

SECTION E

OPERATING COSTS AND EFFICIENCY

Edition 7

ANNUAL RETURN 2008-09

EDITION CHANGES – SECTION E

<u>Edition</u>	<u>Description of Change</u>
	<u>No changes for Annual Return 2008-09</u>

**SECTION E
CHAPTER E1**

ACTIVITY BASED COSTING – WATER SERVICE

Edition 7

**SECTION E
CHAPTER E1
ACTIVITY BASED COSTING – WATER SERVICE**

This table includes operating costs and capital maintenance costs. The information in these tables is used for operating cost trends analysis and for the compilation of unit costs.

Column definitions

Column 1: **Water resources and treatment:** all direct costs associated with the abstraction, conveyance and treatment of raw water, including routine maintenance. (Non-routine maintenance should be charged to *General and support activities*.) Include the cost of bulk water supplies purchased, but exclude the functional costs of bulk water supplied to third parties and of non-potable water. For these purposes, the latter costs should be estimated, and adjustments made to the appropriate subjective fields (including asset and infrastructure depreciation. Compensating adjustments should be made under *Services provided for third parties*. Where pumps serve a dual abstraction/distribution function, an assessment must be made of the costs of each function based on relative pumping head.

See Regulatory Accounting Rules 4 for further description of activities.

Column 2: **Water distribution:** all direct costs associated with the pumping, storage and conveyance of treated water, including the operation, control and monitoring of the distribution system, including routine maintenance. (Non-routine maintenance should be charged to *General and support activities*.) Where pumps serve a dual abstraction/distribution function, an assessment must be made of the costs of each function based on relative pumping head. The costs of distributing non-potable water should be excluded. Include here the installation, removal, and replacement of consumer meters (except where capitalised or rechargeable), but not meter reading. Where distribution employees are employed on work related to tariff matters, and charging and billing enquiries, they should be charged to *Customer services*.

See Regulatory Accounting Rules 4 for further description of activities.

Section E

Column 3: **Water service total:** where entries are required in columns 1 and 2, column 3 is calculated from those entries.

Categories of cost

- **Direct Costs**

These are costs that are directly attributable to each water service activity, namely *Water Resources* and *Treatment and Water Distribution*. Such costs include apportionments, where such apportionments are necessitated by operational consideration (for example where mobile gangs are used to operate both water and sewerage activities). The direct costs incurred in the provision of *General and Support Activities* are given in total for the water service and are also apportioned between service activities.

- **Operating Expenditure**

The costs of subjective elements (i.e. rates, doubtful debts or exceptional items) are included only at the water service level and are not apportioned between service activities.

- **Reactive Maintenance**

The costs of reactive maintenance expenditure on water infrastructure and non-infrastructure assets are included within operating expenditure, for each of the two service activities.

- **Capital Maintenance**

The capital charges for each service category for infrastructure depreciation and non-infrastructure depreciation. Other capital charges are included at the service level only and are not apportioned between service activities.

Guidance to SW

Scottish Water (SW) should ensure that no input cell is left blank in any of the area columns reported on. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG. Area columns that are not reported on can be left blank.

Commentaries

Allocation of costs: SW must explain the basis for allocation of costs between opex, capex and capital maintenance: between water and sewerage services; and between service areas within the water service. SW should also clearly state any general allocation rules which have been used by

Section E

themselves, their contractors or agents; e.g. a rule requiring the capitalisation of any expenditure greater than £100.

SW should state whether costs such as leakage control have been allocated entirely to opex, or whether significant elements of expenditure have been allocated to capital maintenance or capex lines.

It is important for SW to explain how costs related to business activities (particularly customer services/billing) and indirect costs (general and support expenditure, restructuring provisions and other atypical items) are allocated between the water and sewerage services.

It is important that SW clearly explains the allocation of indirect costs between the individual service areas (eg. water distribution and water distribution and treatment).

Atypical costs and provisions: SW must reveal and explain all significant atypical costs which have occurred during the reporting year, regardless of whether or not they are declared as exceptional items. SW must also confirm the absence of any atypical costs. In the commentary to the table, SW must disclose:

- Restructuring costs (which includes redundancy payments, pension contributions and consultants' fees);
- Compensation payments (for one-off events, but not standard GMS or customer charter payments);
- Costs attributable to unusual weather conditions;
- Pension holidays;
- Rebates of SEPA or other service charges, including local authority rates.

In addition, SW must disclose the reasons for any exceptional items that have been declared and whether they are expenses or provisions for future costs.

SW must disclose the purpose and amount of any provision included in operating expenditure, and disclose the amount of provision expended or released in the reporting year.

Changes in costs: SW must explain all changes between the prior year (inflated) and reporting year in each element of operating expenditure, where the change in an element exceeds 2% of total operating expenditure, and explain fluctuations in any element of direct costs or operating expenditure which has changed by more than 30% of the prior year figure. An element here refers to a specific category of cost in a service area. So, for example, a change in power costs for the distribution service area above the threshold would need to be explained, as would a change in materials and consumables

Section E

for the resources and treatment service. If the total column for any category of cost changes above the threshold, this will also need to be explained if it hasn't already been explained by changes in the individual service areas.

Water infrastructure renewals charge (IRC): SW is required to provide an explanation of the basis of its IRC, commenting on forecast levels of future IRE compared with prior year levels. The commentary should explain how the IRC is calculated and the factors that SW has taken into account in arriving at its IRC. SW must state the movement in infrastructure renewals accrual/prepayment and provide an explanation of the period over which it considers that the infrastructure renewals accrual or prepayment will be wound out.

Pensions: SW should identify in the commentary the total element relating to pension costs reported in table E1. SW is also asked to set out the level of its actual pension contributions in the report year and explain how this compares with the previous two years.

Donations to charitable trusts or other funds assisting customers with payment difficulties should be included in the customer services line, otherwise SW should state in which line it has accounted for the costs. SW must confirm how much it has paid to charitable trusts or other funds assisting customers with payment difficulties. Where the costs have been accounted for in different lines in previous years, please specify which line they have been included in and disclose the amounts.

Guidance to the Reporter

Changes in costs: the Reporter should check that SW has provided explanations on the reasons for changes and fluctuations in costs. If it has not, the Reporter should comment himself. The Reporter should give an opinion, based on his knowledge of the business, on Scottish Water's explanation of any significant changes in costs, particularly where they relate to changes in operating conditions or practice.

Cost allocation: the Reporter is required to give particular attention to the methods used by SW in allocating costs to the following lines within the table:

- SEPA charges
- Local Authority rates
- Third party costs
- Exceptional costs
- Atypical costs

In particular, the Reporter should verify that the allocation methods used are consistent with previous years and are consistent across all parts of the business.

Section E

The Reporter is required to confirm that there have been no incidences of 'double counting' of costs during the process of allocating them to cost drivers.

The Reporter should pay particular attention to the systems and methods used to allocate labour costs to individual cost drivers. At all times, the Reporters should promote transparency and robustness in the allocation of costs.

Water infrastructure renewals charge: the Reporter should comment upon the calculation of the infrastructure renewals charge and whether he/she considers it to reflect SW's long-term view of infrastructure renewals expenditure.

**SECTION E
CHAPTER E2**

**ACTIVITY BASED COSTING – WASTEWATER
SERVICE**

Edition 7

SECTION E
CHAPTER E2
ACTIVITY BASED COSTING – WASTEWATER SERVICE

This table includes operating costs and capital maintenance costs. The information in these tables is used for operating costs, trends analysis and for the compilation of unit costs. PPP Data should not be included in these tables.

Column definitions

Column 1-9: Sewerage: Include all direct costs associated with sewerage, including agency costs and routine maintenance. (Non-routine maintenance should be charged to *General and support activities*.) Exclude all costs associated with sea outfalls. Exclude terminal pumping costs (i.e. costs incurred in pumping to treatment works).

Costs should be broken down by operational areas, and entered in the appropriate columns. SW should maintain a record of the boundaries of each area. Areas should not change year-on-year without agreement from WIC.

See Regulatory Accounting Rules 4 for further description of activities.

Column 10: Sewage treatment: Include all direct costs associated with sewage treatment, including terminal pumping costs and routine maintenance. (Non-routine maintenance should be charged to *General and support activities*.) Include the costs of sewage exports, but exclude the cost of treating imported sewage. For these purposes, the latter costs should be estimated, and adjustments made to the appropriate subjective lines (and compensating adjustments made under *Services provided for third parties*). Include all costs associated with sea outfalls, except the costs of sludge disposal where sea outfalls discharge treated effluent, and sludge is disposed of separately.

See Regulatory Accounting Rules 4 for further description of activities.

Column 11: Sludge treatment and disposal: Include all direct costs associated with sludge treatment and disposal, including routine maintenance. (Non-routine maintenance should be charged to *General and support activities*.) Include the cost of sludge exported, but exclude the cost of treating and disposing of imported sludge. For these purposes, the latter cost should be estimated, and adjustments made to the appropriate subjective lines (and compensating adjustment made under *Services provided for third parties*).

See Regulatory Accounting Rules 4 for further description of activities.

Column 12: Sewerage service total: where entries are required in columns 1-8, 10 and 11, column 12 is calculated from those entries.

Categories of cost

- **Direct Costs**

These are costs that are directly attributable to each service activity, namely *Sewerage, Sewage treatment, and Sludge treatment and disposal*. Such costs include apportionments, where such apportionments are necessitated by operational considerations (for example where mobile gangs are used to operate both water and sewerage activities). The direct costs incurred in the provision of *General and support activities* are given in total for the sewerage service and are also apportioned between service activities.

- **Operating Expenditure**

The costs of subjective elements (i.e. rates, doubtful debts, or exceptional items) are included at the sewerage service level only, and are not apportioned between service activities.

- **Reactive Maintenance**

The costs of reactive maintenance expenditure on sewerage infrastructure and non-infrastructure assets, which are included within operating expenditure for each of the service activities.

- **Capital Maintenance**

The capital charges for each service category for infrastructure depreciation expenditure asset depreciation. Other capital charges are included at the service level only and are not apportioned between service activities.

Guidance to SW

SW should ensure that no input cell is left blank in any of the area columns reported on. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG. Area columns that are not report on can be left blank.

Commentaries

Allocation of costs: SW must explain the basis for allocation of costs between opex, capex and capital maintenance; between water and sewerage services; and between service areas within the sewerage service. SW should clearly state any general allocation rules which have been used by themselves, their contractors or agents (e.g. a rule requiring the capitalisation of any expenditure greater than £100).

It is important for SW to explain how costs related to business activities (particularly customer services/billing) and indirect costs (general and support

Section E

expenditure, restructuring provisions and other atypical items) are allocated between the water and sewerage services.

It is important that SW clearly explains the allocation of indirect costs between the individual service areas.

Atypical costs and provisions: SW must reveal and explain all significant atypical costs which have occurred during the reporting year, regardless of whether or not they are declared as exceptional items. SW must also confirm the absence of any atypical costs. In the commentary to the table SW must disclose:

- restructuring costs (which includes redundancy payments, pension contributions and consultants' fees);
- compensation payments (for one-off events).
- costs attributable to unusual weather conditions;
- pension holidays;
- rebates of Scottish Environmental Protection Agency or other service charges, including local authority rates.

In addition, SW must disclose the reasons for any exceptional items that have been declared and whether they are expenses or provisions for future costs.

SW must disclose the purpose and amount of any provision included in operating expenditure, and disclose the amount of provision expended or released in the reporting year.

Sewerage infrastructure renewals charge (IRC): SW is required to provide an explanation of the basis of its IRC, commenting on forecast levels of future IRE compared with prior year levels. The commentary should explain how the IRC is calculated and the factors that SW has taken into account in arriving at its IRC. SW must state the movement in infrastructure renewals accrual/prepayment and provide an explanation of the period over which it considers that the infrastructure renewals accrual or prepayment will be wound out.

Changes in costs: SW must explain all changes between the prior year (inflated) and reporting year in each element of operating expenditure, where the change in an element exceeds 2% of total operating expenditure, and explain fluctuations in any element of direct costs or operating expenditure which has changed by more than 30% of the prior year figure. An element here refers to a specific category of cost in a service area. So, for example, a change in power costs for the sewage treatment service area above the threshold would need to be explained, as would a change in materials and consumables for the sewerage service. If the total column for any category of

Section E

cost changes above the threshold, this will also need to be explained if it hasn't already been explained by changes in the individual service areas

Pensions: SW should identify in the commentary the total element relating to pension costs reported in Table E2. SW is also asked to set out the level of its actual pension contributions in the report year and explain how this compares with the previous two years.

Donations to charitable trusts or other funds assisting customers with payment difficulties should be included in the customer services line, otherwise SW should state in which line it has accounted for the costs. SW must confirm how much it has paid to charitable trusts or other funds assisting customers with payment difficulties. Where the costs have been accounted for in different lines in previous years, please specify which line they have been included in and disclose the amounts.

Guidance to the Reporter

Changes in costs: the Reporter should check that SW has provided explanations on the reasons for changes and fluctuations in costs. If it has not, the Reporter should comment himself. The Reporter should give an opinion, based on his knowledge of the business, on SW's explanation of any significant changes in costs, particularly where they relate to changes in operating conditions or practice.

Cost allocation: the Reporter is required to give particular attention to the methods used by Scottish Water in allocating costs to the following lines within the table:

- SEPA charges
- Local Authority rates
- Third party costs
- Exceptional costs
- Atypical costs

In particular, the Reporter should verify that the allocation methods used are consistent with previous years and are consistent across all parts of the business.

The Reporter is required to confirm that there have been no incidences of 'double counting' of costs during the process of allocating them to cost drivers.

The Reporter should pay particular attention to the systems and methods used to allocate labour costs to individual cost drivers. At all times, the Reporter should promote transparency and robustness in the allocation of costs.

Sewerage infrastructure renewals charge: the Reporter should comment upon the calculation of the infrastructure renewals charge and whether he/she

Section E

considers it to reflect SW's long-term view of infrastructure renewals expenditure.

**SECTION E
CHAPTER E3**

PPP PROJECT ANALYSIS

Edition 7

SECTION E
CHAPTER E3
PPP PROJECT ANALYSIS

This table allows for project information on individual PPP schemes to be reported. One column should be completed for each scheme. Where schemes include multiple treatment sites, details can be recorded using one column per site, and a column showing relevant totals.

Guidance to SW

On completion of Table E3 SW should ensure that no input cell is left blank in any of the project columns reported on. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG. Project columns that are not reported on should be left blank.

Guidance to the Reporter

The Reporter should confirm the source of the information contained within table E3 and in particular, should check whether that information reflects assumptions made by SW or actual information supplied by the PPP contractors.

The Reporter should check that all material assumptions used by SW relating to information contained within this table have been disclosed. The Reporter should give an opinion as to the validity and consistency of these assumptions and whether they materially affect the information submitted. The Reporter should also comment on any sensitivity analysis that has been undertaken by Scottish Water relating to the application of these assumptions.

The Reporter is asked to confirm that the information submitted relating to the following areas is consistent with the same information supplied elsewhere in the Annual Return, is collected in a manner consistent with previous years' submissions and is derived in an appropriate manner:

- Population values
- Sewage treatment loads

SECTION E
CHAPTER E3a
PPP COST ANALYSIS

Edition 7

SECTION E
CHAPTER E3a
PPP COST ANALYSIS

This table allows for cost information on individual PPP schemes to be reported. One column should be completed for each scheme. Where schemes include multiple treatment sites, details can be recorded using one column per site, and a column showing relevant totals.

Table is split into five blocks. Please refer to Column definitions for Table E2 for definitions of these five blocks.

Guidance to SW

On completion of Table E3a SW should ensure that no input cell is left blank in any of the project columns reported on. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG. Project columns that are not reported on should be left blank.

Guidance to the Reporter

The Reporter should confirm that estimates of the running costs of the Public Private Partnership schemes are soundly derived and are consistent with those reported in table E2.

**SECTION E
CHAPTER E4
WATER EXPLANATORY FACTORS – RESOURCES
AND TREATMENT**

Edition 7

**SECTION E
CHAPTER E4
WATER EXPLANATORY FACTORS – WATER RESOURCES AND
TREATMENT**

This table is used in water service operating efficiency studies. It covers:

- Source types
- Peak demand and pumping head
- Resources and treatment costs
- Water treatment works by process type; and
- Water treatment works by size band

Source Types

This section includes the number of sources in each of the following categories, and the proportions of distribution input derived from sources in each category, and the proportion of distribution input obtained from bulk supplies for each category:

- Impounding reservoirs
- Lochs
- River and burn abstractions (including via bankside storage); and
- Boreholes

Number of sources

A source is to be defined as an independent raw water supply to a treatment works. Standby or mothballed sources from which no water has been obtained in the year should not be included in the number of sources.

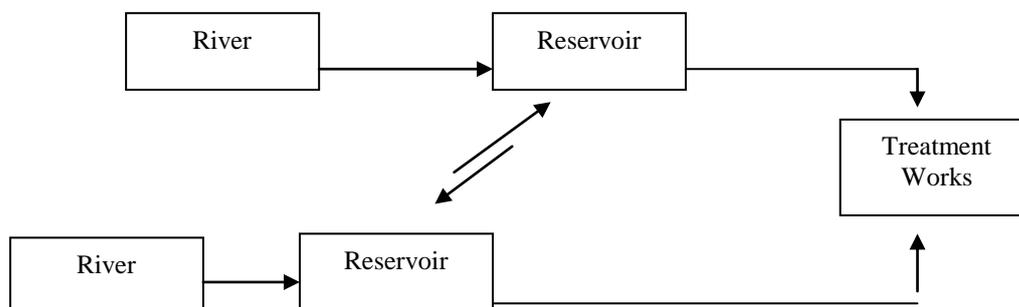
SW should follow these guidelines:

- If a treatment works receives water from three boreholes on one site, this would be classed as one source.
- If a treatment works receives water from a reservoir that has been filled by a river this would be classed as one reservoir source.
- If a treatment works receives water directly from two reservoirs this would be classed as two reservoir sources.
- If a treatment works receives water directly from two reservoirs, but water can be transferred between the two reservoirs, this would still be classed as two reservoir sources.
- If a treatment works receives water from a reservoir that has been filled by another reservoir then this would be classified as one reservoir source.

In the example below the arrows represent the flow of water. There is one reservoir, filled by a river, which feeds into one inlet at the treatment works. There is another reservoir that is fed by a different river, this reservoir feeds

Section E

into a different inlet at the treatment works. It is possible to transfer water between each of the reservoirs.



SW should report this as two reservoir sources.

Proportion of distribution input from each source category

The proportion of water in each source category is a measure of how difficult SW's water is to treat. When classifying the water into one of the categories, the following guidelines should be followed.

- Water abstracted from boreholes or springs and pumped directly to a treatment works should be classified as borehole water.
- Water abstracted from a river and transported directly to a treatment works (either by pumping or by gravity) should be classified as river water.
- Water that is transported directly to a treatment works from a reservoir which has been filled by a river should be classified as water from reservoirs (this is because, in general, while the water is stored in the reservoir, sediments will settle making the water easier to treat).
- Water that is transported from a reservoir, via a river, to a treatment works should be classified as water from a river.

If multiple sources feed a works (for example a river and a number of boreholes) and the flow from these sources is combined prior to treatment, then all of the flow entering the works can be categorised as the more difficult to treat water. (In this example, all of the water would be categorised as river water.)

Non-potable supplies

Non-potable supplies for water should not be included in this table. The water supplied should not be included in the distribution input figures, and if a source only provides non-potable water it should not be included in column 1. This includes sources that are used only to provide stream support.

Peak Demand and pumping head

This section comprises peak to average ratio and the average pumping head for resources and treatment

Average pumping head

The key reason we collect this data is as an explanatory factor for power costs. Therefore the variable needs to reflect the amount of pumping SW needs to do. In order to do this we need to know, in effect, how much each MI of water is pumped through the process, from abstraction to supply. Obviously this cannot be measured in practice so a calculation is used instead.

$$\text{Average pumping head} = \frac{\sum_i (l_i * WP_i)}{V_p + V_g}$$

where:

l_i = annual mean lift at site i

WP_i = volume of water pumped at site i

$V_p + V_g$ = total volume of water that enters supply (pumped and gravity fed)

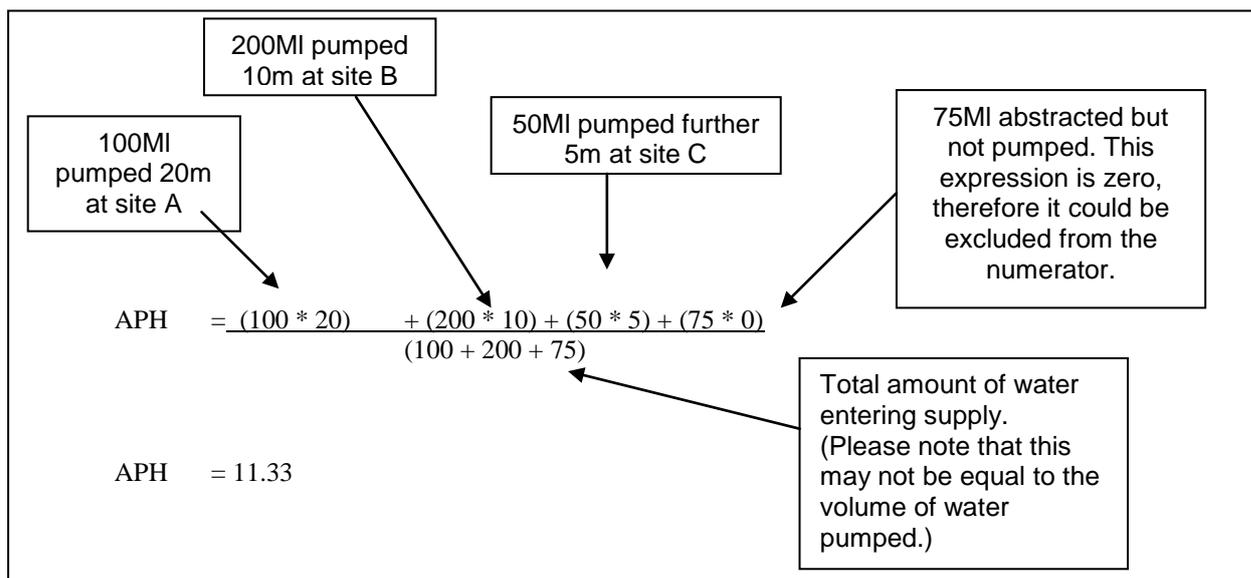
Included below is an example of how average pumping head should be calculated (the numbers are not representative of a real life situation, just for illustrative purposes.)

A company has the following processes:

- 100 MI of water is pumped 20m at site A
- 200MI of water is pumped 10m at site B, then 50MI of this water is pumped a further 5m at site C (a booster station). The remainder of the water is gravity fed to customers
- 75MI of water is abstracted and reaches supply without ever being pumped.

Section E

The average pumping head for this example would be calculated as follows:



The average pumping head should be calculated using data from all sites if possible. SW should state in its commentary if sites have not been used in calculating the average pumping head, and why they could not be used.

Pumping of **non-potable water** into supply (for example for stream support) should not be included in the average pumping head calculation.

Pumping of water that is exported to another company (**bulk supply exports**) should not be included in the average pumping head calculation.

We would expect all other pumping used in the abstraction, treatment and supply of water to be included in the pumping head calculation. This includes pumping as part of the treatment process and the pumping of process water.

Resources and treatment costs

This table requests Scottish Water to report operating costs by regional area. These costs include Power, Service Charges, Total direct costs, General and support costs and functional expenditure. Total costs should reconcile with the Resource and Treatment costs reported in table E1.

Water treatment works by process type

This section covers the proportion of distribution input derived from works falling into each category of water treatment, the number of works in each category as well as the corresponding operating costs.

For both groundwater and surface water, a **works** is here defined as an individual location which receives raw or partially treated water for treatment (excluding secondary disinfection) and ultimate delivery to customers. Where

Section E

the total treatment process is split between a number of sites, banding should be carried out on the basis of the size and treatment category of the sites at which the greatest proportion of costs are incurred.

SW should state in its commentary if it has included treatment works that have not been used in the report year.

The categories of treatment types are:	Examples
SD: Works providing simple disinfection only;	<ul style="list-style-type: none"> • Marginal chlorination
W1: Simple disinfection plus simple physical treatment only;	<ul style="list-style-type: none"> • Rapid gravity filtration • Slow sand filtration • Pressure filtration
W2: Single stage complex physical or chemical treatment;	<ul style="list-style-type: none"> • Super chlorination • Coagulation • Flocculation • Biofiltration • pH correction • Orthophosphate dosing • Softening • Membrane filtration
W3: More than one stage of complex treatment; but excluding processes in W4.	
W4: This category is intended to capture processes with very high operating costs;	<ul style="list-style-type: none"> • Ozone addition • Activated carbon / pesticide removal • UV treatment • Arsenic removal • Nitrate removal

Water treatment works by size band

This section covers the proportion of distribution input derived from works falling into each size band category, the number of works in each category as well as the corresponding operating costs.

The appropriate size band should be based on each work's peak hydraulic capacity, not its distribution input in a particular year. This ensures that a treatment works will appear in the same size band from one year to the next.

Guidance to SW

On completion of Table E4 SW should ensure that no input cell is left blank in any of the area columns reported on. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG. Area columns that SW does not report on should be left blank.

Commentary

SW must:

- comment on the changes which have occurred since previous years and provide clear explanations for them;
- state whether changes are one-off revisions because of exceptional circumstance (e.g. drought) or whether they are due to permanent changes in its assets or operations; and
- where treatment types are not covered by this guidance, state in its commentary what assumptions it has made in categorising these processes.

Guidance for Reporters

Reporters must:

- bring to WICS attention any areas where SW has failed to explain changes to the reported information and comment on their significance
- comment on the reasonableness of any changes; and
- comment on the average pumping head methodology, including the sites that have not been included in the calculation.

The Reporter should confirm that the reported costs are consistent with those reported in table E1.

**SECTION E
CHAPTER E6
WATER EXPLANATORY FACTORS - DISTRIBUTION**

Edition 7

SECTION E
CHAPTER E6
WATER EXPLANATORY FACTORS - DISTRIBUTION

This table is used in water service operating efficiency studies. It covers:

- Area data
- Distribution costs
- Water mains data
- Pumping stations
- Service reservoirs; and
- Water towers

SW should complete this table on a sub-regional basis for a number of areas following the criteria set out below. Data should be broken down by operational areas, and entered in the appropriate columns.

Areas must be based on the operating units by which SW is managed

Each area should form a single geographical unit with a contiguous boundary, preferably geographically separate areas should not be combined for reporting purposes although this might not be possible in some island areas

The areas must cover the whole of SW's region to ensure that the totals calculated in the final column of the table reconcile with information reported elsewhere in the annual return

SW must provide a brief commentary, identifying the location of each area, giving some background information on its nature, such as its topography and whether it is predominantly rural, semi rural or urban in character.

SW must explain the methods used to report costs for the areas, setting out clearly any allocation rules used. SW should reveal any assumptions made in arriving at costs or explanatory factor information.

Guidance to SW

SW should ensure that no input cell is left blank in any of the reported area columns. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG. Area columns that SW does not report on should be left blank.

Guidance to the Reporter

The Reporter should bring to WICS' attention any areas where SW has failed to explain changes to the reported information and comment on their significance. The Reporter must also comment on the reasonableness of any changes.

Section E

The Reporter should check that all material assumptions used by SW relating to information contained within this table have been disclosed. The Reporter should give an opinion as to the validity and consistency of these assumptions and whether they materially affect the information submitted. The Reporter should also comment on any sensitivity analysis that has been undertaken by SW relating to the application of these assumptions.

The Reporter should verify all explanatory factors and where he/she feels it necessary, pass comment on the information supplied by Scottish Water.

The Reporter is asked to confirm that the information submitted relating to the following areas is consistent with the same information supplied elsewhere in the Annual Return, is collected in a manner consistent with previous years' submissions and is derived in an appropriate manner:

- Population and connected properties
- Water volumes
- Length of mains
- Number of bursts
- Asset information.

The Reporter should confirm that the reported costs are consistent with those reported in Table E1.

**SECTION E
CHAPTER E7
WASTEWATER EXPLANATORY FACTORS –
SEWERAGE AND SEWAGE TREATMENT BY AREA**

Edition 7

SECTION E
CHAPTER E7
WASTEWATER EXPLANATORY FACTORS – SEWERAGE AND SEWAGE TREATMENT BY AREA

This table is used in wastewater service operating efficiency studies. It covers:

- Area data
- Sewerage data
- Pumping stations; and
- Sewage treatment works

SW should complete this table on a sub-regional basis for a number of areas (according to their size) following the criteria set out below:

- Areas must be based on the operating units by which SW's region is managed;
- Each area should form a single geographical unit with a contiguous boundary (i.e. geographically separated areas should not be combined for reporting purposes);
- The areas must together cover the whole of SW's region (to ensure that the totals calculated in the final column of table E7 reconcile with information elsewhere in the Annual Return).
- The number of areas on which SW reports should be between four and eight.

SW must provide a brief commentary, identifying the location of each area and giving some background information on its nature, such as its topography and whether it is predominantly rural or urban in character.

SW must explain the methods used to report costs for the areas, setting out clearly any allocation rules used. SW must reveal any assumptions made in arriving at costs or explanatory factor information.

Guidance to SW

SW should ensure that no input cell is left blank in any of the reported area columns. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG. Area columns that SW does not report on should be left blank.

Guidance to the Reporter

The Reporter should bring to WICS' attention any areas where SW has failed to explain changes to the reported information and comment on their

Section E

significance. The Reporter must also comment on the reasonableness of any changes.

The Reporter should check that all material assumptions used by SW relating to information contained within this table have been disclosed. The Reporter should give an opinion as to the validity and consistency of these assumptions and whether they materially affect the information submitted. The Reporter should also comment on any sensitivity analysis that has been undertaken by SW relating to the application of these assumptions.

The Reporter should verify all explanatory factors and where he/she feels it necessary, pass comment on the information supplied by SW.

The Reporter is asked to confirm that the information submitted relating to the following areas is consistent with the same information supplied elsewhere in the Annual Return, is collected in a manner consistent with previous years' submissions and is derived in an appropriate manner:

- Population and connected properties values
- Sewage volumes
- Length of sewers
- Asset information

The reporter should confirm that the reported costs are consistent with those reported in Table E2.

**SECTION E
CHAPTER E8**

**WASTEWATER EXPLANATORY FACTORS -
SEWAGE TREATMENT WORKS**

Edition 7

SECTION E
CHAPTER E8
WASTEWATER EXPLANATORY FACTORS –
SEWAGE TREATMENT WORKS

This table is used in wastewater service operating efficiency studies. It covers:

- Number of works
- Loads
- Compliance; and
- Costs

Column definitions

The columns in this table permit the classification of sewage treatment methods. These definitions are intended to agree (where they overlap) with those used in the Urban Waste Water Treatment Directive, i.e. primary treatment requires the removal of at least 50% of suspended solids from the sewage entering the works and a reduction of at least 20% in BOD. Innovative processes are to be classified according to equivalence of effluent quality.

Column 0: Septic Tanks: Include septic tanks owned by SW. Sludge from septic tanks to be included in loading to more complex works.

Column 1: Primary: Include works whose treatment methods are restricted to preliminary and primary treatment (screening, comminution, maceration, grit and detritus removal, pre-aeration and grease removal, storm tanks, plus primary sedimentation, including where assisted by the addition of chemicals e.g. Clariflow). It is expressed as a percentage to 2 decimal places.

Column 2: Secondary activated sludge: As primary plus works whose treatment methods include activated sludge (including diffused air aeration, coarse bubble aeration, mechanical aeration, oxygen injection, submerged filters) and other equivalent techniques including deep shaft process, extended aeration (single, double and triple ditches) and biological aerated filters as secondary treatment.

Column 3: Secondary biological: As primary, plus works whose treatment methods include rotating biological contactors and biological filtration (including conventional filtration, high rate filtration, alternating double filtration and double filtration), root zone treatment (where used as a secondary treatment stage).

Works with **Tertiary treatment stages** are divided into four categories:

Section E

Column 4: Tertiary A1: Works with a secondary activated sludge process whose treatment methods also include prolonged settlement in conventional lagoons or raft lagoons, irrigation over grassland, constructed wetlands, root zone treatment (where used as a tertiary stage), drum filters, microstrainers, slow sand filters, tertiary nitrifying filters, wedge wire clarifiers or Clariflow installed in humus tanks, where used as a tertiary treatment stage;

Column 5: Tertiary A2: Works with a secondary activated sludge process whose treatment methods also include rapid-gravity sand filters, moving bed filters, pressure filters, nutrient control using physico-chemical and biological methods, disinfection, hard COD and colour removal, where used as a tertiary treatment stage;

Column 6: Tertiary B1: Works with a secondary stage biological process whose treatment methods also include prolonged settlement in conventional lagoons or raft lagoons, irrigation over grassland, constructed wetlands, root zone treatment (where used as a tertiary stage), drum filters, microstrainers, slow sand filters, tertiary nitrifying filters, wedge wire clarifiers or Clariflow installed in humus tanks, where used as a tertiary treatment stage; and

Column 7: Tertiary B2: Works with a secondary biological process whose treatment methods also include rapid gravity sand filters, moving bed filters, pressure filters, nutrient control using physico-chemical and biological methods, disinfection, hard COD and colour removal, where used as a tertiary treatment stage.

Column 8: Preliminary via sea outfall: The load being discharged via sea outfall which receives preliminary treatment. It is expressed as a percentage to 2 decimal places.

Column 9: Screened via sea outfall: The load being discharged via sea outfall which receives simple screening. It is expressed as a percentage to 2 decimal places.

Column 10: Unscreened via sea outfall: The load being discharged via sea outfall which receives no treatment. It is expressed as a percentage to 2 decimal places.

Column 11: Total

Size Bands

For the purpose of this table, STW size is defined by the load received by the works, expressed as mass (i.e. kilograms [kg]) of BOD₅ per day. In calculating the size of a works, SW should assume that resident connected population contribute 60g BOD₅/head/day and add the trade effluent load (total COD) using a conversion factor of COD:BOD of 2:1.

No allowance should be made for non-resident population when classifying the size band of a works. SW should comment on whether this

Section E

is significant for an individual works, particularly where it might cause an increase in the size classification of the works.

SW must include non-resident population when reporting loads and costs.

Under this classification scheme, **large works** are defined as those with an average daily loading >1500kg BOD₅/day, and **small works** are those with an average loading ≤1500kg BOD₅/day.

For this table, the size bands are defined as:

Small works:

- | | | |
|---------------|--|--|
| • Size band 0 | ≤6kg BOD ₅ /day | (population equivalent: 0 – 100) |
| • Size band 1 | >6 but ≤15kg BOD ₅ /day | (population equivalent: 100 – 250) |
| • Size band 2 | >15 but ≤30kg BOD ₅ /day | (population equivalent: 250 – 500) |
| • Size band 3 | >30 but ≤120kg BOD ₅ /day | (population equivalent: 500 – 2000) |
| • Size band 4 | >120 but ≤600kg BOD ₅ /day | (population equivalent: 2000 – 10000) |
| • Size band 5 | >600 but ≤1500kg BOD ₅ /day | (population equivalent: 10000 – 25000) |

Large works:

- Size band 6 >1500kg BOD₅/day

These bands may be abbreviated to 15 –30 kg BOD₅/day (etc)

PPP Data should not be included in this table.

Scottish Water should comment on any works where there is doubt about which band or treatment type applies.

Loads:

The figures SW must report are the average daily loads received (in kg BOD₅/day) by treatment works and sea outfalls in each of the various categories for works size and treatment method. The average daily load for each STW should be calculated as the total annual load received (in kg BOD₅) by the STW, divided by 365. The figure to be reported in the table is the sum of the loads received by each STW or outfall in each particular category. Loads should be consistent with actual loads treated and therefore consistent with reported costs. If exclusions are made this will make processes appear more expensive. The convention outlined under the common definitions should be used to calculate the load for each STW. SW must include non-resident population when reporting loads.

Guidance to SW

SW should ensure that no input cell is left blank. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG.

Guidance to the Reporter

The Reporter should comment on the methodology adopted to estimate the various components within the table, their accuracy and SW's confidence grade assessment. The Reporter must also highlight any changes to these explanatory factors on which SW does not comment.

The Reporter should check that all material assumptions used by SW relating to information contained within this table have been disclosed. The Reporter should give an opinion as to the validity and consistency of these assumptions and whether they materially affect the information submitted. The Reporter should also comment on any sensitivity analysis that has been undertaken by SW relating to the application of these assumptions.

The Reporter is asked to confirm that the information submitted relating to the following areas is consistent with the same information supplied elsewhere in the Annual Return, is collected in a manner consistent with previous years' submissions and is derived in an appropriate manner:

- Numbers of sewage treatment works
- Sewage loads.

The Reporter should confirm that the reported costs are consistent with those reported in table E2.

**SECTION E
CHAPTER E9**

**LARGE SEWAGE TREATMENT WORKS
INFORMATION DATABASE**

SECTION E
CHAPTER E9
LARGE WORKS INFORMATION DATABASE

This table is used in wastewater service operating efficiency studies.

Large STWs are defined as those which receive an average loading in excess of 1500kg BOD₅/day (including effluent from both domestic and trade sources, but excluding any allowance for non-resident population). This is roughly equivalent to a population of 25000.

Exclude all sewage treatment works operated under PPP that meet the above load criteria.

Guidance to SW

SW must complete this table for each large sewage treatment works but should not complete it for individual sea outfalls.

The total number of large sewage treatment works reported in this table must equal the sum of columns 1 to 7 of Table E8. (There is available space for a maximum of 50 works).

SW should also explain how the costings have been obtained, reveal any assumptions made, and comment on any areas of uncertainty.

The costs reported in this table should be consistent with the sewage treatment costs reported in tables E2 and E8.

Works that have been commissioned during the report year should be clearly identified in the commentary along with the commissioning date of the works. This should reflect the period of the year that the reported costs reflect.

Works that have been upgraded during the report year should be clearly identified in the commentary along with an indication of the date the upgrade was complete.

SW must also explain how the costing have been obtained, reveal any assumptions made, and comment on any areas of uncertainty.

Do not include any costs in line E9.21 other than estimated sludge costs, if SW wishes to tell us about other costs not requested in the guidance please mention this in the accompanying commentary.

SW should ensure that no input cell is left blank in any of the reported large treatment work columns. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG. Large treatment work columns that SW does not report on should be left blank.

Guidance to the Reporter

The Reporter should:

- ensure that any assumptions made in reporting this information are revealed and comment on the accuracy of the information provided;
- comment on the methods used to record the costs of individual treatment works and on the methods used in allocating costs between treatment works;
- confirm that the reported costs are consistent with those reported in tables E2 and E8.
- comment on any works that are identified by SW as having no consent for either BOD or SS but which has one of these consents set so low (tight) that this means that the other consent would also be low (tight); and
- comment on any works identified as having particularly tight ammonia consents which involves treatment far in excess of that required to lower BOD or SS levels.

The Reporter is asked to confirm that the information submitted relating to the following areas is consistent with the same information supplied elsewhere in the Annual Return, is collected in a manner consistent with previous years' submissions and is derived in an appropriate manner:

- Numbers of sewage treatment works
- Sewage loads

**SECTION E
CHAPTER E10**

**WASTEWATER EXPLANATORY FACTORS
SLUDGE TREATMENT & DISPOSAL**

Edition 7

SECTION E
CHAPTER E10
WASTEWATER EXPLANATORY FACTORS – SLUDGE TREATMENT AND DISPOSAL

This table is used in wastewater service operating efficiency studies.

The disposal routes are classified as:

Farmland untreated:	Untreated sewage will have received no form of treatment designed to reduce its pathogen content. The sludge may be thickened and/or de-watered to facilitate transportation.
Farmland conventional:	“Conventionally treated” sewage sludge is that which has undergone processes designed to reduce the amount of E. Coli present by no less than 99% (a 2 log reduction).
Farmland advanced:	“Advanced” treated sewage is that which has undergone processes designed to reduce the amount of E. Coli present by no less than 99.9999% (a 6 log reduction).
Incineration:	Sewage sludge disposed of by incineration
Landfill:	Sewage sludge disposed to landfill sites.
Composted:	Sewage sludge disposed of by means of composting
Land reclamation:	Sewage sludge disposed of to land reclamation projects.
Other:	Any other form of sewage sludge disposal; for example, gasification, forestry, or silviculture.

Guidance to SW

SW should clearly explain any significant changes in sludge disposal routes, which have occurred since this information was last collected. SW must provide a clear explanation of any sludge disposal methods, which are classified as ‘other’ and the percentage disposed of by each method.

SW should also comment on the reasons for any significant increases in the costs associated with a particular disposal route. For the purpose of this table, significant changes are those that amount to more than 5% of total

Section E

sludge treatment and disposal costs, or more than 10% of any individual category.

PPP Data should not be included in this table.

SW should only report the amount of sludge treated during the report year. This may not be the same as the amount of sludge disposed in the year. SW should explain any large movements between stockpiled and disposed stock.

SW should ensure that no input cell is left blank. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG.

Guidance to the Reporter

The Reporter should comment on the methodology adopted to estimate the various components within the table, their accuracy and SW's confidence grade assessment. The Reporter must also highlight any changes to these explanatory factors on which SW does not comment.

The Reporter should check that all material assumptions used by SW relating to information contained within this table have been disclosed. The Reporter should give an opinion as to the validity and consistency of these assumptions and whether they materially affect the information submitted. The Reporter should also comment on any sensitivity analysis that has been undertaken by SW relating to the application of these assumptions.

The Reporter is asked to confirm that the information submitted relating to the following areas is consistent with the same information supplied elsewhere in the Annual Return, is collected in a manner consistent with previous years' submissions and is derived in an appropriate manner:

- Volume of sludge disposed of by each route
- Numbers of own sludge works and sludge centres.

The Reporter should confirm that the reported costs are consistent with those reported in table E2.

SECTION E
CHAPTER E11
MANAGEMENT AND GENERAL

SECTION E
CHAPTER E11
MANAGEMENT AND GENERAL

The purpose of this table is to collect management and general information by water and wastewater service. For lines 5-20, definitions are as Table H6.

Guidance to SW

SW should ensure that no input cell is left blank. If the information is unknown or not applicable, then a zero should be entered in the cell with an appropriate CG.

Guidance to the Reporter

The Reporter should confirm that the reported information is derived in a reasonable manner and should ensure that SW has disclosed any material assumptions relating to the allocation of employees. The Reporter should comment on whether these assumptions are reasonable.