Annual Information Return 2014

Northern Ireland Water

Sewage Explanatory Factors

(Commentaries for Tables 17a - g)

Public Domain Submission

Prepared for

Utility Regulator and NI Water

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CH2MHILL®

304 Bridgewater Place
Birchwood Park
Warrington WA3 6XG

Table 17a –Sewerage Sub-Area Explanatory Factors (Total)

1. Introduction

This table collects information on companies' sewerage services (both costs and explanatory factors) to enable UR to update their sewerage services models.

2. Key findings

- After the Company's submission, we agreed with the Company that the confidence grades for Line 4 is B2. Please see our Table 7 commentary for further detail.
- The audit has revealed that NI Water does not report data in a format required by the reporting requirements. The financial data contained in this table has simply been transposed from appropriate lines in Table 22. No allocations have been made across different sewerage sub areas for AIR14.
- We audited the reported data and challenged the processes on a sample basis. Except where detailed below, we consider the data reported in the table is robustly prepared using systems and process that are appropriate and in line with the reporting requirements and that are properly implemented with effective quality control and governance arrangements.

2.1 Key recommendations

- Split the data on some other basis whilst waiting for the cost to serve to be fully implemented.

3. Audit approach

The audit consisted of an interview with the data owners to discuss the method and data used to generate this table. Cross-checks were made against source data.

As part of our audits of financial data we liaised with KPMG to share key findings. This was done at a tripartite meeting between the Reporter, KPMG and NI Water.

4. Company methodology

4.1 Lines 1 and 2

The methodology to populate both lines has been revised for AIR13 due to the availability and format of the third party reports NI Water relies on to derive the population estimates reported. Given the reliance upon third party data and the methodology required to calculate the population estimates confidence in the data is consider low (NI Water has assigned a confidence grade of C3). Whilst we have not undertaken any exercises to verify this grade, we concur that weaknesses recognised by NI Water in their commentary is likely to reduce confidence.

To confirm the reconciliation within the AIR submission the Company was able to demonstrate the consistency with Table 13 Line 10 and the approach adopted for the population lines reported in Table 2. We confirmed that total population reported in Table 13 includes non resident population and therefore the approach to calculate resident population in Line 1 by deducting the non resident population from the total population is appropriate.

4.2 Lines 3 and 4

Line 3 is copied from Table 14 Line 7.

Line 4 is a sum of Table 4 Lines 7 and 8.

4.3 Lines 5 and 6

Lines 5 and 6 are based on running control queries on the GIS database in order to extract the required information. This data is provided in the form required by UR and only requires transcription to the data tables.

4.4 Lines 7 to 11

The Company's approach is unchanged since AIR08. The data contained has not been split by region due to limitations in the reporting system. The financial data contained in this table has simply been transposed from appropriate lines in Table 22. No allocations have been made across different sewerage sub areas for AIR14. The Company has advised for a number of years that it is close to being able to report this data.

5. Audit findings

5.1 Resident and non-resident population (Lines 1 and 2)

The Company provided a detailed explanation of the approach adopted to provide this estimate (which is also replicated in their commentary for Table 17a). We have followed the methodology laid out by the Company in their commentaries and confirm the approach taken is as documented here.

To demonstrate trend information and ensure consistency, NI Water has helpfully provided a retrospective data for 2012 and 2013 and residential population continues to show an increasing trend.

5.2 Volume of sewerage collected (Line 3)

The total volume returned to sewer should be the sum of Table 14 Lines 3, 4, 5 and 6 (or Line 7) which equates to 316.01, which equals to this line.

5.3 Total connected properties (Line 4)

The number of total connected properties is calculated based on the total number of connected properties (household and non-households) and is inclusive of voids. We have checked the Company's calculation and confirm their approach is consistent to the data presented in Table 13.

5.4 Area of sewerage district (Line 5)

NI Water is still not able to disaggregate the data in this table into sub-areas. The reported total is unchanged from last year as expected. The area of the sewerage district given in Line 5 is the area of Northern Ireland excluding the area of major lakes.

5.5 Sewerage data (Line 6)

The length of sewer in Line 6 is only the length of main sewers. NI Water is also responsible for most lateral sewers, unlike other water companies in England and Wales. However as most of these lateral sewers are not mapped, their length is not known although a recent exercise has estimated the total length of lateral sewers at 2,155km. This length is not included in the total length given in Line 6.

The total length of sewer reported has increased from 15,254km to 15,410km, an increase of just over 1% from last year. We reviewed the extracts of data and also had a sample of these re-run whilst at audit, resulting in zero errors being located.

5.6 Costs (Lines 7 to 11)

Progress on the cost to serve project has been slower than expected. Although the Company has started to phase in the cost to serve project, it was felt that there was insufficient data for it to be used for AIR14. NI Water is hopeful that in the near future it will be able to provide some type of split between areas on the cost to serve project. Comment on the basis of the costs in the total column is provided in our commentary to Table 22.

6. Assumptions

Except where disclosed above, no assumptions have been identified.

7. Confidence grades

Lines 1 and 2

We are content with the confidence grade of C3.

Lines 3 and 4

We are content with the confidence grade of B3 for Line 3.

The Company submitted their confidence grade of A2 for Line 4, however after their submission we agreed that the confidence grade is B2. Please see our detailed comments on the confidence grades in Table 7.

Lines 5 and 6

The Company has assigned a B2 grade (1% to 5%) to Line 5 and a B3 grade (5% to 10%) to Line 6. After high level consideration of the data methodology and audit discussions, we believe that the assigned confidence grades are reasonable. In brief, it is difficult to assess the level of accuracy/inaccuracy inherent in the datasets but we believe it is appropriate to retain the grades which relate to NI Water's underlying methodologies. We have however not undertaken any specific statistical analysis to fully verify this.

Lines 7 to 11

No confidence grades are required for financial data.

8. Consistency checks

We confirm that:

- Total volume of sewerage in Table 17a Line 3 equals the figure in Table 14 Line 7.
- Direct costs in Table 17a Line 7 Column 9 equals direct costs in Table 22 Line 9 Column 1.
- Power costs in Table 17a Line 8 Column 9 equals power costs in Table 22 Line 2 Column 1.
- Service charges in Table 17a Line 9 Column 9 equals service charges in Table 22 Line 7 Column 1.
- General and support costs in Table 17a Line 10 Column 9 equals general and support costs in Table 22 Line 10 Column 1.
- Functional expenditure in Table 17a Line 11 Column 9 equals functional expenditure in Table 22 Line 11 Column 1.

Table 17b – Sewage Treatment Works – Large Works Information Database

1. Introduction

The purpose of this table is to allow UR to update the econometric modelling of large sewage treatment works (WwTWs).

2. Key findings

- The data is based on the asset performance spreadsheet to be consistent with other reporting tables.
- The Company has identified 13 large works, a reduction of 2 from last year, each of which has its own location code to enable the identification of related costs.
- There are no significant changes to previous methodologies applied by the Company in AIR13. The Company has identified 13 large works, each of which has its own location code to enable the identification of related costs.
- Only 1 power meter exists at each site. Where a treatment works provides both sewerage and sludge treatment facilities the costs are split on the basis of the judgement of operational staff.
- The Company has used the same approach to reporting general and support costs as compared to AIR13.
- The approach requires some judgements and apportionment of data.
- Noting the above limitations, based on our audit of sample data, we believe that the data reported in this table is consistent with the reporting requirements.

2.1 Key recommendations

- Consider future justification for raising confidence grade in Line 2.

3. Audit approach

The responsibility for completing Table 17b is shared among various line owners. We audited each data owner. The audits consisted of interviews to discuss methodology, and cross check the results against the original sources of data.

As part of our audits of financial data we liaised with KPMG to share key findings. This was done at a tripartite meeting between the Reporter, KPMG and NI Water.

4. Company methodology

4.1 Large works information (Lines 1 to 8)

The data utilised to populate Lines 1, 2 and 8 of Table 17b is sourced from the master asset performance spreadsheet compiled and updated by Asset Management Section (performance team) for the reported year. We reviewed the spreadsheet and found it to be well structured with a good level of checks, including clear comments on reasons for changes. Sites for inclusion in Table 17b are identified through simple filtering for <25,000 PE (taken as equivalent to 1500kg/BOD/day loading). The PE used to categorise works size for this table are consistent with those used for Tables 15, 16 and 17c-d. The figures correctly include tourist populations.

The information in Section B Lines 3-7 relating to final effluent compliance is taken from Water Order Consents. These values are based on 95%ile compliance and in line with figures issued by NIEA. It is noted that the consented PE values for works may differ from those in the Asset Management Section master spreadsheet due to the 'fixing' of the banding at the time consent (hence NI Water cannot apply updates to PE that would subsequently change a banding).

The works treatment classification in Line 8 is allocated by the Asset Performance team and matches that listed in Table17c for consistency. It is noted that these may differ from categories listed by NIEA on the works consent document as NIEA categorise any site with an nitrogen or phosphate consent to be a tertiary (for example, Belfast is categorised as 'tertiary' by NIEA, but as 'SAS' under UR definitions).

Most of the data for this table is based on the asset performance spreadsheet which we have reviewed in detail for Table 15. Discharge consent information has then been applied by the Environmental Regulation team to filter the outputs for the requirements of Table 17b. Checks are made by NI Water to ensure that data aligns with those in other sections of Table 17 and associated information and analytical data is signed off by the Head of Function.

We confirm PPP data has been correctly excluded from the reported data.

4.2 Quality assurance

The Company carries out a number of cross checks against source data and with relevant internal departments to check and challenge information included in the database. Evidence of this was observed in the master database which contains formulae to automatically identify when a works parameter such as consent or PE banding has changed. A separate column also records the reasons for change where not obvious. Changes from year to year are therefore clear and auditable.

4.3 Cost (Lines 9 to 15)

The Company has identified 13 large works which meet the criteria to be reported in Band 6, this is two less than last year. The approach to reporting costs has remained unchanged from previous years.

5. Audit findings

5.1 Works Sizes (Lines 1 and 2)

Following a substantial review of population equivalent (PE) numbers undertaken primarily as part of PC15, 2 sites (Enniskillen and Larne) have been removed from the list following revisions in their estimated PE values to below 25,000. Table 17b therefore now comprises columns for 13 works. Changes are hence primarily due to improvements in accuracy rather than any significant change to catchments or demographics.

We noted that the revised population of Enniskillen was only just below the 25,000 threshold (24,977) and that rounding up could easily argue inclusion. NI Water admitted that inclusion of the site was possibly justified, but that they preferred to retain application of strict filters to avoid ambiguity and ensure consistency with other tables. We accept this approach, but note the likelihood of this site to re-appear in the table next year.

Checks against the source database confirmed the correct table entries. The data also indicated 5 non-listed works with populations in the range 20,000-25,000: Enniskillen, Larne, Glenstall, Banbridge and Strabane.

5.2 Effluent Consent Standard (Lines 3 to 7)

The table correctly lists reported consent levels for each site taken from the company spreadsheet. The only change to the values from AIR13 was the addition of a new 2mg/l phosphate consent at Omagh. We carried out spot checks against the original consent documents issued by Northern Ireland Environment Agency (NIEA) for Belfast, Antrim and Omagh works. These confirmed the correct listing for these sites with blank cells correctly reporting no applied standard. The reported additional phosphate consent at Omagh was validated as being applied on the 29th July 2013, within the report year, due to re-designation of the receiving watercourse.

All consents for the listed works include BOD, COD and SS targets. Of the 8 sites which also include ammonia consents, none are considered overly tight in proportion to the respective BOD and SS levels.

5.3 Treatment Category (Line 8)

Comparison of the classifications against last year identified a change to the classification of Omagh from SAS to TA2. Further investigation confirmed that phosphorous dosing is installed on site and no physical changes had occurred at the site during the year. However, as a formal P consent was only introduced since AIR13, the categorisation of the works was effectively changed this year on the basis of it now providing dosing to achieve a specific P consent.

In order to investigate the allocation of some sites into the tertiary category, we requested process flow diagrams for two sites; Omagh and Antrim. These confirmed the installation of dosing equipment at both sites and hence their qualification as TA2 under the listed criteria.

5.4 Cost (Lines 9 to 15)

The Company has identified 13 large works which meet the criteria to be reported in Band 6, this is two less than last year. The approach to reporting costs has remained unchanged from previous years.

Line 9 - Direct Costs

The value in total direct costs seems to be consistent with the value in Table 17f for direct costs for large NI Water works. Cost for large works is easily identifiable because each large works has a separate finance location code.

Direct costs include Contractors (531X), Materials (541X), Chemicals (548X) and Direct Labour (611X and 612X – Wages Overheads).

All operational staff are required to complete timesheets. Labour costs can be queried on the basis of account codes and location codes to attribute labour costs by site.

We note that the cost to serve project has allowed NI Water to continue to refine its categorisation of costs particularly between sewage and sludge assets, and now allows them to report costs at site level. This is because when allocating costs NI Water staff have to select whether any cost relates to sewage or sludge. We challenged the Company to advise whether any particular expenditure could be used for both sewage and sludge treatment. An example may be operational materials. They advised that where it does occur the costs would be in general coded to sewage.

We also challenged NI Water to advise whether any portion of works classed as sewage treatment could also have an element that is sludge treatment. They advised most of the large works will have an element of cost that is specific to sludge treatment.

Line 10 – Power Costs

Power costs are measured at each site by a single meter. As such, the costs by site can be extracted directly from the oracle system. In order to split costs between sewage and sludge treatment the company relies on operational judgement by the field managers on a site by site basis, based on their knowledge of the processes and likely power consumption. We challenged the Company if these percentages were reviewed for AIR14. They advised that in fact these percentages were reviewed and this judgement is revised annually and hence the data reflects the most current information.

As mentioned previously, there is currently a single meter at Duncrue Street, which measures power to both the Belfast WwTW and the incinerators. This is the same as AIR13. For AIR13 the Company used a 42%:58% split, which was an estimate of the kilowatt usage between the sites during the year. For AIR14 they has used a 45%:55% split. The Company confirmed that no incinerator costs are reported in this table.

Line 11 – Service Charges

In AIR12 NI Water included these charges within the general and support category. Since then these costs are reported separately. They report a total of £0.2m of direct costs included in Band 6 for service charges. This is consistent with the value reported in AIR13.

Line 12 – General and Support Costs

These are allocated to each individual WwTW in proportion to the direct labour costs. The total is taken from table 22 for general and support costs. This was then split across all WwTWs based on Costed Wages Charge (611X). The data for direct labour costs was extracted from the company general ledger system which records operational costs on a timesheet basis.

Data for qualifying works was then reported in the relevant cells for this table. We believe the approach is appropriate for the purposes of reporting the data in the absence of direct allocation of costs.

Line 13 – Functional Expenditure

Functional expenditure is calculated as the sum of Line 9 and 12.

Line 14 – Estimated Terminal Pumping Costs

Terminal pumping station costs previously only included power costs, as these are the only costs that NI Water were able to be separately identified. Due to the improvement in data due to cost to serve the Company now has greater data granularity and is able to remove all terminal pumping station costs from data. The data entry in this line is therefore zero.

Line 15 – Estimated Sludge Costs

The Company has reported zero in these rows as sludge costs are generally identifiable separately and are not included in the lines above.

6. Assumptions

Population figures are generally based on property counts with catchment boundaries within GIS systems and apply an assumed head count of 3 No people per property.

Assumptions have been made by the field managers regarding the split of power usage to sewage treatment and sludge treatment, as discussed above. This is a reasonable approach in the absence of more appropriate data.

7. Confidence grades

The Company report a confidence grade for Line 2 of C5. This is based on advice from consultants of the reliability of values for individual works. Where such values are amalgamated as in Tables 15 and 17d, the confidence grade is increased to C3 to represent the improved confidence in the total PE. Following assessment of the accuracy of source data and grades reported in other tables, we felt that a confidence grade of C5, implying an accuracy of only +/-50%, is likely to be over-cautious, particularly when applied to larger works. We discussed this with NI Water who was reluctant to change confidence grades at this stage, particularly with their expectations of potential large inaccuracies at works such as Belfast WwTW. However, with increasing cross checks and confidence in their data, we suggest that the Company considers raising the grade for Line 2 to at least C4 next year when further confidence has been acquired.

The applied gradings of A1 for Lines 3-7 are appropriate as these are exact and defined values.

8. Consistency checks

The populations and treatment categories are consistent with those reported in Tables 15, 17c and 17d.

Table 17c – Sewage Treatment Works – Numbers

1. Introduction

The purpose of this table is to classify each of the Company's sewage treatment works by size and by method of treatment.

2. Key findings

- The total number of STWs has decreased by 4 to 1030 following rationalising, decommissioning and re-designation of some sites.
- Significant change to treatment categories, the majority due to changes in interpretation or improved information rather than physical changes.
- Proposed re-categorisation of 33 sites based on a revised interpretation of the definition of what is required to meet a Tertiary TA2 and TB2 treatment standard.
- One minor error was noted during audit; the works classification for one PPP works was correctly identified in the methodology but transposed into the reporting table in the wrong column. This was not corrected for the final table version.
- We audited the reported data and challenged the processes on a sample basis. Except where detailed below, we consider the data reported in the table is robustly prepared using systems and process that are appropriate and in line with the reporting requirements and that are properly implemented with effective quality control and governance arrangements.

2.1 Key recommendations

- Consideration to be given to possible impacts of revised interpretation of tertiary treatment on future reporting. NI Water should discuss further with NIAUR to ensure a balanced decision is made.
- Identification of changes to size bands and treatment categories should be automated.

3. Audit approach

The audit consisted of an interview with the line owners to discuss the methodology and review the master spreadsheet that has been used as an input to this table.

4. Company methodology

4.1 General

There has been no change to the methodologies used from previous years and the data sources, processing and reporting procedures applied remain the same. However, the Company has proposed a modification to its assignment of treatment categories following a review of other UK water companies and a query with Ofwat. This is discussed further in Section 5.1.

4.2 Information sources

Data is extracted from a master spreadsheet used as a basis for the population of Tables 15 and 17a-g. The spreadsheet contains rows for each individual Sewage Treatment Works (STWs) and is populated and maintained as a live document throughout the year by the Asset Performance Team. To track

changes and maintain the process, the Asset Performance Team (APT) monitor and update this tool by liaising with various internal departments including Operational Technical Support Team (OTST), Engineering & Procurement (EP) and Environmental Regulation Section (ERS). Meetings are held on a regular basis with OTST to discuss potential issues. Details of any new or changed consent are provided by ERS.

APT are responsible for compiling population equivalent (PE) figures for the works and are the only section authorised to change PE figures. Figures for PE are based on flow and load surveys and GIS-based property counts (Pointer database). Despite some increased utilisation of flow and load surveys, the majority of sites are based on property counts. Wastewater treatment facilities serving less than 250 PE are largely defined by the consent, with actual values based on property counts from the Company's GIS systems. The Company apply an assumed occupancy of 3 people per property to derive the overall PE.

All information is collated within a 'master' spreadsheet from which band size for each STW is automatically assigned by formulae based on PE. Any changes to previous categorisations are highlighted for validation, although this is done manually and hence remains prone to some human error. We would encourage the Company to adopt automated formulae where possible, particular in such areas where automation appears straightforward.

Size banding for all works is based on the latest PEs excluding non-resident PE in accordance with the reporting requirements. This was confirmed through checks against the source data. In general, whilst NI Water does identify possible commercial and non-residential buildings using the Pointer database, they do not exclude them from the applied PE totals due to uncertainty in their actual usage. Inputs from trade effluent are based on figures from NI Water's Trade Effluent Section compiled using data for individual traders and converted to an equivalent PE value for inclusion. No allowance is made for commuters. This methodology is generally acceptable as it remains consistent with previous years and avoids potential subjectivity in the exclusion of properties. However, as a result it will tend to slightly over-estimate population equivalents.

Works treatment classification follows the definitions by UR and is allocated to each works in the spreadsheet by the Asset Performance Team. The definitions of tertiary treatment remain subject to some interpretation. NI Water generally includes STWs with dosing for phosphorous removal as tertiary treatment. Following recent clarification sought from Ofwat, NI Water now also includes any works with an ammonia consent less than or equal to 5mg/l on the basis of it being a 'tight' consent and requiring a higher level of treatment than normal. This is discussed further in Section 5.1.

The Asset Management Section has co-ordinated information from PPP for the population of 'Table 17c – total' table, and the associated commentary.

4.3 Quality assurance

The Company carries out a number of cross checks against source data and with relevant internal departments to check and challenge information included in the database. These are detailed in the Company's methodology, but include regular meetings to compare information with other departments, and cross-checking against department updates and reports. To ensure consistency, the same database is used for populating other related tables including Tables 15 and 17c.

Evidence of quality control was observed in the master database which contains cells to highlight when a works parameter such as consent or PE banding has changed. However, the current method appears to rely overly on manual translation of data such that the database may be prone to human error. Automation of the process using set formulae and conditional formatting would improve data reliability. A separate column records the reasons for change where not obvious. Changes from year to year are therefore generally clear and auditable.

5. Audit findings

5.1 Small and large works (Lines 1 to 7)

NIW Only

This year, the Company has carried out a significant amount of re-assessment of population equivalent (PE) values for sites, predominantly as a result of similar work on PC15. This has resulted in updates to 152 sites in AIR14 of which 8 have changed size band.

The total number of NI Water STWs in AIR 14 is reported as 1024, a net decrease of 4 from AIR 13. The number of PPP owned sites remains unchanged at 6 (hence an overall total of 1030 works). The change includes a reduction in the number of unscreened outfalls to 7 following the decommissioning in year of Rathlin Retention tank. Checks of the changes against the source data confirmed consistency with NI Water reported and tabulated changes. The net changes are summarised in the tables below for information:

Table 17c.1 – Summary of net changes to size bands (NI Water Only)

STW Size Band	NIW Total No. AIR 13	NIW Total No. AIR 14	Net Change
1	782	779	-3
2	58	59	+1
3	106	103	-3
4	54	54	0
5	13	16	+3
6	15	13	-2
All	**1028**	**1024**	**-4**

Checks against the source data confirmed the correct changes to the line totals. However, these checks identified the failure in the master spreadsheet to highlight a change in band size at Magilligan Point Road STW which resulted in it being excluded from the table in the Company Commentary summarising the changes in band sizes. The spreadsheet appears to still rely on manual assessment of changes in categorisation or size band which is prone to error. This should be rectified by including a simple automated formula to identify any changes.

There has been some significant change to treatment categories this year, with changes in categorisation at 56 works in total. Full listings of these works, including reasons for the change, are included in the Company Commentary. The net impact on the total in each treatment category in Line 7 is summarised in the table below.

Table 17c.2 – Summary of net changes to treatment categories (Line 7 - NI Water Only)

STW Treatment Category	NIW Total No. AIR 13	NIW Total No. AIR 14	Net Change	%age Change
Primary	241	238	-3	-1.2
Secondary Activated	95	71	-16	-16.8
Secondary Biological	611	594	-17	-2.8
Tertiary A1	15	16	+1	-6.7
Tertiary A2	20	44	+24	+120.0
Tertiary B1	19	23	+4	+21.1
Tertiary B2	11	23	+12	+109.0
Sea Outfall - Preliminary Treatment	6	6	0	0.0
Sea Outfall - Screened	2	2	0	0.0
Sea Outfall - Unscreened	8	7	-1	-12.5
All	**1028**	**1024**	**-4**	**-0.3**

Whilst the overall change in total is negligible, the summary totals above indicate a major increase (>100%) in the numbers of works being categorised as tertiary A2 and B2.

Of the 56 works listed as having a change in treatment categorisation, 33 are a direct result of a NI Water decision to revise their interpretation of what is required to meet a Tertiary TA2 and TB2 treatment standard. As reported in their commentary, clarification with Ofwat appears to have confirmed that they consider sites with an ammonia consent less than 5mg/l to be a 'tight' consent. As such, the Company considers that any site with an ammonia consent less than 5mg/l has effectively had to be enhanced or over-sized in some way to meet the tighter consent. We challenged the Company on this conclusion and in particular how they differentiate between sites that happen to meet the standards anyway, and those where they have consciously had to enhance treatment levels. NI Water admits that it is not practical to attempt to differentiate between the two scenarios, hence why they have elected to adopt a simple trigger point of 5mg/l ammonia. However, they provided some examples of sites such as Gullyduff STW and Tamnaherin STW, both relatively new sites, where RBCs have been sized and installed significantly above the design PE to specifically achieve the tighter consent levels. Our review suggests that this was the case in these sites and hence the proposal appears to have some justification.

Without adopting such an approach, NI Water feels that sites such as Gullyduff and Tamnaherin are not being given sufficient recognition for the actual level of treatment processing provided and the resulting figures suggest that NI Water has a relatively low proportion of tertiary treatment standard works. However, from a purely engineering point of view, these works do not contain plant that would traditionally be categorised as tertiary treatment and the interpretation is generous by default in that it automatically includes works on the basis of the consent without any reference to physical site processes.

We compared the listed treatment category against operational process flow diagrams we requested at 7 selected STWs (Omagh, Antrim, Ballygowan, Dromara, Garvagh, Drumsurn and Monea). In general, the process diagrams do not identify dosing facilities or indicate where facilities have been oversized and hence in most cases it was very difficult to reconcile the plant process against the treatment level being reported.

Whilst we therefore accept that there is some logic behind their decision, we remain concerned that such blanket allocation will lead to increasing numbers of site being categorised as tertiary as a result of a change in consent standard rather than any physical improvement in treatment levels at the site. We note that this only affects TA2 and TB2 categories and our checks confirmed that the application has not resulted in any sites being upgraded from primary to tertiary.

The justification appears to have been at least partially discussed (although not necessarily agreed) with Ofwat and as such we recommend that UR consider and discuss this further with NI Water to ensure a balanced decision is made.

A summary of the overall changes to the table is provided in the table below.

Table 17c.3 – Summary of change in treatment category

Reason for change in treatment category	Number
Re-interpretation of TA2 and TB2 definition	33
New information (leading to upgrade of site category)	10
Works decommissioned	4
Upgrade to existing works	3
New information (leading to downgrade of site category)	2
New works	2
Re-designated as private	2
Total	**56**

The majority of the changes are therefore not related to any physical changes on site. Analysis of the data indicates that only 9 of the changes actually refer to direct physical changes on site (4 decommission/pump-aways and 5 new or upgraded works).

PPP only

As previously reported, there are 6 WwTWs operating under two separate contracts. The Omega Contract operated by Glen Water (accounting for five works at North Down Ards, Armagh, Richill, Ballyrickard and Ballynacor) and Coastal Clearwater operate the sixth facility at Kinnegar.

All the PPP facilities provide secondary treatment and sample and monitor cumulative flows of the incoming influent on a regular (at worst weekly) basis as per contract requirements. We understand sampling at Kinnegar occurs daily from a 24 hour composite sampler. The information provided specific to PPP was checked with Table 15 Line 8 data and correlated. The PPP facilities have no treatment works within Bands 1 to 3.

The variance between AIR12, AIR13 and AIR14 are tabulated below. There are no band changes from AIR13. As with the AIR13 report period there are significant variances between loads measured at the works in this report year and last year. There are no particular explanations around these variances and it can be seen that the AIR14 values fall mid-range of the previous years and hence are in the right order.

The initial Table of 17c received at audit placed Kinnegar as Biological not activated treatment, however the accompanying methodology listed the works as an SBR and proposed an activated treatment classification. The line holder double checked the classification and advised in a follow-up email that the entry had be made in the wrong column of Table 17c and that the band 5 biological works was in fact a band 5 activate sludge works. This error was highlighted to NI Water's AIR team correction on both Tables 17c and 17d. Unfortunately, it appears to have only been corrected on 17d, for Table 17c Line 6 remains with the error that a band 5 biological works is reported instead of a band 5 activated works for the PPP entries.

Similar to Table 17d commentary, the sampling protocol was consistent and the loads calculated in the same manner as previous years.

The tabulated details highlights loading and percentage changes and provides a works by works description of treatment provided.

Table 17c.4 – Loading of PPP works

Name of Treatment Works	Ave Daily BOD load (kg/d)			% variance 13/14	Resultant size band	Treatment process	Resultant treatment category
	AIR12	AIR13	AIR 14				
North Down	3902	4286	4739	10.6	6	Secondary activated sludge process with disinfection	TA2
Armagh	1404	1252	1024	-18.3	5	Secondary activated sludge process with nutrient removal	TA2
Rich hill	157	196	154	-21.4	4	Secondary activated sludge process with drum filters	TA1
Ballyrickard	1632	1793	2453	36.8	6	Secondary activated sludge process with disinfection	TA2
Ballynacor	9465	6148	6684	8.7	6	Secondary activated sludge process with nutrient removal	TA2
Kinnegar	4846	4393	4697	6.9	6	Secondary activated	Secondary activated
Total	21406	18068	19751	9.3			

Total

The totals are the correct summation of values from NIW Only and PPP tables.

5.2 Small works with ammonia consent (Lines 8 and 9)

NIW Only

The data is abstracted from the master spreadsheet populated with information from the Environmental Regulation Team on ammonia consent levels. Checks against the source data confirmed that the line totals are the correct summation of sites with relevant ammonia consent levels and correctly excludes size band 6 works.

We noted that Garvaghy, a size band 1 site, was listed as having an ammonia consent and included in Line 8. Checks against listed consent data (Table 16) identified that although correctly defined as a size band 1, the works correctly has a numeric consent, including ammonia, due to its high non-resident population.

PPP Works

There is no change from AIR13 for Line 8 or 9. Armagh and Richhill WwTWs are classified as small works (size band 5 and 4), both have ammonia consent of 2mg/l, therefore they must be accounted for in Line 9 – small works with ammonia consent <=5mg/l.

Total

The totals are the correct summation of values from NIW Only and PPP tables.

6. Assumptions

- The sizing of works is assumed to be directly proportional to the population within its catchment (as defined in the reporting requirements).
- Population equivalents are based on property counts from GIS which include all recorded properties. These are typically based on counts of property on GIS with an assumed occupancy rate of 3 per property. The totals therefore assume the GIS system is accurate and up to date.
- With the exception of caravan parks and hotels, the Company assumes that all commercial and potentially non-residential properties are classified as residential.
- Trade effluent is assumed to be over and above any property based PE.
- The impact of commuters is assumed to be negligible.

7. Confidence grades

Confidence grades are not applied to this table.

8. Consistency checks

The populations and size bandings are consistent with those reported in Tables 15, 17b and 17d. The number of STWs does not match Line 8 of Table 15 as the total correctly excludes screened and unscreened outfalls as per the guidance.

Table 17d – Sewage Treatment Works – Loads

1. Introduction

The purpose of this table is to collect information on the sewage loads received by the various types and sizes of treatment works in each company. The data collected is used to inform UR's assessment of NI Water's relative operating efficiency.

2. Key findings

- Significant number of changes in load at 42 sites, the majority due to improved information rather than physical changes.
- Significant change between treatment categories due to NI Water revised interpretation of treatment levels required to meet a Tertiary TA2 and TB2 treatment standard.
- One minor error was noted during audit; the works classification for one PPP works was correctly identified in the methodology but transposed into the reporting table in the wrong column. This was corrected in the PPP table for the final version, but unfortunately not carried forward to the total table which remains incorrect.
- We audited the reported data and challenged the processes on a sample basis. Except where detailed below, we consider the data reported in the table is robustly prepared using systems and process that are appropriate and in line with the reporting requirements and that are properly implemented with effective quality control and governance arrangements.

2.1 Key recommendations

- Automation of master database to identify changes in population equivalents and treatment categories should be improved.

3. Audit approach

The audit consisted of an interview with the line owners to discuss the methodology and review the master spreadsheet that has been used as an input to this table.

4. Company methodology

4.1 General

There has been no change to the methodologies used from previous years and the data sources, processing and reporting procedures applied remain the same and identical to those applied to Table 17c. As discussed in detail in our commentary of Table 17c, the Company has proposed a modification to its assignment of treatment categories following a review of other UK water companies and a query with Ofwat which has resulted in some significant changes to the allocation across secondary and tertiary treatment categories.

4.2 Information sources

Data is extracted from a master spreadsheet used as a basis for the population of Tables 15 and 17a-g. The spreadsheet contains rows for each individual Sewage Treatment Works (STWs) and is populated and maintained as a live document throughout the year by the Asset Performance Team. To track changes and maintain the process, the Asset Performance Team (APT) monitor and update this tool by

liaising with various internal departments including Operational Technical Support Team (OTST), Engineering & Procurement (EP) and Environmental Regulation Section (ERS). Meetings are held on a regular basis with OTST to discuss potential issues. Details of any new or changed consent are provided by ERS.

Figures for PE are based on flow and load surveys and GIS-based property counts and are identical to those used in Table 17c.

Size banding for all works is based on the latest PEs excluding non-resident PE in accordance with the reporting requirements. The size band for each STW is automatically assigned by formulae based on the PE. In general, whilst NI Water does identify possible commercial and non-residential buildings using the Pointer database, they do not exclude them from the applied PE totals due to uncertainty in their actual usage. No allowance is made for commuters. This methodology is generally acceptable as it remains consistent with previous years and avoids potential subjectivity in the exclusion of properties. However, as a result it will tend to slightly over-estimate population equivalents.

Works treatment classification follows the definitions by UR and is allocated to each works in the spreadsheet by the Asset Performance Team. The definitions of tertiary treatment remain subject to some interpretation. NI Water generally includes STWs with dosing for phosphorous removal as tertiary treatment. Following recent clarification sought from Ofwat, NI Water now also includes any works with an ammonia consent less than or equal to 5mg/l on the basis of it being a 'tight' consent and requiring a higher level of treatment than normal. This is discussed further in Section 5.1 of Table 17c.

NI Water carries out correlation and checking of the data against flow and load surveys, typically at larger works (>2000 PE) or works with high trade influent for correlation with population equivalents. Currently, loading data for only 6 works are actually based on data directly from flow and load surveys, the remainder are all based on property counts. The application and impact of flow and load data to date is therefore limited.

Loads received at NI Water STWs are calculated based on the estimated PE for the works and applying an assumed fixed average rate of 60g BOD per person per day. Loads are hence directly proportional to allocated PE.

Most of the data for PPP works are based on the asset performance spreadsheet which was reviewed in detail for Table 15. Discharge consent information has then been applied by the Environmental Regulation Team.

Load data for PPP works is obtained from works operators and is calculated by direct measurement of influent BOD concentration and works flow measurement, giving a more accurate assessment of works loading. At Kinnegar WwTW daily 24hr composite influent BOD samples are taken and recorded which are combined with the flow to full treatment measurements to calculate loadings to a good level of accuracy. At the other five PPP works weekly samples of influent load are taken and extrapolated against total weekly flows to give the measurement of load received. Although not as accurate as the daily sampling undertaken at Kinnegar the weekly sampling of actual BOD concentrations gives a good calculation of total load.

4.3 Quality assurance

The Company carries out a number of cross checks against source data and with relevant internal departments to check and challenge information included in the database. To ensure consistency, the same database is used for populating other related tables including Tables 15 and 17c.

Evidence of quality control was observed in the master database which contains cells to highlight when a works parameter such as consent or PE banding has changed. However, the current method appears to rely overly on manual translation of data such that the database may be prone to human error. Automation of the process using set formulae and conditional formatting would improve data reliability.

A separate column records the reasons for change where not obvious. Changes from year to year are therefore generally clear and auditable.

5. Audit findings

5.1 Small and large works (Lines 1 to 7)

NIW Only

This year, the Company has carried out a significant amount of re-assessment of PE values for sites, predominantly as a result of similar work on PC15. This has resulted in updates to 152 sites in AIR14, of which 8 have changed size band.

As reported and discussed in detail in Table 17c, there has also been some significant re-allocation of works between treatment categories following a decision by NI Water to revise their interpretation of what is required to meet a Tertiary TA2 and TB2 treatment standard. This has resulted in significant changes in columns 2, 3, 5 and 7 with up to 33 works previously categorised as secondary treatment being re-categorised as tertiary TA2 or TB2.

The Company provide a breakdown of works with more than 15% change in load from the previous year. Analysis of this table confirmed that the majority (32) have changed as a result of new information resulting from population studies or updates to the trade PE. A minor inconsistency was noted in that the table lists 42 sites, but the commentary refers to 43. A full breakdown of the reasons are summarised in the table below.

Table 17d.1 – Summary of reasons for significant change in load

Reason for change in treatment category	Number
Improved information from Population Study / Trade PE update	32
Pumpaway or decommissioned	4
Re-designated as private	2
New works	2
Flow and Load survey	1
On site house count	1
Total	**42**

Checks against the source data identified the omission of 2 sites (Priestland and Aughnacloy) from this list. Both were marginal and were correctly included in the table values, but they highlight the fact that whilst some manual manipulation of data is inevitable, the system is currently over-reliant on manual identification and automation of the system should be improved where practical.

Checks against the source data for size bands and PE values confirmed consistency with NI Water reported and tabulated changes and those reported in Table 17c. For all lines, size bandings are correctly based on resident population only. Load figures are correctly based on the population including non-residents in accordance with the Reporting Requirements. The net change in line totals are summarised in the table below for information:

Table 17d.2 – Summary of net change by size band (NI Water Only)

STW Size Band	NIW Total Load AIR 13	NIW Total load AIR14	% Net Change
1	1,979	1,781	-11.1
2	1,325	1,590	+8.3
3	6,685	6,325	+5.7
4	13,645	13,085	+4.3
5	13,136	16,740	+7.8
6	73,676	70,653	+4.3
All	**110,446**	**110,174**	**+0.2**

The totals in lines 1 to 6 correctly sum to the line 7 total. No active sites are excluded. The net change on the total load in each treatment category in Line 7 is summarised in the table below.

Table 17d.3 – Summary of net changes to treatment categories (Line 7 - NI Water Only)

STW Treatment Category	NIW Total No. AIR 13 (kg BOD/d)	NIW Total No. AIR 14 (kg BOD/d)	%age of total load AIR 14	Net change in load (kg BOD/d)
Primary	785	750	0.7	-35
Secondary Activated	57,444	53,688	48.7	-3,756
Secondary Biological	8,121	6,263	5.7	-1,858
Tertiary A1	8,960	9,029	8.2	+69
Tertiary A2	29,890	33,986	30.8	+4,096
Tertiary B1	995	1,357	1.2	+362
Tertiary B2	1,943	2,967	2.7	+1,024
Sea Outfall - Preliminary Treatment	1,894	1,738	1.6	-156
Sea Outfall - Screened	262	257	0.2	-5
Sea Outfall - Unscreened	151	140	0.1	-11
All	**110,446**	**110,174**	**100**	-272

Whilst the total load and overall percentages remain relatively consistent, the summary totals above indicate a significant increase in the load received by STWs with treatment level tertiary A2 and B2. This is almost wholly as a result of the re-interpretation of the treatment definition rather than any physical changes on site. The significant increase in Tertiary B1 is due to 6 sites (Ballycarry, Cargan, Cloughmills, Dervock, Stewartstown and Stranocum) being re-categorised from Secondary Biological to Tertiary B1 based on improved information following checks on existing levels of treatment at NI Water sites (ADAI Project).

PPP Only

There are 6 sewage treatment works operating under two separate contracts. The Omega Contract, operated by Glen Water, accounts for five works; North Down Ards, Armagh, Richhill, Ballyrickard and Ballynacor. Coastal Clearwater operates the sixth facility at Kinnegar. Loadings for Omega Works equates to 15054 kg/BOD/day Kinnegar 4697 kg/BOD/day. Compared to AIR13 the loads from both contracts have increased; Kinnegar by 6.9% and Omega by 10.1%, an overall increase of 9.3%.

All the PPP facilities provide secondary treatment, flow monitoring and influent sampling is carried out as per contractual requirements. At Kinnegar daily 24 hour composite samples are taken, whilst weekly sampling is undertaken for the Omega sites. Average load information has been used to determine the appropriate size band classification. The information provided was checked with Table 15 data and correlated.

In relation to the total of NI Water Treatment load, the PPP load for AIR14 makes up 15.2%. This compares to 14% for AIR13 and 16.5% for AIR12.

The initial Table of 17d received at audit placed Kinnegar as Biological not activated treatment, however the accompanying methodology and that for Table 17d listed the works as an SBR and proposed an activated treatment classification. The line holder double checked the classification and advised in a follow-up email that the entry had be made in the wrong column of Table 17d and that the band 5 biological works was in fact a band 5 activated sludge works and that the 4697 kg BOD5/day should be entered in column 2 not 3. This has been corrected for later issues of the table.

Total

In checking the NI Water final tables, we noted that the correction to the PPP works noted above has not been carried forward to the Total table which still incorrectly reports the input as biological. The totals in column 2 and 3 for lines 6 and 7 are therefore incorrect. The correct values should be:

- Line 6 Col 2: 50,265
- Line 6 Col 3: 0
- Line 7 Col2: 58,385
- Line 7 Col3: 6,263
- The totals in column 11 are unaffected as the error affects treatment categorisation only.

5.2 Small works with ammonia consent (Lines 8 and 9)

NIW Only

The data is abstracted from the master spreadsheet populated with information from the Environmental Regulation Team on ammonia consent levels. Checks against the source data confirmed that the line totals are the correct summation of sites with relevant ammonia consent levels and correctly exclude size band 6 works.

The table below summarise the key changes in lines 8 and 9 respectively:

Table 17d.4 – Summary of reasons for change in Line 8

Reason for change in value	Number of listed works	Net change in total load
Improved information from Population Study / Trade PE update	15	+10
Re-banding of Enniskillen	1	+1499
Addition to list	2	+63
Removal from list (incl Magherafelt)	2	-987
Total	**20**	**+585**

Table 17d.5 – Summary of reasons for change in Line 9

Reason for change in value	Number of listed works	Net change in total load
Improved information from Population Study / Trade PE update	25	-23
Addition to list (incl Magherafelt)	7	+1863
Removal from list (Moira)	1	-305
Total	**33**	**+1535**

Both lines 8 and 9 show significant increase compared to AIR13. As indicated by the tables above, the majority of change has been primarily due to the inclusion of Enniskillen STW which was re-banded from size band 6 to 5 and the re-allocation of Magherafelt STW from line 8 to line 9. In addition, a significant number of new sites have been added to line 9 following changes or new consent conditions applied within year. Changes due to improved information were generally small. We challenged the Company on the reasons for the re-allocation of Moira, Magherafelt and Ballygowan STWs in Line 9 and were provide with information confirming that all were due to valid changes in consents within year.

PPP Only

There is no variance in line 8 from AIR13, registering a zero return.

There is no change in line 9 from AIR13 as Armagh and Richhill WwTWs are classified as small works (size bands 5 and 4); both have ammonia consent of 2mg/l. The loading has decreased again this year to 1178kg/BOD/day from 1448kg/BOD/day for AIR13 and 1561kg/BOD/day for AIR12.

Total

The totals are the correct summation of the values in the NIW Only and PPP tables.

6. Assumptions

- The sizing of works is assumed to be directly proportional to the population within its catchment (as defined in the reporting requirements).
- Population equivalents are based on property counts from GIS which include all recorded properties. These are typically based on counts of property on GIS with an assumed occupancy rate of 3 per property. The totals therefore assume the GIS system is accurate and up to date.
- The loads received at NI Water STWs are based on an assumed fixed average rate of 60g BOD per person per day (hence directly proportional to PE).
- With the exception of caravan parks and hotels, the Company assumes that all commercial and potentially non-residential properties are classified as residential.
- The impact of commuters is assumed to be negligible.

7. Confidence grades

The designation of confidence grade C3 to all NI Water lines is considered appropriate given their reliance on population equivalent values and the level of estimation and assumptions in obtaining PE values. This is generally consistent with other tables where amalgamated values have been applied (subject to recommended revisions to confidence grades in Table 15).

There is a good sampling regime across the PPP sites which should be reflected in the high confidence grade attributed to the lines. In previous years B3 has been assigned to the data by the Company last year upon recommendation of the reporter this was raised to B2. Although consistent sampling is undertaken throughout the year and at Kinnegar daily composite samples are taken the averaged weekly sampling undertaken at the 5 Omega works does introduce a small degree of variance. Following a review of the methodology and expected level of accuracy we consider B3 (some degree of interpolation producing an error margin in the range 5 to 10%) to be the appropriate confidence grade for the PPP Data in the table.

8. Consistency checks

The populations and size bandings are consistent with those reported in Tables 15, 17b and 17c. Cross referencing confirmed consistency of line totals with Table 15 Lines 2 to 5.

Table 17f – Sewage Treatment Works - Costs

1. Introduction

The purpose of this table is to collect background information on the costs of different types and sizes of sewage treatment works. The data collected is used to inform UR's assessment of the Company's relative operating efficiency. The overall approach remains unchanged from last year.

2. Key findings

- NI Water is increasingly relying on the cost to serve project to assign all costs for this table. It estimates that around 80%-85% of costs are directly attributable based on the cost to serve project, whilst the remainder are allocated on the basis of population equivalents. In future years the cost to serve project is likely to be able to allocate more than 85% of costs directly, though it is believed there will always be a residual cost value that is allocated on a different basis.
- Noting the above limitations, based on our audit of sample data, we believe that the data reported in this table is consistent with the reporting requirements.

3. Audit approach

The audit consisted of an interview with the table owner to discuss the method and review the source data extracted from the financial system.

As part of our audits of financial data we liaised with KPMG to share key findings. This was done at a tripartite meeting between CHUK, KPMG and NI Water.

4. Audit findings

4.1 NI Water Only

Data is extracted from the Company general ledger system. Not all data exists at the level of detail required to populate this table. Where this is the case, apportionments have been made based on management judgement and analysis. We discuss these apportionments in more detail below.

Direct costs include Power (521X), Contractors (531X), Materials (541X), Chemicals (548X) and Cost Reallocations 611X (this includes direct labours costs and & overhead charges). As in AIR13 service charges which were reported in General and Support costs are now reported in service charges.

The Company advised that its ability to report data against each of the lines has been greatly improved with the addition of the cost to serve project. NI Water believes that about 80% of costs can now be directly allocated to Waste Water Treatment Works (WwTWs).

The Company expects that the cost to serve project will continue to allow NI Water to improve the cost allocations for future years.

The Company provided appropriate supporting information consisting of reports extracted from the Company Oracle system. NI Water has circa 1,100 individual treatment works related to sewerage and sewerage and sludge treatment.

The improved allocation of costs has resulted in some minor variations specifically due to the improved cost allocation method.

Lines 1-4 – Direct Costs of Sewerage Treatment Works in Bands

The approach the Company has used this year follows on from that adopted last year. It relies on a review of the location code. Large works are flagged with a 'W' location code and all direct costs associated to single WwTWs can be identified. Smaller works are identified with a 'X' location code. The X code is used to consolidate costs for a number of smaller works in a specific geographical area. In total circa 1,100 works exist, which are coded to 100 individual codes. In order to report data in bands 1- 4 the Company has relied on both directly allocated data via cost to serve and data on population equivalents for the group of works coded under the 'X' codes in order to split the costs where the cost to serve project is not able to allocate costs directly. We believe this approach is acceptable and in general improving and is likely to result in data that is reflective of the actual position. We note that the cost to serve project is increasingly allowing NI Water to report costs at site level. We challenged NI Water if there was a possibility of allocating too much costs to works categories if all non-allocated costs are assigned on a population equivalent basis. For example, if 60% of the costs for a works in size band 4 are already allocated using cost to serve, then allocating the residual data based on population equivalents could results in a disproportionate total cost for works in size band 5. NI Water advised that this would be of insignificant value as the total costs left unallocated to asset level are reducing each year.

In reporting the direct costs, the Company extracted data from the general ledger, related specifically to direct costs. As a result no apportionment was required to split direct and general and support costs.

Power costs are all traceable directly to each site and each site has only one power meter. In order to assess the power cost element specific to sewage where a treatment works provides both sewage treatment and sludge treatment the Company has used the assessment of operational staff. These are updated annually so the assessment used by the Company reflects the current assessments on usage. In the absence of more detailed information we believe this approach is appropriate.

A further apportionment was required for data relating to the Belfast WwTW and incinerator. This is because these operations share a common meter. This is the same process as that followed for AIR13. For AIR 13 NI Water used a 42%:58% split, which was an estimate of the kilowatt usage between the sites during the year. For AIR14 the Company has used a 45%:55% split. We challenged NI Water in relation to the change in split for AIR14. NI Water advised that this was due to different volumes between incineration and WwTWs. The estimated power costs for the incinerator have been excluded from the power costs reported.

Costs are reported to have reduced by 4 percent. This is largely attributed to the improved cost allocation method.

Lines 5-6 – Direct Costs of Sewerage Treatment Works in Bands

Costs for works within size bands 5-6 are individually coded within the Company general ledger system. As a result these costs were extracted directly from the ledger system. A judgement on power costs is used as described above to split power costs where the works provides more than just sewage treatment services. This is the same as the approach used to split costs between works in bands 1-4. Costs have increased by 29 percent for works in size band five. This is likely to be due to the reclassification of some bands to between work band five and work band six.

For work band six costs have reduced by £1.0 million or 19%. We challenged NI Water to advise the reasons for this reduction. NI Water advised that this is due to the reclassification of two large works which were included in Band 6 in AIR 13.

Line 7 – Total Direct Costs Sewage Treatment Works

This is a summation of data in Lines 1-6. We note the total is consistent with Table 22, Column 2 Line 9.

Line 8 – Sludge Treatment and Disposal Costs

The Company has not reported costs under this line, on the basis that it has excluded all such costs from the data reported. NI Water has previously confirmed that costs related to sludge treatment and disposal are fully removed from data in this table.

Line 9 – Sewage Treatment: Direct Costs

This is the same value as the total direct costs for all sewerage treatment works as reported in Line 7 above. We note the total is consistent with Table 22 Column 2 Line 9.

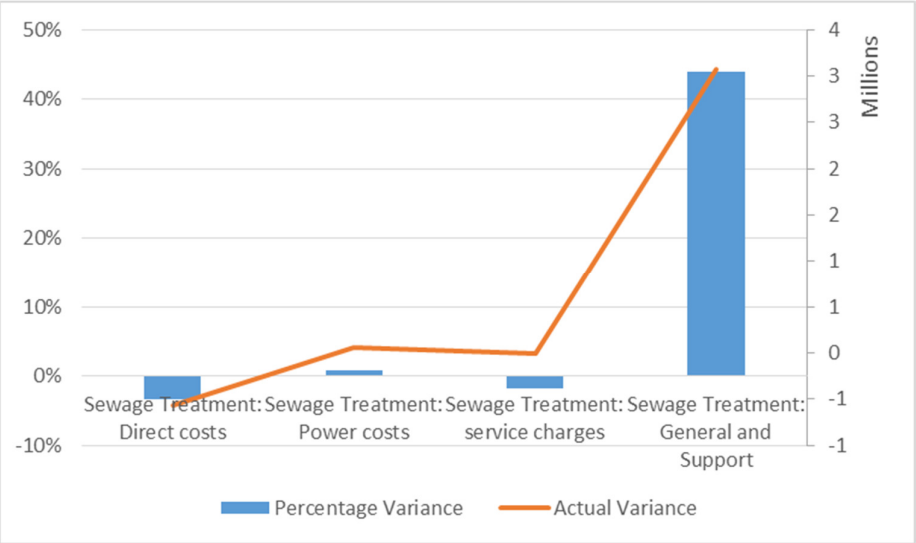
The data contained in this line seems to be a duplicate of the data in Line 7. The reporting requirements could usefully be expanded to identify the expected differences between these two lines if any.

Line 10 – Sewage Treatment: Power Costs

Power costs exclude power costs for sludge treatment and terminal pumping. For AIR14 NI Water has taken the costing information at individual site level from the EAM report. This then provides the full cost at individual WwTWs. This provides a better split than in previous years.

As noted previously where a works has a sludge element, power costs are estimated based on the judgement of field managers. NI Water advised that although more than 1,000 separate works exist only a small number, 20 to 30 on have a sludge treatment element, hence the related power costs are small.

Overall there have been minor movements in costs except for general and support which shows significant increases in costs. This is shown in the chart below:



This is discussed more in the Table 22 commentary.

We challenged NI Water about what it was doing to minimise the impact of increasing tariffs. NI Water advised that it was looking to mitigate the impact of future increases in electricity costs by purchasing electricity in advance. We further challenged NI Water about any scope for electricity generation and potentially selling this to the electricity providers as a way to manage future increases in costs. NI Water advised that it is currently still working based on the Regulatory Accounting Guidelines from 2009 as per the regulators instruction. These provide little incentive for electricity generation.

We note that the power costs are consistent with those reported in Table 22.

Line 11 – Service Charges

NI Water has reported £0.75 million of service charges for AIR14. This is broadly consistent with the figure reported for AIR13. It reported these in general and support costs in AIR12 but now it is reported as a separate cost under this line.

Line 12 – Sewerage Treatment – General and Support

The Company has apportioned the total general and support costs on the basis of direct labour costs. We note the total here is consistent with Table 22 Line 10 Column 2. In the absence of direct data we believe this method is appropriate and will provide data that is broadly reflective of the actual position. Further comment on general and support costs is provided in our commentary to Table 22.

4.2 PPP Only

It should be noted that the PPP only costs for works relate only to power costs and general and support. These are obtained from interrogation of the Company oracle database by means of location codes.

Since the end of the fixed price agreement NI Water has been able to get better costs for power compared to those under the fixed price agreement.

Column 2 Treatment Category – Activated Sludge

Kinnegar WwTW contract falls under this category. The power costs for Kinnegar form part of the Concessionaire's payment to the operating company. The Concessionaire is not required to provide these costs to NI Water and hence these costs are not reported.

Column 4 - Line 4 - Direct costs of STWs in size band 4, Tertiary

These costs relate to Richhill, and amount to power costs related to this site.

Column 5 - Line 5 - Direct costs of STWs in size band 5, Tertiary

These costs relate to Armagh, and amount to power costs related to this site.

Column 5 - Line 6 - Direct costs of STWs in size band 6, Tertiary

There are three PPP works in this category. These are:

- North Down;
- Ballyrickard; and,
- Ballinacor

The costs all relate to power costs and are obtained by interrogation of location costs from the Company oracle system.

Line 7 – Total Direct Costs of STWs all sizes

This is a calculated line.

Line 8 – 11

The only costs reported here relate to the power costs already reported in Lines 1-6 above.

Line 12 – General and Support Costs

The total support costs reported by NI Water for these contacts are a combination of staffing costs and consultancy expenditure. Consultancy expenditure is extracted from the general ledger and can be attributed directly to a particular contract.

Time costs are based on a pro-rata approach. Staff are utilised to varying degrees in the management of the PPP contracts. There costs are obtained from the payroll system.

The costs reported for each line relate to time costs of staff working on the contracts and an assessment of the portion of their time spent on each type of contract.

We believe that in the absence of more accurate data the Company approach is appropriate.

Overall there has not been a significant variance in costs between AIR13 and AIR14 for PPP costs.

5. Assumptions

Where assumptions have been made these are set out in the above text.

6. Confidence grades

No confidence grades are required for financial data.

7. Consistency Checks

We confirm that:

- Total direct costs in Line 7 Column 11 equal total direct costs for sewage treatment in Table 22 Line 9 Column 2.
- Power costs in Line 10 Column 11 equal power costs for sewage treatment in Table 22 Line 2 Column 2.
- There is no variation in the total Service charges in Line 11 Column 11 and service charges for sewage treatment in Table 22 Line 7 Column 2.
- General and support costs in Line 12 Column 11 equal general and support expenditure for sewage treatment in Table 22 Line 10 Column 2.
- Total direct costs for NI Water works in size band 6 in Line 6 Column 11 equal the sum of direct costs in Table 17b. There is no Table 17b equivalent for the PPP only sites.

Table 17g – Sludge Treatment and Disposal

1. Introduction

The purpose of this table is to collect information about sewage sludge disposal routes, and the costs of sludge treatment and disposal associated with each of these routes.

This information is used to update the modelling of sewerage services to enable the assessment of comparative operating efficiency of Company's sewerage services.

2. Key findings

- The costing data is extracted from the Company general ledger system.
- Based on audit of sample data we believe that data reported in this table is consistent with the reporting requirements. Some assumptions are required to apportion costs between categories. We believe these are appropriate in the absence of more relevant data.

3. Audit approach

The audit consisted of an interview with the table owner to discuss the method and review the source data extracted from the financial system.

As part of our audits of financial data we liaised with KPMG to share key findings. This was done at a tripartite meeting between CHUK, KPMG and NI Water.

4. Company methodology

4.1 Population and sludge data (Lines 1 and 2)

Resident population served is consistent with the total resident population taken from Table 13 Line 10, less the non-resident population. The figure is consistent with the value given in Table 17a Line 1. The figures are allocated to the columns in a ratio consistent with the reported sludge volumes of Line 2.

The Company would appear to have a well controlled management system for controlling sludge movements both as liquid and cake through use of a GPS logging system and recently installed weighbridges. The amount of sludge produced is calculated based on sewage sludge disposal data produced by Area Sludge Officers. The data originates from reconciled dockets upon which the contractors are paid.

4.2 NI Water costs (Lines 3 to 9)

The cost data has been downloaded from the financial system for collation and input into this table. The financial system coding generally allows the costs to be captured for each of the categories in this table.

5. Audit findings

5.1 Resident population and sludge volume

In line with the reporting requirements for Line1 'Resident Population Served', a figure for resident population is used for this line copied from Table 17a Line 1 'Annual average resident connected population'. There is a slight difference between the two definitions of 17a L1 and 17g L1; Population Connected to Sewerage System and Population Served Contribution to Sludge Disposal. It could be considered that the difference in definitions could allow the reporting of septic tank population in 17g L1

in addition to the connected population reported in 17a L1, however the reporting guidance for T17g would indicate that unregulated septic tanks should not be included in the table data. NI Water has sought guidance on this in the past and the regulator has confirmed the requirement to exclude population served by septic tanks from the L1 figure even though they contribute to the sludge volume reported in L2. The reporting of Lines 1 and 2 is consistent with previous years.

The sludge treatment and disposal is a centralised system; all sludge is transported to the PPP facilities for disposal. NI Water records the transfer of sludge to the PPP facility independently of the PPP contractor, a reconciliation of the figures have shown a 2.5% difference in recording which is expected to be a result of variances in solids measurements. The volume of sewage sludge produced and reported in Line 2 is that recorded at the disposal facility plus the addition of grit and screenings which go to land fill. The entry is consistent with Table 15 Lines 15 and 16 NIW only less the 0.8ttds quantity of screenings and grit disposed of to landfill. The PPP recorded figures are considered as the most appropriate to report as the recording and calibration of instruments is closely monitored a figures are used for payment purposes.

Sludge production for NIW only equates to 32.5ttds, 31.7ttds transferred to PPP and 0.8ttds disposed of to landfill. This volume is a 1.5% increase from AIR13 (32.0ttds) with the volume of screening remaining consistent at 0.8ttds. The resident population in Line 1 has only increased by 0.25% the relative difference would be attributed to improvements in treatment facilities and the completion of capital schemes which increase the volume of sludge produced.

5.2 NI Water costs

The cost data has been downloaded from the financial system for collation and input into this table. This allows costs to be separately captured for each of the lines in this table.

Line 3 – Sludge Treatment Direct Costs

Incineration

NI Water reports no costs under this heading.

Other

These costs relate to sludge treatment and waste water treatment works. These costs can be identified separately from activity code 621. The Company has extracted the relevant direct costs for this line from the general ledger.

Overall costs are broadly consistent between the two years.

For power costs each site now has direct costs allocated due to the cost to serve project. Where a treatment works provides both sewage and sludge treatment it is necessary to apportion the power costs as only one meter exists per site. These apportionments are based on professional judgement of the field managers responsible for each works. An element of judgement is therefore involved. However in the absence of more accurate information we believe this is an appropriate method to report these costs.

Line 4 – Sludge Disposal Direct Costs

The majority of sludge disposal occurs by means of PPP. There has been a minor (non material) variation in these costs. This is attributed to changes in employment costs.

Line 5 – Sludge Treatment and Disposal Direct Costs

This is a calculated line.

Line 6 – Sludge Treatment and Disposal Power Costs

Power costs are allocated in a consistent way with Line 3, sludge disposal, direct costs. Effectively all power costs relate to sludge treatment works operated by the Company, which are combined sewage and sludge treatment works. The apportionment of power costs to these sites is discussed above.

Line 7 – Sludge Treatment and Disposal Service Charges

Historically NI Water did not report any costs under this row however, due to a change in the regulatory requirements in AIR13, Regulatory costs which were previously reported under General & Support are included in this line, £0.2 million. PPC (Pollution Prevention Control) Permits are included as Sludge Treatment. The overall cost between AIR13 and AIR14 remains broadly the same.

Line 8 – Sludge Treatment and Disposal, General and Support Expenditure

The data is simply extracted from Table 22, NI Water only Column 3 Line 10 and apportioned across this table on the basis of direct labour costs. The overall approach is the same as that used for AIR13. However, the cost to serve system has resulted in a more accurate split of labour costs between sludge and sewerage treatment.

6. Assumptions

A %ds for the conversion of screenings volumes into ttds is 30% which is consistent with other tables.

Where other assumptions have been made these are set out in the above text.

7. Confidence grades

The confidence grades for Lines 1 and 2 have not changed from AIR13. We believe that they are still appropriate for these lines.

8. Consistency checks

We confirm that:

- Sludge treatment and disposal: direct costs in Table 17g Line 5 Column 10 are slightly different to the total direct costs for sludge treatment and disposal in Table 22 Line 9 Column 3 for NI Water (£1k). This is due to rounding;
- Sludge treatment and disposal: power costs in Table 17g Line 6 Column 10 is consistent with the power costs for sludge treatment and disposal in Table 22 Line 2 Column 3 for NI Water;
- Sludge treatment and disposal: Service charges in Table 17g Line 7 Column 10 equals service charges for sludge treatment and disposal in Table 22 Line 7 Column 3.
- Sludge treatment and disposal: general and support expenditure in Table 17g (Line 8, Column 10) equals general and support expenditure for sludge treatment and disposal in Table 22 (Line 10 Column 3).
- Sludge treatment and disposal: functional expenditure in Table 17g Line 9 Column 10 equals general and support expenditure for sludge treatment and disposal in Table 22 (Line 11 Column 3).