



SCOTTISH WATER

WIC ANNUAL RETURN

Commentaries

June 2016

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A Tables Base Information

Table A1 Connected and Billed Properties

General Comments

Property numbers are for the report year as at 30 September 2015.

A confidence grade of A2 has been applied to the figures reported in Table A1 for household properties in the report year, and B4 for non-household properties. The confidence grade reflects the number of properties expected to be added at the Central Market Agency (CMA) via the gap sites project currently underway, in addition to the other known issues noted in this commentary. Further details are set out below.

Data Sources

The non-household figures have been sourced from settlement reports supplied by the CMA, which are loaded into Scottish Water's reconciliation datamart. The vacancy status, used to determine whether the property is 'Billed' or 'Void', has been sourced from the Market Data Set (MDS) files which are also published by the CMA along with the disaggregated settlement reports. This is consistent with last year's Annual Return.

The September 2015 2nd Reconciliation (R2), the latest available at the end of March 2016, along with the MDS file published at the same time were used to populate the A Tables.

The disaggregated settlement reports include all premises which are in settlement at the CMA. When new supply points are created, via either the New Connection or the Gap Site processes, there are a number of steps to be followed, starting with the supply point being requested by Scottish Water and finishing with it being accepted into charge by the Licensed Provider. Between these two points, the 'New' and 'Partial' supply points are held in the Central Systems but are not in settlement and therefore not reflected in the A Tables.

As of 1st April 2016, there were 415 water and 681 sewerage 'New' and 'Partial' supply points registered at the CMA. The current balance of 'New' and 'Partial' supply points consists of an on-going run-rate of new connections and gap sites.

A further 'gap sites' project is currently underway; Gap Site Phase 3. The CMA has undertaken a comparison between premises listed in the records of the Scottish Assessors Association (SAA) and premises registered in the market. The purpose of the exercise is to establish a cross-reference between the premises which are assessed and the premises registered in the market. Where no match can be obtained and the CMA consider the assessed property to be an eligible premise, it is considered to be a potential gap site for review by Scottish Water and Licensed Providers. Once complete, the cross referencing is made available in the CMA's Central Systems in the interests of data quality.

The CMA presented 55,239 potential gap sites for investigation by Scottish Water, the attrition rate is relatively high as many candidate properties do not have services from Scottish Water or are already in the market. Processing work commenced during 2014 and is projected to continue into 2017/18 with circa 30,000 gap sites expected to be tradable in the market by project completion. At the time of the September R2 settlement run, used to populate this year's Annual Return, 19,078 gap sites had been fully processed and either registered in the market or rejected for the reasons set out above. A further 10,605 gap sites were under investigation or undergoing processing work. In addition to the project work,

Scottish Water has been pro-actively identifying gap sites by carrying out a regular reconciliation of CMA data and SAA data to identify new assessed properties as potential gap sites. This has resulted in a further 3,328 gap sites being processed into the market. The combined total tradable at the time of the Annual Return was 10,439; this has led to some significant movements in this year’s data, with further impact expected on next year’s data.

Following on from the CMA’s work, Scottish Water has initiated a further project with the objectives of improving market data quality, completing the matching of Supply Points to SAA data and facilitating changes in charging policy planned by the Scottish Government. This project is being implemented by Scottish Water under the governance of the CMA board and is likely to have an impact on next year’s Annual Return.

Scottish Water has continued to monitor the occupancy status of properties. As of March 2016 13.4% of supply points were flagged as vacant, this is a 1% decrease from last year and a considerable reduction from 20.4% four years ago.

The current Gap Site project is affecting the vacancy rate as the proportion of gap sites which are genuinely vacant is slightly higher than for the customer base as a whole, so the addition of these gap sites to the market will increase the overall % of vacant properties in settlement. In addition, as part of their process of registering gap sites at the CMA, some Licensed Providers involved in the project process gap sites into settlement and then switch them to vacant at the CMA pending confirmation of the occupancy status of the property. This temporary switching to vacant contributes towards, and slightly skews, the occupancy status changes in the table below.

The table below shows that there has been a slight net movement of supply points from occupied to vacant over the last year.

Occupancy status changes in 12 months prior to Annual Return data cut	Occupied to Vacant	Vacant to Occupied	Net change in occupied SPIDs
2010	14,032	12,741	-1,291
2011	19,029	16,400	-2,629
2012	33,191	26,045	-7,146
2013	23,762	31,890	8,128
2014	21,698	20,257	-1,441
2015	25,819	22,728	-3,091

Following the correction that occurred in 2013 due to the introduction of the Vacancy Admin Scheme and the opening of the Vacant Site Incentive Scheme to non-registered Licensed Providers, this year’s movement is likely to be more reflective of actual market activity and will also reflect the fact that some gap sites will be vacant (all new Supply Points are created in the CMA systems flagged as occupied so any subsequent correction for vacant premises would be reflected in this table). However, Scottish Water continues to have concerns about Supply Points being incorrectly flagged as vacant with particular issues in some segments of the market and certain Licensed Providers. We continue to work with the relevant Licensed Providers to address these concerns but expect that the introduction of charging for vacant properties should help to address the issue. The Scottish Government is proposing to introduce water, sewerage and drainage charges for vacant premises; the outcome of its consultation is expected to be announced shortly with the changes currently expected to be take effect on 1 April 2017.

Forecast data for 2016/17

Our Business Plan 2015-21 assumes zero growth in non-household revenue before allowing for the impact of the Gap Site Phase 3 Project.

Forecast non-household data for the 2016/17 financial year has therefore been derived by adding the forecast new non-household premises which will have been processed into settlement by the Gap Site Phase 3 Project to the actuals for 2015/16. 8,822 gap sites are expected to be added to the market and be tradable by next Annual Return runtime. Analysis of project gap sites already in the market and information from project planning suggests 59% of these sites will be Surface Water Drainage Only; the remaining 41% will predominantly be measured sites (29%) with Water, Sewerage and Surface Water Drainage services, the remainder will be Unmeasured. The vacancy status of Surface Water Drainage only sites is higher due to the nature of the properties; this is 23%, with Measured and Unmeasured sites at 8.5% and 22% respectively, this is based on the current market position for the project sites.

Non-household connected properties

The number of connected non-household properties taking water services has increased by 1,920 to 152,069 as shown in the table below. Non-household properties taking sewerage services have similarly increased by 872 to 124,847.

Line ref.	Non-household connected properties	2014/15 Annual Return	2015/16 Annual Return	Variance
A1.8	Unmeasured non-household connected properties – water	28,737	28,132	-605
A1.9	Measured non-household connected properties - water	121,412	123,937	2,525
A1.8 + A1.9	Total connected non-household connected properties - water	150,149	152,069	1,920
A1.19	Unmeasured non-household connected properties – sewerage	26,465	24,958	-1,507
A1.20	Measured non-household connected properties - sewerage	97,510	99,889	2,379
A1.19 + A1.20	Total connected non-household connected properties – sewerage services	123,975	124,847	872

These increases are primarily due to gap site properties being processed into the market as a result of the current gap site project; Gaps 3.

The largest increases have been observed in measured properties as a higher proportion of gap sites connected for water and foul sewerage are measured and, unlike previous gaps projects, meters have been installed prior to the sites becoming tradable. This increase does not represent the total number of gap sites which have entered the market as they are offset by properties being deregistered from the market and properties where the meter has been removed. The latter is artificially inflated this year due to a systems issue at the CMA. Following their September 2015 software release it became apparent that when meters were exchanged, the new meter was not correctly entering charge in the CMA systems. A fix was deployed in late January which has addressed the issue but as the September R2 settlement report was issued prior to this fix, there are 750 metered properties missing from the figures reported in lines A1.4, A1.9 and 494 metered properties missing from the figures reported in lines A1.15 and A1.20.

Although there has been around 1,000 unmeasured gap sites added to the market over the annual return period, the overall number of unmeasured properties has decreased. This is due to deregistration of properties and the removal of the service element where charges are being wrongly applied for un-measurable services. This typically relates to multi-tenancy premises where it is identified that water and foul sewerage charges are already being applied to the entire premises on a metered basis. There is also some impact from properties moving from unmeasured to measured charges.

Other factors affecting the totals include new connections to the network, changes to services recorded at properties and premises changing their status, namely from Council Tax to business rated and in the reverse direction, for example holiday chalets or houses for short term lettings, leading to some churn in this sector.

Changes to Unmeasured Connected Properties

Removed

	Total	Dereg/ Pdisc	Remove Unm Service Element	Unmeasured to Measured
Water	2,026	1,269	41	716
Sewerage	2,817	718	1,415	684

Added

	Total	Gap Site/ New Conn	Unm Service Element Added	Measured to Unmeasured
Water	1,421	1043	121	257
Sewerage	1,310	936	145	229

Changes to Measured Connected Properties

Removed

	Total	Dereg/ Pdisc	Remove Metered Service Element	Measured to Unmeasured
Water	1,994	980	757	257
Sewerage	1,612	733	650	229

Added

	Total	Gaps & New Conn	Metered Service Element Added	Unmeasured to Measured
Water	4,519	3,773	30	716
Sewerage	3,991	3,199	108	684

Non-household void properties

The number of void non-household properties taking water and foul sewerage services in the table below has been derived by subtracting the reported billed properties from the connected properties. The number of void properties taking water services has increased by 144 in the report year and the number taking sewerage service has decreased by 200 in the report year.

Void properties	2014/15 Annual Return	2015/16 Annual Return	Variance
Unmeasured void properties – water	7,571	7,169	-402
Measured void properties – water	11,225	11,771	546
Total void properties – water	18,796	18,940	144
Unmeasured void properties – sewerage	7,163	6,526	-637
Measured void properties - sewerage	9,893	10,330	437
Total void properties - sewerage	17,056	16,856	-200

As set out above, the movements are mainly due to gap site properties being processed into the market and properties being deregistered from the market. Deregistrations are generally skewed towards unmeasured, void properties; duplicate Supply Points have been found to be more prevalent for unmeasured properties and sites are often flagged as vacant prior to being deregistered.

The 12 months prior to the September 2015 R2 settlement report used to populate this year's Annual Return saw a small net movement in Supply Points turning from occupied to vacant at the CMA. There continues to be issues with properties which are flagged as vacant at the CMA by the registered Licensed Provider but which Scottish Water is unable to agree are unoccupied. However, the position is greatly improved compared with previous years.

Non-Household billed properties and wholesale revenue

As shown in the table below, there has been an increase in billed properties, since last year's Annual Return; 1,776 for water and 1,072 for sewerage. As set out above, this is the net effect of Supply Points being processed into settlement, the deregistration of properties found to be incorrectly in the market (for example duplicates, domestic and demolished properties), disconnection activity and changes in occupancy status.

Line ref.	Water services – billed	2014/15 Annual Return	2015/16 Annual Return	Variance
A1.3 + A1.4	Total billed Non-household properties – water	131,353	133,129	1,776
A1.14 + A1.15	Total billed Non-household properties - sewerage	106,919	107,991	1,072

Movement of Properties between Void and Billed

	Void to Billed	Billed to Void
Water	4,241	4,650
Sewerage	3,947	4,262

A1.1 & 1.6 Household properties (connected and billed)

The data for these lines has been sourced directly from the WIC4 reports of September 2015 for report year.

The growth in billed properties (including exempt) was 12,281 (0.5%). The growth in connected properties of 16,511 (0.7%), differs to the growth in billed properties as we are now billing properties which were, in the past, connected but not billed.

Line ref.		2014/15 Annual Return	2015/16 Annual Return	Variance
A1.1	Unmeasured household billed properties - potable water (including exempt)	2,411,359	2,423,640	12,281
	Number of void properties	52,214	56,443	4,229
A1.6	Unmeasured household connected properties	2,463,572	2,480,083	16,511

A1.1-5 Billed Properties – Water

A1.2 Measured household billed properties

The number of measured households has decreased by 7 customers compared with 18 customers in the previous year. This reduction is principally due to customers determining that Council Tax based charging is more economic. The confidence grade of A2 is consistent with previous year. The forecast of 440 measured households for 2016-17, a reduction of 12 is based on the average movement over the last 2 years.

A1.3-4 Unmeasured and Measured non-household billed properties

The recorded number of billed non-household properties has increased by 1,776 (1.4%) to 133,129 compared with the 2014/15 Annual Return. This movement was due to the combined effect of changes in occupancy status at Supply Points, gap sites and new connections processed into settlement and deregistrations as set out below.

Line ref.	Water services - (connected and billed)	2014/15 Annual Return	2015/16 Annual Return	Variance
A1.3	Unmeasured non-household billed properties – potable water (including exempt)	21,166	20,963	-203
A1.4	Measured non-household billed properties - potable water	110,187	112,166	1,979
	Total billed Non-household properties	131,353	133,129	1,776

A1.6-11 Connected Properties – Water

A1.6 Unmeasured Household Connected Properties

This figure is the cumulative total of billed properties, exempt properties and void properties which is sourced directly from the WIC4 reports and therefore given a confidence grade of A2. For the current report year, the void property total is 56,443.

A1.7 Measured household connected properties

The number of Measured household connected properties is described in the commentary to line A1.2.

A1.8-9 Unmeasured and Measured non-household connected properties

The recorded number of connected non-household properties receiving water services has increased by 1,920 (1.3%) to 152,069 compared with the 2014/15 Annual Return. As set out earlier, this is primarily due to gap site properties being processed into the market as a result of the current gap site project. The number of unmeasured properties has decreased due to deregistration of Supply Points and properties moving to measured following meter installations.

Line ref.	Connected Properties	2014/15 Annual Return	2015/16 Annual Return	Variance
A1.8	Unmeasured non-household connected properties	28,737	28,132	-605
A1.9	Measured non-household connected properties	121,412	123,937	2,525
	Total connected Non-household properties	150,149	152,069	1,920

A1.11 Number of properties connected during the report year

The number of properties connected in the report year is 19,803 compared to the forecast figure of 15,200. The number of properties connected in this report year shows an increase to the previous year of 4,434. The forecast for 2016/17 reflects our Delivery Plan 2016 position.

The methodology for reporting the connected properties has changed since last year. The figures are now based on the number of infrastructure charges invoiced. The infrastructure charge is applicable to each new property connected. The confidence grade of A2 reflects that the figures come directly from the PeopleSoft financial system.

A1.12-16 Billed Properties – Foul Sewerage

A1.12 Unmeasured household billed properties

There has been growth of 11,522 unmeasured household billed properties for sewerage in the report year. The confidence grade remains unchanged at A2

A1.13 Measured household billed properties

A decrease of 2 measured household properties is directly linked to the reduction in Measured Household properties having a measured water service. The confidence grade of A2 has not altered.

A1.14-15 Unmeasured and Measured non-household billed properties

The recorded number of billed non-household properties receiving sewerage services has increased by 1,072 to 107,991 compared with the 2014/15 Annual Return. This movement was due to the combined effect of changes in occupancy status at Supply Points, gap sites and new connections processed into settlement and deregistration’s as set out above.

Line ref.	Billed Properties	2014/15 Annual Return	2015/16 Annual Return	Variance
A1.14	Unmeasured non-household billed properties – sewerage	19,302	18,432	-870
A1.15	Measured non-household billed properties – sewerage	87,617	89,559	1,942
	Total billed Non-household properties	106,919	107,991	1,072

A1.17-22 Connected Properties – Foul Sewerage

A1.17 Unmeasured Household Connected Properties

Please refer to the commentary for line A1.6. For the current report year, the void property total is 54,312. The number of voids is calculated by subtracting A1.12 from line A1.17.

A1.18 Measured Household Connected Properties

Please refer to the commentary for line A1.13.

The confidence grade of A2 has not altered

A1.19-20 Unmeasured and Measured Non-household connected properties

The recorded number of connected non-household properties taking sewerage services has increased by 872 (0.2%) to 124,847 compared with the 2014/15 Annual Return. As set out earlier, this is primarily due to gap site properties being processed into the market as a result of the current gap site project offset by the removal of unmeasured services (generally multi-tenancy premises where the water and foul sewerage charges are already being recovered through metered charges for the whole site) and deregistration of properties found to be incorrectly in the market (generally duplicates, domestic and demolished properties).

Line ref.	Connected Properties	2014/15 Annual Return	2015/16 Annual Return	Variance
A1.19	Unmeasured non-household connected properties	26,465	24,958	-1,507
A1.20	Measured non-household connected properties	97,510	99,889	2,379
	Total connected Non-household properties	123,975	124,847	872

A1.22 Number of properties connected during the report year

New properties connected have increased in this report year to 15,290, an increase of 825, a description is provided in the commentary to A1.11.

A1.23-29 Billed Properties – Surface Drainage

A1.23 Unmeasured Household Billed Properties (including exempts) not billed for Property Drainage

Due to our tariff structure, there are zero unmeasured billed properties not billed for property drainage.

A1.25-26 Measured and Unmeasured Billed Properties not billed for Property Drainage

The number of properties not billed for Property Drainage has remained fairly static this year. Movements in this category result from Property Drainage charges being added or removed at properties following requests to verify property drainage services. There is also some impact from gap sites and new connections entering the market, deregistrations and changes to occupancy status.

Line ref.	Properties not billed for Property Drainage	2014/15 Annual Return	2015/16 Annual Return	Variance
A1.25	Unmeasured non-household billed properties not billed for property drainage	1,293	1,306	13
A1.26	Measured non-household billed properties not billed for property drainage	1,918	1,892	-26
	Total billed Non-household properties	3,211	3,198	-13

A1.27 Household Billed Properties billed for Surface Drainage only

Due to our tariff structure, there are zero unmeasured billed properties not billed for surface drainage.

A1.28 Non-household properties billed for surface drainage only

The number of non-household properties billed for surface drainage only has increased by 4,225 to 17,693 since 2014/15. This increase is mainly due to gap sites being processed into the market from the current gap site project. The largest proportion of these sites are charged for “surface drainage only” due to being multi-tenancy premises where water and foul sewerage charges are applied to the entire premises on a metered basis. There are also some changes to services on the Supply Point from the correction of data at multi-tenancy premises, already in the market. In this scenario any incorrectly applied unmeasured water and foul sewerage charges on individual rated components of the premises are removed, leaving only surface drainage charges.

A1.30-34 Connected Properties – Surface Drainage

A1.31 Measure household connected properties

This line shows an increase in billed customers from 432 to 446.

A1.32-33 Non-household Connected Properties – Surface Drainage

The recorded number of connected non-household properties connected for surface drainage has increased by 7,424 (5.3%) to 147,463 compared with the 2014/15 Annual Return. As set out earlier, this mainly relates to gap sites being processed into the market. This number includes surface drainage only SPIDs as well as those with all services.

Line ref.	Properties connected for Surface Drainage	2014/15 Annual Return	2015/16 Annual Return	Variance
A1.32	Unmeasured non-household connected properties	46,408	51,629	5,221
A1.33	Measured non-household connected properties	93,631	95,834	2,203
	Total connected Non-household properties	140,039	147,463	7,424

A1.35 Number of properties connected during the report year

New properties connected have increased in this report year to 15,290, an increase of 825, a description is provided in the commentary to A1.11.

The confidence grade remains at A2.

A1.36 – Number of Billed Properties

The number of billed properties has increased from 1,328 reported in AR15 to 1,338. The increase in billed DPIDs could be to do with the number of Licensed Providers entering the market and highlighting to their customers were full Trade Effluent consents for site may be required.

The forecast number of billed properties is 1,309. This is the number of properties that existed at P06 that were also billed at P12.

The confidence grade for the report period and forecast is A2 and A3 respectively.

A1.37 – Connected Properties

The number of billed and connected properties has increased from 2,978 to 3,103. This reflects the fact that Scottish Water continues to issue an increasing proportion of “Letters of Authorisation” to small dischargers, rather than full consents.

The forecast number of billed and connected properties is 3,130.

Note, these figures are not affected by the inappropriate disconnection of SPIDs as the number is sourced from Scottish Water’s trade effluent system ICMS, which holds up to date information on all discharge points, regardless of whether they are billable or not.

A1.38 - Trade Effluent load receiving secondary treatment

The total BOD load receiving secondary treatment reported has increased from 15,639T to 16,192T/yr. Further analysis is required to identify the specific reason for this but the increase in number of billed trade effluent properties will have had an effect.

The forecast figure is down slightly to 16,144T mainly due to the number of billed DPIDs which Scottish Water is directing on to Letters of Authorisations as not deemed to be high risk discharges.

The confidence grade has been retained as B2 for the current and B4 for forecast years.

A1.39 - Trade Effluent load receiving secondary treatment

The reported total COD load receiving secondary treatment has increased from 35,115 to 35,515T/yr.

The forecast is 34,138T/yr. Again this has decreased in line with the number of billed DPIDs being moved on to Letters of Authorisations.

The confidence grade has been retained at B2 for the current and B4 for forecast years.

Table A2 Population, Volumes and Loads (Water)

A2.1 Population Water & Wastewater – Winter

Population data is based on National Records of Scotland (NRS) Population Projections for this year. Populations are derived from the published NRS 2012 based Population Projections.

A2.2 Population Water – Summer

To determine the increment of the summer population (above the winter population), business classifications from OSAPR Address Based Premium (ABP) were used to identify properties which offer accommodation to visitors and to which was applied the average bed space supplied by Visit Scotland. Yell (Yellow point address) data has been superseded by ABP within Scottish Water. In this way, a derived number for summer visitors of 138,406 was reached. This figure has reduced slightly from AR15.

No change in the confidence grade has occurred in the year.

A2.3 Population of unmeasured household properties

The population of unmeasured household properties connected to our networks has increased by 18,196 for water, reflecting the NRS 2012 projection. The confidence grade remains the same at A2.

A2.4 – Population of measured household properties

The population of measured household properties taking water services has decreased by 19, reflecting the decrease by 7 in the number of measured household properties reported in line A1.2. The confidence grade remains the same at A2.

Water Balance

A2.6 - 7 Water treated at own works to own customers & distribution input treated water

These are both reported identically because Scottish Water does not supply treated water to any party other than direct customers of Scottish Water through the water distribution networks.

Distribution Input (DI) has reduced from 1806.7 MI/d in AR15 to 1779.8 MI/d in AR16, principally due to reduced total leakage and a reduction in water delivered to non-household properties.

DI is being reported with a B2 confidence grade maintained from AR15.

A2.8 & A2.9 Bulk supply imports/exports

There are no bulk supply imports or bulk supply exports so these are again reported as 0 MI/d with a confidence grade of N.

A2.10 Net Distribution input treated water (water put into supply)

The net DI is the same as the DI (line A2.7) as there are no bulk supply imports or exports.

A2.11 Unmeasured household volume of water delivered (including losses)

The unmeasured household volume of water delivered has increased from 875.8 MI/d to 905.2 MI/d.

The rise in water delivered is due in part to an increase in the number of reported occupied household properties. The other reason for the increase is that in AR16 Scottish Water has updated its leakage reporting methodologies in relation to the amount of water used in domestic properties at night. This data improvement in relation to Household Night Use (HHNU) brings us in line with industry averages and comes on the back of extensive internal studies. This is a step towards using a Scottish Water specific HHNU value in the future, something which is deemed best practice.

The confidence grade for this line remains at B2, reflecting the continued confidence associated with the Scottish Water unmeasured household volume calculated using data reported from Scottish Water's Continuous Area Per Household Consumption (PHC) Monitor.

A2.12 Measured household volume of water delivered (including losses)

The measured household volume of water delivered has remained at 0.25 MI/d. The percentage of meter under-registration has remained at 4.1%, taken as a mean from the 2007/08, 2008/09 and 2009/10 supporting information documents for the OFWAT Service and Delivery report.

The confidence grade reported for this line remains at B2.

A2.13 & 14 Unmeasured & Measured non-household volume of water delivered (including Losses)

The calculation of non-household consumption follows the same method as used for the 2014/15 Annual Return. Consumption data calculated by the Central Market Agency (CMA) has been used to populate lines A2.13 and A2.14.

For each settlement run, the CMA provides an aggregated settlement report which is used by Scottish Water for billing purposes, and a disaggregated settlement report to enable reconciliation of wholesale charges by market participants. The data reported in lines A2.13 and A2.14 has been derived from these disaggregated settlement reports.

Table A2 has been populated using the latest available data at the time of reporting. For April to July 2015 inclusive, the R3 report has been used; for August 2015 to January 2016 the R2 report has been used; and for February and March 2016, the R1 report has been used.

A2.13 Unmeasured Non-Household Consumption

The reported unmeasured non-household volume of water delivered has decreased from 17.6 MI/d to 16.9 MI/d in the report year.

The consumption in line A2.13 relates to Supply Points which are unmetered and reflects assessed consumption derived from the Ratable Value.

The table below summarises this component:

	AR11	AR12	AR13	AR14	AR15	AR16
Occupied and exempt properties	47,451	20,216	20,730	22,313	21,176	20,963
Consumption (MI/d)	14.80	19.13	19.70	18.99	16.18	15.53
Underground supply pipe leakage l/prop/d	29.67	29.71	24.57	32.12	43.68	43.58
Underground supply pipe leakage (MI/d)	1.41	0.60	0.51	0.72	0.92	0.91
Water delivered (MI/d)	16.21	19.73	20.20	19.70	17.10	16.44
Void properties (vacant)	18,282	12,272	16,071	9,502	7,561	7,169
Internal plumbing losses (voids) l/prop/d	11.05	10.68	10.18	9.52	9.23	8.96
Underground supply pipe leakage (voids) l/prop/d	34.94	34.23	28.31	37.01	50.32	50.21
Internal plumbing losses (voids) (MI/d)	0.20	0.13	0.16	0.09	0.07	0.06
Underground supply pipe leakage (voids) (MI/d)	0.64	0.42	0.45	0.35	0.38	0.36
Water delivered to void (vacant) properties (MI/d)	0.84	0.55	0.62	0.44	0.45	0.42
Total line A2.13 unmeasured non-household volume (MI/d)	17.05	20.28	20.83	20.15	17.56	16.87

A2.14 Measured Non-Household Consumption

The consumption in line A2.14 reflects the actual consumption recorded at metered Supply Points plus an element for meter under registration (line A2.30). The metered volume has decreased from 367.9 MI/d to 364.4 MI/d in the current reporting year; the total water delivered for AR16 being 381.8 MI/d compared with 385.5 MI/d in AR15.

Derivation of Consumption from CMA Settlement Reports

Volumetric wholesale charges are applied at the CMA via the calculation of an Estimated Weighted Average (EWA) unit rate for each Supply Point at each settlement run. This is replaced with an Actual Weighted Average unit rate at Final Reconciliation.

In certain circumstances, generally as a result of issues with a meter reading or technical data, negative consumption can be calculated at meters. A related issue is the calculation of a EWA value of zero in certain circumstances relating to large negative historical consumption.

Consumption has been included in the A tables wherever it is a positive value at a Supply Point which is occupied. Where the calculated consumption is negative, this is substituted with an estimated consumption using the same methodology as is applied by the CMA in the absence of meter readings at a Supply Point. In the first instance, the Licensed Providers' Yearly Volume Estimate (YVE) is used if available. In the absence of an YVE value, the industry standard consumption for that meter size is used.

The A tables report consumption at occupied properties only, with the exception of the adjustment described below which is applied in relation to estimated consumption at properties wrongly flagged as vacant at the CMA.

Other Adjustments to Billed Consumption

A number of additional adjustments are also applied to convert billed consumption into delivered potable water.

There are a number of non-household customers receiving non-potable supplies. Consumption at these Supply Points is reported separately in line A2.26 and is therefore excluded from line A2.14.

The supply of shipping water at Queen's Dock in Aberdeen is not supplied via a Licensed Provider and not included in the CMA's settlement reports. The water supplied is potable and is therefore included in line A2.14.

Additional adjustments have been made at a small number of Supply Points where erroneous consumption has been identified, usually due to either a faulty meter or spurious meter readings. In both cases, the adjustment reflects the expected consumption following correction of the issue, which will include amendment of data at the CMA and - in some cases - repair or replacement of the meter. These adjustments are consistent with provisions and accruals made for revenue forecasting purposes.

A2.15 Water taken unbilled – legally

The volume reported as water taken legally unbilled (WTLU) has increased from 55.6 MI/d in 2014/15 to 62.8 MI/d in this report year. The confidence grading remains at C4 due to the nature and estimation of the volume reported. The methodology has remained the same for the majority of components.

A summary of changes to the individual components which make up WTLU is provided below:

- No significant change in fire service use (from 8.4 MI/d to 8.3 MI/d).
- No significant change in licensed standpipe use which remains at 17.0 MI/d.
- Decrease in Waste Water Treatment Works (WWTW) volumes from 15.6 MI/d to 14.2 MI/d.
- Scottish Water Offices and Depot has increased slightly to 0.2 MI/d.
- No significant change in Scottish Water jetting volumes which remain at 1.2 MI/d this year.
- No significant movement in unbilled field trough usage (from 11.2 MI/d to 11.1 MI/d).
- No significant change in water used for temporary building connections (from 1.6 MI/d to 1.4 MI/d).
- Unbilled water use by non-household users has increased from 0.5 MI/d to 9.5 MI/d. This majority of this increased volume is the result of one particular meter at a large site where extensive investigations have been undertaken throughout the year. The issue has very recently been resolved and should cause no further problems in AR17.

A2.16 Water taken unbilled – illegally

The volume of water reported as water taken illegally unbilled (WTIU) has shown no significant change, and remains at 1.7 MI/d.

The confidence grade has remained at C4 due to the nature and estimation of the volume reported. The data sources and methodology used to calculate this component have remained the same.

- Void property use – the volume has increased from 0.8 MI/d to 0.9 MI/d
- Hydrant misuse - the volume has decreased from 0.3 MI/d to 0.2 MI/d.
- Illegal standpipes - the volume has remained the same at 0.6 MI/d.

A2.17 Water take unbilled – Distribution System Operational Use (DSOU)

The volume of water reported as distribution system operational use (DSOU) has increased from 2.4 MI/d in 2014/15 to 3.2 MI/d in this reporting year. The confidence grade remains at C3 due to the nature and estimation of the volume reported. The changes in volumes can be explained as follows:

- Service Reservoir Cleaning – the volume has decreased from 0.6 MI/d to 0.4 MI/d.
- Mains Rehabilitation & New Mains - the volume used had increased from 0.01MI/d last year to 0.02 MI/d in AR16.
- Proactive Flushing & Swabbing - the volume of water has increased from 1.0 MI/d to 2.0 MI/d in this reporting year.
- Burst Repairs / Other Network Interruptions – the methodology applied is the same as the previous year; the volume has decreased from 0.4 MI/d to 0.3 MI/d.
- Reactive Water Quality Incidents – the volume has reduced from 0.3 MI/d to 0.2 MI/d as a result of Scottish Water receiving fewer WQ contacts.
- Planned Water Quality Sampling – the volume reported remains constant at 0.1 MI/d.

A2.18 Net Consumption (including supply pipe losses)

Net consumption has increased from 1,338.7 MI/d to 1,371.8 MI/d, and the confidence grade remains at B3. The increase in volume is mainly due to the increased volume of line A2.11 (Water Delivered to Unmeasured Households) as a result of the change in Household night use as outlined in section A2.11.

A2.19 Distribution losses (including trunk mains and reservoirs)

Distribution losses have reduced from 467.9 MI/d in AR15 to 408.0 MI/d in AR16. This is due to continuing leakage reduction activity and the adjustment to the estimate of household night consumption.

The confidence grade for this line remains B3.

A2.20 Customer supply pipe losses

Customer supply pipe losses (SPL) have increased from 122.4 MI/d in AR15 to 123.0 MI/d in AR16. As in AR15 SPL is calculated based on measurements taken sample properties which are metered at both ends of the supply pipe. The average SPL from these properties is then extrapolated up to SW level, corrected using the Hour Day Factor (HDF) and Average Zonal Night Pressure (AZNP) from the sample site, to the Scottish Water average.

The confidence grade remains the same at C3.

A2.21 Overall water balance

The confidence grade for the overall water balance remains at B3.

A2.22 Total Leakage (pre-MLE Adjustment)

The 'Total Leakage' by definition within the guidance documentation is considered by Scottish Water to include summing the DMA reported leakage, Service Reservoir leakage and Trunk Main leakage. The Total Leakage has reduced from 530.8 Mld in AR15 to 492.0 MI/d this year. A summary of each of the components making up these components is given below:

- DMA leakage has reduced from 473.7 MI/d in AR15 to 435.6 MI/d in the current reporting year. The coverage of reportable DMAs has decreased slightly from 89.6% in AR15 to 89.2%.

The change in HHNU outlined in section A2.11 has also been applied within the DMA leakage calculation, this along with continuing leakage reduction activity is the reason for the significant reduction in this component this year.

- Service Reservoir leakage has decreased from 9.8 MI/d in AR15 to 8.9 MI/d this year.
- Trunk Main leakage has increased from 47.2 MI/d in AR15 to 47.5 MI/d this year.

A2.23 Water Balance Closing Error

The Water Balance Closing Error is the difference between the top down and bottom up leakage figures expressed as a percentage of net DI. The closing error has decreased from 3.3% for AR15 to 2.2% in AR16.

A2.24 MLE Adjustment

The MLE adjustment for AR16 is 7.7 MI/d. The overall AR16 MLE calculation is associated with the appropriate MLE confidence grades (mid-point of WICS CGs), being assigned to water balance components in line with WICS own CGs.

The confidence grade for this line is B3.

A2.25 Total Leakage (post-MLE Adjustment)

Where the water balance closing error (A2.23) between top down and bottom up leakage is less than 5% of DI, this is accepted as an indicator of a robust water balance. In such circumstances, a MLE statistical calculation is then undertaken to determine the leakage figure to be reported. If the closing error is > 5% of DI, then the top down leakage figure will be reported.

In recent years the trend in leakage reduction is:

Report Year	Top Down Leakage (MI/d)	Bottom Up Leakage (MI/d)	MLE Leakage (MI/d)
AR07	1,004		
AR08	924		
AR09	868	776	816
AR10	783	705	738
AR11	757	693	699
AR12	661	617	629
AR13	617	561	575
AR14	608	553	566
AR15	590	531	544
AR16	531	492	500

The AR16 Maximum Likelihood Estimation (MLE) leakage is 499.6 MI/d and is reported with confidence grade B3. This is a reduction of 44.4 MI/d from the AR15 MLE leakage figure of 544 MI/d.

Water delivered – non-potable

A2.26 Volume of non-potable water delivered

Eleven non-household customers receive non-potable water supplies. In most cases there is also a separate potable supply to the premises. Several of these Supply Points are subject to Schedule 3 charging arrangements and all of the non-potable supplies are now metered.

The volume reported in line A2.26 reflects the consumption calculated by the CMA for the metered non-potable supplies in addition to a calculated consumption for one supply, Buckieburn Farm and Freshwater Research Unit. A battery powered logger was installed in April 2015 due to the difficulty of providing a power supply at the site and flow data is being collected periodically. This flow data has been used to extrapolate an annual consumption based on 11.57 ML/day, representing a significant improvement on the previous estimates. Investigations are on-going into the feasibility of alternative power supplies which would require less intervention and allow data to be transmitted real time rather than collected from site.

A2.27 Per Household consumption (unmeasured h/hold – excl s/pipe leakage)

The PHC figure for AR16 is 324.56 l/prop/day, compared with an AR15 reported figure of 314.3 l/prop/day. The confidence grade remains at B2.

A2.28 Per Household consumption (measured h/hold – excl s/pipe leakage)

The PHC figure for AR16 is 566.4 l/prop/day, compared with an AR15 reported figure of 490.51 l/prop/day. The confidence grade remains at B3.

A2.29 Meter under-registration (measured households) (included in water delivered)

Scottish Water has derived meter under-registration from the mean value between 2007/08 and 2009/10 from the supporting information document for the OFWAT Service and Delivery Supporting Information Reports and remains at 4.1%. When applied to the domestic metered volume the total measured household meter under-registration is 0.01 MI/d.

A2.30 Meter under-registration (measured non-households) (included in water delivered)

The 2007/8, 2008/09 and 2009/10 OFWAT 'Service and Delivery' supporting information documents have been used to derive a mean figure for non-household meter under-registration, which remains at 4.7%. The decrease in the meter under-registration volume from 17.2 MI/d to 17.0 MI/d is due to a decrease in the volume of water delivered to measured non-households.

Forecast data for 2016-17

The Forecast Report year +1 data provided in sections "Water Balance", "Leakage" and "Water Delivered- components" of the A2 table are based on a forecast reduction of 5 MI/d to the total leakage reported in line A2.25 this year. This reduction is reflected in reductions of 5 MI/d in lines A2.6, A2.7 and A2.19. For all other lines it has been assumed volumes will remain consistent with this year.

This volumetric reduction of 5 Mld is an estimate that comes from a forecast range. There is uncertainty attached to this estimate given factors such as weather can greatly affect this volume.

Table A3 Population, Volumes and Loads (Waste water)

A3.1-A3.4 Summary – Population

A3.1 Population Water & Waste – Winter

Population data is based on National Records for Scotland (NRS) Population Projections for this year. The winter population for waste water has increased by 18,352.

A3.2 Population Waste – Summer

To determine the increment of the summer population (above the winter population), business classifications from OSAPR Address Based Premium (ABP) were used to identify properties which offer accommodation to visitors and to which was applied the average bed space supplied by Visit Scotland. Yell (Yellow point address) data has been superseded by ABP within Scottish Water. A total of 97,508 summer population is included. This figure has reduced slightly from AR15.

The confidence grade remains the same at B2.

A3.3 Household Population connected to the wastewater service

The population of unmeasured household properties connected to our networks has increased by 17,770 for waste water reflecting the NRS 2012 dataset and growth over the year in connected dwellings.

A3.5-A3.11 Sewage – Volumes

A3.5 Unmeasured household volume (including exempt)

The unmeasured household volume has increased from 691.327 MI/d to 717.67 MI/d. The increase in the waste volume is a result of the increase in both the population, and the water unmeasured household per capita consumption reported in the year.

The confidence grade has remained at B3.

A3.6 Measured household volume

The measured household volume has increased from 0.024 MI/d to 0.054 MI/d in the report year. The number of households with a sewage service has increased compared with last year. The confidence grade remains at A2.

A3.7 Unmeasured non-household foul volume (including exempt)

The non-household foul volume remains the same as last year (14.4 MI/day).

The confidence grade remains at B3 as volumes are based on an estimate derived from the use of actual data from the installed FBM meters.

A3.8 Measured non-household foul volume

The total volume of foul waste from measured non-households has decreased from 141.03 MI/d to 138.51 MI/d. The confidence grade remains at B3.

A3.9 Trade Effluent Volume

The volume of trade effluent discharged has decreased from 76.066MI/d to 74.569MI/d. This figure is the volume associated with the DPIDs billed at P06. As noted, the CMA system now calculated the trade effluent volume. In order to do this, it is necessary for the Licensed Provider to submit meter readings, when this doesn't happen, the CMA system defaults to an "industry standard" volume which is very low. This may account for the apparently significant reduction. Volumes reported this year are taken from the latest available reconciliation run from the CMA for the reporting period. For DPIDs which haven't been billed by the CMA we have used in order of preference, volumes submitted by the Licensed Provider for the DPID for the reporting period (the CMA system accepts these volumes even though the DPID doesn't appear on reconciliation runs), or the process for calculating the Annual volume estimate sent to the CMA when the DPID is initially set up, which is 200 times the Consented daily volume.

The forecast is for this to decrease to 69.161MI/d. This is calculated by pro-rating of the current year's volume, based on the number of DPID still active in IP12.

The confidence grade has been revised to B4 for the current and forecast years. This is primarily due to the change in volume calculation method and the need for the system to be updated with meter readings by Licensed Providers in order for the volume calculations to be correct.

A3.10 Total Volume

The confidence grade remains at B3.

A3.11 Volume septic tank waste

The volume of septic tank waste has decreased from 48.270 MI to 34.148 MI over the reporting period.

As there has been no change to the methodology used the A3 confidence grade is unchanged from last year.

A3.12-A3.26 Sewage Load (BOD/yr)

The household load reported is based on household occupancy multiplied by 60g BOD per head per day in line with E table guidance.

The slight increase in unmeasured household load to 107,388 BOD t/yr is a result of an increase in household population.

The measured household load has increased due to more measured household customers.

There has been no change in methodology therefore the confidence grade remains the same.

A3.14-A3.15 Unmeasured and measured non-household load

The non-household load is derived as 300g BOD/m³ applied to the volumes of sewage reported in lines A3.7 and A3.8.

There has been no change in methodology therefore the confidence grade remains the same

A3.16 Trade effluent load

A decrease from 137.9t to 100.4t is reported in line A3.18. This illustrates a decrease in the number of private tanks being emptied as per planned emptying from the Scottish Water Gemini system over the previous year which is thus reflected in the decreased volume compared to 2014/15.

The reported septic tank loads (lines A3.18 and A3.19) are derived by applying an assumed load of 6,543g/m³ to the volumes removed from private and public septic tanks respectively.

In addition there has been a significant decrease in A3.20 other tanker load reporting line. This is due to a correction at Kinneil Kerse waste water treatment works from AR15, as some of the tanker loads were identified as going straight to sludge holding tanks rather than for treatment through the works. No significant change in the process has occurred and the confidence grades remain the same as the prior year.

A3.22 Average COD concentration

The average settled COD concentration used to calculate Trade Effluent charges continues to be 350mg/l.

No significant change has occurred and the confidence grade remains the same as the prior year.

A3.23 Average suspended solids concentration

The average suspended solids concentration used to calculate Trade Effluent charges continues to be 250mg/l.

No significant change has occurred and the confidence grade remains the same as the prior year.

A3.24 Equivalent population served (resident)

The figure reported in A3.24 is the total load divided by 60g/h/day. The equivalent population reported is 6,568,503 which is a small decrease from the 6,611,471 reported in the previous year. The confidence grade remains the same as prior years.

A3.25 Equivalent population served (resident) (numerical consents)

The figure reported in A3.25 is the total load divided by 60g/h/day, (for works that have a numerical consent). The equivalent population reported is 6,360,618 which is a decrease from the 6,460,500 reported in the previous year. The confidence grade remains the same as prior years.

A3.26 Total load receiving treatment through PPP treatment works

In the report year a reduction from 65,112t to 64,465t was observed, which is the result of reduced population equivalents for trade effluent sites receiving treatment through PPP treatment works.

There has been no change in methodology therefore the confidence grade remains the same.

The total BOD load discharged to the network has decreased from 17,865T to 17,018T as the number of billed DPIDs in IP12 also decreases.

The forecast figure also decreases to 16,970T.

The confidence grade has been revised to B4 for the current and forecast years. This is primarily due to the change in volume calculation method and the need for the systems to be updated with meter readings by Licensed Providers in order for the volume calculations to be correct.

A3.27-A3.29 Sewage Sludge Treatment and Disposal

The reported mass of waste water treatment sludge recycled was 119.403ttds, of which the majority came from the PPP/PFI works 99.28ttds. As with AR10 all the Scottish Water figures reported were taken direct from the Gemini system and recycling contractors' duty of care documentation. As in previous years we have retained the existing confidence grade.

For the Scottish Water sludge a slight decrease in the volume of enhanced treated sludge was noted, 1.67ttds. This was mainly attributable to de-watered sludge cake, that was further treated via lime stabilization the previous year, now being recycled via land restoration outlets during the reporting period.

Conventional sludge production showed a very small decrease by 0.47 ttds from the previous year. This is mainly associated with better digestion capability at all the conventionally treated sites, slightly decreased tanker imports into these sites and also improved de-watering of the cake material particularly at Stirling and Dalderse sludge treatment centres.

0.41ttds of untreated cake continues to be landfilled in the Shetland Islands.

D Tables – Activities

Table D5: Activities – Water Service

As these tables have not been submitted since 2010 we are reporting the opening balance on table D5 from the closing balance in our AR10 submission.

D5.1-11 Mains – Asset Balance

Lines D5.1-D5.11 report the water mains asset balance at March 2016 and the number of communication pipes replaced in the Report Year.

The closing balance for water mains on line D5.8 is 1,079.8km higher than the opening value reported on line D5.1, which is consistent with the 48,380.5km reported in line H3.4 in 2015/16.

D5.2 and D5.23 Mains renewed and mains relined

Lines D5.2 & D5.3 report mains replaced as part of our Mains Rehabilitation Programme, lengths replaced by reactive operations capital maintenance lines and lengths from named projects.

D5.4 Mains cleaned (total)

The 8,474.9km length reported has been derived from the length of flushing specified in WAMS work orders and through the capital programme.

D5.5 Distribution mains cleaned for quality

The reported length of 7,899.9km has been derived from routine flushing and swabbing codes, as these works are carried out for water quality reasons, plus any length reported against capital programme work packages.

D5.6 New mains

Line D5.6 is a combination of the lengths adopted for new developments and lengths delivered as part of our capital programme.

D5.7 Mains abandoned

The length of mains abandoned reported equals the length of mains renewed taken from D5.2 above less reduction in total length reported from the mains rehabilitation programme. It does not include any impact of improved information which we have included in D5.7a.

D5.7a Other changes

The length reported is the balancing value to bring the total changes in the year in line with the closing balance from our corporate GIS, reported in D5.8.

D5.8 Total length of mains (closing balance)

The total length of 48,380.5km is consistent with line H3.4.

D5.9 Lead communication pipes replaced – quality

We are reporting 29 lead communication pipes as replaced during the period 2010 to 2016 for quality purposes. This is a cumulative total based on the information available.

D5.10 Lead communication pipes replaced - maintenance or other

We are reporting 871 lead communication pipes as replaced or refurbished in this table to reflect the collective changes since these table were last submitted in AR10.

Going forward we will revert to reporting the year on year changes under these lines. We have reduced the confidence grade to B3 to reflect the need for a cumulative submission.

D5.11 Communication pipes replaced – other

A cumulative total of 9,624 communication pipes, of materials other than lead, has been replaced as part of both mains rehabilitation programme and through work undertaken as part of the capital maintenance programme since 2010. The confidence grade has been reduced to B3 to reflect the need for the addition across the intervening years.

Table D6 Activities – Waste water Service

As these tables have not been submitted since 2010 we are reporting the opening balance on this table from the closing balance in our AR10 submission.

D6.1-13 Critical/Non-Critical Sewers

The total reported length of critical sewer has decreased by 290.7km. The net length of all sewers recorded has decreased by 497.5km when compared to the 2009/10 inventory, which is the last time this table was submitted as part of the Annual Return.

D6.1 Total length of sewers - opening balance

The opening balance of 50,086.0km is taken from the AR10 line D6.13.

D6.2 Total length of critical sewer - opening balance

The opening balance is taken directly from AR10 line D6.8 which reflects the closing balance from the previous reporting year.

D6.3 New critical sewers added during the year

The total value of 472.6km new sewers added is reported from GIS.

D6.4 Critical sewers inspected by CCTV or man entry during the year

328.3km of inspections were recorded since the last submission in 2009/10. These are made up from man entry reported through WAMS, and CCTV sewer survey data.

D6.5 Critical sewers – renovated

No critical sewer renovations are reported.

D6.6 Critical sewers – replaced

No sewer replacements were reported from the infrastructure programme.

D6.7 Abandoned "critical" sewers

The total length of 40.0km is reported from our GIS due to operational activities.

D6.7a Other changes to "critical" sewers

This line reports the balance between the changes reported through the lines above to bring the total in line with the closing balance reported in D6.8.

D6.8 Total length of critical sewer (closing balance)

The total length of 11,181.5km is consistent with line H4.1.

D6.9 New "non-critical" sewers

Line D6.9 reports 1,179.6km of new sewers, taken from GIS.

D6.10 "Non-critical" sewers – renovated

26.4km of sewer renovations are reported as part of our sewer rehabilitation programme.

D6.11 "Non-critical" sewers – replaced

The 30.0km of sewer replacement reported for this line has been delivered through the sewer rehabilitation programme, reactive sewer rehabilitation projects for operational purposes, and through waste water quality projects.

D6.12 Abandoned "non-critical" sewers

The 41.1km of abandoned sewer is reported from GIS.

D6.12a Other changes to "non-critical" sewers

This line reports the balance between the changes reported through the lines above with the closing balance reported in D6.13.

D6.13 Total length of sewers – closing balance

The length of 49,588.5km is consistent with the total of lines H4.1 and H4.2.

Table D7 and D8 Capital Maintenance Expenditure

General comments

D7 reports capital maintenance investment on wastewater assets. In 2015/16, a total of £95.9m was allocated to capital maintenance waste water assets. D8 reports capital maintenance investment on water assets in the Report Year. Total expenditure on capital maintenance of water assets equated to £164.6m. The combined figure of £260.6m equates to the total spend on capital maintenance in 2015/16.

With the exception of Management and General, the investment is reported against operational regions.

Each project is assigned to one of the four operational regions. Where projects are flagged as Scottish Water Wide, they span more than one operational area and are split equally between the four operational areas.

The financial values reported in D7 and D8 are based on the percentage of capital maintenance allocated to projects.

D7.21 and D8.16 – Wastewater/Water Management and General

These lines include all support services. The non-operational assets have been allocated to either water or wastewater. Wastewater Management and General equated to £15.2m while Water accounted for £12.4m investment in 2015-16.

E Tables - Operating Costs and Efficiency

General Comments

Methodology

Cost analysis in E Tables (E4, E6, E7, E8, E9 and E10) was prepared using reports from Scottish Water's Activity Based Management (ABM) systems and is prepared on a historic cost basis excluding IFRS adjustments.

ABM provides analysis of the costs of key activities and processes, and links these to the factors that cause or drive our level of cost. This allows us to develop an understanding of the full cost of providing services, either internally within Scottish Water, or to our external customers.

Scottish Water has built an ABM toolkit founded upon consistent principles which apply across some key core systems and processes.

Activity Based Management data (financial and non-financial) is captured in various corporate systems.

Cost Allocation

Consistent with prior years, costs are captured or allocated in line with Regulatory Accounting Rules including modifications, agreed with the Commission, to reflect the Scottish retail market.

A more detailed commentary on ABM methodology and cost allocation is provided in support of Regulatory Accounts Tables M18 and is not repeated in this document.

Confidence Grades

Confidence grades of the operating cost lines on the E Tables remain consistent with 2014/15.

Direct costs are predominantly captured in the core corporate financial system, with labour costing feeds from the core corporate works management system. A high proportion of direct costs are captured by asset or zone, hence the A2 confidence grade. A smaller proportion of costs – mainly general and support costs – remains to be allocated to asset/zone by means other than direct capture.

In order to achieve A1 accuracy, Scottish Water will need to increase the level of direct cost capture further and build in more accurate and tested allocations of cost where direct cost capture does not provide splits by regulatory classification, e.g. single power meter at a dual function asset.

Table E3 and E3a PPP Project Analysis

Table Overview

Table E3 provides details of the 21 PPP wastewater treatment works that are managed under 9 separate PPP Concession agreements.

The following works form part of each scheme:

PPP Scheme	Wastewater Treatment Works
Highland	Fort William, Inverness
Tay	Hatton
Aberdeen	Fraserburgh, Peterhead, Nigg, Persley
Moray Coast	Lossiemouth, Buckie, Banff/Macduff
AVSE	Seafield, Newbridge, East Calder, Blackburn, Whitburn
Levenmouth	Levenmouth
Dalmuir	Dalmuir
Daldowie*	Daldowie sludge treatment centre
MSI	Meadowhead, Stevenston, Inverclyde

* Daldowie is a sludge treatment centre only.

E3.0-3 Project data

E3.1 Annual average resident connected population

The annual average resident connected population increased by 10,626 to 2,191,433. This reflects the increase in the general population reported in Table E7.1. The confidence grade remains at B3.

E3.2 Annual average non-resident connected population

The annual average non-resident connected population decreased by 1842 to 21,608. The confidence grade remains at B3 which is unchanged from the Annual Return last year.

E3.3 Population equivalent of total load received

The population equivalent of total load received decreased by 29,535 to 2,943,617. This drop is due to a reduction in the trade effluent load and reported as being received at these WWTW.

The population equivalent of total load received consists of the following constituents:

- Population
- Non-domestic load
- Tourist
- Trade effluent
- Imported public septic tanks
- Imported private septic tanks
- Imported WTW sludge
- Imported WWTW sludge
- Imported other loads
- Sludge return liquors

	Population	Non-domestic load	Tourist	Trade effluent	Imported public septic tanks
AR16	2,191,433	394,320	21,608	324,856	208
% of Total	74.45%	13.40%	0.73%	11.04%	0.01%
AR15	2,180,807	396,698	23,450	362,054	279
% of Total	73.35%	13.34%	0.79%	12.18%	0.01%
Difference	10,626	-2,378	-1,842	-37,198	-71

	Imported private septic tanks	Imported WTW sludge	Imported WWTW sludge	Imported other loads	Sludge return liquors	Total
AR16	1,051	0	8,422	0	1,720	2,943,618
% of Total	0.04%	0.00%	0.29%	0.00%	0.06%	
AR15	815	0	8,676	0	372	2,973,151
% of Total	0.03%	0.00%	0.29%	0.00%	0.01%	
Difference	236	0	-254	0	1,348	-29,533

E3.4-8 Scope of works

E3.4 Sewerage

Fort William	Includes 4 pumping stations and associated pumping mains.
Inverness	Includes 14 pumping stations and associated pumping mains/gravity sewer.
Hatton	Includes 16 pumping stations and associated pumping mains/gravity sewer.
Nigg	Includes 14 pumping stations and associated pumping mains/gravity sewer.
Persley	Includes a short section of sewer.
Peterhead	Includes a short section of sewer.
Fraserburgh	Includes a section of sewer and 1 pumping station.
Lossiemouth	Includes extensive pumping mains and 7 pumping stations.
Buckie	Includes extensive pumping mains and 12 pumping stations.
Banff/Macduff	Includes extensive pumping mains and 10 pumping stations.
Seafield	Includes the Esk valley trunk sewerage network, a number of storm water works with overflows and 7 pumping stations.
Newbridge	Includes a section of sewer, a storm water works with overflow and 2 pumping stations.
Whitburn	Includes 1 pumping station.
Levenmouth	Includes 8 pumping stations and associated rising mains and sewers.
Daldowie	Includes 1 pumping station and pumping main.
Inverclyde	Includes a short section of sewer.

E3.5 Sewage Treatment

Only Daldowie does not include sewage treatment as it is exclusively a sludge treatment centre.

E3.6 Sludge Treatment

Permanent sludge treatment facilities

Inverness	Indigenous sludge, imports from Fort William, plus Scottish Water imports
Hatton	Indigenous sludge plus Scottish Water imports
Nigg	Indigenous sludge, imports from Persley, Peterhead, Fraserburgh, plus Scottish Water imports
Lossiemouth	Indigenous sludge, imports from Buckie, Banff/Macduff, plus Scottish Water imports
Seafield	Indigenous sludge, occasional imports from Newbridge, East Calder, Blackburn, Whitburn, plus Scottish Water imports
Newbridge	Indigenous sludge, imports from East Calder, Blackburn, Whitburn, plus Scottish Water imports
Levenmouth	Indigenous sludge, plus Scottish Water imports
Daldowie	Receives sludge from Dalmuir and Scottish Water wastewater treatment works (Daldowie, Shieldhall, Paisley, Dalrnarnock and Erskine) by sludge pipeline, and from SW tankered imports
Meadowhead	Indigenous sludge, plus imports from Stevenston and Inverclyde

Some raw cake using thickening was disposed of from Persley, Peterhead and Fraserburgh but there is no sludge treatment on site.

Temporary sludge treatment facilities

The following sites do not have a permanent sludge treatment centre but temporary sludge treatment facilities were deployed on site.

Dalmuir	Temporary centrifuging deployed to limit the pass forward sludge to Daldowie STC to a maximum ferric content of 2 tonne/day
Daldowie (Shieldhall)	Temporary centrifuging deployed to alleviate storage constraints at Daldowie STC

E3.7 Terminal Pumping Station - means a pumping station that is the final point on the forward flow path from a sewerage network into a wastewater treatment works and may include both pumping of all/partial 'FFT' flows or stormwater flows to storm tanks and/or storm outfalls. The Terminal Pumping Station may form part of the sewerage network (i.e. be remote from the WwTW) or may be associated with a wastewater treatment works depending on actual location and power supply source. It is not a Combined Pumping Station or a Stormwater Pumping Station.

The following works include incoming terminal pumping stations as part of the PPP scheme. Maximum capacity (l/s) of terminal pumping station, excluding standby capacity, is given in brackets.

Fort William	Caol Transfer (118 l/s), Fort William WwTW(590 l/s).
Inverness	Allanfearn WwTW(50 l/s)This pumping station receives flows from a small part of the catchment.
Hatton	South Balnossie (1,563 l/s), West Haven (110 l/s), Inchcape Park(241 l/s).
Fraserburgh	Fraserburgh Inlet (195 l/s).
Lossiemouth	Duffus Junction (33 l/s), Moycroft (300 l/s).
Buckie	Nook (84 l/s), Shipyard (70l/s), Buckie WwTW (13 l/s).
Banff/Macduff	Craigfauld (552l/s), Banff/Macduff WwTW (222 l/s).
Seafield	A proportion of total flow is delivered via Marine Esplanade Terminal PS (1420 l/s).

Newbridge	A proportion of total flow is delivered via the Ratho Sewer Terminal PS (196 l/s).
Whitburn	A proportion of total flow is delivered via the Harrison Sewer Terminal PS (45 l/s).
Levenmouth	All flow delivered via terminal pumping stations; Methil M2 (125 l/s), Leven (212 l/s), Buckhaven (133 l/s), Levenmouth WwTW inlet FFT flows (1,650 l/s), Levenmouth WwTW inlet storm flows (2,347 l/s).

E3.8 Other - No plants in this category.

E3.9-14 Sewage treatment - effluent consent standard

E3.9-13 Effluent consent standards - Data obtained from the current SEPA consents.

Where effluent consent standard includes both CAR and UWWTD elements the stricter standard is given in the return.

Updated E3.9 Suspended solids consent as per the Meadowhead CAR license which was issued 12 May 2014.

E3.9 Suspended solids consent – all CAR.

E3.10 BOD consent – all UWWTD except Newbridge, East Calder, Blackburn and Whitburn

E3.11 COD consent – all UWWTD

E3.12 Ammonia consent – all CAR

At Dalmuir there has been an Improvement Plan and Variation Notice in place since May 2012. This Variation Notice, as varied, suspends the ammonia consent condition until 30 June 2016.

E3.13 Phosphate consent – all CAR,

At Newbridge, East Calder, Blackburn and Whitburn the consent is expressed as; 'Mean concentration of total phosphorous of any series of composite samples taken at regular but randomised intervals in any period of 12 months.

E3.14 Compliance with effluent consent standards – Compliance for BOD, COD, SS, Ammonia, and Phosphate is reported for each works, based on the total number of sample results and exceedances (upper and lower tier) for sanitary determinands (to the exclusion of other parameters that may be included in the SEPA consent). Where effluent consent standard includes both CAR and UWWTD standards both sets of samples are used for the calculation of compliance.

Percentage compliance is calculated as:

$$(1 - (\text{total number of failures} / \text{total number of samples})) \times 100$$

The SEPA Annual Compliance Report for period ending 31 December 2015 has been taken as the definitive data source, provided by our Regulator, and as such a Confidence Grade of A1 has been assigned.

Compliance calculated under this methodology may cause conflicts with Table C4 (C4.19) "Number of discharges confirmed as failing", which considers all SEPA consent parameters.

Failing site		Parameter	Exceedance (E) / Failure (F)	
Nigg	UWWTD	BOD, COD	E	18/02/2015
	UWWTD	COD	E	16/03/2015
	UWWTD	BOD, COD	E	09/04/2015
	UWWTD	COD	E	29/04/2015
	UWWTD	COD	E	16/06/2015
	UWWTD	COD	E	24/06/2015
	UWWTD	COD	E	14/07/2015
Persley	UWWTD	BOD, COD	F	27/04/2015
Lossiemouth	UWWTD	BOD, COD	E	11/11/2015
Blackburn	CAR	Ammonia	E	14/10/2015
Meadowhead	UWWTD	BOD	F	26/08/2015
	UWWTD	COD	E	26/08/2015

E3.15-21 Treatment works category

Information contained in these lines is extracted from the project agreements and is given a confidence grade of A1.

E3.15 Primary.

E3.16 Secondary activated sludge - Includes all plants except Blackburn.

E3.17 Secondary biological - Blackburn.

E3.18 Tertiary A1 (activated sludge process)

East Calder	Nitrifying filters.
Whitburn	Nitrifying filters.
Dalmuir	Nitrifying filters. (installed in 2015, under commission, not yet in the ownership or control of the PFI Company)

E3.19 Tertiary A2 (activated sludge process)

Inverness	UV disinfection.
Persley	UV disinfection.
Fraserburgh	UV disinfection.
Banff/Macduff	UV disinfection.
Seafield	UV disinfection, plus chemical (peracetic acid) contact tank used on an intermittent basis depending on flow.
Levenmouth	Densadeg lamella settlement tanks followed by UV disinfection.
Newbridge	Low head loss sand filters.
East Calder	Low head loss sand filters.
Whitburn	Low head loss sand filters.
Meadowhead	Biofors tertiary filter.

E3.20 Tertiary B1 - No plants in this category.

E3.21 Tertiary B2 (biological sludge process)

Blackburn	Low head loss sand filters.
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E3.22-32 Sewerage Data

Includes all sewerage (sewers, pumping stations, rising mains, outfalls and long sea outfalls)

Data sources: Concession Agreements, Operator O&M manuals, Operator asset inventories, SW GIS system, as built drawings, SEPA consents.

Pump capacity (kW) obtained from motor drive rating, not the pump duty point.

E3.22 Total length of sewer – Length of outfalls included in data unless noted otherwise in commentary. Where terminal pumping stations are located remote from a waste water treatment works, the length of rising main connecting the terminal pumping station and wastewater treatment works is included.

E3.23 Total length of critical sewer – All PPP sewers (including relief sewers, rising mains and CSO outfalls) are deemed to be critical.

E3.24 Number of pumping stations – includes stormwater, combined and terminal pumping stations. Interstage and final effluent pumping stations forming part of a wastewater treatment plant are not included.

E3.25 Capacity of pumping stations (m³/d) - includes stormwater, combined and terminal pumping stations. Maximum flow pumped forward per day. This excludes capacity of standby pumps.

E3.26 Capacity of pumping stations (kw) - includes stormwater and combined pumping stations, but not terminal pumping stations. Includes capacity of standby pumps.

E3.27 Number of combined pumping stations - Combined pumping station means a network waste water pumping station containing a pump or pumps transferring waste water and surface drainage within the downstream sewerage network. The transferred wastewater flow rate from the combined pumping station is the “FFT” rate, the generally accepted term used in design and SEPA consents. For the sake of clarity, where stormwater storage tank returns are pumped back into the sewerage system for onward flow, this shall be classed as a combined pumping station (as such flows become part of ‘FFT’). Terminal pumping stations are not included.

The following combined pumping stations are included:

Fort William	Blar Mhor, Caol No1
Inverness	Longman
Hatton	Riverside, KGV, Stannergate, West Ferry, Broughty Castle, Fort Street, Gray Street
Nigg	Downies, Portlethen Village, Newtonhill Clifftop, Portlethen South, Backies, Cowie (3), Slughead, Bridge of Muchalls, Cammachmore, Portlethen North
Lossiemouth	Burghead, Cummington, Hopeman, Moycroft
Buckie	Portgordon West, Portgordon East, Seatown, Cluny, Cullen East, Portknockie, Findochty, Portessie
Banff/Macduff	Whitehills, Whitehills Harbour, Inverboyndie, Scotstown, Castlehill Park, Union Road, Bankhead
Seafield	Wallyford Transfer, Wallyford SWW, Portobello SWW, Harelaw SWW, Dalkeith SWW, Mayshade SWW*
Newbridge	Broxburn SWW
Levenmouth	Methil M1

*Mayshade SWW: pumping station comprises a separate duty/standby pump set in two separate storm tanks. As only one duty pump operates at any one time (i.e. storm tank 1 emptied before commencing emptying of storm tank 2) these four pumps have been entered as a single combined pumping station on a 1 duty/3 standby basis.

E3.28 Capacity of combined pumping stations (m3/d) - Maximum flow pumped forward per day. This excludes capacity of standby pumps.

E3.29 Number of stormwater pumping stations - stormwater pumping station means a network wastewater pumping station containing a pump or pumps transferring wastewater, containing stormwater, to a stormwater storage tank or storm overflow. The stormwater pumping station transfers wastewater in excess of “FFT”, the generally accepted term used in design and SEPA consents. For the sake of clarity, the function of the stormwater pumping station is to prevent and/or limit surcharging of the upstream sewerage system.

The following stormwater pumping stations are included:

Inverness	Longman (2)
Hatton	Riverside, KGV, Stannergate, Westhaven, Broughty Castle, Inchcape Park
Nigg	Backies (2)
Lossiemouth	Moycroft
Buckie	Portessie
Banff/Macduff	Bankhead
Levenmouth	Leven, Roundall

E3.30 Capacity of stormwater pumping stations (m3/d) – Maximum flow pumped forward per day. This excludes capacity of standby pumps.

E3.31 Number of combined sewer overflows &

E3.32 Number of combined sewer overflows (screened) - CSOs that overflow within the sewerage system rather than to an outfall discharging direct to the environment are not included.

The following CSOs are included:

Fort William	Caol No1, Caol Transfer
Inverness	Longman
Hatton	Riverside, KGV, Stannergate, South Balmossie, Westhaven, Broughty Castle, Inchcape Park, Panmurefield/Balmossie Mill (2)
Nigg	Downies, Portlethen Village, Newtonhill Clifftop, Backies (2), Cowie, Portlethen North, Nigg
Fraserburgh	Fraserburgh Inlet (Watermill)
Lossiemouth	Burghead, Cummingston, Hopeman, Moycroft
Buckie	Portgordon West, Portgordon East, Seatown, Cluny, Nook, Cullen East, Portknockie, Findochty, Portessie, Shipyard
Banff/Macduff	Whitehills, Whitehills Harbour, Inverboyndie, Scotstown, Castlehill Park, Union Road, Bankhead, Craigfauld
Seafeld	Wallyford, Dalkeith*, Hardengreen, Harelaw, Haveral Wood, Middlemills, Newbattle, Newtongrange, Suttieslea*
Newbridge	Broxburn
Levenmouth	Buckhaven, Methil M2 CSO2**, Methil CSO1**, Leven, Roundall

*Seafeld - Dalkeith SWW consists of two separate screen overflows on two separate legs of the sewer which combine at the SWW. As each screened overflow is located on the same site and feeds one common storm water tank and outfall, this overflow has been recorded as a single CSO. Suttieslea: ‘Copa Sac’, (equivalent to 6 mm screen), provided on outfall from storm tank.

**Levenmouth - Methil CSO1 and Methil M2 CSO2 discharge into a common outfall.

E3.33-40 Sludge Treatment and Disposal Data - The quantities reported are the total sludge tonnages prior to the sludge treatment process. This is in accordance with the methodology used in England & Wales.

The information is based on PPP Company records of sludge disposed to the appropriate route.

Seafield sludge is mostly recycled to Industrial Crop. This is included in E3.40 Other.

Allanfearn sludge quantities disposed of by Scottish Water are included in Table E3 and the corresponding costs are included in Table E3a to be consistent with the rest of the PPP works.

TABLE E3a

This table provides operating costs for each scheme. As actual data is not available, all costs have been extracted from the relevant contractual financial models. Where the financial models do not split costs into specific categories the following has been assumed:

- Works with a Sludge Centre: 72 % Treatment Costs, 28% Sludge Costs
- All other works: 80% Treatment, 20% Sludge Costs. These sludge costs have been allocated to the appropriate sludge treatment centre where the sludge is treated, e.g. Fort William sludge costs appear against Inverness sludge centre.

The cost split was reviewed in detail and agreed with WIC auditor John Mills in May 2007 and has not been subject to further discussion since that date.

E3a.1, 8, 16 Estimated Direct Operating Cost

Estimated annual direct operating costs are based on the Concessionaire's financial model adjusted for actual inflation.

Where the model identified Rates and SEPA charges these have been deducted otherwise actual charges were deducted.

No adjustments were made at AVSE (for Rates), Daldowie (for Rates), and MSI (SEPA and Rates) as charges are paid by Scottish Water and are not included in the financial model. At Dalmuir Scottish Water pays the charges but amounts are also included in the model, therefore an adjustment to the model costs was made (Rates and SEPA charges included in the model are refunded to Scottish Water).

Actual costs are not known and could, in reality, vary considerably from the contractual financial model. A confidence grade of D6 has therefore been used. A confidence grade of A3 was allocated to the Dalmuir sludge treatment costs as these costs are available.

E3a.2, 9, 17 Rates paid by the PPP Contractor

These are based on the rateable value and poundage published on the government website (www.saa.gov.uk). Rates paid by Scottish Water are also included and are based on actual charges for the year (Dalmuir, Daldowie, MSI, AVSE).

Confidence grade for total rates paid for each site is A2, but because rates have to be split to take account of the sewerage, treatment and sludge elements a lower confidence grade has been applied.

	E3a.2	E3a.9	E3a.17	
Site	Sewerage	Sewage Treatment	Sludge Treatment	Comment on confidence grade
Fort William	N	B3	N	No sludge centre at works, sludge cost moved to Inverness
Inverness	N	B3	B3	Cost distribution is estimated
Hatton	N	B3	B3	Cost distribution is estimated, based on the Financial Model
Nigg	N	B3	B3	Cost distribution is estimated, based on the Financial Model
Persley	N	B3	N	No sludge centre at works, sludge cost moved to Nigg
Peterhead	N	B3	N	No sludge centre at works, sludge cost moved to Nigg
Fraserburgh	N	B3	N	No sludge centre at works, sludge cost moved to Nigg
Lossiemouth	N	B3	B3	Cost distribution is estimated, based on the Financial Model
Buckie	N	B3	N	No sludge centre at works, sludge cost moved to Lossiemouth
Banff/Macduff	N	B3	N	No sludge centre at works, sludge cost moved to Lossiemouth
Seafield	N	B3	B3	Cost distribution is estimated, based on the Financial Model
Newbridge	N	B3	B3	Cost distribution is estimated, based on the Financial Model
East Calder	N	B3	N	No sewerage and no sludge centre at works, sludge cost moved to Newbridge
Blackburn	N	B3	N	No sewerage and no sludge centre at works, sludge cost moved to Newbridge
Whitburn	N	B3	N	No sludge centre at works, sludge cost moved to Newbridge
Levenmouth	N	B3	B3	Cost distribution is estimated
Dalmuir	N	B3	N	No sewerage and no permanent sludge centre at works
Daldowie	N	N	A2	No sewage treatment at works
Meadowhead	N	B3	B3	Cost distribution is estimated
Stevenston	N	B3	N	No sewerage and no sludge centre at works, sludge cost moved to Meadowhead
Inverclyde	N	B3	N	No sludge centre at works, sludge cost moved to Meadowhead

E3a.3, 10, 18 SEPA charges paid by the PPP Contractor

Cost allocation is as per the relevant SEPA invoices for 15/16.

The following confidence grades have been assigned:

Site	E3a.3 Sewerage	E3a.10 Sewage Treatment	E3a.18 Sludge Treatment	Comment on confidence grade
Fort William	A2	A2	N	No sludge centre at works
Inverness	N	A2	A2	No separate cost for sewerage
Hatton	A2	A2	A2	
Nigg	A2	A2	A2	
Persley	N	A2	N	No separate cost for sewerage, no sludge centre at works
Peterhead	N	A2	N	No separate cost for sewerage, no sludge centre at works
Fraserburgh	N	A2	N	No separate cost for sewerage, no sludge centre at works
Lossiemouth	A2	A2	N	No subsistence charge included in invoices
Buckie	A2	A2	N	No sludge centre at works
Banff/Macduff	A2	A2	N	No sludge centre at works
Seafield	A2	A2	A2	
Newbridge	A2	A2	N	No WML charge included in invoice
East Calder	N	A2	N	No sewerage and no sludge centre at works
Blackburn	N	A2	N	No sewerage and no sludge centre at works
Whitburn	N	A2	N	No sewerage and no sludge centre at works
Levenmouth	A2	A2	A2	
Dalmuir	N	N	N	SEPA fees paid by SW
Daldowie	N	N	A2	Sludge treatment only
Meadowhead	N	N	A2	Only PPC fees paid by the PFI Co
Stevenston	N	N	N	SEPA fees paid by SW
Inverclyde	N	N	N	SEPA fees paid by SW

E3a.4, 11, 19, 23 Total Direct Cost

Total of E3a.1-3, 8-11 and 16-18. Confidence grade for Total direct cost is D6 as per E3a.1, 8 and 16 (Estimated direct operating cost) as this is the most significant element of Total direct cost. A confidence grade of A3 was allocated to the Dalmuir sludge treatment costs as these costs are available.

E3a.5, 12, 20 Scottish Water General and Support Expenditure

This includes costs such as advisors and legal costs, power, rent and insurance and the cost of the Scottish Water PPP department that administers the PPP projects which have been allocated to projects based on opex. Costs are as per the P&L. In addition, Scottish Water costs of sludge disposal from Inverness, inter-site sludge tankering and terminal pumping costs (where tankering or pumping has taken place between a Scottish Water works and a PFI site) and additional support costs have been included

Confidence grade for total charges is A1, but because Scottish Water PPP department costs have to be split across all sites and all charges have to be split to take account of the sewerage, treatment and sludge elements the following confidence grades have been assigned:

A confidence grade of A3 was allocated to the Dalmuir sludge treatment costs as these costs are available.

	E3a.5	E3a.12	E3a.20	Comment
Site	Sewerage	Sewage Treatment	Sludge Treatment	Comment on confidence grade
Fort William	CX	C4	N	Network cost very small, no sludge centre at works
Inverness	C4	C4	C4	
Hatton	C4	C4	C4	
Nigg	C4	C4	C4	
Persley	CX	C4	N	Network cost very small, no sludge centre at works
Peterhead	CX	C4	N	Network cost very small, no sludge centre at works
Fraserburgh	CX	C4	N	Network cost very small, no sludge centre at works
Lossiemouth	C4	C4	C4	
Buckie	C4	C4	N	No sludge centre at works
Banff/Macduff	C4	C4	N	No sludge centre at works
Seafield	C4	C4	C4	
Newbridge	CX	C4	C4	Network cost very small
East Calder	N	C4	N	No sewerage and no sludge centre at works
Blackburn	N	C4	N	No sewerage and no sludge centre at works
Whitburn	CX	C4	N	Network cost very small, no sludge centre at works
Levenmouth	C4	C4	C4	
Dalmuir	N	C4	A3	No sewerage
Daldowie	C4	N	C4	No sewage treatment at works
Meadowhead	N	C4	C4	No sewerage
Stevenston	N	C4	N	No sewerage and no sludge centre at works
Inverclyde	CX	C4	N	Network cost very small, no sludge centre at works

E3a.6, 13, 21 Scottish Water SEPA Charges

With the exception of Dalmuir and MSI, all standard SEPA charges are paid for by the PFI Company and are included in the tariff rates. At Nigg, Scottish Water meet the additional SEPA charges associated with 2 parameters as detailed in the contract. Costs are as per the P&L and reflect charges as invoiced by SEPA.

	E3a.6	E3a.13	E3a.21	
Site	Sewerage	Sewage Treatment	Sludge Treatment	Comment on confidence grade
Fort William	N	N	N	SEPA charges paid by PFI Co
Inverness	N	N	N	SEPA charges paid by PFI Co
Hatton	N	N	N	SEPA charges paid by PFI Co
Nigg	N	N	N	Treatment cost only (exotics) are included with E3a.26
Persley	N	N	N	SEPA charges paid by PFI Co
Peterhead	N	N	N	SEPA charges paid by PFI Co
Fraserburgh	N	N	N	SEPA charges paid by PFI Co
Lossiemouth	N	N	N	SEPA charges paid by PFI Co
Buckie	N	N	N	SEPA charges paid by PFI Co
Banff/Macduff	N	N	N	SEPA charges paid by PFI Co
Seafield	N	N	N	SEPA charges paid by PFI Co
Newbridge	N	N	N	SEPA charges paid by PFI Co
East Calder	N	N	N	SEPA charges paid by PFI Co
Blackburn	N	N	N	SEPA charges paid by PFI Co
Whitburn	N	N	N	SEPA charges paid by PFI Co
Levenmouth	N	N	N	SEPA charges paid by PFI Co
Dalmuir	N	A2	N	No sewerage, no charge for temporary sludge centre at works
Daldowie	N	N	N	SEPA charges paid by PFI Co
Meadowhead	N	A2	N	Treatment cost only, sludge costs are paid by the PFI Co
Stevenston	N	A2	N	No sewerage and no sludge centre at works
Inverclyde	BX	A2	N	No sludge centre at works

E3a.7, 14,22 Total sewerage cost, total sewage treatment cost, total sludge treatment costs and disposal cost - Confidence grade is D6 as per E3a.1, 8 and 16 (estimated direct operating Cost) as this is the most significant element of the cost.

A confidence grade of A3 was allocated to the Dalmuir sludge treatment and disposal costs as these costs are available.

E3a.15 Estimated terminal pumping cost – Reported costs are as per the costs incurred for the SW operated terminal pumping stations.

Where the terminal pumping station is part of the PPP scheme the costs are met by the Concessionaire and are included in the tariff rates and not reported as part of E3a.15.

E3a.24 Total Scottish Water cost - Total of Scottish Water General and Support Expenditure, and Scottish Water SEPA Charges (E3a.5-6, 12-13 and 20-21).

Confidence grade for total charges is A1, but because Scottish Water PPP department costs and internal recharges have to be split across all sites a confidence grade of C4 has been allocated.

Site	15/16 £m	14/15 £m	Variance £m	Costs lower than previous year	Costs higher than previous year
Ft William	0.013	0.009	0.004		15/16 includes higher other Scottish Water operating costs £0.004m
Inverness	0.615	0.661	-0.046	15/16 includes lower sludge tankering and disposal costs £0.076m, lower terminal pumping costs £0.003m, and lower ABM support costs £0.004m	15/16 includes higher legal/consultants fees £0.035m, and other Scottish Water operating costs £0.002m
Hatton	0.259	0.298	-0.039	15/16 includes lower sludge tankering costs £0.025m, lower terminal pumping costs £0.007m, and lower ABM support costs £0.008m,	15/16 includes higher other Scottish Water operating costs £0.001m,
Nigg	0.774	1.116	-0.342	15/16 includes lower other Scottish Water operating costs £0.006m, lower sludge tankering costs £0.361m, and lower ABM support costs £0.021m,	15/16 includes higher legal/consultants fees £0.046m
Persley	0.016	0.017	-0.001	15/16 includes lower ABM support costs £0.002m	15/16 includes higher other Scottish Water operating costs £0.001m
Peterhead	0.018	0.008	0.010		15/16 includes higher other Scottish Water operating costs £0.007m, and higher terminal pumping costs £0.003m
Fraserburgh	0.014	0.008	0.006		15/16 includes higher other Scottish Water operating costs £0.006m
Lossiemouth	0.133	0.257	-0.124	15/16 includes lower legal/consultants fees £0.006m, lower other Scottish Water operating costs £0.006m, lower sludge tankering costs £0.107m, and lower ABM support costs £0.005m	
Buckie	0.015	0.009	0.006		15/16 includes higher other Scottish Water operating costs £0.006m
Banff/Macduff	0.018	0.016	0.002	15/16 includes lower ABM support costs £0.001m	15/16 includes higher other Scottish Water operating costs £0.003m
Seafield	0.147	0.250	-0.103	15/16 includes lower other Scottish Water operating costs £0.009m, lower sludge tankering costs £0.082m, and lower ABM support costs £0.015m	15/16 includes higher consultants costs £0.003m
Newbridge	0.030	0.028	0.002	15/16 includes lower ABM support costs £0.001m	15/16 includes higher other Scottish Water operating costs £0.003m

Site	15/16 £m	14/15 £m	Variance £m	Costs lower than previous year	Costs higher than previous year
East Calder	0.015	0.010	0.005		15/16 includes higher other Scottish Water operating costs £0.005m
Blackburn	0.010	0.005	0.005		15/16 includes higher other Scottish Water operating costs £0.005m
Whitburn	0.012	0.007	0.005		15/16 includes higher other Scottish Water operating costs £0.005m
Levenmouth	0.326	0.373	-0.047	15/16 includes lower legal/consultants costs £0.020m, lower sludge tankering costs £0.001m, and lower ABM support costs £0.034m	15/16 includes higher other Scottish Water operating costs £0.008m
Dalmuir	1.148	0.875	0.273	15/16 includes lower legal/consultants costs £0.015m, and lower ABM support costs £0.005m	15/16 includes higher Scottish Water sludge disposal costs £0.257m, and higher other Scottish Water operating costs £0.036m
Daldowie	1.545	2.624	-1.079	15/16 includes lower Shieldhall centrifuging costs £0.391m, lower sludge tankering costs £0.656m, and lower ABM support costs £0.055m	15/16 includes higher other Scottish Water operating costs £0.023
Meadowhead	1.161	1.115	0.046	15/16 includes lower ABM support costs £0.004m	15/16 includes higher other Scottish Water operating costs £0.014m, and higher terminal pumping costs £0.036m
Stevenston	0.393	0.391	0.002	15/16 includes lower terminal pumping costs £0.005m, and lower ABM support costs £0.001m	15/16 includes higher other Scottish Water operating costs £0.008m
Inverclyde	0.450	0.401	0.049		15/16 includes higher other Scottish Water operating costs £0.004m, and higher terminal pumping costs £0.045m
TOTAL	7.112	8.478	-1.366		

E3a.25 Total operating cost - Confidence grade for Total operating cost is D6 as per E3a.23 Total direct cost, as this is the most significant element of Total operating cost.

E3a.26 Annual charge - The Annual charge is based on the service fees for the year, provisions and business rates (including rebates). Expenditure is taken from the P&L.

Confidence grades for each of the schemes is A1 other than the AVSE scheme which is B3 as the charges are based on the total AVSE flows as there is no separate tariff for each scheme.

Site	2015/16 £m	2014/15 £m	Variance £m	Costs lower than previous year	Costs higher than previous year
Ft William	4.400	4.103	0.297		15/16 higher flows/loads £0.229m, inflation £0.068m
Inverness	7.806	7.725	0.081	15/16 lower flows/loads £0.139m, higher release of accruals £0.036m	15/16 lower penalties £0.132m, inflation £0.124m
Hatton	22.006	21.943	0.063	15/16 lower flows £0.116m, higher release of accrual £0.014m	15/16 inflation £0.193m
Nigg	11.603	13.063	-1.460	15/16 higher penalties £2.563m	15/16 higher flows/loads £0.681m, inflation £0.072m, business rates rebate £0.008m, SEPA recharge from KWS £0.007m and electricity recharge from KWS £0.001m, lower release of accruals £0.334m
Persley	2.498	2.348	0.150	15/16 higher penalties £0.041m	15/16 higher flows/loads £0.064m, inflation £0.015m, business rates rebate £0.002m, lower release of accruals of £0.110m
Peterhead	2.015	1.944	0.071	15/16 higher penalties £0.016m	15/16 higher flows/loads £0.062m, inflation £0.012m, business rates rebate £0.001m, Carbon Reduction Commitment £0.001m, lower release of accruals of £0.011m
Fraserburgh	1.899	1.899	0.000	15/16 lower flows/loads £0.027m, higher release of accruals of £0.002m	15/16 inflation £0.011m, lower penalties £0.017m, business rates rebate £0.001m
Lossiemouth	4.332	4.613	-0.281	15/16 higher penalties £0.236m, lower flows £0.083m	15/16 inflation £0.022m, and lower release of accruals of £0.016m
Buckie	2.735	2.734	0.001	15/16 lower flows £0.013m	15/16 inflation £0.013m, and lower release of accruals £0.001m
Banff/Macduff	3.207	3.148	0.059		15/16 higher flows £0.039m, inflation £0.016m, and lower release of accruals £0.004m
Seafield	21.083	20.563	0.520	15/16 lower Seafield Odour Improvement project £0.042m, higher release of accruals £0.033m	15/16 based on 100% compliance with the contract plus inflation £0.159m, sludge rebate £0.440m, Carbon Reduction Commitment £0.096m, business rates £0.062m.
Newbridge	3.051	2.977	0.074		
East Calder	1.664	1.624	0.040		
Blackburn	0.832	0.812	0.020		
Whitburn	1.110	1.082	0.028		
Levenmouth	12.156	10.801	1.355	15/16 lower Odour Project chemical dosing	15/16 higher flows £0.986m, inflation £0.444m, Leven PS

Site	2015/16 £m	2014/15 £m	Variance £m	Costs lower than previous year	Costs higher than previous year
				£0.173m	fence £0.010m, lower release of accruals £0.088m
Dalmuir	13.046	13.274	-0.228	15/16 lower Compensation Event provision £1.750m	15/16 slightly higher flows £0.027m, inflation £0.028m, Annual operations compensation payment £0.215m, centrifuge project £0.156m, Capital Project opex £0.460m, business rates £0.016m, lower release of accruals £0.620m
Daldowie	19.702	19.055	0.647	15/16 lower sludge volumes £0.038m, necessary change costs £0.004m, 14/15 included chromium and Commonwealth Games costs £0.163m, additional works £0.011m	15/16 inflation £0.156m, business rates £0.008m, claim excess ragging £0.070m, lower release of accrual £0.629m
Meadowhead	7.819	8.301	-0.482	15/16 lower Landfill Tax & Gas cost £0.115m, trader necessary change £0.005m, additional works £0.792m	15/16 inflation £0.057, PADR2 £0.250m, Sludge Odour Sampling Project £0.065m, lower release of accruals £0.058m
Stevenston	3.709	3.422	0.287	15/16 lower trader necessary change £0.004m	15/16 higher flows £0.225m, inflation £0.018m, higher business rates £0.007m, lower release of accruals £0.041m
Inverclyde	3.674	4.133	-0.459	14/15 included additional works £0.520m	15/16 higher flows £0.038, inflation £0.020m, higher business rates £0.003m
TOTAL	150.347	149.564	0.783		

E3a.27 Public sector capital equivalent values – values were derived from the base model incorporated in a report to the Transport and Environment Committee on 21 June 2001 adjusted for inflation. At Daldowie the PPP cost was used in the absence of a PSCE value, similarly for Levenmouth and AVSE the values have been taken from the 01/02 WIC return.

E3a.28 Contract period - The period quoted is the Contract Period as defined in the Contract.

E3a.29 Contract end date - Contract end date is as defined in the Contract.

Table E4 Water Explanatory Factors - Resources and Treatment

E4.1-5 Source Types

The number of sources has decreased by 3 to 279. This reduction is due to a number of previously reported sources supplying water treatment works (WTW) which were closed during 2015/16 (5 sources). However, there were also 2 new sources added (2 additional direct spring sources at Blairnamarrow WTW). Details are provided in the table below:

	2014/15 No. of sources	282
Reductions	Source or WTW closures	5
Additions	New sources (data cleansing)	2
	2015/16 No. of sources	279

Distribution input (DI) reduced by 26.881 MI/d to 1779.793 MI/d.

Changes to DI this year are detailed in the table below:

Source Type	2014/15	2015/16	Net Change
	<i>MI/d</i>		
Impounding reservoirs	1,342.682	1,326.036	-16.646
Lochs	19.367	19.550	0.183
River and burn abstractions	374.031	367.764	-6.267
Boreholes	70.595	66.443	-4.152
Total	1,806.674	1,779.793	-26.881

As in previous years, we have completed columns 110–140 by assuming that, where multiple sources feed a WTW, the total average daily output comes only from the primary source. The primary source is therefore allocated 100% of the DI and all other sources are allocated 0%.

The confidence grade for the number of sources remains at B2 (as per previous year). The overall reliability band remains as B. Although the asset information now held in Ellipse is sufficient to enable the number of sources to be reliably determined, it is recognised that there is still work to be done in establishing a robust process for this data being maintained as business as usual. Currently it is reliant on annual checks and bulk updates. The confidence grade for columns 110-140 (the average daily output of these sources) remains at B2 (in line with reported confidence for table A2).

E4.6-7 Bulk water exports and imports

We do not have any raw water exports or imports. Accordingly, a confidence grade of A1 has been entered for these lines.

E4.8-12 Proportion of own source output

There were only minor changes to the source type proportions of total distribution input (DI) this year.

E4.13 Peak demand - peak to average ratio

This line reports the ratio A: B where –

A = the average daily volume put into supply in the peak seven day period in the reporting year, and

B = the average daily volume put into supply in the reporting year

The peak week occurred in the week ending 28 February 2016 (1844.769MI/d), resulting in a Peak to Average Ratio of 1.037 for 2015-16 (1.047 in 2014-15). The second highest week was in March 2016 (factor equal to 1.030). The annual profile for 2015-16 was similar to that for the previous year.

No changes were made to the process or methodology used to report this line. As the figure is based on weekly reported distribution input (DI), the confidence grade assigned to it is based on the confidence grade of the DI in the peak year. The confidence grade is therefore B2, the same as that reported for the DI data in Table A2.

E4.14 Average pumping head – resources and treatment

The reported Average Pumping head this year is 27.9, an increase of 0.2m from the previous year.

As limited flow and pressure data is available, the methodology used was to update last year's figures by calculating the change to the "Work Done" (m⁴) at regional level based on the proportional (regional) change to DI. This figure was then divided by the Regional DI to obtain the Regional Pumping Head, which was then aggregated.

Although the definitions include a requirement to report on interstage pumping for this line, we have again not included any such information due to insufficient data in this area.

Pumping head data

We note that due to data limitations our confidence grade has remained at C4. We currently have a limited dataset from which we extrapolate an overall pumping head value across the whole of Scottish Water. We acknowledge that further work is required to improve the quality of this data.

E4.20-26 Water Treatment Works by Process Type

The number of water treatment works (WTW) decreased by 5 to 244; the total distribution input (DI) reduced by 26.88 MI/d to 1,779.79 MI/d.

The process for completing Table E is the same as for previous years. Changes to the numbers of WTW by process type have arisen as a result of operational changes this year.

Note: Table E reports all WTW that provided water into supply at any time during the year.

The confidence grade for the number of WTW remains at B2. The confidence grade for total DI remains at B3

E4.28-39 Water Treatment Works by Size Band

Changes to the number of water treatment works (WTW) in use and proportions (%) of total distribution input (DI) this year are broken down by WTW size band in the table below:

Size Band	2014/15		2015/16		Net Change	
	No.	% ⁽¹⁾	No.	%	No.	%
<= 1 MI/d	134	1.11	132	1.11	-2	0.01
>1, <= 2.5 MI/d	27	1.36	25	1.37	-2	0.06
>2.5, <= 5 MI/d	25	3.02	23	2.66	-2	-0.48
>5, <= 10 MI/d	17	4.62	18	4.76	1	0.12
>10, <= 25 MI/d	19	10.64	19	10.60	0	-0.16
>25, <= 50 MI/d	12	14.65	12	14.72	0	-0.55
>50, <= 100 MI/d	9	23.27	9	23.26	0	0.47
>100, <= 175 MI/d	4	21.15	4	21.63	0	1.05
>175 MI/d	2	20.17	2	19.88	0	-0.53
Total	249		244		-5	

The confidence grade for proportion of total DI remains at C3.

E4.15-39 Functional costs by operational area, process and size band

Water Resources & Treatment E4.19

	Total
Functional expenditure:	£m
2015/16	61.464
2014/15	56.046
Variance	(5.418)
Landfill Tax movement	5.549
Variance excluding Landfill tax credit in 2014/15	0.131

Water resources and treatment costs increased by £5.4m (9.7%) from 2014/15. This is analysed as follows:

- £1.3m (8.9%) increase in employment costs mainly due to a pay progression increase of £0.3m; and increased asset operating costs to maintain OPA of £0.8m;
- £1.1m (9.5%) increase in power costs due to the impact of higher tariffs (£0.5m); an increase in consumption of £0.1m and £0.2m of new operating costs associated with capital investment.
- £4.6m increase in hired and contracted costs mainly due to the release of a landfill tax accrual (£5.5m) in 2014-15. This movement has been partially offset by a reduction in sludge disposal costs (0.9m).

- £0.3m (14.3%) increase in other direct costs due mainly to an increase in retained costs associated with operational incidents; and
- £1.7m (11.5%) decrease in general and support costs mainly due to the impact of the 2014 pension fund triennial valuation of £2.3m. This has been partially offset by increases in support employment costs (£0.1m) and an increase in restructure related costs (£0.5m).

Water resources and treatment costs analysed by region:

	North	East	South	West	Direct	General and Support	Total
	£m	£m	£m	£m	£m	£m	£m
Functional expenditure:							
2015/16	11.021	12.847	9.445	14.696	48.009	13.455	61.464
2014/15	9.867	11.273	7.543	12.168	40.851	15.195	56.046
Variance	(1.154)	(1.574)	(1.902)	(2.528)	(7.158)	+1.740	(5.418)
Landfill Tax movement	0.300	1.294	1.377	2.578	5.549	0.000	5.549
Variance excluding Landfill tax credit in 2014/15	(0.854)	(0.280)	(0.525)	0.050	(1.609)	1.740	0.131

Changes to the numbers of WTW by process type and size band have arisen as a result of operational changes and process re-classifications in WTW during 2015/16. Re-stating 2014/15 figures on like-for-like basis shows the following variations:

Analysis of water resources and treatment costs by process type:

	2015/16	2014/15	Variance
	£m	£m	£m
Process Type			
SD : Simple Disinfection	1.575	1.657	+0.082
W1 : SD plus simple physical or chemical treatment	0.254	0.162	(0.092)
W2 : Single stage complex physical or chemical treatment	9.744	8.320	(1.424)
W3 : Multiple stage complex treatment, excluding W4	32.257	26.787	(5.470)
W4 : Very high cost treatment Process	4.179	3.908	(0.271)
Direct	48.009	40.834	(7.175)
General and Support	13.455	15.195	+1.740
Total	61.464	56.029	(5.435)
Landfill tax movement			+5.549
Variance excluding Landfill tax credit in 2014/15			+0.114

Cost by process type have moved in line with overall cost increases explained above with the exception of Simple Disinfection, which reflects reductions in power costs at both Kinnesswood WTW (due to a kerosene contamination at the borehole source), and Knowhead WTW (due to a pump failure).

Analysis of water resources and treatment costs by size band:

	2015/16	2014/15	Variance
Size band	£m	£m	£m
<=1 MI/d	6.592	6.203	(0.389)
>1 to <=2.5 MI/d	3.198	2.517	(0.681)
>2.5 to <=5 MI/d	3.915	3.598	(0.317)
>5 to <=10 MI/d	4.940	4.514	(0.426)
>10 to <=25 MI/d	7.859	6.544	(1.315)
>25 to <=50 MI/d	7.541	6.189	(1.352)
>50 to <=100 MI/d	5.791	4.730	(1.061)
>100 to <=175 MI/d	4.570	3.255	(1.315)
>175 MI/d	3.603	3.284	(0.319)
Direct	48.009	40.834	(7.175)
General and Support	13.455	15.195	+1.740
Total	61.464	56.029	(5.435)
Landfill tax movement			+5.549
Variance excluding Landfill tax credit in 2014/15			+0.114

Costs by process type have increased in line with overall cost increases explained above with the exception of the following size band:

- >100 to <=175 MI/d – The release of a landfill tax accrual from 2014-15 has had a proportionally greater impact on the Hire and Contracted costs at both Carron Valley WTW and Bradan WTW.

Costs which are directly attributable to abstraction and treatment are charged to the specific asset cost code in PeopleSoft, either via direct charging, Ellipse timesheets or work orders. Of the £48.0m total direct resource and treatment costs, £40.7m of costs or 84.7% have been directly charged to assets in our corporate costing system.

Other costs have been allocated to Water Resources and Treatment through ABM support activity allocation, e.g. stores based on number of issues, IT applications based on number of users, etc. Therefore, support costs are allocated on a resource consumed basis. However, many of these costs are not specific to an asset; they are generally attributable to an employee. It follows that the majority of these support costs should be allocated to the activities the employees have been completing.

Confidence Grades – Confidence grades on Table E4 are consistent with grades in the general E table commentary and remain consistent with 2014/15.

Table E6 Water Distribution

E6.1 Annual average resident connected population

The annual average resident connected population increased by 18,812 to 5,210,614. This figure is consistent with the figure reported in A2.1.

The methodology used to allocate population to 4 operational regions remains unchanged from the method used last year.

The confidence grade remains at A2.

E6.2 Total connected properties

The total number of connected properties has increased by 18,424 to 2,632,604. This figure is consistent with the figure reported in A1.10.

The methodology used to allocate properties to 4 operational regions remains unchanged from the method used last year.

The confidence grade remains at B4, in-line with table line A1.10.

E6.3 Volume of water delivered to households

The volume of water delivered to households has increased by 29.4 MI/d to 905.4 MI/d. This figure is consistent with the sum of the figures reported in A2.11 and A2.12.

The volume was calculated by operational region using the property figures calculated for line E6.2, multiplied by the regional specific Per Household Consumption figure.

In AR16 Scottish Water has updated its leakage reporting methodologies in relation to the amount of water used in domestic properties at night. This data improvement in relation to Household Night Use (HHNU) brings us in line with industry averages and comes on the back of extensive internal studies. This is a step towards using a Scottish Water specific HHNU value in the future, something which is deemed best practice.

The confidence grade remains at B2.

E6.4 Volume of water delivered to non-households

The volume of water reported as delivered to non-households decreased by 4.3 MI/d to 398.7 MI/d. This figure is consistent with the sum of the figures reported in A2.13 and A2.14.

Measured and unmeasured non-household volumes are allocated to water operational areas and summed to regional level; the method remains unchanged from last year.

The confidence grade remains unchanged at B4.

E6.5 Area

There has been no change to the operational regions in the last year and the area has remained the same at 79,799km². The confidence grade remains at A1, reflecting the fact that the operational region boundaries are taken directly from the corporate GIS.

E6.6 Number of supply zones

The number of supply zones has reduced by 1 to 289.

This was calculated using the same methodology as last year and matches the number reported to the Drinking Water Quality Regulator.

Changes in zones topology are tracked and recorded by the Water Quality Regulation Zone procedure and have a full audit trail.

The confidence grade remains at A1.

E6.12-16 Potable mains

There were no significant changes in the figures of Bands 1-4 or total length of mains, with a total increase in length of 123.4 km (0.3%).

The inventory is reported from our corporate GIS, where the diameter field is populated to 99.3% leaving 330km (0.7%) of mains not populated with diameter. The default value used to infill is DN150, falling into Band 1, which is the smallest band.

Bands coincide with nominal size bands for newer materials, which are based on external diameter and use size bands from previous returns.

The confidence grades remain at B2.

E6.17 Total length of unlined iron mains

The total length of unlined iron mains decreased by 350.9 km (3%) to 12354.4km.

The report relies on population of the material and lining attributes in the inventory. 46km of GIS potable main was populated by the Infill material model and is defaulted to unlined spun iron, constituting 0.10% of reported value.

The information available for pipe lining is not fully complete, with 40.58% of the lined ferrous inventory having null or unknown lining attribute. GIS lining attribute signified as bitumen and unknown for cast, grey and spun iron is included as unlined iron main. Ductile iron is assumed to be cement lined where the lining material is unknown and totals 2037.66km.

E6.18 Total length of mains >320mm diameter

The total length of mains greater than 300mm diameter decreased by 1.26km to 3910.55km.

The inventory is reported from our corporate GIS. The diameter field is populated for effectively all these mains, with less than 0.02% not populated with a diameter. The confidence grade remains at B2.

E6.19 Mains bursts

The number of water mains bursts has decreased by 961 to 6,784 over the report year representing an overall 12.4% reduction on last year.

Generally over the first eight months there was a decrease in the number of bursts compared to last year by around 9%. A further decrease in the number of bursts was evident throughout the last 4 months of the report year of around 23%.

The trend over the last six years has been a decrease in the number of customer reported bursts, with a 35% decrease overall. In 2014/15 there was a 6.7% increase in the number of non-customer-reported bursts compared to the previous year. There has been an increase of 3.8% in the report year compared to last year.

The annual number of non-customer-reported bursts for the reporting year is 24% of the total number of bursts, leaving 76% being customer reported bursts. This split shows a 4% increase in the number of customer reported bursts compared to last year.

The confidence grade remains at B3.

E6.20 Leakage level

The reported top-down leakage level has decreased by 59.3 MI/d from 590.3 MI/d in 2014/15 to 531.0 MI/d in 2015/16.

The confidence grade remains at B3.

We also report leakage in terms of Maximum Likelihood Estimation (MLE) leakage in A.2 and G.3 tables. Our MLE reported leakage for 2015/16 is 499.6 MI/d which is a 44.4 MI/d reduction on our reported MLE leakage of 544.0 MI/d for 2014/15.

E6.21 Low pressure

The overall number of low pressure properties has increased from 415 to 417. Targeted investment and operational changes have improved pressure to 3 properties during 2015-16. No properties have been recorded as being added to the register due to investigation work, through customer complaints, or due to better information. No properties have been removed due to better information. 5 properties were added as a result of asset deterioration. There have not been any properties added within the report year due to operational changes.

The confidence grade remains at B2.

2014/15 Properties reported for low pressure	415
Removed due to operational improvements	-3
Removed due to asset improvements	0
Removed due to better information	0
Added due to asset deterioration	+5
Added due to better information	0
Added due to operational changes	0
2015/16 Properties reported for low pressure	417

E6.22-25 Pumping Stations

E6.22 Total number of pumping stations

The total number of pumping stations decreased by 3 to 601. The table below shows the change in the number of stations recorded in the corporate asset inventory as being operational during this year:

2014/15 No. of pumping stations	604
Stations removed	-8
Stations added	5
2015/16 No. of pumping stations	601

The confidence grade remains at B2.

E6.23 Total capacity of pumping stations

The total capacity of pumping stations has decreased by 59,027 to 2,378,560 m³/d.

The change recorded this year is attributed to the decrease in asset numbers and improved data quality. The increase in data available has resulted in an decrease in the capacity reported.

The confidence grade has remained at C4, reflecting the level of extrapolation used to derive the reported figures.

E6.24 Total capacity of booster pumping stations

The total capacity of booster pumping stations decreased by 1,214 kW to 41,751 kW.

Our methodology for determining the design capacity (in kW) of stations remains unchanged. The confidence grade remains at C3.

E6.25 Average pumping head

Average pumping head is reported as 29.97m this year. This reflects an decrease of -2.05m on the previous year.

As limited new flow and pressure data is available, the methodology used was to update last year's figures by calculating the change to the "Work Done" (m⁴) at regional level based on the proportional change to DI. This figure was then divided by the Regional DI to obtain the Regional Pumping Head, which was then aggregated.

Pumping head data

We note that due to data limitations our confidence grade has remained at C4. We currently have a limited dataset from which we extrapolate an overall pumping head value across the whole of Scottish Water. We acknowledge that further work is required to improve the quality of this data.

E6.26-27 Service Reservoirs

The total number of service reservoirs decreased by 13 to 1,335. During the year 6 new service reservoirs were commissioned. The changes are generally the result of operational revisions across the network.

The total capacity of service reservoirs increased by 49.57 MI to 3988.3 MI. This is mainly due to improvement in data quality and the result of operational revisions across the network. The confidence grades remain at B2.

E6.28-29 Water Towers

The total number of water towers remains unchanged at 19. The total capacity of water towers remains unchanged at 29.7 MI. The confidence grades remain at B2.

E6.7-11 Functional Costs

Water Distribution E6.11

	Total
	£m
Functional expenditure:	
2015/16	61.271
2014/15	63.297
Variance	+2.026

Water distribution costs decreased by £2.0m (3.2%), from 2014/15. This is analysed as follows:

- £0.5m (2.3%) decrease in employment costs mainly due to reduced network leakage costs (£0.2m) and service reservoir cleaning costs (£0.2m);
- £0.4m (4.5%) increase in power costs mainly due to the impact of higher tariffs;
- £1.2m (11.1%) decrease in hired and contracted services mainly due to an increase in capital work (£0.7m) and a reduction in network leakage detection costs (£0.3m);
- £1.9m (85.4%) increase in 'other direct costs' mainly due to an increase in retained costs associated with operational incidents (£1.9m); and
- £2.7m (15.8%) decrease in general and support costs mainly due to the impact of the 2014 pension fund triennial valuation of £2.7m. This has been partially offset by an increase in restructure related costs (£0.5m).

Water distribution costs are analysed by region:

	North	East	South	West	Total	General and Support	Total
	£m	£m	£m	£m	£m	£m	£m
Functional expenditure:							
2015/16	5.839	11.853	13.799	14.961	46.452	14.819	61.271
2014/15	5.763	12.412	11.621	15.902	45.698	17.599	63.297
Variance	(0.076)	+0.559	(2.178)	+0.941	(0.754)	+2.780	+2.026

Confidence Grades – Confidence grades on Table E6 are consistent with grades in the general E table commentary and remain consistent with 2014/15. Scottish Water has slightly lower confidence levels on Network cost analysis than treatment cost analysis. This is due to lower levels of direct labour capture on Networks.

Table E7 Wastewater Explanatory Factors - Sewerage & Sewage treatment

E7.1 Annual average resident connected population

The annual average resident connected population increased by 17,959 to 4,904,115.

The increase from AR15 is primarily due to an increase in the population and more accurate address data. The confidence grade remains at B2.

E7.2 Annual average non-resident connected population

The annual average non-resident connected population increased by 2089 to 72,548.

As with previous years, tourist population has been determined on the basis of average bed spaces multiplied by an average occupancy factor. Average occupancy rates are taken from Visit Scotland's latest available Tourism in Scotland report.

The confidence grade remains at C4.

E7.3 Volume of sewage collected (daily average)

The daily average volume of sewage collected increased by 381.4 MI/d to 3,384.6 MI/d.

The average daily volume collected has been calculated as the flow which arrives in a public sewer (of any type) from any source e.g. rainfall, infiltration, domestic use, industrial use, tidal flows and connected watercourses. The approach used is the same as that in previous years and has been applied consistently across the country. It uses data sets for rainfall, connected properties and sewered areas consistent with the wastewater element of the Annual Return.

The flow has been calculated in two parts; the dry weather flow and the storm flow.

Dry Weather Flow: A factor has been established that relates the number of connected properties to the amount of sewer flow in periods without rainfall. To establish this figure a number of recordings of flows with a known connected population were analysed to establish a range of flow per connected population. These factors were averaged and applied to all sewered areas to establish a total dry weather flow contribution per sewered area.

Storm Flow: The storm flow element was calculated by using existing sewer models to establish a relationship between rainfall depth, area of the sewered area and the amount of run-off generated. A selection of models was used and an average value of run-off per millimetre rainfall per hectare of sewered area was established. This was then applied to each sewered area to establish a total storm flow contribution per sewered area.

The total sewage collected was calculated (dry weather plus storm flows) for each sewered area and a total for each operational region calculated.

This figure includes all flows that are collected by the wastewater network but does not necessarily relate to the flows that arrive at treatment sites as a proportion of flows will be discharged via overflows and other flows collected by storm sewers will be discharged without treatment.

The confidence grade remains at C4.

E7.4 Total connected properties

The total number of connected properties figure increased by 16,404 to 2,505,712.

This rise reflects the increase in properties connected to the wastewater network as reported in A1.21.

E7.5 Area of sewerage district

The area of sewerage district remains unchanged at 79,799km².

E7.6 Drained area

The drained area has increased slightly by 10.0 km² to 1,927 km². This rise is as a result of on-going verification of the sewered areas in our corporate GIS. The confidence grade remains at A2 as the data comes directly from our corporate system, GIS.

E7.7 Annual precipitation

During the year annual precipitation was 1,482 mm, which is 253 mm higher than last year.

E7.8 Total length of sewer

The total length of sewer decreased by 620km to 50,890km.

The information comprises our GIS inventory (34,343km) and a statistical calculation of lateral sewer length from unit length connections by dwelling (16,548km). The AR15 lateral sewer length was overestimated due to an error in the number of connected properties. This has been corrected in AR16 and is the reason for the reduction in total sewer length. The confidence grade remains at C4.

E7.9 Total length of lateral sewer

The total length of lateral sewer has decreased by 888km to 16,548km. The calculation used is based on the number of properties connected to the waste water network (connected properties).

The AR15 lateral sewer length was overestimated due to an error in the number of connected properties. This has been corrected in AR16 and is the reason for the reduction in total lateral sewer length.

These are supported by a proximity calculation which allocates the Ordnance Survey Address Point References (OSAPRs) located within 70m of the wastewater network. This is the same methodology as used in previous returns. CACI house type proportions in each operational region are also used as part of this calculation.

New data from our corporate GIS, on properties having sewers within 3 metres, has refined the lateral sewer calculation, increasing the rise in inventory due to the refinement of the number of properties connected to the wastewater network.

Unit lengths of lateral sewer are derived from a 2004 survey and checked for validity in 2014 by a GIS desktop study. The figures use dwellings/premises numbers rather than Ordnance Survey property seed points. The statistical sample size is not, however, large enough for the allocation of a high confidence grade.

E7.10 Length of combined sewer

The length of combined sewer has increased by 45.6km to 17,495Km.

As modern sewerage systems are constructed with separate foul and storm sewers for new builds, any rise in the length of combined sewer is the result of legacy record data being added to the corporate system, and any new outfall pipe construction.

The figure is derived from a record inventory with known gaps in asset stock; however sewer usage is populated to high levels. No off-inventory allowance is made for combined sewers.

The confidence grade remains at B2.

E7.11 Length of separate stormwater sewer

The length of separate storm sewer increased by 110km to 8,294km. This increase is due to the construction of separate storm sewers for new build developments.

E7.12 Length of sewer >1,000mm diameter

The length of sewer greater than 1000mm diameter increased by 63km to 848km. The continuous asset recording from our capital investment programme is resulting in a consistent rise in this figure.

An improved infill methodology used in AR16 has resulted in less default diameters (225mm) being used. This has meant greater accuracy and an overall increase in other size bands.

The confidence grade remains at B2.

E7.13 Length of critical sewer

The length of critical sewer has increased by 297km to 11,182km.

The figure is derived from analysis of a record inventory with known gaps in asset stock.

The classification of critical sewers uses the WRc methodology for asset size, material, depth and proximity to particular features.

An improved infill methodology used in AR16 has resulted in less default diameters (225mm), materials & depths being used. This has meant greater accuracy and an overall increase in sewers able to be assessed correctly for criticality.

The confidence grade remains at B3.

E7.14 Sewer Collapses

The number of reported sewer collapses has decreased to 1,663 due to the application of the methodology over the reporting year. Now that all work orders raised have a fault code applied to better reflect the actual cause of the issue in the sewer network and the action undertaken to resolve it, a more robust number of reported collapses is available.

E7.15-19 Sewerage Costs

Sewerage E7.19

	Total
Functional expenditure:	£m
2015/16	41.767
2014/15	<u>41.132</u>
Variance	<u>(0.635)</u>

Sewerage costs increased by £0.6m (1.5%) from 2014/15. This is analysed as follows:

- £0.7m (5.4%) increase in employment costs due to a pay progression increase of £0.3m and increased WWPS operating costs of £0.9m, partly offset by decreased sewer repair and inspection costs of £0.3m and lower levels of complaints and incidents £0.1m;
- £1.3m (17.7%) increase in power costs due to the impact of higher tariffs (£0.4m) and increased pumping costs associated with high rainfall of £0.7m;
- £0.9m (27.9%) increase in hired and contracted costs due to an increase in contracted labour for the operation of CSOs;
- £0.2m (34.2%) decrease in 'other direct costs' mainly due to a decrease in retained costs associated with operational incidents of £0.3m; and
- £2.0m (15.7%) decrease in general and support costs mainly due to the impact of the 2014 pension fund triennial valuation (£2.1m).

Sewerage costs are analysed by region:

	North	East	South	West	Direct	General and Support	Total
Functional expenditure:	£m	£m	£m	£m	£m	£m	£m
2015/16	3.683	8.147	7.608	11.226	30.664	11.103	41.767
2014/15	3.372	7.523	7.280	9.792	27.967	13.165	41.132
Variance	<u>(0.311)</u>	<u>(0.624)</u>	<u>(0.328)</u>	<u>(1.434)</u>	<u>(2.697)</u>	<u>+2.062</u>	<u>(0.635)</u>

E7.20-29 Pumping Stations

E7.20 Total number of pumping stations

The total number of pumping stations has increased by 4 to 2,205.

A pumping station is defined as an individual site (i.e. not an individual pump). It includes foul, combined and stormwater pumping stations situated at treatment works but excludes inter-stage pumping. The confidence grade remains at B3.

E7.21 Total capacity of pumping stations (m3/d)

The total capacity of pumping stations increased by 227,705 m3/d to 13,298,204 m3/d.

This figure is based on extrapolated corporate data as not all stations have a design capacity in m3/d recorded in the corporate asset inventory. The confidence grade remains at C4, reflecting the level of extrapolation used to derive the figure.

E7.22 Total capacity of pumping stations (kW)

The total capacity of pumping stations increased by 1,229 kW to 82,014 kW.

Our methodology for determining the design capacity (in kW) of stations is the same as last year, therefore the increase is due to revisions to the assets. The confidence grade remains at C4.

E7.23 Average pumping head

The average pumping head is reported at 28.87m this year representing an decrease of 3.23m compared with the previous year. This figure has been calculated by additions, deletions and corrections to the pumping data contained in the historic AR09 spreadsheet.

We note that due to data limitations our confidence grade has remained at C5. We currently have a limited dataset from which we extrapolate an overall pumping head value across the whole of Scottish Water. We acknowledge that further work is required to improve the quality of this data.

E7.24 Total number of combined pumping stations

The total number of combined pumping stations has increased by 2 to 1,360. The confidence grade remains at B3.

E7.25 Total capacity of combined pumping stations

The total capacity of combined pumping stations increased by 223,668 m³/d to 10,678,428 m³/d. The change recorded this year is mainly attributed to the inclusion of new sites containing large pumps. The confidence grade has remained at C4, reflecting the level of extrapolation used to derive the reported figures.

E7.26 Total number of stormwater pumping stations

The total number of stormwater pumping stations remains unchanged at 36. The confidence grade remains at B3.

E7.27 Total capacity of stormwater pumping stations

The total capacity of stormwater pumping stations increased by 760 m³/d to 275,206 m³/d. The change recorded this year is attributed to a net increase of capacity across the regions. The confidence grade remains at C4.

E7.28 Number of combined sewer overflows

The number of combined sewer overflows (CSOs) increased by 45 to 2,982. A desktop survey backed up by selected site surveys has been continued this year to identify and record screens and type of screens (powered / non-powered). Continual improvement has been undertaken to identify abandoned CSO and duplicate records. The confidence grade remains at A3.

E7.29 Number of combined sewer overflows (screened)

The reported number of combined sewer overflows (CSOs) with screening in place decreased by 97 to 823. Screened CSOs constitute 27.6% of the total number of CSOs reported in E7.28. The decrease is due to a desktop survey backed up by selected site surveys has been carried out this year to identify and record screens and type of screens (powered / non-powered) and rationalisation of CSO in the UID programme. The confidence grade remains at A3.

E7.30 Number of sewage treatment works

The number of sewage treatment works (WWTW) decreased by 3 to 1,851. The confidence grade remains at A3.

E7.31 Total load

The total load increased by 431kg BOD/day to 221,846 kg BOD/day. This increase reflects the net change in the constituent components of the works loads. Due to rounding the individual differences may not add up to the total difference.

The load consists of the following constituents:

- Population
- Tourist
- Non-domestic load
- Trade effluent
- Imported private septic tanks
- Imported public septic tanks
- Imported other loads
- Imported WWTW sludge
- Imported WTW sludge
- Sludge return liquors

Population (73.4% of total load)

The population load increased by 440 kg BOD/day. The increase in population load is a reflection of the increase in population reported in line E7.1.

Tourist (1.4% of total load)

The tourist load increased by 236 kg BOD/day. This increase is due to a greater occupancy rate being reported at tourist accommodation.

Non-domestic load (10.0% of total load)

The non-domestic load decreased by 594 kg BOD/day due to a reduction in the metered non-domestic volumes recorded

Trade effluent (11.2% of total load)

The trade effluent load increased by 3884 kg BOD/day.

Imported private septic tanks (0.1% of total load)

The imported private septic tanks load decreased by 117 kg BOD/day.

Imported public septic tanks (0.1% of total load)

The imported public septic tanks load decreased by 146 kg BOD/day.

Imported other loads (1.1% of total load)

The imported other load decreased by 5,999 kg BOD/day. This is due to a correction at Kinneil Kerse STW from AR15, as some of the tanker loads were identified as going straight to sludge holding tanks rather than for treatment through the STW.

Imported WWTW sludge (2.2% of total load)

The imported WWTW sludge load increased by 1,365 kg BOD/day.

Imported WTW sludge (0.2% of total load)

The imported WTW sludge load increased by 94 kg BOD/day.

Sludge return liquors (0.2% of total load)

The sludge return liquor load increased by 156 kg BOD/day.

The confidence grade remains at B3.

E7.32-36 Sewage Treatment Costs

Sewage Treatment E7.36

	Total
Functional expenditure:	£m
2015/16	50.866
2014/15	50.863
Variance	<u>(0.003)</u>

Sewage treatment costs have remained static since 2014/15. The main movements have been analysed as follows:

- £1.3m (8.4%) increase in power costs mainly due to the impact of higher tariffs (£0.5m) and an increase in consumption of £0.6m associated with high rainfall;
- £0.5m (20.1%) increase in materials and consumables mainly due to increased chemicals usage of £0.5m;
- £1.9m (16.7%) decrease in general and support costs mainly due to the impact of the 2014 pension fund triennial valuation (£0.9m).

Sewage treatment costs are analysed by region:

	North	East	South	West	Direct	General and Support	Total
Functional expenditure:	£m	£m	£m	£m	£m	£m	£m
2015/16	6.235	9.864	13.559	11.844	41.502	9.364	50.866
2014/15	6.180	8.997	13.037	11.404	39.618	11.245	50.863
Variance	<u>(0.055)</u>	<u>(0.867)</u>	<u>(0.522)</u>	<u>(0.440)</u>	<u>(1.884)</u>	<u>+1.881</u>	<u>(0.003)</u>

Confidence Grades – Confidence grades on Table E7 are consistent with grades in the general E table commentary and remain consistent with 2013/14.

Scottish Water has slightly lower confidence levels on Network cost analysis than treatment cost analysis. This is due to lower levels of direct labour capture on Networks.

Table E8 Waste water Explanatory Factors - Sewage Treatment Works

E8.1-8 Sewage treatment works size bands

The total number of sewage treatment works (WWTW) decreased by 3 to 1,851. Changes to the number of WWTW this year are broken down by size band and treatment category in the tables below:

Size Band	2014/15	2015/16	Net Change
0	1,126	1,134	8
1	227	214	-13
2	139	138	-1
3	180	183	3
4	123	125	2
5	37	36	-1
6	22	21	-1
Total	1,854	1,851	-3

Treatment Category	2014/15	2015/16	Net Change
Septic Tanks	1,173	1,176	3
Primary	43	39	-4
Sec Activated Sludge	179	179	0
Sec Biological	296	297	1
Tertiary A1	35	37	2
Tertiary A2	18	18	0
Tertiary B1	60	60	0
Tertiary B2	14	14	0
Sea Preliminary	8	8	0
Sea Screened	4	4	0
Sea Unscreened	24	19	-5
Total	1,854	1,851	-3

The confidence grade remains at B3.

E8.9 Small sewage treatment works with ammonia consent 5-10 mg/l

The number of small sewage treatment works with ammonia consent 5-10 mg/l remained the same at 45. The confidence grade remains at A1.

E8.10 Small sewage treatment works with ammonia consent <= 5 mg/l

The number of small sewage treatment works with ammonia consent <= 5 mg/l has increased by 1 to 63. The confidence grade remains at A1.

E8.11-18 Average Daily Loads

The total average daily load, excluding septic tanks, decreased by 759 kg BOD/day to 216,149 kg BOD/day.

Changes to the total average daily load received this year are broken down by size band and treatment category in the below tables:

Size Band	2014/15	2015/16	Net Change
	<i>Excluding septic tanks</i>		
0	437	425	-12
1	1,104	1,130	26
2	1,898	1,886	-12
3	10,225	10,244	19
4	36,089	37,486	1,397
5	32,008	32,582	574
6	135,147	132,396	-2,752
Total	216,908	216,149	-759

Treatment Category	2014/15	2015/16	Net Change
Primary	4,059	3,010	-1,049
Sec Activated Sludge	150,256	148,674	-1,582
Sec Biological	22,074	23,072	998
Tertiary A1	23,666	23,802	136
Tertiary A2	4,568	4,793	225
Tertiary B1	8,209	8,752	543
Tertiary B2	1,547	1,533	-14
Sea Preliminary	1,717	1,750	33
Sea Screened	400	381	-19
Sea Unscreened	412	384	-28
Total	216,908	216,149	-759

The confidence grade remains at B3.

E8.19 Small sewage treatment works with ammonia consent 5-10 mg/l

The total average daily load at small sewage treatment works with ammonia consent 5-10 mg/l decreased by 56 kg BOD/day to 8,572 kg BOD/day. The confidence grade remains at B3.

E8.20 Small sewage treatment works with ammonia consent <= 5 mg/l

The total average daily load at small sewage treatment works with ammonia consent <= 5 mg/l increased by 208 kg BOD/day to 40,547 kg BOD/day. Secondary Activated Sludge and Tertiary A1 categories are mainly responsible for the increase. The confidence grade remains at B3.

E8.21-30 Compliance

The percentage compliance has been calculated on the basis of SEPA results. Our methodology for calculating compliance is the same as last year and, in the case of two-tier consents, all failures have been counted, not just upper-tier failures. WWTW that are not sampled are not included in the averaging process for individual treatment categories and size bands. The sampling period is the financial year 2015/16.

The number of failing waste water treatment works is being reported as 6 for 2015/16,

Where the cells in this section are listed as 0 and AX confidence grade, this means that there was no WWTW in that treatment category and size band thus there has been no sampling.

The average compliance has been maintained or improved at all WWTW treatment categories with the exception of Secondary Biological.

The confidence grade remains at B2.

E8.29 Small sewage treatment works with ammonia consent 5-10 mg/l

The compliance at small sewage treatment works with ammonia consent 5-10 mg/l has been maintained or improved at all treatment categories except secondary activated sludge and secondary biological.

E8.30 Small sewage treatment works with ammonia consent <= 5 mg/l

The compliance at small sewage treatment works with ammonia consent <= 5 mg/l has been maintained or improved at all treatment categories except secondary activated sludge.

E8.31-42 Costs

Overall movements are explained in table Sewage Treatment E7.36 earlier in this commentary. The costs of treating and disposing of sludge are contained within Table E10 Sludge Treatment and Disposal.

Analysis of sewage treatment costs by process type:

Changes to the numbers of STW by process type have arisen as a result of operational changes and process re-classifications in STW during 2015/16. Re-stating 2014/15 figures on like-for-like basis shows the following variations:

	Septic tanks	Primary	Secondary	Tertiary	Sea Outfalls	Direct	General and Support	Total
	£m	£m	£m	£m	£m	£m	£m	£m
Total treatment works								
2015/16	2.713	1.216	29.186	8.125	0.262	41.502	9.364	50.866
2014/15	2.925	1.067	27.730	7.653	0.243	39.618	11.245	50.863
Variance	+0.212	(0.149)	(1.456)	(0.472)	(0.019)	(1.884)	+1.881	(0.003)

Costs which are directly attributable to treatment are charged to the specific asset cost code in PeopleSoft, either via direct charging, Ellipse timesheets or work orders. Of the £41.5m total direct waste water treatment costs, £30.5m of costs or 97.5% have been directly charged to assets in our corporate costing system.

Other costs have been allocated to Wastewater Treatment through ABM support activity allocation, e.g. stores based on number of issues, IT applications based on number of users, etc. Therefore, support costs are allocated on a resource consumed basis. However, many of these costs are not specific to an asset; they are generally attributable to an employee. It follows that the majority of these support costs should be allocated to the activities the employees have been doing.

Confidence Grades – Confidence grades on Table E8 are consistent with grades in the general E table commentary and remain consistent with 2014/15.

Table E9 Large Sewage Treatment Works Information Database

E9.0 Name

The number of large non-PPP waste water treatment works has decreased by 1 to 21 due to:

- A decrease in the trade effluent load to Bothwellbank WwTW, and a decrease in other tanker loads at Rovahead WwTW, has meant both these works now fall under the large works kg BOD/day criteria.
- Dunbar WwTW has been added onto the list due to an increase in load.

Large waste water treatment works are defined as those that receive an average loading in excess of 1,500 kg BOD/day and is approximately equivalent to a population of 25,000.

E9.1 Population equivalent of total load received

The overall population equivalent of the total load received decreased by 21,722 to 2,206,597.

Changes to the population equivalent of each large waste water treatment works are detailed in the below table (due to rounding the total may not equal the sum of the individual values):

WWTW	2014/15	2015/16	Net Change	% Change	Classification change 2015/16
Allers	40,923	42,397	1,474	3.6%	
Alloa	45,455	44,984	-471	-1.0%	
Ardoch	65,631	64,293	-1,338	-2.0%	
Bothwellbank	25,108	0	-	-	Not a large works in 2015/16
Carbarns	47,915	48,404	489	1.0%	
Dalderse	92,954	94,158	1,204	1.3%	
Daldowie	269,679	266,599	-3,080	-1.1%	
Dalmarnock	231,125	247,420	16,295	7.1%	
Dunbar	-	26,596	-	-	Added in 2015/16
Dunfermline	77,678	79,718	2,040	2.6%	
Dunnswood	31,858	31,073	-785	-2.5%	
Erskine	79,004	78,089	-915	-1.2%	
Galashiels	28,145	35,549	7,404	26.3%	
Hamilton	62,664	61,434	-1,230	-2.0%	
Kinneil Kerse	141,171	49,532	-91,639	-64.9%	
Kirkcaldy	61,238	61,715	477	0.8%	
Laighpark (Paisley)	130,515	113,961	-16,554	-12.7%	
Perth	83,915	90,522	6,607	7.9%	
Philipshill	60,996	60,289	-707	-1.2%	
Rovahead	25,629	0	-	-	Not a large works in 2015/16
Shieldhall	533,800	590,695	56,895	10.7%	
Stirling	73,019	75,005	1,986	2.7%	
Troqueer	44,031	44,157	126	0.3%	
Total	2,252,453	2,206,590	-21,722		

E9.2-7 Compliance

Consent data was taken from our corporate consents database. The most onerous of CAR or UWWT parameter was reported.

Confidence grades remain at A1, reflecting the fact that the data is obtained directly from our corporate consents database.

E9.2 Suspended solids content

All consent standards remained the same.

E9.3 BOD consent

All consent standards remained the same.

E9.4 COD consent

There have been no changes to the COD consent standards.

E9.5 Ammonia consent

Stirling Ammonia consent has changed from 15 to 45.

E9.6 Phosphate consent

All consent standards remained the same.

E9.7 Compliance with effluent consent standard

We have used SEPA data from March 2015 to the end February 2016 for this line. For waste water treatment works with a two tier consent we have taken exceeding the lower tier as being a non-compliant sample.

E9.8-14 Treatment Works Category

This information is held in the corporate asset inventory. We are reporting 21 large waste water treatment works in Table E9, this is in line with E8.7.

E9.15-21 Works cost

Analysis of functional costs for large sewage treatment works:

	2015/16	2014/15	Variance
	£m	£m	£m
Daldowie	1.048	0.915	(0.133)
Galashiels	0.104	0.086	(0.018)
Tertiary treatment	1.152	1.001	(0.151)
Allers	0.312	0.280	(0.032)
Alloa	0.368	0.382	+0.014
Ardoch	0.365	0.314	(0.051)
Dunbar	0.317	0.192	(0.126)
Carbarns	0.331	0.301	(0.030)
Dalderse	0.329	0.433	+0.104
Dalmarnock	1.384	1.169	(0.215)
Dunfermline	0.288	0.215	(0.073)
Dunnswood	0.351	0.325	(0.026)
Erskine	0.509	0.525	+0.016
Hamilton	0.632	0.539	(0.093)
Kinneil Kerse	0.380	0.342	(0.038)
Kirkcaldy	0.593	0.487	(0.106)
Laighpark (Paisley)	0.962	1.024	+0.062
Perth	0.454	0.516	+0.062
Philipshill	0.977	0.778	(0.199)
Shieldhall	2.115	2.210	+0.095
Stirling	0.596	0.412	(0.184)
Troqueer	0.310	0.265	(0.045)
Secondary treatment	11.572	10.708	(0.864)
Direct large treatment works	12.724	11.709	(1.015)
General and Support	1.690	1.959	+0.269
Total large treatment works	14.414	13.668	(0.746)

The increases across our large sites reflect higher direct employment costs and higher power consumption associated with high rainfall. This has particularly impacted Stirling, Philipshill and Dalmarnock.

The following sites have not followed this general pattern:

- Dalderse STW [West, Secondary Activated Sludge, Band 6] has decreased by £0.1m due to reductions in SEPA costs;
- Shieldhall STW [West, Secondary Activated Sludge, Band 6] has decreased by £0.1m due to reductions in Direct employment costs.

Confidence Grades – Confidence grades on Table E9 are consistent with grades in the general E table commentary and remain consistent with 2014/15.

Estimated terminal pumping station costs are graded slightly lower in confidence than treatment costs, as terminal pumps (as defined) sit in networks or are costed as part of the treatment works.

Table E10 Wastewater Explanatory Factors - Sludge Treatment and Disposal

E10.1-2 Sludge Volumes

E10.1 Resident population served

The total resident population served increased by 31,347 to 2,682,649. This change is consistent with the rise in population reported elsewhere in this submission.

We again report the population treated at Scottish Water operated WWTW that have their sludge treated at PPP sludge treatment centres. This accounts for the anomaly in reporting a population reported against the 'incineration' and 'other' routes but no Scottish Water sludge volumes being recycled through these routes. Some of this was used to carry out trials of recycling of hydrolysed sludge in England and the rest was used for industrial crop.

The confidence grade remains at C3.

E10.2 Amount of sewage sludge

The reported mass of sewage sludge has decreased slightly to 20.125 tds. As in AR15 all the Scottish Water figures reported were taken direct from our Gemini system.

An increase in Land Reclamation disposal was offset by a reduction in Farmland Advanced disposal.

No significant change has occurred and the confidence grade remains the same as the prior year.

E10.3-11 Sludge Treatment and Disposal Costs

Sludge Treatment E10.11

	Total
Functional expenditure:	£m
2015/16	14.726
2014/15	13.920
Variance	<u>(0.806)</u>

Sludge treatment costs have increased by £0.8m (5.8%) from 2014/15. This is analysed as follows:

- £1.2m (52.9%) increase in employment costs due mainly to the in-sourcing of sludge tankering (£1.1m). This has resulted in a £0.8m decrease in hire and contracting costs;
- £0.4m (23.2%) decrease in materials and consumables due to a reduction in the maintenance cost of sludge treatment facilities; and
- £0.9m (33.7%) increase in general and support costs mainly due to an increase in vehicles costs of £0.3m and an increase in other support costs related to higher direct employees.

Scottish Water incurs costs associated with the transportation of sludge from its own sewage treatment works to PPP sludge treatment centres (£3.6m). These costs have been reported within E3a.20 with the corresponding sludge loads reported in E3.

The allocation of sludge treatment and disposal costs by disposal route relies on robust sludge movement data linked to financial data. Scottish Water links sludge movement data from our Gemini waste management system to ABM costs to produce E10 cost analysis.

Analysis of sludge treatment costs by disposal route:

	2015/16	2014/15	Variance
	£m	£m	£m
Farmland:			
Untreated	0.000	0.000	+0.000
Conventional	4.567	3.763	(0.804)
Advanced	6.114	8.635	+2.521
Incineration	0.000	0.000	+0.000
Landfill	1.094	0.867	(0.227)
Composted	0.000	0.000	+0.000
Land reclamation	2.951	0.655	(2.296)
Other	0.000	0.000	+0.000
Total	14.726	13.920	(0.806)

The change in costs by disposal route has been affected by the following main factors:

Sludge volumes have increased by 8% in the year driving an increase in cost of £0.8m (6%).

There has also been a transfer of disposal route from Farmland Advanced to Land reclamation at the following sites:

- Cupar;
- Kilmory;
- Kirkcaldy;
- Oban;
- St Andrews; and
- Troqueer.

Confidence Grades

Sludge cost analysis by ultimate disposal route requires analysis of all sludge treatment, tankering and disposal costs by works, linked to intermediate works (where applicable) and ultimate disposal route. Certain costs are clearly captured by works with identified disposal route. However, certain costs are not fully captured directly against sludge. The main areas of difficulty are inter-site sludge tankering and sludge treatment / conditioning at dual function works (sludge / waste water treatment). Table E10 is completed on the basis of a combination of: ABM analysis, direct cost capture by asset, and Scottish Water sludge model analysis. Confidence grades on Table E10 are lower (B2) than other E Table cost analysis due to these reasons and remain consistent with 2014/15.

G Tables

Tables G1 – G2: General Comments

Tables G1 – G2 present a summary of Scottish Water’s investment programmes for Q&S4, Q&S3a & 3b (completion programme). The investment costs and outputs reported in these tables reflect the position at the end of March 2016. Elements reported include investment within the report year, 2015/16, and our forecasts to 2020/21.

Total forecast gross investment from March 2015 to March 2021 is £3,753.3m comprising £354.2m for completion programme (Q&S3a & Q&S3b), £3,101.0m for Q&S4 and £298.1m for the IR18 allowances. Programme risk, rebates, and contingencies have been allocated to programme areas as required.

Scottish Water successfully delivered £461.7m of investment in 2015/16, which is £482.6m less SWS2 adjustment of £20.9m. Table G1 reports the total investment in the report year of £382.7m on Q&S4 projects and £79.0m on completion (Q&S3a and Q&S3b).

The Q&S3b Completion programme has 15 projects remaining as at March 2016. Of the 37 remaining at 31 March 2015, 22 have been delivered in the year.

Capital maintenance investment accounts for 56.4% of the investment in 2015/16.

The table below reflects the inflation assumptions used within the CIR. Inflation assumptions have been updated to reflect our 2015/16 Delivery Plan.

Inflation Assumptions

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Overall RPI Assumption 2012/13 = 100%	105.95%	108.39%	111.64%	115.55%	119.59%	123.78%

Table G1 Summary - Investment

The total gross capital investment shown on table G1 is £3,753.3m, which is the forecast cost to complete the SR15 programme and the remaining outputs from the SR10 programme. We are forecasting £398.3m for investment post March 2021 in line with our original Delivery Plan assumptions, of which £384.3m is in relation to outputs to be confirmed in IR18 in order to provide continuity of investment across regulatory periods.

As part of the new investment planning and delivery arrangements for the 2015-21 period a strengthened risk management regime has been implemented. Under this regime sub-programme and programme risk allowances are removed from project allocations and are held and governed centrally. As projects mature, the central risk allocation can be drawn down to projects or increased as appropriate. For the purposes of Table G1, the original risk allowances removed from project costs have been re-instated. The risk allowance remaining, £24.3m, has been allocated to capital maintenance which increases the forecast spend in this category.

Table G1 includes investment for the PFI project at Dalmuir. This has been included within the cost of the Non OMG180 completion programme. The expected total cost of Dalmuir is £24.0m with £6.2m forecast in the 2015-21 period.

Programme Financing

The SR15 Programme is forecast to be delivered for the available financing. The forecast cost is £3,753m and shows a small £1m variance from the value shown in our 2016 Delivery Plan update (which is re-created in the table below).

Capital Expenditure Profile (£million)	Total £m
Sustaining existing high service for customers	1,680
Enhancement 2015-21	1,083
Sub total (2012/13 prices)	2,763
Nominal inflator (RPI)	
Sub total (nominal prices)	3,166
Re-phasing of investment	-7
SR10 Completion Costs	337
PFI completion	6
Infrastructure charges investment	36
Total investment (nominal prices)	3,538
Exceptional capital maintenance	75
Additional investment financed from customer contributions	39
Sub total (nominal prices)	3,652
Additional programme risk	100
Investment profile (nominal prices)	3,752

G1.1- G1.6 Q&S4 Capital Maintenance

Projects containing Capital Maintenance drivers are captured in these lines. In 2015/16 expenditure of £260.6m was made on Capital Maintenance; the total expenditure for the capital maintenance programme is forecast at £2,059m. This includes £120 million of Exceptional Capital Maintenance for Ayrshire Resilience and Strategic Mains Diversions and the remaining risk allowance following re-allocations back to project level (see commentary above) of £24.3m.

G1.7– G1.13 Q&S3b Growth Investment

Projects containing Supporting Economic Development drivers are captured in these lines. In 2015/16 expenditure of £47.5m was made against Q&S4 Growth; the total forecast to complete the growth element of the programme is shown in the tables to be £181.2m in the 2015-21 period.

G1.14- G1.21 Q&S4 Enhancement Expenditure

Projects containing enhancement drivers are captured in these lines. In 2015/16 expenditure of £74.6m was made against Q&S4 enhancements; the total forecast to complete the enhancements is shown in the tables to be £860.6m over the 2015-21 period including £100.0m to cover emerging risks for Daldowie and Dalmarnock waste water treatment works.

G1.22: IR18 Enhancements

No investment has been made in 2015/16 relating to IR18 outputs. The total forecast allowance for outputs to be confirmed in the rolling investment review 2018 (IR18) is £682.4m as shown in the table below.

	£m
IR18 allowances 2015-21 @ 2012/13 Prices	286.4
IR18 allowances 2015-21 @ outturn Prices	345.4
Less: Transfers/confirmed outputs	-25.0
Less: OMG180 increased costs	-22.3
IR18 allowances 2015-21(Table G Reported)	298.1
IR18 allowances post 2021	384.3
Total IR18	682.4

The following adjustments to the IR18 allowances were made during the year:

CODE	DESCRIPTION	2012/13 Prices £m	Outturn Prices £m
50115	Bradán Water Supply Improved Resilience	5.4	5.9
50118	West Lothian Improved Resilience	1.7	1.8
50119	Tayside Improved Resilience	1.1	1.2
50903	Improving resilience of supplies	4.0	4.4
55043	Dougliehill and Greenock WRZ Abstraction improvements (TE change SR15-010).	0.2	0.2
50380	Afton WTW (TE change SR15-014 &15)	10.5	11.5
	Total	22.7	25.0

The IR18 allowances have also been reduced by £22.3m to finance the forecast increased cost of the OMG180 programme. In November 2014 the OMG180 programme was closed to new outputs with any underspend or overspend on the programme taken into account in IR18 – i.e. any overspend on the OMG180 would decrease the amounts available for IR18 and vice versa. We reported our position on the OMG180 programme to the OMGWG on 16 May 2016 and highlighted a forecast cost of £290m to £338.6m to complete the programme against the remaining finance of £286.2m.

G1.23 – G1.25 Q&S3a & 3b Completion Expenditure

Projects from the completion programme are captured in these lines. In 2015/16 a total expenditure of £79.1m was made against this programme with the majority of spend being on outputs included in the OMG180 programme. The non OMG180 programme also contains income of £20.8m from the settlement of the SWS2 programme. The completion programme is predicted to outturn at £354.2m.

Additional investment related to OMG180 above the original allowance is expected to be financed from IR18 allowances. This is reflected through a reduction in planned IR18 investment.

G1.26: Q&S5 Early Start.

No investment is forecast for the Q&S5 early start programme.

G1.27 – G1.40: Total Additional Operating Expenditure

Additional operating expenditure is calculated through the analysis of the proportion of capital spend allocated to quality, enhanced level of service or growth for future years. The value in the report year is based on the actual opex released as a consequence of the capital programme.

G1.41 – G1.48: Grants and Capital Contributions

Contributions received to the end of March 2016 have all related to Service Relocations and Infrastructure Charges. A forecast has been made based on investment run-rate.

G1.49 – G1.57: Expenditure Totals

These lines sum the figures provided in G1.1 to G1.48 and are automatically populated.

Table G2 Summary – Outputs

The following is a summary of all the output programmes included in the G2 table, the number of outputs delivered in 2015/16 and the total number of outputs being delivered in the regulatory period.

G2.1 – G2.4 Growth

G2.1 Strategic Capacity Water Treatment

There were no outputs delivered against this line during 2015/16. We are forecasting to increase the strategic capacity of treated water to 48,032 customers by the end of 2020/21. This includes 33,000 customers for the Inverness and Nairn WRZ and around 7,200 customers for the strategic solution at Killylour.

G2.2 Strategic Capacity Wastewater Treatment

We increased the strategic capacity of our waste water treatment sites during 2015/16 to the equivalent of 1,351 customers. We are forecasting that this will increase to 68,659 customers by the end of 2020/21.

G2.3 Strategic Capacity Water Network Capacity

This line reflects outputs delivered through the Infrastructure Charge Programme for Part 3 assets. 1,920 outputs were delivered during 2015/16. We are forecasting to provide additional network capacity to 39,132 customers by the end of 2020/21.

G2.4 Strategic Capacity Wastewater Network Capacity

This line reflects outputs delivered through the Infrastructure Charge Programme for Part 3 assets. No outputs were delivered during 2015/16. We are forecasting to deliver 683 outputs by the end of 2020/21.

G2.5 – G2.14 Q&S4 Enhancements – Drinking Water Quality

Outputs delivered in this section reflect the forecast position on the milestone graphs provided to the OMG working group in May 2016.

Explanation of movement in forecasts, projects or programme specific issues are detailed within the graph commentary at the quarterly OMG meetings.

G2.5 Number of Water Treatment Works Improved

No outputs were planned to be delivered in 2015/16 for this programme. We forecast all 28 outputs will be delivered by the end of 2020/21. Our Delivery Plan 2015-21 for this programme was 26 outputs and this increased during the year to 28 through the Technical Expression change process to include Afton WTW (TE change SR15-014) and Bradan WTW (TE change SR15-015).

G2.6 Number of zones made compliant with iron & manganese standards

No outputs were planned to be delivered in 2015/16, but a total of 78 are forecast to be delivered by the end of the regulatory period. The remaining 10 outputs in this programme are forecast to be delivered post 2021.

G2.7 Number of enhancements to improve reliability of supply (catchments and treatment)

2 outputs were delivered in 2015/16 for this programme, with a total of 46 outputs forecast to be delivered by the end of 2020/21. 1 output is forecast to deliver post 2021.

G2.8 Number of enhancements to improve reliability of supply (networks and storage)

1 output was delivered in 2015/16, with a total of 82 forecast to be delivered by the end of 2020/21.

G2.9 Distribution mains cleaned (km)

No outputs were planned to be delivered in 2015/16 for this programme, with the total of 5,928km forecast to be delivered in this regulatory period.

G2.10 Water supply resilience strategy and improvements made

4 Outputs were delivered in 2015/16, with the remaining 14 outputs forecast to be delivered by the end of 2020/21. Our Delivery Plan 2015-21 for this programme was 14 outputs which was increased during the year through the Technical Expression change process to include 4 outputs for Ayrshire Strategic Resilience (TE change SR15-003).

G2.11 Number of zones with improved security of supply (SOSI)

1 output was delivered in 2015/16, with the remaining 10 outputs forecast to be delivered by the end of 2020/21.

G2.12 Number of security measures and improvements to the infrastructure of critical reservoirs

This line covers two programme areas: Number of security measures with 633 outputs and improvements to the infrastructure of critical reservoirs with 56 outputs. 3 outputs were delivered in 2015/16, with a total of 689 forecast to be delivered by the end of 2020/21. Our Delivery Plan 2015-21 for this programme was 659 outputs which was increased during the year to 689 outputs (TE change SR15-005).

G2.13 Number of water quality etc. studies to inform future periods

10 outputs were delivered in 2015/16, with the remaining 331 outputs for this programme forecasting to be delivered by the end of 2020/21.

G2.14 2010-15 outputs planned to complete in the 2015-21 period

2 outputs were delivered in 2015/16, with a total of 23 forecast to be delivered by the end of 2020/21.

G2.15 – G2.24 Q&S4 Enhancements – Environment

Outputs delivered in this section reflect the graphs provided to OMG on a quarterly basis. Explanation of movement in forecasts, projects or programme specific issues are detailed within the graph commentary at the quarterly OMG meetings.

G2.15 Number of WWTWs improved to meet UWWTD

5 Outputs were delivered in 2015/16, with a total of 22 outputs forecast to be delivered in this regulatory period.

G2.16 Number of waste water networks improved to meet UWWTD

4 outputs were delivered in 2015/16, with a total of 61 outputs forecast to be delivered by the end of 2020/21. Our Delivery Plan 2015-21 for this programme was 62 outputs which was reduced by 1 due to the removal of the output at Burnbank St. CSO (TE change SR15-020).

G2.17 Number of improvements required to meet UWWTD - Glasgow completion

24 outputs were delivered in 2015/16, with a total of 94 outputs forecast to be delivered by the end of 2020/21. Our Delivery Plan 2015-21 for this programme was 97 outputs which was reduced during the year to 94 due to a net of 2 outputs delivered in the 2010-15 period. There was also the transfer of 1 output from this programme area to the '2010-15 outputs planned to complete in the 2015-21 period' programme as it has been identified as being out with the GSS programme.

G2.18 Number of improvements required to meet the Water Framework Directive

1 output was delivered in 2015/16 for this programme, with the remaining 20 outputs forecast to be delivered by the end of 2020/21. Our Delivery Plan 2015-21 for this programme was 20 outputs which increased during the year to 21 due to the addition of 1 output at Dougliehill and Greenock WRZ (TE change SR15-010).

G2.19 Number of revised Bathing Waters Directive studies

No outputs were planned to be delivered in 2015/16, with a total of 7 outputs forecast to be delivered by the end of 2020/21. Our Delivery Plan 2015-21 for this programme was 12 outputs which reduced during the year to 7 due to the removal of 5 modelling updates at Kinghorn (Harbour Beach), Portobello West, Rockcliffe, Rosehearty and Southernness (TE change SR15-017).

G2.20 Number of studies and catchments to meet the requirements of the Flood Risk Management Act

No outputs were planned to be delivered in 2015/16, with a total of 218 outputs forecast to be delivered by the end of 2020/21 for this programme.

G2.21 Number of environmental studies to inform future periods

No outputs were delivered in 2015/16, with a total of 130 outputs forecast to be delivered by the end of 2020/21. Our Delivery Plan 2015-21 for this programme was 140 outputs which decreased during to 130 due to the removal of 2 outputs associated with the SR15 waste water security requirement (TE change SR15-008), the net removal of 3 surface water action plans (TE change SR15-011), the removal of 2 WFD abstraction studies (TE change SR15-012), the net removal of 2 fish pass studies and the removal of Orbiston WTW Legacy Sludge study (TE change SR15-018).

G2.22 Number of improvements required by the Compliance Assessment Scheme; odour reduction and sludge management

10 outputs were delivered in 2015/16 for this programme, with a total of 38 outputs forecast to be delivered by the end of 2020/21. Our Delivery Plan 2015-21 for this programme was 40 outputs which decreased during the year to 38 due to the removal of 3 outputs associated with the SEPA Compliance Assessment Scheme (TE change SR15-016) and the addition of Orbiston WTW (TE change SR15-018)

G2.23 2010-15 outputs planned to complete in the 2015-21 period

7 outputs were delivered in 2015/16, with a total of 16 outputs forecast to be delivered in this regulatory period. Our Delivery Plan 2015-21 for this programme was 15 outputs which increase during the year 16 due to the transfer of 1 output from 'Number of improvements started in the 2010 to 2015 period to meet UWWTD: Glasgow Scheme) as it has been identified as being out with the GSS programme.

G2.24 Number of improvements to dams to meet the requirements of the Flood Risk Management Act

8 outputs were delivered in 2015/16, with a total of 45 outputs forecast to be delivered by the end of 2020/21.

G2.25 – G2.26 Q&S4 Enhancements – Supporting Economic Development

G2.25 - Number of climate change vulnerability assessments

4 outputs were delivered in 2015/16, with a total of 122 outputs forecast to be delivered by the end of 2020/21. Our Delivery Plan 2015-21 for this programme was 129 outputs which decreased during the year to 122 due to the removal of 7 outputs associated with Climate Change Trends Monitoring (TE change SR15-007).

G2.26 - Improvements in renewable power and energy efficiency

1.22 Gwh has been delivered in 2015/16, giving a total of 1.64Gwh delivered to date. Due to changes in the UK Government's energy policy relating to subsidies for renewable energy, the outputs for this programme are under review. Our Delivery Plan 2015-21 for this programme was 25 Gwh by March 021 which decreased to 17.5 Gwh due to the removal of the AAD plant (TE change SR15-001).

G2.27 – 2.43 Drinking Water Quality Indicators (Annual Measure)

G2.27 - Number of lead communication pipes replaced

This is a demand driven measure as lead pipes are replaced at customers' request. We are forecasting to replace 6,500 lead communications pipes within the regulatory period which is in accordance with our Delivery Plan 2015-21.

G2.28 Assessment of levels of pressure for all customers and number of improvements if low levels of service are found

We plan to undertake a study and we have committed to maintaining the Low Pressure Register which is monitored through line G3.16.

G2.29 Improve response times to reduce average duration of short term interruptions to supply

Work is underway to confirm measurable outputs for this activity. We are measured on ITS response through lines G3.17, G3.17a and G3.18. In addition bursts are reported through G3.19.

G2.30 Number of water efficiency advice and water saving packs provided (to 2% of customer base)

No outputs planned until reporting year 2017/18.

G2.31 Number of internal flooding improvements

We are reporting 47 properties removed from the Internal Flooding "at risk" register in 2015/16.

G2.32 Number of internal flooding improvements – completion programme

There are no completion programme internal flooding improvements outputs to be delivered in this regulatory period.

G2.33 Number of external flooding investigations and improvements

We are reporting 29 properties removed from the External Flooding "at risk" register in 2015/16.

G2.34 % of customers covered by flood resilience assessments

Work is underway to confirm measurable outputs for this activity.

G2.35 Number of surface water management investigations

There is only 1 Surface Water Management Investigation taking place in the 2015-21 regulatory period. This is forecast to be delivered in 2016/17.

G2.36 Number of connections for new households and businesses

We are committed to providing new connections for waste and waste water services for both our domestic and commercial customers in accordance with demand. Based on the predicted demand for new connections, we are forecasting to make a total of 239,728 new connections to all services in the regulatory period.

G2.37 New waste water capacity for 58,000 people

We have committed in our Delivery Plan 2015-21 to increase waste water capacity to 58,000 people. We are currently forecasting to increase the waste water capacity by 69,342 by the end of the regulatory period.

G2.38 Number of developer constructed assets (Part 2&3) adopted

We are reporting 25 assets adopted during 2015/16 as follows:

Asset Type	Number
Pipework	16
Pipework Foul	3
Pipework Surface Water	3
Pumping Stations	3
Total	25

G2.39 Number of first time non domestic meters installed

Data includes installations for the following categories

Installations	Gap Site	2,665
	Install	901
	New connection	501
	Reconnection	2
Installations Total		4,069

We have classed the 2 reconnections included above as “first time” provision. During a temporary disconnection we would normally leave the meter in-situ, however on two occasions during 2015/16 there was no existing meter on-site and therefore during the reconnection process we installed meters.

G2.40 Number of statutory requirements to relocate services for transport infrastructure projects

We are reporting 77 services relocated. Data is based on Transportation Schemes completed in the year and takes into account activity for both NRSWA (New Road & Street works Act) and AWPR (Aberdeen Western Peripheral Route).

G2.41 Improved contact management and proactive communication

There is one project in the 2015-21 period which is intended to improve Scottish Water’s customer contact system, ‘Promise’. This is forecast to be delivered in 2017/18.

G2.42 Number of wholesale meter accuracy improvements

We are reporting 7,729 wholesale meter accuracy improvements split across the following categories.

Exchanges	Accuracy Test	21
	Exchange	480
	Fault & Repair	1,342
	Proactive	5,018
	Resize	868
Exchanges Total		7,729

G2.43 Number of strategic mains diversions

During the course of the 2015-21 investment period, Scottish Water will be undertaking a total of 5 large scale strategic mains diversion projects. 3 of these are forecast to be delivered in 2017/18, with the remaining 2 being delivered in 2018/19.

G2.44 – G2.46 Q&SIIIa & Q&SIIIb Delivery Projects

This section summarises the projects remaining in the 'Unplanned' completion programme.

G2.44 Q&SIIIa Projects Remaining

Killylour is the last remaining Q&S3a project to be delivered. This is forecast to be completed in 2016/17.

G2.45 Q&SIIIb Projects Remaining

During 2015/16 22 projects have been completed within this programme leaving 14 Q&S3b projects remaining. We anticipate delivering the last output, Laggan Bridge, during 2020/21. The forecast within this row reflects our best case position.

Our forecast range for the combined Q&S3a and 3b completion projects is presented below:

	March 2015	March 2016	March 2017	March 2018	March 2019	March 2020	March 2021
Projects due to have completed by March 2015	37	15	8-11	4-6	1-4	1	0

G2.46 Q&SIIIb Km of Mains Rehabilitated Remaining

The projects for this line are already counted in line G2.14 Drinking Water Quality '2010-15 outputs planned to complete in the 2015-21 period' and it was agreed at the OMG working group that, to avoid confusion, we would no longer report these outputs separately.

Table G3 Monitoring Serviceability

G3.1 – G3.5 Drinking Water Quality Indicators (Annual Measure)

G3.1 – G3.2 % of compliant zones for Iron & Manganese

The exclusion of iron from drinking water decreased by 1.38% from 94.14% in calendar year 2014 to 92.76% compliance for water supply zones in calendar year 2015.

The exclusion of manganese from drinking water has increased by 1.38% from 94.83% in calendar year 2014 to 96.21% compliance for water supply zones in calendar year 2015.

We request the removal of percentage compliant zones for Iron and Manganese from the G tables going forward. There is no specific commitment within our Delivery Plan 2015-21 and it is no longer used to inform the OPA calculation. If there is still a requirement for report on Iron and Manganese, we propose that the total number of failing zones (highlighted cells) be used rather than the % zone compliance.

	Number of samples	Number of fails	% Compliance	Number of zones sampled	Number of failing zones	% zone compliance
Iron	5,069	28	99.448	290	21	92.76
Manganese	5,069	13	99.744	290	11	96.21

G3.3 Number of microbiological failures at water treatment works

The number of microbiological failures at water treatment works has decreased by 24 from 40 in calendar year 2014 to 16 in calendar year 2015.

G3.4 – Number of Customer Contacts relating to Taste

The total number of contacts relating to taste for calendar year 2016 was 2,691 increasing from the 2,671 reported in calendar year 2015.

G3.5 – Number of Customer Contacts relating to Discolouration

The total number of contacts relating to discolouration for calendar year 2016 was 6,325 decreasing from 9,211 in calendar year 2015.

G3.6 – G3.15 Environment Serviceability Indicators

G3.6 Number of Failing Waste water treatment works

The number of failing waste water treatment works is reported as 6 for 2015/16, an increase of the 3 reported in 2014/15.

G3.7 Number of sludge treatment facilities improved to comply with safe sludge matrix

There were 8 sludge sites investigated or improved during 2015/16, an increase of 6 from 2014/15. We would recommend updating the description of this line in the G3 table to align with the updated Delivery Plan 2015-21: 'Number of Sludge Management sites investigated or improved.'

G3.8 The maximum number of UIDs

This indicator is dependent on the outcome of the seven-stage process and studies which may reduce or increase the number of outputs to be delivered and the number of known unsatisfactory discharges.

At March 2016 there were 761 UIDs compared to a position of 791 UIDs in March 2015. Studies continue to be undertaken during the 2015/16 period.

We no longer include a target for this measure in our Delivery Plan 2015-21 commitments. Scottish Water will continue to report of the maximum number of UIDs but we would request removing this line from the G tables to align with our Delivery Plan commitments.

G3.9 Number of Pollution Incidents

Environmental Pollution Incidents occur where there is a failure at one of our water or waste water asset that, in agreement with SEPA, impacts on the environment. These incidents are classified by SEPA as water or waste water category 1, 2 or 3 incidents. We recorded a total of 260 water and waste water incidents in 2015/16. The number of agreed Category 1, 2 & 3 incidents are listed below:

Water Category 1 & 2	3 incidents agreed
Sewerage Category 1&2	10 incidents agreed
Sewerage Category 3	247 incidents agreed

There were also a number of the Category 1 & 2 incidents in 2015/16 where, in Scottish Water's view, these were due to third party activity. However SEPA hold that there was insufficient evidence for these incidents to be discounted. A follow up meeting has been set up with SEPA to discuss the approach to third party incidents going forward.

G3.10 Pollution incidents (sewerage)

There were 257 pollution incidents (sewerage) during 2015/16.

G3.11 Serious pollution incidents (sewerage)

There were 10 serious pollution incidents (sewerage) during 2015/16.

G3.12 Serious pollution incidents (water)

There were 3 serious pollution incidents (water) during 2015/16.

G3.13 Discharge permit compliance

Discharge permit compliance has decreased by 0.51% from 99.49% in 2014/15 to 98.98% during 2015/16.

G3.14 Satisfactory sludge disposal

Satisfactory sludge disposal was 100% during 2015/16.

G3.15 Greenhouse Gas (GHG) Emissions (ktCO₂e).

The Greenhouse gas emissions (ktCO₂e) position for 2014/15 was 404, an increase of 25 ktCO₂e from 2013/14. This is down to the increase in the emissions factor for grid electricity.

G3.16 – G3.36 Customer Service Serviceability Indicators

G3.16 Properties on the Low Pressure Register

The number of properties on the Low Pressure Register is reported as 47 excluding allowable exclusions.

G3.17 Properties with Unplanned Interruptions to Supply > 12 hours

The overall figure for 2015/16 for properties affected for more than 12 hours was 716 properties, an increase of 153 properties from 2014/2015. In this reporting year no individual incidents affected more than 100 properties for greater than 12 hours and only 3 incidents affected over 50 properties. The combined impact of these 3 events, which all occurred in February 2016, affected 186 properties for greater than twelve hours.

G3.17a Properties with Unplanned Interruptions to Supply > 6 hours

The overall figure for 2015/16 for properties affected more than 6 hours was 6,434.

G3.18 Number of hours lost due to water supply interruptions for three hours or longer

There were 0.2611 hours per property lost due to water supply interruptions for three hours or longer, a reduction of 0.0152 from the 2014/15 position of 0.2763 hours. This reduction can mostly be attributed to our programme of capital planned work not increasing as expected.

G3.19 Number of Bursts per 1,000km of mains

There were 140 mains bursts per 1,000km during 2015/16. This was a decrease of 20 from 2014/15.

G3.20 Properties at Risk of Internal Flooding

The number of properties at risk of internal flooding at March 2016 was 334. This was an increase of 32 properties compared to 2014/15 outturn of 302. An emerging sewer flooding issue at a shopping centre in Greenock was confirmed resulting in 30 commercial properties being added to the register to reflect each individual unit in the shopping centre.

G3.21 Properties internally flooded due to other causes

The figures reported here relate to flooding caused by blockages or failure of main and lateral sewers. The number of properties internally flooded in 2015/16 was 389, an increase of 22 on the previous year.

We would recommend changing this line to incidents rather than properties to align with the Delivery Plan 2015-21 commitment. This would also align with the reporting of the external flooding measures below and OPA reporting.

G3.22 Properties internally flooded due to overloaded sewers

The number of properties internally flooded due to overloaded sewers in 2015/16 was 95, an increase of 41 from 2014/15.

We would recommend changing this line to incidents rather than properties to align with the Delivery Plan 2015-21 commitment which is based on number of incidents. This would also align with the reporting of the external flooding measures below and OPA reporting.

G3.23 Incidents of internal sewer flooding for properties that have flooded within the last ten years

There were 243 incidents of internal sewer flooding during 2015/16 at properties that have flooded within the last ten years, an increase of 87 incidents on the 2014/15 position.

G3.24 Properties at risk of external sewer flooding

The number of properties at risk of external sewer flooding at March 2016 was 3,693. This is based on: 1:10; 2:10; 1:10 default; 2:10 default; and holding.

G3.25 Incidents of external sewer flooding due to other causes

The number of incidents of external sewer flooding due to other causes at March 2016 was 9,981, a decrease of 787 from 2014/15.

G3.26 Incidents of external sewer flooding due to overloaded sewers

The number of incidents of external sewer flooding due to overloaded sewers in 2015/16 was 349, an increase of 122 from 2014/15.

G3.27 The Overall Satisfaction Level (from the customer service questionnaire)

The Overall Satisfaction Level at March 2016 was 90%. This was a decrease of 2% compared to the reported March 2015 position of 92%.

In 2014/15 the customer service questionnaire result was based on a postal survey. We now use the Rant & Rave survey. In March 2016 we outturned at 89% using the Rant & Rave satisfaction level, 2% higher than the March 2015 position.

We request that the description on line G3.27 of the table be updated to reflect the use of our Rant & Rave system.

G3.28 The maximum number of 'second tier' complaints referred to Scottish Public Services Ombudsman

The overall number of second tier complaints referred by the Scottish Public Services Ombudsman (SPSO) in 2015/16 was 1 which is a reduction of 3 on the previous year.

We would recommend changing the description of this line to 'Regulator Upheld Complaints' to align with hCEM reporting.

G3.29 The number of telephone contacts relating to drinking water quality

Total number of telephone contacts which related to drinking water quality in 2016 was 11,667, a decrease of 2,483 from 2015.

G3.30 The Overall Performance Assessment (OPA) Score (In Year Value)

In 2015/16, the methodology for reporting the following measures was changed: Water Quality; Failing WWTW; and Customer Contact. The March 2016 OPA score was 393 a decrease of 7 points compared to our reported March 2015 position. Rebasement our 2014/15 score of 400 to align with the new reporting methodology results in a revised score of 396, 3 points higher than our actual score for 2015/16.

G3.31 The Overall Performance Assessment (OPA) Score (Period Average)

The 2015/16 period average OPA score was 393.

G3.32 The average annual level of leakage

The 2015/16 Maximum Likelihood Estimation (MLE) leakage is 499.63 MI/d. This is a reduction of 44.36 MI/d from the 2014/15 MLE leakage figure of 543.99 MI/d.

G3.33 Household Customer Experience Measure (hCEM)

The 2015/16 hCEM score was 84.32 compared to the 2014/15 score of 82.6.

G3.34 Non-Household Customer Experience Measure (nhCEM)

As agreed with WICS this new line is not being submitted in this reporting year as the methodology to be used is being trialed during 2016/17 with a view to implementation in April 2017.

G3.35 High Esteem Test

We agreed with the Customer Forum in November 2014 to build a benchmarking comparison which would track customers' satisfaction of Scottish Water alongside other companies in other sectors using the six monthly UK Customer Service Institute (UKCSI) survey, enhanced by a booster survey for Scottish Water. Due to the volatility of the results being experienced, we also agreed with the Forum to obtain survey results from four waves (July 2014 to January 2016) in order to establish a robust baseline. The January 2016 UKCSI results show an index score of 78.6 out of 100

G3.36 Wholesale Key Performance Indicator (KPIs)

The 2015/16 Wholesale KPI score is reported as 91%. Performance remained high across many service areas but fell below target in our connections service due to our focus on resolving process and system issues, combined with the clearance of backlog activity.

G3.37 to G3.38 Resilience of Supply

G3.37 Water Available for Supply Index (covered by 1:40 level of service)

The position at March 2016 was 87.30% of the population receiving a 1 in 40 year level of service or higher.

G3.38 Water Available for Supply Index (covered by 1:100 level of service)

The position at March 2016 was 77.30% of the population receiving a 1 in 100 year level of service or higher.

G3.39 to 3.49 Asset Life Indicators (using Residual Life Expectancy Index)

We provide draft figures for asset health indices for the first time in this year's Annual Return. These use Scottish Water's Residual Life Expectancy Index (RLEI). Currently this Index is being used over a trial period as the approach to asset health indices remains under review.

The RLEI calculates the current age of each asset and divides it by an estimate of the expected life of the asset. This score is subtracted from 1 to give a score of between 1 and 0, where 1 represents a brand new asset and 0 represents an asset at the end of its expected life span.

The current ages for infrastructure and non-infrastructure assets are sourced from Scottish Water information systems. The expected lives are estimates from models. Reservoirs are an exception as they are not covered by models.

The draft values at July in 2015/16 are shown in the table below, where a value of 1 represents a brand new asset and zero represents an asset at the end of its expected life. We note that:

- Sea outfalls and sewer structures are excluded as they are not recognised as specific sites in Ellipse;
- For water resources (G3.39), the value of civil works is sourced from an internal review (2013);
- For water mains (G3.40), ARM assumes retained service standards.

	Asset Life Indicators using Residual Life Expectancy Index	2015/16 (July)
G3.39	Water resources	0.617
G3.40	Water mains	0.411
G3.41	Water treatment works	0.782
G3.42	Water storage	0.754
G3.43	Water pumping stations	0.755
G3.44	Wastewater sewers	0.816
G3.45	Wastewater sewer structures	n/a
G3.46	Wastewater sea outfalls	n/a
G3.47	Wastewater sewage pumping stations	0.540
G3.48	Wastewater sewage treatment works	0.551
G3.49	Wastewater sludge treatment facilities	0.581

Source File: RLEI Summary.xlsx

Table G4 OMD Inputs including Q&S3a and Q&S3b completion project sign-off

G4.1 - G4.22 show the enhancements under the Q&S4 programme by OMD grouping. The number of outputs recorded is split by the 5 delivery milestones by quarter. The data reflects the cumulative actual and forecast position by year over the 2015-21 period. The data also reflects the position recorded in the milestone outputs graphs presented to the OMG working group on 16 May 2016.

Table G5: Growth

Lines G5.1 to G5.14 show the investment Scottish Water has made or is forecast to make on growth for the 2015-21 programme. The report has been produced using the same methodology as table G1 with the actual expenditure of projects taken from Scottish Water's financial systems and the forecast expenditure taken from Primavera(P6). The % allocation assigned to each project has been taken from the systems which hold Scottish Water's CAPEX gateway approval forms. Most projects have 100% assigned to growth but there is significant growth investment delivered as part of some of the large quality schemes.

The total Growth expenditure shown on table G5 aligns with the total Growth on table G1. Table G1 additionally shows the split between Part 3 and Part 4 assets and also the split between household and non-household for Reasonable Cost Contributions (RCC).

The table has been revised since last year with additional drivers added to distinguish projects on Part 3 and Part 4 assets and also a section to analyse the costs and associated contributions for Service Relocations (NRSWA).

At the start of the SR15 period projects were set up to allow specific reporting against each unitary authority, water / waste water and household/non household. This allows G1.9, G1.10 and lines G5.1, G5.2, G5.4 and G5.5 to be populated from the resultant outputs.

Total Net Growth Expenditure is £19.4m in the reporting year and is forecast to be £61.4m in the 2015-21 period but there is currently a significant unallocated amount within IR18 funding which will increase that figure.

G5.15 to G5.19 - Total Service Relocations costs in 2015/16 were £19.84m and customer contributions released against these projects was £16.35 giving a net spend of £3.50m in the period. The overall forecast for SR15 is a net spend after contributions of £7.5m.

G5.20 & G5.26 – Water household infrastructure charge income for the period to March 2016 is £6.5m, which relates to 19,244 new properties being connected, or applying to be connected, to the water network.

G5.21 & G5.27 – Water non-household infrastructure charge income for the period to March 2016 is £189k, which relates to 559 new non-household properties being connected, or applying to be connected, to the water network.

G5.22 & G5.28 – Waste water household infrastructure charge income for the period to March 2016 is £5.1m, which relates to 15,061 new households being connected, or applying to be connected, to the waste water network.

G5.23 & G5.29 – Waste water non-household infrastructure charge income for the period to March 2016 is £77k, which relates to 229 new non-household properties being connected, or applying to be connected, to the waste water network.

G5.24 – Total infrastructure charge income across all activities in the period is £11.9m and is forecast to be £81.1m in the 2015-21 period from a combined 239,728 connections to the water and waste networks in SR15.

G5.25 – Total Net Growth Expenditure after all contributions is £19.3m in the period and is forecast to be £61.4m in the 2015-21 period but there is currently a significant unallocated amount within IR18 funding which will increase that figure.

G5.32 – For the period to March 2016 we paid RCC to developers for 14,393 household properties that are connected to our water assets (Part 2 & 3).

G5.33 – For the period to March 2016 we did not pay RCC to any developers for non-household properties connected to our water assets (Part 2 & 3).

G5.35 – For the period to March 2016 we paid RCC to developers for 11,211 household properties that are connected to our waste water assets (Part 2 & 3).

G5.36 – For the period to March 2016 we did not pay RCC to any developers for non-household properties that are connected to our waste water assets (Part 2 & 3).

G5.38 – For each new household property connected to the water network an Infrastructure Charge is applicable. Therefore, for the period to March 2016, the number of household properties paying an infrastructure charge to Scottish Water for additional water strategic capacity is 19,244 (as line G5.26).

G5.39 – For each new non-household property connected to the water an Infrastructure Charge is applicable. Therefore, for the period to March 2016, the number of non-household properties paying an infrastructure charge to Scottish Water for additional water strategic capacity is 559 (as line G5.27).

G5.41 – For each new household property connected to the waste water network an Infrastructure Charge is applicable. Therefore, for the period to March 2016, the number of household properties paying an infrastructure charge to Scottish Water for additional waste water strategic capacity is 15,061 (as line G5.29).

G5.42 - For each new non-household property connected to the waste water network an Infrastructure Charge is applicable. Therefore, for the period to March 2016, the number of non-household properties paying an infrastructure charge to Scottish Water for additional waste water strategic capacity is 229 (as line G5.30).

G5.44 - For the period to March 2016 the additional population equivalent served from new part 4 investment – water was zero (0).

G5.45 - For the period to March 2016 the additional population equivalent served from new part 4 investment – waste water was 1,351

Table G6 Project Analysis – Actuals & Forecast – Water & Waste water

General Comments

The datasets used to create tables G1, G2 and G4 are taken from our corporate systems and are then also used to complete this table. The data in this table is consistent with Scottish Water's end of year reporting to our Board. The table analyses the 2015-21 programme by individual Project (by Row), detailing out Investment, Outputs and Dates (by Column).

Column 1 - Contains the unique project auto code number.

Column 2 - Contains the Project Title.

Column 3 - Contains the Q&S Period for each project. This is a project level assessment – some projects may have split funding.

Column 4 - Contains the group each project belongs to and is used by Scottish Water to allocate project ownership and project type.

Column 5 - Contains a more detailed view of programme groupings.

Column 6 - Shows the split project ID to allow projects with multiple outputs to be shown

Column 7 – Shows the output group for the split projects

Column 8 – Shows the split between water, waste water and general

Column 9 - Contains the Technical Expression sign-off owner (if required).

Column 10 - Contains the internal delivery vehicle assignment.

Column 11 - Contains a sub set of Programme Grouping.

Column 12 – Shows the current milestone stage.

Column 13 - 17 Show the forecast Milestone dates.

Column 18 – Contains the Local Authority area each project falls into if it has one location.

Column 19 to 25 –Contain the project expenditure analysed by financial year.

Column 26 – Contains the total actual or forecast project expenditure to March 2021.

Column 27 - Post 2021 project expenditure. This also includes £1.1m of maintenance expenditure which is excluded from Table G1 as maintenance expenditure is guillotined at 31 March 2021.

Column 28 - Grand total project expenditure.

Column 29 – Contains the Table K budget allocation. This is in outturn prices and reflects table K with additional budget for contributions and allocations from elsewhere in Scottish Water. In many cases, projects that were originally identified in table K have been split into multiple projects or aggregated to form larger projects. Although Scottish Water does assess the programme cost compared with the table K allocation, this is generally done at sub-programme and programme level.

Column 30 & 31 – Contain the infrastructure & non-infrastructure grants received.

Column 32 & 33 – Contain the infrastructure & non-infrastructure contributions received.

Column 34 – Contains the impact of projects on operating expenditure.

Column 35 – This has not been populated as any project with a regulatory output will require regulatory signoff or equivalent.

Column 36-55 – Contain the project's drivers and allocations as confirmed through the CAPEX approvals process.

Column 56 – 105 – Contain the low level output groups and show the project level allocation of outputs.

H Tables – ASSET INVENTORY

Summary of Gross MEAV

In 2015/16 Scottish Water's reported gross asset inventory valuation is £62.72 billion. The gross valuation is dominated by the infrastructure valuation of £51.93 billion, comprising 82.8% of the total. The non-infrastructure total valuation is £10.63 billion, which is 16.9% of the total valuation. Support services valuation is approximately £165.61 million representing 0.3% of the gross asset inventory valuation.

Asset Type	2012/13 Gross MEAV (£m)	% of total	2015/16 Gross MEAV (£m)	% of total
Water Infrastructure	13,711	23.7%	14,332	22.9%
Water Non - Infrastructure	5,061	8.8%	5,285	8.4%
Wastewater Infrastructure	33,787	58.4%	37,598	59.9%
Wastewater Non-Infrastructure	5,076	8.8%	5,343	8.5%
Support Services	158	0.3%	165	0.3%
Total	57,793	100.0%	62,723	100.0%

The combined gross valuation of water and wastewater infrastructure assets has increased by £4.43 billion and there has been an increase in the gross valuation for non-infrastructure assets of £0.50 billion. The total valuation of the asset stock has increased by £4.93 billion since our asset inventory (based on 2012/13) was submitted to WICS in October 2013 as part of our Business Plan 2015-21.

Detailed summary of gross MEAV

The table below shows the change in the total gross asset valuation of Scottish Water's assets from 2012/13 to 2015/16 by asset category.

Line Ref.	Asset Type	2012/13 Gross MEAV (£m)	% of total	2015/16 Gross MEAV (£m)	% of total	Change (£m)	% change
H1.1	Water treatment works	2,875	5.0%	3,072	4.9%	197	6.9%
H1.2	Water storage	1,759	3.0%	1,764	2.8%	5	0.3%
H1.3	Water pumping stations	427	0.7%	448	0.7%	21	5.0%
H1.4	Water resources	2,746	4.7%	2,842	4.5%	96	3.5%
H1.5	Water mains	10,965	19.0%	11,490	18.3%	525	4.8%
H1.6	Sewers	32,639	56.5%	36,246	57.8%	3,607	11.0%
H1.7	Sewer structures	508	0.9%	517	0.8%	9	1.9%
H1.8	Sea outfalls	640	1.1%	835	1.3%	195	30.4%
H1.9	Sewage pumping stations	899	1.5%	1,021	1.6%	122	13.6%
H1.10	Sewage treatment works	3,967	6.9%	4,107	6.6%	140	3.5%
H1.11	Sludge treatment facilities	210	0.4%	215	0.4%	5	2.8%
H1.12	Support services	158	0.3%	166	0.3%	8	4.7%
	Total	57,793	100%	62,723	100%	4,930	8.5%

Summary and comparison of net valuations from 2012/13 to 2015/16

The total net depreciated value of Scottish Water's non-infrastructure asset inventory (including support services depreciable assets) is £3.67 billion.

Line Ref.	Asset Type	2012/13 Net MEAV (£m)	% of total	2015/16 Net MEAV (£m)	% of total	Change (£m)	% change
H1.1	Water treatment works [101]	1,006	28.1%	1,221	33.3%	215	21.4%
H1.2	Water storage [102]	715	20.0%	690	18.8%	-25	-3.5%
H1.3	Water pumping stations [103]	104	2.9%	177	4.8%	73	69.9%
H1.9	Sewage pumping stations [109]	315	8.8%	328	8.9%	13	4.2%
H1.10	Sewage treatment works [110]	1,257	35.2%	1,089	29.7%	-168	-13.4%
H1.11	Sludge treatment facilities by disposal type [111]	81	2.3%	63	1.7%	-18	-21.2%
H1.12	Support services [112]	95	2.7%	103	2.8%	8	8.3%
	Total	3,572	100%	3,671	100%	98	2.7%

The table above shows the changes to the net valuation by asset category.

Summary of Confidence grades (MEAV)

There has been no movement in the confidence grade for MEAV from 2012/13 to 2015/16.

The MEAV confidence grade is dominated by the absence of data at certain levels within the asset inventories resulting in C4 grades for non-infrastructure assets and B4 or C4 for infrastructure.

Summary of Confidence grades (Asset Stock)

There has been no movement in the confidence grade for asset stock from 2012/13 to 2015/16.

The confidence grades applied to the asset stock is a reflection of the asset inventories.

General Comment - Asset Valuation

Over the years work has continued to better understand our assets and in some cases these values have been adjusted. Enhancements to existing assets, changes to asset information, cost curves, on-costs and the inflation index value are reasons for movements in MEAV in 2015/16. Indexation has increased the asset valuation by 6.02% as shown in the table below:

	Value	Base	
2015/16 RPI	259.43	225.3	1.1515
2012/13 RPI	244.7	225.3	1.0861
Difference			0.0654
% Difference			6.02%

Table H2: Water Non infrastructure

H2.1-2.8: Water Treatment Works

Asset Stock

The total number of Water Treatment Works in this reporting year is 243. This is a reduction of 9 from the 252 reported in 2012/13. There has been an overall reduction as a result of rationalisation of water treatment works and abandonment of smaller ones.

Asset valuation

The asset valuation for water treatment works for the reporting year has increased from £2,875 to £3,072 million. The valuation has increased as a result of enhancements to existing assets, changes to asset information and indexation, offset by there being fewer in number in AR16.

H2.9 - 2.10: Water Storage

Asset Stock

There has been an overall reduction in Water Storage Assets. The total number of in this reporting year is 1,325. This is a reduction of 47 from the 1,372 reported in 2012/13.

The majority of the change is due to the abandonment of assets, however this is partially offset by some newly built assets. The number of water towers reported has decreased by 1.

Asset valuation

The asset valuation for water treatment works for the reporting year has increased from £1,759 million to £1,764 million. The valuation has increased by less than the RPI indexation as a result of the reduction in the number of assets.

H2.11-2.13: Water Pumping Stations

Asset Stock

The total number of Water Pumping Stations (WPS) in this reporting year is 764. This is an increase of 16 from the 748 reported in 2012/13. The increase is due to new pumping stations and exiting pumping stations being adopted by Scottish Water. This has been partially offset by the abandonment of assets no longer required.

Asset valuation

The asset valuation for water pumping stations for the reporting year has increased from £427 million to £448 million. The reason is a combination of a net increase of 16 new sites being valued, redundant equipment being removed from the asset inventory and an increase in the RPI.

Table H3: Water Infrastructure

H3.1: Water Resources - Dams & Impounding Reservoirs

Asset Stock

The total number of Dams & Impounding Reservoirs in this reporting year is 217. This is a reduction of 3 from 2012/13.

Asset valuation

A decrease in the number of dams & impounding reservoirs and better capacity information, which has re-categorised existing assets into lower value size bands, has decreased the MEAV from £1,415 million to £1,352 million.

H3.2: Water Resources – Raw Water Intakes

Asset Stock

The total number of raw water intakes in this reporting year is 308. A reduction of 6 from 2012/13.

Asset valuation

The asset valuation for raw water intakes for the reporting year has increased from £32 million to £33 million.

For the MEAV methodology for Dams and Impounding Reservoirs and Raw Water Intakes, costs have been determined for a representative set of modern equivalent assets. The costs were developed by Berkeley Consultants in 2008 who estimated the structure cost on the basis of labour, plant and materials only. Included in the cost of the intake are concrete costs of the weir and the intake chamber, as well as all screens, valves, and contractors preliminaries.

H3.3: Water Resources – Raw Water Aqueducts

Asset Stock

The total length of Raw Water Aqueducts in this reporting year is 1,351.8km. This is an increase of 48.9km from 2012/13.

Asset valuation

The asset valuation for this reporting year has increased from £1,299 million to £1,457 million. The increase in the valuation is due to indexation and the use of the 2016 ITN (integrated transport network) surface classification map, as opposed to the 2011 ITN version used in 2012/13. Generally there has been a change from grassland to rural classification of the infrastructure. This results in a higher MEAV as pipes on rural roads incur a higher replacement cost than those in grass.

H3.4: Water Mains – Mains Potable

Asset Stock

The total length of Potable Mains in this reporting year is 48,380.5km. This is an increase of 422.2km from 2012/13.

Asset valuation

The asset valuation for this reporting year has increased from £10,031 million to £10,499 million.

The use of the 2016 ITN (integrated transport network) surface classification map, as opposed to the 2011 ITN used in 2012/13, has meant the proportion of infrastructure classified as being urban, rural or grassland has changed. Water mains classified as grassland and urban have decreased by similar total lengths with a corresponding increase in those with a rural classification. Grassland mains replacement incur a lower value and urban a higher value than rural. There is a greater difference in values moving from urban to rural, therefore the updated surface classification has resulted in this element of the valuation decreasing from the values reported in 2012/13.

H3.5: Mains Other

Asset Stock

The total length of Other Mains in this reporting year is 136.4km. This is a decrease of 40.2km from 2012/13. The reduction is due to better identification of pipe type in Scottish Water's GIS, which is used to categorize mains as potable or other.

Asset valuation

The asset valuation for this reporting year has decreased to £24 million from £33 million. The valuation decrease is broadly in line with the reduction in the total length of assets.

H3.6: Communication Pipes (Lead)

Asset Stock

The total number of Communication Pipes (Lead) in this reporting year is 64,288. This is a decrease of 9,424 from 2012/13. The reduction is due to better identification of pipe material in Scottish Water's GIS and on-going lead pipe replacement in the ground.

Asset valuation

The asset valuation for this reporting year has decreased to £31 million from £33 million. The valuation decrease is broadly in line with the reduction in the total number of assets.

H3.7: Communication Pipes (other)

Asset Stock

The total number of Communication Pipes (other) in this reporting year is 1,823,243. This is an increase of 31,529 from 2012/13. The increase is due to new housing connections, better identification of pipe material in Scottish Water's GIS and on-going lead pipe replacement in the ground.

Asset valuation

The asset valuation for this reporting year has increased from £813 million to £874 million. The increase is a combination of the increase in the asset stock and the RPI indexation.

H3.8: Water Meters

Asset Stock

The total number of Water Meters in this reporting year is 134,090. This is an increase of 1,753 from 2012/13.

Asset valuation

The asset valuation for this reporting year has increased from £54 million to £62 million. The increase is a combination of an increase in the average meter size within the asset stock from 2012/13, which generates a higher MEAV, and the increase in the RPI indexation.

Table H4: Wastewater Infrastructure

H4.1: Sewers – Critical Sewers

Asset Stock

The total length of Critical Sewers in this reporting year is 11,181.5km. This is an increase of 292.8km from 2012/13.

For wastewater infrastructure, an improved method of determining pipe diameters and materials from adjoining pipes has been employed for the first time in AR16. This is used where previously a default value would have been used. As a result there are fewer critical sewers in size band 2 (default 225mm) and an increase in other size bands.

Asset valuation

The asset valuation for this reporting year has increased from £11,510 million to £13,332 million.

The increase in the valuation is due to RPI indexation, the use of the 2016 ITN (integrated transport network) surface classification map, as opposed to the 2011 ITN one used in 2012/13, and an improved method of determining pipe diameters and materials from adjoining pipes mentioned under Asset Stock generally results in a higher MEAV due to assets moving into larger size bands. Sewers in size bands 4 and 5 are significantly more expensive to replace.

H4.2: Sewers – Non Critical Sewers

Asset Stock

The total length of Non-Critical Sewers in this reporting year is 38,407.0km. This is an increase of 518.1km from 2012/13.

For wastewater infrastructure, an improved method of determining pipe diameters and materials from adjoining pipes has been employed for the first time in AR16. This is used where previously a default value would have been used. As a result there are fewer non-critical sewers in size band 2 (default 225mm) and an increase in other size bands.

Asset valuation

The asset valuation for this reporting year has increased from £20,727 million to £22,439 million.

The increase in the valuation is due to indexation, the use of the 2016 ITN (integrated transport network) surface classification map, as opposed to the 2011 ITN one used in 2012/13, and an improved method of determining pipe diameters and materials from adjoining pipes mentioned under Asset Stock generally results in a higher MEAV due to assets moving into larger size bands.

H4.3: Sewers – Sewage and sludge pumping mains

Asset Stock

The total length of sewage and sludge pumping mains in this reporting year is 1,301.8km. This is an increase of 87.2km from 2012/13.

For wastewater infrastructure, an improved method of determining pipe diameters and materials from adjoining pipes has been employed for the first time in AR16. This is used where previously a default value would have been used. For sewage and sludge pumping mains, this results in fewer in size band 1 (the default), however, this is partially offset by new rising mains being laid.

The increase in sewage and sludge pumping mains corresponds with the reduction in the number of WwTW, as smaller WwTW are rationalised and their catchments pumped to other works.

Asset valuation

The asset valuation for this reporting year has increased from £403 million to £474 million.

The increase in the valuation is due to indexation, the use of the 2016 ITN (integrated transport network) surface classification map, as opposed to the 2011 ITN one used in 2012/13, and an improved method of determining pipe diameters and materials from adjoining pipes mentioned under Asset Stock generally results in a higher MEAV due to assets moving into larger size bands.

H4.4 and 4.5: Sewer Structures: CSO's and Other Sewer Structures

Asset Stock

The total number of CSO's and Other Sewer Structures in this reporting year is 4,061. This is a decrease of 53 from 2012/13.

Continual improvement has been done to identify abandoned CSOs and duplicate records, which has reduced the overall number.

Asset valuation

The asset valuation for this reporting year has increased from £507 million to £517 million. The RPI increase and improved asset data (an increase in the recorded number of powered screens) has meant the MEAV increase outweighs the reduction in the number of assets.

H4.6 and 4.7: Sea Outfalls: Short and Long Sea Outfalls

Asset Stock

The total number of Sea Outfalls in this reporting year is 1,452. This is a decrease of 5 from 2012/13.

Asset valuation

The asset valuation for this reporting year has increased from £640 million to £835 million. There has also been improved identification of the length of the outfalls, which has resulted in a higher MEAV being calculated.

Table H5: Wastewater Non-infrastructure

H5.1 and H5.2: Sewage Pumping Stations

Asset Stock

The total number of Sewage Pumping Stations (SPS) in this reporting year is 2,200. This is an increase of 100 from the 2,100 reported in 2012/13.

The increase is mainly due to new pumping stations being built. Additionally, ownership has been taken of some existing assets.

Asset valuation

The asset valuation for the reporting year has increased from £899 million to £1,021 million. The valuation has increased due to the construction of new pumping stations, better information about existing assets and the RPI indexation, offset by the removal of some redundant equipment.

H5.3 to 5.7: Sewage Treatment Works

Asset Stock

The total number of Sewage Treatment Works in this reporting year is 1,838. This is a reduction of 27 from the 1,865 reported in 2012/13.

There has been an overall reduction as a result of rationalisation of sewage treatment water treatment works and abandonment of smaller ones. This is reflected in an increase in the number of pumping stations and pumping main length as catchments are pumped to larger works.

Asset valuation

The asset valuation for the reporting year has increased from £3,967 million to £4,107 million. The valuation has increased as a result of enhancements to existing assets, changes to asset information and indexation, offset by there being fewer in number in 2015/16.

H5.8 and 5.9: Sludge Treatment Facilities

Asset Stock

The total number of sludge treatment facilities in this reporting year is 20. This is a reduction of 6 from the 26 reported in 2012/13.

Asset valuation

The asset valuation for the reporting year has increased from £210 million to £216 million. The increase in indexation and data improvement generating a higher MEAV at existing sites has outweighed the reduction in the total asset numbers.

Table H6: Support Services

H6.1- H6.7: Support Services

Asset Stock

Since 2012/13 the Control Centre at Balmore Road has been closed along with the office. The new control centre is now integrated with the new office at Stepps.

Building Type	2012/13	2015/16
Control Centre	1	0
Depot	40	38
Laboratory	2	2
Offices	8	7

Asset valuation

The asset valuation for the report year has increased from £73 million to £87 million mainly due to the new office at Stepps.

As with the previous reporting year, condition grade has been used to calculate the remaining life of non-operational buildings, which all have an asset design life of 60 years. The remaining asset life was used to calculate the net MEAV which has increased to £63 million.

Leased assets are not specifically excluded in the H6.1 to H6.3 line definitions (unlike H6.7) therefore, to be consistent with previous Annual Returns, they have been included. As some of the individual buildings have a high value, the following table provides details.

Leased assets (included in Table H6)			
Building Name	Asset Type	Gross MEAV (£m)	Net MEAV (£m)
Orkney Area Office	Depot	0.626	0.253
Gremista Depot	Depot	0.626	0.253
Dornoch Area Office & Depot	Depot	0.626	0.545
Kilmory Depot	Depot	0.626	0.253
Juniper House Laboratory	Lab	9.042	7.876
Torridon House Office	Office	9.388	3.790

H6.4 - Vehicles & plant

Asset valuation

The gross valuation has increased from £31 million to £36 million.

Net values were calculated based on the age and design life of each vehicle or plant using the same method as previous Annual Returns.

H6.5 - Telemetry systems

Asset Stock

The 4,939 telemetry sites reported show a small decrease from 5,247 as reported in 2012/13. This equates to having 44% coverage of Scottish Water's operational sites. Data improvement has been on-going to improve telemetry information held for Scottish Water's assets. This has identified redundant telemetry systems and updated the inventory accordingly.

Asset valuation

The asset valuation for the report year has decreased slightly from £23 million to £22 million, based on the same standard unit valuation as used in 2012/13.

Net MEAV is based on remaining asset life calculated from the condition grade matrix. The process is unchanged from that explained in AR09 Commentary, Annex 1. All telemetry outstations were assigned a short (6-15 year) design life, as recommended in the WIC guidance notes.

H6.6 - Information systems

Asset Stock

There is a net increase of 74 laptops and a reduction of 217 workstations and 1,273 servers from 2012/13. The reduction in the number of servers is due to an improved IT inventory, which enabled identification of virtual servers. It was viewed that these are software partitions on a server, rather than physical assets.

Asset valuation

The asset valuation for the report year has decreased from £16 million to £6 million primarily for the net change in asset stock explained above. The total Net MEAV has decreased by £5 million.

H6.7 - Other Non-Operational Assets

Asset Stock

There are 36 properties/land reported as being owned by Scottish Water in 2015/16, the same as in 2012/13. Details of the remaining asset categories are contained in the following table.

Type of property	2012/13 Count	2015/16 Count
Houses	26	26
Farms and Grazing land	10	10
Total	36	36

Asset valuation

The asset valuation for the report year remains the same as 2012/13 at £15 million.

Farm and grazing land values are based on valuations carried out in 2008/09.