

National Rivers Authority
Welsh Region

Awdurdod Afonydd Cenedlaethol
Rhanbarth Cymru



SEVERN ESTUARY COASTAL WATERS. AND ASSOCIATED CATCHMENTS.
USES, OBJECTIVES AND STANDARDS.

Report No. EAR 89/8
Regional Environmental Appraisal Unit
National Rivers Authority
St. Mellons
Cardiff CF3 0LT

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ENVIRONMENT AGENCY WALES

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SEVERN ESTUARY COASTAL WATERS AND ASSOCIATED CATCHMENTS -
USES, OBJECTIVES AND STANDARDS

NRA - WELSH REGION

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DATE DUE

22 - OCT - 2002

SEVERN ESTUARY COASTAL WATERS AND ASSOCIATED CATCHMENTS - USES, OBJECTIVES AND STANDARDS

DEFINITIONS

N.B. Throughout this document the term SEVERN ESTUARY COASTAL WATERS refers to all tidal waters (coastal and estuarine) in the following geographical limits:

LIMPERT BAY to USK MOUTH

IMPORTANT NOTES

1. Consultation will be required throughout the scheme design process on all design proposals pertinent to environmental impact matters.
2. Techniques and models used for both hydraulic and water quality modelling will require approval from the NRA as to their suitability and sensitivity analyses will be required as appropriate to the environmental design requirements indicated in this document.
3. The National Rivers Authority reserves the right to amend any conditions in this document as and when future policy is developed and/or statutory objectives are derived for controlled waters.
4. Notwithstanding the environmental standards presently required and detailed herein, it may be prudent for dischargers to consider the possibility of increased standards and additional treatment during the future life of a scheme in order to protect their investment.
5. Any further constraints (e.g. uses, standards, geographic limits etc.), brought to the attention of the NRA following consultations will be advised as appropriate.

1.0 TIDAL WATERS

1.1 Uses

Uses as categorised in Appendix 1 and repeated below for clarity have been applied to both the coastal and estuarine waters of the bay as follows (Ref.1):-

1. Basic amenity
2. General ecosystem conservation
3. Migratory fishery
4. Commercial harvesting of fish for public consumption
5. Commercial harvesting of crustacea and molluscs for public consumption.
6. Bathing
7. Other water contact based recreation.
8. Other recognised uses not incorporated in 1 - 7 (e.g. Industrial abstractions, Harvesting of edible seaweed.

Uses 1 and 2 are uses applicable to all tidal waters and will therefore apply throughout Severn Estuary coastal waters.

Use 3 will apply throughout Severn Estuary coastal waters.

Uses 4 and 5 may apply in some areas. Advice from the South Wales Sea Fisheries Committee and MAFF as to extent of use, will be provided where appropriate.

Use 6 will apply only to those bathing waters identified by the DoE/Welsh Office as falling under the terms of the EC Bathing Waters Directive (ref.2.).

Use 7 will apply to those waters identified for use 6 and other traditionally used areas identified after local consultations.

No other uses under Use 8 are felt applicable.

1.2 Environmental quality objectives (EQO's).

Environmental quality objectives are set to protect each legitimate use to which the tidal waters are put. These are given in full in Appendix 1.

The geographical constraints of each EQO will be determined after local consultation and it will also be appropriate to apply temporal limits. Initial proposed limits of use are as follows:

1.2.1 EQO No.1 (Basic Amenity)

Throughout the year for all tidal waters in the estuary.

1.2.2 EQO No.2 (General ecosystem conservation)

This objective applies to all saline waters of the estuaries up to the tidal limit throughout the year.

1.2.3 EQO No.3.(Migratory fish)

Throughout the year up to the tidal limit of all estuaries.

1.2.4 EQO No.4/5 (Commercial harvesting of fish and crustacea)

Where appropriate these uses will be notified on advice received from SW Sea Fisheries Committee and MAFF.

1.2.5 EQO No.6. (Bathing)

For the stretch of the identified bathing waters (see Figure 1) and applicable for the period May to September (inclusive). These include:

Cold Knap
Whitmore Bay
Jackson Bay

Although the width of the bathing water strip is not specifically defined it would extend to a reasonable distance offshore where bathing is traditionally practised. For initial guidance we would consider a reasonable distance to be 100m from the water's edge.

1.2.6 EQO No.7 (Other water contact based recreation)

Throughout the year for all identified bathing waters extending to a distance where water-contact sports are traditionally practised. This would extend to at least 100 m from the water's edge and further offshore where local usage is identified from local consultation. Other areas identified under this use will be:

The Penarth foreshore - Lavernock Point to Penarth Head

and any other areas deemed appropriate following local consultations.

1.3 Environmental quality standards (EQS's)

In order to achieve the objectives set then the following standards will be applicable:

1.3.1 EQO No.1 (Basic Amenity)

Aesthetic standards as specified in Appendix 2 (A2.A.1) will apply.

1.3.2 EQO No.2 (General Ecosystem Conservation)

All EQS's given in DoE circular 7/89 (Welsh Office 16/89) (Ref.4) for listed substances under the EC Dangerous Substances Directive (Ref.5.) and its associated daughter directives will apply. The NRA Welsh Region must also be notified of the possibility of any Red List substances being present in sewage effluents due to trade effluents to sewer or other routes. Detailed implementation for dealing

with Red List substances will continue to be the responsibility of HMIP in consultation with the NRA. In the case of discharges containing listed substances, the extent of the mixing zone must be measured and agreed.

There are no designated shellfisheries in the area of concern, under the terms of the EC shellfish directive (Ref.6.) These standards under this Directive do not therefore apply.

1.3.3 EQO No.3 (Migratory Fish)

Dissolved oxygen to exceed 5 mg/l for 95% of the time, with an absolute minimum D.O. of 3 mg/l Annual mean for unionised ammonia must not exceed 0.021 mg/l and must not exceed 0.12 mg/l as a maximum value on any occasion. These standards will apply throughout the year.

1.3.4 EQOs No.4/5 (Commercial harvesting of fish and crustacea)

Standards appropriate to the protection of public health from consumption of fish or shellfish originating in the Estuary are the responsibility of the Environmental Health Departments of the relevant councils and MAFF. If these uses are deemed applicable then the standards set by the responsible authorities will be advised after the necessary consultations.

1.3.5 EQO No. 6(Bathing)

Aesthetic standards as specified in Appendix 2 (A2.A.3) apply. Also, those bacteriological imperative standards as specified in the EC Bathing Waters Directive,

i.e. 2000 E.Coli 100ml⁻¹
10000 Total coliforms 100ml⁻¹

will apply for 95% of samples taken during the bathing season at the designated sampling point. For design purposes the standards must be achieved over the full extent of all the identified bathing waters.

1.3.6 EQO No. 7(Other water contact recreation)

Aesthetic standards as specified in Appendix 2 (A2.A.2) apply. In particular a minimum effluent dilution standard of 100 will apply to achieve the aesthetic requirements, although in certain circumstances agreed mixing zone definitions can be applied (see 1.4.4).

1.4 Guidance notes on achieving the required EQS's

The following guidance are given to ensure compliance with required environmental quality standards:

1.4.1 EQO No.1 (Basic Amenity)

Detailed guidance is given in Appendix 2 (A2.A.1). Particular attention must be paid to the removal of persistent materials (such as plastics, condoms, cotton buds, backing strips for feminine sanitary products etc.) in the effluent. These must be removed from

the flow and disposed off-site, all year round. It will be necessary to demonstrate that the chosen preliminary treatment process is effective and efficient at removing such material and also in reducing faecal (or other organic material) particle sizes as required. Field trials or reference to independent published literature would be required for this purpose.

1.4.2 EQO No.2 (General ecosystem conservation)

The extent of any 'mixing zone' for listed substances (i.e. zone of approved EQS failure) will have to be demonstrated to and agreed by the NRA and/or HMIP on a case by case basis

For discharges containing trade effluents, the composition of this component will need to be provided. It will be necessary to demonstrate that adequate dilution and dispersion is available at the discharge location to prevent acutely toxic effects. The need to minimise accumulation in organisms should also be taken into account.

1.4.3 EQO No. 6(Bathing)

There will be a need to demonstrate, principally by means of modelling techniques, that any scheme proposals and design are consistent with achieving the EQS's and demonstrate that:

- a) coliform loads used for scheme design and impact appraisal are supported by actual monitoring of sewage strengths and flows.
- b) coliform die-off rates are appropriate for the local circumstances and supported by in-situ measurements or published data.
- c) a minimum initial dilution at the outfall of 100:1 is achieved to avoid density stability on release of the effluent into the receiving waters. Occasional transgressions of the design standard for short periods may be agreed on a case by case basis, provided all reasonable efforts have been made to achieve the dilutions so described.
- d) a sensitivity analysis is available on the effect of water quality arising from changes to the relevant design criteria (e.g. changes in wind speed/direction, dispersion coefficients used in the model, T90 variations etc.,)

1.4.4 EQO No 7 (Other water contact based recreation)

Where a sewage discharge is made directly into the use area irrespective of the level of treatment, then every effort should be made to achieve the 100:1 effluent dilution standard (see A2.A.2). However, the National Rivers Authority (Welsh Region) may consider, on a case by case basis, the application of a mixing zone up to the boundary at which the effluent has received at least 100 dilutions.

2.0 INLAND WATERS

Procedures for the prevention of pollution in inland waters do not primarily derive from the use-related approach adopted for coastal and estuarine waters. The existing approach for inland waters is best described by reference to local, national and EC policy and directives. Sections 2.0.1. to 2.0.5 below describe this approach and are further interpreted in sections 2.1 and 2.3 for the purposes of this document:

2.0.1 National Water Council (NWC) Classification scheme (Ref.7)

Rivers under this scheme are divided into classified stretches whereby the quality of the water, as measured against certain defined parameters, determines the class of that particular stretch. Long term river quality objectives (LTRQO's) are then set to achieve a certain improved or maintained class for that stretch.

2.0.2 EC Freshwater Fisheries Directive (Ref.8)

The implementation of this Directive requires that river stretches are designated where important salmonid or cyprinid fisheries are recognised. Within these stretches the water quality standards, as defined in the Directive, must be achieved. Those applying depend upon whether the stretch is designated as a salmonid or cyprinid fishery or both.

2.0.3 EC Dangerous Substances Directive

This Directive is applicable to all waters and hence equally applies to inland waters as to tidal waters. The UK implementation of this Directive (Ref.4) covers all environmental quality standards to be achieved for the listed substances.

2.0.4 EC Surface Water Quality Directive (Ref.9)

This Directive applies to all surface waters abstracted for potable water use. The Directive does not impose standards for surface water quality but classifies the existing water quality into 3 classes - A1, A2 or A3. The classification then determines the level of treatment required before the water is suitable for potable use. (e.g. A1 refers to the highest class of water quality and thereby requiring only the minimum amount of treatment).

2.0.5 Use-related approach for non-classified and/or non-designated watercourses.

For the protection of non-classified (non- NWC) and non-designated (non EC Freshwater Fish) minor watercourses, then a use-related approach will be adopted. The standards appropriate to the protection of the identified uses will be set by the NRA (Welsh Region) after appropriate consultations.

2.1 Application of existing Inland Waters policy to the Severn Estuary.

Table 1 gives a summary of river stretches and LTRQO's for the rivers draining into the Estuary. The table also includes a summary of the stretches designated under the terms of the Directives described in 2.0.2 to 2.0.4.

- (i.e. PW (SWD) - Potable water (Surface Water Directive)
FF (S) - Freshwater Fishery (Salmonid)
FF (C) - Freshwater Fishery (Cyprinid)
DS - Dangerous Substances

2.2 River quality standards

For all inland watercourses, basic standards necessary to protect amenity and conservation will be required all year round. These require a visually unobjectionable state and one without offensive odour in addition to those standards which may be deemed appropriate under section 2.2.5. In certain circumstances however, a seasonal consent may be required in order to protect the receiving water at times of reduced flows and/or increased populations. Storm flows will require screening to the levels described in Appendix 2 (A2.B).

Clearly the most stringent standards for any particular water quality parameter will apply, (e.g. for classified and designated stretches then the most stringent NWC standards or EC Freshwater Fish Directive standards will apply). In consent setting for continuous discharges, sensitivity analysis must be undertaken and reported.

2.2.1 NWC Classification scheme

Current NWC standards, as defined by the DoE (DoE, 1986), will apply in relation to the river systems and their LTRQO's as indicated in Table 1 and in line with the policy of no deterioration of the existing quality of the waters as defined by the NRA.

2.2.2 EC Freshwater Fish Directive

Designated salmonid and cyprinid stretches indicated in Table 1 are required to achieve the relevant standards as appropriate to the type of fishery as detailed in the Directive.

2.2.3 EC Dangerous Substances Directive

The standards for all listed substances as given in the UK implementation of this Directive (Ref.4) will apply to all inland watercourses. Table 1 indicates those stretches subject to discharges covered by the directive.

2.2.4 EC Surface Water Quality Directive

Where abstraction for potable water quality is indicated in Table 1 then this Directive will apply and the relevant level of treatment must be undertaken according to the classified surface water quality at the abstraction point.

2.2.5 Use-related standards for non-classified watercourses.

The following approach will be adopted for dealing with non-classified stretches:

- a) The uses of the waters will be identified after appropriate consultations with the NRA.
- b) Where the sole objective is to prevent nuisance, a 95%ile BOD of 20 mg/l may be applied, on condition that the aeration characteristics of the watercourse are sufficient to maintain aerobic conditions.
- c) For all other identified uses, standards will be set using NWC class limits if deemed appropriate. No assigned NWC standards will be more relaxed than those for Class 2B, and no more than a single sub-class deterioration (in NWC terms) will be acceptable below the point of discharge.

2.3 Guidance notes on achieving the required standards.

2.3.1 Storm Overflow Water Quality Considerations

Significant Proposals:

- a) These are defined as overflows serving a catchment where any of the following conditions apply:

Dry Weather Flow (DWF)	> 600 m ³ /d
Population	> 5000
Cost of relevant part of scheme	> £250,000

- b) Hydraulic and water quality impact modelling will be required such that the spill volumes are consistent with achieving the most stringent standards that apply in the watercourse.

Detailed hydraulic modelling of a significant proportion of any sewerage system will be required according to the criteria set out in the Storm Sewer Overflow Policy Guidance notes available as a supplement to this report. Details of the currently approved techniques for assessing the level of acceptable impact are also included in the above notes.

Non-significant Proposals:

- a) For these proposals the impact on the watercourse may be evaluated by simpler mass-balance techniques. The results must be consistent with achievement of the most stringent standards that apply.

Hence the currently approved QWALSOC criteria should be applied using the standards indicated below :

Receiving waters	LTRQO	NWC Class 1	- 10 mg/l BOD (99%ile impact std.)
"	"	NWC Class 2	- 20 mg/l BOD (" " ")
"	"	NWC Class 3	- 30 mg/l BOD (" " ")

All classes should exhibit no evidence of visible gross solids or give rise to complaints.

2.3.2 Storm Overflow Aesthetic Considerations

All those overflows discharging to sensitive waters should be screened at the levels defined in Appendix A2.B.1. It will be necessary to demonstrate the effectiveness and efficiency of selected screens either by reference to field trials, or to relevant independent published literature. Further guidance for sensitive and non-sensitive waters is given in Appendix 2 (A2.B.1 and A2.B.2).

River	Hyd. Ref. No	Km	U/S OSGR	D/S OSGR	LTQO	PW	FF (S)	FF (C)	DS
RHYMNEY	57-1-2 1-11-0	5.1	ST 169885	ST 155923	1B				
"	1-12-0	1.0	ST 155923	ST 146929	2B		S		
"	1-13-0	0.2	ST 146929	ST 147931	2B		S		
"	1-14-0	0.8	ST 147931	ST 148941	2B		S		
"	1-15-0	4.7	ST 148941	ST 154975	2B		S		
"	1-16-0	2.0	ST 154975	ST 153993	1B		S		
"	1-16-A	0.9	ST 153993	SO 151003	2B		S		
"	57-1-1 1-17-0	5.8	SO 151003	SO 132051	1B		S		
"	1-18-0	1.6	SO 132051	SO 122063	1B		S		
"	1-19-0	2.6	SO 122063	SO 108086	1B		S		
"	1-20-0	0.2	SO 108086	SO 105103	1B				
GLEDYR	57-1-2 14-1-0	1.6	ST 165884	ST 158871	2B				
"	14-2-0	1.6	ST 158871	ST 144867	1B				
"	14-3-B	0.5	ST 144867	ST 137869	2B				
NANT Y ABER	57-1-2 17-1-0	5.8	ST 164885	ST 120893	1B		S		
"	17-2-0	0.5	ST 120893	ST 127923	1B		S		
NANT CYLLA	57-1-2 22-1-0	1.6	ST 148941	ST 144958	2B				
"	22-2-0	0.2	ST 144958	ST 134980	1B				

River	Hyd. Ref. No	Km	U/S OSGR	D/S OSGR	LTQO	PW	FF (S)	FF (C)	DS
NANT BARGOED RHYMNI	57-1-1 25-1-0	1.0	SO 151003	SO 145007	1B		S		
"	25-2-0	1.6	SO 145007	SO 133008	1B		S		
"	25-3-B	2.6	SO 133008	SO 120030	1B				
"	25-3-A	0.6	SO 120030	SO 116036	1B		S		
"	25-4-0	0.2	SO 116036	SO 100062	1B		S		
DOCK FEEDER	57-2-5 1-3-0	3.2	ST 191758	ST 170780	2B				
TAFF	57-2-5 1-4-0	0.5	ST 170780	ST 165783	2B			C	
"	1-5-0	1.0	ST 165783	ST 157784	2B			C	
"	1-6-0	2.9	ST 157784	ST 143802	2B			C	
"	1-7-0	1.4	ST 143802	ST 130807	2B			C	
"	1-9-0	0.3	ST 130807	ST 130811	2B				
"	1-10-0	0.8	ST 130811	ST 131820	2B				
"	1-11-0	1.4	ST 131820	ST 122831	2B				
"	1-12-0	0.3	ST 122831	ST 121834	2B				
"	1-13-0	1.9	ST 121834	ST 119852	2B				
"	1-14-0	0.2	ST 119852	ST 118853	2B				
"	1-15-0	0.8	ST 118853	ST 112856	2B				
"	1-16-0	0.8	ST 112856	ST 107862	2B				

River	Hyd. Ref. No	Km	U/S OSGR	D/S OSGR	LTQO	PW	FF (S)	FF (C)	DS
TAFF	57-2-5 1-17-0	1.1	ST 107862	ST 102872	2B				
"	1-18-0	0.8	ST 102872	ST 094874	2B				
"	1-19-0	1.8	ST 094874	ST 085888	2B				
"	1-20-0	1.9	ST 085888	ST 072899	2B				
"	1-21-0	1.6	ST 072899	ST 081912	2B				
"	1-22-0	0.6	ST 082912	ST 085920	2B				
"	1-23-0	1.0	ST 085920	ST 082928	2B				Cd (1), Cr, Cn, Pb, Ni, Zn
"	1-24-0	2.6	ST 082928	ST 084950	1B				
"	57-2-2 1-25-0	1.3	ST 084950	ST 093957	1B				
"	1-26-0	1.3	ST 093957	ST 096966	1B				
"	1-27-0	0.5	ST 096966	ST 092968	1B		S		
"	1-28-0	3.9	ST 092968	ST 077990	1B		S		
"	1-29-B	0.7	ST 077990	ST 075996	1B		S		
"	1-29-A	0.6	ST 075996	ST 073002	1B		S		
"	1-30-B	1.4	SO 073002	SO 073016	1B		S		
"	1-30-A	0.8	SO 073016	SO 070022	1B		S		
"	1-31-0	0.3	SO 070022	SO 068025	1B		S		

River	Hyd. Ref. No	Km	U/S OSGR	D/S OSGR	LTQO	PW	FF (S)	FF (C)	DS
"	1-32-0	0.3	SO 068025	SO 066028	1B		S		
"	1-33-0	1.1	SO 066028	SO 060038	1B		S		Zn,Ni
"	1-34-0	0.5	SO 060038	SO 057042	1B		S		Zn,Ni
"	1-35-0	1.4	SO 057042	SO 052055	1B		S		
"	1-36-0	1.0	SO 052055	SO 048063	1B		S		
TAFF	57-2-2 1-37-0	0.2	SO 048063	SO 048064	1B		S		
"	1-38-0	1.0	SO 048064	SO 039069	1A		S		
"	1-39-0	0.3	SO 039069	SO 037072	1A		S		
TAFF FAWR	57-2-1 1-40-0	1.0	SO 037072	SO 030076	1A		S		
"	1-41-0	3.9	SO 030076	SO 013114	1A		S		
NANT FFYNON WEN	57-2-5 10-1-0	0.6	ST 118853	ST 118858	2B				
RHONDDA	570204 16-1-0	0.3	ST 072899	ST 069899	1B				
"	16-2-0	1.4	ST 069899	ST 058907	1B				
"	16-3-0	1.9	ST 058907	ST 043913	1B				
"	16-4-0	0.6	ST 043913	ST 038911	1B				
"	16-5-0	1.0	ST 038911	ST 028911	1B				
"	16-6-0	0.6	ST 028911	ST 024915	1B				
RHONDDA FAWR	16-7-0	1.0	ST 024915	ST 014918	1B				

River	Hyd. Ref. No	Km	U/S OSGR	D/S OSGR	LTQO	PW	FF (S)	FF (C)	DS
RHONDDA FAWR	16-8-9	1.0	ST 024915	ST 059190	1B				
"	16-9-0	0.3	ST 059190	ST 012918	1B				
"	16-10-0	0.6	ST 012918	ST 998922	1B				
"	16-11-0	0.5	ST 998922	SS 99492	1B		S		
"	16-12-B	0.2	SS 994927	SS 994928	1B		S		
"	16-12-A	3.0	SS 994928	SS 986949	1A		S		
"	16-13-0	1.3	SS 986949	SS 976952	1A		S		
"	16-14-0	1.0	SS 976952	SS 970955	1A		S		
"	16-15-0	1.6	SS 970955	SS 959967	1A		S		
"	16-16-0	1.0	SS 959967	SS 953972	1A		S		
"	16-17-0	1.6	SS 953972	SS 942980	1A		S		
"	16-18-0	1.6	SS 942980	SS 931989	1A		S		
"	16-19-0	0.2	SS 931989	SS 928991	1A		S		
"	16-20-0	1.6	SS 928991	SN 926007	1A		S		
RHONDDA FACH	23-1-0	2.4	ST 024915	ST 021938	2A				
"	23-2-0	3.5	ST 021938	ST 007962	2A				
"	23-3-0	3.9	ST 007962	SS 978981	2A				
"	23-4-0	2.3	SS 978981	SS 964998	2B				

River	Hyd. Ref. No	Km	U/S OSGR	D/S OSGR	LTQO	PW	FF (S)	FF (C)	DS
RHONDDA FACH	23-5-0	0.3	SS 964998	SS 999999	1A				
CWM CLYDACH	37-2-4-33-1-0	2.4	SS 994927	SS 969928	1B				
PARC	37-2-4-38-1-0	1.8	SS 959967	SS 945956	1A				
"	38-2-0	1.3	SS 945956	SS 934961	1A				
"	38-3-0	0.2	SS 934961	SS 925970	1A				
SELSIG	57-2-4-44-1-0	0.6	SS 928991	SS 923990	1A				
CLYDACH	57-2-5 52-1-0	1.6	ST 082928	ST 066928	1B				
"	52-2-B	1.4	ST 066928	ST 063938	1B				
"	52-2-A	0.2	ST 063938	ST 061942	1B				
"	52-3-0	1.1	ST 061942	ST 055950	1B				
CYNON	57-2-3 57-1-0	2.7	ST 084950	ST 067969	2A				
"	57-2-0	1.3	ST 067969	ST 063977	2A				
"	57-3-0	1.6	ST 063977	ST 052988	2A				
"	57-4-0	0.8	ST 052988	ST 047994	2A				
"	57-5-0	0.6	ST 047994	ST 042995	2A				
"	57-2-3 57-6-B	0.7	ST 042995	ST 033999	2A				
"	57-6-A	0.6	ST 033999	ST 033000	2A				
"	57-7-B	0.8	SO 033000	ST 031001	2A				

River	Hyd. Ref. No	Km	U/S OSGR	D/S OSGR	LTQO	PW	FF (S)	FF (C)	DS
CYNON	57-2-3 57-7-A	0.8	SO 029003	SO023011	1B		S		
"	57-8-0	0.3	SO 023011	SO 020012	1B		S		
"	57-9-0	0.6	SO 020012	SO 014016	1B		S		
"	57-10-0	1.6	SO 014016	SO 006027	1B		S		
"	57-11-0	0.2	SO 006027	SO 005028	1B		S		
"	57-12-0	1.8	SO 005028	SN 994041	1B		S		
"	57-13-0	0.8	SN 994041	SN 989047	1B		S		
"	57-14-0	1.0	SN 989047	SN 981049	1B		S		
"	57-15-0	1.1	SN 981049	SN 968053	1B		S		
"	57-16-0	1.0	SN 968053	SN 961054	1B		S		
"	57-17-0	0.6	SN 961054	SN 957058	1B		S		
"	57-18-0	0.6	SN 957058	SN 954065	1A		S		
"	57-19-B	1.6	SN 954065	SN 949088	1B		S		
"	57-19-A	0.2	SN 949088	SN 997100	1A		S		
NANT CWMBOI	64-1-0	0.2	SO 033000	ST 032999	1A				
"	64-2-0	0.2	ST 032999	ST 023988	1A				
AMMAN	68-1-0	2.1	SO 020012	ST 059940	1B		S		
NANT MELYN DARE	71-1-0	1.8	SO 006027	SN 988027	1A		S		

River	Hyd. Ref. No	Km	U/S OSGR	D/S OSGR	LTQO	PW	FF (S)	FF (C)	DS
NANT MELYN DARE	71-2-0	1.6	SN 988027	SN 974028	1A		S		
"	71-3-0	0.2	SN 974028	SN 956033	1A		S		
TAFF BARGOED	57-2-2 87-1-0	0.8	ST 096966	ST 102970	2B				
"	87-2-0	0.6	ST 102979	ST 101977	2B				
"	87-3-13	1.9	ST 101977	ST 103990	2B				
"	87-3-A	0.6	ST 103990	ST 102998	1B		S		
"	87-4-0	1.3	ST 102998	SO 095009	1B		S		
"	87-5-B	2.4	SO 095009	SO 086027	1B				
"	87-5-A	2.4	SO 086027	SO 089046	1B				
"	57-2-2 87-6-0	1.3	SO 089046	SO 081054	1B				
"	87-7-0	0.1	SO 081054	SO 080057	1B				
NANT GYRAWD	57-2-2 93-1-0	1.0	SO 089046	SO 090055	2B				
"	93-2-0	0.3	SO 090055	SO 009058	2B				
NANTCWM BARG	57-2-2 95-1-0	0.8	SO 081054	SO 086060	1B				
NANT Y MAEN	57-2-2 98-1-0	1.0	SO 073002	SO 070009	1A				
NANT MORLAIS	57-2-2 106-1-0	0.8	SO 048064	SO 053068	1B				Zn
"	106-2-C	1.0	SO 053068	SO 060073	1B				Zn
"	106-2-B	0.3	SO 060073	SO 074082	1B				Zn

River	Hyd. Ref. No	Km	U/S OSGR	D/S OSGR	LTQO	PW	FF (S)	FF (C)	DS
NANT MORLAIS	57-2-2 106-2-A	1.0	SO 074082	SO 069085	1B				
TAF FECHAN	57-2-1 110-1-0	2.3	SO 037072	SO 041092	1A		S		
"	110-2-0	0.6	SO 041092	SO 044097	1A		S		
"	110-3-C	1.2	SO 044097	SO 057100	1A		S		
"	110-3-B	1.4	SO 057100	SO 060107	1A		S		
"	110-3-A	1.3	SO 060107	SO 061118	1A		S		
ELY	57-3-1 1-3-0	1.3	ST 149776	ST 140770	2B				
"	1-4-0	4.8	ST 140770	ST 113762	2B				
"	1-5-0	1.6	ST 113762	ST 104768	2B				
"	1-6-0	1.6	ST 014768	ST 091766	2B				
"	1-7-0	1.6	ST 091766	ST 081761	2B				
"	1-8-0	1.0	ST 081761	ST 071762	2B				
"	1-9-0	1.0	ST 071762	ST 068768	2B				
"	1-10-0	0.2	ST 068768	ST 067769	2B				
"	1-11-0	1.3	ST 067769	ST 066781	2B				
"	1-12-0	0.6	ST 066781	ST 067788	2B				
"	1-13-0	0.2	ST 067788	ST 066788	2B				
"	1-14-0	1.0	ST 066788	ST 059793	2B				

River	Hyd. Ref. No	Km	U/S OSGR	D/S OSGR	LTQO	PW	FF (S)	FF (C)	DS
ELY	57-3-1 1-15-0	4.5	ST 059793	ST 036810	2B				
"	1-16-0	0.6	ST 036810	ST 031809	2B				
"	1-17-0	0.3	ST 031809	ST 032814	2B				
"	1-18-0	0.6	ST 032814	ST 037819	2B				
"	1-19-0	1.6	ST 037819	ST 035834	2B				Pb, Cu, Zn, Cr, Ni
"	1-20-0	1.9	ST 035834	ST 028848	2B				Pb, Cu, Cr, Ni, Zn
"	1-21-0	1.3	ST 028848	ST 019857	2B				
"	1-22-0	1.0	ST 019857	ST 016857	1B				
"	1-23-0	0.6	ST 016857	ST 011868	1B				
"	1-24-0	0.6	ST 011868	ST 006877	1B				
NANT FELIN	57-3-1 20-1-0	1.0	ST 031809	ST 019806	2A				
FACH	20-2-0	0.6	ST 019806	ST 005817	2A				
NANT DOWLAIS	23-1-0	1.9	ST 037819	ST 054825	2B				
"	23-2-0	0.6	ST 054825	ST 058826	2B				
"	23-3-0	1.9	ST 058826	ST 075829	2B				
"	23-4-0	1.0	ST 057829	ST 073837	2B				
"	23-5-0	0.3	ST 073837	ST 075841	1B				
NANT MYCHYDD	31-1-0	1.3	ST 035834	ST 038845	1B				

[illegible]

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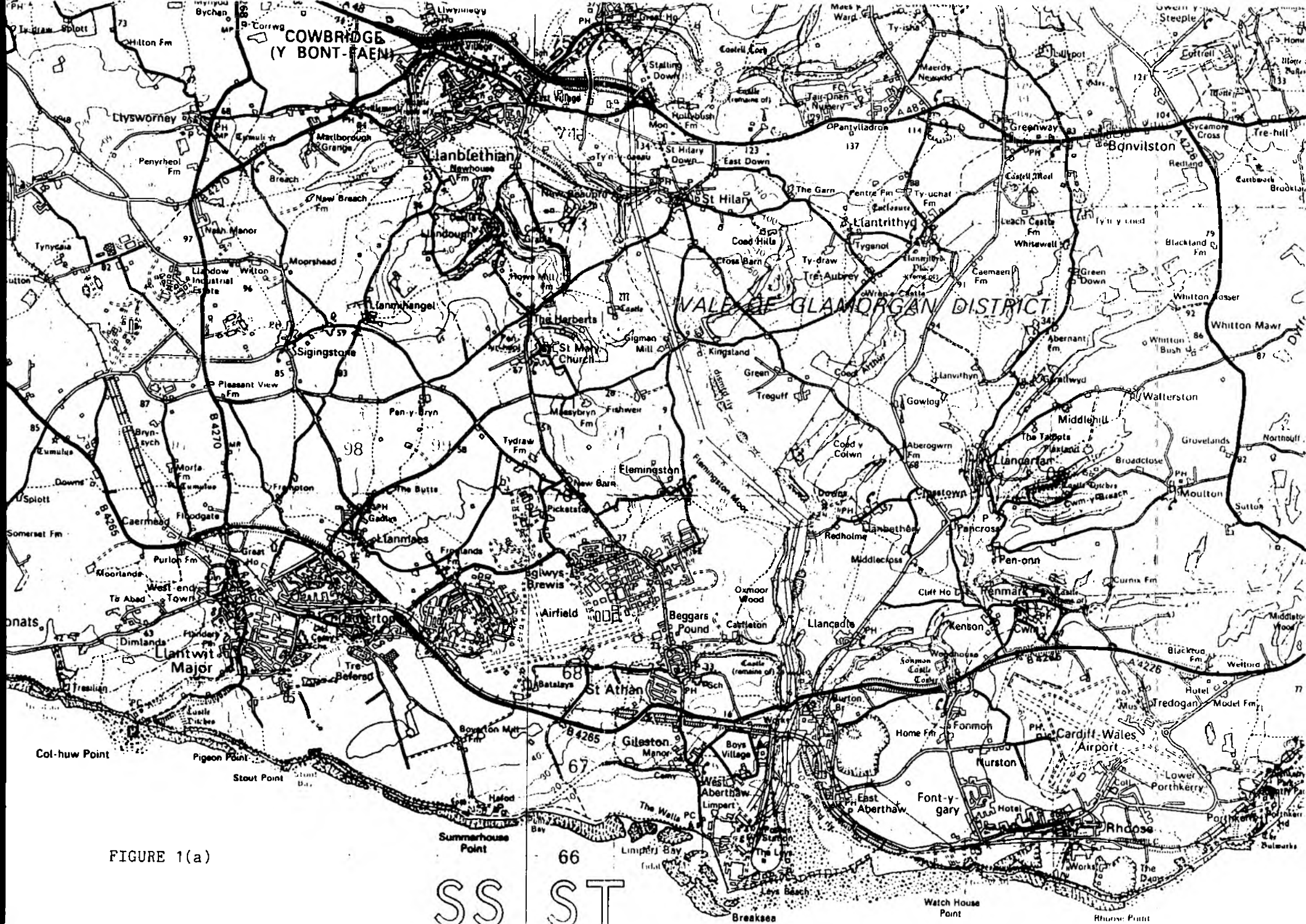


FIGURE 1(a)

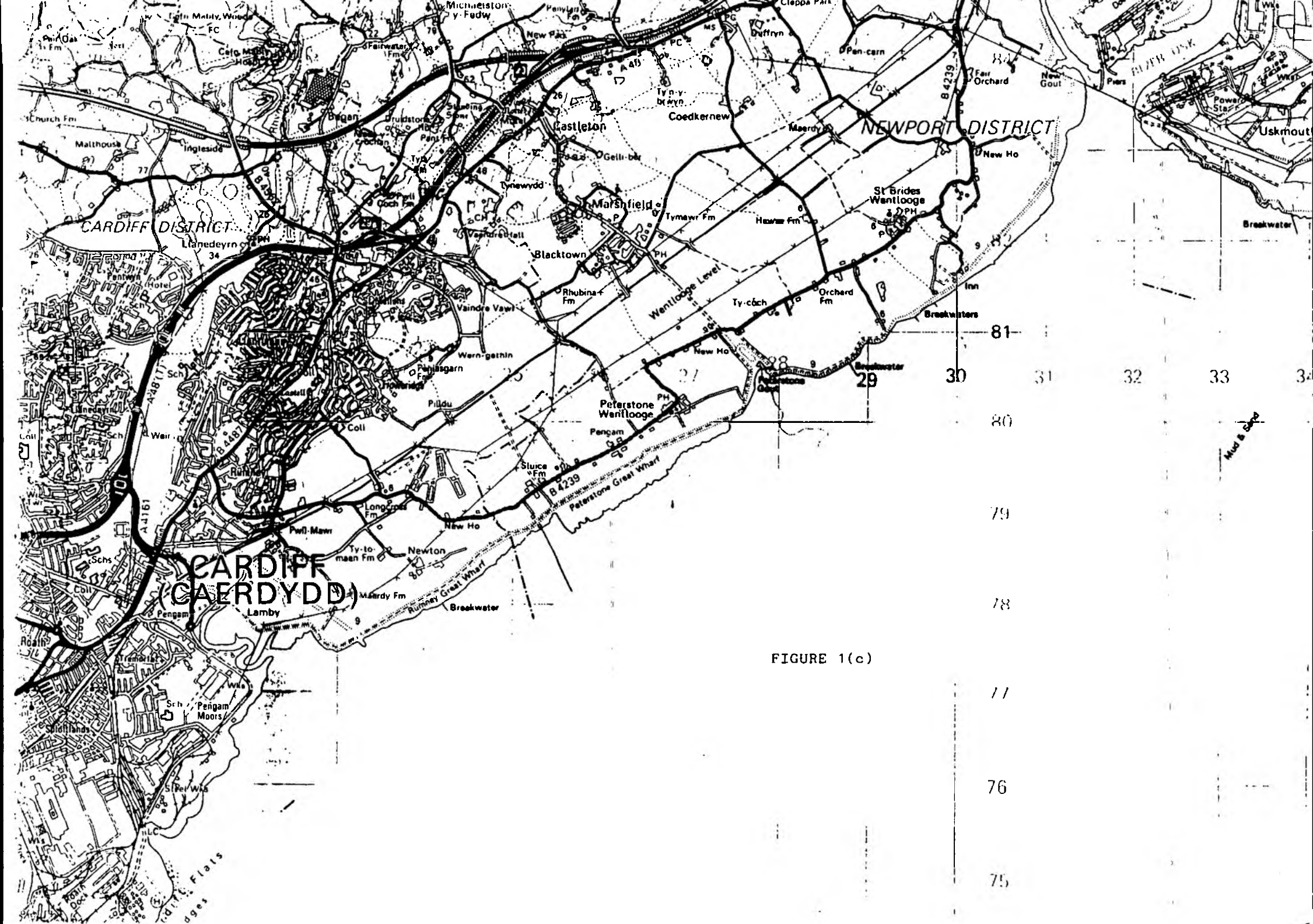


FIGURE 1(c)

APPENDIX 1

Uses and environmental quality objectives (EQO's) for Tidal Waters (Ref. 1).

USE	ENVIRONMENTAL QUALITY OBJECTIVE	NOTES
1. Basic Amenity	Maintain water quality so as to protect public health and prevent a public nuisance arising from visual and smell problems.	
2. General Ecosystem Conservation		
a) For estuaries receiving no substantial effluent discharges directly or indirectly	Maintain water quality so as to protect all aquatic life and dependent non-aquatic organisms such that the ecosystem is typical of an estuary with those physical characteristics and latitude.	It is implicit that objective a) includes all the sub-objectives outlined in b) where applicable
	OR	
b) For estuaries receiving discharges	Maintain or improve water quality to such a condition that: i) it supports a variety of aquatic life and dependent non-aquatic organisms. ii) where appropriate fish and shellfish are protected. iii) where appropriate it supports a benthic fauna essential to sustain sea fisheries	
N.B. Specific species and habitats may need more stringent protection on a local basis because their particular value as an environmental resource.		This will include SSSI's, RAMSAR sites, Marine Nature Reserves, fisheries and shell fisheries (including beds designated under the terms of the EC Shellfish Directive).
3. Migratory Fish	Maintain water quality so as to protect the passage to and from freshwater of all relevant species of migratory fish where physical barriers.	To include eels but not marine species which use parts of estuaries for breeding grounds.

- | | | | |
|----|---|--|---|
| 4. | Commercial
Harvesting of
Fish | Maintain water quality such that commercial marine fish quality shall be acceptable for human consumption as determined by the appropriate competent authorities. | This objectives relates only to the suitability for human consumption; the general health of the fish -- themselves is protected under objective 2) |
| 5. | Commercial
Harvesting of
Shellfish | Maintain water quality such that commercial shellfish quality consumption as determined by the appropriate competent authorities (eg. MAFF) | This objective relates only to the suitability for human consumption; the general health of the fish themselves is protected under objective 2) above. |
| 6. | Bathing | Maintain water quality so as to protect those engaged in bathing. | This should include those activities related to bathing. |
| 7. | Other water-
contact based
recreation | Maintain water quality so as to protect those engaged in water-contact related recreation. | |
| 8. | Other uses | Maintain water quality so as to protect all other recognised uses which are affected directly by water quality and which are not incorporated in other objectives. | This objective should only be applied where positive water quality management is practised. For example, this would not include abstractions unrelated to water quality. Neither would navigation or yachting be included here as they are protected by objective 1). |

APPENDIX 2

AESTHETIC WATER QUALITY AND EMISSION STANDARDS FOR TIDAL AND SENSITIVE INLAND WATERS

WATER QUALITY STANDARDS

		ASSOCIATED USE/EQO
W.A.A. 1986	Those aesthetic standards specified in EC Bathing Water Directive should be complied with and in addition there should be no recognisable sewage-derived debris such as would give rise to consistent and substantial complaint.	1 BASIC AMENITY 6 BATHING 7 OTHER WATER BASED RECREATION

EMISSION STANDARDS

		ASSOCIATED USE/EQO
H.M.I.P. (1988)	"All flows discharged through the long sea outfall should be subject to fine screening or an equally suitable process to remove persistent sewage debris. Adequate performance is unlikely to be achieved by a mesh aperture greater than 6mm..." "... all storm discharges which directly effect bathing must be subject to fine screening... for the most frequent storms, with a lower level of screening applied to storms of a greater magnitude."	BATHING (LONG SEA OUTFALL)

WRC/WW Pre-treatment group	Maximum allowable faecal particle size in the effluent will be dependent upon the available minimum initial dilution at the discharge point, i.e.	ALL USES
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		<u>Dilution</u>	<u>Particle Size</u>
recom- mendations		AMID < 10	<1mm
(1989)	10	<AMID < 100	<3mm
		AMID > 100	<6mm

HMIP (1989)	Persistent plastics are considered a listed substance hence fine screens (<6mm) should be installed to screen a level of storm intensity which will approximately correspond to treating 80% of the total volume spilled to sensitive waters (inland). The level of treatment should be demonstrated to the satisfaction of relevant regulatory staff using the appropriate data and modelling techniques.	SENSITIVE INLAND WATERS
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FURTHER GUIDANCE ON THE BASIC REQUIREMENTS OF DISCHARGES TO ACHIEVE AESTHETIC REQUIREMENTS IN TIDAL AND INLAND WATERS

A2.A. TIDAL WATERS

A2.A.1 BASIC AMENITY USE (EOO No.1)

Foul Flows

- a) All persistent material to be removed from the flow and disposed off site.
- b) Faecal (or other organic material) particle size discharged will be dependent upon the available minimum initial dilution (AMID) in the receiving waters as calculated during a mean spring or neap tidal range, whichever gives the lowest value at any time during the tidal cycle:

Dilution	Particle Size
AMID < 10	< 1mm
10 < AMID < 100	< 3mm
AMID > 100	< 6mm

- c) All discharges, whether preliminary treated, primary settled or secondary treated to be made below the low water mark of mean spring tides.

Storm Flows

- a) The screening level will be determined on a case by case basis taking into account the frequency and duration of the spills and the local usage of the waters.
- b) All storm discharges will be made below the low water mark of mean spring tides unless there are particular extenuating circumstances, in which case the decision on outfall location will be made on a case by case basis.

A2.A.2 WATER CONTACT BASED RECREATIONAL USE (EOO No.7)

Foul Flows

- a) All persistent material to be removed from the flow and disposed off site.
- b) Faecal (or other organic material) particle size discharged will be dependent upon the AMID as described for Basic Amenity use.
- c) A minimum initial dilution standard of 100 will apply to all discharges, however treated, for aesthetic acceptability.

Storm Flows

- a) It will be necessary to demonstrate the expected frequency and duration of overflow spills by means of hydraulic modelling of the catchment sewer system.
- b) All storm flows equating to 80% of the total volume spilled during a typical year will require screening to < 6mm with persistent material retained and returned to foul flow for removal off the fine screens.
- c) For storm flows in excess of those treated above, the agreement of suitable screens will be on a case by case basis and dependent upon the removal

efficiency of the screens. Again all screenings should be removed or returned to foul flow for removal off the fine screens.

d) All storm discharges will be made below the low water mark of mean spring tides unless there are particular extenuating circumstances, in which case the decision of outfall location will be made on a case by case basis.

A2.A.3 BATHING USE (EQO No.6)

Foul Flows

a) All persistent material to be removed from the flow and disposed of off site.

b) Faecal (or other organic material) particle size discharged will be dependent upon the AMID as described for Basic Amenity use.

c) A minimum initial dilution standard of 100 will apply to all discharges, however treated, for aesthetic acceptability and to reduce the density stability of the diluted effluent.

Storm Flows (Discharging to or in close proximity to identified bathing waters)

a) It will be necessary to demonstrate the expected frequency and duration of overflow spills by means of hydraulic modelling of the catchment sewer system.

b) The frequency and duration of spills during the Bathing season (May to September) must be consistent with achieving the bacteriological standards required in the identified bathing waters. Storms with a return period in excess of 1 in 5 years can be excluded in accordance with UK interpretation of "extreme storms" in the EC Directive when failure is permitted.

c) Both within and outside of the bathing season, all storm flows equating to 80% of the total volume expected to be spilled during a typical year will require screening to < 6mm with persistent material retained and returned to foul flow for removal off the fine screens.

d) For storm flows in excess of those treated as above, the agreement of suitable screens will be on a case by case basis and dependent upon the removal efficiency of the screens. Again, all screenings should be removed or returned to foul flow for removal off the fine screens.

e) All storm discharges will be made below the low water mark of mean spring tides unless there are particular extenuating circumstances, in which case the decision of outfall location will be made on a case by case basis.

A2.B. INLAND WATERS - AESTHETIC REQUIREMENTS

A2.B.1 STORM FLOWS TO SENSITIVE WATERS

a) The decision as to the sensitivity or otherwise of the receiving waters will be decided by the NRA after appropriate consultations on a case by case basis.

b) It will be necessary to demonstrate the expected frequency and duration of overflow spills by means of hydraulic modelling of the catchment sewer system.

c) All storm flows equating to 80% of the total volume expected to be spilled during a typical year will require screening to < 6mm with persistent material retained and returned to the foul flow for removal off the fine screens.

d) For storm flows in excess of those treated above, the agreement of suitable screens will be on a case by case basis and dependent upon the removal efficiency of the screens. Again, all screenings should be removed or returned to the foul flow for removal off the fine screens.

A2.B.2 STORM FLOWS TO NON-SENSITIVE WATERS

a) The screening level will be determined on a case by case basis taking into account the frequency and duration of spills and the local usage of the waters.