Table 11 – Water Service Activities

1. Key Findings

Criteria	RAG	Assessment
Independent review of performance and reporting	Green	Performance good. Reporting process well managed
Methodology	Blue	Methodology consistent with current process, control points identified and understood. Improvements to output sign off process recommended
Assumptions	Green	Assumptions reasonable and appropriately applied
Source data	Green	Source data is clearly identified, complete beyond material concern, well managed through to accurate systems input
Clarity of audit trails	Green	Detailed and comprehensive audit trail to all numbers available
Confidence grades	Green	Confidence grade appropriate and rationale clearly documented
Governance	Green	Responsibilities for integrity of data and commentary clearly defined. Good evidence of engagement and of final sign-off.

- There has been a small increase in the length of new/renewed mains renewals. The proportion of new mains within this total has increased.
- There has been a large increase in the total number of lead communication pipes being replaced which the Company report is due to the increased length of mains replaced in areas where lead communication pipes are more prevalent.
- New lines (8a – 8d) were added during the AIR14 report year; these are now considered more robust values than those reported last year.
- All zonal study models were completed in 2012/13, so the Company has reported 100% completion. The Company is starting to update the oldest models when investment is planned and requires an up-to-date model.
- The confidence grades are similar to last year, with small changes due to the balance of data from different sources with different levels of confidence.
- The number of mains bursts reported (Line 11) is similar to AIR15 decreasing slightly from 86.1 to 84.8 bursts per km. However, the monthly profile of repairs shows a different pattern to previous years, being significantly lower for most of the year (April to December) but then increase significantly in the last three months.
- Mean Zonal Compliance dropped slightly from 99.85% to 99.84% due in part to the new (tighter) Lead standard that came into force in 2014.
- We note from 2015 onwards, Mean Zonal Compliance (Table 11) is being discontinued as the primary means of assessing compliance. Instead NIW is moving to match the rest of the Water Industry and DWI by using percentage overall compliance against all regulatory consented parameters.
- We located no material issues with the data presented by NI Water for Lines 20-23. We do however recommend that the beneficial use date, which is the underlying basis for the data

contained in these lines, be made more robust by utilising a more formal sign-off procedure which could confirm what is being signed off and that it is appropriate for reporting purposes.

- 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. Audit Scope

The audit consisted of an interview with the NI Water system holders to discuss the methodology and data that has been used to populate this table as well as plans for improving the data in future years

3. Performance and significant events

Company performance has largely been in line with AIR14, except in the following areas:

- The Company has replaced more communication pipes in AIR15 than the previous year. A greater number were identified as lead as the Company has undertaken more mains replacement in areas where lead communication pipes are more prevalent.

- Although all distribution studies have been completed the company has started the process of updating these as up-to-date information is required. Within AIR15 models have been updated in zones affecting 8% of the population.

- Whilst the burst rate is virtually unchanged, there has been a different monthly profile though the year.

- Mean Zonal Compliance has marginally dropped from 99.85% to 99.84% due in part to the new (tighter) Lead standard that came into force in 2014.

4. Compliance methodology and process controls

4.1 Compliance methodology

This information will provide a statement of activities in the Report Year relating to the water service. It includes activities and asset balance in respect of water distribution; information on water distribution zone studies, performance against water quality compliance and delivery of nominated outputs.

4.2 Process/methodology controls

The entries of Lines 2 to 17 in this table are largely a summation of values provided from Networks Water Operations (NOW) and Engineering Procurement (EP). The values are collated centrally before compilation of the commentary and table. We recommend that the data providers (EP and

Networks Water or their contractors) supply a commentary with their data which discusses trends and highlights any reasons for a-typical years.

We note, in general, that the Company's methodology demands that the table and commentary are signed off by senior management.

The Company demonstrated the quality assurance controls they have in place to ensure the data collation process is robust.

We recommend that in future years a single spreadsheet is used to collate the data from EP and Networks Water. We further recommend that this spreadsheet includes consistency checks and trends to allow year-on-year comparisons.

Lines 20 to 23 are based on extracting PC13 nominated output scheme data from CPMR which is then analysed to provide the required information. The focus of the data retrieval is to assess those schemes which have recorded beneficial use during the report year. We note, in general, that the Company's methodology demands that the table and commentary are signed off by senior management. We also noted that clear audit trails back to the CPMR system were available for inspection at all times for members of staff with access to the CPMR system. Any queries that the data compiler has can be directed back to the project managers for each scheme.

5. Summary of audit checks

Total length of mains (Lines 1 and 12)
The total length of mains has increased by 11.65 km this year to 26,712.44 km. This figure has been taken directly from a query of its GIS system on 31/03/15. NI Water confirmed that this length excludes raw water, private mains, mains owned and operated by PPP, non-potable mains and all small diameter service pipes.

The nominal bore potable main lengths are extracted from the GIS database. The data provided for audit was checked against the data produced from the query run during audit which showed no errors.

Changes during report year (Lines 2 to 11)
There have been no significant changes to overall methodologies or commentary structures compared to last year. The commentary segregates the inputs from Networks Water Operations (NWO) and Engineering & Procurement (EP) for Lines 2 to 10. The level of detail provided for Lines 7 to 10 has been improved significantly from the AIR14 commentary.

The data for Lines 2 to 10 is based on information returned from construction and operations activities on site, whereas the data on total length of mains for Lines 1 and 12 comes from GIS systems. The GIS data is being continually improved using information from various sources, resulting on the correction of previous errors. The Company has the option of taking account of such corrections in Line 7 (Mains abandoned and other changes) but has not done so. Instead Line 7 is used only to report on mains abandoned. Therefore, the change to total length of main reported between Lines 1 and 12 differs from that which could be calculated using the information in Lines 2 to 7 by 174km.

Main renewal, relining and cleaning (Lines 2-6)
In line with the Reporting Requirements, the inputs into the line totals comprise input data from EP and NWO. Mains owned and operated by PPP are correctly excluded from the line totals.

Trunk main lengths have been included in the totals, with details of trunk mains included in the commentary as required by the reporting requirements.

Water Quality Compliance (Lines 18 and 19)
The Company explained that there was no change in its methodology.

Contributing volume from each works is calculated from the average of the daily flow inputs throughout the calendar year. In line with previous clarification from the UR, the Company does not include sites which have been taken offline part-way through a year although it provides full details in the commentary to ensure transparency.

The data spreadsheet can be accessed by the LIMS, Regulation and Internal Audit teams. These teams do not have access to the original spreadsheets. For this return the originals are downloaded to the LIMS team server where the team combine the 2 financial year spreadsheets to produce a calendar year dataset which is then reported on.

Line 2 - Mains Renewals
The Company reports a reduction in mains renewals this year from 202.31km to 164.91km, of which 162.43km were undertaken by EP. Checks were carried out against the source data provided by the Company which confirmed the contributing lengths and line total.

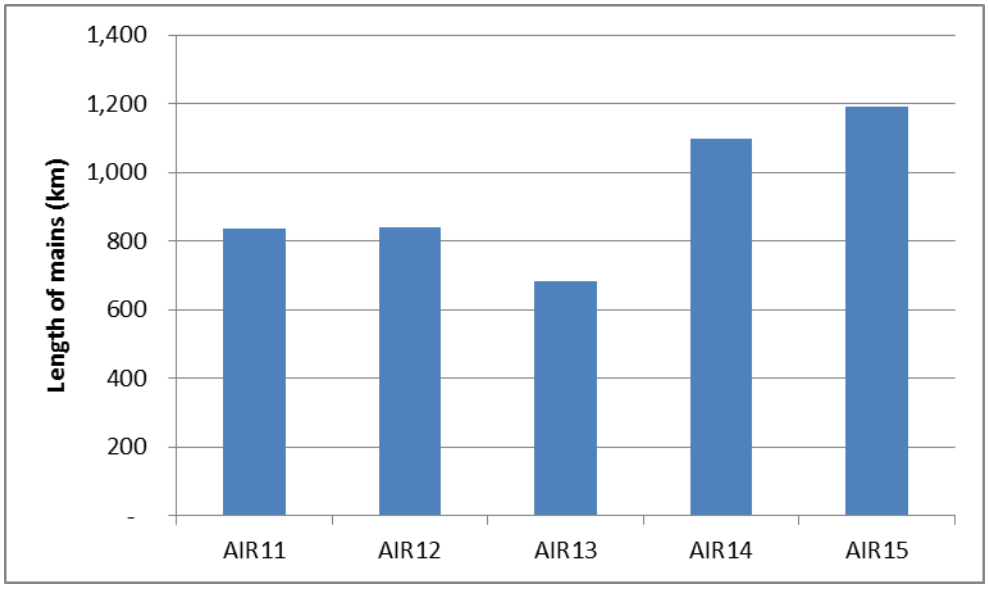
The decrease in activity from last year is in line with Company expectations based on where they are in their investment programme.

Line 3 - Mains Relined
Pipes replaced by pipe bursting or structural lining methods (standard slip-lining techniques are generally considered to replace the existing main) are correctly included in Line 2 as these are deemed to replace the existing pipe. Only where a lining is applied to the fabric of the existing pipe (e.g. spray application) is it reported in Line 3. Historically, the Company does not employ any non-structural lining methods and hence the Line 3 total is zero.

Line 4 - Mains Cleaning
Mains cleaning is all undertaken by Networks Water under maintenance activity and hence the EP input is zero. This year, the Line 4 total of 1,189.50km represents an increase to the length of 92.98km reported last year as shown in the figure below. The increase in length since AIR14 has been due to first time completion of flushing programmes set up for AIR14 but not done during that report year. No new flushing programmes were added during AIR15, just amendments to existing frequencies etc. The trend of switching from reactive to planned flushing is a positive one.

The Company undertakes manual checks to assess the data for errors and duplication. NI Water admits that there remains a potential for some double counting (primarily of repeated one-off incidents within year or for cleaning in response to customer water quality complaints following a mains repair), but advise that these occurrences are 'minimal'. We agree that recent changes to the system through the adoption of work codes and that carrying out manual checks on the data have greatly improved the reliability and reduced the potential for error.

We are therefore satisfied that the impact of any remaining duplications is likely to be within the margin of error covered by the current B2 confidence grade.



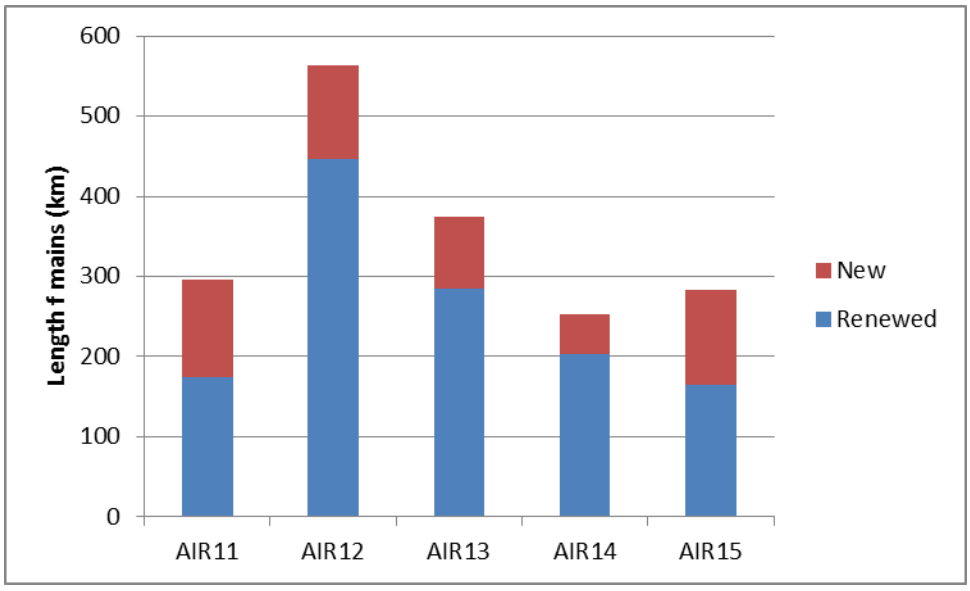
Line 6 – New mains

The reported length of new mains installed has increased significantly from 50.40km last year to 118.24km within the Report Year, although this is more in-line with previous years. This comprises 27.85km (26.41km) reported by NWO and 90.39km (23.99km) reported by EP. The increase in the length reported by EP has been has been partly driven by the increase in nominated trunk mains projects from 0.18km 20.45km last year to 28.09km within the Report Year, which is again in-line with previous years.

The 27.85km total reported by NWO relates to new housing developments, and is very similar to last year's total of 26.41km.

Line 6a – New, renewed or relined mains

This is a calculated line, the sum of Lines 2, 3 and 6, which is 283.15km, as shown below.



Line 6b – New, renewed or relined mains delivered under the watermain rehabilitation programme
This is a calculated line, the sum of Lines 2, 3 and 6 (283.15km) minus new mains on new developments (32.40km) and nominated trunk mains (28.09km) giving a value of 222.66km.

Mains abandoned and other changes (Line 7)
The Company has reported a total of 208.09km of abandoned mains this year, with the majority which are reported by EP under the mains rehabilitation programme (205.62km). Lengths are based on data provided by individual project managers.

Our review concluded that the lengths of abandoned mains have been correctly extracted in accordance with the Reporting Requirements. The total includes both wholly abandoned mains and those replaced by renewals as per the Line 7 definition. Due to the way NI Water reports abandoned mains, it is not possible to ascertain from the data how much of this length was wholly abandoned and how much was through the process of renewal.

Communication pipes (Lines 8 to 10)
The reporting requirements for Lines 8 to 9 changed for AIR14, with greater detail requested for the reasons leading to the lead communication pipe replacement. This is the first year when the reporting requirements were know before the data was recorded, so we consider the values are more robust than those reported for AIR14.

Line 8a – Lead communication pipes replaced as a consequence of water quality sample failures
This activity is undertaken by NOW, with performance in AIR15 (15) similar to AIR14 (20).

Line 8b – Lead communication pipes replaced as a consequence of customers notifying NI Water that they are replacing their lead supply pipe
This activity is undertaken by NWO only; we were provided with monthly totals that confirm the annual total is 566 (AIR14 was 617).

Line 8c – Opportunistic lead communication pipes replacement undertaken under the watermain rehabilitation programme or during burst service pipe repairs
The Company reports that 2,747 (AIR14 1,239) lead communication pipes of this category were replaced, this was comprised of 2,670 (AIR14 1,187) by EP and 77 (AIR14 52) by NWO.

We undertook an audit of the data provided by EP and confirm that the total number replaced in 2014/15 was 2,670.

The total number replaced by Networks Water was 77; we were provided with monthly totals. We undertook an audit of the May 2013 values and confirm the company has a robust audit trail.

Line 8d - Lead communication pipes replaced under the proactive lead replacement programme
This activity is undertaken by EP and relates to a new programme that started in April 2014. The AIR14 value was zero with 401 being reported for AIR15.

Line 9 - Lead communication pipes replaced - maintenance or other
There is an inconsistency in the reporting requirements for this line. The processing rule states it is the summation of Lines 8a, 8b, 8c and 8d whereas the definition states it should exclude replacements due to quality (which are in line 8a). The Company has reported a value that is the summation of 8a, 8b, 8c and 8d (3,729).

This line shows a significant increase from 1,856 in AIR14 to 3,729 in the report year, which the Company report is due to more mains replacement being undertaken in areas where lead communication pipes are more prevalent, such as Greater Belfast.

Line 10 - Communication pipes replaced - other
The Company has replaced 7,469 communication pipes, which is lower than the AIR14 number of 8,790. This is built up from 6,312 from EP and 1,157 from Networks Water.

We were provided with a spreadsheet that confirms the EP total of 6,312.

The total replaced by Networks Water was 1,157; we were provided with monthly totals for these replacements. We undertook an audit of the May 2014 values and confirm the company has a robust audit trail. The Company state that the decrease may, in part, be due to better quality information arising from more detailed analysis of work orders by Networks Water.

Mains bursts per 1000km (Line 11)
There has been a minor reduction in the reported number of mains bursts per 1,000km this year, decreasing from 86 (86.1 to 1dp) to 85 (84.8 to 1dp) bursts per 1,000km. As explained in the Company's commentary, this figure is derived from the total number of recorded burst events, divided by the total length of mains.

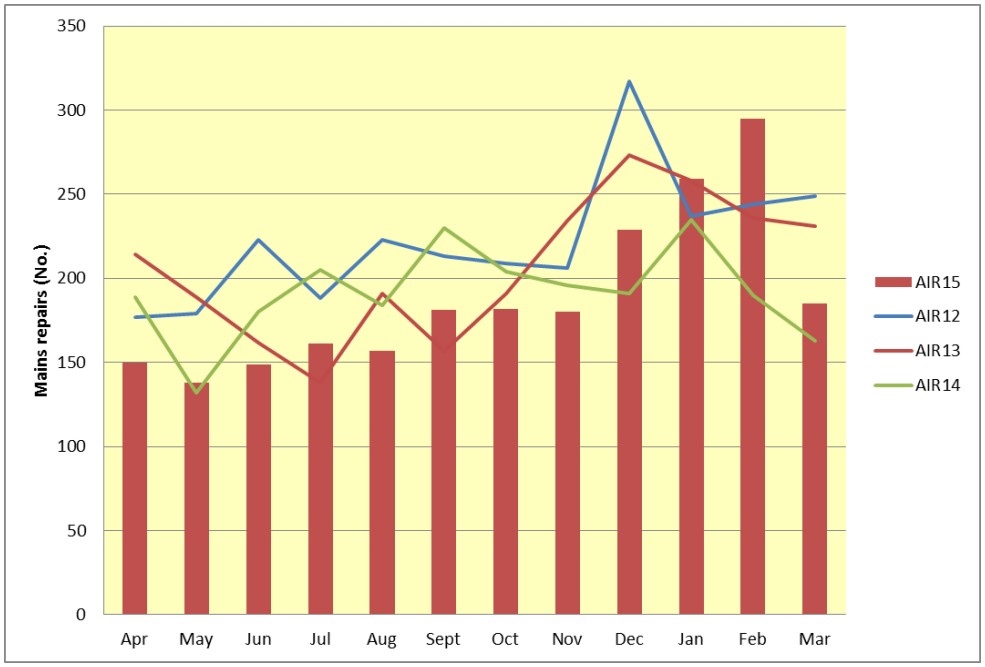
The calculation applies a total length of 26,712.44km, which is the length reported in Line 12.

The number of bursts is calculated directly from data compiled and reported primarily by the Water Business Unit and agreed with field managers within Networks Water Function.

A check against the source data confirmed the contributing total of 1,352 (1,397 in AIR14) reported burst mains repairs by Networks Water. An additional 996 (985 in AIR14) repairs were undertaken due to waste detection. Additionally, 82 (83 in AIR14) repairs due to third party damage on mains were deducted from the total giving a total of 2,266 (2,299 in AIR14) repairs in the report year.

We undertook an audit of the May 2014 values and confirm the company has a robust audit trail.

As shown in the graph below there was a decrease in the number of bursts each month for the first nine months, but then a significant increase in January to March. This increase is likely to be due to a combination of the winter weather, and possibly a backlog from the period of industrial action.



NI Water confirmed that any repairs to PPP mains are not included in the totals. The line total is confirmed as the correct summation of the data obtained from the two data sources divided by 1,000km as required.

Distribution Studies (Lines 13 to 17)
NI Water's zonal model development started in 1999 leading to the adoption of a distribution zonal study programme in 2001. The programme aimed to set up models to cover all 71 water supply zones, and the final 7 models were completed by 2012-13. NI Water now has models for all 71 distribution zones, and consequently 100% of the zones studies have been completed, and 100% of the population are now covered.

Now that all models have been completed, the company has started a new programme to update the oldest models, those where significant changes may have occurred, and those covering areas where there may be operational problems or investment planned.

The Company state that five models have been updated during 2014/15, covering a population (AIR13 values) of 143,243 which is approximately 8% of the total AIR13 population.

Water quality compliance measures (Lines 18 and 19)
Mean Zonal Compliance has marginally dropped from 99.85% to 99.84% due in part to the new (tighter) Lead standard that came into force in 2014.

Weekly samples are taken for Coliforms at Service Reservoirs, such that each site has 52 samples, however since it is a rolling programme some sites have a total of 51 samples, with some having 53. Line 19 requires the Percentage of Service Reservoirs with coliforms detected in >5% of samples to be reported. 5% of 52 samples per site is 2.6 samples. NIW had 17 sites where coliforms were detected in one sample, and is therefore reporting zero for Line 19.

We note from 2015 onwards, Mean Zonal Compliance (Table 11) is being discontinued as the primary means of assessing compliance. Instead NIW is moving to match the rest of the Water Industry and DWI by using percentage overall compliance against all regulatory consented parameters.

Nominated water service outputs (Lines 20 to 23)
Lines 20 covers 'Completion of nominated trunk main schemes to improve security of supply', which reports 1 scheme completed during 2014-15. The Company's commentary also notes that 2 further schemes are projected for completion in 2015-16. We have checked all three of the schemes referred to in NI Water's commentary back to CPMR and are satisfied that the data reported correlates with that extracted from CPMR.

Line 21, 'Completion of nominated water treatment works schemes to improve water quality' reports 3 schemes completed during 2014-15. We have checked all three of the schemes referred to in NI Water's commentary back to CPMR and confirm the data is accurately reported.

Line 22 covers the 'Completion of nominated improvements to increase the capacity of service reservoirs and clear water tanks', which reports 1 scheme completed. To confirm this return we reviewed the CPMR record and are satisfied that the data reported correlates with that extracted from CPMR.

Line 23 - Completion of nominated Major Incident Mitigation schemes, has 2 scheme completions attributed to it for 2014-15. We confirmed this output from CPMR by completing a sample review of the CPMR records for this line.

For all lines we found no errors.

During the course of our audit of Lines 20-23, we noted that although the data reported from CPMR was consistent, the dates themselves rely on the project managers completing the project record and effectively signing the data off. However there is no formal sign-off or more importantly a statement of what the Project manager is actually committing to when undertaking this sign-off. Although unlikely to result in material errors we would consider a statement of sign-off that has been read and confirmed when the beneficial use date is entered would make the audit trail more robust, particularly considering that the CPMR data that is reported is solely based on this 'sign-off' process.

We therefore recommend that the beneficial use date, which is the underlying basis for the data contained in these lines, be made more robust by utilising a more formal sign-off procedure which could confirm what is being signed off and that it is appropriate for reporting purposes. This could also add robustness to the date of beneficial use itself. Our recommendation could be executed electronically within CPMR and does not require a paper record per se, although this would also be an acceptable implementation.

6. Confidence Grades

During the audit we discussed the confidence grades assigned and the Company's rationale and concur with the Company's assessments in all cases.

Lines 1 and 12
The Company has assigned a B3 grade (5% to 10%) to Lines 1 and 12. 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 2 to 12
The Company generally apply average confidence grades for Lines 2-10 to reflect the two separate streams of information from Engineering and Procurement (EP) and Network Water Operations (NWO).

Currently, all data provided by EP for Lines 2-10 is applied a confidence grade of either A1 or A2 due to the detailed project records held and theoretical accuracy of the data. Data provided by NWO for Lines 2-10 is applied confidence grades varying from A1 to B3. Given the relative accuracy of the various data sources, we consider these confidence grades to be appropriate.

The overall grade applied to each line is generally to lower of the confident grades from the relevant data sources, unless one source dominates then the confidence grade from the dominant source is used.

We are satisfied that the B3 confidence grade applied to Lines 11 and 12 is appropriate.

Lines 13 to 17
Given the discrete data entities, the A1 grades applied to Lines 13-17 in AIR14 are considered appropriate, although the company has used A2 for AIR15.

Lines 18 and 19
The Company's confidence grades remain unchanged from last year, maintaining the policy of reporting A2 grades for all non-zero data and A1 for all zero entries. With no significant changes to the methodologies or data techniques and sources, the generally applied confidence grade of A2 is still considered reasonable given the potential for inaccuracies in estimating average flow.

Lines 20 to 23
The Company has assigned an A1 grade (0% to 1%) to Lines 20 to 23. After high level consideration of the data methodology and audit discussions, we believe that the assigned confidence grades are appropriate as it reflects the data being taken from the CPMR system directly.

7. Recommendations

The entries of Lines 2 to 17 in this table are largely a summation of values provided from Networks Water Operations (NOW) and Engineering Procurement (EP). The values are collated centrally before compilation of the commentary and table. We also recommend that the data providers (EP and Networks Water or their contractors) supply a commentary with their data which discusses trends and highlights any reasons for a-typical years

We recommend that in future years a single spreadsheet is used to collate the data from EP and Networks Water. We further recommend that this spreadsheet includes consistency checks and trends to allow year-on-year comparisons.

For Lines 20-23 we recommend that the beneficial use date, which is the underlying basis for the data contained in these lines, be made more robust by utilising a more formal sign-off procedure which could confirm what is being signed off and that it is appropriate for reporting purposes.