# Environmental Protection Internal Report

# COMPLIANCE ASSESSMENT FOR EC SURFACE WATER ABSTRACTION DIRECTIVE 1991

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COMPLIANCE ASSESSMENT FOR EC SURFACE WATER ABSTRACTION DIRECTIVE 1991

TECHNICAL REPORT NO. FWS/92/017


SUMMARY

Compliance with the standards required by the EC Directive on the quality of surface water intended for the abstraction of drinking water has been assessed using monitoring data obtained during 1991.

Thirty two river and 22 reservoir intakes were monitored.

The Broadall Lake intake was the only source that failed to achieve the mandatory water quality requirements for the relevant water treatment class. However, the non-compliance was only marginal and is considered to result from the peaty, moorland nature of the water source.

The number and percentage of abstraction intakes non-compliant with the treatment class standards are summarised below:

| | NON-COMPLIANT INTAKES | | | |
|---|---|---|---|---|
| | Guide Standards | | Mandatory Standards | |
| | Number | Percentage | Number | Percentage |
| River sources | 24 | 75% | 1 | 3% |
| Reservoir sources | 14 | 64% | 0 | 0% |
| Total | 38 | 70% | 1 | 1.8% |

There was a higher proportion of river intakes which failed to comply with the guideline treatment class standards than reservoir intakes.

However, more reservoir intakes (33%) were non-compliant with the manganese guideline standards than river intakes (9%). College Reservoir exceeded the guideline manganese standards by more than 3 times.

Fifty three percent of river intakes and 27% of reservoir intakes exceeded the guideline bacteriological standards.

It is recommended that the priority for assessment of the causes and actions required to resolve non-compliance with guideline standards is considered along with the regions' other statutory and non-statutory obligations for investigation of water quality problems.



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ACKNOWLEDGEMENTS

The Abstraction Intake Location Map was prepared with the assistance of P. Grigorey of the Freshwater Planning Unit.

The software programme for compliance assessment was developed and run by A. Burghes of Moonsoft.

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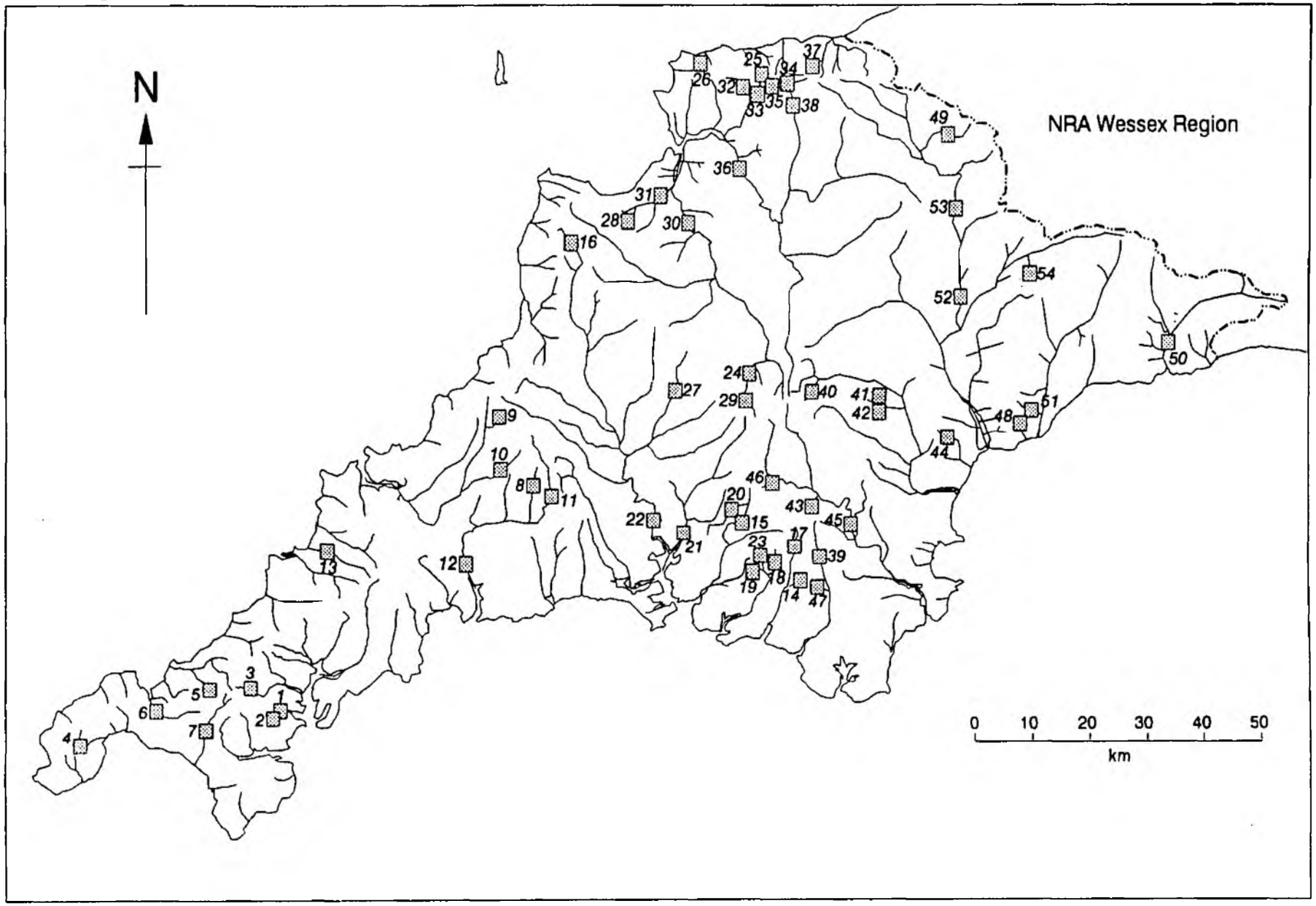
# Figure 1: Public Potable Abstractions Monitored by NRA (SW) 1991



Index for Figure 1 :

| | | |
|---|---|---|
| 1 | College Reservoir | SW 7730 3350 |
| 2 | Argal Reservoir | SW 7630 3280 |
| 3 | Stithians Reservoir | SW 7190 3639 |
| 4 | Drift Reservoir | SW 4399 2873 |
| 5 | Boswyn Reservoir | SW 6592 3629 |
| 6 | River Hayle at St Erth | SW 5495 3490 |
| 7 | River Cober at Wendron | SW 6752 3104 |
| 8 | Colliford Reservoir | SX 1790 7110 |
| 9 | Crowdy Reservoir | SX 1397 8327 |
| 10 | Delank River at Leaze | SX 1358 7655 |
| 11 | River Fowey at Trekeivesteps | SX 2272 6986 |
| 12 | River Fowey at Restomel | SX 0971 6247 |
| 13 | River Porth at Rialton | SX 8487 6230 |
| 14 | Butterbrook Reservoir | SX 6456 5930 |
| 15 | Burrator Reservoir | SX 5513 6803 |
| 16 | Upper Tamar Lake | SS 2890 1180 |
| 17 | River Erme Intake | SX 6403 6317 |
| 18 | River Yealm Intake | SX 6170 6202 |
| 19 | Ford Brook Intake | SX 6123 6184 |
| 20 | Devonport leat | SX 5500 6837 |
| 21 | River Tavy at Lopwell | SX 4751 6503 |
| 22 | River Tamar at Gunnislake | SX 4337 7235 |
| 23 | Broadall Lake Intake (R.Yealm) | SX 6128 6196 |
| 24 | Meldon Reservoir | SX 5636 9169 |
| 25 | Wistlandpound Reservoir | SS 6436 4148 |
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| 28 | Melbury Reservoir | SS 3864 2015 |
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| 37 | West Ilkerton River Intake | SS 7047 4759 |
| 38 | Spreycott Spring Intake | SS 6537 3974 |
| 39 | Avon Dam | SX 6790 6510 |
| 40 | Fernworthy Reservoir | SX 6706 8430 |
| 41 | Kennick Reservoir | SX 8067 8386 |
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| 43 | Venford Reservoir | SX 6860 7110 |
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| 45 | River Dart at Littlehempston | SX 8005 6163 |
| 46 | River Swincombe Intake | SX 6325 7187 |
| 47 | Bala Brook Intake | SX 6715 6294 |
| 48 | Squabmoor Reservoir | SY 0402 8393 |
| 49 | Wimbleball Reservoir | SS 9654 2935 |
| 50 | River Axe at Whitford | SY 2618 9532 |
| 51 | Budleigh Brook Intake | SY 0732 8418 |
| 52 | River Exe at Pynes Intake | SX 9300 9710 |
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| 54 | Sheldon Stream Intake | ST 1057 0887 |

# 1. INTRODUCTION

1.1 This report presents the results of the monitoring programme undertaken in 1991 by the National Rivers Authority (South West) in relation to the EC Surface Water Abstraction Directives (75/440/EEC, 1975 and 79/869/EEC, 1979).

1.2 The monitoring programme was established in February 1991 to fulfil the legal requirements under the EC Surface Water Abstraction Directives 75/440/EEC and 79/869/EEC, and the UK Surface Waters (Classification) Regulations 1989, Statutory Instrument 1989/1148.

1.3 Directive 75/440/EEC, concerning the "quality required of surface water intended for the abstraction of drinking water", gives a list of determinands which must be measured and standards which must be met according to the specified level of drinking water treatment. The three categories of treatment methods and the list of associated parameters and standards given in Annex I and II of the Directive are reproduced in Appendix A.1 and A.2 of this report.

1.4 Directive 79/869/EEC, establishes the methods of measurement and the frequencies of sampling and analysis of surface water abstracted for potable supply. The minimum annual sampling frequencies for each of the determinands given in 75/440/EEC are set with respect to both the level of treatment and the size of the population served. These are reproduced in Appendix A.3.

1.5 The requirements of Directive 75/440/EEC were translated into UK legislation via Section 104(i) of the 1989 Water Act (now Section 82 of the 1991 Water Resources Act) by the Surface Waters (Classification) Regulations 1989, Statutory Instrument (SI) 1989/1148. These Regulations came into force on 1 September 1989 and defined three classifications DW1, DW2 and DW3.

1.6 The NRA has not yet been requested by the Department of the Environment to report compliance with the Directives. Compliance assessed in this report is solely for the purpose of water quality management for NRA South West Region.

## 2. METHODS

### 2.1 Locations Monitored 1991

2.1.1 Fifty four "permanent" surface water abstraction intakes for public drinking water supply in the South West Region were monitored during 1991. These included 22 reservoir intakes and 32 river intakes (Figure 1).

2.1.2 In the case of river abstractions, water quality was monitored at the river intakes. In the case of reservoir abstractions, water quality was monitored at the depth(s) from which water was abstracted.

### 2.2 Determinands Monitored 1991

2.2.1 All mandatory determinands given by Directive 75/440/EEC were monitored in 1991, except Dissolved or emulsified hydrocarbon, and polycyclic aromatic hydrocarbons. This was because routine analysis of these determinands was not available in the NRA laboratory during 1991. Analysis of these determinands will be available in 1992.

2.2.2 All non-mandatory determinands were also analysed where methodologies were available. Those determinands not analysed for are given below:

1. Nitrogen by Kjeldahl method
   Substances extractable with chloroform and
   Odour.

   This was because laboratory methods were not available for these determinands and there are no mandatory standards in the Directive for these substances;

2. Total extractable organic chlorine
   Beryllium
   Cobalt
   Nickel and
   Vanadium.

   This was because no standards for these determinands are given in the Directive.

## 2.3 Sampling Frequency 1991

2.3.1 For all abstraction intakes, the annual sampling frequencies were set at 12, 4 and 1 for determinands in categories I, II and III respectively as defined in 79/869/EEC. These were the minimum frequencies recommended by the Directive for Class A3 water serving a population greater than 100,000 (Appendix A.3).

2.3.2 The analytical methods for organic compounds in category III only became available at the NRA's laboratory in December 1991, therefore sampling and analysis for category III determinands only began in December 1991. As a result, there was no data for those determinands at 30 intakes.

## 2.4 Compliance Assessment

2.4.1 Compliance was assessed against a target for raw water quality and the actual water treatment class. The raw water class is the quality objective to be achieved. The treatment class is the category of water treatment that the raw water received (Appendix A.1). The raw water quality standards corresponded to the A1, A2 and A3 class treatment given by Directive 75/440/EEC are given in Appendix A.2.

2.4.2 Compliance with the mandatory standards was assessed by using the 95 percentile sample statistic, which is the UK interpretation of the sample statistic for compliance assessment specified in Directive 75/440/EEC (Gardiner, 1989). When the number of samples was smaller than 20, the maximum value was used.

2.4.3 Compliance with the guide standards for all determinands, except dissolved oxygen, was assessed by using the 90 percentile sample statistic (Gardiner, 1989). The 10 percentile value was used for dissolved oxygen, and both 10 and 90 percentiles were used for the lower and upper limits of pH. When the number of samples was smaller than 10, the maximum/minimum values were used.

2.4.4 When the concentration of a determinand was below the analytical detection limit, a concentration value of half the detection limit was assigned to that determinand. This is the general protocol accepted by the NRA.

2.4.5 The higher values of the Fluoride guideline standards (Appendix A.2) were used for compliance assessment, i.e. 1mg/l, 1.7mg/l and 1.7mg/l for A1, A2 and A3 Class respectively. These standards are

recommended by the Water Research Council (Gardiner, 1989) to be applied under lower temperature conditions. Temperature is not defined numerically in the WRc Report.

2.4.6 The analytical detection limit for Total Phenols is 2.8μg/l which is higher than the mandatory standard of 1μg/l for Class A1 waters. This is the lowest detection limit that can currently be achieved by the NRA laboratory. No margin of improvement is anticipated in the near future. Hence, this determinand was not included in the assessment of compliance with the A1 Class standards when concentrations were below 2.8μg/l.

2.4.7 Total Pesticides concentration was obtained by adding together the concentrations of parathion, alpha-, beta-, gamma- and delta-HCH, and dieldrin as specified in Directive 75/440/EEC.

2.4.8 The units for the standards of nitrates, sulphates, surfactants, phosphates and ammonia given by Directive 75/440/EEC were converted as below (Table 2.1) for compliance assessment:

TABLE 2.1 : Determinand Units Converted for Compliance Assessment

| Determinands | Units in Directive 75/440/EEC | for Compliance Assessment |
|---|---|---|
| Nitrates | mg/l $NO_3$ | mg/l N |
| Sulphates | mg/l $SO_4$ | mg/l S |
| Surfactants | mg/l (Laurylsulphate) | mg/l (Monoxol O.T.) |
| Phosphates | mg/l $P_2O_5$ | mg/l P |
| Ammonia | mg/l $NH_4$ | mg/l N |

## 3. RESULTS

3.1 The 95 percentile values and the number of samples taken for the mandatory determinands analysed are listed in Table B.1 (Appendix B.1).

3.2 The 90 and/or 10 percentile values and the number of samples taken for the guide determinands analysed are listed in Table B.2 (Appendix B.2).

### 3.3 Mandatory Standard Compliance

3.3.1 Mandatory standard compliance, non-compliant determinands and the percentage deviations from the mandatory standards are summarised in Table 3.1.

3.3.2 Treatment Class Compliance

Only one abstraction intake failed to comply with the mandatory treatment class standards. This was the Broadall Lake intake in the River Yealm catchment which was non-compliant with the colour standard.

3.3.3 Raw Water Class Compliance

The number and percentage of intakes non-compliant with the mandatory standards are summarised in Table 3.2.

**TABLE 3.2 : Number and Percentage of Intakes Non-compliant with Mandatory Standards.**

| | Raw water Class | | Treatment Class | |
|---|---|---|---|---|
| | No. | % | No. | % |
| River intakes | 9 | 28 | 1 | 3 |
| Reservoir intakes | 6 | 27 | 0 | 0 |
| Total | 15 | 28 | 1 | 1.8 |

Note : No. of river intakes monitored = 32
No. of reservoir intakes monitored = 22

TABLE 3.1 : SUMMARY OF COMPLIANCE WITH MANDATORY STANDARDS

Units : Metals - mg metal/l Colour - Hazen

| ABSTRACTION INTAKES | RAW WATER CLASS | COMPLIANCE | NON-COMPLIANT DETERMINANDS | STANDARD | 95 %ILE | % HIGHER THAN STDS | TREATMENT CLASS | COMPLIANCE | NON-COMPLIANT DETERMINANDS | STANDARD | 95 %ILE | % HIGHER THAN STDS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| College Reservoir | A1 | PASS | | | | | A2 | PASS | | | | |
| Argal Reservoir | A1 | PASS | | | | | A2 | PASS | | | | |
| Stithians Reservoir | A1 | PASS | | | | | A2 | PASS | | | | |
| Drift Reservoir | A1 | PASS | | | | | A2 | PASS | | | | |
| Boswyn Reservoir | A1 | PASS | | | | | A1 | PASS | | | | |
| River Hayle | A1 | FAIL | Barium | 0.01 | 0.014 | 40 | A2 | PASS | | | | |
| River Cober | A2 | PASS | | | | | A3 | PASS | | | | |
| Colliford Reservoir | A1 | FAIL | Colour<br>Diss Fe | 20<br>0.3 | 40<br>0.43 | 100<br>43.3 | A2 | PASS | | | | |
| Crowdy Reservoir | A1 | FAIL | Colour<br>Diss Fe | 20<br>0.3 | 46<br>0.32 | 130<br>6.7 | A2 | PASS | | | | |
| Delank River | A1 | FAIL | Colour | 20 | 50 | 150 | A2 | PASS | | | | |
| Trekeivesteps, River Fowey | A1 | FAIL | Colour | 20 | 28 | 40 | A2 | PASS | | | | |
| Restomel, River Fowey | A1 | FAIL | Colour | 20 | 30 | 50 | A2 | PASS | | | | |
| Rialton, River Porth | A1 | FAIL | Colour | 20 | 27 | 35 | A2 | PASS | | | | |
| Butterbrook Reservoir | A1 | PASS | | | | | A1 | PASS | | | | |
| Burrator Reservoir | A1 | FAIL | Colour | 20 | 21 | 5 | A2 | PASS | | | | |
| Upper Tamar Lake | A2 | PASS | | | | | A2 | PASS | | | | |
| River Erme | A1 | FAIL | Colour | 20 | 53 | 165 | A2 | PASS | | | | |
| River Yealm | A1 | PASS | | | | | A1 | PASS | | | | |

TABLE 3.1 : SUMMARY OF COMPLIANCE WITH MANDATORY STANDARDS

Units : Metals - mg metal/l Colour - Hazen

| ABSTRACTION INTAKES | RAW WATER CLASS | COMPLIANCE | NON-COMPLIANT DETERMINANDS | STANDARD | 95 %ILE | % HIGHER THAN STDS | TREATMENT CLASS | COMPLIANCE | NON-COMPLIANT DETERMINANDS | STANDARD | 95 %ILE | % HIGHER THAN STDS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ford Brook | A1 | PASS | | | | | A1 | PASS | | | | |
| Devonport Leat | A1 | FAIL | Colour | 20 | 24 | 20 | A2 | PASS | | | | |
| Lopwell, River Tavy | A2 | PASS | | | | | A2 | PASS | | | | |
| Gunnislake, River Tamar | A2 | PASS | | | | | A2 | PASS | | | | |
| Broadall Lake, River Yealm | A1 | FAIL | Colour | 20 | 22 | 10 | A1 | FAIL | Colour | 20 | 22 | 10 |
| Meldon Reservoir | A2 | PASS | | | | | A2 | PASS | | | | |
| Wistlandpond Reservoir | A1 | PASS | | | | | A1 | PASS | | | | |
| Lower Slade Reservoir | A1 | PASS | | | | | A2 | PASS | | | | |
| Roadford Reservoir | A2 | PASS | | | | | A2 | PASS | | | | |
| Melbury Reservoir | A1 | FAIL | Colour | 20 | 26 | 30 | A2 | PASS | | | | |
| West Okement River | A2 | PASS | | | | | A2 | PASS | | | | |
| River Torridge | A2 | PASS | | | | | A2 | PASS | | | | |
| River Yeo (Bideford) | A2 | PASS | | | | | A2 | PASS | | | | |
| Loxhore, River Yeo | A2 | PASS | | | | | A2 | PASS | | | | |
| Bratton Stream | A2 | PASS | | | | | A2 | PASS | | | | |
| Leehamford, River Bray | A1 | PASS | | | | | A1 | PASS | | | | |
| Brockemburrow Intake | A1 | PASS | | | | | A1 | PASS | | | | |
| Newbridge, River Taw | A2 | PASS | | | | | A2 | PASS | | | | |

TABLE 3.1 : SUMMARY OF COMPLIANCE WITH MANDATORY STANDARDS

Units : Metals - mg metal/l Colour - Hazen

| ABSTRACTION INTAKES | RAW WATER CLASS | COMPLIANCE | NON-COMPLIANT DETERMINANDS | STANDARD | 95 %ILE | % HIGHER THAN STDS | TREATMENT CLASS | COMPLIANCE | NON-COMPLIANT DETERMINANDS | STANDARD | 95 %ILE | % HIGHER THAN STDS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| West Ilkerton River | A2 | PASS | | | | | A2 | PASS | | | | |
| Spreycott Spring | A1 | PASS | | | | | A1 | PASS | | | | |
| Avon Dam | A1 | FAIL | Colour | 20 | 48 | 140 | A2 | PASS | | | | |
| Fernworthy Reservoir | A1 | PASS | | | | | A2 | PASS | | | | |
| Kennick Reservoir | A1 | FAIL | Colour | 20 | 38 | 90 | A2 | PASS | | | | |
| Trenchford Reservoir | A1 | PASS | | | | | A2 | PASS | | | | |
| Venford Reservoir | A1 | PASS | | | | | A1 | PASS | | | | |
| Thornes Intake, Kenton | A1 | PASS | | | | | A2 | PASS | | | | |
| Littlehempston, River Dart | A2 | PASS | | | | | A3 | PASS | | | | |
| Swincombe Intake | A2 | PASS | | | | | A2 | PASS | | | | |
| Bala Brook | A1 | FAIL | Colour | 20 | 33 | 65 | A2 | PASS | | | | |
| Squabmoor Reservoir | A2 | PASS | | | | | A2 | PASS | | | | |
| Wimbleball Reservoir | A1 | PASS | | | | | A2 | PASS | | | | |
| Whitford, River Axe | A2 | PASS | | | | | A2 | PASS | | | | |
| Budleigh Brook | A2 | PASS | | | | | A2 | PASS | | | | |
| Pynes Intake, River Exe | A2 | PASS | | | | | A3 | PASS | | | | |
| Bolham Leat, River Exe | A2 | PASS | | | | | A3 | PASS | | | | |
| Sheldon Stream | A1 | PASS | | | | | A1 | PASS | | | | |

## 3.4 Guideline Standards Compliance

3.4.1 Compliance with the guideline standards, and non-compliant determinands are summarised in Table 3.3.

3.4.2 The number and percentage of intakes non-compliant with the guideline standards are summarised in Table 3.4.

**TABLE 3.4 : Number and Percentage of Intakes Non-compliant with Guideline Standards.**

| | Raw water Class | | Treatment Class | |
|---|---|---|---|---|
| | No. | % | No. | % |
| River intakes | 30 | 93 | 24 | 75 |
| Reservoir intakes | 22 | 100 | 14 | 64 |
| Total | 52 | 96 | 38 | 70 |

Note : No. of river intakes monitored = 32
No. of reservoir intakes monitored = 22

3.4.3 The determinands non-compliant with the treatment class guideline standards, the non-compliant intakes, and the percentage deviations from the guideline standards are summarised in Tables 3.5a and 3.5b.

3.4.4 The percentages of mandatory and guideline standard non-compliance for categories A1, A2, and A3 raw water classes and treatment classes are summarised in Table 3.6.

3.4.5 The percentages of river and reservoir intakes non-compliant with treatment guideline standards for individual determinands were summarised in Figure 2.

TABLE 3.3 : SUMMARY OF COMPLIANCE WITH GUIDELINE STANDARDS

pH(L) : pH Lower Limit
pH(H) : pH Higher Limit
T Coli : Total Coliforms
F Coli : Faecal Coliforms
F Strep : Faecal Streptococci

| ABSTRACTION INTAKES | RAW WATER CLASS | COMPLIANCE | NON-COMPLIANT DETERMINANDS | TREATMENT CLASS | COMPLIANCE | NON-COMPLIANT DETERMINANDS |
|---|---|---|---|---|---|---|
| College Reservoir | A1 | FAIL | pH(H), Colour, Diss Fe, Mn, BOD, NH3, T Coli, F Coli, F Strep | A2 | FAIL | Mn, BOD, T Coli, F Coli |
| Argal Reservoir | A1 | FAIL | Colour, T coli, F coli | A2 | PASS | |
| Stithians Reservoir | A1 | FAIL | Colour, Diss Fe, NH3, T Coli, F Coli | A2 | PASS | |
| Drift Reservoir | A1 | FAIL | Colour, NO3, Diss Fe, Phosphate, BOD, NH3, T Coli, F Coli, F Strep | A2 | PASS | |
| Boswyn Reservoir | A1 | FAIL | pH(L), SS, T coli, F coli, F Strep | A1 | FAIL | pH(L), SS, T coli, F coli, F Strep |
| River Hayle | A1 | FAIL | NO3, Diss Fe, Cu, Zn, NH3, T coli, F coli, F Strep | A2 | PASS | |
| River Cober | A2 | FAIL | BOD | A3 | PASS | |
| Colliford Reservoir | A1 | FAIL | pH(L), Colour, Diss Fe, Mn, Cu, Zn, DO, BOD, NH3, T & F Coli, F Strep | A2 | FAIL | Zn |
| Crowdy Reservoir | A1 | FAIL | pH(L), Colour, SS, Diss Fe, NH3, T Coli, F Coli, F Strep | A2 | FAIL | pH(L), T Coli |
| Dalank River | A1 | FAIL | pH(L), Colour, Diss Fe, NH3, T Coli, F Coli, F Strep | A2 | FAIL | pH(L) |
| Trekeivesteps, River Fowey | A1 | FAIL | pH(L), Colour, NH3, T Coli, F Coli, F Strep | A2 | PASS | |
| Restomel, River Fowey | A1 | FAIL | pH(L), Colour, Diss Fe, BOD, NH3, T Coli, F Coli, F Strep | A2 | FAIL | T Coli |
| Rialton, River Porth | A1 | FAIL | pH(H), Colour, SS, NO3, Diss Fe, Mn, Phosphate, BOD, NH3, T & F Coli, F Strep | A2 | FAIL | Mn, T Coli, F Coli |
| Butterbrook Reservoir | A1 | FAIL | pH(L), Colour, T Coli | A1 | FAIL | pH(L), Colour, T Coli |
| Burrator Reservoir | A1 | FAIL | pH(L), Colour, Diss Fe, Mn, DO, NH3, T Coli | A2 | FAIL | Mn |
| Upper Tamar Lake | A2 | FAIL | Mn | A2 | FAIL | Mn |
| River Erme | A1 | FAIL | pH(L), Colour, Diss Fe, NH3, T Coli, F Coli | A2 | FAIL | pH(L), Colour |
| River Yealm | A1 | FAIL | pH(L), Colour, T Coli, F Coli | A1 | FAIL | pH(L), Colour, T Coli, F Coli |

TABLE 3.3 : SUMMARY OF COMPLIANCE WITH GUIDELINE STANDARDS

pH(L) : pH Lower Limit
pH(H) : pH Higher Limit
T Coli : Total Coliforms
F Coli : Faecal Coliforms
F Strep : Faecal Streptococci

| ABSTRACTION INTAKES | RAW WATER CLASS | RAW WATER COMPLIANCE | RAW WATER NON-COMPLIANT DETERMINANDS | TREATMENT CLASS | TREATMENT COMPLIANCE | TREATMENT NON-COMPLIANT DETERMINANDS |
|---|---|---|---|---|---|---|
| Ford Brook | A1 | FAIL | pH(L), T Coli, F Coli | A1 | FAIL | pH(L), T Coli, F Coli |
| Davonport Leat | A1 | FAIL | pH(L), Colour, Diss Fe, T Coli, F coli, F Strep | A2 | FAIL | pH(L) |
| Lopwell, River Tavy | A2 | FAIL | T coli, F Strep | A2 | FAIL | T coli, F Strep |
| Gunnislake, River Tamar | A2 | FAIL | T Coli | A2 | FAIL | T Coli |
| Broadall Lake, River Yealm | A1 | FAIL | pH(L), Colour, SS, T Coli, F Coli, | A1 | FAIL | pH(L), Colour, SS, T Coli, F Coli, |
| Maldon Reservoir | A2 | FAIL | pH(L), Mn, | A2 | FAIL | pH(L), Mn, |
| Wistlandpond Reservoir | A1 | FAIL | Cu, NH3, F Coli | A1 | FAIL | Cu, NH3, F Coli |
| Lower Slade Reservoir | A1 | FAIL | Diss Fe, Cu, NH3, T Coli, F Coli, F Strep | A2 | PASS | |
| Roadford Reservoir | A2 | FAIL | Mn | A2 | FAIL | Mn |
| Melbury Reservoir | A1 | FAIL | pH(L), Colour, Diss Fe, Mn, Cu, NH3, T Coli, F coli | A2 | PASS | |
| West Clement River | A2 | FAIL | pH(L) | A2 | FAIL | pH(L) |
| River Torridge | A2 | FAIL | Mn, Phosphate, T coli, F Coli | A2 | FAIL | Mn, Phosphate, T coli, F Coli |
| River Yeo (Bideford) | A2 | FAIL | Phosphate, T Coli, F Coli, F Strep | A2 | FAIL | Phosphate, T Coli, F Coli, F Strep |
| Loshore, River Yeo | A2 | FAIL | F Coli | A2 | FAIL | F Coli |
| Bratton Stream | A2 | PASS | | A2 | PASS | |
| Leshamford, River Bray | A1 | FAIL | Cu, T Coli, F Coli | A1 | FAIL | Cu, T Coli, F Coli |
| Brockenburrow Intake | A1 | FAIL | Colour, T Coli, F Coli | A1 | FAIL | Colour, T Coli, F Coli |
| Newbridge, River Taw | A2 | FAIL | Mn, Phosphate, T Coli, F Coli | A2 | FAIL | Mn, Phosphate, T Coli, F Coli |

TABLE 3.3 : SUMMARY OF COMPLIANCE WITH GUIDELINE STANDARDS

pH(L) : pH Lower Limit
pH(H) : pH Higher Limit
T Coli : Total Coliforms
F Coli : Faecal Coliforms
F Strep : Faecal Streptococci

| ABSTRACTION INTAKES | RAW WATER CLASS | RAW WATER COMPLIANCE | RAW WATER NON-COMPLIANT DETERMINANDS | TREATMENT CLASS | TREATMENT COMPLIANCE | TREATMENT NON-COMPLIANT DETERMINANDS |
|---|---|---|---|---|---|---|
| West Ilkerton River | A2 | PASS | | A2 | PASS | |
| Sprayscott Spring | A1 | FAIL | SS, T Coli, F Coli | A1 | FAIL | SS, T Coli, F Coli |
| Avon Dam | A1 | FAIL | pH(L), Colour, Diss Fe, NH3, T Coli, F Coli | A2 | FAIL | pH(L) |
| Fernworthy Reservoir | A1 | FAIL | pH(L), Colour | A2 | PASS | |
| Kennick Reservoir | A1 | FAIL | Colour, NH3 | A2 | PASS | |
| Trenchford Reservoir | A1 | FAIL | pH(L), Colour, NH3, T Coli | A2 | PASS | |
| Venford Reservoir | A1 | FAIL | pH(L), Mn, Cu, T Coli | A1 | FAIL | pH(L), Mn, Cu, T Coli |
| Thornes Intake, Kenton | A1 | FAIL | Colour, Diss Fe, NH3, T Coli, F Coli | A2 | PASS | |
| Littlehempston, River Dart | A2 | FAIL | T Coli, F Coli | A3 | PASS | |
| Swincombe Intake | A2 | FAIL | pH(L) | A2 | FAIL | pH(L) |
| Bala Brook | A1 | FAIL | pH(L), Colour, T Coli, F Coli | A2 | FAIL | pH(L) |
| Squabmoor Reservoir | A2 | FAIL | Temperature | A2 | FAIL | Temperature |
| Wimbleball Reservoir | A1 | FAIL | Mn, NH3, T Coli, F Coli, F Strep | A2 | FAIL | Mn |
| Whitford, River Axe | A2 | FAIL | Colour, Phosphate, T Coli, F Coli, F Strep | A2 | FAIL | Colour, Phosphate, T Coli, F Coli, F Strep |
| Burleigh Brook | A2 | FAIL | pH(H), Phosphate, T Coli, F Coli, F Strep | A2 | FAIL | pH(H), Phosphate, T Coli, F Coli, F Strep |
| Pynes Intake, River Exe | A2 | FAIL | Mn, T Coli, F Coli, F Strep | A3 | FAIL | COD |
| Bolham Least, River Exe | A2 | FAIL | F Coli, F Strep | A3 | PASS | |
| Sheldon Stream | A1 | FAIL | pH(L), Colour, Diss Fe, NH3, T Coli, F Coli, F Strep | A1 | FAIL | pH(L), Colour, Diss Fe, NH3, T Coli, F Coli, F Strep |

TABLE 3.5a : Physical and Chemical Determinands Non-compliant with the Treatment Guideline Standards and Percentage Deviations from the Guide Determinand Standards

| NON-COMPLIANT DETERMINANDS | NON-COMPLIANT INTAKES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | RESERVOIRS | TREATMENT CLASS | STANDARD 90 %ILE | 90 %ILE | % DEVIATION FROM 'G' STDS | RIVERS | TREATMENT CLASS | STANDARD 90 %ILE | 90 %ILE | % DEVIATION FROM 'G' STDS |
| pH (Lower) (10 %ILE) | Crowdy | A2 | 5.5 | 5.16 | 6.2 | Delank | A2 | 5.5 | 5.06 | 8.0 |
| | Butterbrook | A1 | 6.5 | 5.70 | 12.3 | River Erme | A2 | 5.5 | 4.80 | 12.7 |
| | Meldon | A2 | 5.5 | 5.20 | 5.5 | River Yealm | A1 | 6.5 | 4.69 | 27.8 |
| | Avon | A2 | 5.5 | 5.00 | 10.0 | Ford Brook | A1 | 6.5 | 5.02 | 22.8 |
| | Venford | A1 | 6.5 | 5.50 | 15.4 | Devonport Leat | A2 | 5.5 | 4.88 | 11.3 |
| | Boswyn | A1 | 6.5 | 5.88 | 9.5 | Broadall Lake | A1 | 6.5 | 4.50 | 30.8 |
| | | | | | | West Okement | A2 | 5.5 | 5.10 | 7.3 |
| | | | | | | Swincombe | A2 | 5.5 | 5.20 | 5.5 |
| | | | | | | Bala Brook | A2 | 5.5 | 4.70 | 14.5 |
| | | | | | | Sheldon Stream | A1 | 6.5 | 6.00 | 7.6 |
| pH (Upper) | | | | | | Budleigh Brook | A2 | 9.0 | 9.10 | 1.1 |
| Colour (Hazen) | Butterbrook | A1 | 10 | 11.0 | 10.0 | River Erme | A2 | 50 | 53.0 | 6.0 |
| | | | | | | River Yealm | A1 | 10 | 11.8 | 18.0 |
| | | | | | | Broadall Lake | A1 | 10 | 20.7 | 107.0 |
| | | | | | | Brockemburrow | A1 | 10 | 16.0 | 60.0 |
| | | | | | | Whitford | A2 | 50 | 67.0 | 34.0 |
| | | | | | | Sheldon Stream | A1 | 10 | 14.0 | 40.0 |
| BOD (mg/l) | College | A2 | <5 | 6.39 | 27.8 | | | | | |
| COD (mg/l) | | | | | | Pynes Intake | A3 | 30 | 47.5 | 58.3 |
| Ammonia (mg N/l) | Whistlandpound | A1 | 0.039 | 0.09 | 131.0 | Sheldon Stream | A1 | 0.039 | 0.15 | 285.0 |
| Temperature (deg C) | Squabmoor | A2 | 22.0 | 23.0 | 4.5 | | | | | |
| Suspended Solids (mg/l) | Boswyn | A1 | 25.0 | 61.4 | 17.5 | Broadall Lake | A1 | 25 | 434.4 | 1638.0 |
| | | | | | | Spreycott Spring | A1 | 25 | 35.0 | 40.0 |
| Phosphates (mg P/l) | | | | | | River Torridge | A2 | 0.153 | 0.31 | 103.0 |
| | | | | | | River Yeo (Bideford) | A2 | 0.153 | 0.18 | 17.6 |
| | | | | | | New Bridge, River Taw | A2 | 0.153 | 0.19 | 24.2 |
| | | | | | | Whitford | A2 | 0.153 | 0.37 | 142.0 |
| | | | | | | Budleigh Brook | A2 | 0.153 | 0.22 | 43.8 |
| Manganese (mg Mn/l) | College | A2 | 0.1 | 0.323 | 223.0 | Rialton, River Porth | A2 | 0.1 | 0.113 | 13.0 |
| | Burrator | A2 | 0.1 | 0.105 | 5.0 | River Torridge | A2 | 0.1 | 0.115 | 15.0 |
| | Upper Tamar Lake | A2 | 0.1 | 0.170 | 70.0 | New Bridge, River Taw | A2 | 0.1 | 0.158 | 58.0 |
| | Meldon | A2 | 0.1 | 0.177 | 77.0 | | | | | |
| | Roadford | A2 | 0.1 | 0.160 | 60.0 | | | | | |
| | Venford | A1 | 0.05 | 0.123 | 146.0 | | | | | |
| | Wimbleball | A2 | 0.1 | 0.206 | 106.0 | | | | | |
| Zinc (mg Zn/l) | Colliford | A2 | 1.0 | 2.90 | 190.0 | | | | | |
| Copper (mg Cu/l) | Wistlandpound | A1 | 0.02 | 0.025 | 25.0 | Leehamford, River Bray | A1 | 0.02 | 0.025 | 25.0 |
| | Venford | A1 | 0.02 | 0.025 | 25.0 | | | | | |
| Diss. Iron (mg Fe/l) | | | | | | Sheldon Stream | A1 | 0.1 | 0.13 | 30.0 |

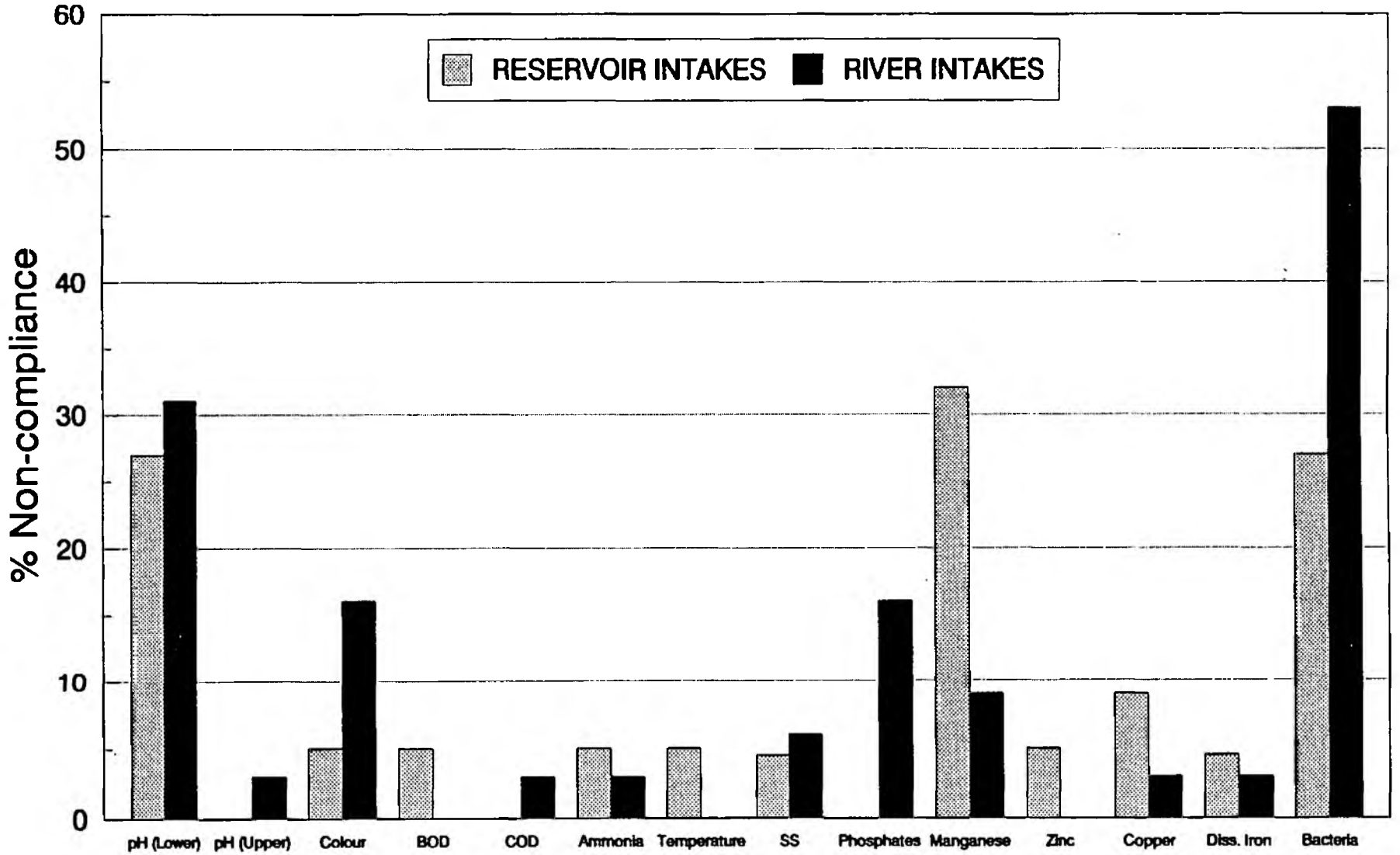
TABLE 3.5b : Bacteriological Determinands Non-compliant with the Treatment Guideline Standards and Percentage Deviations from the Guide Determinand Standards

| NON-COMPLIANT INTAKES | TREATMENT CLASS | TOTAL COLIFORMS | | | FAECAL COLIFORMS | | | FAECAL STREPTOCOCCI | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | STANDARD | 90 %ILE | % HIGHER THAN 'G' STDS | STANDARD | 90 %ILE | % HIGHER THAN 'G' STDS | STANDARD | 90 %ILE | % HIGHER THAN 'G' STDS |
| RESERVOIRS : | | | | | | | | | | |
| College | A2 | 5000 | 41000 | 720 | 2000 | 3000 | 50 | 1000 | 202 | 0 |
| Boswyn | A1 | 50 | 3000 | 5900 | 20 | 100 | 400 | 20 | 56 | 180 |
| Crowdy | A2 | 5000 | 16700 | 234 | 2000 | 700 | 0 | 1000 | 120 | 0 |
| Butterbrook | A1 | 50 | 70 | 40 | 20 | 20 | 0 | 20 | 5 | 0 |
| Wistlandpound | A1 | 50 | 310 | 520 | 20 | 100 | 400 | 20 | 100 | 400 |
| Venford | A1 | 50 | 100 | 100 | 20 | 0 | 0 | 20 | 0 | 0 |
| RIVERS : | | | | | | | | | | |
| Restomel, River Fowey | A2 | 5000 | 7500 | 50 | 2000 | 1700 | 0 | 1000 | 470 | 0 |
| Rialton, River Porth | A2 | 5000 | 39000 | 680 | 2000 | 8000 | 300 | 1000 | 540 | 0 |
| River Yealm | A1 | 50 | 170 | 240 | 20 | 60 | 200 | 20 | 10 | 0 |
| Ford Brook | A1 | 50 | 200 | 300 | 20 | 28 | 40 | 20 | 12 | 0 |
| Lopwell, River Tavy | A2 | 5000 | 6500 | 30 | 2000 | 1800 | 0 | 1000 | 1290 | 29 |
| Gunnislake, River Tamar | A2 | 5000 | 5600 | 12 | 2000 | 2200 | 10 | 1000 | 900 | 0 |
| Broadall Lake | A1 | 50 | 140 | 180 | 20 | 80 | 300 | 20 | 12 | 0 |
| River Torridge | A2 | 5000 | 59000 | 1080 | 2000 | 14000 | 600 | 1000 | 910 | 0 |
| River Yeo (Bideford) | A2 | 5000 | 37000 | 640 | 2000 | 21000 | 950 | 1000 | 10000 | 900 |
| Loxhore, River Yeo | A2 | 5000 | 3500 | 0 | 2000 | 3700 | 85 | 1000 | 0 | 0 |
| Leehamford, River Bray | A1 | 50 | 4500 | 8900 | 20 | 2800 | 13900 | 20 | 0 | 0 |
| Brockemburrow | A1 | 50 | 1790 | 3480 | 20 | 1510 | 7450 | 20 | 0 | 0 |
| New Bridge, River Taw | A2 | 5000 | 7500 | 50 | 2000 | 2800 | 40 | 1000 | 70 | 0 |
| Spreycott Spring | A1 | 50 | 2500 | 4900 | 20 | 3300 | 16400 | 20 | 0 | 0 |
| Whitford, River Axe | A2 | 5000 | 42000 | 740 | 2000 | 85000 | 4150 | 1000 | 7500 | 650 |
| Budleigh Brook | A2 | 5000 | 13400 | 168 | 2000 | 2600 | 30 | 1000 | 3300 | 230 |
| Sheldon Stream | A1 | 50 | 100 | 100 | 20 | 69 | 245 | 20 | 50 | 150 |

TABLE 3.6 : Numbers and Percentages of Non-compliance for A1, A2 and A3 Class Intakes

| Abstraction Intakes | Raw Water Class | | | Treatment Class | | |
|---|---|---|---|---|---|---|
| | A1 | A2 | A3 | A1 | A2 | A3 |
| Total No. | 34 | 20 | 0 | 11 | 39 | 4 |
| No. of Intakes Non-compliant with Mandatory Standards | 15 | 0 | 0 | 1 | 0 | 0 |
| % Non-compliance | 44 | 0 | 0 | 9 | 0 | 0 |
| No. of Intakes Non-compliant with Guideline Standards | 34 | 18 | 0 | 11 | 26 | 1 |
| % Non-compliance | 100 | 90 | 0 | 100 | 67 | 25 |

*Figure 2: Percentage Non-compliance - Treatment Class Guide Standards*



# 4. DISCUSSION

## 4.1 Mandatory Standard Compliance

The Broadall Lake intake was the only source that failed to comply with the mandatory standards for the treatment type available. The 95 percentile colour value was 22 Hazen units which marginally exceeded the mandatory Colour standard of 20 Hazen units for Class A1 treatment. The non-compliance is not considered to be a serious problem because it is likely to be due to the moorland origin of the water source. The margin of non-compliance was also small. Therefore, it is not recommended to take any action unless repetitive non-compliance occurs in future years.

## 4.2 Guideline Standard Compliance

4.2.1 Generally, a higher proportion of river intakes failed to comply with the treatment class guideline standards than reservoir intakes. However, manganese was a more frequent problem in reservoir sources (Table 3.4, 3.5a, 3.5b and Figure 2).

4.2.2 Non-compliance with the pH (Lower) and colour standards mostly occurred at upland sources (Table 3.5a and Figure 1). Similar observations have been reported by Broome (1992). Low pH and high colouration tends to be common in water which originates from peaty moorland. These parameters are unlikely to cause serious problems after appropriate water treatment. It has been reported by the DoE (1991) that less than 0.1% of samples taken from the South West Water Services Ltd. drinking water distribution system exceeded the prescribed value for colouration in 1990.

4.2.3 Non-compliance with the pH (Upper) limit at the Budleigh Brook intake was found to be due to algal growth in a silt trap upstream of the intake (Wilcock, 1991).

4.2.4 Non-compliance with the Phosphates guideline standards was confined to lowland river sources (Table 3.5). This may be attributed to sewage treatment works discharges, dairy industry discharges and farming activities in river catchments.

4.2.5 Thirty two percent of the reservoir intakes and 9% of the river intakes failed to comply with the Manganese guideline standards (Table 3.5 and Figure 1). The 95 percentile manganese concentration at College Reservoir was found to be 0.323mg/l, which was more than three times the guideline standard of 0.1mg/l. The high manganese

concentrations recorded in reservoirs could result from thermal stratification which leads to the release of soluble manganese from the sediment into the water column under anaerobic condition in the hypolimnion.

4.2.6 Seventeen river intakes (53%) and 6 reservoir intakes (27%) exceeded the guideline bacteriological standards (Table 3.4, 3.5b and Figure 1).

These suggest that half of the river sources used for public drinking water abstraction prior to treatment in the South West were of poor bacteriological quality in 1991, and below the EC guideline standards. A large proportion of these sources were likely to be associated with faecal pollution as a result of agricultural activities and sewage treatment works discharges in catchments.

Most of the abstraction intakes listed in Table 3.5b showed high Faecal Coliforms counts (Appendix B.2). This suggests that heavy faecal pollution occurred in these water sources. Faecal Coliforms counts significantly exceeded the guideline standards were found at:

| Abstraction Intakes | F. Coliforms counts % higher than 'G' Stds |
|---|---|
| Wistlandpound reservoir | 400% |
| River Torridge at Torrington | 600% |
| River Yeo (Bideford) at Edge Mill | 950% |
| River Bray at Leehamford | 13900% |
| Brockemburrow Stream at Brockemburrow Intake | 7450% |
| Spreycott Stream at Spreycott Spring Intake | 16400% |
| River Axe at Whitford Intake | 4140% |

The DoE (1991) reported that the bacteriological quality of potable water provided by the South West Water Services Ltd. after treatment was good (>99.9% compliance). Therefore, even though many supply sources did not meet the guideline bacteriological standards for the EC Directive 75/440/EEC, the treatment available is apparently adequate to ensure that the final potable water meets the EC Drinking Water Directive.

## 5. CONCLUSION

5.1 The Broadall Lake intake marginally exceeded the mandatory Colour standard for the treatment type available.

5.2 Twenty four river intakes and fourteen reservoir intakes failed to comply with the appropriate treatment class guideline standards.

Freshwater Officer to consider the priority to be allocated to investigating causes and actions to resolved non-compliance with EC Abstraction Directive guideline standards.

ACTION Freshwater Officer

## 7. REFERENCES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79/869/EEC, (1979). EC Directive concerning the methods of measurement and frequencies of sampling and analysis of surface water intended for the abstraction of drinking water in the Member States. Official Journal of the European Communities No. L271/44.

Broome, R.J., (1992). Compliance assessment for EC Freshwater Fish Directive 1990. National Rivers Authority (South West) Internal Report, No. FWS/92/013.

DoE, (1991). Drinking water 1990, A report by the Chief Inspector, Drinking water Inspectorate. Department of the Environment, Welsh Office.

Gardiner, J. and Zabel, T. (1989). United Kingdom water quality standards arising from European Community Directives - An update. Water Research Council Report No. PRS 2287-M.

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# APPENDIX A1

## ANNEX 1

### Definition of the standard methods of treatment for transforming surface water of categories A1, A2 and A3 into drinking water

Category A1

Simple physical treatment and disinfection, e.g. rapid filtration and disinfection.

Category A2

Normal physical treatment, chemical treatment and disinfection, e.g. pre-chlorination, coagulation, flocculation, decantration, filtration, disinfection (final chlorination).

Category A3

Intensive physical and chemical treatment, extended treatment and disinfection e.g. chlorination to break-point, coagulation, flocculation, decantation, filtration, absorption (activated carbon), disinfection (ozone, final chlorination).

# APPENDIX A.2

## *ANNEX II*

### *Characteristics of surface water intended for the abstraction of drinking water*

| | Parameters | | A1 G | A1 I | A2 G | A2 I | A3 G | A3 I |
|---|---|---|---|---|---|---|---|---|
| 1 | pH | | 6.5 to 8.5 | | 5.5 to 9 | | 5.5 to 9 | |
| 2 | Coloration (after simple filtration) | mg/l Pt scale | 10 | 20 (O) | 50 | 100 (O) | 50 | 200 (O) |
| 3 | Total suspended solids | mg/l SS | 25 | | | | | |
| 4 | Temperature | ° C | 22 | 25 (O) | 22 | 25 (O) | 22 | 25 (O) |
| 5 | Conductivity | µs/cm⁻¹ at 20°C | 1000 | | 1000 | | 1000 | |
| 6 | Odour | (dilution factor at 25°C) | 3 | | 10 | | 20 | |
| 7* | Nitrates | mg/l $NO_3$ | 25 | 50 (O) | | 50 (O) | | 50 (O) |
| 8 | Fluorides | mg/l F | 0.7 to 1 | 1.5 | 0.7 to 1.7 | | 0.7 to 1.7 | |
| 9 | Total extractable organic chlorine | mg/l Cl | | | | | | |
| 10* | Dissolved iron | mg/l Fe | 0.1 | 0.3 | 1 | 2 | 1 | |
| 11* | Manganese | mg/l Mn | 0.05 | | 0.1 | | 1 | |
| 12 | Copper | mg/l Cu | 0.02 | 0.05 (O) | 0.05 | | 1 | |
| 13 | Zinc | mg/l Zn | 0.5 | 3 | 1 | 5 | 1 | 5 |
| 14 | Boron | mg/l B | 1 | | 1 | | 1 | |
| 15 | Beryllium | mg/l Be | | | | | | |
| 16 | Cobalt | mg/l Co | | | | | | |
| 17 | Nickel | mg/l Ni | | | | | | |
| 18 | Vanadium | mg/l V | | | | | | |
| 19 | Arsenic | mg/l As | 0.01 | 0.05 | | 0.05 | 0.05 | 0.1 |
| 20 | Cadmium | mg/l Cd | 0.001 | 0.005 | 0.001 | 0.005 | 0.001 | 0.005 |
| 21 | Total chromium | mg/l Cr | | 0.05 | | 0.05 | | 0.05 |
| 22 | Lead | mg/l Pb | | 0.05 | | 0.05 | | 0.05 |
| 23 | Selenium | mg/l Se | | 0.01 | | 0.01 | | 0.01 |
| 24 | Mercury | mg/l Mg | 0.0005 | 0.001 | 0.0005 | 0.001 | 0.0005 | 0.001 |
| 25 | Barium | mg/l Ba | | 0.01 | | 1 | | 1 |
| 26 | Cyanide | mg/l Cn | | 0.05 | | 0.05 | | 0.05 |

## ANNEX II

### Characteristics of surface water intended for the abstraction of drinking water (Continued)

| | Parameters | | A1 G | A1 I | A2 G | A2 I | A3 G | A3 I |
|---|---|---|---|---|---|---|---|---|
| 27 | Sulphates | mg/l $SO_4$ | 150 | 250 | 150 | 250 (O) | 150 | 250 (O) |
| 28 | Chlorides | mg/l Cl | 200 | | 200 | | 200 | |
| 29 | Surfactants (reacting with methyl blue) | mg/l (laurylsulphate) | 0.2 | | 0.2 | | 0.5 | |
| 30* | Phosphates | mg/l $P_2O_5$ | 0.4 | | 0.7 | | 0.7 | |
| 31 | Phenols (phenol index) paranitraniline 4 aminoantipyrine | mg/l $C_6H_5OH$ | | 0.001 | 0.001 | 0.005 | 0.001 | 0.1 |
| 32 | Dissolved or emulsified hydrocarbons (after extraction by petroleum ether) | mg/l | | 0.05 | | 0.2 | 0.5 | 1 |
| 33 | Polycyclic aromatic hydrocarbons | mg/l | | 0.0002 | | 0.0002 | | 0.0001 |
| 34 | Total pesticides (parathion, BHC, dieldrin) | mg/l | | 0.001 | | 0.0025 | | 0.005 |
| 35* | Chemical oxygen demand (COD) | mg/l $O_2$ | | | | | 30 | |
| 36* | Dissolved oxygen saturation rate | % $O_2$ | >70 | | >50 | | >30 | |
| 37* | Biochemical oxygen demand ($BOD_5$) (at 20°C without nitrification) | mg/l $O_2$ | <3 | | <5 | | <7 | |
| 38 | Nitrogen by Kjeldahl method (except $NO_3$) | mg/l N | 1 | | 2 | | 3 | |
| 39 | Ammonia | mg/l $NH_4$ | 0.05 | | 1 | 1.5 | 2 | 4 (O) |
| 40 | Substances extractable with chloroform | mg/l SEC | 0.1 | | 0.2 | | 0.5 | |
| 41 | Total organic carbon | mg/l C | | | | | | |
| 42 | Residual organic carbon after flocculation and membrane filtrations (5 µ)TOC | mg/l C | | | | | | |
| 43 | Total coliforms 37°C | /100 ml | 50 | | 5000 | | 50000 | |
| 44 | Faecal coliforms | /100 ml | 20 | | 2000 | | 20000 | |
| 45 | Faecal streptococci | /100 ml | 20 | | 1000 | | 10000 | |
| 46 | Salmonella | | Not present in 5000 ml | | Not present in 1000 ml | | | |

I = mandatory
G = guide
O = exceptional climatic or geographical conditions
* = see Article 8 (d)

# APPENDIX A.3

## ANNEX II

Minimum annual frequency of sampling and analysis for each parameter in Directive 75/440/EEC

| Population served | A1 (*) | | | A2 (*) | | | A3 (*) | | |
|---|---|---|---|---|---|---|---|---|---|
| | I (**) | II (**) | III (**) | I (**) | II (**) | III (**) | I (**) | II (**) | III (**) |
| ≤ 10 000 | (***) | (***) | (***) | (***) | (***) | (***) | 2 | 1 | (***) (1) |
| > 10 000 to ≤ 30 000 | 1 | 1 | (***) | 2 | 1 | (***) | 3 | 1 | 1 |
| > 30 000 to ≤ 100 000 | 2 | 1 | (***) | 4 | 2 | 1 | 6 | 2 | 1 |
| > 100 000 | 3 | 2 | (***) | 8 | 4 | 1 | 12 | 4 | 1 |

(*) Quality of surface waters, Annex II Directive 75/440/EEC.
(**) Classification of parameters according to frequency.
(***) Frequency to be determined by the competent national authorities.

(1) Assuming that such surface water is intended for the abstraction of drinking water, the Member States are recommended to carry out at least annual sampling of this category of water (A3, III, ≤ 10 000).

### CATEGORIES

| I | | II | | III | |
|---|---|---|---|---|---|
| Parameter | | Parameter | | Parameter | |
| 1 | pH | 10 | Dissolved iron | 8 | Fluorides |
| 2 | Coloration | 11 | Manganese | 14 | Boron |
| 3 | Total suspended solids | 12 | Copper | 19 | Arsenic |
| 4 | Temperature | 13 | Zinc | 20 | Cadmium |
| 5 | Conductivity | 27 | Sulphates | 21 | Total chromium |
| 6 | Odour | 29 | Surfactants | 22 | Lead |
| 7 | Nitrates | 31 | Phenols | 23 | Selenium |
| 28 | Chlorides | 38 | Nitrogen by Kjeldahl method | 24 | Mercury |
| 30 | Phosphates | 43 | Total coliforms | 25 | Barium |
| 35 | Chemical oxygen demand (COD) | 44 | Faecal coliforms | 26 | Cyanide |
| 36 | Dissolved oxygen saturation rate | | | 32 | Dissolved or emulsified hydrocarbons |
| 37 | Biochemical oxygen demand (BODs) | | | 33 | Polycyclic aromatic hydrocarbons |
| 39 | Ammonium | | | 34 | Total pesticides |
| | | | | 40 | Substances extractable with chloroform |
| | | | | 45 | Faecal streptococci |
| | | | | 46 | Salmonella |

# APPENDIX B.1

TABLE B.1 : 95%ile and Number of Sample (n) of the Mandatary Determinands.

| ABSTRACTION INTAKES | COLOUR mg/l | | TEMPERATUR deg C | | NITRATE mg N/l | | FLUORIDES mg F/l | |
|---|---|---|---|---|---|---|---|---|
| | 95%ile | n | 95%ile | n | 95%ile | n | 95%ile | n |
| College Reservoir | 17 | 10 | 20.5 | 10 | 4.3 | 10 | 0.09 | 1 |
| Argal Reservoir | 11 | 9 | 19.1 | 9 | 4.3 | 9 | 0.10 | 1 |
| Stithians Reservoir | 15 | 11 | 18.9 | 11 | 3.5 | 11 | 0.12 | 1 |
| Drift Reservoir | 19 | 12 | 19.5 | 12 | 5.9 | 12 | 0.12 | 1 |
| Boswyn Reservoir | 7 | 11 | 16.9 | 10 | 4.5 | 11 | 0.11 | 1 |
| River Hayle | 9 | 11 | 14.8 | 11 | 7.4 | 11 | 0.19 | 1 |
| River Cober | 19 | 11 | 14.0 | 11 | 4.1 | 11 | 0.11 | 1 |
| Colliford Reservoir | 40 | 11 | 17.7 | 11 | 0.5 | 11 | 0.05 | 1 |
| Crowdy Reservoir | 46 | 10 | 17.8 | 9 | 0.3 | 10 | 0.04 | 1 |
| Delank River | 50 | 11 | 14.6 | 11 | 0.4 | 11 | 0.09 | 1 |
| Trekeivesteps, River Fowey | 28 | 11 | 16.5 | 11 | 0.9 | 11 | 0.08 | 1 |
| Restomel, River Fowey | 30 | 10 | 16.7 | 10 | 2.3 | 10 | 0.09 | 1 |
| Rialton, River Porth | 27 | 11 | 17.7 | 11 | 6.0 | 11 | 0.11 | 1 |
| Butterbrook Reservoir | 11 | 8 | 16.0 | 8 | 0.3 | 8 | - | 0 |
| Burrator Reservoir | 21 | 11 | 16.1 | 11 | 0.4 | 11 | - | 0 |
| Upper Tamar Lake | 33 | 11 | 18.8 | 11 | 2.9 | 11 | 0.05 | 1 |
| River Erme | 53 | 8 | 17.0 | 8 | 0.4 | 8 | - | 0 |
| River Yealm | 13 | 12 | 14.4 | 12 | 0.4 | 12 | 0.11 | 1 |
| Ford Brook | 6 | 10 | 14.2 | 10 | 0.4 | 10 | - | 0 |
| Devonport Leat | 24 | 11 | 15.2 | 11 | 0.9 | 11 | 0.08 | 1 |
| Lopwell, River Tavy | 27 | 11 | 15.6 | 12 | 2.1 | 12 | 0.08 | 1 |
| Gunnislake, River Tamar | 31 | 11 | 16.3 | 11 | 3.8 | 11 | 0.15 | 1 |
| Broadall Lake, River Yealm | 22 | 11 | 14.6 | 11 | 0.4 | 11 | 0.10 | 1 |
| Meldon Reservoir | 25 | 7 | 15.0 | 7 | 1.3 | 7 | - | 0 |
| Wistlandpond Reservoir | 10 | 8 | 18.0 | 8 | 2.1 | 8 | - | 0 |
| Lower Slade Reservoir | 10 | 9 | 18.5 | 9 | 3.8 | 9 | - | 0 |
| Roadford Reservoir | 25 | 11 | 18.9 | 12 | 1.3 | 11 | 0.08 | 1 |
| Melbury Reservoir | 26 | 8 | 19.0 | 8 | 1.6 | 9 | - | 0 |
| West Okement River | 43 | 6 | 15.5 | 6 | 0.2 | 6 | - | 0 |
| River Torridge | 49 | 8 | 20.0 | 9 | 4.3 | 9 | - | 0 |
| River Yeo (Bideford) | 32 | 8 | 16.0 | 9 | 5.9 | 9 | - | 0 |
| Loxhore, River Yeo | 9 | 7 | 14.0 | 8 | 3.3 | 8 | - | 0 |
| Bratton Stream | 8 | 8 | 15.0 | 9 | 2.9 | 9 | - | 0 |
| Leehamford, River Bray | 9 | 8 | 14.0 | 9 | 2.0 | 9 | - | 0 |
| Brockemburrow Intake | 16 | 7 | 14.0 | 7 | 2.3 | 8 | - | 0 |
| Newbridge, River Taw | 35 | 8 | 18.0 | 9 | 4.9 | 9 | - | 0 |
| West (Lyn) Ilkerton River | 16 | 6 | 14.0 | 6 | 1.5 | 6 | - | 0 |
| Spreycott Spring | 10 | 8 | 13.5 | 9 | 1.8 | 9 | - | 0 |
| Avon Dam | 48 | 7 | 18.0 | 7 | 2.6 | 7 | - | 0 |
| Fernworthy Reservoir | 18 | 9 | 16.0 | 9 | 0.8 | 8 | - | 0 |
| Kennick Reservoir | 38 | 10 | 16.5 | 10 | 1.9 | 8 | - | 0 |
| Trenchford Reservoir | 13 | 12 | 16.5 | 12 | 1.9 | 10 | - | 0 |
| Venford Reservoir | 9.7 | 22 | 19.9 | 21 | 0.5 | 21 | - | 0 |
| Thornes Intake, Kenton | 16 | 7 | 13.0 | 7 | 3.1 | 7 | - | 0 |
| Littlehempston, River Dart | 27 | 7 | 16.0 | 7 | 1.8 | 7 | - | 0 |
| Swincombe Intake | 34 | 8 | 15.0 | 8 | 0.5 | 8 | - | 0 |
| Bala Brook | 33 | 9 | 17.0 | 9 | 0.2 | 9 | - | 0 |
| Squabmoor Reservoir | 24 | 8 | 23.0 | 8 | 1.3 | 8 | - | 0 |
| Wimbleball Reservoir | 9 | 9 | 17.5 | 9 | 3.5 | 9 | - | 0 |
| Whitford, River Axe | 67 | 9 | 19.0 | 9 | 6.4 | 9 | - | 0 |
| Budleigh Brook | 33 | 9 | 20.0 | 9 | 8.3 | 9 | - | 0 |
| Pynes Intake, River Exe | 38 | 9 | 19.0 | 9 | 4.0 | 9 | - | 0 |
| Holham Leat, River Exe | 30 | 8 | 16.5 | 8 | 2.3 | 8 | - | 0 |
| [illegible] Stream | 14 | 9 | 12.5 | 9 | 5.5 | 9 | - | 0 |

| DISS IRON mg Fe/l | | TOT COPPER mg Cu/l | | TOT ZINC mg Zn/l | | TOT ARSENIC ug As/l | | TOT CADMIUM ug Cd/l | | TOT CHROMIUM mg Cr/l | | TOT LEAD mg Pb/l | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 95%ile | n | 95%ile | n | 95%ile | n | 95%ile | n | 95%ile | n | 95%ile | n | 95%ile | n |
| 0.101 | 4 | 0.0060 | 4 | 0.014 | 4 | 1.6 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0040 | 4 |
| 0.030 | 3 | 0.0010 | 3 | 0.010 | 3 | 0.4 | 1 | 0.1 | 1 | 0.001 | 3 | 0.0015 | 3 |
| 0.130 | 4 | 0.0070 | 4 | 0.046 | 4 | 0.6 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0150 | 4 |
| 0.109 | 4 | 0.0040 | 4 | 0.014 | 4 | 0.7 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0040 | 4 |
| 0.025 | 4 | 0.0140 | 4 | 0.170 | 4 | 1.2 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0040 | 4 |
| 0.130 | 4 | 0.0310 | 4 | 0.670 | 4 | 8.0 | 1 | 1.0 | 1 | 0.001 | 3 | 0.0015 | 4 |
| 0.210 | 4 | 0.0150 | 4 | 0.034 | 4 | 0.8 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0060 | 4 |
| 0.430 | 3 | 0.0250 | 3 | 2.900 | 3 | 1.3 | 1 | 0.1 | 1 | 0.001 | 3 | 0.0240 | 3 |
| 0.320 | 3 | 0.0050 | 4 | 0.022 | 4 | 9.5 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0150 | 4 |
| 0.160 | 4 | 0.0060 | 4 | 0.017 | 4 | 0.7 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0230 | 4 |
| 0.090 | 4 | 0.0050 | 4 | 0.011 | 4 | 0.5 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0050 | 4 |
| 0.174 | 3 | 0.0090 | 3 | 0.023 | 3 | 3.3 | 1 | 0.1 | 1 | 0.001 | 3 | 0.0015 | 3 |
| 0.256 | 4 | 0.0070 | 4 | 0.028 | 4 | 1.5 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0220 | 4 |
| 0.025 | 3 | 0.0025 | 3 | 0.013 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.267 | 4 | 0.0060 | 4 | 0.057 | 4 | 0.4 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0160 | 4 |
| 0.450 | 3 | 0.0750 | 2 | 0.024 | 3 | 0.1 | 1 | 0.1 | 1 | 0.001 | 3 | 0.0170 | 3 |
| 0.210 | 3 | 0.0040 | 3 | 0.020 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.025 | 3 | 0.0020 | 4 | 0.045 | 4 | 0.2 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0130 | 4 |
| 0.030 | 3 | 0.0030 | 4 | 0.041 | 4 | 0.3 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0120 | 4 |
| 0.108 | 4 | 0.0030 | 4 | 0.045 | 4 | 0.2 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0120 | 4 |
| 0.150 | 3 | 0.0140 | 4 | 0.053 | 4 | 7.8 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0150 | 4 |
| 0.310 | 3 | 0.0270 | 3 | 0.074 | 3 | 3.2 | 1 | 0.1 | 1 | 0.001 | 3 | 0.0140 | 3 |
| 0.050 | 3 | 0.0010 | 4 | 0.036 | 4 | 0.1 | 1 | 0.1 | 1 | 0.001 | 4 | 0.0160 | 4 |
| 0.074 | 2 | 0.0025 | 2 | 0.006 | 6 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.100 | 3 | 0.0250 | 3 | 0.025 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.230 | 4 | 0.0250 | 4 | 0.055 | 9 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.260 | 3 | 0.0480 | 3 | 0.014 | 3 | 0.1 | 1 | 0.1 | 1 | 0.001 | 3 | 0.0150 | 3 |
| 0.116 | 2 | 0.0250 | 2 | 0.086 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.124 | 2 | 0.0025 | 2 | 0.084 | 5 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.290 | 3 | 0.0030 | 3 | 0.017 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.252 | 4 | 0.0030 | 4 | 0.008 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.067 | 3 | 0.0025 | 3 | 0.011 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.034 | 3 | 0.0025 | 3 | 0.006 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.040 | 3 | 0.0250 | 3 | 0.025 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.066 | 1 | 0.0025 | 2 | 0.008 | 6 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.160 | 4 | 0.0025 | 4 | 0.008 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.087 | 2 | 0.0025 | 2 | 0.007 | 4 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.029 | 3 | 0.0025 | 3 | 0.003 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.300 | 3 | 0.0025 | 3 | 0.025 | 6 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.100 | 2 | 0.0025 | 2 | 0.040 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.028 | 1 | 0.0025 | 2 | 0.006 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.100 | 2 | 0.0025 | 2 | 0.009 | 9 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.100 | 6 | 0.0250 | 6 | 0.025 | 19 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.189 | 3 | 0.0025 | 3 | 0.009 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.073 | 2 | 0.0025 | 2 | 0.021 | 6 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.119 | 2 | 0.0390 | 2 | 0.008 | 7 | - | 0 | - | 0 | 0.0025 | 1 | 0.0025 | 1 |
| 0.080 | 3 | 0.0025 | 3 | 0.015 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.100 | 3 | 0.0250 | 3 | 0.025 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.025 | 4 | 0.0025 | 4 | 0.025 | 8 | - | 0 | - | 0 | 0.0025 | 1 | 0.0025 | 1 |
| 0.350 | 4 | 0.0120 | 4 | 0.017 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.210 | 4 | 0.0070 | 4 | 0.016 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| 0.210 | 4 | 0.0050 | 4 | 0.019 | 8 | - | 0 | - | 0 | 0.0025 | 1 | 0.0025 | 1 |
| 0.130 | 3 | 0.0030 | 3 | 0.016 | 7 | - | 0 | - | 0 | 0.0025 | 1 | 0.0025 | 1 |
| 0.130 | 4 | 0.0025 | 4 | 0.021 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |

TABLE B.1 : 95%ile and Number of Sample (n) of the Mandatary Determinands.

| ABSTRACTION INTAKES | TOT SELENIUM ug Se/l | | TOT MERCURY ug Hg/l | | TOT BARIUM mg Ba/l | | CYANIDES mg CN/l | | SULPHATES mg SO4/l | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 95%ile | n | 95%ile | n | 95%ile | n | 95%ile | n | 95%ile | n |
| College Reservoir | 0.10 | 1 | 0.70 | 1 | 0.010 | 1 | 0.025 | 1 | 15.7 | 10 |
| Argal Reservoir | 0.05 | 1 | 0.03 | 1 | 0.007 | 1 | 0.025 | 1 | 15.0 | 9 |
| Stithians Reservoir | 0.05 | 1 | 0.01 | 1 | 0.007 | 1 | 0.025 | 1 | 13.6 | 11 |
| Drift Reservoir | 0.05 | 1 | 0.01 | 1 | 0.010 | 1 | 0.025 | 1 | 14.0 | 12 |
| Boswyn Reservoir | 0.05 | 1 | 0.01 | 1 | 0.010 | 1 | 0.025 | 1 | 14.9 | 11 |
| River Hayle | 0.10 | 1 | 0.01 | 1 | 0.014 | 1 | 0.025 | 1 | 41.2 | 11 |
| River Cober | 0.05 | 1 | 0.01 | 1 | 0.011 | 1 | 0.025 | 1 | 36.8 | 11 |
| Colliford Reservoir | 0.40 | 1 | 0.01 | 1 | 0.002 | 1 | 0.025 | 1 | 5.8 | 11 |
| Crowdy Reservoir | 0.50 | 1 | 0.01 | 1 | 0.003 | 1 | 0.025 | 1 | 5.8 | 10 |
| Delank River | 0.30 | 1 | 0.01 | 1 | 0.004 | 1 | 0.025 | 1 | 5.0 | 11 |
| Trekeivesteps, River Fowey | 0.30 | 1 | 0.01 | 1 | 0.004 | 1 | 0.025 | 1 | 5.7 | 11 |
| Restomel, River Fowey | 0.30 | 1 | 0.01 | 1 | 0.006 | 1 | 0.025 | 1 | 8.2 | 10 |
| Rialton, River Porth | 0.40 | 1 | 0.01 | 1 | 0.010 | 1 | 0.025 | 1 | 19.2 | 11 |
| Butterbrook Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 4.9 | 8 |
| Burrator Reservoir | 0.05 | 1 | 0.01 | 1 | 0.005 | 1 | 0.025 | 1 | 4.1 | 11 |
| Upper Tamar Lake | 0.30 | 1 | 0.01 | 1 | 0.008 | 1 | 0.025 | 1 | 9.1 | 11 |
| River Erme | - | 0 | - | 0 | - | 0 | - | 0 | 5.4 | 8 |
| River Yealm | 0.10 | 1 | 0.01 | 1 | 0.003 | 1 | 0.025 | 1 | 4.8 | 12 |
| Ford Brook | 0.05 | 1 | 0.01 | 1 | 0.004 | 1 | 0.025 | 1 | 4.9 | 10 |
| Devonport Leat | 0.10 | 1 | 0.01 | 1 | 0.004 | 1 | 0.025 | 1 | 3.9 | 11 |
| Lopwell, River Tavy | 0.10 | 1 | 0.01 | 1 | 0.005 | 1 | 0.025 | 1 | 10.0 | 12 |
| Gunnislake, River Tamar | 0.10 | 1 | 0.01 | 1 | 0.007 | 1 | 0.025 | 1 | 19.1 | 11 |
| Broadall Lake, River Yealm | 0.10 | 1 | 0.01 | 1 | 0.004 | 1 | 0.025 | 1 | 4.6 | 11 |
| Meldon Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 7.6 | 7 |
| Wistlandpond Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 8.6 | 8 |
| Lower Slade Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 10.6 | 9 |
| Roadford Reservoir | 0.10 | 1 | 0.01 | 1 | 0.003 | 1 | 0.025 | 1 | 11.0 | 11 |
| Melbury Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 10.8 | 9 |
| West Okement River | - | 0 | - | 0 | - | 0 | - | 0 | 7.3 | 6 |
| River Torridge | - | 0 | - | 0 | - | 0 | - | 0 | 19.4 | 9 |
| River Yeo (Bideford) | - | 0 | - | 0 | - | 0 | - | 0 | 15.0 | 9 |
| Loxhore, River Yeo | - | 0 | - | 0 | - | 0 | - | 0 | 9.9 | 8 |
| Bratton Stream | - | 0 | - | 0 | - | 0 | - | 0 | 9.3 | 9 |
| Leehamford, River Bray | - | 0 | - | 0 | - | 0 | - | 0 | 7.3 | 9 |
| Brockemburrow Intake | - | 0 | - | 0 | - | 0 | - | 0 | 6.4 | 8 |
| Newbridge, River Taw | - | 0 | - | 0 | - | 0 | - | 0 | 13.0 | 9 |
| West (Lyn) Ilkerton River | - | 0 | - | 0 | - | 0 | - | 0 | 4.7 | 6 |
| Spreycott Spring | - | 0 | - | 0 | - | 0 | - | 0 | 8.0 | 9 |
| Avon Dam | - | 0 | - | 0 | - | 0 | - | 0 | 27.9 | 6 |
| Fernworthy Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 6.5 | 9 |
| Kennick Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 10.0 | 10 |
| Trenchford Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 9.4 | 12 |
| Venford Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 6.1 | 21 |
| Thornes Intake, Kenton | - | 0 | - | 0 | - | 0 | - | 0 | 11.2 | 7 |
| Littlehempston, River Dart | - | 0 | - | 0 | - | 0 | - | 0 | 9.7 | 7 |
| Swincombe Intake | - | 0 | - | 0 | - | 0 | - | 0 | 3.7 | 7 |
| Bala Brook | - | 0 | - | 0 | - | 0 | - | 0 | 4.3 | 8 |
| Squabmoor Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 18.3 | 8 |
| Wimbleball Reservoir | - | 0 | - | 0 | - | 0 | - | 0 | 11.0 | 9 |
| Whitford, River Axe | - | 0 | - | 0 | - | 0 | - | 0 | 38.8 | 9 |
| Budleigh Brook | - | 0 | - | 0 | - | 0 | - | 0 | 18.5 | 9 |
| Pynes Intake, River Exe | - | 0 | - | 0 | - | 0 | - | 0 | 26.1 | 9 |
| Bolham Leat, River Exe | - | 0 | - | 0 | - | 0 | - | 0 | 9.8 | 8 |
| [redacted] | [redacted] | | [redacted] | | [redacted] | | [redacted] | | [redacted] | |

| PHENOLS ug/l | | AMMONIA mg N/l | | TOT PESTICIDES ug/l | |
|---|---|---|---|---|---|
| 95%ile | n | 95%ile | n | 95%ile | n |
| 1.4 | 1 | 0.09 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.03 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.10 | 3 | 0.0132 | 1 |
| 1.4 | 1 | 0.18 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.02 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.05 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.06 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.19 | 4 | 0.0165 | 1 |
| 1.4 | 1 | 0.16 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.08 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.10 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.19 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.13 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.02 | 3 | - | 0 |
| 1.4 | 1 | 0.14 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.22 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.18 | 3 | - | 0 |
| 1.4 | 1 | 0.03 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.02 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.03 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.11 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.13 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.02 | 4 | 0.0132 | 1 |
| 1.4 | 1 | 0.07 | 2 | - | 0 |
| - | 0 | 0.09 | 2 | - | 0 |
| 1.4 | 2 | 0.12 | 3 | - | 0 |
| 1.4 | 1 | 0.11 | 4 | 0.0132 | 1 |
| - | 0 | 0.06 | 2 | - | 0 |
| 1.4 | 1 | 0.12 | 2 | - | 0 |
| 1.4 | 2 | 0.14 | 3 | - | 0 |
| 1.4 | 2 | 0.16 | 3 | - | 0 |
| 1.4 | 1 | 0.04 | 2 | - | 0 |
| 1.4 | 1 | 0.10 | 2 | - | 0 |
| 1.4 | 1 | 0.03 | 2 | - | 0 |
| 1.4 | 1 | 0.03 | 1 | - | 0 |
| 1.4 | 2 | 0.09 | 3 | - | 0 |
| 1.4 | 1 | 0.01 | 2 | - | 0 |
| 1.4 | 1 | 0.04 | 2 | - | 0 |
| 1.4 | 1 | 0.27 | 3 | - | 0 |
| 1.4 | 1 | 0.04 | 2 | - | 0 |
| 1.4 | 2 | 0.07 | 2 | - | 0 |
| 1.4 | 2 | 0.06 | 2 | - | 0 |
| - | 0 | 0.06 | 6 | - | 0 |
| - | 0 | 0.07 | 2 | - | 0 |
| - | 0 | 0.34 | 2 | - | 0 |
| - | 0 | 0.03 | 2 | - | 0 |
| 1.4 | 1 | 0.03 | 3 | - | 0 |
| - | 0 | 0.13 | 2 | - | 0 |
| 1.4 | 2 | 0.09 | 3 | - | 0 |
| 1.4 | 2 | 0.19 | 3 | - | 0 |
| 1.4 | 2 | 0.15 | 3 | - | 0 |
| 1.4 | 2 | 0.13 | 3 | - | 0 |
| 1.4 | 2 | 0.12 | 3 | - | 0 |
| 1.4 | 2 | 0.15 | 3 | - | 0 |

# APPENDIX B.2

TABLE B.2 : Percentiles and Number of Sample (n) of the Guide Determinands.

| ABSTRACTION INTAKES | pH | | pH | | COLOUR mg/l | | SUSP. SOLIDS mg/l | |
|---|---|---|---|---|---|---|---|---|
| | 10%ile | n | 90%ile | n | 90%ile | n | 90%ile | n |
| College Reservoir | 7.02 | 10 | 8.87 | 10 | 16.9 | 10 | 24.0 | 10 |
| Argal Reservoir | 6.90 | 9 | 7.70 | 9 | 11.0 | 9 | 9.2 | 9 |
| Stithians Reservoir | 6.58 | 11 | 7.60 | 11 | 14.8 | 11 | 5.0 | 11 |
| Drift Reservoir | 6.56 | 12 | 7.37 | 12 | 18.7 | 12 | 17.4 | 12 |
| Boswyn Reservoir | 5.88 | 11 | 7.24 | 11 | 6.8 | 11 | 61.4 | 11 |
| River Hayle | 6.92 | 11 | 7.30 | 11 | 9.0 | 11 | 5.1 | 11 |
| River Cober | 6.30 | 11 | 7.08 | 11 | 19.0 | 11 | 5.9 | 11 |
| Colliford Reservoir | 5.92 | 11 | 7.60 | 11 | 40.0 | 11 | 16.6 | 11 |
| Crowdy Reservoir | 5.16 | 10 | 6.93 | 10 | 45.2 | 10 | 266.8 | 10 |
| Delank River | 5.06 | 11 | 6.68 | 11 | 46.0 | 11 | 9.6 | 11 |
| Trekeivesteps, River Fowey | 5.84 | 11 | 6.98 | 11 | 27.8 | 11 | 17.8 | 11 |
| Restomel, River Fowey | 6.24 | 10 | 7.30 | 10 | 29.2 | 10 | 87.3 | 10 |
| Rialton, River Porth | 7.32 | 11 | 8.94 | 11 | 26.8 | 11 | 31.2 | 11 |
| Butterbrook Reservoir | 5.70 | 8 | 7.70 | 8 | 11.0 | 8 | 3.0 | 8 |
| Burrator Reservoir | 5.84 | 11 | 7.78 | 11 | 19.8 | 11 | 5.3 | 11 |
| Upper Tamar Lake | 6.68 | 11 | 7.80 | 11 | 32.6 | 11 | 25.0 | 11 |
| River Erme | 4.80 | 8 | 7.13 | 8 | 53.0 | 8 | 2.0 | 8 |
| River Yealm | 4.69 | 12 | 6.62 | 12 | 11.8 | 12 | 7.9 | 12 |
| Ford Brook | 5.02 | 10 | 7.04 | 10 | 6.0 | 10 | 3.9 | 10 |
| Devonport Leat | 4.88 | 11 | 7.22 | 11 | 23.8 | 11 | 5.9 | 11 |
| Lopwell, River Tavy | 6.60 | 12 | 7.64 | 12 | 26.4 | 11 | 4.4 | 12 |
| Gunnislake, River Tamar | 7.02 | 11 | 7.76 | 11 | 30.6 | 11 | 42.0 | 11 |
| Broadall Lake, River Yealm | 4.50 | 11 | 6.86 | 11 | 20.7 | 11 | 434.4 | 11 |
| Meldon Reservoir | 5.20 | 7 | 6.00 | 7 | 25.0 | 7 | 4.0 | 7 |
| Wistlandpond Reservoir | 7.40 | 8 | 7.90 | 8 | 10.0 | 8 | 5.0 | 8 |
| Lower Slade Reservoir | 7.40 | 9 | 8.00 | 9 | 10.0 | 9 | 10.0 | 9 |
| Roadford Reservoir | 6.64 | 11 | 7.68 | 11 | 23.8 | 11 | 7.6 | 11 |
| Melbury Reservoir | 6.40 | 8 | 7.70 | 8 | 26.0 | 8 | 15.0 | 8 |
| West Okement River | 5.10 | 6 | 6.20 | 6 | 43.0 | 6 | 2.0 | 6 |
| River Torridge | 7.20 | 9 | 8.40 | 9 | 49.0 | 8 | 111.0 | 9 |
| River Yeo (Bideford) | 7.40 | 9 | 7.80 | 9 | 32.0 | 8 | 63.0 | 9 |
| Loxhore, River Yeo | 7.30 | 8 | 8.90 | 8 | 9.0 | 7 | 14.0 | 8 |
| Bratton Stream | 7.20 | 9 | 7.70 | 9 | 8.0 | 8 | 54.0 | 9 |
| Leehamford, River Bray | 7.10 | 9 | 7.70 | 9 | 9.0 | 8 | 21.0 | 9 |
| Brockemburrow Intake | 6.80 | 8 | 7.60 | 8 | 16.0 | 7 | 6.0 | 8 |
| Newbridge, River Taw | 7.20 | 9 | 7.90 | 9 | 35.0 | 8 | 82.0 | 9 |
| West (Lyn) Ilkerton River | 7.00 | 6 | 7.60 | 6 | 16.0 | 6 | 7.0 | 6 |
| Spreycott Spring | 7.00 | 9 | 7.90 | 9 | 10.0 | 8 | 35.0 | 9 |
| Avon Dam | 5.00 | 7 | 5.60 | 7 | 48.0 | 7 | 15.0 | 7 |
| Fernworthy Reservoir | 5.60 | 9 | 6.80 | 9 | 18.0 | 9 | 13.0 | 9 |
| Kennick Reservoir | 6.60 | 10 | 7.30 | 10 | 35.2 | 10 | 8.0 | 10 |
| Trenchford Reservoir | 6.40 | 12 | 7.00 | 12 | 12.7 | 12 | 3.7 | 12 |
| Venford Reservoir | 5.50 | 22 | 6.27 | 22 | 8.0 | 22 | 6.0 | 22 |
| Thornes Intake, Kenton | 6.90 | 7 | 7.90 | 7 | 16.0 | 7 | 5.0 | 7 |
| Littlehempston, River Dart | 7.20 | 7 | 7.40 | 7 | 27.0 | 7 | 6.0 | 7 |
| Swincombe Intake | 5.20 | 8 | 6.60 | 8 | 34.0 | 8 | 2.0 | 8 |
| Bala Brook | 4.70 | 9 | 6.82 | 9 | 33.0 | 9 | 1.0 | 9 |
| Squabmoor Reservoir | 6.60 | 8 | 7.10 | 8 | 24.0 | 8 | 18.0 | 8 |
| Wimbleball Reservoir | 7.00 | 9 | 7.55 | 9 | 9.0 | 9 | 8.0 | 9 |
| Whitford, River Axe | 7.80 | 9 | 8.50 | 9 | 67.0 | 9 | 50.0 | 9 |
| Budleigh Brook | 7.70 | 9 | 9.10 | 9 | 33.0 | 9 | 37.0 | 9 |
| Pynes Intake, River Exe | 7.40 | 9 | 7.90 | 9 | 38.0 | 9 | 93.0 | 9 |
| Bolham Leat, River Exe | 7.30 | 8 | 7.78 | 8 | 30.0 | 8 | 32.0 | 8 |
| Meldon Stream | 6.00 | 9 | 6.90 | 9 | 14.0 | 9 | 4.0 | 9 |

| TEMPERATURE deg C | | CONDUCTIVIT uS/cm | | NITRATE mg N/l | | FLUORIDES mg F/l | | DISS IRON mg Fe/l | | TOT MANGANESE mg Mn/l | | TOT COPPER mg Cu/l | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90%ile | n | 90%ile | n | 90%ile | n | 90%ile | n | 90%ile | n | 90%ile | n | 90%ile | n |
| 20.5 | 10 | 242.4 | 10 | 4.25 | 10 | 0.09 | 1 | 0.101 | 4 | 0.323 | 4 | 0.0060 | 4 |
| 19.1 | 9 | 186.0 | 9 | 4.30 | 9 | 0.10 | 1 | 0.030 | 3 | 0.029 | 3 | 0.0010 | 3 |
| 18.9 | 11 | 162.6 | 11 | 3.42 | 11 | 0.12 | 1 | 0.130 | 4 | 0.020 | 4 | 0.0070 | 4 |
| 19.4 | 12 | 240.0 | 12 | 5.75 | 12 | 0.12 | 1 | 0.109 | 4 | 0.044 | 4 | 0.0040 | 4 |
| 16.8 | 10 | 189.8 | 11 | 4.50 | 11 | 0.11 | 1 | 0.025 | 4 | 0.027 | 4 | 0.0140 | 4 |
| 14.8 | 11 | 339.4 | 11 | 7.36 | 11 | 0.19 | 1 | 0.130 | 4 | 0.042 | 4 | 0.0310 | 4 |
| 13.9 | 11 | 179.0 | 11 | 4.10 | 11 | 0.11 | 1 | 0.210 | 4 | 0.038 | 4 | 0.0150 | 4 |
| 17.5 | 11 | 76.0 | 11 | 0.50 | 11 | 0.05 | 1 | 0.430 | 3 | 0.052 | 3 | 0.0250 | 3 |
| 17.8 | 9 | 89.3 | 10 | 0.28 | 10 | 0.04 | 1 | 0.320 | 3 | 0.031 | 4 | 0.0050 | 4 |
| 14.4 | 11 | 77.0 | 11 | 0.40 | 11 | 0.09 | 1 | 0.160 | 4 | 0.025 | 4 | 0.0060 | 4 |
| 16.0 | 11 | 92.0 | 11 | 0.90 | 11 | 0.08 | 1 | 0.090 | 4 | 0.030 | 4 | 0.0050 | 4 |
| 16.5 | 10 | 133.4 | 10 | 2.29 | 10 | 0.09 | 1 | 0.174 | 3 | 0.025 | 3 | 0.0090 | 3 |
| 17.7 | 11 | 306.6 | 11 | 5.86 | 11 | 0.11 | 1 | 0.256 | 4 | 0.113 | 4 | 0.0070 | 4 |
| 16.0 | 8 | 815.0 | 8 | 0.30 | 8 | - | 0 | 0.025 | 3 | 0.014 | 3 | 0.0025 | 3 |
| 16.0 | 11 | 66.8 | 11 | 0.38 | 11 | - | 0 | 0.267 | 4 | 0.105 | 4 | 0.0060 | 4 |
| 18.7 | 11 | 170.6 | 11 | 2.84 | 11 | 0.05 | 1 | 0.450 | 3 | 0.170 | 3 | 0.0750 | 2 |
| 17.0 | 8 | 48.7 | 8 | 0.40 | 8 | - | 0 | 0.210 | 3 | 0.025 | 3 | 0.0040 | 3 |
| 14.3 | 12 | 55.4 | 12 | 0.40 | 12 | 0.11 | 1 | 0.025 | 3 | 0.021 | 4 | 0.0020 | 4 |
| 14.2 | 10 | 63.6 | 10 | 0.39 | 10 | - | 0 | 0.030 | 3 | 0.028 | 4 | 0.0030 | 4 |
| 15.0 | 11 | 56.0 | 11 | 0.80 | 11 | 0.08 | 1 | 0.108 | 4 | 0.023 | 4 | 0.0030 | 4 |
| 15.6 | 12 | 142.1 | 12 | 2.10 | 12 | 0.08 | 1 | 0.150 | 3 | 0.040 | 4 | 0.0140 | 4 |
| 16.2 | 11 | 216.6 | 11 | 3.74 | 11 | 0.15 | 1 | 0.310 | 3 | 0.097 | 3 | 0.0270 | 3 |
| 14.5 | 11 | 66.8 | 11 | 0.38 | 11 | 0.10 | 1 | 0.050 | 3 | 0.017 | 4 | 0.0010 | 4 |
| 15.0 | 7 | 51.0 | 7 | 1.30 | 7 | - | 0 | 0.074 | 2 | 0.177 | 2 | 0.0025 | 2 |
| 18.0 | 8 | 157.0 | 8 | 2.06 | 8 | - | 0 | 0.100 | 3 | 0.025 | 3 | 0.0250 | 3 |
| 18.5 | 9 | 229.0 | 9 | 3.80 | 9 | - | 0 | 0.230 | 4 | 0.025 | 4 | 0.0250 | 4 |
| 18.8 | 12 | 315.0 | 11 | 1.30 | 11 | 0.08 | 1 | 0.260 | 3 | 0.160 | 3 | 0.0480 | 3 |
| 19.0 | 8 | 158.0 | 8 | 1.60 | 9 | - | 0 | 0.116 | 2 | 0.071 | 2 | 0.0250 | 2 |
| 15.5 | 6 | 43.0 | 6 | 0.20 | 6 | - | 0 | 0.124 | 2 | 0.091 | 2 | 0.0025 | 2 |
| 20.0 | 9 | 203.0 | 9 | 4.30 | 9 | - | 0 | 0.290 | 3 | 0.115 | 3 | 0.0030 | 3 |
| 16.0 | 9 | 243.0 | 9 | 5.86 | 9 | - | 0 | 0.252 | 4 | 0.073 | 4 | 0.0030 | 4 |
| 14.0 | 8 | 181.0 | 8 | 3.30 | 8 | - | 0 | 0.067 | 3 | 0.042 | 3 | 0.0025 | 3 |
| 15.0 | 9 | 154.0 | 9 | 2.90 | 9 | - | 0 | 0.034 | 3 | 0.065 | 3 | 0.0025 | 3 |
| 14.0 | 9 | 123.0 | 9 | 2.00 | 9 | - | 0 | 0.040 | 3 | 0.025 | 3 | 0.0250 | 3 |
| 14.0 | 7 | 126.0 | 8 | 2.30 | 8 | - | 0 | 0.066 | 1 | 0.016 | 2 | 0.0025 | 2 |
| 18.0 | 9 | 203.0 | 9 | 4.90 | 9 | - | 0 | 0.160 | 4 | 0.153 | 4 | 0.0025 | 4 |
| 14.0 | 6 | 110.0 | 6 | 1.50 | 6 | - | 0 | 0.087 | 2 | 0.021 | 2 | 0.0025 | 2 |
| 13.5 | 9 | 114.0 | 9 | 1.80 | 9 | - | 0 | 0.029 | 3 | 0.015 | 3 | 0.0025 | 3 |
| 18.0 | 7 | 46.0 | 7 | 2.60 | 7 | - | 0 | 0.300 | 3 | 0.033 | 3 | 0.0025 | 3 |
| 16.0 | 9 | 75.0 | 9 | 0.82 | 8 | - | 0 | 0.100 | 2 | 0.031 | 2 | 0.0025 | 2 |
| 16.5 | 10 | 117.9 | 10 | 1.92 | 8 | - | 0 | 0.028 | 1 | 0.026 | 2 | 0.0025 | 2 |
| 16.5 | 12 | 105.0 | 12 | 1.90 | 10 | - | 0 | 0.100 | 2 | 0.029 | 2 | 0.0025 | 2 |
| 19.0 | 21 | 45.0 | 22 | 0.21 | 21 | - | 0 | 0.100 | 6 | 0.123 | 6 | 0.0250 | 6 |
| 13.0 | 7 | 181.0 | 7 | 3.10 | 7 | - | 0 | 0.189 | 3 | 0.046 | 3 | 0.0025 | 3 |
| 16.0 | 7 | 184.0 | 7 | 1.80 | 7 | - | 0 | 0.073 | 2 | 0.018 | 2 | 0.0025 | 2 |
| 15.0 | 8 | 48.0 | 8 | 0.50 | 8 | - | 0 | 0.119 | 2 | 0.015 | 2 | 0.0390 | 2 |
| 17.0 | 9 | 56.0 | 9 | 0.20 | 9 | - | 0 | 0.080 | 3 | 0.019 | 3 | 0.0025 | 3 |
| 23.0 | 8 | 191.0 | 8 | 1.30 | 8 | - | 0 | 0.100 | 3 | 0.025 | 3 | 0.0250 | 3 |
| 17.5 | 9 | 654.5 | 9 | 3.50 | 9 | - | 0 | 0.025 | 4 | 0.206 | 4 | 0.0025 | 4 |
| 19.0 | 9 | 417.0 | 9 | 6.40 | 9 | - | 0 | 0.350 | 4 | 0.063 | 4 | 0.0120 | 4 |
| 20.0 | 9 | 359.0 | 9 | 8.30 | 9 | - | 0 | 0.210 | 4 | 0.046 | 4 | 0.0070 | 4 |
| 19.0 | 9 | 224.0 | 9 | 4.00 | 9 | - | 0 | 0.210 | 4 | 0.230 | 4 | 0.0050 | 4 |
| 16.5 | 8 | 159.0 | 8 | 2.30 | 8 | - | 0 | 0.130 | 3 | 0.091 | 3 | 0.0030 | 3 |
| 12.5 | 9 | 113.0 | 9 | 5.50 | 9 | - | 0 | 0.130 | 4 | 0.019 | 4 | 0.0025 | 4 |

TABLE B.2 : Percentiles and Number of Sample (n) of the Guide Determinands.

| ABSTRACTION INTAKES | TOT ZINC mg Zn/l | | BORON mg B/l | | TOT ARSENIC ug As/l | | TOT CADMIUM ug Cd/l | | TOT MERCURY ug Hg/l | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 90%ile | n | 90%ile | n | 90%ile | n | 90%ile | n | 90%ile | n |
| College Reservoir | 0.014 | 4 | 0.0220 | 1 | 1.6 | 1 | 0.1 | 1 | 0.03 | 1 |
| Argal Reservoir | 0.010 | 3 | 0.0190 | 1 | 0.4 | 1 | 0.1 | 1 | 0.03 | 1 |
| Stithians Reservoir | 0.046 | 4 | 0.0130 | 1 | 0.6 | 1 | 0.1 | 1 | 0.01 | 1 |
| Drift Reservoir | 0.014 | 4 | 0.0180 | 1 | 0.7 | 1 | 0.1 | 1 | 0.01 | 1 |
| Boswyn Reservoir | 0.170 | 4 | 0.0150 | 1 | 1.2 | 1 | 0.1 | 1 | 0.01 | 1 |
| River Hayle | 0.670 | 4 | 0.0230 | 1 | 8.0 | 1 | 1.0 | 1 | 0.01 | 1 |
| River Cober | 0.034 | 4 | 0.0160 | 1 | 0.8 | 1 | 0.1 | 1 | 0.01 | 1 |
| Colliford Reservoir | 2.900 | 3 | 0.0040 | 1 | 1.3 | 1 | 0.1 | 1 | 0.01 | 1 |
| Crowdy Reservoir | 0.022 | 4 | 0.0180 | 1 | 9.5 | 1 | 0.1 | 1 | 0.01 | 1 |
| Delank River | 0.017 | 4 | 0.0070 | 1 | 0.7 | 1 | 0.1 | 1 | 0.01 | 1 |
| Trekeivesteps, River Fowey | 0.011 | 4 | 0.0060 | 1 | 0.5 | 1 | 0.1 | 1 | 0.01 | 1 |
| Restomel, River Fowey | 0.023 | 3 | 0.0090 | 1 | 3.3 | 1 | 0.1 | 1 | 0.01 | 1 |
| Rialton, River Porth | 0.028 | 4 | 0.0190 | 1 | 1.5 | 1 | 0.1 | 1 | 0.01 | 1 |
| Butterbrook Reservoir | 0.013 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| Burrator Reservoir | 0.057 | 4 | 0.0025 | 1 | 0.4 | 1 | 0.1 | 1 | 0.01 | 1 |
| Upper Tamar Lake | 0.024 | 3 | 0.0070 | 1 | 0.1 | 1 | 0.1 | 1 | 0.01 | 1 |
| River Erme | 0.020 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| River Yealm | 0.045 | 4 | 0.0025 | 1 | 0.2 | 1 | 0.1 | 1 | 0.01 | 1 |
| Ford Brook | 0.041 | 4 | 0.0025 | 1 | 0.3 | 1 | 0.1 | 1 | 0.01 | 1 |
| Devonport Leat | 0.045 | 4 | 0.0025 | 1 | 0.2 | 1 | 0.1 | 1 | 0.01 | 1 |
| Lopwell, River Tavy | 0.053 | 4 | 0.0180 | 1 | 7.8 | 1 | 0.1 | 1 | 0.01 | 1 |
| Gunnislake, River Tamar | 0.074 | 3 | 0.0190 | 1 | 3.2 | 1 | 0.1 | 1 | 0.01 | 1 |
| Broadall Lake, River Yealm | 0.036 | 4 | 0.0025 | 1 | 0.1 | 1 | 0.1 | 1 | 0.01 | 1 |
| Meldon Reservoir | 0.006 | 6 | - | 0 | - | 0 | - | 0 | - | 0 |
| Wistlandpond Reservoir | 0.025 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| Lower Slade Reservoir | 0.055 | 9 | - | 0 | - | 0 | - | 0 | - | 0 |
| Roadford Reservoir | 0.014 | 3 | 0.0060 | 1 | 0.1 | 1 | 0.1 | 1 | 0.01 | 1 |
| Melbury Reservoir | 0.086 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| West Okement River | 0.084 | 5 | - | 0 | - | 0 | - | 0 | - | 0 |
| River Torridge | 0.017 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| River Yeo (Bideford) | 0.008 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| Loxhore, River Yeo | 0.011 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| Bratton Stream | 0.006 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| Leehamford, River Bray | 0.025 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| Brockemburrow Intake | 0.008 | 6 | - | 0 | - | 0 | - | 0 | - | 0 |
| Newbridge, River Taw | 0.008 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| West (Lyn) Ilkerton River | 0.007 | 4 | - | 0 | - | 0 | - | 0 | - | 0 |
| Spreycott Spring | 0.003 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| Avon Dam | 0.025 | 6 | - | 0 | - | 0 | - | 0 | - | 0 |
| Fernworthy Reservoir | 0.040 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| Kennick Reservoir | 0.006 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| Trenchford Reservoir | 0.009 | 9 | - | 0 | - | 0 | - | 0 | - | 0 |
| Venford Reservoir | 0.023 | 19 | - | 0 | - | 0 | - | 0 | - | 0 |
| Thornes Intake, Kenton | 0.009 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| Littlehempston, River Dart | 0.021 | 6 | - | 0 | - | 0 | - | 0 | - | 0 |
| Swincombe Intake | 0.008 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| Bala Brook | 0.015 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| Squabmoor Reservoir | 0.025 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| Wimbleball Reservoir | 0.025 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| Whitford, River Axe | 0.017 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| Budleigh Brook | 0.016 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| Pynes Intake, River Exe | 0.019 | 8 | - | 0 | - | 0 | - | 0 | - | 0 |
| Bolham Leat, River Exe | 0.016 | 7 | - | 0 | - | 0 | - | 0 | - | 0 |
| [redacted] | | | | | | | | | | |

| SULPHATES mg SO4/l | | CHLORIDES mg Cl/l | | SURFACTANTS mg/l | | PHOSPHATES mg P/l | | PHENOLS ug/l | | COD mg O/l | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 90%ile | n | 90%ile | n | 90%ile | n | 90%ile | n | 90%ile | n | 90%ile | n |
| 15.68 | 10 | 0.0010 | 4 | 0.0925 | 5 | 0.05 | 2 | 1.4 | 1 | 42.2 | 10 |
| 15.00 | 9 | 0.0010 | 3 | 0.0925 | 4 | 0.05 | 2 | 1.4 | 1 | 40.0 | 9 |
| 13.56 | 11 | 0.0010 | 4 | 0.0385 | 5 | 0.05 | 2 | 1.4 | 1 | 35.6 | 11 |
| 13.91 | 12 | 0.0010 | 4 | 0.0771 | 5 | 0.10 | 2 | 1.4 | 1 | 30.1 | 11 |
| 14.84 | 11 | 0.0010 | 4 | 0.0385 | 5 | 0.05 | 2 | 1.4 | 1 | 19.6 | 11 |
| 41.16 | 11 | 0.0010 | 3 | 0.1079 | 5 | 0.05 | 2 | 1.4 | 1 | 22.8 | 11 |
| 31.86 | 11 | 0.0010 | 4 | 0.0925 | 5 | 0.05 | 2 | 1.4 | 1 | 21.2 | 11 |
| 5.78 | 11 | 0.0010 | 3 | 0.1079 | 5 | 0.05 | 2 | 1.4 | 1 | 35.8 | 11 |
| 5.58 | 10 | 0.0010 | 4 | 0.0925 | 5 | 0.05 | 2 | 1.4 | 1 | 136.8 | 10 |
| 4.88 | 11 | 0.0010 | 4 | 0.1079 | 5 | 0.05 | 2 | 1.4 | 1 | 29.2 | 11 |
| 5.62 | 11 | 0.0010 | 4 | 0.1079 | 5 | 0.05 | 2 | 1.4 | 1 | 10.4 | 11 |
| 8.19 | 10 | 0.0010 | 3 | 0.1542 | 4 | 0.05 | 2 | 1.4 | 1 | 18.0 | 10 |
| 19.20 | 11 | 0.0010 | 4 | 0.1850 | 5 | 0.10 | 2 | 1.4 | 1 | 30.2 | 11 |
| 4.90 | 8 | - | 0 | 0.0385 | 1 | 0.05 | 1 | 1.4 | 1 | 7.5 | 2 |
| 4.10 | 11 | 0.0010 | 4 | 0.0385 | 3 | 0.05 | 2 | 1.4 | 1 | 10.0 | 10 |
| 9.08 | 11 | 0.0010 | 3 | 0.1542 | 5 | 0.05 | 2 | 1.4 | 1 | 25.6 | 11 |
| 5.40 | 8 | - | 0 | 0.0385 | 1 | 0.05 | 1 | 1.4 | 1 | 20.6 | 2 |
| 4.71 | 12 | 0.0010 | 4 | 0.0385 | 5 | 0.05 | 2 | 1.4 | 1 | 36.6 | 12 |
| 4.90 | 10 | 0.0010 | 4 | 0.0385 | 5 | 0.05 | 2 | 1.4 | 1 | 49.6 | 10 |
| 3.88 | 11 | 0.0010 | 4 | 0.0385 | 5 | 0.05 | 2 | 1.4 | 1 | 10.0 | 11 |
| 9.70 | 12 | 0.0010 | 4 | 0.0771 | 6 | 0.14 | 2 | 1.4 | 1 | 18.4 | 12 |
| 18.88 | 11 | 0.0010 | 3 | 0.0925 | 5 | 0.10 | 2 | 1.4 | 1 | 27.6 | 11 |
| 4.58 | 11 | 0.0010 | 4 | 0.0385 | 5 | 0.05 | 2 | 1.4 | 1 | 10.0 | 11 |
| 7.60 | 7 | - | 0 | 0.0385 | 1 | 0.05 | 1 | 1.4 | 1 | 16.2 | 1 |
| 8.60 | 8 | - | 0 | 0.0771 | 2 | 0.05 | 1 | - | 0 | 7.5 | 1 |
| 10.60 | 9 | - | 0 | 0.0771 | 3 | 0.05 | 1 | 1.4 | 2 | 7.5 | 2 |
| 10.86 | 11 | 0.0010 | 3 | 0.0385 | 4 | 0.05 | 2 | 1.4 | 1 | 52.8 | 11 |
| 10.80 | 9 | - | 0 | 0.0771 | 2 | 0.05 | 1 | - | 0 | 33.0 | 1 |
| 7.30 | 6 | - | 0 | 0.0385 | 1 | 0.05 | 1 | 1.4 | 1 | 18.4 | 1 |
| 19.40 | 9 | - | 0 | 0.1388 | 3 | 0.31 | 1 | 1.4 | 2 | 44.0 | 2 |
| 15.00 | 9 | - | 0 | 0.1696 | 2 | 0.18 | 1 | 1.4 | 2 | 22.0 | 2 |
| 9.90 | 8 | - | 0 | 0.0771 | 2 | - | 0 | 1.4 | 1 | 7.5 | 1 |
| 9.30 | 9 | - | 0 | 0.0771 | 3 | 0.05 | 1 | 1.4 | 1 | 7.5 | 2 |
| 7.30 | 9 | - | 0 | 0.0771 | 3 | 0.05 | 1 | 1.4 | 1 | 7.5 | 2 |
| 6.40 | 8 | - | 0 | 0.0771 | 3 | 0.05 | 1 | 1.4 | 1 | 7.5 | 2 |
| 13.00 | 9 | - | 0 | 0.0771 | 3 | 0.19 | 1 | 1.4 | 2 | 24.0 | 2 |
| 4.70 | 6 | - | 0 | 0.0385 | 2 | 0.05 | 1 | 1.4 | 1 | 7.5 | 2 |
| 8.00 | 9 | - | 0 | 0.0771 | 3 | 0.05 | 1 | 1.4 | 1 | 7.5 | 2 |
| 27.90 | 6 | - | 0 | 0.0385 | 2 | 0.05 | 2 | 1.4 | 1 | 19.0 | 2 |
| 6.50 | 9 | - | 0 | 0.0385 | 2 | 0.05 | 2 | 1.4 | 1 | 18.0 | 2 |
| 9.95 | 10 | - | 0 | 0.0385 | 3 | 0.05 | 3 | 1.4 | 2 | 20.0 | 3 |
| 9.07 | 12 | - | 0 | 0.0385 | 3 | 0.05 | 3 | 1.4 | 2 | 16.0 | 3 |
| 4.54 | 21 | - | 0 | 0.0385 | 3 | 0.05 | 3 | - | 0 | 914.0 | 3 |
| 11.20 | 7 | - | 0 | 0.0771 | 1 | - | 0 | - | 0 | - | 0 |
| 9.70 | 7 | - | 0 | 0.0385 | 1 | 0.05 | 1 | - | 0 | 7.5 | 1 |
| 3.70 | 7 | 0.0025 | 1 | 0.0385 | 1 | 0.05 | 1 | - | 0 | 7.5 | 1 |
| 4.30 | 8 | - | 0 | 0.0385 | 1 | 0.05 | 1 | 1.4 | 1 | 15.2 | 2 |
| 18.30 | 8 | - | 0 | 0.0771 | 2 | 0.05 | 1 | - | 0 | 7.5 | 1 |
| 11.00 | 9 | 0.0025 | 1 | 0.0771 | 3 | 0.05 | 1 | 1.4 | 2 | 15.2 | 2 |
| 38.80 | 9 | - | 0 | 0.0925 | 3 | 0.37 | 1 | 1.4 | 2 | 61.5 | 2 |
| 18.50 | 9 | - | 0 | 0.1079 | 3 | 0.22 | 1 | 1.4 | 2 | 27.0 | 2 |
| 26.10 | 9 | 0.0025 | 1 | 0.0771 | 3 | 0.13 | 1 | 1.4 | 2 | 47.5 | 2 |
| 9.80 | 8 | 0.0025 | 1 | 0.0385 | 2 | 0.13 | 1 | 1.4 | 2 | 28.4 | 2 |
| 4.20 | 9 | - | 0 | 0.0771 | 3 | 0.05 | 1 | 1.4 | 2 | 7.5 | 2 |

TABLE B.2 : Percentiles and Number of Sample (n) of the Guide Determinands.

| ABSTRACTION INTAKES | DO % SAT | | BOD mg O/l | | AMMONIA mg N/l | | TOT COLI /100ml | | FAECAL COLI /100ml | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 10%ile | n | 90%ile | n | 90%ile | n | 90%ile | n | 90%ile | n |
| College Reservoir | 72.5 | 10 | 6.39 | 10 | 0.087 | 10 | 41000 | 4 | 3000 | 4 |
| Argal Reservoir | 96.0 | 9 | 3.00 | 9 | 0.030 | 9 | 2100 | 4 | 200 | 4 |
| Stithians Reservoir | 94.2 | 11 | 2.08 | 11 | 0.098 | 11 | 800 | 3 | 100 | 3 |
| Drift Reservoir | 89.6 | 12 | 3.88 | 12 | 0.147 | 12 | 700 | 4 | 60 | 4 |
| Boswyn Reservoir | 96.6 | 11 | 2.74 | 11 | 0.020 | 11 | 3000 | 4 | 100 | 4 |
| River Hayle | 86.4 | 11 | 1.16 | 11 | 0.048 | 11 | 230 | 4 | 72 | 4 |
| River Cober | 85.2 | 11 | 5.76 | 11 | 0.058 | 11 | 1000 | 4 | 450 | 4 |
| Colliford Reservoir | 68.6 | 11 | 3.24 | 11 | 0.188 | 11 | 98 | 4 | 46 | 4 |
| Crowdy Reservoir | 80.0 | 9 | 2.54 | 10 | 0.158 | 10 | 16700 | 4 | 700 | 4 |
| Delank River | 82.0 | 11 | 2.08 | 11 | 0.074 | 11 | 420 | 4 | 150 | 4 |
| Trekeivesteps, River Fowey | 91.2 | 11 | 2.20 | 11 | 0.100 | 11 | 1100 | 4 | 600 | 4 |
| Restomel, River Fowey | 88.7 | 10 | 3.15 | 10 | 0.177 | 10 | 7500 | 4 | 1700 | 4 |
| Rialton, River Porth | 82.0 | 11 | 3.24 | 11 | 0.116 | 11 | 39000 | 4 | 8000 | 4 |
| Butterbrook Reservoir | 98.0 | 7 | 1.60 | 8 | 0.020 | 8 | 70 | 3 | 20 | 3 |
| Burrator Reservoir | 64.0 | 11 | 2.22 | 11 | 0.138 | 11 | 260 | 4 | 5 | 4 |
| Upper Tamar Lake | 75.2 | 11 | 3.24 | 11 | 0.216 | 11 | 114 | 4 | 58 | 4 |
| River Erme | 92.0 | 7 | 1.40 | 8 | 0.180 | 8 | 130 | 3 | 70 | 3 |
| River Yealm | 88.3 | 12 | 1.70 | 12 | 0.027 | 12 | 170 | 4 | 60 | 4 |
| Ford Brook | 92.1 | 10 | 1.68 | 10 | 0.019 | 10 | 200 | 4 | 28 | 4 |
| Devonport Leat | 93.0 | 11 | 1.74 | 11 | 0.028 | 11 | 270 | 4 | 150 | 4 |
| Lopwell, River Tavy | 82.5 | 12 | 2.00 | 12 | 0.101 | 12 | 6500 | 4 | 1800 | 4 |
| Gunnislake, River Tamar | 88.2 | 11 | 3.08 | 11 | 0.128 | 11 | 5600 | 4 | 2200 | 4 |
| Broadall Lake, River Yealm | 93.0 | 11 | 2.10 | 11 | 0.020 | 11 | 140 | 4 | 80 | 4 |
| Meldon Reservoir | 91.0 | 7 | 1.50 | 7 | 0.070 | 7 | 170 | 2 | 60 | 2 |
| Wistlandpond Reservoir | 86.0 | 8 | 2.90 | 8 | 0.090 | 8 | 50 | 2 | 50 | 2 |
| Lower Slade Reservoir | 93.0 | 9 | 2.60 | 9 | 0.120 | 9 | 310 | 3 | 100 | 3 |
| Roadford Reservoir | 85.4 | 11 | 1.76 | 11 | 0.106 | 11 | 44 | 4 | 44 | 4 |
| Melbury Reservoir | 85.0 | 8 | 3.00 | 8 | 0.060 | 9 | 100 | 2 | 50 | 2 |
| West Okement River | 75.0 | 6 | 3.50 | 6 | 0.120 | 6 | 100 | 2 | 100 | 2 |
| River Torridge | 86.0 | 9 | 3.90 | 9 | 0.140 | 9 | 59000 | 3 | 14000 | 3 |
| River Yeo (Bideford) | 86.0 | 9 | 2.80 | 9 | 0.160 | 9 | 37000 | 3 | 21000 | 3 |
| Loxhore, River Yeo | 95.0 | 8 | 2.80 | 8 | 0.040 | 8 | 3500 | 2 | 3700 | 2 |
| Bratton Stream | 92.0 | 9 | 2.40 | 9 | 0.100 | 9 | 2600 | 2 | 1860 | 2 |
| Leehamford, River Bray | 92.0 | 9 | 2.00 | 9 | 0.030 | 9 | 4500 | 2 | 2800 | 2 |
| Brockemburrow Intake | 92.0 | 7 | 1.90 | 8 | 0.030 | 8 | 1790 | 1 | 1510 | 1 |
| Newbridge, River Taw | 88.0 | 9 | 3.00 | 9 | 0.090 | 9 | 7500 | 3 | 2800 | 3 |
| West (Lyn) Ilkerton River | 90.0 | 6 | 1.90 | 6 | 0.010 | 6 | 1380 | 2 | 890 | 2 |
| Spreycott Spring | 92.0 | 9 | 2.50 | 9 | 0.040 | 9 | 2500 | 2 | 3300 | 2 |
| Avon Dam | 88.0 | 7 | 1.80 | 7 | 0.270 | 7 | 300 | 3 | 100 | 3 |
| Fernworthy Reservoir | 93.0 | 9 | 1.80 | 9 | 0.040 | 8 | 18 | 2 | 8 | 2 |
| Kennick Reservoir | 92.1 | 10 | 1.90 | 10 | 0.070 | 8 | 49 | 2 | 5 | 2 |
| Trenchford Reservoir | 92.3 | 12 | 1.95 | 12 | 0.059 | 10 | 90 | 2 | 1 | 2 |
| Venford Reservoir | 94.0 | 22 | 2.07 | 22 | 0.040 | 21 | 100 | 6 | - | 6 |
| Thornes Intake, Kenton | 85.0 | 7 | 2.60 | 7 | 0.070 | 7 | 200 | 2 | 300 | 2 |
| Littlehempston, River Dart | 78.0 | 7 | 1.40 | 7 | 0.340 | 7 | 9500 | 2 | 2600 | 2 |
| Swincombe Intake | 87.0 | 8 | 3.10 | 8 | 0.030 | 8 | 400 | 2 | 56 | 2 |
| Bala Brook | 93.0 | 8 | 1.10 | 9 | 0.030 | 9 | 1000 | 3 | 300 | 3 |
| Squabmoor Reservoir | 86.0 | 8 | 2.00 | 8 | 0.130 | 8 | 1500 | 2 | 50 | 2 |
| Wimbleball Reservoir | 91.0 | 8 | 2.20 | 9 | 0.090 | 9 | 130 | 3 | 100 | 3 |
| Whitford, River Axe | 85.0 | 9 | 3.80 | 8 | 0.190 | 9 | 42000 | 3 | 85000 | 3 |
| Budleigh Brook | 81.0 | 9 | 4.50 | 9 | 0.145 | 9 | 13400 | 3 | 2600 | 3 |
| Pynes Intake, River Exe | 82.0 | 8 | 3.90 | 9 | 0.130 | 9 | 34000 | 3 | 13000 | 3 |
| Bolham Leat, River Exe | 86.0 | 7 | 2.40 | 8 | 0.120 | 8 | 4700 | 3 | 2600 | 3 |
| Sheldon Stream | 83.0 | 9 | 2.30 | 9 | 0.150 | 9 | 130 | 3 | 69 | 3 |

| F. STREPS /100ml | | SALMONELLA /5000ml | |
|---|---|---|---|
| 90%ile | n | pres/abs | n |
| 202 | 4 | - | 0 |
| 14 | 4 | - | 0 |
| 0 | 3 | - | 0 |
| 220 | 4 | - | 0 |
| 56 | 4 | - | 0 |
| 108 | 4 | - | 0 |
| 50 | 4 | - | 0 |
| 40 | 4 | - | 0 |
| 120 | 4 | - | 0 |
| 148 | 4 | - | 0 |
| 122 | 4 | - | 0 |
| 470 | 4 | - | 0 |
| 540 | 4 | - | 0 |
| 5 | 1 | abs | 1 |
| 1 | 4 | - | 0 |
| 890 | 4 | - | 0 |
| 5 | 1 | abs | 1 |
| 10 | 4 | - | 0 |
| 12 | 4 | - | 0 |
| 48 | 4 | - | 0 |
| 1290 | 4 | - | 0 |
| 900 | 4 | - | 0 |
| 12 | 4 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| 100 | 1 | - | 0 |
| 64 | 4 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| 910 | 1 | - | 0 |
| 10000 | 1 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| 70 | 1 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| 5 | 1 | abs | 1 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| - | 0 | - | 0 |
| 5 | 1 | abs | 1 |
| - | 0 | - | 0 |
| 30 | 1 | abs | 1 |
| 7500 | 1 | pres | 1 |
| 3300 | 1 | pres | 1 |
| 8000 | 1 | pres | 1 |
| 3100 | 1 | pres | 1 |
| 50 | 1 | abs | 1 |