impact due to solids or fungus or has a history of justified public complaint;

(ii) causes or makes a significant contribution to a deterioration in river chemical or biological class;

(iii) causes or makes a significant contribution to a failure to comply with Bathing Water Quality Standards for identified bathing waters;

(iv) operates in dry weather conditions;

(v) operates in breach of consent conditions provided that they are still appropriate; and/or

(vi) causes a breach of water quality standards (EQS) and other EC Directives.

4.2 It is also appropriate to pay due regard to the presence of designated shellfish waters in the vicinity of a CSO. However, it should be noted that, when the EC Directive on Production and

Marketing of Shellfish (91/492/EEC) was implemented on 1 January 1993, the faecal coliforms standard given in the Annex to the EC Directive on the Quality of Shellfish Waters (79/923/EEC) reverted from an "imperative" to a "guide" value.

4.3 The criteria given in section 4.1 above are largely objective although some subjectivity may apply in the case of (i). It is not considered productive at this stage to refine these definitions further. Research is being conducted into the quantification of some of these issues. Some discretion must be left for local interpretation of the significance and contribution of an overflow to a particular problem, taking account of the costs and benefits of remedial action.

5. CONSENTING OF SATISFACTORY COMBINED SEWER OVERFLOWS

5.1 Only consents for unsatisfactory existing CSOs as defined in Section 4.1 need to be reviewed. Those that are satisfactory will therefore meet the requirements of the Regulations and consequently there is no need to review their consents to incorporate the requirements of the appropriate Appendix. A consent may exist which is adequate or a discharge may require a consent because it is currently unconsented.

5.2 If a new consent is required for an existing satisfactory CSO that is not subject to change, it need only specify current conditions. These should include a statement of carry-forward flow where this information is available and should include any other facilities such as screens etc, currently installed.

5.3 Revised consents will clearly be required for existing satisfactory CSOs if their status changes ie, they become unsatisfactory. This is covered in Section 6.

6. CONSENTING OF UNSATISFACTORY, NEW AND ALTERED COMBINED SEWER OVERFLOWS TO RIVERS

6.1 Consents will be reviewed or determined as a priority in the following cases:

(i) storm overflows that are unsatisfactory according to the criteria set out in Section 4.1;

(ii) new storm overflows;

(iii) storm overflows that are identified, as a result of drainage area studies, as potentially becoming unsatisfactory in the near future; and

(iv) storm overflows that will potentially change their operating characteristics due to changes in the sewerage network (eg, consolidating CSOs).

6.2 If the performance is unsatisfactory due to only one of the criteria in section 4.1 then the review should take the form of tightening only the performance of the failing criterion, subject to the proposed solution not adversely affecting other criteria. For example, if the CSO operates in dry weather conditions but does not cause any problem in respect of the other criteria, the review need

only look at the carry-forward flow or the provision of storage. If the problem is only one of solids deposition, then a solids condition may be all that is required.

6.3 However, if the CSO is failing on two or three criteria, or is a new or radically altered discharge, then the consent review should take account of the relevant factors.

7. PROCEDURE FOR REVIEWING CSOs TO FRESHWATERS

7.1 Appendix H.2 sets out the criteria which determine how a consent is to be reviewed for discharges to freshwaters and the model conditions that are to be incorporated. Three different approaches have been suggested in relation to the significance of the discharge. These require different levels of sophistication to determine the quality criteria (reflected in the carry forward flow). Indicative criteria for impact assessment are set out in Table H1.1. For the less significant discharges it is proposed to use minimum data methods (eg, Formula A or QUALSOC). However, there may be circumstances where, for very high dilutions, less demanding requirements than Formula A may be acceptable. In this case aesthetic impacts could become overriding particularly on pristine and high amenity rivers. For the highly significant discharges the adoption of sewer hydraulic analysis and water quality modelling with a model such as MIKE II require significant data collection and modelling facilities, but are only envisaged to be required in relatively few circumstances. In between these two extremes there is a discretionary band where sewer hydraulic models, together with simpler water quality models (eg, QUALSOC, QUALSIM, CARP), which have less demanding data requirements, may be utilised.

7.2 When models are used to determine consent conditions, it is important to use some form of sensitivity analysis to check the impact of any assumptions made on the final outcome. The outcome must also be reviewed if the costs of potential solutions are excessive in the context of benefits gained.

7.3 The procedures and models referred to in the document for use with highly significant cases are expanded on in the Urban Pollution Management Manual, published by the Foundation for Water Research in November 1994 FR/CL 0002.

TABLE H1.1 INDICATIVE IMPACT ASSESSMENT CRITERIA FOR SETTING CONSENTS FOR CSOs TO FRESHWATERS

LOW SIGNIFICANCE
Minimum Data Methods eg, Formula A, or possibly QUALSOC Method Dilution >8:1 (foul DWF @ 5%ile low river flows) No interaction with other discharges This approach is likely to be adequate in most cases.
MEDIUM SIGNIFICANCE
Simple Models (eg, SDD Method, QUALSOC, QUALSIM, CARP + sewer hydraulic model such as WALLRUS) Dilution <8:1 No interaction or limited interaction with other discharges >2000 population equivalent Cyprinid fishery This approach is only likely to be required if all of these criteria apply.
HIGH SIGNIFICANCE
Complex Models (eg, sewer hydraulic models such as MOSQITO and river quality models such as MIKE II Dilution <2:1 Interaction with other discharges >10,000 population equivalent Cyprinid or salmonid fishery This approach is only likely to be required if all of these criteria apply.

8. DISCHARGES INTO COASTAL WATERS AND ESTUARIES

8.1 Intermittent discharges to coastal waters and estuaries impact on a number of different types of receiving water: identified bathing waters, designated Shellfish Waters, areas classified for shellfish harvesting and other waters used for activities such as recreation, contact sports, and basic amenity. The most stringent conditions apply to those identified as EC Bathing Waters.

8.2 Priorities for action will again be focused on the unsatisfactory discharges. In the context of coastal waters and estuaries, similar criteria can be used as for freshwaters (Section 4.1) except that sub-paragraph (ii) (causes or makes a significant contribution to a deterioration in river chemical or biological class) is inappropriate. A suggested approach is summarised in Table H1.2 below.

8.3 Appendix H3 sets out criteria for SEPA to determine consents for discharges to coastal waters based on the number of acceptable spills per bathing season to each of these waters. If it can be demonstrated that a scheme can be designed with no more than a 1.8% risk of failure of the Bathing Water Directive's Mandatory Standards, specifically due to CSOs, then alternatives may be considered. Where relevant an equivalent statistical risk of failure should be considered in respect to the Bathing Water Directive's Guideline standard. These are on the assumption that the discharge is directly to the water concerned and located below MLWS (soffit level).

8.4 If the discharger decides to take the discharge away from the identified bathing water or to use alternative means and can demonstrate satisfactorily that the alternatives will enable the EC Bathing Water Directive standards to be met, then this will be acceptable.

TABLE H1.2 INDICATIVE IMPACT ASSESSMENT CRITERIA FOR SETTING CONSENTS INTO COASTAL WATERS AND ESTUARIES

LOW SIGNIFICANCE
Minimum data methods (eg, Formula A) Estuarial and coastal waters not containing EC identified bathing waters and/or shellfish waters
MEDIUM SIGNIFICANCE
Simple Models (sewer hydraulic model with frequency assessment of overflow spill) Population equivalent 2,000 - 10,000 Affects identified bathing waters and/or shellfish waters This approach is only likely to be required if both criteria apply.
HIGH SIGNIFICANCE
Complex models (sewer hydraulic model with frequency assessment of overflow spill and an option for coastal dispersion model and impact assessment) Population equivalent > 10,000 Affects identified bathing waters and/or shellfish waters This approach is only likely to be required if both criteria apply.

CONSENTING INTERMITTENT SEWAGE DISCHARGES INTO FRESHWATERS

1. INTRODUCTION

1.1 This Appendix sets out the basis for issuing consents for intermittent sewage discharges into freshwaters. The discharges covered include combined sewer overflows (CSOs) and storm tank discharges, at sewage treatment works and pumping stations.

2.1.2 This Appendix supplements Annex H, the "Framework for Consenting Intermittent Discharges", and should be read in conjunction with it. The Appendix sets out the basis of policy for issuing consents for combined sewer overflows (CSOs) discharging to freshwaters. Although the standards set down in this section are considered to meet the provisions of the Regulations, it is acknowledged that there will be certain circumstances where, for the purpose of protection of the water environment, more stringent standards may be necessary. SEPA will give due regard to cost and environmental benefits in such cases.

2. DEFINITIONS

2.1 **DWF - Dry Weather Flow**: For design purposes calculated by the equation:

DWF = PG + I + E where:
P = Population served;
G = Water consumption per head per day;
I = Infiltration allowance; and
E = Trade Effluent flow to sewer as applicable.

2.2. **Formula A**: A CSO setting as defined in the Report of the Technical Committee on Storm Overflows and the Disposal of Storm Sewage (1970)[(1)]. The Formula should be amended, as described in the Report, for any separate areas within the sewer catchment. Where storage is provided at a CSO, and in very large sewerage systems where significant smoothing of flows occurs, this will be taken into account in defining the performance equivalent to "Formula A" without storage. The standard "Formula A" is DWF + 1360P + 2E, where flows are expressed in litres/day, but minor local variations have been developed and are acceptable provided they are fully documented.

2.3 **The Scottish Development Department Method:** An extension of the Formula A methodology using storage to limit pollution from CSOs according to the dilution capacity of the receiving stream, using the following definitions.

Available Dilution	Percentage Spill	Overflow Arrangement
8	100	Formula A
4	50	Formula A + 40 l/hd storage
2	25	Formula A + 80 l/hd storage
1	12	Formula A + 120 l/hd storage

2.4 **WALLRUS**: A hydraulic sewer model developed by Hydraulics Research, Wallingford.

2.5 **CARP**: A comparative procedure developed by WRc for assessing CSO improvements required to achieve a good quality coarse fishery in a river.

2.6 **QUALSOC**: A simple mass balance procedure for setting spill rates of CSOs.

2.7 **QUALSIM**: A statistical procedure which is a development of QUALSOC for assessing CSO improvements.

2.8 **MIKE II**: A suite of models developed by the Danish Hydraulics Institute with a component sponsored by the FWR Urban Pollution Management Programme. It is intended for assessing the impact of intermittent discharges using a dynamic approach.

3. APPLICATION OF GUIDANCE

3.1 This guidance applies to all new and unsatisfactory intermittent sewage discharges to any fresh waters in the UK.

4. NORMAL REQUIREMENTS

4.1 The following requirements will normally apply.

4.2 Retained Flow: The sewerage system must be designed so that the discharges are not made until the incoming flow exceeds that calculated from "Formula A" as defined in 2.2 or its modification as provided by 2.3. For existing satisfactory situations less demanding requirements may be acceptable when dilution is high.

4.3 Aesthetic Control: The discharge should not create any visual or aesthetic impact caused by solids, paper, plastic or fungus or as demonstrated by a history of justified public complaints or concern.

4.4 Water Quality Impact: The discharge should not cause, or significantly contribute to, a deterioration in water quality standards.

4.5 Consent Conditions

4.5.1 Consents issued must include necessary conditions such as overflow location, type, weir setting, storage requirements etc, and aesthetic performance standards as appropriate to the receiving water uses.

4.5.2 It will not be necessary to apply numeric, chemical and bacteriological quality conditions in the consent.

4.5.3 The requirements may in certain circumstances be for the provision of a storm event/duration monitor, the results from which would normally be presented in the form of an annual report from the discharger.

4.6 Appraisal Techniques: Three different methodologies are currently available to set CSO Consent Conditions and these are defined as follows:

discharge control based upon Formula A or QUALSOC;

impact assessment using simple procedures and models eg, SDD, QUALSOC, CARP; and

dynamic river quality approach using intermittent water quality standards, with complex sewerage and environmental modelling techniques eg, WALLRUS, MIKE II. This is being developed by the UPM procedures.

The choice of which procedure should be used should be determined by the impact of the discharge.

5. ASSESSING THE IMPACT OF A DISCHARGE

5.1 The requirements for the engineering and environmental assessment needed to specify design standards will be directly related to the size and potential significance of the scheme.

5.2 The significance of indicative impact criteria will be assessed following procedures described in the UPM Manual (FWR Non. 1994, FR/CL 0002**)**.

In defining significance the following Table H2.1 provides guidance for selection of a particular methodology.

TABLE 2.1

INDICATIVE IMPACT ASSESSMENT CRITERIA FOR SETTING CONSENTS FOR CSOs TO FRESHWATERS

LOW SIGNIFICANCE
Discharge Control Methods eg, Formula A[(1)], or in some cases QUALSOC Dilution > 8:1 (foul DWF @ 5%ile low river flows) No interaction with other discharges This approach is likely to be adequate in most cases.
MEDIUM SIGNIFICANCE

Impact assessment using Simple Models (eg, SDD method, QUALSOC, QUALSIM, CARP + sewer hydraulic model such as WALLRUS) Dilution <8:1 No interaction or limited interaction with other discharges >2000 population equivalent Cyprinid fishery This approach is only likely to be required if all of these criteria apply.
HIGH SIGNIFICANCE
Complex Models (eg, sewer hydraulic models such as MOSQITO and river quality models such as MIKE II - to be overtaken by UPM Procedures) Dilution <2:1 Interaction with other discharges >10,000 population equivalent Cyprinid or salmonid fishery This approach is only likely to be required if all of these criteria apply.

The significance of indicative impact will be assessed following the procedures described in the UPM manual.

6. DISCHARGE CONTROL METHODS

6.1 Where the impact of discharges is of low significance, then assessment can be less sensitive and the use of Formula A as defined in 2.2 and its modifications are the most appropriate.

6.2 Storm treatment should normally be given by provision of storm tank capacity of 68 l/hd or 2 hours storage at 3PG+I+3E or by a process giving equivalent performances. Storm tank contents should be returned to the ongoing flow for full treatment as soon as practicable after cessation of a storm.

6.3 Formula A[1]

6.3.1 This traditional approach to combined sewer overflows has been based upon hydraulic criteria to assess the size of the downstream sewer, and takes little account of the assimilative capacity of the receiving watercourse.

6.4 SDD Method: The Scottish Development Department Report 1977[7]

6.4.1 This provides guidelines for deciding upon the amount of storage to be incorporated within a combined sewer overflow structure. The level of storage is dependent upon the dilution factor (ie

stream 95% exceedance flow/sewer DWF). This method does not predict the receiving water impact. It only attempts to reduce the impact of the discharge to a lower level, which may or may not be acceptable, depending on the river quality objectives of that river.

6.4.2 Design guidelines are given in the SDD report for overflow settings and tank capacities where dilution in the receiving stream is limited.

6.5 QUALSOC[5,8,9]

6.5.1 QUALSOC uses a simple mass balance technique that enables the effects of varying the weir setting (spill rate) on the water quality downstream of the overflow to be estimated. In its current form the water quality parameter used is the 5-day BOD value and the overflow impact is assessed against the Maximum Admissible Concentration value (MAC) in the downstream river appropriate to the river classification.

7. THE IMPACT ASSESSMENT APPROACH

7.1 In the circumstances where impact assessments utilising sewer hydraulic models are required, as set out in Table H2.1. the data requirements for the building of a full dynamic sewerage and river model are considerable. In many circumstances these cannot be justified for the size or impact of the scheme. A first approach is to consider the use of the following procedures.

7.2 QUALSIM

7.2.1 A stochastically based methodology for calculating impact of intermittent discharges against specified duration and percentile standards, given spill data from a validated sewerage model and river flow/quality data. It is a statistical procedure which is a development of QUALSOC for assessing CSO improvements.

7.3 Standards

7.3.1 Table 2.2 sets out standards which may be used as guidance in the QUALSOC - QUALSIM procedures for the achievement of appropriate class for supporting a viable fishery.

7.4 If it is intended that the QUALSOC - QUALSIM procedures are used to model Scottish rivers it will be necessary to re-assess the classification of the rivers using the following parameters.

TABLE H2.2

Guidance standards for QUALSOC/QUALSIM/INCARLO models

River Class	BOD LIMIT 95%ile mg/l	99%ile mg/l	MAC mg/l
1A	3	5	6
1B	5	9	12
2	9	16	20

7.5 CARP[5,6]

7.5.1 CARP is an interim procedure for spill load estimates. This is used to calculate acceptable spill loads to individual river reaches by comparing the pattern of load input with a river reach of similar characteristics which receives significant spills but still attains its desired quality objectives.

8. THE DYNAMIC APPROACH USING RIVER QUALITY STANDARDS FOR INTERMITTENT DISCHARGES

8.1 In rivers seriously affected by intermittent polluting discharges from large urban conurbations, intermittent river quality standards are required. The aim is to provide standards which ensure the long term survival of fish and other biological life. Intermittent standards for water quality have been proposed by WRc and standards have been developed based on the following parameters:

(a) return period of an event, eg, occurs once a year;

(b) the duration of the event, eg, lasts two hours; and

(c) the magnitude of the pollution eg, river concentrations should not exceed 3 mg/l of ammonia.

8.2 By setting appropriate standards to protect aquatic life, the impact of sewerage schemes can be assessed and design conditions set for an acceptable discharge. These standards should be suitable for use in the application of the complementary dynamic river discharges model MIKE 11.

8.3 Return Period

8.3.1 The standards have been developed to achieve a satisfactory quality in the river for events with a 1 year return period. A rolling 5 year period could be the minimum practical time period over which to judge performance. Appropriate return periods for design purposes will be available through the UPM Manual procedures, or in the MIKE II Application Guide.

8.4 Event Duration

8.4.1 The duration of an event and its effect on a river is difficult to model. For practical application it is recommended that a short term duration could be 6 hours; other duration periods may be considered.

8.5 Magnitude

8.5.1 From the chosen return period and event duration the limit for dissolved oxygen and ammonia can be determined from the research recommendations.

8.6 Standards

8.6.1 It is recommended that, as an interim measure, the receiving water quality standards to achieve and support a viable fishery with respect to intermittent discharges could be expressed as in Table H2.3.

TABLE H2.3

Recommended Criteria for 6 Hour Duration

Duration of Event	**6 hours**
Return Period	**1 year**
Dissolved Oxygen	**≥3.5 mg/l**
Total Ammonia	**≤5.0 mg/l**

8.6.2 The Urban Pollution Management Manual specifies the methodology, suitable models and data requirements in greater detail.

8.6.3 These standards should be suitable for use in the application of the complementary dynamic river discharges model MIKE II.

9. AESTHETIC CONTROL

9.1 The major objective in controlling CSO discharges is to minimise the presence of objectionable solids and persistent materials in watercourses. This can be achieved by a number of means, for example the design of the overflow structure or the provision of screens.

9.2 Design

9.2.1 The WRc Guide to Design of Storm Overflow Structures[10] should normally be used and, as a minimum, the installation should be of a type which gives acceptable solids separation and retention (eg a properly designed high sided weir, stilling pond or vortex separator). Such structures as leaping weirs, low sided weirs and holes in a wall are unacceptable unless no adverse impact is noted from existing structures.

9.3 Aesthetic Control

9.3.1 Guidance on aesthetic control for new and existing unsatisfactory CSOs is given in Appendix H.5.

9.4 Storm Tank Discharges

9.4.1 The normal requirement is for all sewage flows up to 3PG + I + 3E to be fully treated. Flow between 3PG + I + 3E and 6PG + I + 3E or Formula A as defined in 2.2.2 should normally have tank treatment provided by storm tank capacity of 68 l/hd or two hours at 3PG + I + 3E as appropriate or by a process giving equivalent performance. Flows greater than 6PG + I + 3E should be dealt with as CSOs.

REFERENCES

In the preparation of this section the following references have been taken into account.

1. Ministry of Housing and Local Government Technical Committee on Storm Overflows, HMSO, 1970.

2. Proposed water quality criteria for the protection of aquatic life from intermittent pollution: Dissolved Oxygen, Water Research Centre, Medmenham 1990, PRS 2498-M.

3. Proposed water quality criteria for the protection of aquatic life from intermittent pollution: Ammonia, Water Research Centre, Medmenham 1991, NR 2682.

4. NRA Policy Implementation Guidance Note SC/CC/002 - Interim guidance on issuing consents for discharge (internal).

5. Interim river quality planning procedures for controlling intermittent pollution from storm sewage overflows, Water Research Centre Report ER316E.

6. Time Series Rainfall, Water Research Centre Report ER 195E.

7. Storm Sewage Separation and Disposal; Scottish Development Department, HMSO, 1977.

8. QUALSOC, Storm Sewage Overflow Policy Group October, 1988, Welsh Sewerage authority.

9. QUALSOC, User Manual January, 1991, Version 5, Welsh NRA.

10. A Guide to the Design of Combined Sewer Overflow Structures, FR0488, November 1994.

11. WRC/CIRIA Tech Note 132 Phase III Stormwater Overflows and Pumping Station, 1991.

CONSENTING COMBINED SEWER OVERFLOWS (CSOs) INTO COASTAL WATERS AND ESTUARIES

1. INTRODUCTION

1.1 This Appendix supplements Annex H, the "Framework for Consenting Intermittent Discharges", and should be read in conjunction with it. The Appendix sets out the basis of policy for issuing consents for combined sewer overflows (CSOs) discharging to estuarial and coastal waters. Although the standards set down in this section are considered to meet the provisions of the Regulations, it is acknowledged that there will be certain circumstances where, for the purpose of protection of the water environment, more stringent standards may be necessary and due regard will be given to cost and the environmental benefit. Control of combined sewage overflows to coastal and estuarial tidal waters is needed to ensure that, where waters are identified under the provisions of the EC Bathing Water Directive, compliance with the requirements of that directive is not compromised by the adverse effect of such discharges.

1.2 The section recognises the need to protect other uses of coastal and estuarial waters, such as recreation and amenity. For these uses there is currently no statutory requirement to be met. SEPA however, has a duty to maintain and where necessary improve the quality of waters in the marine environment.

1.3 It is also recognised that there are distinct variations in the nature of receiving coastal and estuarial waters of the UK. This section is therefore designed to take into account local conditions and provide a framework for issuing consents which reflect the local needs and benefits to the environment.

1.4 The need to limit the operation of tidal CSOs and provide emission control of sewage solids through the use of appropriate solids retention techniques is also described.

2. DEFINITIONS

2.1 Bathing Season

2.1.1 The period during which monitoring is carried out in accordance with EC Bathing Water Directive requirements. (For sewerage scheme design purposes this is mid-May to mid-September in Scotland.)

2.2 Identified Bathing Waters

2.2.1 Refers to those bathing waters identified in Scotland under the provisions of the EC Bathing Water Directive.

2.3 Other Waters

2.3.1 Includes those other waters used for activities such as recreation and water contact sports.

2.4 Soffit Level

2.4.1 The level of the top inner surface of the outfall pipe.

2.5 MLWS

2.5.1 The level of Mean Low Water Spring tides as given in the Admiralty Tide Tables and corrected, where necessary, for the actual location of the outfall.

2.6 On Average

2.6.1 Normally, the average over a period of not less than 10 years.

2.7 Spill Frequency

2.7.1 The number of significant spills from a CSO into the environment per bathing season or per year as appropriate. The number of spills may be based on observed spill frequency or that predicted using a verified sewer system model and long term rainfall data (See Appendix H3). The size of spill which qualifies as significant will depend upon a number of factors. In general, however, for design purposes a spill greater than 50 m^3 will be significant.

2.8 Estuarine Waters

2.8.1 All waters identified as estuarial as defined under the provisions of the Regulations.

2.9 Coastal Water

2.9.1 All marine waters up to the 3 nautical mile limit, excluding estuaries, as defined in the Control of Pollution Act 1974.

2.10 Formula A

2.10.1 As defined in Section 2.2. of Appendix H1. Where there is a significant influx of holiday population then the alternative of 6 x Dry Weather Flow (defined as 6PG + I (summer) + 3E) can be used.

2.11 DWF - Dry Weather Flow

2.11.1 For design purposes calculated by the equation:

DWF = PG + I + E where:

P = Population served; and

G = Water consumption per head per day.

I = Infiltration allowance; and

E = Trade effluent flow to sewer as applicable.

3. APPLICATION

3.1 This section applies to all new or unsatisfactory combined sewage overflows discharging to any estuarial and coastal waters in the UK.

3.2 No specific bacteriological Environmental Quality Standards currently exist for water other than those for identified Bathing Waters. This document therefore suggests interim target performance standards for guidance. A "Guideline" value for faecal coliforms is given in the Annex of the EC Shellfish Waters Directive for designated shellfish waters.

3.3 The procedure for consenting storm discharges to coastal waters is outlined in the flow diagram in Appendix H2.1.

4. MINIMUM REQUIREMENTS

4.1 In general, subject to specified exceptional circumstances, the following requirements will apply as a minimum.

4.2 Minimum Retained Flow

4.2.1 The sewerage system should normally be designed so that the CSO will not spill until the incoming flow exceeds that calculated from "Formula A". The Formula is to be amended as described in the Report for any separate areas within the sewered catchment. Where storage is provided at a CSO or in very large sewerage systems where significant smoothing of flows occur, then this shall be taken into account in defining the performance equivalent to "Formula A" without storage.

4.3 Location

4.3.1 The outfall soffit level of all CSOs must be located below the level of low water mark of mean spring tides (MLWS) unless the following exceptional circumstances apply.

4.3.2 Exceptional circumstances.

4.3.2.1 Where there are particular local extenuating circumstances which either prevent, or render it impossible to locate the outfall in accordance with the minimum requirement, then the following guidance should be applied appropriate to the receiving water category:

4.3.2.2 Identified Bathing Waters

A spill frequency standard should be applied as follows:

CSO soffitt above MLWS but below the level of high water of mean spring tides (MHWS):

- spill frequency should be set between 3 spills/season and 1 spill in every 5 bathing seasons based on local considerations and the actual location of the CSO soffit

CSO soffit at MHWS:

- Spill frequency should be limited to 1 spill in every 5 bathing seasons

CSO soffit above MHWS:

- spill frequency should be limited to 1 spill in every 5 years

4.3.2.3 Other Waters

Decisions should be based on local factors, for example visibility of pipe, direct access by the public, overflow located in cliff face etc, and also the practical engineering considerations of construction and maintenance. The use of an alternative means of achieving the required standards is acceptable.

4.4 Consent Conditions

4.4.1 Consents will include such necessary conditions as overflow location, type, weir setting, storage requirements, etc to limit the operation of, and the aesthetic performance of such overflows, as appropriate to the receiving water uses.

4.4.2 It will not be necessary to set numeric, chemical and bacteriological quality conditions in the consent, but the requirements may, in certain circumstances, be for the provision of a storm event/duration monitor, the results of which would normally be in the form of an annual report from the discharger.

5. USE RELATED SPILL FREQUENCY DESIGN STANDARDS

5.1 Where spill frequency standards are applicable under this section, sewerage authorities should provide full technical information, including any modelling undertaken, in order to determine the expected spill frequency performance of the CSOs. The steps to be taken in applying spill frequency standards are shown diagrammatically in Appendix H2.1.

5.2 Where the sewerage authorities wish to apply standards different from those given in 5.3 they will need to complete validated sewer hydraulic modelling and time series rainfall response estimates for the system using historic rainfall records covering the most recent period of 10 years. Shorter periods should only be accepted where such local records are not available. Guidance on recommended methods is given in Appendix H3.

5.3 Identified Bathing Waters

5.3.1 The maximum number of independent storm event discharges via the combined sewer overflow(s) to identified bathing waters, or in close proximity to such waters, must not, on average, exceed the spill frequency standards of 3 SPILLS PER BATHING SEASON. This spill frequency will apply:

a) unless the CSO has not, historically, caused non-compliance of the EC Bathing Water Directive; or

b) unless the sewerage authority demonstrates that the scheme is designed to achieve the water quality standards of the EC Bathing Water Directive for at least 98.2% of the time.

5.4 Higher Protection (Lower Spill Frequency) Levels

5.4.1 For CSOs operating at a spill frequency of not more than 1 in 1 year a 10 mm bar screen emission performance will be acceptable.

5.5 EC Designated Shellfish Waters

5.5.1 The discharge from any new combined sewer overflows into designated Shellfish Waters should be avoided. For existing unsatisfactory overflows discharging directly to shellfish waters the sewerage authority should adopt a policy of improvement to minimise such spills.

5.6 Other Waters

5.6.1 There are currently no statutory provisions for these waters. As a minimum, Formula A will apply.

5.6.2 If it can be demonstrated that this level of protection will produce no significant environmental benefit, the sewered area should be treated on a case by case basis, where necessary supported by investigations and modelling exercises.

5.6.3 If, because of local use requirements, a more stringent standard of protection is needed, monitoring and modelling exercises are required to asses the required discharge frequency.

6. IMPACT CRITERIA

6.1 Where the sewerage authority intends to extend the outfall of the CSO some distance offshore of MLWS to achieve improved dispersion of the discharge of storm sewage, the following criterion may be adopted.

- Achievement of the water quality standards of the EC Bathing Water Directive should be achieved in not less than 98.2% of the bathing season.

6.2 The impact criterion should ONLY be used in those circumstances where extensive studies, including field exercises, can be undertaken and SEPA who have responsibility for auditing such information provided by the discharger can be reasonably satisfied with the validity of the assumptions made and the predictions produced. See WRc Report No UC 693, March 1991[(2)] for further advice on this approach, if applicable. Small volume discharges as defined in *2.7* may be exempted from impact criteria requirements.

7. CONTROL OF DISCHARGE OF SOLIDS

7.1 The control of discharge of solids is required on a year-round basis and therefore consent calculation must be based on annual data and generally based on WRc report No UC 693, 1991.[2]

7.2 The steps to be taken in applying solids separation techniques to achieve aesthetic emission standard are shown diagrammatically in Appendix H2.1 to this section. A method for predicting total volumes (from annual time series rainfall) for the requirements and corresponding flow limits is summarised in Appendix H2.3.

7.3 The specified solids control applies to the volumes discharged after application of the appropriate engineering design to achieve the requirements of sections 4-6 of this Appendix as applicable to the receiving waters.

7.4 Any form of solids control will be considered, provided it can be demonstrated to meet the standards reasonably comparable to the polluting load removed by aperture screens, as set out in Appendices H2.1-H2.3.

REFERENCES

In preparation of this document the following references have been taken into account.

1. Technical Committee on Storm Overflows. HMSO 1970. Ministry of Housing and Local Government (1970)

2. Overall design approach for demonstrating compliance with Bathing Water Standards. Report No 9, WRc Report No UC693, March 1991.

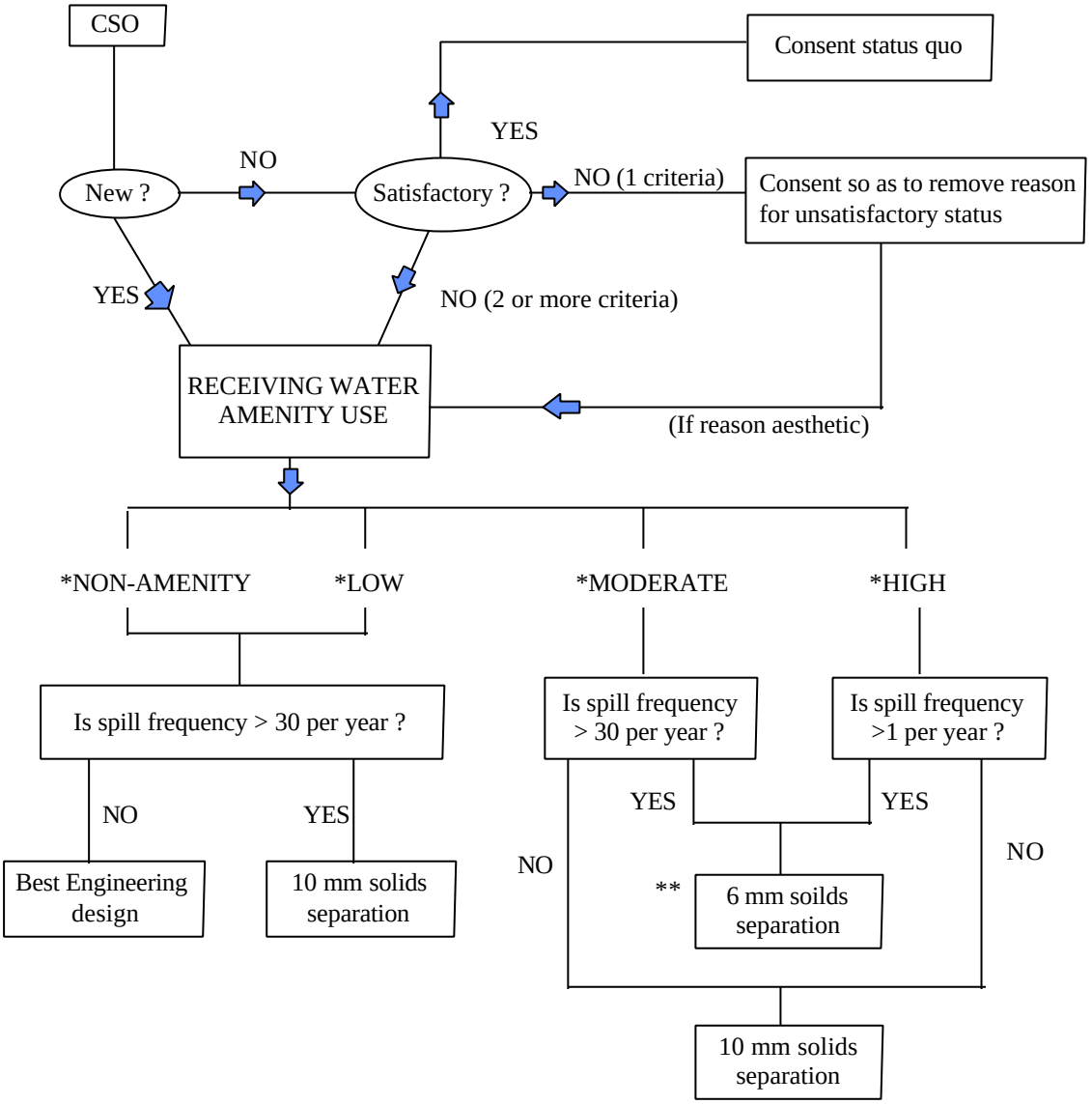
3. Thomas DK, Brown S J & Harrington SW (1989). Screening at Marine Outfall Headworks. Journal of IWEM Vol. 3, No 6 December 1989.

4. Draft framework for Consenting Intermittent Discharges. NRA (1992).

5. Consenting Combined Sewer Overflows to Tidal Waters. Wessex Water (1992).

6. Summary of Case Studies. Wessex Water (1992).

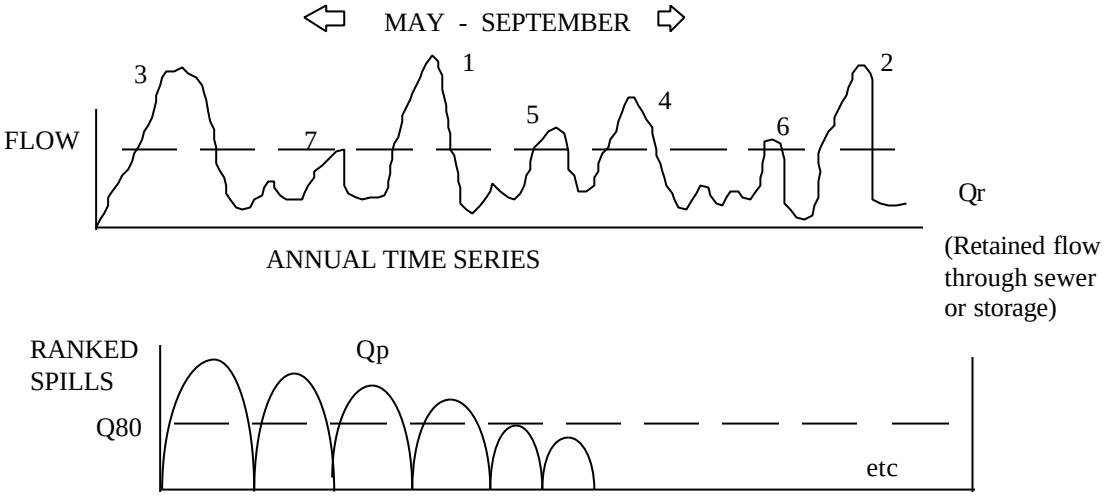
CONTROL FOR DISCHARGE OF SOLIDS - INLAND & TIDAL WATERS



* Refer to text for guidance on selecting appropriate amenity category

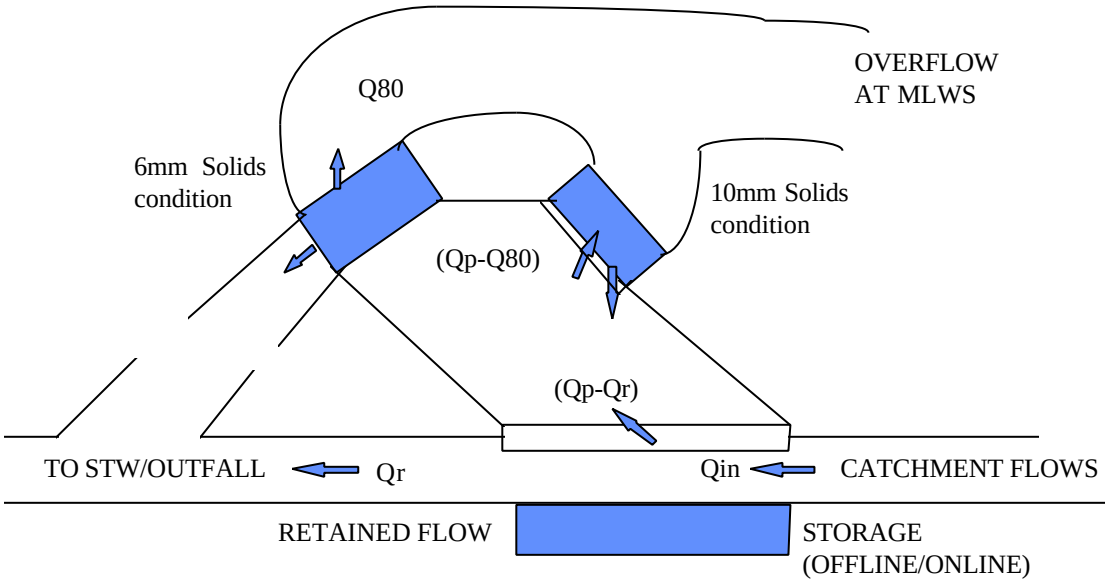
** For significant quantity of solid matter - refer to text

AESTHETIC CONTROL REQUIREMENTS FOR CSO's INTO COASTAL WATERS AND ESTUARIES

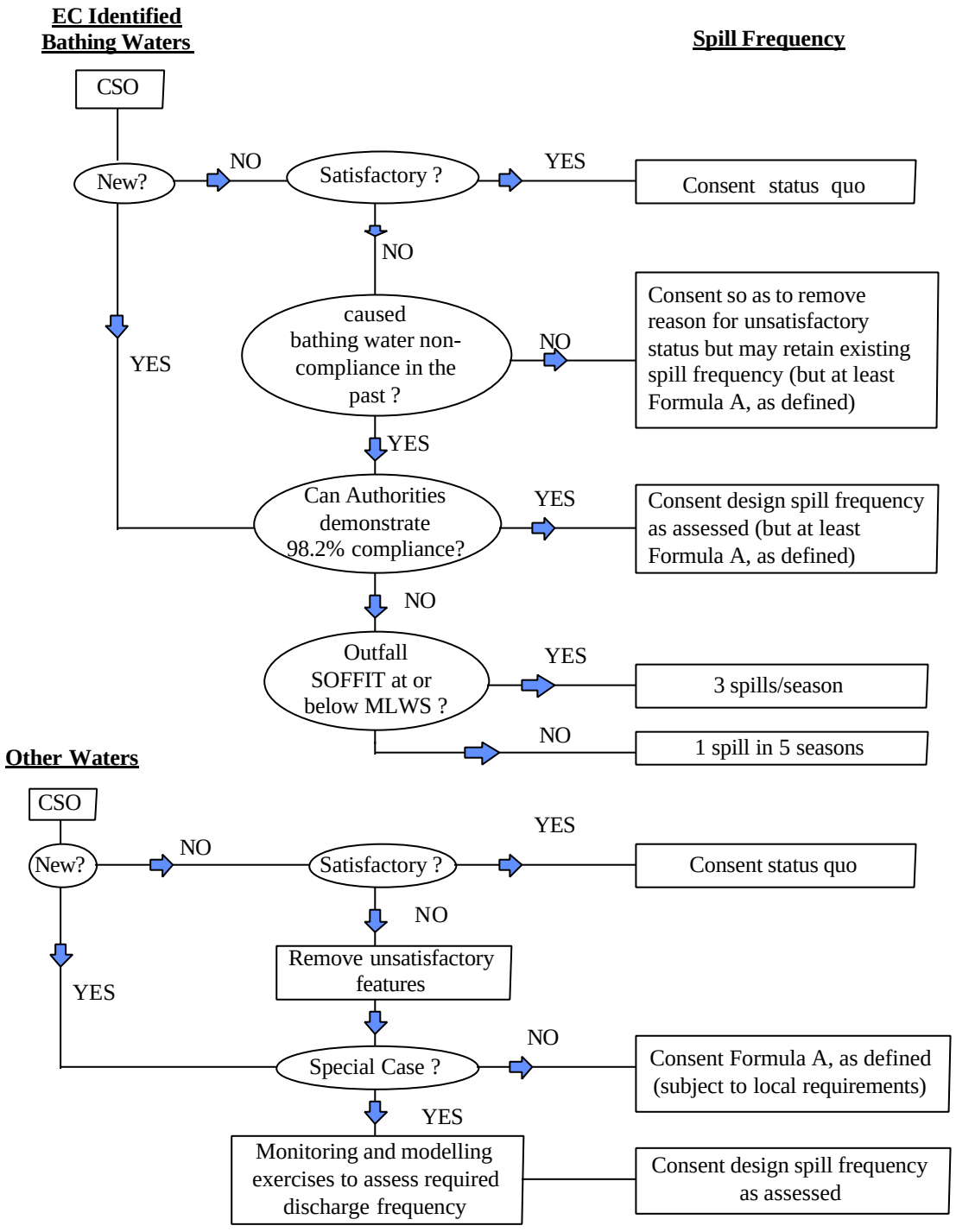


Total volume - Area under curve
Q80 - (80% of total volume) flow
Where Qp >> Q80 then Q80 - 6mm Solids condition
(Qp - Q80) - 10mm Solids condition
Where Qp >> Q80 then 6mm for all flows

TYPICAL INSTALLATION



SPILL FREQUENCY STANDARDS - COASTAL WATERS & ESTUARIES



RESPONSE OF SEWERAGE SYSTEMS TO THE TIME SERIES RAINFALL USING SEWER HYDRAULIC MODELLING

1. INTRODUCTION

1.1 In section 3 reference is made to the need for a validated sewer hydraulic model and the analysis of time series rainfall events during the bathing season. This analysis is required to ensure confidence that an appropriate assessment of the risk has been made.

1.2 The Coastal Sewerage Research Group (CSRG) have investigated methods of analysing the data for time series rainfall as obtained from the Meteorological Office to produce confident predictions of spill frequencies over long time periods. These are:

Method 1	Gross characteristics of historical storms only. Urban Catchment Wetness Index (UCWI) fixed. No sequencing of events.
Method 2	Historical storms used directly with hydraulic models making maximum use of hourly information. UCWI values calculated for each storm event.
Recommended	Development of SMARTS (Stormwater Management Analysis with Rainfall Time Series) model. UCWI values calculated for each storm event. Full sequencing of events over rainfall time series.

1.3 All methods require that a prior validated sewer hydraulic model of the catchment is produced (eg WASSP/WALLRUS).

1.4 The Urban Pollution Management Manual, November 1994 may be used.

1.5 The recommended method allows full sequencing of events, that is the storm tank contents at the end of one storm are taken as the start condition for the next event. It is dependent on the use of the SMARTS model.

1.6 This method also allows investigation of pumping regimes to control discharges within a defined tidal window if this provides operational advantages. The results produced give predictions of the number of spills to be expected in a year or bathing season using the historical rainfall record. The approach is therefore particularly suitable for use with spill frequency design criteria.

1.7 As with all modelling procedures, care must be taken to avoid using the process to investigate criteria outside the original assumptions. The SMARTS routine takes as its base time step an hourly interval. Its use for spills of less than this duration is questionable and therefore in very small catchments an alternative methodology may be required, based on an actual time series of rainfall.

1.8 A report is now available on the relative accuracies of the spill reductions procedure by the three methods. Assessments have been made of the individual spill volumes, associated storage

volumes and the use of a median UCWI value. The accuracy of the methods used by the discharger should be considered when determining the consent.

2. MINIMUM LENGTH OF RAINFALL RECORD

2.1 The method recommends that the minimum length of the rainfall record should be 10 years.

2.2 Such long records are not available for all parts of the UK. The method also includes advice on how to deal with shorter records.

2.3 Whatever the length of record available an assessment of the relative wetness of the period should be made against established long rainfall records. This will ensure any undue bias to wet or dry periods is avoided in making the assessment.

REFERENCES

CSRG (1990) Estimating the frequency of operation of storm outfall and overflows - Method 1. CSRG Report No 5 WRc Report No C408 March 1990.

CSRG (1990) Estimating the frequency of operation of storm outfalls and overflows - Method 2. CSRG Report No 4 WRc Report No C409 March 1990.

CSRG (1991) Recommended method for estimating storm discharge volumes and frequencies. CSRG Report No 12 WRc Report No UC10106 March 1991.

CSRG (1991) An investigation of error bands associated with different spill prediction methods. CSRG Report No 14 WRc Report No UC1338 December 1991.

AESTHETIC CONTROL REQUIREMENTS FOR NEW AND EXISTING UNSATISFACTORY CSOs TO INLAND AND COASTAL WATERS

1. APPLICATION OF THIS GUIDANCE

1.1 This appendix deals with aesthetic control requirements for CSOs and applies to the design criteria for all new and existing unsatisfactory discharges to inland and tidal waters.

1.2 Aesthetic control of CSOs will be required based on the combined criteria of Amenity use and spill frequency as detailed in sections 3.1 and 4.1 below.

2. DEFINITIONS

2.1 Identified bathing waters

2.1.1 Bathing waters identified by The Scottish Office as falling under the terms of the EC Bathing Waters Directive (76/160/EEC)

2.2 Shellfish Waters

2.2.1 Those waters used for the commercial harvesting of shellfish.

2.3 6mm solids separation performance criteria

2.3.1 Separation, from the effluent, of a significant quantity of persistent material and faecal/organic solids giving a performance equivalent to that of 6mm bar screen.

2.4. 10mm solids separation performance criteria

2.4.1 Separation, from the effluent, of a significant quantity of persistent material and faecal/organic solids giving a performance equivalent to that of a 10mm bar screen.

3. CATEGORIES OF RECEIVING WATER AESTHETIC AMENITY VALUE

3.1 The following categories of Amenity use should be used

The Amenity category shall have regard for the affected receiving waters for a reasonable distance downstream as well as those in the immediate vicinity of the discharge.

High Amenity

Influences area where bathing and water contact sport (immersion) is regularly practised (eg wind-surfing, sports canoeing).
Receiving watercourse passes through formal public park.
Formal picnic site.

Designated (and classified for harvesting) Shellfish waters.
Designated Freshwater Fish waters.

Moderate Amenity

Boating on receiving water.
Popular footpath adjacent to watercourse.
Watercourse passes through housing development or frequently used town centre area (eg bridge, pedestrian area, shopping area).
Recreation and contact sport (non-immersion) areas.

Low Amenity

Basic amenity use only.
Casual riverside access on a limited or infrequent basis, such as a road bridge in a rural area, footpath adjacent to watercourse.

Non-Amenity

Seldom or never used for amenity purposes.
Remote or inaccessible area.

4. AESTHETIC CONTROL REQUIREMENTS

4.1 Aesthetic control of CSOs will be required based upon the combined criteria of Amenity use and Spill frequency as detailed below and shown diagrammatically in Appendix x to Annex E for the purposes of this design exercise. These are the minimum requirements necessary for compliance with the Directive and Regulations only.

High Amenity	> 1 Spill Per Annum	6mm solids separation
	<=1 Spill Per Annum	10mm solids separation
Moderate Amenity	>30 Spills Per Annum	6mm solids separation
	<=30 Spills Per Annum	10mm solids separation
Low Amenity & Non-Amenity	>30 Spills Per Annum	10mm Solids separation
	<=30 Spills Per Annum	Best Engineering design

4.2 Where 6mm solids separation is required, the practical limitation of passing all the flow through the process is recognised. In these cases a significant quantity of solid matter, from the sewage flows specified in Paragraph 4.4 below should be subject to 6mm solids separation methods. The remaining flow, up to the flow resulting from a 1 in 5 year storm, should be subject to 10mm solids separation.

4.3 The Recommended Consent Conditions for Sewage Effluent Discharges (Annex J) describes 6mm and 10mm separation as meaning "subject to a process designed and operated to be at least equivalent to a 6mm mesh (10mm bar) screen in its removal of solid matter."

4.4 The flow rate to be used for the hydraulic design of the 6mm solids separation can be set in two ways:

i. Where time series data is available - At a maximum flow equivalent to 80% of the flow volume that would be discharged in an annual time series as per Appendix H3.

ii. Where time series data is unavailable - At a flow rate which is equal to 50% of the volume that would be discharged in a 1 in 1 year design event.

DISCHARGES OF INDUSTRIAL WASTE WATER TO COLLECTING SYSTEMS OR TREATMENT PLANTS

1. RELEVANT PROVISIONS OF EXISTING LEGISLATION

1.1 Regulation 7 imposes a duty on sewerage authorities to ensure that the requirements of Schedule 4 are met in respect of any trade effluent discharge to sewers. The existing power (Sewerage (Scotland) Act 1968, Part II) to consent such discharges either unconditionally or subject to such conditions as the authority may think fit, or to refuse it, is in effect, reinforced by this duty. Sewerage authorities will be expected to initiate changes in their current consenting regimes such that this new duty is met.

2. SCHEDULE 4 REQUIREMENTS

2.1 In general, the requirements set out in Schedule 4 of the Regulations are the objectives of current trade effluent (TE) law in the UK. However, these objectives are not set out precisely in this form in other legislation at present. The Schedule therefore specifies them for the purpose of compliance with the Directive. In many cases effluent discharged is able to comply with the relevant conditions without pre-treatment. However, in requiring the sewerage authorities to ensure that the requirements of Schedule 4 are met, the Regulations provide for sewerage authorities to require pre-treatment as necessary.

3. Present Practice

3.1 Under present practice, the requirements of Schedule 4 can be dealt with as set out below.

3.2 "Protect the health of staff working in collecting systems and treatment plants":

Certain states of flow, substances in sewage and atmospheres are already recognised as hazardous to health with action taken accordingly. Conditions can be set to ensure harmless dilution of known hazardous substances and control flows. Substances other than those declared by the trader to be present are deemed to be excluded from the effluent.

3.3 "Ensure that collecting systems, waste water treatment plants and associated equipment are not damaged":

The conditions under which such damage can occur are well defined and can be adequately addressed by Consents or other existing statutory powers.

3.4 "Ensure that the operation of waste water treatment plants and treatment of sludge are not impeded":

Again conditions under which this may occur are generally well defined, and the Consent procedure under the statutes covering trade effluent control allows adequate cover.

3.5 "Ensure that discharges from waste water treatment plants do not adversely affect the environment, or prevent receiving waters from complying with other Community Directives":

The statutory control of discharges from waste water treatment plants is carried out by SEPA. Their consent procedures define treatment plant effluent content under environmental statutes and Community Directives. In turn, this defines what can be accepted into collecting systems. The relevant trade effluent statutes allow regulation, authorisation and control by sewerage authorities.

3.6 "Ensure that sludge can be disposed of safely in an environmentally acceptable manner":

Sludge is disposed of or recycled by a variety of means, which are covered by The Sludge (Use in Agriculture) Regulations 1989 and the Food and Environment Protection Act 1985, the Waste Management Licensing Regulations 1994, or the Environmental Protection Act 1990. Similarly to 3.5 above, constraints relating to the nature and composition of industrial waste water can be imposed on dischargers by sewerage authorities under trade effluent statutes in order to control sludge quality.

3.7. Current legislation enables sewerage authorities to adopt practices which fit well with the philosophy of Regulation 7 and the objectives of Schedule 4.

CONSENT CONDITIONS FOR SEWAGE EFFLUENT DISCHARGES

1. Before April 1996, the Association of Directors and River Inspectors for Scotland (ADRIS) and the Scottish Association of Directors of Water and Sewerage Services (SADWSS) agreed a Recommended Consent Conditions for Sewage Effluent Discharges. The guidance document contained draft consent conditions for differing types of sewerage and sewage works discharge consents. SADWSS concluded that it had no objection to the document as a set of guiding principles, within which individual consents would be negotiated by the Sewerage authority and the Regulator.

2. Subsequently, the recommended Consent Conditions have been adopted by SEPA as a Consents Conditions Manual, and Version 1 (1 July 1996) is attached as Appendix J.1 of this Annex. This manual may be updated periodically by SEPA.

SCOTTISH ENVIRONMENT PROTECTION AGENCY

POLICY NO 4

CONSENT CONDITIONS MANUAL

Version 1
1 July 1996

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INTRODUCTION

This document contains draft consent conditions for differing types of sewerage and sewage works discharge consents. These conditions cover the requirements of the European Community Urban Waste Water Treatment Directive (91/271/EEC) and include agreements reached by the Urban Waste Water Treatment Directive Implementation Group on the implementation of the Directive in the UK. The directive concerns the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industrial sectors. The objective of the Directive is to protect the environment from the adverse effects of the above-mentioned waste water discharges. Article 2 of the Directive contains definitions of terms relevant to the implementation of the Directive. Additional relevant 'terms of reference' are provided in Annex 2 of this document.

This is **NOT** a comprehensive list of all consent conditions appropriate to these discharges. It may be that the conditions require modification to ensure that the consent fully covers a particular situation.

This document has been prepared to reflect the situation in Scotland.

Draft consent conditions are provided for the following:

Continuous Discharges

A. Conditions suitable for descriptive consents (article 7)

B. Conditions suitable for works covered by numeric conditions (article 7)

C. Secondary Treatment (article 4)

Cx Nutrient limitation conditions (article 5)

D. Primary Treatment (articles 6 and 8.5)

Table 1 details the expected use of these conditions in relation to the receiving water and the population equivalent of the discharge.

Intermittent Discharges

E. Discharges from Emergency Overflows (EOs)

F. Discharges from storm tanks

G. Discharges from Combined Sewer Overflows (CSOs) to freshwaters

H. Discharges from CSOs to estuaries and coastal waters.

J. Discharges from combined CSO/EOs at pumping stations

Each section follows a similar form and generally includes parts on nature, volume and composition for inclusion in consents.

General

K. General Conditions covering sampling provisions, access, flow measurement, timing etc.

The consent will be made up of conditions from the appropriate discharge type list and the relevant general conditions. Where more than one discharge type is included in a single consent document, for each discharge type the relevant sections of the standard condition document will need to be considered to provide volume, composition and other conditions for that discharge type.

Each condition has a two character reference (alpha, numeric).This refers to the type of discharge and the condition number within that discharge type section. For example E3 is the third condition in the emergency overflow list. Within each general condition there may be subsections which will either apply *en masse*, or be applied independently and/or optionally. Subsections of conditions are numbered such that E3.2.1, for example, refers to the first subsection of the second subsection of the general condition E3.

LAYOUT

General remarks are made in italics.

Mandatory conditions are shown in the standard typeface (although it may be acceptable to select from a range of suggested conditions).

Optional conditions are shown in smaller type.

Double-underlined comments show where the full wording of a condition will be inserted in the final document.

Where there is a choice of wording or numeric variable dependent upon the situation, or where the inclusion of wording is optional, this is shown within < > in fine type.

TABLE 1 CONTINUOUS DISCHARGES

Consent Conditions appropriate to different Waters and discharge population equivalents

DISCHARGE POPULATION EQUIVALENT		< 250	250 to 2,000	2,000 to 10,000	10,000 to 15,000	15,000 to 150,000	> 150,000
WATER							
FRESHWATER	Normal	A/B (2005)	B/A (2005)	C (2005)	C (2005)	C (2000)	C (2000)
	Sensitive	A/B (2005)	B/A (2005)	C (2005)	Cx (1998)	Cx (1998)	Cx (1998)
ESTUARIES	HNDA	A/B (2005)	B/A (2005)	C/D (2005) [1]	C (2005)	C (2000)	C (2000)
	Normal	A/B (2005)	B/A (2005)	C (2005)	C (2005)	C (2000)	C (2000)
	Sensitive	A/B (2005)	B/A (2005)	C (2005)	Cx (1998)	Cx (1998)	Cx (1998)
COASTAL	HNDA	A/B (2005)	B/A (2005)	B (2005)	C/D (2005) [1]	C/D (2000) [1]	C/D (2000) [2]
	Normal	A/B (2005)	B/A (2005)	B (2005)	C (2005)	C (2000)	C (2000)
	Sensitive	A/B (2005)	B/A (2005)	B (2005)	Cx (1998)	Cx (1998)	Cx (1998)

A = Appropriate treatment descriptive.
B = Appropriate treatment numeric (the precise level of treatment will depend on the needs of the receiving waters).
C = Secondary treatment.
Cx = "More stringent" treatment than secondary unless approved otherwise under Annex 1A of the Directive.
D = Primary Treatment
HNDA = High Natural Dispersion Area. Note: Articles 6 and 8.5 may apply

The year in parenthesis is the year by the end of which the Directive's treatment requirements have to be met.

Note 1 ; Less stringent treatment may apply subject to outcome of comprehensive studies.
Note 2 ; Conditional upon successful application for derogation under Article 8.5 , applying Article 6 to such discharges.

CONDITIONS SUITABLE FOR DESCRIPTIVE CONSENTS (Article 7).

Descriptive consents may be used where appropriate treatment is applicable in terms of the directive.

"Appropriate treatment" means treatment of urban waste water by any process and/or disposal system which after discharge allows the receiving waters to meet the relevant quality objectives and the relevant provisions of the EC UWWT and other Community Directives.

The requirement of the Directive is the provision of appropriate treatment not the demonstration of compliance with the limits included in the consent. The precise form of appropriate treatment for discharges to freshwaters will depend upon the size of the discharge relative to the receiving water and can include the following: trickling filter, activated sludge plant, rotating biological contactor, reed bed or equivalent alternative system.

For discharges to estuarine and coastal waters, given the dilution and dispersive characteristics, a minimum requirement will normally be screening or equivalent to retain aesthetically objectionable solids. Primary treatment or the treatment listed for freshwaters may however be required.

NATURE *Use the most appropriate of A1 and A2.*

A1 The discharge shall consist of treated sewage effluent from a population equivalent not exceeding <$$$>.

A2 The discharge or discharges shall consist of storm sewage and/or treated sewage effluent from a population equivalent not exceeding <$$$>.

VOLUME *Use the most appropriate of A3.1 and/or A3.2.*

A3

3.1 The volume of treated sewage effluent discharged shall not exceed <$$$> cubic metres in any continuous period of 24 hours.

3.2 The dry weather flow of treated sewage effluent discharged shall not exceed <$$$> cubic metres in any continuous period of 24 hours.

A4 See G2 for volume condition for the storm discharge.

COMPOSITION

A5

5.1 The discharge shall not contain any matter, to such an extent as to cause the receiving waters to be poisonous or injurious to fish in those waters, or to the spawning grounds, spawn or food of fish in those waters, or otherwise cause damage to the ecology of those waters.

5.2 The discharge shall not have an adverse environmental impact, such as creating significant:

5.2.1 growth of sewage fungus in the bed of the receiving waters;

5.2.2 deposition of visible sewage solids on the banks or bed of the receiving waters;

5.2.3 visible discoloration of the receiving waters by the effluent plume;

5.2.4 increase in foaming of the receiving waters downstream of the discharge.

5.3 The discharge shall contain no significant trace of visible oil or grease.

A6 The discharge of treated sewage effluent shall be subject to a process designed and operated to be at least equivalent to a <***> millimetres <type> screen in its removal of solid matter.

*The choice of '***' and 'type' in A6 will depend on the needs of the receiving waters and may vary.*

UNUSUAL SITUATIONS

This clause is split into three parts dealing with illegal discharges to sewer/emergency discharges to sewer, unusual weather conditions, and short term variations of consents. The unusual weather part has been confirmed as an agreed paper at UWWTDIG and the other parts are written to the same format reflecting the agreed UWWTDIG paper on normal operating conditions.

Use in conjunction with A5. The relevant condition/section numbers will be inserted at <$$$>.

A7

7.1 *Illegal/Emergency discharges to sewer*

7.1.1 No samples of sewage effluent taken at a time when Sections 30H(2) or 30J(1) of the Control of Pollution Act 1974, as amended by Schedule 23 of the Water Act 1989 and Schedule 16 of the Environment Act 1995, apply, and the operation of the sewage treatment works is consequently adversely affected, shall be taken into account in deciding whether or not the conditions contained in paragraphs <$$$> of this consent have been complied with.

7.1.2 On each occasion that the sewage treatment works is not under normal operating conditions for the reasons in A7.1.1 , the discharger shall use its best endeavours to mitigate any adverse effect.

7.2 *Unusual weather conditions*

7.2.1 No samples of sewage effluent taken at a time when unusual weather conditions are adversely affecting the operation of the sewage treatment works, shall be taken into account in deciding whether or not the conditions contained in paragraphs <$$$> of this consent have been complied with.

7.2.2 For the purpose of this condition "unusual weather conditions" shall include:-

7.2.2.1 low ambient temperatures as evidenced by effluent temperatures of 5^{o}C or less, or by the freezing of mechanical equipment in the works;

7.2.2.2 significant snow deposits;

7.2.2.3 tidal or fluvial flooding;

7.2.2.4 weather conditions causing unforeseen loss of power supply to the sewage treatment which could not be ameliorated by the reasonable provision and operation of standby generation facilities.

7.2.3 On any occasion where unusual weather conditions adversely affect the operation of the sewage treatment works, the discharger shall use its best endeavours to mitigate that adverse affect.

7.2.4 For a < *sample of the discharge* > < *inspection of the sewage treatment works* > to be considered for the purposes of A 7.2.1, the discharger shall notify SEPA by telefax or telephone as soon as unusual weather conditions are known to have adversely affected operations and shall confirm the circumstances in writing as soon as possible thereafter (and

in any event within 14 days of the occurrence of such conditions). That notification shall include a full description of the unusual weather conditions and their impact on the operation of the works.

7.3 *Short term variation of consent*

7.3.1 No sample of sewage effluent taken during a period specified in a variation of this consent under Part II of the Control of pollution Act 1974, for reasons such as capital works construction or periods of industrial action, and when the operation of the sewage treatment works is adversely affected as a consequence of such activities, shall be taken into account in deciding whether or not the conditions contained in paragraphs <$$$> of this consent have been complied with.

7.3.2 On each occasion that the sewage treatment works is not under normal operating conditions for the reasons in A7.3.1 the discharger shall use its best endeavours to mitigate any adverse effect.

OPERATION

A8 The works shall be operated and maintained in accordance with good operational practice such that:

8.1 It remains fully operational except at times of unavoidable mechanical or electrical breakdown which shall be attended to, and SEPA informed of the failure, as soon as practicable.

8.2 Following a failure all equipment shall be returned to normal operation as soon as practicable.

8.3 Tanks shall be desludged at sufficient frequency and in such a manner to prevent excessive carryover of suspended solids.

TELEMETRY *Use in special circumstances .*

A9 A telemetry alarm system connected to a 24 hour response system shall be provided and maintained to provide a notification to the discharger of failure or breakdown of the <RBC/Activated sludge> unit.

B. CONDITIONS SUITABLE FOR WORKS COVERED BY NUMERIC CONDITIONS (Article 7).

"Appropriate treatment" means treatment of urban waste water by any process and/or disposal system which after discharge allows the receiving waters to meet the

relevant quality objectives and the relevant provisions of the ECUWWT and other Community Directives, as implemented in regulations.

The requirement of the Directive is the provision of appropriate treatment not the demonstration of compliance with the limits included in the consent. The precise form of appropriate treatment for discharges to freshwaters will depend upon the size of the discharge relative to the receiving water and can include the following: trickling filter, activated sludge plant, rotating biological contactor, reed bed or equivalent alternative system.

For discharges to estuarine and coastal waters, given the dilution and dispersive characteristics, a minimum requirement will normally be screening or equivalent to retain aesthetically objectionable solids. Primary treatment or the treatment listed for freshwaters may however be required.

NATURE *Use the most appropriate of B1, B2 and B3.*

B1 The discharge shall consist of treated sewage effluent from a population equivalent not exceeding <$$$>.

B2 The discharge or discharges shall consist of settled storm sewage and/or treated sewage effluent from a population equivalent not exceeding <$$$>.

B3 The discharges shall consist of screened storm sewage and/or settled storm sewage and/or treated sewage effluent from a population equivalent not exceeding <$$$>.

VOLUME *Use the most appropriate of B4 and B5.*

B4 The dry weather flow of treated sewage effluent discharged shall not exceed <$$$> cubic metres in any continuous period of 24 hours.

B5 The volume of treated sewage effluent discharged shall not exceed <$$$> cubic metres in any continuous period of 24 hours.

B6 See F4 for volume condition for settled storm discharge.

B7 See G2 for volume conditions for storm discharge.

COMPOSITION : SECONDARY APPROPRIATE TREATMENT

Other determinands such as suspended solids, ammonia, List I, List II and red list substances should only be included where it is necessary to maintain or achieve Environmental Quality Standards. However, the suspended solids standards should not normally determine the scale of treatment provision. Standards may be applied on a seasonal basis taking into account available dilution and temperature.

B8

8.1 Subject to section 8.2 below, no instantaneous sample shall contain more than:

8.1.1 <$$$> milligrams per litre of biochemical oxygen demand (determined in the presence of excess allyl-thiourea after 5 days at 20°C);

8.1.2 <$$$> milligrams per litre of <$$$>;

8.1.3 <$$$> milligrams per litre of ammoniacal nitrogen (expressed as N).

8.2 The limit for any of the relevant parameters set out in section 8.1 may be exceeded where, in any series of samples of the treated sewage effluent taken at regular but randomised intervals in any period of twelve months (as listed in Column 1 of the table at Annex 1 to this consent) no more than the relevant number of samples (as listed in Column 2 of the said table) exceed the applicable limit for that relevant parameter.

8.3 Notwithstanding section 8.1 above, no instantaneous sample of treated sewage effluent shall contain more than:

8.3.1 <$$$> milligrams per litre of biochemical oxygen demand (determined in the presence of excess allyl-thiourea after 5 days at 20°C);

8.3.2 <$$$> milligrams per litre of <$$$>;

8.3.3 <$$$> milligrams per litre of ammoniacal nitrogen (expressed as N).

The value of $$$ in 8.3 to be the required 99.5%ile (effective absolute value) of the appropriate quality parameter frequency distribution.

B9

9.1 The discharge shall not contain any matter, other than matter specifically authorised or limited by numerical conditions in this consent, to such an extent as to cause the receiving waters to be poisonous or injurious to fish in those waters, or to the spawning grounds, spawn or food of fish in those waters, or otherwise cause damage to the ecology of those waters.

9.2 The discharge shall contain no significant trace of visible oil or grease.

B10 The <discharge type> shall not contain more than <$$$> milligrams/micrograms/nanograms per litre of <$$$>.

B11 The <discharge type> shall not contain <$$$>.

COMPOSITION ; PRIMARY APPROPRIATE TREATMENT (where there is no requirement for secondary)

Other determinands should only be included where it is necessary to maintain or achieve Environmental Quality Standards.

B12

12.1 Subject to section 12.2 below, no instantaneous sample shall contain more than:

12.1.1 <$$$> milligrams per litre of suspended solids (measured after drying at 105°C).

12.1.2 <$$$> milligrams per litre of <$$$>;

12.2 The limit for any of the relevant parameters set out in section 12.1 may be exceeded provided that, in any series of samples of the treated sewage effluent taken at regular but randomised intervals in any period of twelve months, as listed in Column 1 of the table at Annex 1 to this Consent, no more than the relevant number of samples, as listed in Column 2 of the said table, exceed the applicable limit for that relevant parameter.

12.3 Notwithstanding section 12.1 above, no instantaneous sample of treated sewage effluent shall contain more than:

12.3.1 <$$$> milligrams per litre of suspended solids (measured after drying at 105°C).

12.3.2 <$$$> milligrams per litre of <$$$>.

The value of $$$ in 12.3 to be the required 99.5%ile (effective absolute value) of the appropriate quality parameter frequency distribution.

10

B13 The discharge of treated sewage effluent shall be subject to a process designed and operated to be at least equivalent to a <***> millimetres <type> screen in its removal of solid matter.

*The choice of '***' and 'type' in B13 will depend on the needs of the receiving waters and may vary.*

B14

14.1 The discharge shall not contain any matter, other than matter specifically authorised or limited by numerical conditions in this consent, to such an extent as to cause the receiving waters to be poisonous or injurious to fish in those waters, or to the spawning grounds, spawn or food of fish in those waters, or otherwise cause damage to the ecology of those waters.

14.2 The discharge shall contain no significant trace of visible oil or grease.

B15 The <discharge type> shall not contain more than <$$$> milligrams/micrograms/nanograms per litre of <$$$>.

B16 The <discharge type> shall not contain <$$$>.

COMPOSITION : SCREENING APPROPRIATE TREATMENT (where there is no requirement for primary or secondary treatment)

B17 The discharge of treated sewage effluent shall be subject to a process designed and operated to be at least equivalent to a <***> millimetres <type> screen in its removal of solid matter.

*The choice of '***' and 'type' in B17 will depend on the needs of the receiving waters and may vary.*

B18

18.1 The discharge shall not contain any matter, other than matter specifically authorised or limited by numerical conditions in this consent, to such an extent as to cause the receiving waters to be poisonous or injurious to fish in those waters, or to the spawning grounds, spawn or food of fish in those waters, or otherwise cause damage to the ecology of those waters.

18.2 The discharge shall contain no significant trace of visible oil or grease.

B19 The <discharge type> shall not contain more than <$$$> milligrams/micrograms/nanograms per litre of <$$$>.

B20 The <discharge type> shall not contain <$$$>.

UNUSUAL SITUATIONS

This clause is split into three parts dealing with illegal discharges to sewer/emergency discharges to sewer, unusual weather conditions, and short term variations of consents. The

unusual weather part has been confirmed as an agreed paper at UWWTDIG and the other parts are written to the same format reflecting the agreed UWWTDIG paper on normal operating conditions.

Use B21 in conjunction with B8 and B12. The relevant condition/section numbers will be inserted at <$$$>.

B21

21.1 *Illegal/Emergency discharges to sewer*

21.1.1 No samples of sewage effluent taken at a time when Sections 30H(2) or 30J(1) of the Control of Pollution Act 1974, as amended by Schedule 23 of the Water Act 1989 and Schedule 16 of the Environment Act 1995, apply, and the operation of the sewage treatment works is consequently adversely affected, shall be taken into account in deciding whether or not the conditions contained in paragraphs <$$$> of this consent have been complied with.

21.1.2 On each occasion that the sewage treatment works is not under normal operating conditions for the reasons in B21.1.1 , the discharger shall use its best endeavours to mitigate any adverse effect.

21.2 *Unusual weather conditions*

21.2.1 No samples of sewage effluent taken at a time when unusual weather conditions are adversely affecting the operation of the sewage treatment works, shall be taken into account in deciding whether or not the conditions contained in paragraphs <$$$> of this consent have been complied with.

21.2.2 For the purpose of this condition "unusual weather conditions" shall include:-

21.2.2.1 low ambient temperatures as evidenced by effluent temperatures of 5^{o}C or less, or by the freezing of mechanical equipment in the works;

21.2.2.2 significant snow deposits;

21.2.2.3 tidal or fluvial flooding;

21.2.2.4 weather conditions causing unforeseen loss of power supply to the sewage treatment which could not be ameliorated by the reasonable provision and operation of standby generation facilities.

21.2.3 On any occasion where unusual weather conditions adversely affect the operation of the sewage treatment works, the discharger shall use its best endeavours to mitigate that adverse affect.

21.2.4 For a < *sample of the discharge* > < *inspection of the sewage treatment works* > to be considered for the purposes of B21.2.1, the discharger shall notify SEPA by
telefax or telephone as soon as unusual weather conditions are known to have adversely affected operations and shall confirm the circumstances in writing as soon as possible thereafter (and in any event within 14 days of the occurrence of such conditions). That notification shall include a full description of the unusual weather conditions and their impact on the operation of the works.

21.3 *Short term variation of consent*

21.3.1 No sample of sewage effluent taken during a period specified in a variation of this consent under Part II of the Control of pollution Act 1974, for reasons such as capital works construction or periods of industrial action, and when the operation of the sewage treatment works is adversely affected as a consequence of such activities, shall be taken into account in deciding whether or not the conditions contained in paragraphs <$$$> of this consent have been complied with.

21.3.2 On each occasion that the sewage treatment works is not under normal operating conditions for the reasons in B21.3.1 , the discharger shall use its best endeavours to mitigate any adverse effect.

C. SECONDARY TREATMENT (ARTICLE 4).

"Secondary treatment" means treatment of urban waste water by a process generally involving biological treatment either with secondary settlement or another process in which the requirements in Table 1 of Annex I are respected.

Consents will contain separate consent conditions for compliance with the EC UWWTD and determinands (SS, BOD, NH_3, metals, pesticides etc.) required for compliance with environmental quality objectives.

Condition C1 will be used together with relevant conditions from section B.

C1 For the purposes of the Urban Waste Water Treatment Directive 1991,
in respect of biochemical oxygen demand and chemical oxygen demand the discharge shall comply with the requirements of Schedule 3 of the Urban Waste Water Treatment (Scotland) Regulations 1994 < *from date* >

Cx. NUTRIENT LIMITATION CONDITIONS (Article 5).

NUTRIENTS *Use the most appropriate of Cx1, Cx2, Cx3 and Cx4.*

These conditions can be waived where discharge nutrient reduction will not have an appreciable effect in reducing eutrophication.
12^{o}C Caveat condition when basis of caveat has been finalised.

Cx1 FRESHWATER

For the purposes of the Urban Waste Water Treatment (Scotland) Regulations 1994 the annual mean of any series of 24 hour time based composite samples, taken at regular but randomised intervals, of treated sewage effluent, shall not exceed <$$$> milligrams per litre of total phosphorus (expressed as P) *<from date>*

<$$$> will be 2 mg/l for discharges 10,000 - 100,000 p.e., 1mg/l for discharges > 100,000 p.e.

Cx2 FRESHWATER

For the purposes of the Urban Waste Water Treatment (Scotland) Regulations 1994 the annual mean of any series of 24 hour time based composite samples, taken at regular but randomised intervals, of treated sewage effluent, shall not exceed<$$$> milligrams per litre of total nitrogen (expressed as N) *<from date>*

Cx2 may be used in two circumstances only:
a) where the area is sensitive because it exceeds the 50mg/l NO_3 limit and is abstracted for drinking water purposes - there are no defined standards.
b) to replace Cx1 where nitrogen is the limiting nutrient rather than phosphorus. <$$$> will be 15mg/l for discharges 10,000 - 100,000 p.e., 10mg/l for discharges >100,000 p.e.

Cx3 ESTURIAL AND COASTAL

For the purposes of the Urban Waste Water Treatment (Scotland) Regulations 1994 the annual mean of any series of 24 hour time based composite samples, taken at regular but randomised intervals, of treated sewage effluent, shall not exceed<$$$> milligrams per litre of total nitrogen (expressed as N) < *from date* >

<$$$> will be 15 mg/l for discharges 10,000 - 100,000 p.e., 10mg/l for discharges > 100,000 p.e.

Cx4 No 24 hour time based composite samples of the effluent shall contain more than <$$$> milligrams per litre (phosphorus or nitrogen).

The need for this control parameter is agreed but the actual values are as yet unknown. Identification of these numbers must await current research.

D. PRIMARY TREATMENT (Articles 6 and 8.5).

"Primary Treatment" means treatment of urban waste water by a physical and/or chemical process involving settlement of suspended solids, or other processes in which

the BOD of the incoming waste is reduced by at least 20% and the total suspended solids is reduced by at least 50% before discharge.

NATURE *Use the most appropriate of D1, D2 and D3.*

D1 The discharge shall consist of primary treated sewage effluent from a population equivalent not exceeding <$$$>.

D2 The discharge or discharges shall consist of settled storm sewage and/or primary treated sewage effluent from a population equivalent not exceeding <$$$>.

D3 The discharges shall consist of screened storm sewage and/or settled storm sewage and/or primary treated sewage effluent from a population equivalent not exceeding <$$$>.

VOLUME *Use the most appropriate of D4 and D5.*

D4 The dry weather flow of primary treated sewage effluent discharged shall not exceed <$$$> cubic metres in any continuous period of 24 hours.

D5 The volume of primary treated sewage effluent discharged shall not exceed <$$$> cubic metres in any continuous period of 24 hours.

D6 See F4 for volume condition for settled storm discharge.

D7 See G2 for volume condition for storm sewage.

COMPOSITION

D8 For the purposes of the Urban Waste Water Treatment (Scotland) Regulations 1994 < *from date* >

8.1 Subject to sections 8.2 and 8.3 below, no 24 hour time based sample of primary treated sewage effluent shall contain more than:

8.1.1 50% of the suspended solids content in milligrams per litre (measured after drying at 105°C) in a 24 hour time based sample of the untreated sewage taken at the inlet to the sewage treatment works over the same time period.

8.1.2 80% of the biochemical oxygen demand in milligrams per litre (determined in the presence of excess allyl-thiourea after 5 days at 20°C) in a 24 hour time based sample of the untreated sewage

taken at the inlet to the sewage treatment works over the same time period.

8.2 The limit for any of the relevant parameters set out in section 8.1 may be exceeded provided that, in any series of samples of the primary treated sewage effluent taken at regular but randomised intervals in any period of twelve months, as listed in Column 1 of the table at Annex 1 to this Consent, no more than the relevant number of samples, as listed in Column 2 of the said table, exceed the applicable limit for that relevant parameter.

D9 Notwithstanding section 8 above, no instantaneous sample of treated sewage effluent shall contain more than:

<$$$> milligrams per litre of suspended solids (measured after drying at 105°C).

The value of $$$ in D9 to be the required 99.5%ile (effective absolute value) of the suspended solids frequency distribution.

D10 See condition B10

D11 See condition B11

D12 NON-INJURIOUS TO FISH See condition B9 Optional

D13 UNUSUAL SITUATIONS (Annex 1D5) See condition B21

D14 See condition B17

E. EMERGENCY OVERFLOWS (EO)

The emphasis in these consents is to ensure that there are adequate arrangements for a quick response to minimise pollution. What is adequate will depend on local circumstances.

The means of minimising pollution, chosen by the discharger, may include telemetry, standby power, storage or access for tankers. The choice agreed between the discharger and the Agency should be reflected in the consent.

NATURE

E1 The discharge shall consist solely of sewage.

LIMITATIONS ON DISCHARGE

E2 The discharge shall occur only when the sewage pumping station is inoperative as a result of one or more of the following:

2.1 electrical power failure not due to the act or default of the discharger, its agents, representatives, officers, employees or servants;

2.2 mechanical breakdown of duty and standby pumps;

2.3 rising main failure;

2.4 blockage of the downstream sewer not due to the act or default of the discharger, its agents, representatives, officers, employees or servants;

and it is not reasonably practicable to dispose of the sewage otherwise. There shall be no undue delay on the part of the discharger in remedying any such failure or breakdown.

TELEMETRY

There are two types of telemetry alarm. One to advise of pumping station failure and the other to advise of the occurrence of an overflow.

E3 A 24 hour response telemetry alarm system shall be provided which ensures notification to the discharger of failure or breakdown of the pumping station such that, immediate and appropriate action is taken.

In E3 where telemetry is already installed no date is necessary. Where required, the date will be either the date of installation from the application or the date of issue of the consent plus up to 2 years, as appropriate.

E4 Following installation of the failure/breakdown 24 hour response telemetry alarm system the discharger shall notify SEPA, as agreed in writing with SEPA, in the event of failure or breakdown of the pumping station, that there is potential for operation of the emergency overflow.

Use E4 in potentially high impact circumstances only.

E5 A 24 hour response telemetry alarm system shall be provided by <date> and maintained to provide a notification to the discharger in the event of operation of the emergency overflow.

In E5, where telemetry is already installed no date is necessary. Where required, the date will be either the date of installation from the application or the date of issue of the consent plus up to 2 years as appropriate.

E6 Following installation of the overflow telemetry system the discharger shall notify SEPA as soon as practicable after receipt by the discharger of an overflow telemetry warning, that operation of the emergency overflow had taken place.

Use E6 where the operation of the discharge will require incident mobilisation and advising of downstream users.

RESPONSE TIME

E7 The discharger shall initiate remedial measures within <$$$> hours of the occurrence of the pumping station failure.

<$$$> will be agreed between SEPA and the discharger having regard to, for example, storage times.

POWER

Where necessary use the most appropriate of E8, E9 and E10 , dependent upon the vulnerability of the receiving waters.

E8 Facilities shall be provided by <date> so that a mobile stand-by generator may readily be installed at the pumping station in the event of electrical failure and the discharger shall install and operate such a generator as soon as is practicable after an electrical failure.

E9 A permanent stand-by power generator shall be provided by <date> and maintained in good working order.

E10 A duplicate electricity supply shall be provided by <date> and maintained for use in the event of failure of the normal electricity supply.

PUMPS

E11 The duty pump(s) shall be maintained in good working order, and stand-by pump(s) of capacity <***> shall be provided and maintained at all times.

E12 Stand-by pump(s) shall <automatically> activate should the duty pump(s) become inoperative for reasons other than power failure. The pumping station shall be maintained so that the pump shall <automatically> reactivate <immediately/as soon as is practicable> after the power is restored after interruption to the supply.

'Automatically' should only be included where agreed with the discharger. Where automatic reactivation is not provided as soon as is practicable should be used rather than automatically.

E11 and E12 may need to be amended to reflect assist and ejector pumps. The standby capacity is based upon the sensitivity of the receiving water and the potential impact.

STORAGE

E13 Storage capacity, equivalent to a total of at least <***> hours of the dry weather flow in the sewer immediately upstream of the pumping station, shall be provided by <date> in the pumping station wet well and/or the upstream sewerage system above the wet well design top water level.

*'***' will depend on local circumstances.*

TANKERING/PUMPING AWAY *Use the most appropriate of E14 and E15*

E14 A tanker access facility at an appropriate location shall be provided and maintained to enable removal of sewage from the pumping station.

E15 An external pumping equipment facility shall be provided and maintained for use in the event of installed pumps being inoperative.

CLEAN-UP

E16 When the discharge results in solid matter being visible in the receiving watercourse or on the banks of the receiving watercourse, the discharger shall take all reasonable steps to collect and remove such matter as soon as reasonably practicable after the discharge has been made.

F. STORM TANKS

NATURE *Use the most appropriate of F1, F2 and F3.*

F1 The discharge shall consist of settled storm sewage.

Use F1 where there is a separate outlet.

F2 The discharges shall consist of settled storm sewage and/or treated sewage effluent.

Use F2 where there is a shared outlet with treated sewage effluent.

F3 The discharges shall consist solely of storm sewage and/or settled storm sewage and/or treated sewage effluent.

Use F3 where there is a shared outlet with treated sewage effluent and storm overflow.

VOLUME

F4 The discharge of settled storm sewage shall occur when and only for as long as the storm tanks are full. The discharge of storm sewage to the storm tank shall only occur when the rate of flow at the <storm sewage separating weir/inlet sewer/combined sewer overflow/storm overflow weir/storm overflow chamber> is in excess of <***> litres per second due to rainfall and/or snow melt and shall consist only of flows in excess of this figure. The storm tanks shall be emptied <automatically> and their contents returned for full treatment as soon as practicable after cessation of the overflow to the storm tanks.

The default overflow setting in F4 is 3PG+I+3E. Variations may be permitted following environmental cost benefit analysis by the discharger or where there are very large/small sewerage systems which warrant lower/higher settings respectively. The inclusion of 'automatically' should be agreed with the discharger prior to use.

F5 The capacity of the storm tank(s) shall be at least <***> cubic metres.

In F5, for existing satisfactory discharges state the volume currently provided. For new or unsatisfactory existing discharges the volume should be 68 l/hd or two hours at 3PG+I+3E. Variations may be permitted following environmental cost benefit analysis by the discharger or where there are very large/small sewerage systems which warrant lower/higher settings respectively.

COMPOSITION *Screening will normally be placed upstream of the storm tank inlet.*

F6 The discharge of settled storm sewage shall be subject to a process designed and operated to be at least equivalent to a <***> millimetres <type> screen in its removal of solid matter.

*The choice of '***' and 'type' in F6 will depend on the needs of the receiving waters and may vary.*

G. COMBINED SEWER OVERFLOWS (CSOs) TO FRESHWATERS

The EC UWWTD states the following: Given that it is not possible to construct collecting systems and treatment plants in a way such that all water can be treated during situations such as unusually heavy rainfall, member states shall decide on measures to limit pollution from such storm overflows. Such measures could be based on dilution rates or capacity in relation to dry weather flow or could specify a certain acceptable number of overflows per year.

Where an existing CSO is satisfactory the consent should reflect the existing conditions/provisions and no improvements are necessary. Where a CSO is

unsatisfactory (see "guidance note to UWWTD regulations") due to only one of the criteria the new consent should only tighten performance of the failing criterion. If the unsatisfactory CSO is failing two or three criteria, the new consent should take account of all requirements.

NATURE

G1 The discharge shall consist of storm sewage from a contributing sewerage catchment with a flow in dry weather not exceeding <***> m^3 in any continuous period of 24 hours.

VOLUME

G2 The discharge of storm sewage shall occur only when the rate of flow in the sewer at the <storm sewage separating weir/inlet sewer/combined sewer overflow/storm overflow weir/storm overflow chamber> exceeds <***> litres per second due to rainfall and/or snow melt and shall consist only of flows in excess of this figure.

The default overflow setting in G2 is Formula A (DWF+1.36P+2E m^3/day). For existing satisfactory situations variations may be acceptable, for example, when river dilution is high, following environmental cost benefit analysis by the discharger or where there are very large/small sewerage systems which warrant lower/higher settings respectively. (Litres per second x 86.4 = m^3/day.)

G3 The discharge of storm sewage effluent shall be subject to a process designed and operated to be at least equivalent to a <***> millimetres <type> screen in its removal of solid matter.

*The choice of '***' and 'type' in G3 will depend on the needs of the receiving waters and may vary. In G3, for existing satisfactory discharges state the current provisions. For new discharges and existing unsatisfactory discharges state 6mm equivalent as standard.*

STORAGE IN THE SEWERAGE SYSTEM

G4 A storm sewage storage facility of <***> cubic metres design capacity shall be provided and fully utilised prior to a discharge being made.

G5 The discharge of storm sewage shall occur when, and only for as long as, the storm sewage storage facility is fully utilised and the rate of flow at the <storm sewage separating weir/inlet sewer/combined sewer overflows/storm overflow weir/storm overflow chamber> is in excess of <***> litres per second due to rainfall and/or snow melt and shall consist only of flows in

excess of this figure. The storm sewage storage facility shall be emptied and its contents returned to the main flow as soon as practicable after cessation of the overflow.

Replace G2 with G5 where appropriate.

TELEMETRY/EVENT MONITOR *These conditions may be used, either singly or in combination.*

G6 A 24 hour response telemetry alarm system shall be provided by < date> and maintained to provide a notification in the event of operation of the combined sewer overflow. The system shall be tested on a regular basis, as agreed in writing, to ensure that it is functioning satisfactorily.

G7 Following installation of the overflow telemetry system the discharger shall notify SEPA, as agreed in writing, as soon as is practicable after receipt by the discharger of a telemetry warning in respect of operation of the combined sewer overflow, that operation of the combined sewer overflow has taken place.

G8 Following installation of the overflow telemetry system the discharger shall supply SEPA with a written report on the operation of the combined sewer overflow. The contents and format of the report to be agreed in writing.

G9 A system to record the frequency and duration of overflow events shall be installed and records, as agreed in writing with SEPA, made available for inspection by authorised officers of SEPA at all reasonable times.

CLEAN UP

G10 See condition E16.

H. COMBINED SEWER OVERFLOWS (CSOs) TO ESTUARIES AND COASTAL WATERS

The EC UWWTD states the following: Given that it is not possible to construct collecting systems and treatment plants in a way such that all water can be treated during situations such as unusually heavy rainfall, member states shall decide on measures to limit pollution from such storm overflows. Such measures could be based on dilution rates or capacity in relation to dry weather flow or could specify a certain acceptable number of overflows per year.

Where an existing CSO is satisfactory the consent should reflect the existing conditions/provisions and no improvements are necessary. Where a CSO is unsatisfactory (see "guidance note to UWWTD regulations") due to only one of the criteria the new consent should only tighten performance of the failing criterion. If the unsatisfactory CSO is failing two or three criteria, the new consent should take account of all requirements.

NATURE

H1 The discharge shall consist of storm sewage from a contributing sewerage catchment with a flow in dry weather not exceeding <***> m^3 in any continuous period of 24 hours.

VOLUME

H2 The discharge of storm sewage shall occur only when the rate of flow in the sewer at the <storm sewage separating weir/inlet sewer/combined sewer overflow/storm overflow weir/storm overflow chamber> exceeds <***> litres per second due to rainfall and/or snow melt and shall consist only of flows in excess of this figure.

*For guidance on *** in H2 see guidance note to UWWTD regulations.*

COMPOSITION *Use the most appropriate of H3/H4.*

H3

3.1 The discharge of storm sewage shall be subject to a process designed and operated to be at least equivalent to a <***> millimetres <type> screen in its removal of solid matter.

3.2 The discharge shall not be comminuted or macerated to achieve the standard in 3.1

*The choice of '***' and 'type' in 3.1 will depend on the needs of the receiving waters and may vary.*

H4

4.1 For flows of up to <80% maximum flow> litres per second the discharge of storm sewage shall be subject to a process designed and operated to be at least equivalent to a <***> millimetres <type> screen in its removal of solid matter.

4.2 For flows greater than <80% maximum flow> litres per second the discharge of storm sewage shall be subject to a process designed and operated to be at least equivalent to a <***> millimetres <type> screen in its removal of solid matter.

4.3 The discharge shall not be comminuted or macerated to achieve the standards in 4.1 or 4.2.

*Only use H4 where the discharger wishes to take up this option. The choice of '***' and 'type' in 4.1 and 4.2 will depend on the needs of the receiving waters and may vary.*

STORAGE IN THE SEWERAGE SYSTEM

H5 See condition G4

H6 See condition G5

TELEMETRY/EVENT MONITORING *These conditions may be used, either singly or in combination.*

H7 See condition G6

H8 See condition G7

H9 See condition G8

H10 See condition G9

CLEAN-UP

H11 See condition E16

J. PUMPING STATIONS WITH BOTH COMBINED SEWER OVERFLOWS (CSOs) AND EMERGENCY OVERFLOWS (EOs)

This section will contain a set of conditions combining the agreed conditions from sections E and G.

K. GENERAL CONDITIONS

DISCHARGE POINT LOCATION *Use the most appropriate of K1, K2 and K3 ; vary to cover the actual situation.*

K1 The discharge of <discharge type> shall be made from an outlet at National Grid Reference <£$ $$$$ $$$$> into <watercourse name>.

K2 The discharges of <discharge type A and discharge type B> shall be made from separate outlets at the same National Grid Reference <£$ $$$$ $$$$> into <watercourse name>.

K3 The discharges shall be made from outlets at National Grid Reference <£$ $$$$ $$$$> for <discharge type A> into <watercourse name> and at National Grid Reference <£$ $$$$ $$$$> for <discharge type B> into <watercourse name>.

In coastal situations the minimum requirement for all continuous discharges is that they shall discharge below mean low water spring tides (MLWST; as defined in Admiralty Tide Tables). Where practicable this will also apply to intermittent discharges.

A physical description of the outlet may be inserted into any of these conditions.

FLOW MEASUREMENT FOR DISCHARGES FROM SEWAGE TREATMENT WORKS *Use the most appropriate of K4/K5.*

K4 Flow measurement structures shall be provided by <date> and maintained to enable the daily volume and instantaneous flow rate of the <discharge type> to be measured or determined as required.

K5

5.1 A continuous flow recorder with on-site visual display from which readings can be readily obtained, shall be provided by <date> and maintained to enable the daily volume and instantaneous flow of the <discharge type> to be recorded.

5.2 Copies of the records shall be maintained by the discharger and kept available for inspection by SEPA.

5.3 The recorder shall be calibrated and maintained on a regular basis to ensure that it is reading the actual flow to an agreed standard. The discharger shall keep a record of the calibration results available for inspection by SEPA.

SAMPLING POINTS

Use the most appropriate of K6(concentration), or K6 and K7(% reduction) referring to plans as available. Where necessary, amend the conditions to reflect the actual situation.

Where there are several discharge types from one site it must be clear from the conditions where each type should be sampled.

K6 A sample point at National Grid Reference <£$ $$$$ $$$$> shall be constructed, maintained and appropriately labelled so that a representative sample of the <discharge type> may be obtained.

K7 A sample point at the inlet to the sewage treatment works at National Grid Reference <£$ $$$$ $$$$> shall be constructed, maintained and appropriately labelled so that a representative sample of the untreated sewage may be obtained.

AUTOMATIC SAMPLERS/MONITORING

K8 Outlet Sampling *Use 8.1 and 8.3 where it has been agreed between the discharger and SEPA that SEPA will utilise mobile samplers. Use 8.2, 8.3, including optional clauses, 8.4 and 8.5 where the discharger is to provide and operate the sampling facility.*

8.1 The discharger shall provide <refrigerated> lockfast facilities for the housing of an automatic sampler, together with the required electricity supply and sampling access.

8.2 The discharger shall provide by <date> and maintain an automatic sampling device to enable the taking of composite, time proportional samples of the <discharge type> at the <discharge type> sampling point.

8.3 The composite time proportional sample shall be made up of 24 equal aliquots taken at hourly intervals, <beginning at 1000 on each day and concluding at 0900 on the following day>. These shall be maintained at 4°C.

8.4 The discharger shall take 24 hour composite samples.

8.5 Each composite sample shall be kept on site at 4°C for a minimum of 24 hours and shall be available for collection by an officer of SEPA.

The presumption is that the samplers referred to will run on every day in the year. Notwithstanding this the period(s) of sampler operation will be a matter for local agreement in each case.

K9 Inlet Sampling *Use 9.1 and 9.3 where it has been agreed between the discharger and SEPA that SEPA will utilise mobile samplers. Use 9.2, 9.3 ,including optional clauses, 9.4 and 9.5 where the discharger is to provide and operate the sampling facility.*

9.1 see condition K8.1

9.2 The discharger shall provide by <date> and maintain an automatic sampling device to enable the taking of composite, time proportional samples of the untreated sewage at the inlet sampling point.

9.3 see condition K8.3

9.4 see condition K8.4

9.5 see condition K8.5

TIMING

K10 The conditions to which this Consent is subject shall take effect from {Date}, or from the date of commissioning of the works to which the application received on ..... relates, whichever is the earlier.

Annex 1 : Table of permitted failures

Series of samples taken in any period of 12 consecutive months	Maximum permitted number of samples which fail to conform
4 - 7	1
8 - 16	2
17 - 28	3
29 - 40	4
41 - 53	5
54 - 67	6
68 - 81	7
82 - 95	8
96 - 110	9
111 - 125	10
126 - 140	11
141 - 155	12
156 - 171	13
172 - 187	14
188 - 203	15
204 - 219	16
220 - 235	17
236 - 251	18
252 - 268	19
269 - 284	20
285 - 300	21
301 - 317	22
318 - 334	23
335 - 350	24
351 - 365	25

Annex 2. Terms of reference (in addition to those provided by Article 2. of UWWTD(91/271/EEC)).

DWF ('Dry Weather Flow') is defined as follows ;

When the sewage flow is mainly domestic in character ,the average daily flow to the treatment works during seven consecutive days without rain (excluding a period which includes public or local holidays) following seven days during which the rainfall did not exceed 0.25 mm on any one day. With an industrial sewage the dry weather flow should be based on the flows during five working days if production is limited to that period. Preferably, the flows during two periods in the year, one in the summer and one in the winter, should be averaged to obtain the average dry weather flow.

MONITORING OF DISCHARGES FROM WASTE WATER TREATMENT PLANTS

1. REQUIREMENTS OF THE REGULATIONS

1.1 Regulation 11 places a duty on SEPA to monitor or procure the monitoring by competent authorities or appropriate bodies of discharges from urban waste water treatment plants to verify compliance with the requirements of Part I of Schedule 3 and paragraph 5(8)(b) in accordance with control procedures laid down in Part II of that Schedule.

2. MONITORING REQUIREMENTS

2.1 Guidelines on the monitoring may be formulated in accordance with the procedures laid down in Article 18 of the Directive, ie through the Regulatory Committee.

2.2 Monitoring for compliance with the Regulations for secondary and tertiary treatments can be assessed either by concentrations or by percentage reductions. Primary treatment is assessed on percentage reductions.

3. SAMPLING REQUIREMENTS

3.1 For each works SEPA will identify the number of samples to be taken in a year on the basis of Schedule 3, Part II, paragraph 3.

3.2 Normally, samples will be 24 hour time proportional composites, made up of 24 equal aliquots taken at hourly intervals. Flow proportional composites may be necessary in a few cases, eg when pe > 150,000. The composite sample results will be taken to be the daily average concentration. Where required by SEPA the discharger will provide suitable 24 hour sampling equipment and where appropriate flow measurement equipment. Appropriate site facilities will be provided to standards approved by SEPA.

3.4 Effluent samples are taken at points agreed with SEPA.

3.5 Where works require only primary treatment or where percentage reduction is to be used to monitor compliance with the Regulations, composite sampling will be carried out on influent and effluent and compliance assessed on percentage reductions.

3.6 Parameters measured will reflect those listed in the consents. Parameters reported in terms of the Regulations will reflect those listed in Table 1 and 2 in Part I of Schedule 3. For works providing secondary and tertiary treatment BOD and COD will be reported. Suspended solids will not be reported to the EC except where the works only provides primary treatment.

3.7 The statutory register will be kept and maintained by SEPA and sample results entered therein. Samples taken when works were not performing within normal operating conditions will be identified.

3.8 SEPA may take spot samples at any time, particularly when poor performance of works is suspected. Results will be compared with absolute spot values identified in consents. This is additional to the requirements needed to achieve compliance with the Regulations.

3.9 Discharges will comply with the Regulations when the requirements of Schedule 3, Part II, paragraphs 4 and 5 are met.

3.10 Samples will continue to be taken by SEPA for the purposes of assessing compliance with other parameters included in the consents (eg List II substances) where relevant.

3.11 Sampler Specification (Fixed Site)

The following specification for the sampler may include all or some of the following. However, SEPA may agree that a lockable, refrigerated housing be provided by the Sewerage authority and SEPA installs a mobile sampler.

1. Microprocessor controlled
2. Sampler capable of flow and time based samples
3. Sampler capable of taking automatic discrete and composite samples
4. Sample taken by vacuum system
5. Sampler contained within lockable, weatherproof housing
6. Samples contained within refrigeration unit, temperature 4°C
7. Equipment must have purge/rinse operation
8. Time based 24 hourly composite sample can be 3 litres
9. Sampler operated on 110 volt power supply

It is recommended that samplers should be sited at the plant inlet and final effluent sample points.

3.12 Flow Recording Equipment Specification (when required)

The specification of the flow recording equipment may include all or some of the following:

1. Ultrasonic level measurement with temperature compensation
2. Flow measurement based on BS 3680 where measuring device allows this
3. Data logging facilities
4. Weatherproof external cabinet to IP67
5. Downloading of data to IBM compatible software
6. RS232 serial port available
7. Minimum data requirements of minimum and maximum flow, total daily flow
8. Supplier to provide the accuracy they guarantee with the specific site and measuring device
9. 4/20 mA analogue outputs if required for the site
10. Data software to have graphic capabilities

It is recommended that flow recorders should be sited at the inlet and the final effluent channel.

NORMAL OPERATING CONDITIONS, UNUSUAL SITUATIONS AND NORMAL LOCAL CLIMATIC CONDITIONS

1. THE REGULATIONS' TERMINOLOGY

1.1 The term "normal operating conditions" is used in paragraph 4(b) of Part II of Schedule 3; the phrase "unusual situations such as those due to heavy rain" is used in paragraph 5 of Part II of Schedule 3; "normal local climatic conditions" are referred to in Regulation 4(3)(a).

2. INTERPRETATION

2.1 In order to assist in interpreting the weather conditions that might be considered to be abnormal or unusual, a definition of exceptional weather conditions is given below, together with examples of what might be considered to be other kinds of abnormal or unusual operating conditions.

2.2 The abnormal conditions set out below include capital works construction and periods of industrial action. Both are being considered by the Regulatory Committee, along with other possible exceptions suggested by other Member States. An amendment to this guidance note will be issued in the light of any guidance from the Regulatory Committee.

3. DEFINITIONS

3.1. Sewage treatment works will be deemed to have been under normal operating conditions except during that period when:

3.1.1 Section 30H(2) (e.g. the contravention is attributable to a discharge which another person caused or permitted to be made into the sewer or works) or section 30J(1) (e.g. the discharge is made, in an emergency in order to avoid danger to life or health) of the Control of Pollution Act 1974 as amended by the Environment Act 1995 applied;

3.1.2 unusual weather conditions including:-

3.1.2.1 low ambient temperatures as evidenced by effluent temperatures of 5°C or less, or by the freezing of mechanical equipment in the works;

3.1.2.2 significant snow deposits;

3.1.2.3 tidal or fluvial flooding;

3.1.2.4 weather conditions causing unforeseen loss of power supply to the sewage treatment plant which could not be ameliorated by the reasonable provision and operation of standby generation facilities.

3.1.3 SEPA has issued a variation of the consent under Part II of the Control of Pollution Act 1974 for reasons such as:

3.1.3.1 capital works construction;

3.1.3.2 periods of industrial action;

4.3.3 experimental work to determine accurate design criteria.

3.1.4 When an unauthorised, unforeseen discharge into the sewer (e.g. resulting from a car crash or washdown from a fire) for which the Sewerage authority has no control.

4. WORDING TO BE USED IN DISCHARGE CONSENTS FOR SEWAGE TREATMENT WORKS IN RELATION TO UNUSUAL WEATHER CONDITIONS

4.1 No samples of sewage effluent taken at a time when unusual weather conditions are adversely affecting the operation of the sewage treatment works shall be taken into account in deciding whether or not the conditions contained in paragraphs X, Y and Z of this consent have been complied with.

4.2 For the purpose of this condition "unusual weather conditions" shall mean that defined in paragraph 3.1.1 of this Annex. Condition B21 of SEPA's Consent Conditions Manual (Appendix J1) contains the wording SEPA has adopted.

4.3 When a sewage treatment works is operating in conditions other than "normal operating conditions" the discharger shall use its best endeavours to mitigate that adverse affect. The discharger shall notify SEPA by telephone as soon as such conditions are known to have adversely affected operations and shall confirm the circumstances in writing as soon as possible thereafter (and in any event within 14 days of the occurrence of such conditions). That notification shall include a full description of these conditions and their impact on the operation of the works.